

The Process of Representation and Development of Knowledge
In Career Decision Making and Counselling

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THESES

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To
my husband

To
Michael and Aglaia

The Process of Representation and Development of Knowledge in Career Decision Making and Counselling

ABSTRACT:

The principal focus of the study was to understand the way people and in particular, adolescents represent and conceptualize their career decision problem. The research presented has investigated career decision making by addressing how adolescents represent the knowledge of their career problem, and how, on the basis of this representation, aid can be provided to them. The assumptions used were (a) that career decision making is a dynamic process containing the characteristics of personal decision making in real life situations; (b) it is relevant to the social context of decision implementation and to the individual's "small world" (prejudices, past experiences, future plans, expectations), which define his subjective knowledge representation of the decision situation. Greek adolescents (ages 16-20) were selected as subjects because, within Greek society and its educational system, the demand for Higher Education makes adolescents' career decision making especially stressful. The results and observations from the first phase of the study, together with the existing theoretical models of decision making and "soft-system" thinking, were used to construct a new model of the representation of the process of career decision making. The model incorporated the above assumptions and the findings that people represent their problem in more than one way and that the process of career choice is non linear. The model is proposed as being both descriptive and prescriptive, showing 'what' is essential in problem resolution and 'how' this has to be done; it was used for the formulation of a methodology which enables us (i) to address the career decision problem longitudinally; (ii) to identify, via the adolescent's discourse, his subjective way of conceptualizing and processing his career problem; and (iii) to identify how and where support can be provided to the individual during his career decision making process. The methodology was tested on actual case studies, providing findings which permitted the extension of the model to a general model for the support and counselling of career problems.

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INTRODUCTION

"It is not the things themselves that worry us
but the opinions that we have about those things"
Epictetus

The above statement refers to the two "realities" we are faced with, the world as it is and the world as we think it is. Our thoughts and opinions about the realities of the world around us form our knowledge representations of it. Each one of us sees and represents the world from his own perspective. As Jaspers says, "The world is the way it is, not the world, only our knowledge, can be true or false" (Jaspers, 1947).

To survive and function in the world we have to make decisions and choices on the basis of how the world is presented to us. Nurture and nature fasten or handicap our interpretations of the reality shaping our way of deciding. The social world, through its many manifestations at the macro level as culture and language, and at the micro level as the environment of the family, school, and work, determines the individual's perception of life, and has an impact on the way the individual conceptualizes his problem situation. The individual is seen not as passive, acted upon by the environment, but as active, interpreting actions upon decision making, and thus changing that environment. Following this argument, an individual's decision making, apart from the social constraints, is predicated on his own conceptual constraints emitted from his own 'small world'. This world includes his interpretations of past experiences as well as his explanations for the future, his plans and his prejudices (Toda, 1986; Humphreys and Berkeley, 1985). As such, the decision process is based on the way individuals perceive and represent decision situations by continuous interactions with their social environments.

The main focus of the present study is to investigate the way people and, in particular, adolescents represent their personal reality in constructing the conceptualization of their career problem in order to obtain a fruitful decision or at least one consequential to their reality.

To choose a job is to choose a way of life and to embark upon a path of personal and social adult development. The kind of person one will become, and the sort of life goals one will strive for, will be conditioned through the working role one will adopt. The most critical period for this choice is undoubtedly the adolescent period. In particular, the period between 16 to 19 years old is when the consolidation of all the past experiences and achievements are taking place, and critical choices about future scenarios have to be made. However, as mentioned above, these choices are not made in isolation. The young person is subject to "structural influences", stemming from the social and cultural group to which he belongs, his educational background and his family, and the peer group to which he relates. Moreover, there seems to be a general acknowledgment, amongst people working in the field of vocational development and counselling, that career choice is not characterized as a "point-in-time" event, but it is rather a series of decisions reviewed continuously during the individual's life span. Thus, the question "what will I become when I grow up" encompasses a series of dilemmas which have to be resolved en route to adult status. It is apparent that the investigation of the career problem, or the provision of help to the individual in his career decision making process, are not easy tasks. Such tasks become even more difficult if the rapidity of change in today's society is to be taken into consideration.

The aim of the present study is to investigate the way the adolescent represents the knowledge of his career problem, since it is my argument that, only by doing this, we can actually provide any help for him. In the process of this investigation, it soon became apparent that, in addition to making observations, there was a need for active self-participation. The methodological procedure developed and followed throughout the research, as well as the framework of analysis, is an innovative one, and a powerful tool which allows the investigator to act as a researcher and to intervene as a counsellor. It was of constant concern, especially in the initial phases of the research, that the chosen method of investigation did not come into conflict with the counsellor's role. Certain fundamental principles had to be followed throughout the project (Lewin, 1947). They were: (a) to accept both self-experience and concrete information as valid contributory elements in solving a problem, and (b) not to

undermine the student's ownership of the problem, since it is his problem which primarily needs to be resolved and not the needs of the research project.

Overall, the proposed process model of career decision making and the methodological procedure followed enabled the researcher:

- (a) to take into account the individual's subjective way of perceiving his career decision making situation and
- (b) to provide help to him.

In the next section a more detailed outline of the chapters and the organization of the thesis will be given.

Outline of the thesis

The thesis is presented in three basic parts. Part one (Conceptualization of the Career Problem: Chapters 1-3) is devoted to the theoretical background of the work and sets the grounds upon which the research took place. Part two (Career Decision Making as a Process: Chapters 4-7) is devoted to the development of the Process Model and the Methodology for Career Decision Making. Part three (Helping in Practice: Chapters 8-10) includes the decision aiding techniques used in the study, and how the Career Process model can be applied in Career Counselling.

Chapter 1 reviews the theoretical foundations on which vocational development has been conceptualized over the years. It is emphasized that career decision making is not characterized by a once and for all decision. It is, rather, a process influenced by both psychological and sociological determinants, and may undergo continual review during the individual's life span. The rest of the chapter is devoted to the conceptualization of the career problem as a personal decision making problem. In addition, four concepts particularly salient for the investigation and modelling of the career decision making problem are addressed: a) the behavioral concept of exploration, b) cognitive dissonance, c) the concept of transition, and d) the relationship between career decision making and knowledge representation. The construction of the social reality in which the individual lives and interacts and of the way he perceives this reality by his past and present experience are particularly emphasized. The research question which derives from the adolescent's inevitable dilemma: *Who I am, Where I am going, Why and How* is addressed.

It is the main argument of this thesis that the decision process is based on the subjective meaning representation of the decision situation of each decision maker.

In the light of this argument, ways of approaching the investigation and the counselling of career problems are addressed in Chapter 2. Particular emphasis is placed on the identification of theoretical frameworks that can be used as the foundation for the development of a process model of career decision making. The significance of the context of the career problem situation is addressed in the next chapter (Chapter 3), in which the contextual background of the present study is described. The Greek reality which has contributed to the experimental material used, is outlined in relation to the development of family ideas about achievement and education.

Discussion hitherto has been primarily on the theoretical background of the career decision making process. Helping the career problem in practice is initiated in Chapter 4. The part played by career counsellors, as well as the issues involved in individuals seeking career counselling, are addressed.

Chapter 4 includes the pilot work (90 students, age 16-20) for the accumulation of data (over a 2 year period) which has enabled the identification of concepts that have been used for the construction of a process model of career decision making.

Results and observations from the pilot work initiated the practical foundations for the development of a general methodology for modelling the process of career decision making. This methodology and a putative generic model of the process of career decision making became the focus of Chapter 5, with the aims of (a), tracking individuals in the process of decision making; (b) seeing how they represent their career problem; and c), identifying the rules and items which may help people to get through the career decision making process effectively.

The methodological procedure which was followed in the main study is described more explicitly in Chapter 6. It includes three steps, on the basis of the three activity areas of the proposed general process model (Scenario exploration; Option formation; Option evaluation). Data was collected from the interviews of 24 adolescents representing three age groups.

Chapter 7 deals with the actual analysis of the data which was based on how activities are structured in relation to the operations and the objectives of the general process model. The ways in which individuals handle these activities (exploration, structuring and evaluation of the alternative solutions) are evaluated and related to the intervening role of the counsellor.

Having established the core process of the general model and methodology for the process of career decision making, Chapter 8 goes on to establish techniques which can be used to support individuals in the structuring process their career problem. The findings from both the analysis of the way that people operate while proceeding to the solution of their problem, as well as the findings from the decision aiding techniques, are discussed in Chapter 9 in the context of the general process model of career decision making which is in fact established through these findings. In the same Chapter the proposal of a counselling model which incorporates the above findings in a general model for support and counselling is addressed. The last chapter discusses the overall conclusions, the models and the techniques employed, the limitations of the research, issues regarding further development of the present study, and ends with the practical implications of the findings for the process of career decision making.

Finally, through this study I hope, first, to introduce a comprehensive methodology which will help to reveal the way the adolescent can visualize and represent his career problem and, second, I hope that such methodological considerations may have practical implications in the way practitioners conceptualize the career decision making process, and in the way the educational system looks upon career development and vocational preparation.

PART ONE
THE CAREER PROBLEM

CHAPTER ONE

CONCEPTUALIZATION OF THE CAREER PROBLEM

OVERVIEW

This chapter is devoted first, to a brief review of the literature on career development and career decision making, and second, to the conceptualization of the career problem as a personal decision making problem.

The various theoretical approaches to career development and choice are discussed critically in terms of the way they approach the subject matter. The assumptions: people's vocational development and choice are due to various personality traits and aptitudes or, are merely the result of the influences of the social environment, are questioned in light of developments in social psychology. The need for a more interdisciplinary perspective towards career development and career choice is considered.

Career choice is investigated as a personal decision problem; first, in terms of the characteristics of the decision maker, i.e. cognitive features, motivational factors and coping patterns, and second, in terms of the characteristics of the decision problem, i.e. possibility of continuity, reversibility, range of effects and time pressure.

In addition, four concepts particularly relevant to the investigation and modelling of the career decision making problem are addressed: (a) the behavioral concept of exploration, which is discussed both as a normal activity engaged in by the individual during the early stages of career development, and as a phase in the process of planning and structuring of a decision; (b) cognitive dissonance in relation to the representation of the career problem; (c) the concept of transition as a discontinuity in a person's life space in relation to the changes the individual may experience during his transition from school to work or to university; and (d) the relationship between career decision making and knowledge representation. Emphasis is placed on the fact that an individual's knowledge about himself, as well as about the problems he is facing within the real world, is a construction of the social reality in which he lives and interacts, and of the way he perceives this reality by his past and present experience.

The purpose of this chapter is to show that career development and career choice are

processes characterized by a dynamic social exchange between the individual and his environment, and influenced by both the individual's personality and the intervening psychological and sociological determinants. It is also suggested that the process of career decision making has to be seen on the basis of the individual's subjective meaning representation of his career problem. Only by taking into account this representation, can the individual's career problem solving behaviour be understood and aid be given.

1.1. Approaches To Career Development And Choice

It has been widely accepted that vocational choice appears to be a major determinant of an individual's personal development and adjustment in any given society. The kind of job that the individual may choose can influence the various aspects of his life, shaping his values, attitudes and habits, as well as determining his socioeconomic identity, and even affecting his leisure time pursuits. To choose a job means choosing a way of life and a certain way of personal development. Consequently, it is to be recognised that there is no single decision which can characterize vocational or occupational choice. Rather, vocational development involves a series of decisions which demand the consideration of long and short range consequences, the estimation of the level of personal satisfaction, and the anticipation of a series of conflicts and personal problems (Super, 1957; Tiedeman and O'Hara, 1963; Becker, 1977). Thus, career development has to be seen mainly as a lifelong process of working out a synthesis between the individual's needs and his self-concept with the realities, opportunities and limitations of his world.

A review of the literature of career development reveals a number of different approaches which tend to reflect the orientation of particular disciplines and trends, the origins which stem from psychological, sociological or psycho-sociological views. These approaches will be summarized in the following subsections, by grouping them into five main categories: The Trait and factor approaches; The psychodynamic approach; The Developmental and Self-concept models; Sociological perspectives and Decision theory perspectives. Emphasis will be placed on what is required in the

exploration of this field for the development of an approach which takes into account the complexities of the career choice process, and which examines the different but yet related effects of psychological, sociological and socioeconomical influences.

1.1.1. Trait and factor approach

The first approach to matching individuals and jobs, known as "the trait and factor" approach, is carried over from the days of Franc Parsons (1909). Followers of this approach have focused primarily on the identification and measurement of personality traits and of the differences, in the behaviour of individuals. They see individuals as having different abilities and interests, and they view the optimal career choice as the process of matching these attributes with the requirements of jobs available. Research and development of this approach resulted in the establishment of various tests and measurements of intelligence and personality attributes. The two world wars contributed further to these studies because of the need for the selection and placement of recruits into the armed forces (Anastasi, 1976).

The individual's abilities, interests and needs are important variables for the study of occupational choice and development. However, the idea that test data and measurements alone can adequately predict occupational success and performance, was later challenged by a number of investigators (Thorndike and Hagen, 1959). Other variables, including the individual's self concept, his self-esteem and gender stereotypes (Ginzberg et al., 1951; Super, 1957), as well as his perceptions of social environment (Herriot, 1984), were identified as being of equal importance for the development of a career choice approach. The importance of the social environment and its interaction with the individual's personality traits is taken into account in Holland's theory (1966).

Holland's typological theory, one of the most widely studied "trait and factor" based theoretical perspectives, received increased attention by 1971. Holland identifies six broad categories of personality type - realistic, investigative, artistic, enterprising conventional and social - suggesting that people's occupational choices, as well as vocational satisfaction, stability and achievement, depend on the congruence between a person's personality and the environment in which he works. Holland's theory has

been criticized, however, like the other matching approaches, as being too static and simplistic (Weinrach, 1984; Herriot, 1984; Super & Hall, 1978; Arthur et al., 1989), and as failing to account for the process of career development over a life span (Osipow, 1973). Nevertheless, extensive research has been mounted on Holland's congruence hypothesis, and a large number of studies have supported his postulates (Spokane, 1985). Moreover, Holland's work is exemplary for its continual revision and refinements made in response to his critics (Hackett, Lent and Greenhaus, 1991). During the 1980s, more emphasis was placed on the "person-environment fit" aspects of Holland's theory. Some researchers have addressed the dynamic rather than the static nature of person-environment interactions (Spokane, 1985; Caplan, 1983, 1987; Furnham, 1987). An additional area of new research, with potentially important implications, is that of person-job fit hypothesis (congruence) within occupations and work environments (Hesketh and Shouksmith, 1986; Furnham, 1986). A very recent account of the importance of personality traits, and the role of the individual's differences in predicting and determining behaviour in the workplace, is given by Furnham (1992). More specifically, Furnham provides a critical and comprehensive review of the personality correlates in reference to vocational preference, work motivation, productivity, satisfaction, absenteeism and accidents. He also addresses the need for further research in the psychometric area which covers the ever-increasing demand for psychological and ability assessment in organizational settings.

1.1.2. Psychodynamic approach

Another theoretical perspective, based on the influence of personality on vocational choice, is that of Roe (1956). In fact, Roe's theory derives its concepts mainly from the traditional psychoanalytic approach by stressing the importance of early childhood experience and psychodynamic factors in determining occupational choice. In this approach, the basic individual variable is that of psychological needs which play a significant part in the motivation of vocational behaviour and vocational choice. In fact, in reviewing the range of parental behaviours in childrearing, Roe distinguishes six types of behaviours: Over-protection, over-demanding, emotional rejection, neglect, casual acceptance, loving acceptance. According to Roe, these six

types of parental behaviour will determine whether in their future development people will be person or non-person oriented; this in turn will influence the type of work the individual will choose. The assumption in Roe's model is that the individual who is neglected during his childhood, is likely to be non-person oriented during his adult life and thus choose a job in the fields of technology or science. The opposite will happen in person oriented people, who will choose jobs in service, business contact, art and entertainment.

Roe's theory has received insufficient research attention, presumably because of the methodological problems of collecting early childhood experience data and relating these to career choice (Hall, 1976).

1.1.3. The developmental approach

The second major approach derives its origin from the developmentalists. Rather than formulating their theory on the basis of individual differences, developmental theorists describe occupational choice as a long process involving the individual's personality growth and self-awareness. Two major career theorists, Ginzberg (Ginzberg et al., 1951) and Super (1957), are the principal contributors to the theoretical foundation of this approach.

Ginzberg has put forward the notion that occupational choice is a lengthy, largely irreversible process which involves a compromise between the individual's occupational preferences and the constraints and "realities of the world of work" (Ginzberg et al., 1951).

"..an individual never reaches the ultimate decision at a single moment in time, but through a series of decisions over a period of many years, the cumulative impact is the determining factor." (Ginzberg, 1959)

Ginzberg's theory, although it has been criticized as only applicable to an elite group (Roberts, 1975), since his initial research was conducted with middle class and educationally successful subjects, has, however, become the basis of Super's theoretical perspective (Super, 1957).

Super's theory, which is rather phenomenological in nature, has had the greatest influence on the practice of career counselling in Britain and the United States (Ball,

1984; Kidd, 1981; Herriot, 1984). Super maintains that occupational choice is a process characterized by a series of life-stages in career development. The central features of these stages are the development and the implementation of the self-concept, along with an awareness of the occupational roles available in the world of work (Super, 1980). Research evidence (especially from studies in the U.S.A.) has, until now, supported Super's theory. Some doubts concerning the effectiveness of developmental guidance interventions have been expressed by Watts and Kidd (1978), who have suggested that developmental models can make an impact, but "do not yet provide any firm empirical basis for affirming (or denying) the superiority of such programmes to the more traditional approaches". Irrespective of the above criticism, Super's research on the integration of the self-perception theory with the traditional domains of "trait-factor" theories can be considered important in social Psychology.

1.1.4. The sociological approach

The third perspective in career development places emphasis on how the wider social system defines and influences the individual's life changes and his vocational behaviour. Thus, occupational choice is generally regarded, by the followers of this approach, as a process of interaction between the aspirations and expectations of the individual and the opportunities and experiences he gets from his social environment. One of the most controversial theoretical frameworks in this area is that of Roberts (1975). In fact, Roberts (1975), whose work has challenged the activities of the career counsellors and those of helping agencies, argues that career development is dictated by the opportunity structures to which the individual is exposed in his home environment, in educational institutions and later in the labour market.

According to this theory, the opportunities, rather than the choice itself or the individual's own motivation and ambition, determine his career development and his entry into the world of work. Therefore individuals rarely choose jobs, they simply take what is available. It is in this respect that Roberts argues that career guidance intervention, however well meaning, is of marginal value. Instead, he proposes that career guidance should be a matter of adjusting the individual to the opportunity structures in which he may succeed.

Although Roberts' arguments are common to many of the sociological perspectives

on occupational choice, his work generated considerable controversy. His theory was particularly challenged by Daws (1981), who argues that the opportunity structure model only partially explains the process of work entry. Daws also argues that the need for an all-embracing theory, using both psychological and sociological explanations, is more appealing (Daws, 1977). Such a need was pointed out earlier by Blau et al. (1956), who provided a model of occupational choice that took into consideration psychological, sociological and economic variables.

In their theory, Blau et al. start with the observation that the individual's occupational entry is not determined solely by his preferences, but that it is the result of the interactions between the process of vocational choice and occupational selection. Like Super and Ginzberg, Blau et al. argue that occupational choice is a developmental process which extends over many years and involves a compromise between the individual's hierarchy of preferences and his hierarchy of expectations. In addition, the social experiences the individual gains by interacting with other people, play, according to Blau, an essential part in his career development. These experiences, together with the individual's personality characteristics and qualifications, and the prevailing economic conditions and employment policies, determine the decision of the selectors and his recruitment (Blau et al., 1956).

Actually Blau et al. can be considered as pioneers in the conception of vocational choice as an interdisciplinary subject matter, and it is surprising that it has not attracted more research interest. As Hall (1976) and Ball (1984) have pointed out, research in the field has concentrated either on factors influencing individual choice or on those concerning the selection processes, but not both. Perhaps because of the methodological difficulties involved in the examination of the interaction of these factors, the interplay between the choice process and the selection process has not, as of yet, been investigated.

A major new theoretical development in the 1970s was the introduction of social learning theory models of career decision making (Krumboltz, Mitchell and Jones, 1976, Betz and Hackett, 1981). Krumboltz et al. (1976) have utilised social learning theory in their attempt to identify how genetic endowments, environmental conditions

and learning experiences influence the development of preferences skills and career decision making. Although their theory was criticised for failing to generate subsequent empirical tests (Osipow, 1983), it is considered as an important contribution to career development (Osipow, 1987).

1.1.5. Career choice in decision theory

Since the 1960s, a number of vocational theorists have put the emphasis of career development on the choice process itself (Super, 1960; Tyler, 1961; Jepsen and Dilley, 1974; Beach and Mitchell, 1978). It has been suggested that the process of career development could be understood better if concepts from psychological decision theory could be employed. Early considerations about how the fundamental decision concepts could be used for the understanding of vocational development, can be found in the works of Blau et al. (1956), Bross (1953), Super (1960), and Tyler (1961). Although no consistent approach to career decision making has been developed in the literature on decision making, the use of various decision models in the conceptualization of the career choice process has become very common.

In this thesis the decision theory approach to vocational choice is considered to offer a useful framework for the analysis of vocational development and counselling. Encouragement for adopting this approach has been derived from Jespen's suggestions that "...when treated as a conceptual framework, rather than as a formal theory, psychological decision making appears to have promise in vocational psychology" (Jespen and Dilley, 1974; Hesketh, 1982).

The emphasis on the models originating from the decision theory has been placed mainly on the choice process itself. How should people, and how do people, choose an occupation? The central concern appears to be the individual's perceptions of the outcomes of a particular choice and the importance of these outcomes to him or her. Furthermore, vocational decision making models have to take into account the process of vocational guidance and counselling, trying to give instructions, or presenting a normative way of how to look, investigate and help the career problem.

1.1.6. Towards an integration

The above overview of the main theoretical perspectives of career development, indicates that, despite the diversity of available approaches, career choice is considered as a purposive rather than a random phenomenon, representing the culmination of a process in which both sociological and psychological factors are taken into consideration. It is not surprising, therefore, that the need for a more interdisciplinary approach to occupational choice has been noticed in recent reviews and speculations in this field (Osipow, 1987; Arthur et al., 1989). This need becomes even more prominent if we consider that the career problem is a real world problem characterized by a dynamic social exchange between the individual and his environment (Herriot, 1984). This need is also implied by Sonnenfeld & Kotter (1982), who have stated that the habit of career researchers of working within the traditional view points "...retards the maturation of career theory".

More recently, it has been widely argued that emphasis placed only on psychology and sociology is not enough to cover the range of social science perspectives which can contribute to the understanding of careers and career development (Van Maanen, 1977; Mitroff and Kilman, 1978; Sonnenfeld and Kotter, 1982). For example, either the political science or the economic perspective can also affect the individual's career development and choice, regardless of his disposition. Such considerations can lead to a more multi-disciplinary way of studying the process of career development. Arthur et al. (1989), have suggested that, by engaging the diversity of social science perspectives in the study of careers, the concept of career could provide "...an excellent nexus for transdisciplinary debate". In his review on career counselling Osipow (1987) has identified a number of recent researchers in the field such as Astin, Farmer, and Fassinger, who have advanced more multi-dimensional and sociopsychological models of occupational choice. In their models they have taken into consideration both personal characteristics and social environmental forces and variables (Astin, 1984; Farmer, 1985; Fassinger, 1985). Arthur et al. (1989), in their attempt to move toward a multidisciplinary career theory, have differentiated two guiding principles in career theory which justify the more transdisciplinary study of people at work. They propose, firstly, that the career as a concept should encourage

theorists to examine individuals as well as institutions and the relationships between them; and, secondly, that it should encourage theorists to consider "emergence and relativity" by referring to the way people emerge, evolve and experience space over time. According to them, the study of careers should encompass the study of the individual, and the changes that appear in institutions and organizations (Arthur et al, 1989).

Looking at the vocational decision making models, it would appear that most of them rely on the assumption that clients can successfully make career decisions by themselves. Therefore, it has become essential that emphasis in decision aid should be placed upon the importance of awareness in making decisions wisely, rather than making wise decisions (Katz, 1969; Ball, 1984). However, for this to be possible, any career decision making model, like any other career decision theoretical framework, has to be part of a more holistic perspective in the careers advisory work. Hays and Hopson (1972) and Law and Watts (1977) amongst others, have noticed this trend and have classified the careers advisor's work under four headings:

1. Increasing client's knowledge of self.
2. Increasing client's knowledge of the world.
3. Increasing client's knowledge of decision-making skills.
4. Increasing client's capacity to cope with transition.

The above necessitate, firstly, that any career decision making model should be formulated under the notion that the individual is not acting alone and in isolation from the outside world but that he is part of it; secondly, that a more interdisciplinary way of looking at the career problem is needed rather than adopting any available theoretical perspective. Such an approach may be able to give a wider scope in the exploration of the career decision making process.

The continuation and further development of existing theories will probably be the focus of career researchers in the next decade, with the general aim of answering the question posed by Wallis (1978) when he refers to the matching and developmental models: "Can the models be reconciled or even combined?" "My own feeling", he continues, "is that there need be no incompatibility in principle, and that for eventual practice both approaches are necessary". Indeed, theory and practice have indicated that a joint approach to the subject will be necessary for further research and a more

effective solution to the career problem. The approach to occupational choice and development will have to be integrated with the organizational and social sciences, without losing its identity.

In the present study effort was made to go beyond offering simply a general certification and reconciliation of the approaches and trends reviewed above. Rather, as will also be discussed in Chapter 2, the intention is to support the argument that, for a real world problem to be investigated, new ideas and methods have to be established based on the individual's subjective way of perceiving, representing and coping with his decision situation. As Gelatt (1989) states, "...reality is a subjective creation in personal frame of reference". Thus, any new decision strategies have to be flexible and represent the individual's perspective, while at the same time they should be able capture the change, the uncertainty, and the rationality or irrationality of real life problem situations. Methodologies of this kind, which relate to the problem under investigation, and not those which give "normative" solutions of how a good decision has to be made, may promote a more holistic way of investigating the career problem.

1.1.7. Career choice as a process - The definition of the career concept

A general acknowledgement, made in the above mentioned theoretical perspectives, is that career decision making is not characterized by a once and for all decision. It is, rather, a process influenced by both psychological and sociological determinants, and may undergo continual review during the individual's life span. This acknowledgment is particularly prominent in the definitions given by several theorists of the concept of career. The word career, according to Super, "...always to middle class people had an aura of adventure about it, not only to those who make a career of the study of careers, but also to ordinary individuals in status populari in the work force, in the street and in the home" (Super and Hall, 1978). Actually, the above quote denotes that the individual, throughout his working life, passes through various experiences and adventures which mark his life-span progress. This is emphasized

further in Super's subsequent definition of career as "the combination and sequence of roles played by a person during the course of his lifetime" (Super, 1980). Similarly, Arthur and his co-workers define career as "the evolving sequence of a person's work experiences over time " (Arthur et al, 1989).

A common feature, implied in the above definitions, is the acknowledgement of a social exchange process between the individual and his environment. In this process, the individual, through the various roles he undertakes in his home and the organization or institution which provides work for him, interacts with his environment in a constantly changing and developing relationship.

In addition, it has been suggested that, a career has to be conceptualized as a commitment to more than one role or job, and to be characterized by a steady advancement and promotion over one's life time (Ball, 1984; Super, 1980). Watts takes this even further, and suggests that, in the currently increasing labour force, the vertical model of career development, where one is promoted upwards in the same position in an institution or organization, is inadequate to explain the career process and development (Watts, 1981). Instead, he suggests that lateral and horizontal career changes will be the characteristics of this process.

Taking the above into consideration, the definition used for the term career in this work, is "the person's course or progress through his life time work experiences".

1.2. Career Decision As A Personal Decision Problem

Are there any salient characteristics which determine career decision making as a personal decision problem in which decision theory can be of any help?

What particularly characterizes career decision making as a personal decision problem is the fact that it has an ultimate effect on the individual's future and on his personal and social life. Career decision making, in its actualization, defines and shapes major aspects of the individual's social existence, i.e. status, life-style, friendships, attitudes and opinions (Super, 1957; Mitchell & Beach, 1978), as well as his psychological existence, his emotional development and his coping patterns (Janis & Mann, 1977). Jungermann suggests that the essential characteristic of

personal decisions is that the decision maker himself has to bear the consequences of the action taken. Jungermann contrasts this with the organizational decision making situations, studied mainly within decision research, which primarily affect other people (Jungermann, 1980). However, is this distinction clear with regard to the career decision making process? Mitchell & Beach suggest that occupational choice is not "purely personal", since it is equally important to society (Beach & Mitchell, 1987). The same view is supported by recent theorists of career choice and development (Super, 1980; Herriot, 1984; Arthur et al., 1989), who pay special attention to the process of social exchange and the interdependence between the individual and the organization or the institution which provides work for the individual. Because of this interdependence, the individual's choice affects the organization which recruits him, the individual himself, his environment as well as the environment of the organization.

The following sections address some particular characteristics, concerning either the decision maker or the decision problem, through which the career problem can be conceptualized as a personal decision making problem to which decision theory can be applied.

1.2.1. Characteristics of the decision maker

According to Jungermann (1980), people who are facing a decision making problem appear most often to share some general characteristics which determine the outcome of their decision. These characteristics can be divided into three categories :

- (1) cognitive features
- (2) motivational features and
- (3) coping patterns.

These will be briefly reviewed below in reference to the career problem.

1.2.1.2. Cognitive features

Cognitive features like memory, attention, information processing, imagination and others play a role in the individual's overall awareness of the problem structure and

its solution (Simon, 1976; Miller and Star, 1967; Taylor, 1965). They may also interfere in the use of heuristics by people (Tversky and Kahnemann, 1982) and may lead to biased assessment from a normative standpoint. Miller and Starr, for example, have noticed that the individual, in his attempts to obtain sufficient knowledge about the alternative solutions and outcomes, could be overwhelmed by "information inundation, which can be quite as debilitating as information scarcity" (Miller and Star, 1967). The world, says Simon, is peopled by creatures "...of bounded or limited rationality" who constantly rely upon gross simplifications when dealing with complex problems" (Simon, 1976).

An increasing interest in the investigation of cognitive variables has also been expressed in the research of career choice and development (Osipow, 1987). For example, Bodden (1970) and Bodden & Klein (1973), have found that individuals high in cognitive complexity were more likely to succeed in the occupation they preferred.

Cesari et al. (1984), in their investigations on decided versus undecided students, have found that the cognitive complexity* variable had an effect on the kind of information received by the students. In addition, Herriot (1984), in the analysis of data from the Career Maturity Inventory Test, has shown that the more complex individuals demonstrate more "mature" attitudes and competence. Cognitive complexity has also been used as a predictor in studies investigating sex-role orientation and occupational choice. For example, the studies of Harren et al. (1978) and Lawlis and Crawford (1975) have indicated that cognitive complexity predicted women's choice of a male dominated role. In particular, in this study, it was found that women higher in cognitive complexity were more capable of perceiving a wider variety of roles, and thus they were less restricted in choosing female oriented vocational roles.

* [Cognitive complexity refers to an information-processing variable apparently unrelated to intelligence (Crockett, 1965, Bodden, 1970). According to Bierri, cognitively complex individuals have a greater number of constructs or meaning categories available for processing stimulus-information input than do cognitively simple individuals (Bodden, 1970)]

Studies have also investigated the relation of the individual's information processing capabilities to his vocational maturation and his ability to explore possible alternative career solutions and make plans for his future. In particular, concerning information processing, Goodstein (1965) has found that if the individual lacks the proper information about himself and the world of work, he is vocationally immature, fails to make an occupational choice and thus experiences anxiety. Taylor (1985), from his investigations on school-to-work transition, has suggested that the mere accumulation of information about careers is insufficient to help a student in his transition from school to work, whereas occupational knowledge and crystallization of vocational self-concept would be more effective.

Occupational information in relation to cognitive differentiation (considered as the ability to differentiate among job titles of 12 constructs), was also investigated by Waas (1984). His study has indicated that students who actively seek information increase their ability to differentiate among potential careers in comparison to those who passively receive objective information. Finally, from their research on cognitive structures and vocational development, Neimeyer et al. (1985) have found that career exploration and planning are a function of cognitive structures.

It can be assumed that cognitive aspects affect the individual's career decision making as they affect other personal decision situations. People vary in their memory, attention, information processing capabilities, imagination, or in their cognitive complexity in general, which determine how they perceive their career problem and how they try to solve it.

1.2.1.3. Motivational aspects

The second common characteristic identified in decision makers facing personal decision problems, refers to the motivational aspects. Motivational aspects, in this case, differentiate decision makers in terms of their ego-involvement in the decision situation and in terms of the way they handle the problem (Jungermann, 1980). Thus, although a personal decision may have an effect on the individual's family or on his wider social context, the ultimate consideration goal of the decision maker is

basically his private satisfaction.

In career decision making, motivation has been studied in terms of job satisfaction and the concepts of interest, of needs and of values. In studies supporting the matching approach to career development especially, it has been found that congruence between the person's interests (his preferences for people, events or activities) and his job requirements is positively related to job satisfaction and job attainment (Kuder, 1966; Holland, 1973). Additionally, Holland (1985) has postulated that "...people search for [work] environments that allow them to exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles".

However, in sharp contrast to Holland and those who argue that motives and needs precede an individual's career (Holland, 1973; Super, 1957), there is the claim from the "Chicago group" of sociologists (Hughes, 1958; Becker & Straus, 1956; Barley, 1989), that careers actually "prefigured motives" and thus career specific motives serve the institution as they serve the individual. Barley (1989), has defined motives as "collectively shared social constructions, employed in the service of accounts, that enable persons to orient to what might otherwise be mistaken for the purely objective circumstances of their careers". It would appear, therefore, that a distinction has to be made between motives coming from organizations to attract employees in order to achieve the ultimate success of the organization, and the individual's own motives. The latter stem from various urges, drives and instincts, and are "...pulled by incentives, goals, purposes and values" (Cofer and Appley, 1964), and find their realization in the world of work.

Concerning values, a direct and indirect relationship has been found between organizational efficiency and personal work values (Drake et al., 1973; Vechiotti and Korn, 1980). Considerable research has been focused on occupational reward values (Davis, 1965; Kohn, 1969; Belcher and Atchinson, 1976), as well as on the relationship between work values, sex differences (Marshall, 1985; Lindsay and Knox, 1984) and occupational choice and attainment. In the case of reward values, it was found, for example, that the importance of values in the process of

occupational choice is greater at upper than lower socioeconomic levels (Lindsey & Knox, 1984). In a recent study regarding the occupational demands and the work values of the educated youth in Greece, it was found that work rewards valued by adolescents were related to their decisions for their occupational futures (Karmas et al., 1986).

1.2.1.4. Coping patterns

Coping patterns refer to the way individuals cope with the demands and requirements of a decision problem or a decision situation (Jungermann, 1980). Lazarus and Folkman (1984) have defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person". When people are faced with major personal decisions, they may employ a number of strategies which may not always help so much in deciding effectively but only in coping with the stressful situation. Usually, related research views "coping" as an important process which helps to explain the effects of stressful situations on individuals (Janis and Mann, 1977; Latack, 1989).

Janis & Mann (1977), for example, have proposed a model of decision making derived mainly from Janis's earlier studies on how people face and cope with psychological stress. They have suggested that career decision making can also produce considerable stress and emotional upheaval. This stress can have the same consequences for the decision maker as the stress generated by "the threat of disasters imperiling physical survival". During that stressful situation, the individual may employ a strategy which may satisfy him rather than "maximize" the outcome (Simon, 1976); that is, he looks for a set of actions which may not lead to the best solution, but which are "good enough" to satisfy a minimal set of requirements: i.e. satisfactory pay, good chance for advancement, adequate working conditions, etc. The "satisfying" strategy involves more of a superficial kind of search for information and less cognitive work input. Thus, the individual is not inclined to collect information about all the complicated factors that might affect the outcome of his choice, or to estimate probabilities, or to work out various preferences for many

different alternatives.

In particular, Janis and Mann (1977) in their model of conflict and choice, have distinguished five patterns of coping behaviour which may affect the quality of the individual's decision making: (1) unconflicted inertia; (2) unconflicted change to a new course of action; (3) defensive avoidance; (4) hypervigilance; (5) vigilance. The pattern of vigilance, usually results in thorough and unbiased information search, which leads to high quality decision making and adaptive changes to the individual's problematic situation. The other four patterns are only occasionally adaptive in saving time, effort, and emotional upheaval, especially for minor decisions that do not have serious consequences. More often, however, when the individual is in front of decisions which may have serious consequences for himself or his significant others, these coping patterns result in defective decision making. As for example, under a stressful situation, the person may employ a number of defence mechanisms (i.e. repression, reaction formation and denial) which may alleviate, at least temporarily, the stress generated by the decision task. Alternatively, he may minimize the negative aspects which he feels would enlarge his anxiety in the transition from one situation to another. Studies on this, however, have indicated that failure to consider the negative aspects of the alternative solutions of a decision problem may have measurable effects upon the incidence of post-decision stress or on job satisfaction and adjustment to work (Janis and Mann, 1977).

The pattern of vigilance, on the other hand, as it was said, is characterized by careful search and appraisal and results in high quality decision making. According to Janis and Mann vigilance is specified by the seven "ideal" procedural criteria of Vigilant Information Processing followed by the decision maker to the best of his ability and within his information processing capabilities: i.e (1) appraising of a wide range of alternative courses of action; (2) surveying the full range of objectives and the values implicated by the choice; (3) weighting the costs and risks of negative and positive consequences; (4) searching for new information for further evaluation of the alternatives; (5) taking into account of any new information or expert judgment even when this does not support the most preferable course of action; (6) reexamination of positive and negative consequences of all known alternatives, including those

originally regarded as unacceptable; (7) making detailed provisions and contingency plans for the implementation and execution of the chosen course of action.

It is apparent from the above that both cognitive features and motivational aspects, as personal characteristics, are interrelated with the coping patterns of the decision maker. London and Stumpf (1986), in investigating career motivation, have argued that age, as well as the level of career motivation, play a role in explaining stress and are important determinants of coping strategies. Coping patterns in career decision making research have been also investigated in terms of decision making styles towards the career decision. Thus Jepsen (1974), in his analysis of adolescent behaviour in career decision making, has classified a number of types of decision-making strategies which are related to personality variables and the context of the problem. Two of the most prominent types are: (i) "the active planners", referring to those organizing their career problem logically (in fact following vigilant information processing), and (ii) the "singular fatalists", referring to those who seek a limited amount of information and list a small number of action plans. A similar differentiation has been made by Harren et al. (1978), who have developed a questionnaire as a measure of three career decision styles, namely "rational, intuitive and depended" (for Harren's model see Chapter 2, 2.4.1.)

1.2.2. Characteristics of the personal decision problem

In personal decision making, apart from what characterizes the decision maker, the characteristics of the decision problem must also be taken into account. From the wide list of these characteristics, Jungermann (1980) has specified four variables as particularly salient for personal decision problems:

- (1) possibility of continuity
- (2) reversibility
- (3) range of effects and,
- (4) time pressure

These are reviewed below in reference to the career problem.

1.2.2.1. Possibility of continuity

In the possibility of continuity, two kinds of situation can be identified. One of those situations addresses problems in which continuity is possible since there is the alternative option of maintaining the status quo. The other kind distinguishes problems where a change cannot be avoided, i.e. discontinuity is inevitable. With reference to the former, an example would be when people are faced with the decision problem of whether or not to change their job when their first job is still available. The latter kind of situation could apply in the case of the student when he is faced with a career decision. In this case, the adolescent, having completed his secondary education, has to change his present state of affairs or his present roles (Super, 1980) to those of the world of work, or to further education which will be necessary for his future career. The change, therefore, is necessary, and it is impossible to avoid making this change. Thus, career decisions during adolescence are marked by discontinuity and the transition and change from one state to another (Herriot, 1984).

There is usually disagreement between career theorists as to whether more emphasis should be placed on continuity and stability in career development or on discontinuity and change (Bailyn, 1989). Tilden (1978), from his investigations on vocational maturity in college students, has advanced the notion that career development is a discontinuous process. Tilden's theory, then, is in agreement with the findings of Ginzberg (1951) and Super (1960), who have provided evidence that the process of career development may be discontinuous in the post high school years.

On the whole, however, research into career development has emphasized stability and continuity. Even in the developmental models, which are particularly concerned with the change and the discontinuity variable, the identification of the requirements of particular stages of development requires that emphasis should be placed more on stability and continuity than on change (a review is given by Bailyn, 1989). Bailyn has argued that such theories "reinforce processes that lead more to rigidity than to flexibility, since we know that to fit at any given stage may make it more difficult to adapt to a subsequent stage". Bailyn, instead, has placed importance on research on transitions and has shifted the focus towards the investigation of the career problem

as a real world problem emerging in an ever flexible and rapidly changing world (Bailyn, 1989). Thus, if we take the career problem as a real world problem, where there is a social exchange process between the individual and his work environment, then it will be necessary to take into account the discontinuity variable.

1.2.2.2. Reversibility

Reversibility refers to whether or not the consequences of a decision can be reversed after the decision has been taken. There are some decisions which can easily be reversed, such as for example, buying something which can be exchanged. Some other decisions (for example, sterilization), however, are impossible to reverse (Jungermann, 1980; Berkeley and Humphreys, 1982).

The reversibility of a decision has an impact on predecisional and postdecisional stress. It is related to the degree of commitment the individual feels towards the decision taken, either in terms of the investment he has put in or in terms of the social approval or disapproval he is expecting after action is taken (Janis and Mann, 1977). There is evidence, for example, that, if the person believes that his decision is of low social importance and can easily be reversed, then he terminates his predecisional conflict very rapidly, and becomes less vigilant about the possible sources of post-decisional regret (Mann and Taylor, 1970). The degree of the reversibility of a decision also affects the type of information the individual seeks with regard to both the chosen and the rejected alternatives. Lowe and Steiner (1968), for example, have found that non-supportive as well as supportive information can be perceived as useful when a decision is to be reversed.

Career decisions are often perceived as irreversible, particularly by young adolescents (but this can apply in other age groups too). Mitchell and Beach (1976) have suggested that the importance of a career decision is partly a function of its irreversibility: "Once certain paths are taken with respect to commitment, training and experience, it becomes increasingly difficult to change completely or even mildly revise the course of things. This, together with the personal responsibilities that accrue with age and family, makes a shift in occupation formidable" (Mitchell and

Beach, 1976).

By deciding about his career choice, the adolescent commits himself to a certain path of study or to certain activities into which he has to put a lot of effort, and to invest personal involvement, time and money. He may even deprive himself of entertainment or other activities he likes, or even the circle of friends or groups that he would like to be with. As a result, consideration of the personal and material cost of changing the path he has initially followed (even if he suddenly realizes that he does not like this path or that it does not fit his personality) creates a dilemma which can become unbearable. As Hayes & Hopson (1972) suggest, "...experience cannot be undone, particularly where long and expensive training is necessary, and the psychological and economic cost of reversing occupational decisions at a later date can be prohibitive". According to Weick and Berlinger (1989), the stress which is created by this irreversibility can be alleviated only when the career decision is seen not as an isolated personal event but as a process in a constantly changing environment where discontinuity and change are seen as parts of this process (Herriot, 1984).

1.2.2.3. Range of effects

Range of effects is the variable which represents the degree to which the alternative options will affect the future of the decision maker. The decision to train oneself for a certain occupation is marked by a long range of effects since it will strongly influence the individual's future. According to Jungermann, even decisions with apparently only a short-range of effects can turn out to have severe long range effects, as, for example, in the case of a person who has stopped smoking and decides to have just one cigarette. The range of effects variable can be formally represented by the decision tree, "by the definition of the client's time horizon and the ramifications of the tree" (Jungermann, 1980). Apparently, this variable is highly connected to the range of consequences and changes the individual is prepared to anticipate after a decision or an action. Jepsen and Dilley (1974), referring to vocational behaviours described in vocational decision models, have described four decision types according to the effects of long or short-range changes following a career choice:

1. "Decisions that affect long-range changes and are guided by considerable

information and understanding". According to Jepsen and Dilley these decisions are rarely observed in vocational behaviour; the result from the old study by McArthur (1954), of Harvard undergraduates, provides the only exception because students were found to be highly predictable occupational decision makers.

2. "Decisions that affect long-range changes but are based on limited information".

Such decisions, for example, which require a lesser amount of information and of computational skill, may precede the setting of career goals that function as "levels of aspiration" in short term decisions (Jepsen and Dilley, 1974).

3. "Decisions that affect short-range changes and are based on minimal information. According to Jepsen and Dilley, this type of decision refers to the day-to-day decisions that make up a career which assume short-range changes and relatively low understanding of the problem.

4. "Decisions that affect short-range changes and are based on considerable information and high understanding". Decisions of this type involve elaborate and detailed information to accomplish a more immediate change as, for example, "technical" decisions such as college choices where sufficient data is available (Jepsen and Dilley, 1974). This type of decisions has been considered in most vocational decision models.

1.2.2.4. Time pressure

Time pressure can vary from one problem to another; it might depend on the actual or perceived time available or on the complexity of the decision to be made. According to Jungermann (1980), in contrast to the other variables, this variable cannot be mapped into the formal model of a decision tree (which consists of events and outcomes), since it represents a condition of the situation in which the decision maker has to make his choice.

In studies, concerning the career decision making problem, the time perspective variable is usually studied in relation to the career maturity factor. In these studies, the time variable was found to be related to planfulness as well as to the degree of indecision that students express (Super and Overstreet, 1968; Jepsen, 1974).

As Super and Hall (1978) have pointed out, the time perspective variable clearly emerges as a prime variable in career decision making and in vocational maturity.

The availability of sufficient time to search for and evaluate job alternatives appears to play an important role in the regret the individual might feel after he has committed himself to a job choice (Janis and Mann, 1977). In general, it would appear that the time pressure variable in career choice has not been given sufficient attention in the field of career choice research, even though career counsellors are particularly aware of it, especially concerning the "right time" for vocational counselling to start.

1.2.3. Conclusions in respect of ways of conceptualizing the career decision problem

The variables outlined in the above discussion, as characterising both the decision maker and the personal decision problem, constitute a good framework for the investigation of personal decision problems and of the possible aids which could be given to them. When dealing with the career problem we are dealing with a personal decision problem in which people vary in their cognitive and motivational aspects, their coping patterns (Jungermann, 1980; Sieber, 1974), as well as in the degree and the type of uncertainties they face (Berkeley and Humphreys, 1982; Hogarth, Michand & Merry, 1980). According to Berkeley and Humphreys (1982), real world problems start off undefined since, in the beginning, there is considerable uncertainty about what is involved in them and about how one will represent them. "All real decisions", adds Edwards (1984), "are made under uncertainty". Faced with a career decision the adolescent is uncertain about the outcome of his decision, - "...am I going to succeed in the subject I have chosen?" - as well as about his feelings - "Will I be really happy in the future with this career?" Moreover, he may be uncertain about the various possibilities that may appear later and which he may or may not be able, at present, to incorporate into his thinking about future career scenarios. Or he may even be uncertain about his potential ability to cope with the difficulties which may materialize before he can complete his goal.

Taking into consideration that the career decision problem fits into the framework of decision making, and that for the adolescent this problem starts undefined, what remains to be investigated is: How does the individual react when faced with his career problem and its uncertainties? How does he conceptualize his problem and what are the changes which are involved in this process? Giving an answer to these questions may enable the counsellor to prepare and support the adolescent better in taking and implementing his career decisions.

The following sections address the variables of exploration, cognitive dissonance, transition and knowledge representation with regard to the career decision making problem. The purpose of this discussion is to show the importance of these variables in the process of career decision making and the need to take them into consideration in an attempt to discover a model for the career decision making process.

1.3. Exploration And Career Decision Making

Exploration as a way of approaching a problem has been suggested as a necessary condition for the structuring and implementation of a decision problem (Humphreys, 1986). According to Jordaan (1963), career exploration is considered to be a problem solving behaviour with the aim of eliciting information about an individual's environment, making him more able to choose, to prepare, to enter and to adjust or make progress in an occupation.

Exploration has been conceptualized in two different ways. Originally, developmentalists considered exploration as a normal activity during the early stages of career development (Ginzberg et al., 1951; Super, 1957). During adolescence, the individual is finding out through exploration about adult roles by trying them either in real life or in fantasy. Later on, Super and Hall (1978) saw exploration as a continuous process engaged in by the individual at any new stage of life during any new situations. Decision theorists, on the other hand, have considered exploration as a phase in the process of the planning and structuring of a decision in which the

various alternatives are generated and elaborated upon (Jepsen and Dilley, 1974).

In fact, exploration has received more theoretical attention from career decision theorists than from developmental theorists (Tiedeman, 1961; Gelatt, 1962). Super and Hall (1978), however, have argued that, in the formal decision models, exploration is usually viewed as the gathering of information needed for making decisions and, therefore, it is not analyzed as a process. Instead, more attention is given to other steps involving seeking and weighting information, testing plans and revising them, if necessary. These theorists have suggested that since exploration is preparatory to planning, developmentalists interested in exploration, and industrial and organizational psychologists interested in planning, have to work together for their mutual benefit.

It has become apparent that career exploration, with regard to research and clarification of its nature (Grotevant and Cooper, 1986), is considered to be an important process in the individual's career development (Harren, 1979; Janis and Mann, 1977). It is also considered to be a major developmental task for the crystallization and specification of vocational goals (Stumpf et al., 1983; Blustein et al., 1989). The individual, during his exploration, elicits information about himself and his environment and emerges from this experience with a more accurate understanding of himself and, therefore, is able to make choices more congruent to himself (Grotevant and Cooper, 1986). Also, research evidence indicates that the individual explores himself and the environment in a variety of ways (Stumpf et al., 1983), and that exploration occurs at all stages of development (Phillips, 1982).

Exploratory behaviour is also closely related to the development of the individual's identity. Blustein et al. (1989) have suggested that the nature and the extent of career exploration affects, and is affected by, the identity formation process. In fact, both career developmentalists and identity formation theorists, like Erikson (Erikson, 1968), have suggested that the exploratory activity of late adolescents reflects the individual's need for a clarification of his self-concept and identity (Grotevant & Cooper, 1988; Jordan, 1963; Super, 1980). Herriot (1984) has defined exploration

as the process of anticipatory socialization during which the individual has the opportunity, through social exchange, to experience the world of work, to explore himself and his environment, and thus to adapt his self-concept to the new role that the work imposes on him. Similarly, Arthur and Kram (1989) have defined "exploring" as the dominant individual need of the early career years when the young adult is faced with the major tasks of developing job competence and an initial occupational identity.

Berkeley and Humphreys (1982), by addressing the decision making process from a more micro level of analysis, have conceptualized exploration as a way of going beyond what is given. In particular, they have postulated that in any decision making or judgement process, the instructions given are never self contained:

"The instructions thus invite one to explore beyond what is given. This exploration may involve searching for ideas relevant in evaluating how one feels about consequences of offered options or it may involve searching for a previously learned statistical principle which would provide the needed link to make the demanded inference" (Berkeley & Humphreys, 1982).

This exploration, according to Berkeley and Humphreys, varies from individual to individual, since people hold different roles (Super, 1980), explore different "small worlds", and are influenced by different pieces of information (Wagenaar & Keren, 1984) in order to form a judgment. The concept of "small world" (Toda, 1976; Savage, 1972) refers to the area which defines "the bounds of the material the person is prepared to retrieve and attempt to structure in handling the judgmental problem" (Humphreys, 1986). Furthermore, according to Humphreys & Berkeley (1987), only by looking at what the individual explores can we infer the actual content and bounds of his small world, and provide any help that may be needed.

It can be concluded, therefore, that exploration is vital in order for the individual to be able to conceptualize his problem and proceed towards its solution.

1.4. Cognitive Dissonance And Career Decision Making

It has been established above that through exploration the individual clarifies and establishes the various alternative solutions proposed to him, or even rationalizes and revises his previous thoughts and behaviour. What happens, however, if the individual, having chosen a course of action, realizes that what he believed to be correct appears to be false? Does he change his attitudes or even his vocational preferences?

In a very early experiment, Rosenberg (1965), in his investigations of value changes over occupational demand, found that individuals tended to follow occupational choices which required prior specialization. This did not happen in cases where specialization was not needed. Herriot (1984) has explained those findings in terms of cognitive dissonance behaviour as follows: a chosen course of action, that requires investment of time and effort towards specialization, is more definite for the individual; therefore, all his beliefs and values have to be consonant with his choice in order to avoid cognitive dissonance.

Cognitive dissonance is an area which has attracted a wide range of experimental research (Brehm and Cohen, 1962; Rosenberg, 1965; Mann and Abeles, 1970) - some quite controversial - since the time that Leon Festinger (1957, 1964) first postulated that:

"...the human organism tries to establish internal harmony, consistency, or congruity among his opinions, attitudes, knowledge, and values. That is, there is a drive toward consonance among cognitions" (Festinger, 1964).

This statement has been further explained by Bem (1967) who said that, if a person holds two inconsistent cognitions, he experiences "an aversive motivational state called cognitive dissonance which he will seek to remove, among other ways, by altering one of the two 'dissonant' cognitions".

In the literature there have been several reports, like those of Korman (1966, 1967, 1969; Hilton, 1962; Hilton et al., 1962), as well as of Hershenson & Rothe (1966), which have placed emphasis on the role of cognitive dissonance in career decision making. On the basis of his investigations on the moderating effect of self-esteem in

the relationship between self-congruence and college major choice, Korman (1966) has proposed a balance theory which is an extension of the earlier work of Festinger (1957). He has postulated that the individual who is faced with a career choice, will engage in those behaviour roles which will maximize his sense of cognitive balance and consistency. Korman believes that an individual with high self-esteem, chooses the vocational roles which most satisfy and fulfil his needs so that he maintains cognitive balance. Individuals with low self-esteem, on the other hand, have a self-cognition of incompetence and tend to choose deliberately occupations which they perceive as not meeting their needs because it enables them to maintain cognitive balance.

Korman's model is in considerable disagreement with the cognitive-perceptual approach of Super (Super et al., 1963). Herriot (1984) has suggested that there is no evidence to support Korman's postulation that students with low self-esteem choose an occupation which is contrary to their needs in order to avoid cognitive dissonance (Barrett & Tinsley, 1977; Dipboye, 1977). Festinger (1964), in his reference to the situations which imply the existence of cognitive dissonance, has suggested that "...dissonance almost always exists after a decision has been made between two or more alternatives". The fact that the selected alternative always has some negative features, while the rejected one has some positive ones, brings inconsistency and results in cognitive restructuring in the form of rationalization or bolstering about the decision taken. The same happens when the individual has committed himself to a choice by announcing his decision to others, and then bolsters the attractiveness of the chosen alternative in order to reduce dissonance.

However, Janis & Mann (1977), in their conflict model of decision making, regard bolstering as one form of defensive avoidance which is "motivated primarily by a need to ward off stress of postdecisional conflict rather than by an invariable tendency to reduce cognitive dissonance". Walster (1964), on the basis of data obtained from his experiments dealing with evaluations of alternative job choices in vital career decisions, has also suggested that there is a measurable period of spontaneous regret which goes counter to bolstering or dissonance reaction. In fact, Walster's experiment had a considerable influence on the views of a number of social

psychologists concerning cognitive dissonance theory, and different interpretations have been given of her findings (Brehm, 1968; Janis & Mann, 1977). Festinger (1964), in his interpretation of Walster's experiments, has suggested that a brief period of post decisional regret may occur prior to dissonance reduction during the postdecisional period. Concerning post-decisional regret, Janis and Mann (1977), in contrast to Festinger, believe that "neither regret nor bolstering" will occur following commitment if certain conditions, that make for persisting decisional conflict, are fulfilled.

Irrespective of the intrinsic differences of the various theorists on cognitive dissonance, it is apparent that, when a person selects an alternative after having accepted the validity of a set of tradeoffs, he has to come to terms with "the regret or dissonance involved in the loss of potential options (and fantasies of the future)" (Humphreys & McFadden, 1980). Under these circumstances, it is of interest to examine how the individual handles this uncomfortable psychological situation, and how he can be helped. Humphreys & McFadden (1980) have suggested that, "...coping with regret is necessary unless one adopts defective coping procedures"; for example, "twisted reasoning" (Sjoberg, 1980) adopted by people when they do not implement their mental decisions (but instead they are making "errors") due to motivational and emotional factors; or adopting a "defensive avoidance" coping pattern (Janis and Mann, 1977; see 1.2.1.4). Either of these responses do not alter the situation the individual is in, since there are many ways by which an individual avoids facing reality and keeps the node of the decision tree open (Toda, 1976; Humphreys, 1980).

In order to be able to help the individual in this uncomfortable situation, it is important to see how he represents the knowledge of his problem - and this is one of the foci of the present study - and, in particular, how he represents it retrospectively. An example of the complexity in understanding an individual's problem can be demonstrated in the case of the adolescent who decides to continue education by entering university instead of going to a polytechnic or going to work. After failing his university entrance exams, however, and having expended considerable effort, a

year later he finds himself in the same situation as a year ago. If, after this experience, his decision remains the same, then there are several aspects of his problem that should be investigated. For instance: What kind of pathways does he select in retrospect, to justify his decision ? What kind of attributes does he emphasize? Is he perhaps trying to restructure his past situation to come to terms with the dissonance and regret produced by his failure? How can we investigate the ways he represents this restructuring process?

1.5. Transitions

Transitions are defined as "the discontinuities in a person's life space" (Adams et al., 1980), and refer to the ways the individual faces and experiences the passage through the major or minor changes that happen in his life. "Just occasionally", says Parkes (1975), "a life event can bring about a major change which within a short space of time renders obsolete a large part of my assumptive world". Today, in our rapidly changing world, people's lives are constantly changing at a much faster rate than at any other time in history (Gelatt, 1989). Thus, one has to cope with a variety of transitions, such as for example, leaving school and getting a job, changing jobs, being married or divorced, retraining, changing place of living or friends and social environment etc. Even when the change is desired or planned, there is some strain or stress involved in the adaptation process necessary for an effective passage from one situation to the other (Holdsworth, 1982). This stress results from the anticipatory regret and mourning for the loss and for the giving up of future fantasies (Parkes, 1971; Humphreys & Wooler, 1978).

Transitions have captured the interest of a large number of investigators, especially those in clinical counselling psychology (Parkes, 1971, 1975), and also those involved in career development research (Adams et al., 1980). A number of models have been postulated for the analysis and exploration of transitions with regard to work adjustment (Hopson & Adams, 1976; Feldman, 1976; Katz, 1980; Van Maanen, 1976; Humphreys and Wooler, 1979; Nicholson, 1987). Hopson & Adams have adapted the Kubler-Ross phase model of coping with bereavement; they have

postulated a seven phase transition cycle model for the analysis and understanding of the situation of people entering a new job. In their model, they refer to an initial phase of immobilization, a feeling of "being frozen up" (Hopson, 1982). During this phase the individual is unable to make any plans or take any decisions because of the unfamiliarity of the situation. In the second phase, the individual tries to minimize the change or even to deny that a change exists, thus minimizing the losses associated with the transition. With time, as people become aware of the reality, they become depressed (third phase), until they accept the reality and can detach themselves from the past (fourth phase). At this stage, they find themselves in a position to test out the new situation and new approaches, and so they face transition (fifth phase) and give meaning to it (sixth phase). In the last phase (seventh) the individual internalizes these meanings and incorporates them into his own behaviour, and thus the requirements of his new role become part of his behaviour. Overall, the seven transition phases represent a cycle of experiencing a disruption, gradually acknowledging its reality, testing oneself in front of the new situation, understanding ones own reactions, and incorporating changes in one's behaviour. However, although the Hopson & Adams (1976) model represents the trend of most clinical psychologists working on transition and loss, is criticized as not being able to be applied to all transition situations (Nicholson & West, 1989; Holdsworth, 1988). Holdsworth (1988) has pointed out that seldom does a person move neatly from one phase to another as it is described by the model; she suggested also that each person's experience is unique, with unique progressions and regressions in the transition cycle, following the unique for the individual circumstances; these considerations make the generalization of the model to all change situations even more difficult.

Concerning the transition from school to work or in job change situation, although the model makes us aware of the responses to change, it has been criticized as inadequate to capture the more varied meanings of job change (Nicholson & West, 1989). Nicholson (1987) has proposed a process model for the work role transitions which is also comprised of a number of stages: first, the stage of preparation, including the processes of expectation and anticipation before change; second, the stage of encounter, referring to the affective responses during the first days of

transition; third, the stage of adjustment, where there is subsequent personal effort and role development for better adaptation to the new job; fourth, the stabilization stage, where there is a settled connection between person and role; and, fifth, the preparation stage, which marks the renewal of the transition cycle. According to Nicholson & West (1989), vocational choice is a large area in career theory which is concerned, almost exclusively, with the preparation stage. Whereas the models referring to responses to loss and the resulting strain, are related to the encounter or the adjustment stage.

Transitions, according to current literature, appear mainly as a stressful life event, and thus the stress coping model is considered to apply to all types of transitions. However, recent empirical studies, especially those concerned with work-role transitions, have shown that this is not always the case. For example, in a retrospective study of 2,300 managers, it was found that anticipation of job change was "only mildly anxiety provoking" (Nicholson & West, 1989). The greatest worries of the subjects were about how to fulfil other role requirements. Nicholson's studies on graduate entry and adjustment to corporate life have shown that, before change could take place, the positive anticipation of future challenge and experience was more prominent than anticipatory anxiety (Nicholson, 1987). On the other hand, additional studies (Vaitenas & Wiener, 1977) have found that radical job change as well as downward job mobility and job loss (Warr, 1987), have been shown to provoke considerable stress and emotional upheaval. However, even in these cases, when estimating transitional stress, one has to take into account other moderating variables such as personality and the ability to fit into a new environment, the individual's capacity for prediction and his personal control (Frese, 1984).

Adolescence is a period which is further characterized by important changes that take place in the individual's cognitive functions and structure (Piaget, 1977). The individual has to cope with the transition either from school to work, or from school to higher education, in addition to the passage he has to make from his present developmental stage of self to early adulthood. Super (1980) and Herriot (1984) have suggested that the transition from college to the world of work is a change of theatre

and roles which may affect core aspects of the individual's self. "The new roles awaiting them in their new theatre are largely novel to them, and may well threaten aspects of their present selves" (Herriot, 1984).

Hill (1969) has pointed out the irrelevance of current methods of schooling as a way of building an assumptive world which is in accord with the life space of the school leaver. Many adolescents leaving school are not prepared for the world of adults and tend to "drop out" of society. Their lack of preparation for this transitional phase results in disorganization and depression, and causes them to take a completely negative view of society (Parkes, 1978).

The school to work transition has attracted the interest of many researchers (Holdsworth, 1982; Maizels, 1970; West and Newton, 1983; Reubens, 1977; Carter, 1962). They have been concerned mainly with the way an individual can cope with, and adjust himself to, a new situation by taking into account the kind of preparation he had in school, the amount of information he has had about the alternative work solutions, the type of work he is entering, social class differences and gender differences. In discussing the transition from school to higher education, researchers usually attribute the drop-out percentage of students during their first year of higher education to either poor decision making, or to false expectations, or to the lack of support and help in the new environment (Holdsworth, 1979, 1982).

Irrespective of the differences between the various models proposed, it seems that in any transitional event, the person has to perform two tasks (Hopson, 1982): first, to cope with the strain caused by the transition and, second, to make effective decisions about the appropriateness of new and old behaviour patterns in order to adjust to the transition. As Humphreys & Wooler (1979) have noted, the passage through a career transition depends on effective sequential decision making which involves the consideration of various alternative solutions. In this sense, they add, the student approaching graduation is confronted with a doubly demanding situation; "...to cope with the stresses of preparation for the transition to work and to maintain, while suffering these stresses, sufficiently vigilant information search and self-assessment techniques for sequential decision making leading to beneficial outcomes" (Humphreys & Wooler, 1978).

As an aid to the modelling of career transitions, Humphreys & Wooler have proposed a time dependent "utility hierarchy". This enables the modelling of the composition of the person's preference system in such a way that any changes over time can become apparent. Through the utility hierarchy model, the individual is helped in the structuring of the negative aspects of his decision problem, thus aiding him in coping with the post-decisional stress.

Janis and Mann have proposed the "balance-sheet" procedure, in which the individual becomes more aware of the negative aspects of the various alternative solutions, and thus he is more ready to cope with transition in the post-decisional period (Janis, 1968; Mann, 1972; Janis and Mann, 1977). In addition, they have used the "outcome psychodrama" procedure (Moreno, 1944) with a number of college seniors who were trying to decide what to do after graduation. In this psychodrama session, the student was called upon to act out a heart-to heart talk with a close friend a year after graduation "at a time of crisis, when things were going very badly, worse than he thought they would". The results of their study showed that, in most cases, although there was not a shift in preference, the students were more aware of the realities which may follow their decisions. They claimed to have now a "less romantic" view of their alternatives which, after the experiment, had become in their own words "more real and more frightening".

However, as Herriot (1984) suggests, "the making of a conscious decision is not in itself a solution to the problem of transition". The individual has to be able to look ahead, plan ahead and imagine ahead (Holdsworth, 1982). He has to be able to explore alternative solutions, develop realistic plans and be able to put them into action. Herriot (1984) has suggested that "planned procrastination may be an entirely appropriate proactive response" which, in a way, is typical of the individual with an internal locus of control presupposing a well developed self-concept of his future life (Super, 1980). For a student, planned procrastination refers to the number of proactive responses and preparatory actions the individual can undertake to be prepared to face and cope with the transitional strain, "...anticipating the expectation" to leave from school and "taking some sort of preparatory action". This can take the form of thinking or planning about his future, seeking information and help from

professional counsellors, associating himself with others facing the same transition, or engaging himself in anticipatory socialization by trying out in advance the real role demands of employment.

Is there a way to detect in advance the extent to which the individual is able to make such preparations and thus help him accordingly? It is my intention in the present study to show that, in order to understand how people conceive their problems and intentions, and how they translate them into action, it is necessary to examine the way they represent their decision problems and the knowledge they have about them.

1.6. Career Decision Making And Knowledge Representation

"The world's a stage, but the script is
not "As you like it", it is "Rashomon".
Sandra Scarr (1985)

It should be apparent from the above discussion that career choice as a personal decision problem is not context free. Tversky and Sattach (1979) have pointed out that "individual's choice behaviour is variable, complex, and context dependent". From the review of the literature, we have seen that both sociological and psychological factors, in the form of mental and social constraints, determine the individual's career development and choice. Even when looking at the transition variable, it appears that experience through transitions varies according to individuals' differences, the type of changes involved, as well as the context in which these changes occur (Nicholson & West, 1989).

It is apparent that we cannot expect individuals to act in the same way when confronted with the same decision problem. The decision process is based on the subjective meaning representation of the decision problem by each decision maker (Zakay & Barak, 1984). It is also apparent that individuals are far from making "rational" decisions as was believed until recently; instead they have subjective representations of their problems and decide on the basis of these representations (Humphreys & Berkeley, 1985). Furthermore, as Kreitler & Kreitler (1976) have suggested, the subjective meaning representation of a decision problem is idiosyn-

cratic. It is represented, on the one hand, in terms of the individual's personality and cultural background and, on the other hand, according to the nature of the alternative solutions and their attributes as they are perceived by the decision maker. Zakay & Barak (1984) have suggested that the same happens in the career decision making process. It is only when we take into account the subjective way in which an individual perceives his career problem that we can fully understand it. It is this subjective perception which actually constitutes the knowledge the individual has about his problem, and the type of knowledge he will seek to gain.

In this context, knowledge represents people's generic knowledge which, according to Nisbett & Ross (1980), is organized "...by less 'propositional', more schematic, cognitive structures". "The knowledge of what takes place in a restaurant; one's understanding of the Good Samaritan parable, or one's conception of what an introvert is like", are a few examples of such representations. Knowledge of all kinds, says Sandra Scarr (1985), including scientific knowledge, "...is a construction of the human mind". That is, it is constructed in the social and cultural context of each individual. Similarly, Humphreys and Berkeley (1984) have stated that "in judgment what one sees is a function of what one has seen in the past, how what one is facing now is going to affect one's own future and so on". That is, an individual's knowledge about himself, as well as about the problems with which is faced in the real world, is a construction of the social reality in which he lives and interacts, and of the way he perceives the reality in his past and future state.

Consequently, the individual, by being influenced by his small world and by interacting with his environment, formulates his own subjective ideas about life; as for example, about work life and his role within it. In the literature on career theory, this subjective idea of career has been defined as the internal career (Schein & van Maaner, 1977; Driver, 1982; Derr, 1986). The external career, on the other hand, refers the realities, constraints, opportunities and the actual job in the world of work (Schein, 1975, 1978). Derr and Laurent (1989) believe that careers, both internal and external, can be considered "...psychological constructs and social typifications". This is because, although the external career is supposed to represent objective work

realities, it is highly subjective since, "it is influenced by our own perceptions of ambiguous, complex and fast changing phenomena". The world, says Jasper, "is the way it is; not the world only our knowledge can be true or false" (Jasper, 1947). This statement of Jasper's enhances the idea of the subjective meaning interpretations of the realities of the world which will result in different knowledge representations for each individual.

The adolescent with his career problem is faced with questions like "who am I ? where am I going? what do I want from work , or what is possible?". These questions refer both to the internal subjective representations of " who I am" as well " how I see the world", and to the external realities of the world of work. As Derr and Laurent (1989) have put it; "...given my perceptions of the world of work, what is possible and realistic in my organization and occupation?" In attempting to find answers to these questions, the individual formulates his knowledge of his career problem. What this knowledge represents can be revealed through the individual's language discourse.

The concept of knowledge representation, with regard to identification, representation and utilization of knowledge in problem solving situations, has been encountered in particular by those interested in Artificial Intelligence (Fox, 1985). Fox has pointed out that the importance of knowledge became apparent for artificial intelligence research, especially during the late sixties and early seventies, "when attempts were made to solve real problems such as mass spectrogram analysis, speech understanding and medical diagnosis".

In their efforts to understand the nature of knowledge, and how is this knowledge used, both psychology and artificial intelligence have attempted to give their own answers. Psychologists, by studying "knowledge systems", have tried to understand how concepts are structured and developed in the human mind, and how they can be used in understanding human behaviour (Shank and Abelson, 1977); those involved in artificial intelligence, on the other hand, have tried to capture this knowledge in order to build an intelligence machine which subsequently can interact with the outside world, in order to aid the individual in his problem solving. From these

attempts there has been generated a constantly growing list of terms like "frames" (Minsky, 1975), "scripts" (Abelson, 1981; Schank and Abelson, 1977), "prototypes" (Cantor and Mitchell, 1979), "mental models" (Johnson and Laird, 1983), in addition to the more general term "schema" (Piaget, 1936; Rumelhart, 1975). They are used to provide the researcher with an interpretive framework for the analysis and representation of knowledge. In fact, these terms reflect partitions of the individual's language discourse by which we can detect the way the individual represents the knowledge of his problem and which, as Nisbett and Ross (1980) suggest, "resolves ambiguity and supplements the information 'given' with much 'assumed' information".

Berkeley and Humphreys (1982), have also argued that there is more than one level in which the knowledge of the problem can be represented (see 3.2). In fact, they have suggested at least five qualitatively different decision making levels which have to be taken into account for the conceptualization and structuring of the individual's intuitive way in handling a decision problem. According to Berkeley and Humphreys, each level requires a qualitatively different type of knowledge representation concerning the amount of discretion the individual has for the structuring and activation of the operations involved. In addition, they have proposed that, in order to account for differences between different individuals considering similar problems, and to be able to provide support to their decision making, it is important to understand how the decision problem has been represented by the individual at each level. This process should be of greater importance in the case of career decision making. If the adolescent cannot resolve the issues which are at a specific level of his problem conceptualization, he may not be able to proceed to the other levels or take action. Moreover, it could help the career counsellor to discover at which level the individual encounters difficulties in conceptualizing his career problem, and to give help where it is needed the most.

To summarize, we can conclude that the concept of knowledge representation conceptualizes the individual's internal representations of some external situations or problems which are entirely subjective. There appear to be two important and

interrelated dynamics which determine the knowledge representation process:

- (a) that the social context, as well as the individual's small world, influence the way knowledge is constructed and represented by the individual, and
- (b) through the individual's language discourse, we can reveal the way and the level at which the individual represents his problem.

1.7. Conclusions - Initial Assumptions For The Research

The overall aim of reviewing the theories above is to explain and give grounds for why and how the individual chooses a particular occupation, in order to understand under what circumstances this choice is effective, and how further help can be given for a better choice to be made.

In particular, in this chapter, I have tried to present the following points:

- (a) that career development is influenced by both psychological and sociological determinants; (b) that career choice is a process undergoing continual review during the individual's life span; (c) that the characteristics of career decision making define it as a real world personal decision making problem; and (d) what dynamics make career decision making something to be studied as a knowledge representation problem.

The above theories were taken into consideration as the basis for the **initial assumptions** of the present study. They are as follows:

It is essential that career decision making is seen:

1. As relevant to the social context in which the career decision takes place.
2. As relevant to the individual's small world. This world includes the interpretations of his past experiences as well as his expectations of the future, his plans and his prejudices.
3. Career decision making has the same characteristics as those of personal decision problems in real life situations, and can be seen as a dynamic process which requires some cognitive developmental changes to occur concerning the way the individual operates in the solution of his problem.
4. Finally, since career decision making is based on the subjective meaning representations of the decision situation of each decision maker, help only can be

provided if the means are available to understand the way the problem is represented.

The first of these assumptions is addressed in the present Chapter (Chapter 1) and in Chapter 4. The second and the third are also tackled in the present chapter (Chapter 1). The fourth, which is mentioned briefly in the present chapter, is further elaborated upon in Chapter 2. It is further explored in the rest of the thesis (Methodology, Basic study), providing the basis for the methodology used in the present study for the investigation of the career problem.

1.8. The Research Question

The basic research question for the present study derives from the 16 to 19 year old adolescent's inevitable dilemma: **Who I am, where I am going, why and how?** As I have argued in section 1.5., this is actually a question which encompasses, first, the internal psychological needs, values and experiences of the individual which are nested in his small world, and which formulated his subjective meaning representation of his career problem and, second, his external reality which reflects the real world of constraints and the work opportunities available to him. In this thesis the above dilemma will be studied in the context of high school students faced with career decisions. In order to be able to answer the above question, the following research tasks emerged:

1. The first research task was to select and establish a methodological framework and, within that, to define an appropriate language for the representation and structure of the individual's career problem (Chapter 2).
2. The second research problem was to elucidate the main domains stemming from the individual's family, his educational system, his peer group, his social, cultural and work environment. These domains will be used to represent the main areas which constrain and influence the individual's career decision making (Chapter 4).
3. The third research problem was two-fold: First, it was necessary to assess the impact of the methodology chosen on actual case studies and, second, there was a need to find a way to communicate with the adolescent on his career decision making problem in such a way, that, in the course of investigating his decision making

processes, it was possible to help him at the same time (Chapters 7-9).

The assumption that career decision making is a process also defines the way to proceed to the solutions of the above research questions. A model which could approach the career problem under the above considerations, can not of necessity be a static one. Instead, it has to be diachronic, dynamic and flexible to evolution and expansion. It has to be able to capture the "moving perspective" of career development (Hughes, 1958; Arthur et al., 1989), i.e. to capture, first, the developmental changes that occur during adolescence; second, the dynamic interrelations which exist between the individual and his environment and, third, the differences that exist between the transition patterns of young people, of different age groups. Changes can happen at any point in time of the career decision making process (Banks et al., 1992). New conditions and experiences may appear, which exercise influence upon the decision making process by defining and redefining the individual's situation. For example, a choice to enter university or to start working may have an impact on the individual's status, on his family interrelations as well as on his personality development concerning independency and autonomy. As Banks et al. (1992) point out, "disentangling such dynamics is wellnigh impossible with a single cross-sectional survey". Thus, it became apparent that it would be necessary to approach the career decision problem through a longitudinal design. Moreover, by adopting the assumption that the knowledge representation of the career problem is idiosyncratic, the need for case-studies to be investigated was created.

Overall, the research presented here provides a procedural methodology, applicable to personal decision making problems, which incorporates both theoretical principles on personal decision making and social aspects of a real life decision problem. A counselling process model is also proposed, which provides a comprehensive guidance to how and when the counsellor has to give support to the individual during his decision process.

In the next chapter the theoretical grounds, upon which the model and the methodology used in the present study to represent and structure the individual's career problem, will be addressed.

CHAPTER 2

APPROACHING THE PROBLEM

"The optimal solution of a model is not an optimal solution of a problem unless the model is a perfect representation of the problem, which it never is"
Ackoff, 1979

OVERVIEW

In the preceding chapter I discussed the assumption that the career problem has to be seen as a real life personal decision making problem based on the individual's subjective meaning representation of his problem situation. In this chapter, the various decision making models used for the modelling and the representation of the decision making process, as well as career counselling and career decision making models, are presented and discussed on the basis of the above assumption.

Emphasis is given to (a) the need to take into account the individual's subjective meaning representation in the investigations of the career decision making problems (relativistic way) and, (b) to the identification of the theoretical frameworks that can be used as a foundation for the development of a process model of career decision making.

Systems modelling and soft systems methodologies are also discussed. A more comprehensive description is given of the five level framework of knowledge representation which has been proposed by Humphreys and Berkeley (1983) as able to facilitate decision making and decision analysis. This is done by allowing individuals to structure their problems within the bounds of their perceptions of the problem situations in different levels of abstraction. This framework is discussed in turn, with regard to the career problem and to the way adolescents may represent their problem in relation to the operations and activities which are involved in each level and which constrain the individual at a particular level in this framework.

2.1. Normative versus Relativistic Model in Intuitive Decision Making

Research on the evaluation of people's performance in intuitive decision making shows that standards for comparison of people's performance usually derive from the "normative" model prescribed within any particular theory applicable to the task being investigated. By "normative model" we are referring to the set of standards the decision maker should strive to attain when making vital personal decisions (Janis & Mann, 1977).

However, this approach has been questioned by a number of researchers (Miller and Starr, 1967; Berkeley and Humphreys, 1982; Christensen-Szalanski and Beach, 1984), since it relies on:

- (a) the assumption that the decision making task can be represented in only one correct way, and
- (b) the assumption that the model used as the standard for the appropriate evaluation constrains the answers to the decision task (Humphreys and Berkeley, 1982).

In agreement is Winterfeldt (1980), who believes that 'fitting the problem to the model' is a common pitfall in the decision analysis. Similarly, Miller & Starr (1967) strongly oppose any prescriptive recommendations that might inadvertently encourage decision makers to strive blindly for normative solutions regardless of the circumstances.

It has become apparent that, in evaluating people's decision making, instead of the researcher making comparisons with a particular norm, it is necessary to understand and represent the relative reality of the decision makers under the assumptions of the "relativistic view." According to this view, people may be capable of handling intuitive problems effectively, but only from their own perspective (Berkeley & Humphreys, 1982).

The individual's 'own perspective' is a different notion from the analogy on perspective made by Tversky & Kahneman (1981) between "correct" judgment and veridical perception. Instead, it refers to the individual's own perception of his environment and the way he sees the problem, as well as to the way he sees himself involved in the problem.

In fact the relativistic view of looking at a decision problem is in contrast to any of the 'rational' decision making models used in conventional experiments. In these experiments the representation of the decision making task arrives prestructured at the start of the experiment. It may be argued that it is insufficient to try to describe the way the individual makes his choice by looking at it from a perspective other than his own. Also, it is insufficient to investigate the structure of a problem or, even, to try to represent the knowledge of it under an 'ipso facto' model, which provides a repository for knowledge concerning the task situation, and which is considered a priori 'normatively correct'. This argument is supported by a number of studies on intuitive decision making in laboratory experiments (Tversky & Kahnemann, 1974; Phillips & Boxall, 1983), as well as in experiments on real problems in which a normative model has been followed (Vari et al., 1978; Brown & Ulvila, 1981; Von Winterfeldt & Edwards, 1981). Berkeley and Humphreys (1982) argue that research on intuitive decision making, within the 'normative' paradigm (as, for example, the Kahneman & Tversky's (1982) 'conversational paradigm') typically relies on making comparisons between the subjects' responses in a decision making task and the output of a normative model.

Overall, the above studies have revealed individual differences in the way subjects structure the decision task. It was also found that the decision analyst, in his attempt to represent and structure 'real problems', must allow that the personal factors of the problem owner are very determinative in the problem formulation.

In fact, the notion that decision making is based on the individual's subjective way of problem representation (Larichev, 1983) has also allowed for the consideration of the differences between people in handling a decision problem. Different people can actually view and structure the same problem in different ways.

Under the above considerations two questions seem to be important in approaching and investigating the process of decision making in ill-defined problems: first, whether there is an adequate or "requisite" way of investigating how ill-defined problems are held by different individuals; and second whether this adequate representation could indicate the kind of support required to be given to the individual at each stage of the decision making process. The same question can apply to the

career problem since at it was discussed in the first chapter, career problem is considered an ill-defined real world problem with the same characteristics as the personal decision making problems.

To deal with these questions in the following section first I will give a brief review of the history of decision theory, the emergence of Subjective Expected Utility and the use of the related competing models in the investigation of a decision problem. This will be followed by a discussion on how in this investigation it is important to know how the problem is structured and how the problem is represented by the decision maker, since different people have different ways of problem structuring and problem representation. Next, the five levels framework of Knowledge representation established by Humphreys and Berkeley (1983) will be discussed in more detail. It will provide the theoretical basis for this study, in the attempt to establish a suitable methodology for the investigation of the career decision making problem taking into consideration the subjective meaning representation of the decision problem. The rest of the present chapter will be devoted to a brief description of ways of modelling the decision making process, as well as of the career counselling and decision making models originating mainly from Decision Theory and Soft System theory. Emphasis will be placed on (a) the need to take into account the individual's subjective meaning representation in the investigation of the career decision making problem (relativistic way of handling the career decision problem), and b) the identification of the theoretical frameworks which can support the five-levels framework as well as the development of a process model of career decision making.

2.1.1. Review of the history of Decision Theory

In the previous section it was noted that approaches to decision making stem from two different view points: normative approaches, which are concerned with how decisions ought to be made, and descriptive approaches, which examine how people actually make the choice. Moreover, within the rational paradigm, a further distinction was made between the normative methods -as those which we would ideally like to follow- and prescriptive methods which refer to ways of prescribing

how decision makers should approximate to this ideal in practice (Watson, 1992). In fact prescriptive decision theory provides a set of rules for combining beliefs (probabilities) and preferences (utilities) in order to select an option. It has had an influence on decision analysis and on the investigation of the decision making process which has resulted in a wide range of prescriptive methods. From these prescriptive methods some interesting alternatives to the rational decision making paradigm have emerged (Fishburn, 1980; Kahneman and Tversky, 1979; Keeney, 1982; Payne, 1982; Beach and Mitchell, 1978; Kunreuther and Schoemaker, 1981; Einhorn and Hogarth, 1981; Beach, 1990). However, these alternative proposals can still be challenged in several different ways and in particular for their presumptions that prescriptions, for example those of decision analysis, can be straightforwardly applied to any decision situation (Watson, 1992).

2.1.1.1. Early Utility Models

Early theoretical considerations of individual choice suggest that the mechanism of choice is based on the value or the expected value component almost excluding any subjectivity variable. Accordingly, the correct choice was the one which was in favour of the option with the highest value or the highest expected value; expected value is referring to the value yielded in cases of uncertainty where probabilities were seen as objectively defined entities which when multiplied by the value of the consequence of any course of action yielded an expected value.

Soon, however, the importance of subjectivity entered the decision theory, first by Bernoulli (reprinted 1954), who showed that the psychological value of money and its objective value do not share a proportional relationship. Bernoulli argued that an increase for example in wealth of two thousand pounds does not have the same value to a rich man as to a poor man. Consequently, the subjective value of an objective increase in monetary value is relative to the amount of money already owned. Therefore the 'objective value' of the increase is not equivalent to its psychological value (utility).

The above consideration gave a new perception to the concept of utility and allowed the incorporation of subjectivity within individual decision making in terms of the

worth of consequences. The value of an item is determined only by its price, it is equal for everyone, but the utility depends on the individual's estimation of the particular circumstances and consequences (Bernoulli, 1954). Thus the same objective value can be interpreted differently depending on the utility of that value for any person. Concerning the calculation of the expected utility, probabilities were still seen as objective, whereas the worth of consequence was now seen as subjective.

2.1.1.2. Subjective Expected Utility

Subjective expected utility is the best known normative theory of decision making embodying the idea that nonstandard probability interpretations might affect choice behaviour. Thus, in cases in which no objective probabilities are available, individuals must supply their own estimates (Abelson & Levi, 1985). To such opinion-describing probabilities was given the name 'personal probabilities' (Edwards et al., 1965). In fact, the term personal probability was popularized by Savage (1972), according to whom all sequential probabilities are subjective because the only way to get an objective probability is to have large numbers of repeated observations of the same stable situation, something which is practically nonexistent. Thus, according to Savage, while "objective" quantities (e.g. monetary payoffs) can be placed on particular consequences, this does not mean that the total worth of a consequence is a simple mapping of this "objective" quantity.

For example in career decision the outcome "accept offer of a job A" may involve increase of the salary but also may involve other changes of different value (e.g. on attributes concerning conditions of work, travelling, entertainment, recreation, friendships) which can not easily expressed in non-monetary values but they may have non-monetary costs (e.g. stress and anxiety which may affect the job interview performance) (Wooler, 1982; Berkeley and Humphreys, 1982).

Probabilities therefore should be seen as subjective or personalistic and are the degree of belief a person has in a proposition, consequence or outcome. In fact, through Savage's axioms on subjectivity, decision theory obtained its axioms and a rational decision maker is no longer seen as consistent or inconsistent according to an objective criteria, but rather as coherent within the bounds of his small world.

A thorough account of the S.E.U. theory, descending its great impact in the progress

of thoughts and ideas in the investigation of the decision making process, has been given by Simon (1983, 1986). According to Simon, S.E.U. theory assumes that the decision maker is confronted by a well defined 'set of alternatives'; that he has a well-defined 'utility function' and can assign probabilities to these alternatives in a consistent manner; and that choice will be made in favour of the alternative that yields the highest level of benefit (i.e. "it will 'maximize the expected value' in terms of his utility function, of the set of events consequent on the strategy").

Research in S.E.U. led to the growth of a number of theories models and technologies which to the greater extent centred their investigations on whether the decision makers were able to follow the axioms of decision theory and were capable of providing the necessary inputs (Fischhoff, Goitein and Zur, 1983). For example: Multi Attribute Utility theory (Keeny and Raiffa, 1976; Edwards, 1977), which was developed to handle situations where the decision maker wished to assess the worth of consequences on a number of different attributes rather than on a single criterion such as 'monetary growth'; Prospect theory (Kahneman and Tversky, 1979); Dominance Search theory (Montgomery, 1983), Social Judgment theory (Hammond et al., 1975) and Information Integration theory (Anderson, 1974). The last two, which in fact are not axiomatically founded, use algebraic models instead of probability and utility to show how judgments are related to stimulus information; in this respect they are very restricted in explaining human behaviour in front of a decision problem.

Additional examples can be seen in the Influence diagram technology (Howard and Matheson, 1980) developed to handle situations in which the values given for certain events was depended on probabilities within a network of other events; also in probabilistic information processing systems developed to be used in cases where prior information about the probabilities of events had to be taken into consideration.

In all of the above theoretical approaches as well as in the models used to provide support to the decision maker it was assumed that the procedure used by the decision maker as well as the structure within which the problem would be represented was prespecified (Humphreys, 1984). Consequently, it was generally believed that the

best way to provide support was through 'bootstrapping' the decision maker by predisposing a normatively prescribed decision rule which was assumed to be superior to the intuitive composition rule which the individual would have been employed when unaided (Golberg, 1970; Dawes and Corrigan, 1974; Humphreys, 1977; Larichev, 1984). The underlying idea was that the decision maker needs assistance in investigating his own assessments within a defined structure.

This assumption brought up the important implication that decision makers usually rely on simple decision strategies (heuristics), to keep the information-processing demands of the task or the problem within the bounds of their cognitive capabilities. Consequently, in the investigation of the human decision making process, soon human cognitive limitations and biases were taken into consideration, as well as the fact that people use different decision making strategies in coping with different tasks (Kahneman et al., 1982; Einhorn, 1971). This realization led to research on the use of heuristics and on the biases displayed by individuals when they have to choose between alternative acts (Berkeley and Humphreys, 1982). In some experiments heuristics were investigated as the over-confidence of the individual that what he believes is true, although his beliefs are based on incorrect inference processes (Fischhoff et al., 1986). In other experiments, heuristics were investigated as probabilities assigned to an event as a function of the availability of other similar events in the memory of the decision maker.

However, in the above studies the decision maker is also considered to be at fault for not following the normatively correct prescriptions of the S.E.U. model. In other words, the individual who does not follow the prescribed normative rules, in his attempt to solve a problem, employs a set of cognitive heuristics, which may lead to biases in his decision. Thus, when the individual deviates from the model's prescription, instead of questioning the model which was applying the S.E.U. principles, or instead of questioning the way the problem was structured, the fault was attributed to the decision maker's incoherence.

S.E.U. theory and the models based on it have been criticized for various reasons (Steinbrunner, 1974), but mainly because of its rationality principle which as it is said above, prescribes to the individual that it is only one correct way for decision

making. Simon has criticized the S.E.U. model for this reason; he is claiming that it is impossible to employ this model in making actual human decisions, because it is based on the assumption that the decision maker has only one comprehensive view when thinking about his problem which is less likely for the individual to attain (Simon, 1986; Hosking and Morley, 1991).

However, Berkeley and Humphreys (1982), have argued that the above criticism must not apply to the theory of S.E.U. but to the models derived from this (which, presume that the person has only one way of thinking at the problem and assume that the problems are well defined, and that it is the individual who is at fault not the model). Berkeley and Humphreys, stress that the issue is not the S.E.U theory but how the person structures the problem ("model") within which S.E.U. is to be applied as a "role-back" principle (i.e. the principle based in the decomposition and recomposition of the elements of a decision problem). The question consequently is not whether the person is rational or irrational in front of a prescribed decision task, but how the subject structures the problem, and whether this structure is an adequate representation of the problem (i.e. sufficient exploration of the issues of concern).

2.1.1.3. Multi Attribute Utility Theory

Multi Attribute Utility theory, i.e. MAUT, (Keeney and Raiffa, 1976; von Winterfeldt and Edwards, 1986) and the decision support techniques derived from this theory (e.g. MAUD, Humphreys and Wisudha, 1982; ASTRIDA, Berkeley et al., 1991) focus on preference structuring.

Although it is based on the basic axioms of decision theory, MAUT (further discussed in 2.5.1.3), is an extension of S.E.U. because it represents a further decomposition of the 'utility' part of SEU: i.e. mapping utility in terms of preferences between options on the basis of the individual's subjective attributes. Thus MAUT allows the generation and selection of alternative courses of action (objectives) and related criteria which are indicators of the individual's preferences and are placed within the problem structure (von Winterfeldt and Edwards, 1986). If the decision maker omits to include a subjectively important criterion, in this structure, the MAUT derived model can not generate it and the analysis will not be complete.

However, MAUT assumes both the criteria and the alternatives to be known a priori to the use of the MAUT composition rule, and MAUT decision support techniques have been developed which have powerful availabilities for structuring the decision making process.

For example, MAUD (Multi Attribute Utility Decomposition, Humphreys and McFadden, 1980; Berkeley et al., 1991) is a computer based method which goes beyond MAUT in providing problem structuring support. In application of MAUD, criteria are not assumed as given or fixed; the individual is allowed to explore the criteria on which he wishes to evaluate the possible consequences. MAUD (which will be used and analyzed in the present study see, 8.2) found to be helpful in a wide range of problem structuring situations (Humphreys and McFadden, 1980; Bronner and de Hoog, 1983; von Winterfeldt and Edwards, 1973; Kimbrough and Weber, 1990).

ZAPROS (Larichev et al., 1979) is another computer-based method developed to support preference structuring in a way which is complementary to MAUD. ZAPROS tries to assist the individual in the ordering of his alternatives in terms of preference prior to their assessment by constructing 'partial orderings of multiattributed alternatives within a verbal discussion model'. Both MAUD and ZAPROS succeed in a certain way to allow the decision maker to express his problem in his own language. However they cannot help the individual to generate new alternatives while he is proceeding with the structuring and understanding of his problem.

ASTRIDA (Advanced Strategic Intelligent Decision Aid, Berkeley et al., 1991) was developed to overcome this limitation. It is a process model of structuring and representing the decision making process, and supports the individual (a) to organize and develop his thoughts about the problem, and (b) to develop the choice of the best alternative in practice (rather than merely to select it).

However, although ASTRIDA is a more sophisticated decision aiding technique than the previous ones still belongs to the general class of decision aids which are designed for preferences structuring. As such, all these techniques do deal with the cognitive world of the decision maker within which the problem is embedded and in which

alternatives may be actualized. They can not generate a person's conceptual model, describing how a person processes on a problem based upon future scenarios etc.

2.1.1.4. Problem structuring and Problem representation

The need for an adequate representation and structuring of the decision problem became stronger after the realization that in "real world ill-defined problems", situations are not as "neat" so that normatively correct decision rules could be applied to support in the structuring and resolution of the decision problems (Edwards, 1983). In ill-defined problems instead, there is considerable uncertainty concerning what information to seek and from whom, how to invent alternatives, evaluate consequences and so on (Berkeley and Humphreys, 1982). This is what Hogarth, Michaud and Merry (1980) called "procedural uncertainty", which refers to the uncertainties concerning the means of processing a decision.

To decrease the problems of uncertainty structuring decision problems soon was considered to be the most important step in decision analysis (Von Winterfeldt, 1980). According to Von Winterfeldt (1980), structuring can be defined as the creative process which can translate an initially ill-defined problem into a set of well defined elements, relations and operations. He adds that the structuring process seeks to represent formally both the environmental (objective) parts of the decision problem and the decision maker's or the "expert's" subjective views, opinions and values. The primary concern in structuring of ill-defined problems has to be seen as how to obtain a clear picture: first, of what the individual wishes to achieve; second, of the ways and means used in the manifestation of these wishes and, third, of the possible states of events he can see himself getting involved in, in the future (Vlek, 1987). An attempt to provide a way to achieve the above was made by Beach & Mitchell (1987) in their proposed "Image theory". However, this theory is still in its early stages of development; it is descriptive and it addresses only decisions that have to be made within a certain framing of a decision problem (Montgomery, 1987). Dominance research theory also, which is quite similar to Image theory, allows some

form of structuring to the individual assuming that the individual uses cognitive dominance structures to evaluate his options (Montgomery, 1983, 1987). In this theory it is suggested that, in the case of non dominance of an alternative solution, the individual will create dominance by changing the representation of the decision situation so that one alternative becomes dominant. This is however the major point of criticism of Dominance theory as the decision maker risks making decisions within a fantasy world.

However, as said above, the individual in front of a decision task feels uncertainty concerning the means he can use to achieve the solution of his problem, as well as uncertainty concerning the attractiveness of the criteria which define his alternative solutions and which will vary according to the goals of the decision maker (Berkeley et al., 1991). Help in these situations could be given if the decision maker could be supported to "develop a structure" and an adequate representation of his problem within which "a composition rule could then be applied" (Humphreys, 1984).

Phillips (1982), has investigated problem structuring through the "requisite decision modelling". Requisite decision modelling treats problem solving process as a dynamic process during which the participants will gain a clearer insight about the problem and develop a deeper understanding of it over time. It was developed in attempt to capture the value judgments of the group and their relative importance. Decision problem representations, built through 'requisite decision modelling' are decision theoretic in terms of their structure (Phillips, 1984). These representations involve acts, events, outcomes, consequences, attributes structured through the use of decision trees, influence diagrams, multi attribute analyses. According to Phillips, the model is considered requisite when no new intuitions emerge about the problem situation.

2.1.2. What people are trying to do in handling their decision problem

The concept of Regret

Before proceeding any further in establishing ways of answering the question

of what is the best way to approach problem solving, the most essential question of what people usually do in handling their decision problem will be addressed in the present section. We discussed above the notion of bounded rationality which defines the strategies the individual use in front of a decision problem. In Chapter 1, Janis and Mann's (1977) conflict and choice model was presented as an elaborated model which places special emphasis on the stress and affective reactions engendered by decisional conflict, that lead the decision maker to adopt one or another mode of decision processing. In particular, Janis and Mann put emphasis on a set of general responses and information-processing patterns - unconflicted inertia, unconflicted change, defensive avoidance, hypervigilance, and vigilance- as ways of dealing with stressful situations and decisional conflict. From the above patterns, the states of defensive avoidance and hypervigilance represent nonvigilant or deficient modes of information processing, which however can result first in alleviating the stress the individual may feel in front of a decision situation, and second in minimizing the regret the individual may feel after the decision being taken.

Hogarth et al. (1980), have suggested that in cases of conflict and choice the person is engaged in mental effort (i.e. thinking) in order to resolve the conflict and minimize the consequences of his choice. He suggested that thinking helps the individual to control his actions and thus to have some control over the environment; to clarify his goals and his preferences; to develop mental strategies, to seek more information; and to minimize his psychological regret. By psychological regret, he is referring to the sense of loss the individual may feel if the chosen alternative turns out unfavourably. The meaning of psychological regret implied by Hogarth is closely related to the responsibility inherent in a choice as well as to the uncertainties which may determine a choice situation. That is for important issues, as for example buying a house, changing a place to live, creating a family while not settled in a job, people feel responsibility for their choice to others or to themselves. Thus, as Hogarth suggests, thinking hard for a choice and being aware of any unfavourable outcome of his decisions minimize possible accusations of irresponsibility.

Hogarth also suggests that the trend of people to minimize regret can explain the violation of some axioms inherent in the traditional expected utility models. As for example in cases where people feel compelled to take the option yielding a certain

\$1,000,000 (certainty effect) instead of gambling for \$5,000,000 with 1 % chance of ending up with nothing. Thus, according to Hogarth, people are more conservative in their risk attitudes when faced with gains as opposed to losses, and in these cases the notion of psychological regret has to be taken into consideration.

Bell (1982), in an article on "regret in decision making under uncertainty", has also discussed the role of regret in the analysis of decision making. After making a decision under uncertainty, a person may discover that another alternative would have been more relevant. This knowledge may impart a sense of loss or regret which the individual is prepared to make trade offs (which may violate expected utility axioms), in order to reduce it. Thus Bell assumed that the decision maker compares an obtained outcome with other outcomes that were not obtained, and that the reduced momentary gain may be accepted in order to minimize this retrospective regret.

Hogarth and Bell founded their discussion of regret on considerations of expected utility. In such case, the role of regret is defined in terms of choosing between two alternative solutions (we are talking about monetary values of defining or minimizing regret when two alternatives are involved). So, the question arises how we can define regret when multiple alternatives are involved?

Humphreys and McFadden (1980) suggested that, in any multiattributed decision problem involving non-trivial tradeoffs, there is also a "regret structure" which expresses what a person is giving up when choosing a particular alternative over others which value greater on some attribute dimensions. In fact a multiattribute multi alternative decision problem, in which more than a small number of criteria and alternatives are involved, can demand not only a lot of cognitive effort to determine trade-offs between alternatives in the criteria under consideration, but also a lot of psychological effort from the individual. This is because, during the process of decision making, one has to come to terms with the regret which is involved by the selection of a particular alternative and the consequent loss of some other potential options. Thus the question which arise in the multiattributed utility problems in opposition to the expected utility problems is not only how to minimize regret but also how to cope with regret. Humphreys and McFadden (1980) suggested that, with the exception of the cases where one alternative clearly dominates all the others

coping with regret is necessary for a more effective solution of the individual's problem. Otherwise the individual may adopt defective coping procedure as for example twisted reasoning (Sjoberg,1980), or defensive avoidance patterns (Janis and Mann, 1977), which can minimize the individual's regret. Whereas successful coping, on the other hand, means that the individual can clarify his regret structure so that he knows why he is giving up what he is giving up.

In the present study, the notion of regret involved in the career decision problem became particularly important. In front of his career problem, the individual is faced by various alternative solutions which may represent either his inner goals and preferences or the goals and preferences of his significant others. Attached to these alternative solutions are different criteria which also are valued differently from different people. One student, for example, *subjectively* would have liked to choose an alternative career solution which, as she thinks, would satisfy her ambitions and her inner desires and she anticipates success, money, free time and a lot of social activity. However, the *objective* demands of her situation are different; her father's illness for example, and his will to work in the family business, or her mother's wish not to study abroad, implied choosing an alternative that would be maximally useful in solving a lot of financial problems and helping her family. Yet, this alternative solution was rated as boring, disliked or suppressive on her subjective criterion. As long as she tries to maintain both subjective and objective criteria at once within her decision problem, she will suffer confusion of goals which may violate his capabilities for decision making. Humphreys and McFadden suggested that to resolve this goal confusion state one has to cope with the reality of his situation i.e. to cope with the regret of choosing the alternative which is maybe more preferable for him but valued less on some criteria by his/her parents. Thus the simpler the regret structure the easier this is. Humphreys and McFadden suggested that this can be achieved by aiding the individual in the structuring process of his problem, and by helping him in the evaluation of his alternative solution and of the criteria attached to them.

In the present study, MAUD a computerized decision aid which is based on Multi Attribute utility Theory, will be used in aiding students to structure their career problem, by helping them in the clarification and evaluation of their preferences

concerning their alternative career solutions (see, 2.5.1.3). As will be discussed in 2.5.1.3 applications of MAU theory are based on the assumption that compensatory tradeoffs can be made explicit (Edwards and Newman, 1982), and that preferences can be described by a hierarchical structure in which the more global objectives are defined by more precise objectives or attributes at lower levels (Pitz and Sachs, 1984). We assume that these characteristics of MAU theory can help the individual in the structuring process of his career problem and in a better understanding of the complexity of his problem.

The above considerations of how people approach, and handle their decision situation have to be taken particularly into account in any attempt of modelling the subjective way the individual perceives and represents his problem and tries to solve it, and in any attempt of trying to support the individual in this process.

2.1.3. A systems view of the process of structuring and problem solving

Alternative attempts to look at the problem solving process as an integrated whole are found among the followers of the systems thinking approach (e.g. Bertalanffy, 1968; Emery, 1969; Churchman, 1971; Ackoff, 1974; Luckmann, 1978; Checkland, 1981; Mason and Mitroff, 1981). The central idea of system thinking is the idea of "holism" which suggests that the world is consisted form "wholes" or "systems" which excibits certain emergent properties; the word "system" embodies the idea of a set of elements connected together in a whole, showing properties which are properties of the whole rather than properties of the parts of each component (Checkland, 1981). Thus to investigate the world we have to refer to those systems as wholes rather than to try to understand them by breaking the wholes into their fundamental elements (reductionistic view).

Originally systems thinking develop methodologies applied to problems with defined objectives i.e. "hard system thinking" for "hard" problems (Checkland, 1981). According to Checkland, hard system thinking is based on the assumption that the problem task is "to select a efficient means of achieving a known and defined end". Hard-system thinking includes approaches such as systems engineering, systems

analysis, as well as operational research, decision science and management cybernetics (Jackson, 1991). The main criticism to hard system thinking and the models derived from that is that it fails to take into account the human component, i.e. fails to deal with subjectivity.

As the problem scope of systems applications increased it was realized that this hard systems approach was not appropriate to problems where the objectives were difficult to define or agree upon i.e. "soft" problems. Soft system thinking was then developed then to cope with soft problems and deal with "people and their perceptions, values and interests" (Jackson, 1991). The idea of subjectivity became central to soft system thinking, and was considered important in the modelling of the decision making process (Ackoff, 1969; Mason and Mitroff, 1981). It implies that ill-defined problems have to be regarded as problems which allow for different perceptions of reality, i.e. different subjective perceptions of the problem decision situation (Ackoff, 1974). As Checkland has suggested, the emphasis of soft system methodologies is "not on any external reality but on people's perceptions of reality, on their mental processes rather on the objects of these processes" (Checkland, 1981).

The notion of subjectivity became also the major source for criticism of soft system thinking. Thus soft-systems thinking is criticized as failing to take into consideration the social reality within which people and their problem are embedded. In this criticism it was noticed instead that both structural features of social reality (e.g. conflict and power) or, objective aspects of social systems (e.g. political and economic) may exercise constraints on the way the individual perceives his external reality, and may lead to distorted communication between the individual and his environment.

According to Checkland, however, this criticism can apply to the earlier forms of soft-system methodologies which did not refer to the social factor, and they were different from the recent soft system methodologies which apply to multiple perspectives. He also differentiates the notion of subjectivity from the notion of individualism. Subjectivity in itself embodies the idea of social reality and social context since it refers to the different views the individuals held in relation to their history and the different roles they play in their social context.

Another criticism of soft system thinking is that methodologies deriving from this approach cannot be applied to any problem situation without refinement or approximation because they tend to be based upon the way the analyst or the creator of them works. A particular soft systems methodology can be applied as the most appropriate approach only on a limited range of problem situations (Jackson, 1991). In general, methodologies deriving from soft system thinking are concerned to cope with ill-structured problems, or messes, at the strategic level. They do not attempt to reduce the complexity of the ill-defined (real world) problems and to turn them into well structured, mathematically-modelled problems. Instead, they explore these problems by working within the different perceptions of them as they exist in people's minds (Jackson, 1991). They admit the existence of multiple perceptions of reality and explore these perceptions. They encourage learning of the problem situation in order to reach accommodation among the participants for a better solution of the problem.

They support Rittle's conclusion that every formulation of an ill-defined problem "corresponds to a statement of solution and vice versa. Understanding is synonymous with solving it" (Mason and Mitroff, 1981). Yet, although in soft systems thinking the idea of "understanding the problem is synonymous of solving it, the concept of an adequate and simultaneous representation of the elements of the problem solving process was not as extensively investigated as it was in work on decision problem structuring.

Thus, soft system thinking, as well as experience about the development and application of decision theoretical models, established the need for structuring the problem prior to choice and made it clear that different individuals, faced with the 'same' problem could view, it from different perspectives and therefore have different structures. This realization led: first, to the development of theoretical frameworks allowing for the representation and structuring of the subjective ways the individual perceives and understand his problem; secondly, to the development of supporting tools of the decision making process, which allow individuals to structure their problem within the bounds of their own perception and understanding of the problem situation.

In the following sections, further consideration to these developments is given in an attempt to establish ways of how to best approach and help the individual in his decision making process.

2.1.4. Problem representation in the decision making process - the circular logic of choice

Many times it has been discovered that it is very crucial to use the appropriate language for the development and representation of the option in a problem situation (Fodor, 1976; Schank and Abelson, 1977). When the proper representation is found then it is not questionable what kind of methodology to choose for the solution of the problem; whereas this is not the case in the absence of a proper understanding of the options (Humphreys and Berkeley, 1985; Schank, 1982).

However, within the decision theory based models, the representation problem has usually been dealt with as if it were a separate issue from the problem solving process. In other words, as if it were possible to find first an adequately represented problem, and then the appropriate way to solve it (Nappelbaum, 1994). In opposition to the above view, Nappelbaum argues that the process of choosing the proper representation cannot be divorced from both problem formulation and problem solving. This is because we do not fully formulate (i.e. conceptualize) a problem until it is solved and vice versa, and thus we cannot choose a proper representation of the problem until the problem has been formulated.

Usually, as Nappelbaum suggests, independently of the theoretical viewpoints concerning the understanding of the logic of choice (Jeffrey, 1965; White, 1975; Simon, 1960), problems are represented in terms of the following four major components (Nappelbaum, 1994).

1. Alternatives and options
2. The scope of these alternatives which outlines the boundaries of the problem as it is conceived by the decision maker.
3. The decision maker's preferences which reflect their attitudes and values as well their understanding of the problem situation
4. The logic of choice, that is the argumentation process through which individuals

interrelate all the other components to arrive at the final decision (i.e. choose the preferred alternative).

To these four components Nappelbaum adds a fifth component of the choice problem formulation which he believes is neglected when a choice situation is under investigation.

5. Instrumental intentions of the choice, which combines both the reasons about how we are planning to use the results of the choice as well as the ideas about how this choice is to be implemented.

The first two of the above components represent the objective reality of the choice referring to the objective possibilities and the objective constraints which are relevant to the problem under consideration. The next two, introduce the subjective dimension of problem representation referring to the subjective personal attitudes towards the different worlds which should emerge as a result of the choice.

The fifth component is referring to the planning of the decision making process, i.e. our intentions of what we are going to do, or how we are going to implement our choice. Nappelbaum puts particular emphasis to this component since as he argues "it would be difficult even to start thinking about a proper way of representing something before having a rather clear idea about what we are going to do with this representation both meaningfully and formally".

In fact all of these components can be seen as variable entities which are meaningful only in relation to one another. In other words there is a relationship or a 'function' between them. The way the options are understood by the individual depends on the individual's objectivity and subjectivity, i.e. the individual's subjective way of perceiving objective realities, as well as his subjective way of structuring and evaluating these realities. These perceptions result in different representations of the options and in different criteria in their comparisons.

However, if we accept that the choice of intentions (fifth component) is necessarily related with the choice of representation then this choice is related with the choice of the requisite alternative, and thus different representations of the alternative solutions result in different perceptions of these solutions.

The above interdependency between the five components in traditional decision making models usually is represented in a causal linear model of choice as if each one

of the components was a dependent variable of the previous one. In other words an understanding of the problem situation was seen necessary before the decision maker can consider options and alternatives, which in turn are a prerequisite from preference judgments.

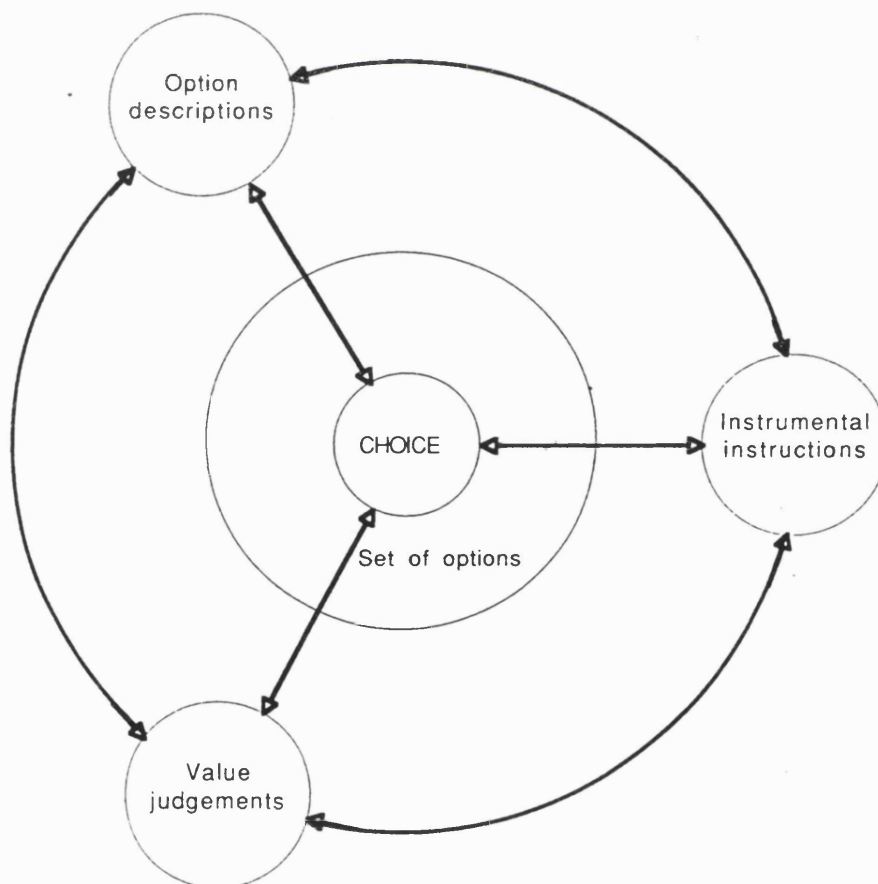
In contrast to this linear view implicit in traditional models of choice, Nappelbaum proposes that the process of problem formulation and problem choice can be seen as circular such that all the elements of decision making are considered simultaneously and must be in balance. This will lead to a narrowing of the problem definition until that definition contains, in itself, the solution (Nappelbaum, 1994; Berkeley et al., 1989). Favouring the idea of balance as an underlying principle covering human behaviour in front of a problem choice Nappelbaum is against the principle of maximization of the utility of one alternative over another, as well as to the principles of the cognitive dissonance theory ("something is either balanced or not, so it is rather strange to speak of the degree to which is balanced"). He believes that all problems start from being ill-structured and unbalanced but they do not tell us how to solve the problem. Only when we start to think about how to improve the situation does the structure become balanced and all the components have to be reformed to narrow the problem choice situation towards the final solution.

In practical terms, this means that the problem owner has to design a problem representation which is without any cognitive dissonance ("removing completely all the doubts produced by the previous *embaras du choix*"). Consequently the problem of choice, i.e. how to find the best solution, turns out to be a problem of problem solving, that is to find a requisite representation which is balanced in all its components.

However, to achieve this balance in practice is not possible even for the simplest kind of representations (Berkeley et al., 1989). In this effort the individual may either use "default" elements of representation as for example in the case of choosing an alternative which is dominant over the others (although valued less in a number of criteria), or try to face the regret involved in not being able to choose 'clearly the best' option (deciding how to make trade offs and cope with the regret involved, see 2.3.1).

In Fig.2.1 the circular logic of problem formulation is represented in an overall holistic representation of the choice situation with declarative, instrumental and value components which represent the overall solution to the problem. The declarative component refers to the description of the problem search space, i.e. the descriptions of the various options. The instrumental component refers to the description of the operations or transformations in the problem search space, and the value component to the definition of a solution or of an instrument for identifying a solution. These components must be self-sufficient and cognitively balanced since they suggest a solution, the existence of which makes the problem formulation appropriate.

Fig. 2.1. The circular logic of choice
(From Nappelbaum, 1994)



However, although the problem choice process can result in an overall representation of the problem under investigation, the same problem can have more than one representations depending, as it was said above, on the different subjective meaning representations each individual can give even to the same objective reality of his problem (e.g. the alternative options and alternative criteria attached to them). These representations stem from different "small worlds" and thus they are conceptually incomparable. They are also conceptually discrete in the sense that one cannot move from one representation to another in an evolutionary manner (Nappelbaum, 1994). Since however any balance achieved within a particular representation, is "likely to be very fragile and temporal" depending on the different subjective meaning representations the individual will give to different options, to understand the problem situation depends crucially on the number and variety of representations one may design for it.

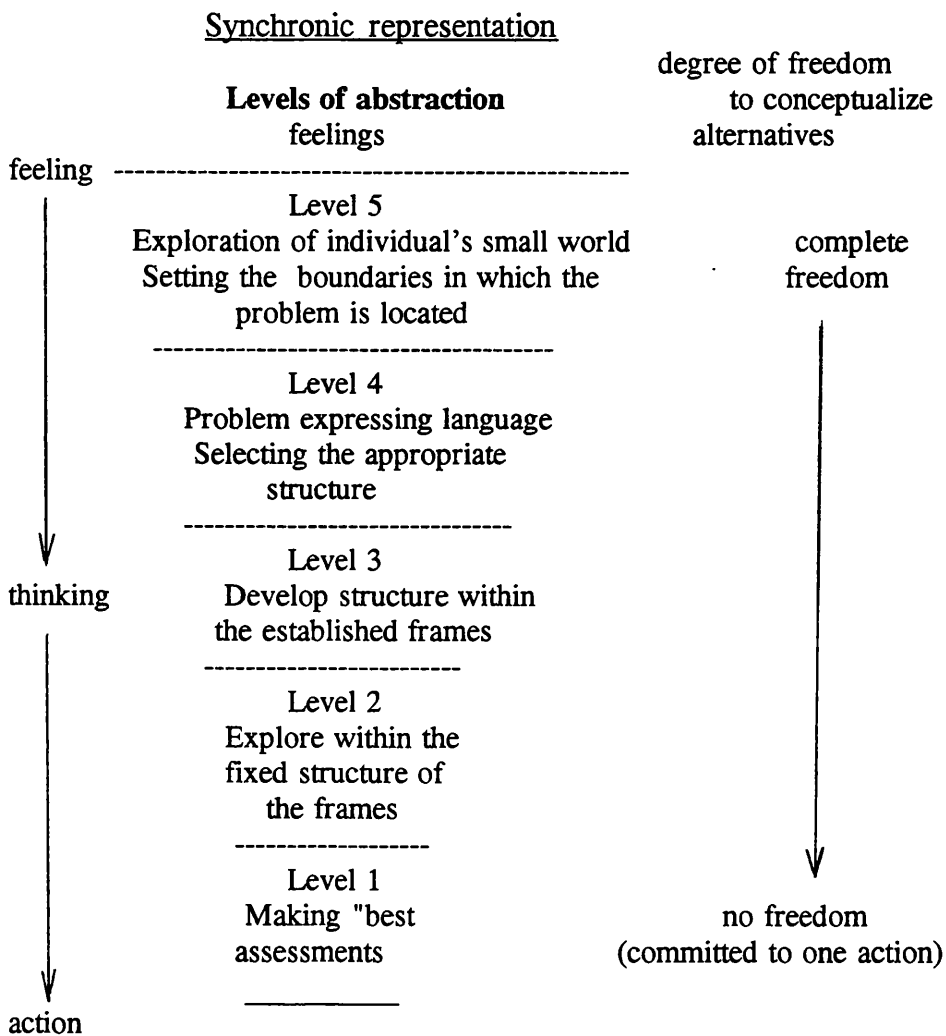
Nappelbaum's model can be embedded within the five levels of knowledge representation discussed by Humphreys and Berkeley (1983) and which is reviewed in the next section. The five levels of knowledge representation is a theoretical framework allowing for the representation and structuring of the subjective way the individual perceives and understand his problem in five levels of abstraction. It helps us to understand how the individual can represent the same problem in more than one ways. It suggests that to solve a problem one needs to increase the structure of problem representation and reduce the discretion within it (e.g. by reducing the discretion among the different representations of the problem) until a single immediate action can be processed. This can eliminate the uncertainty of the problem situation and the person can stop thinking and take action.

In the following sections, after a brief discussion on the process of deciding by moving from feelings to action through the levels of problem representation, I will discuss how the completion of the operations performed at each level of the five levels framework help the individual to increase the structure of his problem decrease its uncertainty and proceed to action. Then, in section 2.3.1., I will discuss how the circular logic of choice can be embedded in this five-levels framework.

2.2. The five-levels framework of knowledge representation

In Fig.2.2 there is a synchronic representation of the five levels framework. The shape of the cone has been chosen to show the reduction of uncertainty and the increase of structure as one proceeds to the solution of his problem and to action.

Fig. 2.2 The synchronic representation of the five Levels framework



At the top of the reversed cone which represents the levels of representation in the decision making process in figure 2.2, are "the desires", or "a preferred state of affairs", "a goal" without any existing structure. At the bottom there is the main structure of action which defines what has to be done to attain this goal. The moment

of deciding can start from the top where there are only feelings and where the individual has complete discretion over how he or she translates desire into action, and finish at the bottom, in action, where there is no discretion and where the decision maker is committed to just one action. Humphreys (1986), referring to the moment of deciding, defines it as the awareness of a "lack" or a "gap" between the "actual state of affairs and a preferred state" which generates the desire to take some action in front of a task. In a similar way, Toda, in answer to the question "what is decision making", refers to the Decision Making System which, at the moment of deciding, changes its state from the "before" area of plans and decision trees to the "after" area where only one plan is taken into action (Toda, 1976). This involves a sequence of smaller decisions, which result in the decision making process proceeding in a hierarchical order.

Thus decision making takes place at all levels from top to bottom by reducing discretion (freedom to conceptualize alternatives) and increasing the structure of the decision problem representation. The results of the operations involved at higher levels of abstraction constrain (a) the way operations are carried out at lower levels and (b) the amount of discretion the individual is able to exercise in thinking about how to solve his problem. Eventually, the discretion the individual has over his actions diminishes. At the last level, he is simply committed to take only one action which has been valued as the best one. Thus, by moving down, there is a progressive reduction of uncertainty for the problem owner concerning the nature of his problem. Problem complexity and ambiguity are reduced whereas, structure increases. So the person can stop thinking and take action.

The three basic principles of the five levels framework

The three basic principles which define the multi-level framework of decision structure are:

1. The cognitive operations which take place at each level in the development of the problem are qualitatively different.
2. The results of these operations constrain the ways operations are

carried out at all lower levels.

3. Any decision problem is potentially represented "in the real world" at all levels.

According to these principles Humphreys (1986) suggests that the problem has to be examined with respect to how it is handled at each level in turn, rather than to be classified like a taxonomy, as a "level x" problem.

The property which the second characteristic actually predisposes is that the examination of problems at each level should be carried out in a top - down analysis. This property, together with the idea of levels in the representation of knowledge of a decision problem, appear to follow the 'hierarchy theory', which is concerned with the fundamental differences between one level of complexity and another (Patee, 1978). This theory mainly postulates that emergent properties, associated with a set of elements at one level, constrain the degree of freedom of the elements at all lower levels (Checkland, 1981). The concept of hierarchy is fundamental in the 'systems thinking' approach, according to which the world is organized in hierarchical levels of increasing complexity (Bertalanffy, 1968; Checkland, 1981). As such, the five levels of knowledge representation are considered to be "...fundamentally a cultural phenomenon, rather than a mathematical or logical necessity" (Humphreys, 1986).

2.2.1. Level 5

In thinking about his problem at Level 5, the individual has complete discretion over his feelings and his actions. However, at this Level, certain aspects of the decision problem may not be structured. They can be revealed via the explorations carried out by the individual in his small world (see Chapter 1, 1.5). This exploration is directed by the decision maker's desire, first, towards the search of all the possible consequences or the anticipated events of his action and, second, towards the avoidance of those events and those states which may bring anxiety and stress (Sjoberg, 1980; Toda, 1976; Janis & Mann, 1977).

However, in the exploration of the individual's small world at this Level, his mental constraints have to be explored first (i.e. his abilities towards a task, his motivations and his goals), and then the social constraints that the environment has impinged upon

him by its various systems must be examined. Both of these constraints define the boundaries of the individual's small world, as well as his operations and his activities (Humphreys, 1986). By taking into account the individual's small world, the social context is acknowledged at all Levels of the decision process at the same time.

Exploring the individual's small world is not an easy task. It can only be done through explorations of the communication channels that the person uses in his interrelations with the environment. Thus, we can only infer or map the bounds of the individual's small world through reconstructions of the paths that the person takes in his natural language discourse. These bounds actually define his background of safety by defining the area where he feels unsafe because he has no contingency plans to handle the problem situation.

The idea of the 'background of safety' has been defined by Sandler and Sandler (1976) as the area developed in childhood through play, and by structured and guided exploration of ways of setting bounds or having bounds provided by parents for the 'worst case' fantasies (Humphreys and Berkeley, 1987).

2.2.2. Level 4

At Level 4, the boundaries of the individual's small world are fixed and define the constraints within which the individual will structure and explore his career problem. At this Level, the individual has a lot of discretion only with regard to choosing different structures which are good for the solution of his problem. Of course, this is idiosyncratic (see Chapter 1, 1.6). Consequently, we may say that the same problem can be expressed in different ways according to the structure and the kind of language the individual uses. As Humphreys (1986) argues, there is no "right" or "wrong" way of handling a decision problem within a multilevel scheme. The individual, instead, is able to choose the structure which is most appropriate for solving his problem and which can be handled by him effectively.

Since, as we have already said, the individual has complete discretion in the ways he might handle his decision problem at level 4, structuring the decision problem at this

level would simply consist of finding the formulas the individual uses in his language to represent the knowledge of his problem. As Minsky (1975) argues, "the primary purpose in problem solving should be to find representations within which the problems are easier to be solved".

Fox (1985), in an article on knowledge representation for Decision Support, argues that the notion of semantics has to be added to the knowledge representation research for artificial intelligence, especially when there is an attempt to solve and represent knowledge in real problem situations where "the search space is quite large and intractable". Semantics represent the knowledge which can be derived from the analysis of linguistic expressions and can be used for the representation and understanding of the knowledge of the problem. Minsky (1975) has emphasized the fact that language guides our problem-solving efforts, and Miller et al (1960) have postulated that "...language for all its notorious short-comings is still the least ambiguous of all the channels open from one human being to another".

However, what are the formulae the individual uses in his problem solving language? As noted in section 2.5., various theorists have given different names to these formulae. Minsky (1975) introduced the concept of "frame" as a semantic representative which, as Fox (1985) states, "...partitions a semantic network into easily identifiable concepts". Frames, according to Minsky, represent elementary units of meaning of linguistic expressions and can be used for the representation and understanding of the knowledge of the problem (Vari et al., 1987). In another attempt to develop formulae for knowledge representation, Schank & Abelson (1977) have postulated the 'script' theory: scripts were developed for adding information about actions which were not explicit at first hand. For the same purpose, Toulmin (1958) introduced the Argumentation theory.

2.2.2.1. Argumentation theory

In this theory, formal elements of arguments can be used to explore the limits between explicit and implicit statements. Mason & Mitroff (1981) use the term

argument as referring to 'a process of reasoning' which, through a sequence of steps, proceeds from the basis of an argument to its conclusions (Toulmin, 1958). Toulmin describes argumentation as the movement from accepted **data (D)** through a **warrant (W)** to a **claim (C)**. The claim is a conclusive statement, i.e. the outcome of the argument, the merits of which one wants to establish. The claim is debatable, never completely true, and needs evidence for its support (Brockriedge and Ehneiger, 1960). The evidence is given by the data (D) which give the facts on the basis of which the claim is identified. Data can be anything from survey results, scientific findings, reports, citations from authorities, accounting reports etc. Data can answer to the question "what do you have to go on" (Mason & Mitroff, 1981); they are the givens in an argument. Warrants (W), on the other hand, in the form of rules or principles or premises, act as a justification which authorizes the data to be the support of the claim. The warrant is the "because" part of the argument: i.e. C follows from D because of an "accepted" principle (W).

For example, in a career decision making problem, the claim by the student: "I have a lot of chances to enter the school of economics this year" follows from the data: "the grade point average to enter the school of economics last year was 531 units" because of the principle "my grades were very high this year, and the grades I got in the mock exams were even higher, which is a good indicator that I can succeed in gaining more than 531 units in the exams", which constitutes the warrant of the argument.

Often the "because part" of an argument is not made explicit and thus warrants must be inferred at the time of making the argumentation analysis. As Toulmin postulates, the claim does not necessarily follow on logically and for this reason **Backing (B)** and **Rebuttals (R)** are added to the framework. The Backing supports and defends the warrant and certifies the assumptions which are inherent in the warrant. Backings can be laws, categories in a taxonomical system, definitions in a language, or accepted methods of calculation, and are often prefaced by "since" (Mason & Mitroff, 1981). The Rebuttal (R) refers to the conditions under which the warrant or the claim may not hold. It may also indicate the outstanding challenges and objections to the argument which come from opponents of the argument. (See Chapter 6, Fig.6.5: data model of the structure of an argument).

However, it is true that Toulmin's book has not stimulated psychological studies of cognition and thinking to any large extent. Recent investigations in social psychology (Kuhn, 1991, Billing, 1987) highlight that this aspect of thinking has been neglected by psychologists.

In the process of decision making, finding a good argument seems to be the most prominent effort of people who generally wish to be able to justify their decisions, by giving reasons why they act the way they do (Slovic, 1971). Good arguments may help the individual stick to a certain line of action (Montgomery, 1987) by justifying how the chosen alternative can be seen as dominating other alternatives. For the individual to reach this stage of a decision making process means that he would be able to frame, in one way or another, his claims and be able to structure the aspects of his problem in order to prepare himself for action. For example, problems appear, in organizational decision making, when the type of frames identified by the different stakeholders are not agreed upon and the warrants and backings are rejected by one or more parties; or, when in personal decision making, the individual makes a lot of claims without being able to structure or represent the knowledge of his problem in a frame by means of a coherent argument.

Overall, Level 4 makes the agenda of the structures upon which the further analysis of the problem will be processed. Through the operations involved at this level, the individual expands the conceptualizations he has made in Level 5 by expressing them in a language which he chooses as relevant to the situation, but which is actually constrained from the boundaries set at level five. Then, by proposing, selecting and linking frames appropriate for the knowledge representation of the problem, the individual forms a sort of data base of the issues necessary to be considered for the problem structuring process.

2.2.2.2. The frame unit

In the present study "**frame unit**" would be defined as a semantic representative unit of linguistic human expression. During the process of decision making, different alternative solutions to the contingencies of the problem are linked together in a

coherent frame which enables the person to move towards a course of action. Before proceeding to any further analysis of the frame unit, three important principles have to be taken into consideration:

- (a) There is no right or wrong "frame unit" to use in the structuring of a decision problem since frames, as semantic primitives, represent actual structured knowledge of the problems and not how the knowledge should be represented;
- (b) within a frame only part of the problem is processed;
- (c) in the process of the problem structuring calculus, the "frame units" must be agreed in advance since, otherwise, different analyses can be employed for the analysis of the same problem (Humphreys & Berkeley, 1983).

Frames, as semantic primitives used in the structuring and analysis of a decision problem, can be found in various forms in decision theory. As Von Winterfeldt (1980) has suggested, graphs, maps, functional equations matrices, trees, physical analogies, flow charts and vein diagrams are all possible problem representations. In addition, the Multi Attribute Utility frame (Von Winterfeldt and Edwards, 1986; Johnson and Johnson, 1987) and Scenarios as problem representations (Jungermann, 1985; Wells et al., 1987; Ducot and Lubben, 1980), are widely used in problem structuring. Moreover, a variety of frame languages have been created (e.g. FRL, Concepts and KRL, UNITS and SRL) based on the Artificial Intelligence techniques for the representation of knowledge for decision support (Fox, 1985).

2.2.3. Level Three

The development of the structure of the individual's problem within each particular frame is a process which is completed piecemeal at Level 3. Level 3, in other words, represents the operations required to develop a strategy within the particular frame identified by the individual at level four. What was content at level four is now represented as form in terms of the relationships and the values of the concepts within the overall frame.

At Level 3, the individual has complete control over how to develop the structure of

the identified frame. This facilitates the progressive reduction of the complexity and ambiguity of the problem representation through the Levels, and leads to the increase of problem structuring.

2.2.4. Level Two

The operations carried out at Level 3 fix the structure of the representation of the problem at Level 2. At this level, the problem owner generates hypotheses based on "what if" questions (Humphreys and Berkeley, 1985). In text books on decision analysis, the exploring of "what if" questions about values and nodes in the exploration and structure of aspects of a decision problem, is actually referred to as "sensitivity analysis" (Humphreys, 1984; Brown et al., 1974).

The decision problem representation can be explored at this level, by changing the values assessed at any chosen node within the structure which has developed at level three. The structure within which this exploration is made remains free, and only one value may be changed at any one time (Humphreys and Berkeley, 1985).

2.2.5. Level One

Operations involved in Level 1 actually address the decision maker's efforts in answering the question of how to make 'the best assessment' of the value to be assigned either to each node of his problem representation or to the degree of the resulting preference order of his alternative solutions (Humphreys & Berkeley, 1983). At this Level, the structure is completely fixed. The output of the operations involved at all previous Levels is established, and the individual has discretion only in the extent to which he will use his or her own subjective assessment or will consider the opinion of an expert as the right one (Humphreys, 1986).

Making the best assessment is a necessary step for both the differentiation of the trade offs between the alternatives identified through the structuring process, and for action to take place. Efforts to improve the quality of decision making at Level 1 would be ensured by improving the subjects' calibration. This can be achieved by correcting numerical biases in the intuitive probability assessments of the subject (Lichtenstein,

Fischhoff and Phillips, 1982).

2.3. Modelling the process of Decision making and Problem Solving

In this section I will discuss how the process of deciding can be seen at the same time through the five levels framework and the circular logic of choice. In both of these theoretical frameworks the process of deciding involves the elimination of the various problem representations (various alternative solutions for the problem) until there is no discretion and one is committed to action. In addition it will be discussed how this notion of the process of deciding can explain the way ill-defined problems have been approached by the decision theory models and the systems theory methodologies. Furthermore, what has been suggested as a more sufficient way to establish methodologies for representing and supporting the problem choice process will be discussed.

2.3.1. The circular logic of choice and the five levels framework

The five levels of Knowledge representation and Nappelbaum's overall representation of the circular logic of choice can be related as it is shown in Fig. 2.3.

In this figure it can be seen that the operations at each level of the five Level framework, with a continual increase in structure and decrease in discretion on the part of the decision maker, correspond to the circles of Nappelbaum's overall representation.

Thus, level 5 of the framework (exploring small worlds) corresponds to the outer space of Nappelbaum's outer circle marking the exploratory area of the decision process. Level 4 (structuring process) corresponds to the circle in which Nappelbaum's three components, i.e. value judgments, option descriptions and instrumental descriptions, are embedded. These three components represent the different "frames" (see, 2.2.2.2) or different ways of representation of the problem situation. Level 2 (asking "what if" questions, sensitivity analysis) corresponds to the "set of options" chosen to be investigated by the individual. Finally, Level 1 corresponds to the choice itself.

THE CHOICE PROCESS

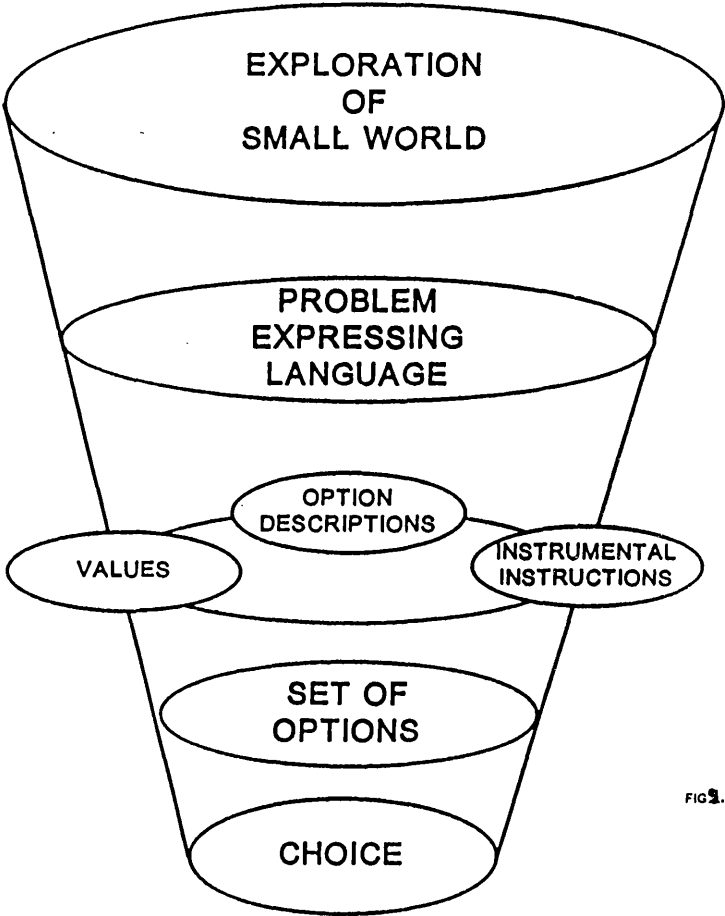


FIG 1.3 THE RELATIONSHIP OF THE FIVE LEVELS OF ABSTRACTION TO NAPPELBAUM'S OVERALL REPRESENTATION OF THE CIRCULAR LOGIC OF CHOICE

In the present study, the above combination of the circular logic of choice with the five levels framework is considered to represent the decision making process in a more global and more holistic way, i.e: as a system with certain interrelated fundamental elements which correspond to the knowledge representation components given by the individual in his language discourse. This holistic representation can give us a more adequate representation of what is needed in the individual's problem solving process and allow for the individual's cognitive representation of the problem situation. In the present study, this combination will be used for the basis of the development of a process model of career decision making. This is because as it was discussed in the first Chapter, career decision making is based on the individual's subjective meaning representation and it is a dynamic process which requires cognitive developmental changes to occur while the individual operates for the solution of his problem.

However, even with this overall representation there are additional questions which need to be answered: as for example how the individual can be helped to have more than one representations which in fact can lead in broadening his background of safety (level 5 operations in the five level framework)? How he can achieve the cognitive balance needed for an adequate problem representation, and how the individual can be aware of the type of balance he is achieving. Although in both of these models the elements or components necessary for problem formulation and problem solving are defined, there is no clear guidelines on how the decision maker can be aided in this process of deciding. Both of these models lack procedural guidance in order to handle the "procedural uncertainty" involved in the problem solving process (i.e. how to overcome the uncertainties involved in developing a representation and proceeding to the solution and to action). They give us the "what is involved in the decision making process". But, since they do not provide any rules on how to move through the levels, they can not be regarded as decision process models. The question of how we can develop a process model which can best support the individual according to his needs and subjective representations still remains open.

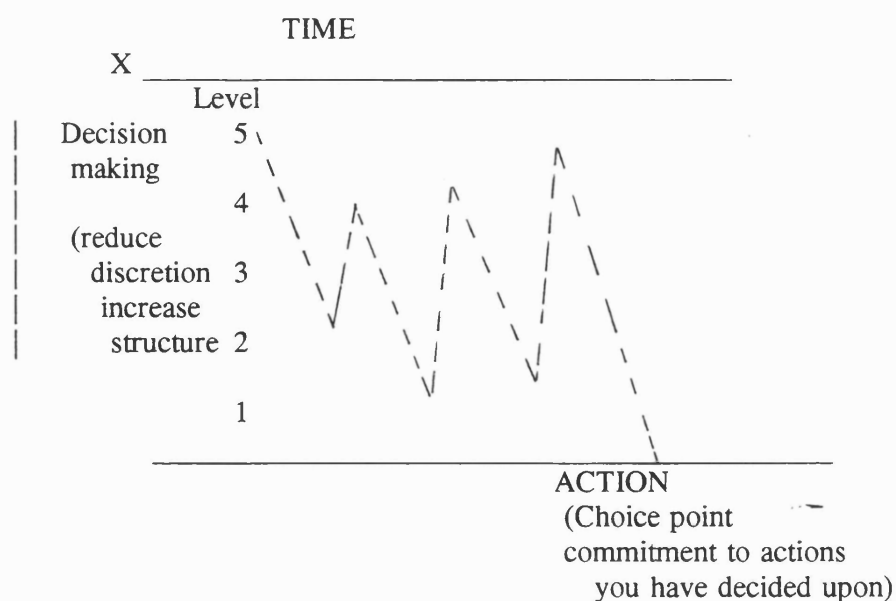
In the following section I will deal with this question after a brief discussion on the process of deciding and problem definition cycle.

2.3.2. The problem definition cycle

In sections 2.1.4 and 2.2., I discussed how a decision maker must move through five levels of problem structuring (Humphreys and Berkeley, 1983) and choice development (Nappelbaum, 1994) in order to move from feelings to action through the process of deciding on a particular course of action (represented as a decision alternative).

However, the progression from higher to lower levels does not necessarily happen in a strictly linear way: One may need to change levels and, because of difficulties encountered in handling the problem at a lower level, one may need to go back to higher levels. In Fig. 2.4 there is a diachronic description of the five levels framework. In this description, the individual starts his decision making process from a point "x" and continues by going through the levels, up and down, until finally he gets to the action level. Starting at point "x", although there is a pause in action, the individual feels motivated to do something: "I have to do something, I have to make a decision about what to do". The action point at the other end is the choice point, where the individual is actually committed to the action he has decided upon. It is also the point where decision making starts. In the same sense, in the circular logic of choice, the action point is not a finish point but the end of a round or a cycle and the beginning of a new cycle depending on the new representation.

Fig. 2.4. A diachronic description of the five levels framework



In both the circular logic of choice and the five levels or representation, there are many entry points at the level that problem solving process is framed (level 3 in the five levels framework) with (in theory) equal access. For example, one can choose to enter the problem by discussing the various options of the problem (i.e. entering the problem space from a prospective declarative representation). Or, one may wish to analyze the instrumental possibilities that exist for the solution of the problem. One may also enter the problem space from the angle of the value components by making value judgments on one's objectives and goals, or by analyzing in detail, either a particular option that an individual has in mind or the scope of his options. During the process also, the individual may wish to change his entry frame and conceptualize his problem through a different frame which he feels it will result to a more adequate problem representation. In any case the individual's language discourse reveals the particular entry points, and any other change in the way the individual conceptualizes and represents the problem.

Consequently, any attempt of modelling the process of deciding has to be flexible enough and able to capture the person's inherent flexibility of entry points and not to encase him within the frame that was intended by the initial representation. According to Nappelbaum, this feature, which is particularly important in a problem conceptualization framework, especially in the structuring of ill-defined problems, is actually lacking in most of the current problem solving and problem conceptualization methodologies.

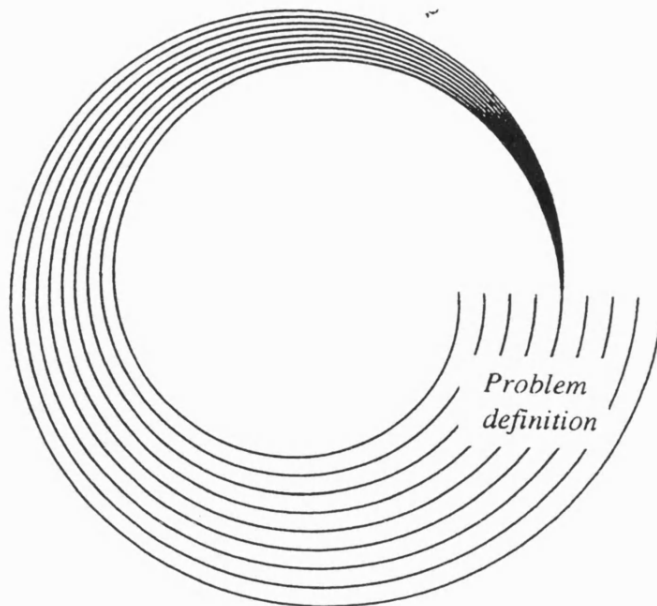
In such methodologies, ill-defined problems are seen as the ones which are "messy" (Ackoff and Emery, 1974), use a different language to describe the world of the decision owner from that what is to describe his objectives and his goals. There are also seen as problems in which there are no means to distinguish a solution, or where there is no hope to achieve this solution (Mason and Mitroff, 1981).

Following the circular logic of choice and the five levels framework, a problem arrives, ill-defined, through the initiation of feelings of unsatisfaction and a desire for change; these are represented in a form of disequilibrium or disbalance, since the person does not know, at this stage, how to implement something which could

"solve" the problem.

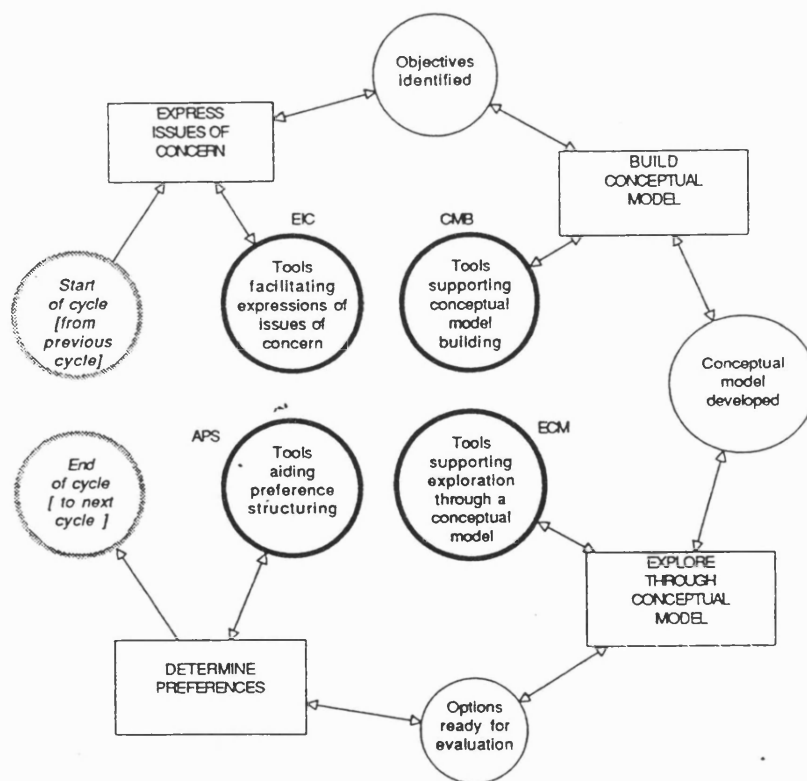
Consequently to structure an ill-defined problem means to try to bring it into balance as it was at the initial formulation of it, but with the new components which had been taken into consideration and the new plans (intentions) for implementation. According to Nappelbaum, to narrow down the problem it means to increase the structure of a representation following the instrumental intentions of how the problem has to be solved until a new problem representation arise (with new intentions for implementation). Figure 2.5. (taken from Nappelbaum, 1994) tries to express this idea of problem solving cycle graphically. In this figure it is shown that in the problem solving process, as a result of reformatting an ill-defined problem to a well-defined one (system analysis), we return to the same stage from which we have started, that is to the problem formulation. However, now this stage is sharpened because through the analysis of the problem and the evaluation of the different alternative solutions there is no discretion among different representations and one has to choose only one solution and take action (Humphreys and Nappelbaum, 1989; Humphreys and Wisdhuha, 1992).

Fig.2.5. The problem definition cycle
(From Nappelbaum, 1994)



Any procedural schema or process model for "problem definition" can be represented as a refinement of the above basic cycle of problem definition. A refinement followed (and usually further refined) by most of the 'structured' problem definition methodologies is shown in the figure below, fig.2.6. In this figure it is shown that to facilitate progress through the problem definition cycle, any refinement of modelling the problem solving process must show the links and the causal relationships between the decision components (different frames of problem representation, i.e. different scenarios, different alternative solutions, different criteria for evaluation). In this way, first it can show the rules of how to achieve a proper representation of a real world problem situation and second it can give the guidelines of how to intervene and help the problem owner in his problem solving process.

Fig. 2.6. A first refinement of the problem definition cycle
(From P.C.Humphreys and E.Nappelbaum (1989): Strategic analysis organizations and transition. Organizational research Group, London School of Economics and Political Science)



In general in structuring an ill-defined problem three things can be identified as necessary:

first, to narrow down the problem by evaluating the alternative solutions and make commitments to one (arrive at the sharpen point of the problem definition cycle), second, to be able to capture the individual's different problem representations as they are constrained from both the context in which the problem is located and the intentions of the individual, and third to give guidelines of how to achieve this.

In the following section a number of methodologies proposed for the process of deciding within the general framework of problem solving will be discussed as to whether they can be seen as further refinements of the problem definition cycle shown in fig. 2.6., and as to whether they can meet the second and the third of the above necessities.

2.3.3. Methodology for the process of deciding

Ill-defined problems have been approached by a variety of process models developed by a number of investigators: Churchman, (1979), de Bono, 1970; Adams, 1979, Mason and Mitroff (1981), Ackoff (1981), Checkland (1981), (Phillips, 1987). These models were created to be used both in personal and in organizational settings, by taking into consideration the way the problem is conceived by the decision owners. Central idea to these models is how the individual deals with the sequence of a number of stages (or phases) which he has to follow in order to reduce uncertainty and increase structure (and thus to transform an ill-defined problem into a well-defined one). These stages represent various further refinements of the representation and the problem definition cycle shown in fig. 2.6. Some examples of these refinements are:

Phillips extending his requisite decision modelling (Phillips, 1984, see 2.1.1.3), advocated the use of Decision Conferencing to build requisite models for group decision making (Phillips, 1989). According to Phillips although every Decision

Conferencing is different, they usually follow the order of sequential stages which are:

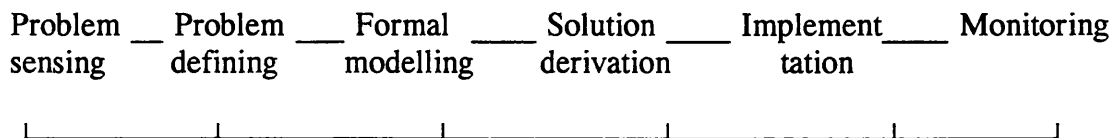
1. Pre analysis of the subject (initial meetings with the client)
2. Exploration of the subject through group discussions
3. Attempt made to formulate the problem
4. Structuring the problem, representation of the group's thinking about the problem
5. Data and subjective judgment added to the model, sensitivity analysis
6. Computer output and creation of action plan

Janis and Mann (1977), proposed a five stage model of decision making to which they have incorporated their conflict and choice model in a "combined model of coping patterns and stages of decision making". Each of the five sequential stages (first described by Janis, 1968) is followed by a number of questions which denote the major concerns associated with each stage and which determine the decision maker's coping patterns. According to Janis and Mann the model is intended to be applicable to all consequential decisions made by all decision makers irrespective of whether vigilance is the dominant coping pattern exhibited by the individual in his problem solving process (see, Chapter 1,1.2.1.4). The five stages and the major concerns associated with each are: (Janis and Mann, 1977).

Stage	Key questions
1. Appraising the Challenge	Are the risks serious if I don't change?
2. Surveying Alternatives	Is this (salient) alternative an acceptable means for dealing with the challenge? Have I sufficiently surveyed the available alternatives?
3. Weighting alternatives	Which alternative is best? Could the best alternative meet the essential requirements?
4. Deliberating about commitment	Shall I implement the best alternative and allow others to know?
5. Adhering despite Negative Feedback	Are the risks serious if I don't change? Are the risks serious if I do change?

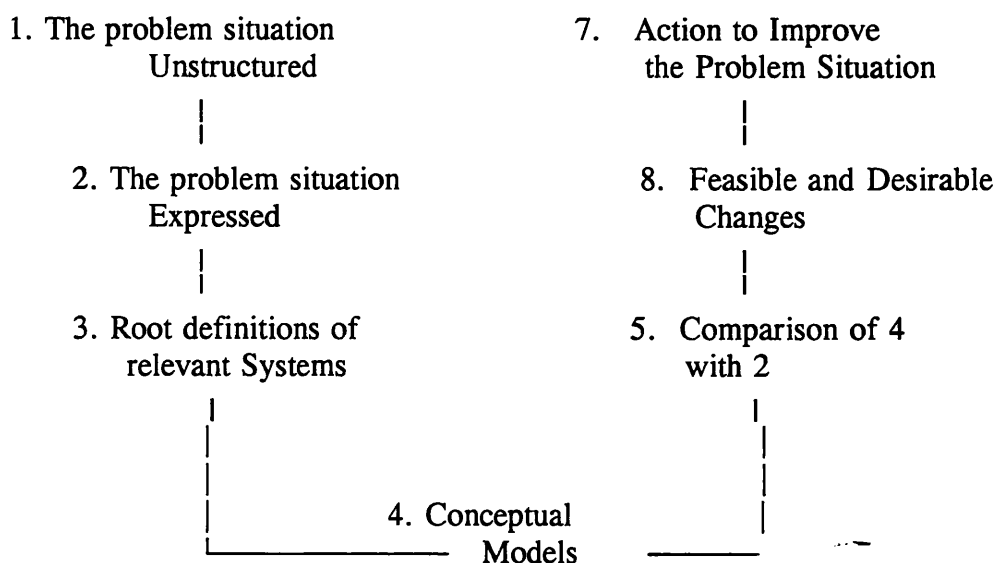
Mason and Mitroff (1981), proposed a composite model of the inquiry/problem solving process which is an overview of the various models attempted since 1960's concerning whole systems modelling of problem solving (e.g. Ackoff, 1979;

Brightman, 1978; Newell and Simon, 1964; Schein, 1969). It consists of a number of sequential and iterative phases which are distinct from one another only in the sense of representing identifiable activities. Thus problem solving through the phases is a continuous ongoing activity rather than a static entity (Mason and Mitroff, 1981). These phases are:



Checkland (1981), proposed also a soft system methodology based on a number of stages representing activities necessary to solve a problem or improve a situation. This model is both applicable to system analysis and to general problem solving but lies firmly within systems thinking. Fig.2.7 provides a schematic diagram of Checkland's methodology. According to Checkland stages 1,2,5,6 and 7 are real-world activities necessarily involving people in the problem situation; stages 3 and 4 involve system thinking and consist of building conceptual models of the human activity system.

Fig. 2.7. Checkland's stages of problem solving



However, all of these methodologies, although they see the problem solving process as an ongoing movement around the problem definition cycle, are too restricted because in following the stages of the process of problem solving round the cycle, they allow for each stage a very restricted set of transitions (usually moving forward from one stage to the next); thus, they do not provide adequate rules for how to make the transition of one stage to the other or of one problem representation to the other. However, in a problem solving process, in real life one needs to move, not only in one direction, but to be able to make looping backs at any stage of the procedure. Moreover, most of these methodologies are further refinements of models developed in particular formal contexts, and thus they have further restrictions concerning where they can be applied: they are not context free.

In addition, Berkeley et al. (1989), investigating organizations in transition, suggest that, the way problem solving is investigated by changing an ill-defined problem to a well-defined one is unnatural and it is like substituting the real problem with a default problem which however is controlled by parameters different from those which define the real problem. Berkeley et al., point out that for an ultimate problem representation one needs to consider both the factors which determine how the problem is conceptualized (context of the problem, constraints coming from above), as well as the instrumental intentions which determine what plans have to be followed for the implementation of the problem solution (actions to be taken for a completion of a plan or for a project to be carried out).

This above approach to problem representation in fact helps us to proceed in the structuring of an ill-defined problem without having the need to regenerate the problem and substitute it with an well-defined one. Thus we can meet the necessities for problem structuring stated in the previous section (see p. 98), i.e:

- develop a procedural schema appropriate for the context in which it is to be applied, which can help us to capture the way the problem is represented, is intended and is constrained.
- find ways to help the individual in his process of deciding.

2.3.4. Conclusion

From the above review of the literature on modelling the decision making process some important conclusions can also be made:

First, decision problems cannot be removed from the real world in which they exist, and thus we cannot simulate models or establish theories of planning and problem solving in isolation from the social context in which they are placed (Mason & Mitroff, 1981; Humphreys & Berkeley, 1985).

Second, for the construction of any decision making model, we have to look at the process of the decision making as an overall representation in which the various stages of the models and its particular subprocesses are integrated into an overall more realistic view of how problems are held by the individuals. This will help us to indicate the kind of support required to be given to the individual at each stage of the decision making process.

Third, problematic situations which produce conflict and stress, as well as situations in which the individual is in a goal confused state may result in defecting mechanisms used by the individual in order to avoid the regret of an unsuccessful decision. This implies that in the investigation of the decision making process, it is important to find ways not only to restructure their problem but also to cope with the reality of their problem situation.

The needs identified in the above conclusions have been taken into consideration for the development of a process model of career decision making where these needs can be incorporated and addressed more adequately. The first step in this attempt was the combination of the five levels framework with the circular logic of choice (as developed in section 2.3.1) which gave us an overall representation of the process of decision making and problem solving. This overall representation helped me to identify how the individual represents his problem in his language (his conceptual model of his decision problem), i.e. what frames he uses when he is talking about his problem (see sec. 2.2.2. and 2.3.2). It will be also used as the basis of the process model of career decision making which is described in Chapter 5. This process model will form the basis for the proposal of a career counselling model discussed in Chapter 9.

2.4. Modelling the Process of career decision making

In the previous chapter, career development and choice were shown to be a process which can be seen as a sequence of a number of decisions made by the individual towards the solution of his career problem. In fact, these decisions can be viewed as links in a chain (Osipow, 1973), where each link can represent minor choices among various alternatives. For example, the decision to continue studying instead of going to work, for a fifteen year old student, entails the minor choices about which school to attend (i.e. technical versus non-technical, private or public school etc.), or about how he can manage to prepare for entering university, with whom he is going to study, or which University to enrol in, and so on.

In addition, in the first chapter, it was discussed how the career problem follows the characteristics of the personal decision making problems. In the previous section I have also discussed how decision making problems can be approached. Since the career problem is viewed as a personal decision making problem, and is considered as a problem solving process rather simply decision making, the main stages defined for the process of decision making and problem solving can be applied here. In fact, as it will be discussed in 2.4.2., the various models of career decision making consist of a number of stages which are usually represented as the refinement of the problem solving cycle discussed in sec. 2.3.2.

In the following I shall first briefly review the general counselling approaches to the career problem. Next, I will review several career models stemming from decision theory, as well as models which found to share a lot of commonalities to the present work. The main purpose of this review is to identify stages in the career decision making process as refinements of the problem definition cycle. The impact of computers in the process of modelling and aiding the career problem will be discussed next. This chapter will finish with a discussion on how the five levels framework can be incorporated in the career problem and best represent the operations involved in the process of career decision making.

2.4.1. Approaches to Career Counselling

Before proceeding any further in reviewing career decision making models, a brief discussion on career counselling in a more general level is given in this section. By generalizing it could be said that career counselling follows the basic theoretical approaches towards career development and decision making.

Thus, career counselling stemming from the various theoretical approaches to career development and choice (discussed in chapter 1), can be distinguished by certain central organizing concepts as follows (Crites, 1981):

- (a). Trait and Factor counselling which focuses on individual differences in ability, interest and personality to assist the client to find an optimal position in the world of work (e.g. Holland's congruence theory).
- (b). Client-Centred counselling, which emphasizes the self-concept and assists the individual to achieve the maximum congruence between himself and his potentialities with the experience he gets from the environment. Rogers' client-centred approach seems to be used more extensively among the career counselling practitioners; according to this approach effective helping depends upon the quality of the relationship between helper and client, particularly the communication of respect, empathy and genuineness.
- (c). Psychodynamic counselling, which is more comprehensive and incorporates concepts and techniques from both of the above, and which focuses on the reinforcement of the individual's internal motivational states and coping mechanisms (e.g. Roe's psychodynamic approach).
- (d). Developmental counselling which focuses on the individual's overall career maturation taking into consideration the possibility of all the changes in behaviour -vocational, personal, or social- which can occur during maturation (e.g. Super's career development theory).
- (e). Behavioral counselling which deals almost exclusively with the process of learning as it impinges upon career decision making (e.g. models derived from behavioral decision theory).
- (f). Career counselling based on the sociological approach to career development. As for example, Robert's opportunity structure approach, Krumboltz's social learning theory (see chapter 1,1.3), and Law's community interaction theory which focus on the role of interpersonal exchanges and interactions within the individual's local community in the process of career development (Law, 1981).

Krumboltz and Thoreson (1976) have also studied career decision making (Krumboltz, 1977). They suggested that career decision making like any other problem solving behaviour is a question of setting and finding ways of achieving appropriate goals. Thus in the question "What career should I choose?" the counsellor should help the individual to move to a career decision through a systematic process, by "determining the problem", "exploring the alternatives", "clarifying values", "seeking out information" and looking at the implications of various courses of action, "eliminating the least likely alternatives". Based on these stages Krumboltz (1977) has developed the DECIDES mnemonic which has provided a useful framework for career education programmes. It consists of the following steps:

1. Define the problem
2. Establish an action plan
3. Clarify values
4. Identify alternatives
5. Discover probable outcomes
6. Eliminate alternatives
7. Start action

In addition to the above, a number of other models borrowed from different theoretical and therapeutic approaches seem to be in use among career counsellors (Kidd et al., 1993). These are:

a) Focusing on Interviewing

Rodger's Seven-Point Plan which is focused more on the process of information gathering, information giving and making recommendations during the interview sessions. According to this model information should be gathered from the client in seven areas: physical make-up; attainments; general intelligence; special aptitudes; interests; disposition; and circumstances (Rodger, 1970). The aim of Rodger's seven-point plan was to give structure and depth to an interview, of which the principal task was clearly the assessment and appraisal of clients. With its emphasis on assessing the individual's characteristics, abilities and intelligence it demonstrates its origins to the "trait and factor" approach (Chapter 1, 1.1.1).

Bedford's FIRST framework. A method devised by Bedford to relate interviewer characteristics with the outcomes of the interview for the young person. The method relies on a diagnostic interview, but since it is looking at the stage the individual has reached in his career maturation it can be considered as looking at the interviews

from the developmental perspective. It is based on based on the mnemonic FIRST:

- Focus - how far has the student narrowed down options
- Information - how well informed is the student about career options
- Realism - how realistic is the student
- Tactics - to what extend has the student worked out the practical steps necessary to achieve his/her career objectives.

b) Focusing on Guidance and Counselling

Egan's 'skilled helper' approach, according to which, counselling and helping the individual is based on a three stage process:

1. Clarification of the problem,
2. Exploration of the possibilities, and
3. Formulation of plans.

Egan defines his model as an active client-centred approach, as well as a problem-management, opportunity-development approach to helping (Egan, 1994). (Egan's refinement will be discussed in more details in the following section).

Berne's transactional analysis, which is based on the analysis of interpersonal transactions involving the functioning of three 'states of being': parent, adult and child (Berne, 1964).

Kelly's (Kelly, 1955) personal construct theory, according to which individuals construe the world and their environment in ways unique to themselves. In career counselling, constructs describing the self and occupations may be elicited and used in decision making (Kidd et al., 1993).

In general the disparity of counselling models and schemes in the career practice seem to be in the consideration of those working in the field. A very recent review by Meier (1991) on studies regarding occupational choice (covering the period 1988-1990) concentrated on topics such as vocational choice, decision making and career development interventions and assessment. Meier, in his review, points out the plethora of constructs used by various studies and models which are often atheoretical and only superficially related to each other. He also suggests that a reexamination of the traditional measurement methods would be useful for renewed progress in the field of vocational choice.

In fact, the need for a more comprehensive approach has been already noted by career counselling theorists (Law and Watts, 1977; Watts, 1990). Crites (1981), has produced a comprehensive model of career counselling in which he utilized concepts and principles from the major approaches reviewed above and also from general systems of counselling and psychotherapy. In a very recent study on the working models in career guidance in Britain conducted by Kidd, Jarvis and Offer (1993), the need for an integrating theory and practice in training for career counselling was also suggested. In the same study it was found that career counselling practitioners prefer to a great extent not to use a model or follow a particular theory in their counselling procedure but to adapt their model of interviewing to the needs of the client. It was also found, that the majority of the counsellors were familiar to Rogers' (Rogers, 1965) client-centred counselling, Super's development theory (Super, 1957, 1974), and over half of them to Egan's (Egan, 1994) skilled-helper approach. Rodger's Seven-Point plan (Rodger, 1970), found as widely known among practitioners although not regarded as very relevant to interviewing practice (Kidd et al., 1993).

Kidd, Jarvis and Offer (1993) concluded that more pooling of experience and expertise seems necessary in order to identify which theories should be covered in the practitioners curriculum and how they could be integrated within their practical training.

2.4.1.1 Egan's helping-skills model

In this section Egan's model will be reviewed more extensively since it was found to share a lot of commonalities with the present work.

Egan's model is a helping skills model for counselling, with the main goal to increase client's ability to manage their problems, develop more opportunities and thus manage their life effectively. As it is said above the model is based on a sequence of flexible stages usually broken into steps. According to Egan the helping-skills model is like a map. At any given moment shows to the helper how to help the individual. It is composed of three stages which overlap and interact as the client strive to achieve the change in his problem. At any stage it is outlined what clients need to do in order to manage their problem situation, and develop opportunities.

The first stage refers to an initial exploration and clarification of the problem and the opportunities available. It consists of three steps: in step one, the counsellor, helps clients to tell their stories as clearly as possible; in step two, the counsellor, helps clients to discover and deal with the kinds of blind spots that keep them from seeing problems and opportunities clearly and from moving ahead; in step three, the counsellor, helps clients to identify new perspectives for their problematic situations, as for example to work on issues, concerns or opportunities that will make a difference in their lives.

The second stage refers to a development of a preferred scenario and goal setting. It tries to give answer to the questions: What do you want? What would things would look like if they were better? This stage consists again of three steps focusing on the identification of the possible goals (step 1), evaluation of goals (step 2), and helping clients to choose their goals and commit themselves to action (step 3) (see Kidd et al., 1993).

The third stage refers to the establishment of the ways necessary to implement action and achieve the goals already established. It consists of three steps referring to developing a number of strategies (step 1), choosing the best strategies (step 2), turning strategies into a plan and into action (step 3).

According to Egan these three stages are cognitive in action.: talking about and planning for action. He stresses however that the stages and the steps of the model are not always sequential. Clients don't take one step after the other, they move back and forth among the stages and steps towards the accomplishment of problem-management goals. According to Egan, the model must remain flexible to the needs of the client and of the counsellor.

Egan also, stresses the importance of negotiation between the counsellor and the client about the subject matter of the problem and the issues which require deeper examination. He proposes the establishment of a contract referring to a reciprocal agreement which makes explicit mutual expectations between client and the counsellor. This is particularly important since according to Egan counselling is a collaborative process between the helper and the client, in which helpers and clients work together. Thus, although counsellors help the clients to achieve outcomes they do not control outcomes. Clients have the greatest responsibility both of the

production and the quality of the outcomes. In this respect Egan's model is a model which is addressed to the counsellors to become better helpers but also is a "problem solving model" addressed to the clients on how to find ways to help themselves.

Egan's model is considered important for the present study for the following reasons on which I agree. Egan looks at the decision problem as a "messy", ill-defined real world problem with consequences which are difficult to be estimated. Egan's model is based on open systems theory borrowing elements and concepts from the behavioral decision theory. It sees the decision process as a sequence of stages which however are not always linear. It stresses the flexibility and the overlapping of the stages according to the needs of the client, the counsellor and the problem situation.

2.4.2. Descriptive versus prescriptive career decision making models

In this section I will describe some additional models of career decision making based on decision theory. Most of them are based on stages which can be seen as refinements of the problem solving cycle discussed in 2.3.1.

Career decision making models can be classified into two main groups, based on the descriptive and prescriptive approaches used for the analysis of decision behaviour (Jepsen and Dilley, 1974; Mitchell and Beach, 1976). The main concern of the descriptive approach is to examine how people actually make a choice. Thus, the purpose of the descriptive model is to represent the ways people generally make vocational decisions. The prescriptive approach, on the other hand, is concerned with how a decision ought to be made. Thus, prescriptive models represent attempts to help people make better decisions by prescribing which rules should be used in order to reduce decision errors. Both approaches interact with one another and have contributed to an increasing body of practical knowledge in the field of career choice (Mitchell and Beach, 1976).

Jepsen and Dilley (1974) have identified five descriptive and three prescriptive models, although, as they have noted, the distinction between prescriptive and descriptive approaches is slippery and depends on the conditions of a decision

situation. In the descriptive models they included the models of Tiedeman and O'Hara (1963), Hilton (1962), Vroom (1964), Fletcher (1966); the prescriptive models included those of Katz (1966), Gelatt (1962). Some of these models have been widely cited in the literature on career decision making and have provided the basis for the development of later career decision making models and computer based aid techniques.

Tiedeman and O'Hara (1963) have divided the process of deciding into two periods called Anticipation and Implementation-Adjustment. The periods distinguish between behaviour prior to, and following, instrumental action on the decision. The Anticipation period is consisted by four anticipatory steps:

1. Exploration
2. Crystallization - recognition of alternative choices through elimination of some inappropriate options
3. Choice - represented by definite commitment with some degree of certainty to a particular goal.
4. Clarification - elaboration of the consequences of the commitment, delaying overt action until circumstances are appropriate for action.

The second period is distinguished by three steps all associated with overt action towards implementing the choice.

Vroom (1964) pioneered the application of explicit theoretical formulations of the expectancy theory in organizational behaviour. According to him, the choice of an occupation depends upon the degree to which a given alternative is seen as more likely to lead to valued outcomes than any other alternative (Mitchell and Beach, 1976).

Katz's (1969), model is different from other models in that the entry point into the career decision making process is the 'identification' and 'definition' of values rather than the listing of alternatives (Jepsen and Dilley, 1974). In this model, values are regarded as the satisfying goals or the desired states which are not sought by the individual in terms of motivating drive or instrumental action. The decision maker develops his own list of dominant values and scales them according to his "magnitude of value". The major contribution of Katz is that he has made available techniques that can be used by students in making their values explicit.

In fact Katz (1966,1973) has developed a computer-based "System of Interactive

Guidance and Information" (SIGI). It is consisted by three basic parts:

1. The "value system"
2. The "information system"
3. The "prediction system"

The "value system", includes gathering information about the applicant's values (in an interaction between the counsellor and the client). The "information system" provides the actual likelihoods (probabilities) that a particular occupation will lead to a particular outcome, based upon statistical data. The "prediction system", represents the chances that a particular applicant with certain skills, grades and personality characteristics will attain a particular occupation. Studies supported the usefulness of the system and consider the system very helpful (Chapman, Morris and Katz, 1973).

Katz, Norris and Pears (1978) have also suggested a diagnostic measure of competencies in career decision making which is essentially based on Subjective Expected Utility (SEU) theory. In this technique the student evaluates certain aspects of alternative occupations and is informed about the likelihood that the alternatives will fulfil these aspects. Then, the scores for each occupation are calculated and compared with the student's overall rating. The instrument is considered useful in stimulating the student to gather information and to discuss possible differences between his/her ranking and the "logical" ranking.

Gelatt (1962) proposed a rational decision making framework which was derived from Bross' (1953) design for statistical decisions, and from Cronbach and Glesser's (1957) description of decision sequences. He suggests that a decision must be evaluated by the process it follows rather than by the outcome alone.

Apart from these early established models, a literature review on occupational choice and career counselling has revealed a vast amount of studies in this field. These studies usually focus on the relationship between vocational choice and variables such as career maturity and motivation, work values, job satisfaction, cognitive styles, career identity, occupational preferences, congruence, self-efficacy success and sex-differences, as well as other factors stemming from the individual's cultural and social environment (see, Annual Reviews in the Journal of Vocational Behaviour).

As an example to these new established models we can refer to:

Mitchell's (1974) and Mitchell and Beach's (1976) models based in rational decision theory as described earlier; in these models the authors have incorporated Vroom's Expectancy Theory and other elements of decision theory, and have proposed models of job satisfaction, occupational preference and effort;

Ekehammar's (1978) model, which introduces the psychological cost-benefit concept as an intervening construct in career choice; his model was applied to the situation of students facing a career choice (education vs work) after high school graduation; Zakay and Barak's (1984) model of career decision making, which is based on the subjective meaning of the values involved in the career decision; this model was tested on ninth-grade pupils who had to decide about their future high school studies, and on university students who had to decide on their major subjects. It was found to have high predictive power regarding the actual choices made.

Harren's (1979) model is a comprehensive counselling model for college students, based mainly on Tiedeman's career decision making model. It uses also concepts from Janis and Mann decision making theory and the theory of cognitive dissonance, as well as from the self-concept and developmental theories (Korman, 1967; Super et al., 1963). Harren postulates four interrelated parameters as important in the career decision making process: Process, Characteristics, Tasks, and Conditions. The first parameter, the "Process", is the core of the model and refers to a four-stage sequential decision making process through which the person progresses in making and carrying out decisions. These stages are:

1. awareness,
2. planning,
3. commitment,
3. implementation

At each stage of this process, the person is preoccupied with different issues and different behaviours in order to resolve these issues. The second parameter, "Characteristics", refers to the individual's personality traits which determine the person's perception of the problem situation, and influence his progress in the process. The third parameter, the "Tasks" refers to the individual's career-relevant developmental and decision making tasks (in particular those of college students). Finally, the fourth parameter, "Conditions" refer to the situational factors which

influence the decision maker present psychological state. Through his model Harren postulates that career decision making needs have to be understood within the context of career development, and that the decision making process varies depending on the context and the type of decision involved and the personality and level of maturity of the decision maker. Harren's model is mainly prescriptive showing ways of counselling of the career decision process should be done, with some elements of a descriptive approach.

In conclusion it can be said that career decision making models and aids deriving from decision theory can be characterized as follows: They are mostly prescriptive. They are analytic and formal, assessing beliefs and values qualitatively and quantitatively. Deriving from a rational and logical set of axioms -empirically tested- they emphasize information gathering, focus mostly on the probabilities of outcomes and aim exclusively in solving the client's decision making abilities in a more general sense. Decision making theories look at vocational choice as a type of personal problem which the individual has to face and which has the essential characteristic that the individual's personality has to bear the consequences of the action taken (Jungerman, 1980).

In general, the effectiveness of rational-prescriptive models in career decision making was questioned mainly because they were considered: (a) to be more prescriptive than descriptive; (b) to ignore the social context of the decision maker and the decision situation, and (c) to ignore the vast range of individual differences in modes of decision making (Herriot, 1984). However, both descriptive and prescriptive models have certain controversial elements. As Super and Hall (1978) point out, empirical studies (naturalistic and experimental) are needed to see whether descriptive models describe what happens, or whether prescriptive models are successful in their prescriptions for action. Nevertheless, literature on occupational choice models has revealed that rational decision making models have been widely used by theorists and have had some success in predicting graduates' intentions and choices (P. Herriot, 1984). Models, like those of Mitchell and Beach (1978) and Mitchell (1982), have been used successfully in organizational psychology contexts (Oldham, 1976; Herriot et al., 1980), as well as in the prediction of a business career in preference to

specialization in professional psychology (Mitchell and Knudson, 1973).

However, for the present study most relevant can be considered Janis and Mann conflict model and Egan's helping-skills model.

The Janis and Mann conflict model (see Chapter 1, 1.2.1.2; chapter 2, 2.3.3) which as it was already discussed applies to personal decision making in general, but has been also established in studies concerning career choice. In particular Janis and Mann's "Balance sheet procedure" (see, 4.2.2) has been used by the authors and others in various counselling models (e.g. Egan, 1994), as well as in career counselling (Hesketh et al., 1987; Harren, 1979). It is also used as a decision aiding technique in the present study (see chapter 4, 4.2.2). Janis and Mann's model is both descriptive (describing individual's behaviour in front of a conflicting situation), and prescriptive (prescribing ways of how to help individuals in their process of overcoming their decision problem).

Egan's model (discussed in 2.4.1.1) is a prescriptive model showing how the counsellor has to proceed in helping the client; it is not descriptive, it does not shows what is involved in the decision making process. In this sense although it stresses the necessity of understanding the client's frame of reference it does not gives us ways of how this understanding can be done. Thus, it does not defines how the counsellor can identify what are the needs of the client at each particular stage.

Both of these models are refinements of the problem solving cycle discussed in 2.3.2. They can be distinguished from the other rational models mainly because they can be characterized as process models, which are looking at the process of career decision making in a more holistic way in which the stages are not strictly followed in a linear way but are flexible and able to be adapted to the decision maker's needs. However, they do not provide the possibility to capture the individual's different problem representations in the different stages of the process so that to represent not only how the problem is represented but also how the problem is constrained, and how is intended (see 2.3.2). Thus they cannot give the rules of how to move through the process, so that the flexibility of the models can be operationalized and handled by the problem owner and the decision helper. This is something which the present study

is trying to achieve through the development of a process model of career decision making on which a process model of career counselling can be based.

2.4.3. The impact of computers in career counselling

Whether they are welcome or not, computers in the 20th century have permeated every part of our lives. In the field of career counselling also, there has been a growth in computer-based work, although users and counsellors are at the early stages of understanding the full potential of such systems (Watts, 1990).

In fact, microcomputer based techniques used as aids differ from counselling in the following way: whereas the various counselling techniques tended to concentrate on the affective side of the decision problem, the emphasis of the computer based techniques is entirely on the cognitive side (Wooler, 1982). Consequently, computer based techniques can be evaluated by the degree to which they clarify, expand and structure the client's perspective of a particular job, rather than by the degree to which they help individuals cope with emotions generated during the experience of a career choice. This justifies Miller's (1970) concern about the extent to which variables such as personal feelings, motives, values and aspirations can be reduced to numbers and computer symbols. Wooler and Lewis (1982) argue that the question to ask is not "how effective are computer models on career decision? but, better how to measure or assess the total effectiveness of a career service.

Irrespective of these criticisms, the use of computerized guidance programs seems to be a promising approach. In this respect, Pinder and Fitzgerald (1984) have emphasized the importance of "computer assisted career guidance systems" which offer information access and retrieval in aiding the individual in his decision process. Such systems are the Computerized Vocational Information System (CVIS), the Coordinated Occupational Information System (COIN), the Guidance Information System (GIS), and the Career Information System (CIS). On the other hand, there are systems like the System of Interactive Guidance and Information (SIGI) and DISCOVER which emphasize guidance and try to teach decision making or valuing processes. It has also been argued that The Computerized Heuristic Occupational

Information and Career Exploration System (CHOISES), contains both information and guidance functions, although it is classified as an on-line information system (Maze and Cummings, 1982).

Moreover, a number of systems -like JIIG-Cal, CASCAID, and GRADSCOPE - are now widely used in Britain (Watts, 1990). Watts (1990) also mentions two interactive systems which he classifies as "learning" systems because they are designed, not only to retrieve and process information, but also to help users to learn relevant skills and concepts. These systems are, the CAREER BUILDER designed to be used in work organizations and in higher education, and PROSPECT, designed initially for higher education, but with the possibility of being adapted later for use in schools and with adults. Watts refers to these systems

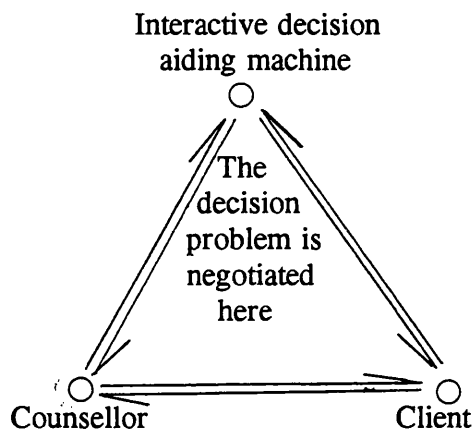
An interesting development in computer assisted career counselling in Britain has been the development of a number of interactive computer programs, namely the Multi Attribute Utility Decomposition (MAUD, Humphreys and Wisudha, 1982) the Career Decision Aiding System (CDAS, Wooler and Lewis, 1982), and the Hierarchical Structuring Aid (HISTRA, Wooler, 1982). These programs are based mainly on the philosophy of decision analysis that intuitive judgment can be improved by decomposing problems into more manageable and more thinkable component parts (Raiffa, 1968). The distinguishing feature of these systems is that they operate by a continual process of interaction between client and computer. The computer program MAUD is used in the present study for the above reason, and because it was found to be able to support individuals in the structuring and evaluation of their alternative options and the criteria attached to them (Humphreys and Mcfadden, 1980). (MAUD is reviewed in Chapter 4, 4.2.3; Chapter 8, 8.2.)

However, the effectiveness of computerized aiding techniques, as well as their usefulness in the career decision making process, is still in question among the career counsellors. As Watts (1990) suggests, such systems should not be seen as merely "powerful tools", nor as simply alternatives to other career guidance help but as "agents of change". He also addresses the need for clarification of the aims and objectives of guidance in general, which he believes lead to a more systematic approach towards computer guidance.

To what extent then computer-based techniques are effective? In my opinion this question still remains open. As Humphreys and McFadden (1980) argues, it is very difficult to criticize a model when there is no external criteria: "without the aid of hindsight, such criteria are invariably absent in decision making situations". What is important to be noticed is the extent to which the cognitive clarification of the decision problem (which can be achieved in computer-based aids) can eliminate the stress that the individual may face in a decision situation. Acceptance of the computer aiding techniques requires not only familiarity with them but also understanding that they can be beneficial when used properly. This can become possible when a person has used computers to solve similar but less important problems. In particular, concerning vocational choice, computer decision aids should be introduced to students from the beginning of their education in addition to career counselling. Thus students will be able to recognize their value and familiarize with them. As a result, when they have to make an important career choice decision, students would be at least cognitively ready to use and accept computer-based aiding techniques.

Actually, an interactive structuring aiding technique can be viewed as one pole of the triangle of the whole counselling process; the other two poles being the counsellor and the client (see Fig. 2.8). The arrows connecting these poles represent the communication channels of negotiating the nature of a decision problem which is negotiated within the triangle. The transactions which go on in this triangle are thus successive and reciprocal. When the outcome of a computer program is therefore available, it can serve as a map of the client's current thinking which can be explored by both the client and the counsellor. Consequently, the two way feedback from the machine and the client to the counsellor, and from the counsellor and the machine to the client, can bring together the clinical judgment of the counsellor and the intuitive thinking of the client, for a more satisfactory decision.

Fig. 2.8: Negotiation of the problem between the counsellor, the problem owner, and computer decision aid.



2.5. The five Levels framework and the circular logic of choice in the context of Career Decision Making

This section is devoted to draw conclusions about how it would be able to operationalize the activities involved in the five levels framework and the circular logic of choice (discussed in 2.3.1) with regard to the career problem. The purpose is first to establish how through the use of these frameworks we can capture the individual's different problem representations as they are constrained from both the context in which the problem is located and the intentions of the individual and second how these frameworks can become useful in developing a process model of career decision making.

2.5.1. The five levels framework

The five Levels of the framework introduced earlier in this chapter (see 2.2), allow the identification of the different ways in which individuals structure and represent their problems within the bounds of their own small world. This can be accessed through the identification of the operations involved at each level. These operations

are qualitatively different at each level, and they themselves are not structures but are functional aspects of structure formation (Berkeley and Humphreys, 1982). Table 2.1 summarizes the operations involved at each level.

Table 2.1 : Operations involved at each level of Knowledge representation

LEVEL	PROBLEM STATE	OPERATIONS INVOLVED AT EACH LEVEL
5	Problem recognition Problem situation unstructured	- Exploration of the individual's small world - Formulation of boundaries
4	Problem definition Problem situation expressed	- Identify the relevant structure for the solution of the problem - Three frames identified
3	Problem simulation Conceptual model building	- Develop structure within each frame
2	Problem evaluation Conceptual model building	- Sensitivity analysis Explore what if questions
1	Problem Solution Decision	- Best Assessments

In any attempt to adapt the five-Levels framework to a real life problem, as for example to the career problem, care should be taken that levels are not considered as logical stages, nor should they be classified as a taxonomy. Rather, they should be considered as an integrated system within which the problem owner can move (Humphreys, 1984). Thus, one cannot assign a person as a Level- one or Level-two person. Instead, one has to detect how the problem owner moves up or down between Levels by adapting or modifying his knowledge representations at each Level, and by changing the constraints that he puts on lower Levels, to have a more

satisfactory way of problem representation (Berkeley and Humphreys, 1982; Humphreys, 1986).

2.5.1.1. Small world exploration

As was mentioned earlier (2.2.2), the individual's representations of his problem situation (i.e. the way he sees, explores, and structures his problem situation) can be detected through the communication channels he uses when he is talking about his problem. We can detect that the individual is operating at **Level 5** in reference to his career problem, when he starts expressing his feelings that something has to be done concerning his career, or that he is in a problematic situation which has to be resolved.

Talking about his problem the individual mentions various factors: parental influence, difficulties in schools, wishes for economic independence, fears about the possibilities of success, and so on. These factors can play a major part in the conceptualization of his career problem by defining the boundaries of his small world. However, following the individual in his problem exploration, it can be seen that, although he may be aware of the various environmental factors, he is not consciously aware of the constraints put on him, or of the conflicts which appear, when he is trying to operate but is not able to do so. In fact, the person is constrained not only by the environment around him but also by the "holes" or the "gaps" he finds in his scenario exploration (Humphreys & Berkeley, 1982). In other words, the individual can proceed in the exploration of his decision problem only as far as the boundaries of his perception will allow him.

The boundaries of a person's perception are shaped by his small world representation. Moreover, the paths he is taking, the contingency plans, as well as the scenario he is following within that representation, constitute his background of safety. Thus, when a person is exploring within the small world of a decision problem and finds a gap in the boundaries of his background of safety (that is where no contingency plans exist for handling the situation), then the negative utility associated with the scenario is unbounded and considerable fear can result.

An example of the above would be the person who says : "All I want is to enter

University. I don't know what I will do if I fail". It is apparent in his statement, that he is unable to consider further scenarios because he is unable to see further than the safety which his entrance to University gives him. He feels unsafe about thinking and exploring areas in which no contingency plan exists. Humphreys (1982), in his investigations of risk decision problems, has shown how the non-familiar risk situations are considered "unsafe" only because they are conceptualized within a bound world.

Feelings of 'unsafety' or statements with an 'unsafe' connotation can be found at large in the adolescent's career problem representation (Banks et al., 1992; Herriot, 1984). For example, studying the occupational demand, Karmas et al. (1987) have shown that the criterion of "security" was attributed to a job with high frequency, although there were variations within the occupational fields chosen.

If we wanted to analyze the individual's knowledge representation at Level 5, we might face difficulties because: a) The cognitive operations at this Level are in themselves beyond language (Humphreys, 1986) and even the person himself cannot represent them in his own language (Jameson, 1977). Because of these difficulties, when we study or we try to aid individuals at Level 5, instead of having external models, we need "internal exploratory techniques" (Humphreys, 1986). Toda (1976) in his analysis of the small world, suggests that it is difficult to construct a "simulation model" for each decision problem; instead he proposes that a general model, (i.e. "a cognitive simulator"), should be constructed for each decision problem after adding some necessary information.

A better way to study and analyze problems at Level 5 would be to establish a number of **domains** within which the exploration of the small world of individuals facing the same problem (as for example the career decision making problem) could be represented. A similar approach has been used by Humphreys et al. (1987) in a five level empirical analysis of an intuitive decision problem.

Extending the boundaries of the "small world"

In theory, when a person is thinking about how to handle a problem at Level 5, he is considered to have total discretion over his action. This does not happen very often, however, since to exercise total discretion would mean that the individual was able to control his identity in relation to the whole world around him. For example, such a person in a career decision making situation should be able to say:

"Forget the family, forget everything, I can start from scratch, I can find a world where I will create my whole life. Everything is up to me".

However, few people, and certainly not a lot of individuals at the age of 17, can do this with sufficient confidence that they can plan a strategy for successfully handling any new situations created by their decisions and their actions.

From a counsellor's point of view, the act of helping the individual at this level would be to extend his discretion upon his actions. This can be done:

- (a) by extending his goals and his ego-involvement in his future scenario exploration;
- (b) by extending the range of considerations interfering in his career problem, i.e. exploring the issues and the consequences which may result from a future act; and
- (c) incorporating (a) and (b) to extend his background of safety.

Extending the background of safety would be to help people develop and put boundaries to scenarios in areas, where at present they "...don't know how to think about what would happen" (Berkeley & Humphreys, 1982). By doing this, the individual can feel safe in knowing that there are alternative solutions and scenarios by which he can proceed in the event of 'undesired consequences'. Also, by having his bounds of safety extended further, he is more able to incorporate the requirements of the new roles that commitment to a career might demand.

As Herriot (1984) suggests, through exploration and "social exchange" (anticipatory socialization), the adolescent may enrol himself in the activities of his social environment, and experience the roles of work, occupation or organization which will be important for the transition to the next stage of his life. In this way, the adolescent is more likely to find new approaches to situations and be able to represent

them within frames and thus develop and structure the new period of his life.

Janis & Mann (1977) have proposed the "outcome psychodrama" as a way of helping people face worse case scenarios (see Chapter 1, 1.2.1.4). Through this the individual, having the reassurance of the therapist, explores the worst consequences. By having to face his feared fantasies, he can 'work out ways of reassuring himself' and ways of looking for useful information.

2.5.1.2. Scenario formation

In the process of exploring and expressing his problem, the individual starts formulating scenarios about the way he is going to handle his problem. At **Level 4**, the young adolescent is setting his goals for his future career, making claims about what he wants to achieve, and trying to lexicalize and express his plans in his language discourse. As mentioned above, the boundaries set at Level 5 constrain the language the person is prepared to use for the identification of all the concepts considered relevant in his scenario exploration. However, at Level 4, he has complete discretion over the way he is going to make use of this language. Therefore he can choose the kind of frames he thinks are more appropriate to the representation of his career problem and thus identify the relevant structure for the solution of his problem. Structuring frames, is the focus of the operations involved at **Level 3**.

2.5.1.3. The use of frames in the career problem

From the variety of frames described in the discussion of Level 4 (2.2.2), three different types of frame units have been selected to be used in the present study for the representation of the adolescent's knowledge of his career problem. These frames have been used most in intuitive decision making (Humphreys et al., 1987) and are:

- (a) MAU frame (Multi Attribute Utility)
- (b) Future Scenario frame
- (c) Rule-based frame.

MAU frame

The Multi Criteria or multi attribute frame derives from the Multi Attribute Utility Theory (MAUT) which was developed during the 1960s by Raiffa (1968), Fishburn (1980), Keeney and Raiffa (1976) and others. It was used later in the development of procedures for "real-life" decision situations (Fischer, 1975; Von Winterfeldt and Edwards, 1973; Humphreys and Humphreys, 1975). In these procedures, the MAUT model is applied in the evaluation of multi attributed alternatives of a real-life decision problem where one, or more than one, alternative must be chosen from a set of choices (Humphreys, 1977).

The underlying procedure of MAUT theory is to define, first, the alternatives of a course of action and, second, to evaluate these alternatives using a set of criteria (Wisudha, 1985). MAUT models have been criticized, by the followers of the heuristic models, as lacking the flexibility to take into account the limited information capabilities of the decision makers (Kahneman, Slovic and Tversky, 1982; Slovic, Fischhoff and Lichtenstein, 1977), or as a normative technique not different from other normative models (Larichev, 1983). However, MAU theory provides the basis for the representation of the "MAU frame" which is used by the majority of lay people or experts when they are faced with a decision problem: "I have a problem; there are various solutions to it; there are various attributes (or different factors) to each solution; I am trying to find the best solution". Moreover, accepting the fact that people have "bounded rationality" (Beach, 1985), and limited information capabilities, the use of techniques based on a MAU frame may help them deal with the details of their problem and see how they perceive the outcomes of the different solutions.

Searching through the literature of career decision making, one finds that decision aiding techniques based on the establishment and clarification of job alternatives after their evaluation on a number of criteria have been used widely (Ekehammar, 1977; Janis & Mann, 1977; Wanous, 1973; Humphreys & McFadden, 1980; Wooler, 1982). Wooler & Lewis (1982), in their model called Career Decision Aiding System (CDAS), have incorporated the decision aiding technique MAUD which is based on MAU Theory. They have suggested that MAUD could give the client a free hand in deciding which factors to employ in the evaluation of his career options. Other

studies have also tested the hypothesis that adolescents who explore a variety of career alternatives will make career choices more congruent with their personality (Grotevant and Cooper, 1986).

In fact, the clarification and evaluation of the dimensions or attributes of the various career problem alternatives should be very helpful to the individual, especially since job choice is characterized as a problem of unique choice where both the problem environment and the choice itself are new (Larichev, 1984). However, a drawback concerning the use of MAU Theory for problem solving is that, for the clarification of the problem and its attributes, it is not a question only of the number of attributes or dimensions on which the Multi Attribute Utility decomposition of the problem is based, but of which attributes will be used (Huber et al, 1976).

Moreover, the identification of all possible criteria for the alternative solutions of a problem can be problematic. In career decision making, for example, because choice between career alternatives implies choice about one's future life, the potentially related facts for the identification of the various criteria for alternative career solutions would be many. For this reason, it would be difficult to build a machine based knowledge system which can provide the information for the establishment of these criteria (Humphreys and Berkeley, 1983). In fact, as of yet, no such system has been successfully built in career decision making technology.

Future Scenario frame

Structuring problems in a probabilistic setting is another way of approaching decision problems. The fundamental intellectual tool for this purpose, as Von Winterfeldt and Edwards suggest (Von Winterfeldt and Edwards, 1986), is a set of stories or scenarios which are composed of observable and unobservable events and describe "possible futures under various conditionalities" (Jungerman, 1985).

Thinking about the future and framing one's thoughts in future plans is undoubtedly a common strategy in human problem solving, and many studies exist on formation of plans and goal setting in many areas of psychological research and particularly in decision making research (Miller, Calander and Pribran, 1960; Toda, 1976; Beach and Mitchell, 1978). However, few studies exist in which scenarios are used as a

tool for the representation of future plans in personal decision making, although it is admitted that most discussions on scenarios focus on their use in goal adoption and planning (Beach, 1990).

Actually, both goal setting and planning are incorporated in the scenario formulation. More precisely, scenarios act as perspectives of the future by helping in the structuring of the problem and the definition of goals. In other words, they provide the framework in which possible or potential futures can be represented, over a period of time, by the individual as a sequence of events, actions and consequences (Jungerman, 1985). This representation of the scenario frame is made through individual language discourse. Minsky (1977), in his frame system theory, states that "...the individual statements of a discourse lead to temporary representations ..which are then quickly rearranged or consumed in elaborating the growing scenario representation".

Rule-based frame

People, in their attempts to represent their decision problems, use rule based frames, where rules -irrespective of their classification - may derive from various principles and beliefs (Svenson, 1979) and are made to help in discriminating between alternatives. Tversky & Kahnemann (1974), in their study of heuristics, have suggested that rules can be developed either from the decision maker's own experience or from other people's experience. Examples include the decision rule, which states that one should follow the decision of an expert, or the rule which states that one should decide according to cultural or family tradition.

This network of the subject's beliefs usually appears within the individual's verbal data, in the form of rules. To interpret this data an understanding of the context upon which they are based is necessary (Schoenfeld, 1983). Rules, based on the individual's beliefs or principles, act as the rules used to prove a mathematical problem, i.e. to make enough regulations so that you get only one solution. In fact, each rule is picked up idiosyncratically by the individual through constraining his freedom of choice, and by removing any discretion over choosing an alternative solution which can lead him to action. When rules are used, the individual does not

even need a frame to express his problem representations, since there is nothing to tradeoff between frames. There is nothing to explore, since the rules automatically **prescribe** what he should do.

Rules are often chosen by 'expert system' designers as a representation of capturing heuristics for use in problem solving. However, even in these systems, there are serious limitations in the extent to which rules can be applied in all settings. In fact, since the rule shows the only way to the solution, rule based reasoning restricts the problem space with regard to making tradeoffs between alternative solutions, which means to assign values, or to make best assessments of what constitutes the best solution.

Research in the career decision making field shows that usually the various social and ethical principles and beliefs of the individual (parts of his value system) dominate his decision making process, by establishing rules and setting constraints upon which the individual will base his choice (Herriot, 1984, Super 1980).

Usually, students use rule based frames to represent their problems. For example, performance at school may restrict the area within which the student is interested in exploring alternative solutions. In this case, the predominant rule may be expressed as follows by the student: "Since I am good in this subject (i.e. mathematics), my only solution is to become a mathematician. I don't want to explore any further"; or, he may say, "I will follow this career because I have good grades in this subject". In other cases, the individual may solve his career decision making problem by saying: "I have decided to become a lawyer, since my father and my grandfather are lawyers and I have to follow the family tradition".

2.5.1.4. What-if questions

Level 2 operations can be used in order to explore what will happen if the individual changes the values at each node of the structures already developed. For example, the adolescent, in his career decision making, may want to explore what will happen if his father retires and is not able to support him. Or, what will happen, if, in a future scenario, the probability of entering university will change at the last minute,

before his exams, because the student decides to change subjects since he is not satisfied with his previous choice.

With reference to a MAU frame (i.e. studying in the university or finding a job or joining the army), it is important to know what will happen to the preference order of the individual's options if he decides to change the values he has assigned to one or more criteria which are important to him (for example, if making money is considered to be more important than being educated).

In fact, most of the recent computerized decision aids which are based on matching individuals to the most suitable occupations are designed to function at Level 2. In particular, attempts have been made to produce a meaningful match between the user and a subset of occupations which are contained in the system's database, on the basis of his self-evaluations on a set of prescribed criteria (Wooler, 1982).

2.5.1.5. Making best assessments

The operations involved at **Level 1** include the formation of an order of preference for the various alternatives, and an output of what is the best alternative for the problem solution. In other words, the aim here is to make best assessments in determining the tradeoffs between the alternatives identified as a result of "sensitivity analysis" (see 3.2.4) held in the previous level. For example, at this level the individual has to finally accept 'that he has to go to work instead of going to university' because this is the best solution for him, since this solution is weighted more in several attributes which were evaluated previously.

People who are using rule based frames usually move straight from Level 4 to Level 1 since they do not have to make any tradeoffs concerning alternative solutions or alternative criteria for their solutions. The rules constrain their choice and tell them what to do.

2.5.2. The circular logic of choice and the five-levels framework in modelling the career decision making process.

In the above discussion it was demonstrated how the operations involved at each level of the five levels framework of knowledge representation allow for the identification of the different ways individuals use in their language discourse to structure and represent their problems and in particular their career problem within the bounds of their small world. In fact, the identification of the three different frames (MAU, Future Scenario, Rule Based frame), used by the individuals when they are talking about their career problem established the way individuals conceptualize their career problem and thus provided the basis for building a conceptual model of the career problem. As it was discussed in 2.3.1, systems thinking and the use of the circular logic of choice helped me to combine this conceptual model into an overall representation with the three main components of option descriptions (Future Scenario frame), value judgments (MAU frame), and instrumental descriptions (Rule based frame) incorporated (see fig.2.2). However, as it was said in 2.3.2 this kind of representation of the process of a decision problem follows the problem solving cycle which is very restricted to be applied in real life problems. What we need is a more general procedural schema - as the one shown in Fig. 2.6 -, which could capture not only how the problem is represented but also how the problem is constrained, and how it is intended.

Such a procedural schema which is based both on problem representation and on systems methodology can provide the rules and the links necessary for the modelling of the process of the career decision making. In other words it can describe how the problem is represented by the individual, as well as how the individual is moving while he is proceeding to the solution of his problem and to action. It can also prescribe the rules for an effective movement and shows the ways by which we can help the individual in this movement. Based on the above considerations, in Chapter 5 a process model of career decision making will be developed which will serve as a methodology to investigate the process of career decision making, and will provide the basis for a proposal of counselling model of career decision making (Chapter 9).

2.6. Summary

In this chapter emphasis was first placed on trying to establish the need to take into account the individual's subjective meaning representation in the investigations of the career decision making problems. The review of the literature was intended to identify models or theoretical frameworks which could be used as the basis for the development of a process model of career decision making.

As it was discussed, in the beginning, modelling of the decision process was based on the comparison and the establishment of the preference ordering of the various options of a decision problem in terms of utilities and values (Keeney and Raiffa, 1976; von Winterfeldt and Edwards, 1986; Raiffa, 1968). As the development of theories of decision making moved beyond the concept of utilities, emphasis was placed on the individual's perspective of the problem, on the way individuals structure and represent their problem, on the differences between problem owners in the structuring and representation of the problem, and on the fact that the same problem can have more than one representation (Kahneman et al., 1982; Berkeley and Humphreys, 1982; Phillips, 1982, 1984; von Winterfeldt, 1980; Montgomery, 1987; Beach and Mitchell, 1987; Humphreys, 1984; Humphreys et al., 1987; Berkeley et al., 1991; Nappelbaum, 1994). The literature on systems thinking and soft system methodologies provides the methodology of modelling the problem solving as a process through the use of a number of stages (Checkland, 1981; Mason and Mitroff, 1981; Janis and Mann, 1977; Phillips, 1989), specified to ensure movement towards problem resolution following the problem definition cycle (Nappelbaum, 1994; Berkeley et al., 1989). Further development of the problem definition cycle resulted in modelling the process of deciding through a procedural schema (Checkland, 1981; Humphreys and Nappelbaum, 1989; Berkeley et al., 1989), which includes all relevant information to solve the problem, allows for more than one representation of the problem and gives the rules of how to move from problem definition to problem resolution.

From this review, the "five levels of knowledge representation framework"

(Humphreys and Berkeley,1982), as well as "the circular logic of choice" (Nappelbaum, 1989) and "the procedural schema" addressed by soft system methodologies and decision theory (Janis and Mann, 1977; Checkland, 1981; Humphreys and Nappelbaum, 1994) were found to provide the most suitable foundations for the investigation of the career problem under the initial assumptions presented in the previous chapter.

The next chapter will be devoted to a discussion of the contextual background which provided the experimental material used in the present study for the investigation of the career problem and the career decision making process.

CHAPTER 3

THE CONTEXTUAL BACKGROUND OF THE STUDY

OVERVIEW

In this chapter, the Greek reality, which has contributed to the experimental material used in the present study, is investigated in relation to the development of family ideas towards achievement and education. In addition, the Greek educational system, especially aspects concerning entrance to higher education, are presented.

What appears as the predominant characteristic is that education is highly valued in Greece. Having a higher education means a better position in society and facilitates securing a good job. As a result, and because of the encouragement given by parents and society, a large number of Greek pupils stay in high school with high aspirations to further their education at university level. However, although the number of students who graduate from high schools is increasing, the number of university places is not. This in turn, has resulted in increased competition for passing university entrance exams and has become a seminal point in an adolescent's transition, not only from school to university, but also from school to adult life.

Taking the above considerations into account, Greek adolescents were chosen for the present study as an example of the way adolescents represent and structure their career problems and the way they proceed in order to find solutions.

3.1 The Greek Reality

Greece, during the last century, has undergone rapid changes which have influenced the way people think and act. After the Greek revolution in 1821, during the 19th century and at the beginning of the 20th century, there was a massive movement of people from rural areas to big cities. This urbanization brought a change of classes and necessitated an ideological transition. The most prominent characteristic of this transition was that Greek people identified themselves with a nationalistic ideology which took the form of a racial union (Tsoukalas, 1975). The impact of this ideology was prominent mostly in educational and family systems.

The educational system actually played the role of giver and receiver. Through its structure and aim to expand knowledge (on how to read and write), nationalistic ideas were transmitted throughout Greece (Greece as a nation in its present form has existed since 1826). On the other hand, because of this nationalistic ideology, the structure of the educational system was formulated in a very democratic way. Education, at this time, was compulsory and free, at the primary school level, for all citizens. As a result, even though Greece was primarily agricultural, the percentage of people attending school rose very quickly to levels equivalent to those found in the rest of Europe.

Moreover, the impact of education on the attitudes of people who were mostly illiterate, was significant. Parents, even if they did not have enough money, would urge their offspring to obtain as much education as possible. For them, an educated member in the family meant a change in the family's status quo and a step to a higher social class. The existence of these attitudes served to strengthen the nationalistic ideology which was necessary for the formulation of the new nation.

However, as the Greek population increased, an imbalance appeared between the population and the number of available schools and universities. At present, the number of students graduating from high school is still very high, whereas the number of university places is not. This has resulted in creating very high competition among candidates for higher education.

In the next section, a more detailed description of the present structure of the Greek educational system will be presented first. This will be followed by further discussion on the excessive demand for higher education in Greece, and on the main problems and factors which put restrictions on the transition of the Greek adolescent from secondary to higher education.

3.2. The Present Structure Of The Educational System In Greece

At present the structure of the Educational System in Greece can be briefly summarized as follows: There are three basic forms of educational institution:

- (a) Basic education which consists of 6 years at Primary school
- (b) Secondary education which consists of:
 - (a) High school (three years)
 - (b) Lyceum (three years)
 - (c) Vocational school (two years)
- (c) Higher education which consists of:
 - (a) The Technological Educational Institutes (TEI)
 - (b) The Universities

Attendance at Primary and at High School is compulsory. On finishing High School, the student has a number of choices: (a), to work; (b), to be trained at technical school; (c), to attend a Lyceum. At the level of Lyceum there are three main types between which the individual can choose.

First, the "General Lyceum" which provides general academic education; its main aim is to prepare pupils for higher education. The general Lyceum is attended by about 80% of Greek students.

Second, the Technical-Vocational Lyceum which concentrates on technical education and provides training for jobs requiring specific skills. In general, the Technical Lyceums are considered to be of a lower educational standard, even though a lot of them offer a good theoretical technological education. Students who graduate successfully from the Technical Lyceum can enrol themselves for university entrance exams. In addition, if they graduate with an A average, they can transfer automatically to one of the Technological Educational Institutes.

The third form of Lyceum is the "Polykladiko", a new type of lyceum, which combines general and technical education, adopting a philosophy similar to that of UK comprehensive schools. This type of Lyceum is new in Greece and are relatively few in number at present.

In the Vocational schools, which are run by the Manpower Employment Organization, students receive mostly vocational training. Special consideration is given to setting graduates into appropriate jobs after the completion of their vocational studies.

The Technological Educational Institutes (TEI) constitute the latest form of higher technological education in Greece. The rationale behind their establishment was to respond to the needs of the economy for higher level manpower, and to alleviate

pressure on the universities (Dragonas and Kostakis, 1986). They are considered to be of a lower standard than the universities; they give a sub-degree and, as Dragonas and Kostakis (1986) put it, "their identity is at stake". In fact, enrolment in TEI comes as the second or last choice after a student fails to be accepted by university. Of course this attitude has a negative effect for the adolescent's career decision making. As Dragonas and Kostakis (1986) have suggested, "...the generalization that TEI students are simply the failures of the universities offers information neither for a better understanding of, nor for a better response to student's needs". In fact, as has become apparent from such student inquiries "Are we going to become scientists or technologists?", there is a need to provide more information to them about the meaning of vocational training at the TEI, and of the job opportunities it create for them. Such additional information may enable the students to see a greater variety of career choices and help them to adjust better in these institutions.

To enter higher education students have to pass the Panhellenic exams, a set of very competitive entrance exams on specific subjects. In fact, at the end of the second year of Lyceum, students have to state their preferences and assign themselves to one of four groups of studies (DESMI) which specialize in these subjects. Each group of studies (DESMI) has four different subjects. The students, depending on their choice of DESMI, are required to pass these four subjects in addition to all the other subjects in their third year curriculum. After graduation, and in order to enter university, they have to pass additional tests on these same four subjects in the Panhellenic exams.

- DESMI I: Mathematics, Physics, Chemistry, Composition
- DESMI II: Physics, Chemistry, Biology, Composition
- DESMI III: Ancient Greek, Latin, History, Composition
- DESMI IV: Mathematics, History, Sociology, Composition

Specified groups of schools/faculties of Universities and Technological Institutions are assigned to each one of the above four groups (DESMI). Each candidate has the right to choose only one of the four DESMI and apply for entry, in order of preference, to two of the corresponding groups of schools. The average grade for passing the entrance exams changes every year in relation to the number of students applying, the number of places available and the overall performance of all

applicants. However, although the flexibility in the choice of schools/faculties enables the candidate to apply for entry to diverse studies, at the same time it increases the competition for those whose choices are more specific. For example, a student whose first choice is to become a gym teacher can very easily be displaced by another whose first choice is medicine. For the latter, although his exam grades may not qualify him to enter medicine, they may be higher than the average required for acceptance to study Physical Education. Studies have shown that Greek students deviate very easily from their first preference and are ready to attend other schools (Soumelis, 1978; Psacharopoulos, 1987). One of the most important reasons for this seems to be the high selection requirement the pupil has to satisfy in order to enter his preferred field of study. However, this change of preference also suggests that Greek students persist in their attempts to enter an institution at post graduate level, even if they have to change their initial aspirations, since a successful entry to any university is more preferable than no entry at all.

3.3. The Transition From School To University - A Restricted Entry

Even now, the demand for higher education among young adolescents and among their families is very strong in Greece. The typical path the Greek adolescent follows, as he grows, is to stay at school through secondary education and then to continue to higher education (Karmas et al., 1986). Further education means a better position in society in the future. Especially among farmers, there is a strong wish to educate their offspring, and to send them to university. This is considered to be the surest way out of farming, and perhaps as the only means of ending up with permanent public-sector employment (Nassiakou, 1981). Soumelis (1978) has addressed the social value of education rooted in the Greek family as being the most effective means of social mobility.

In a recent study on students' attitudes towards university in Greece, the most important factor influencing their decision to go on to higher education was the recognition and social status that can be gained from having a university diploma (Georgas et al., 1991). In this study, the value which the Greek family and Greek society put on education and on the success of their children became apparent.

Indeed, the offspring's success has come to represent the ultimate success of the whole family. Papas and Psacharopoulos (1989), in their studies on the transition from school to university, found that family background influences very strongly the Greek student's aspirations towards university, as well as his choice of the type of secondary school that has to be attended, so that he can either enter the labour market or go on to higher education (Technical versus General lyceum). In the same study, it was also noticed that family background, based on the father's education, has an indirect influence on the student's choice of secondary school, and on his success in entering university, because of the specific aspirations towards education. Moreover, these studies showed that the majority of adolescents reject, or are opposed to, technical education because of its low social status, and the fact that it does not offer a diploma equivalent to that of the university (Kassotakis, 1981; Karmas et al., 1987). In fact, the preference ratio for academic versus vocational schooling was found to be 4 to 1. To be a "university student" was found to be the ideal for the Greek adolescent (Karmas et al., 1986).

However, there are conflicting views as to whether the demands for higher education of today's young generation in Greece, reflect the adolescents' own aspirations or are the result of the influence of their parents' aspirations. Soumelis (1978), in his investigations on the individual's aspirations for higher education in Greece, noted that such aspirations are built on long standing values pertaining to education and work. Such long standing values, however, may no longer reflect the present situation. Due to increasing unemployment and world-wide recession, it is possible that when younger generations are faced with the reality of not being able to embark on a professional career, they may reject the values of the past. At present in Greece, it is questionable whether the old beliefs and values affect individuals' attitudes towards their work or career choice. On the other hand, as Soumelis (1978) has noted, "the build up of parental and environmental social pressure on each pupil, is so great that the pupil needs considerable courage to renounce university study and accept either a non university field of study or to go directly to work".

In addition to the social status that a university degree might offer, studies have

shown that, in a period of high unemployment among high school graduates, the belief about better job opportunities upon completion of a higher degree, is still very strong (Gedeon and Psacharopoulos, 1982). This belief becomes even stronger as the majority of university graduates hope to obtain life-long employment in the public sector. Psacharopoulos (1988) has observed that nine out of every ten university graduates in Greece are employed by the government or by quasi-governmental institutions. On the other hand, unofficial reports show that the percentage of unemployed university graduates in Greece is high. However, in the absence of any data or studies on the "microeconomic" aspects of unemployment in Greece, the above cannot be accepted as conclusive evidence for the existence of a problem of unemployment among university graduates (Psacharopoulos, 1987).

Irrespective of the cause, the demands for education in general, and for higher education in particular, are strongly manifested not only in the number of candidates but also in their persistence in their efforts to enter a post-secondary educational institution. Thus, every year, there is a high number of graduates from secondary schools striving to enter university by passing the set of very competitive national examinations (see above). The competition increases as the number of places available in universities are at odds with the ever increasing number of candidates (Haniotis, 1968; Soumelis, 1978; Psacharopoulos, 1988). As Papas and Psacharopoulos (1987) have noted, this results in a very restrictive system. It is in fact, one of the most restrictive higher education systems in Europe (with the exception of Portugal).

However, since students and their families are still convinced that the rewards of getting a university degree are high, it is inevitable that they will strive to achieve this goal, regardless of the difficulties and the financial costs which they may have to face. This way of thinking becomes especially apparent in the number of ways in which these difficulties are enhanced in the adolescent's perception and formulation of his career problem. In fact, students who are planning to take the entrance exams to a post-secondary educational institution, and especially to a university, have to work very hard preparing themselves from a very early age. This means attending, on a regular basis, a private preparatory school, a kind of "crammer" school, in

addition to their regular school. This school aims to prepare students for secondary-school examinations and mainly for university entrance exams. Although each extra hour of homework increases the probability of students gaining an extra chance to enter university by 9%, attending a preparatory school is not statistically related to succeeding in entering university (Papas and Psacharopoulos, 1987). It has become apparent, that the small number of students entering university is more a reflection of the nature of the examination system and the availability of places than a reflection of a lack of preparation or of the ability of the students. Even so, attending "crammer" schools becomes a "necessary evil", and students spend 12 h per week there on average, costing the family a month's income.

For students who have failed to enter university, there are three main alternatives. First, the student may continue studying the same subjects under the guidance of the preparatory school and try for a second time to take the university entrance exams. Indeed, most students may do so for one, two or even three consecutive years since they can take the exams only once a year. Of course, doing so means extra cost for families who have to support their children in their attempts. Second, the student can either accept registration at one of the Technological Institutions which was his second choice, due to the fact it is considered less prestigious, or he may enrol in a private post-secondary institution. Most of these institutions are non-accredited and require the payment of tuition fees. The third alternative is for the student to go abroad and register in a university of another country, thus satisfying personal and family aspirations. In fact, the number of Greek students studying abroad is increasing. For example, in 1969 there were ten thousand Greek students studying abroad; fifteen thousand in 1971 and over forty thousand in 1978. At present, they constitute about one third of the total number of Greek students at university (Soumelis, 1978; Psacharopoulos, 1988). As was recorded in the Unesco Statistical Yearbook (1988), Greece ranks fourth in the world in the number of its students studying at a foreign university (Psacharopoulos, 1988).

However, any of the above alternatives may be neither the most desirable nor the most attainable from either the student's or the parents' point of view. Many students

cannot afford to continue attending preparatory schools. Furthermore, it is more difficult and sometimes impossible for a student to even consider the third option. Papas and Psacharopoulos (1987) have found that, of the 82 % of students who had stated that they wished to enter university, 41 % expressed the wish to study abroad, but only 16 % stated that they actually could do so. These difficulties put extra pressure on young adolescents deciding about their future careers.

3.4. Conclusion

The above discussion was considered necessary in order to define the contextual background of the present study. What appears as a predominant characteristic is that education is highly valued in Greece. There is a large number of pupils staying on at school and a high level of aspiration towards higher education. Greek families, which are generally tightly knit units, are particularly willing to invest a considerable amount of resources to ensure that their offspring will succeed in obtaining a university diploma. This sometimes becomes a life-time's goal. Therefore, it seems that, because of the social prestige associated with a university education and the expectations for better job opportunities, excess demand for higher education is to be satisfied, irrespective of the efforts of the Greek government to restrict the number of university graduates.

Parental influence on the choice of degree or technical trade is strong. Taking into account the above mentioned social values, there are considerable constraints on the way an adolescent perceives his career problem.

Moreover, the university entrance exams appear to be a seminal point in the adolescent's transition not only from school to university but also from adolescence to adult life. As one of the students said: "Now that I passed I feel like I have made a big step in my life. Everybody looks at me like an adult, and I think I have an identity, and I already have some proposals for work".

Therefore, when trying to investigate career decision making by Greek adolescents, the above attitudes towards career and education, as well as the social pressure imposed on them, have to be taken into consideration. Greece, as a developing

country with a rapid and imbalanced migration of the rural population to urban areas, and with an overriding characteristic of social change provides a good model for the exploration of educational demand and educational expansion. In addition, Greek adolescents being in the middle of all these changes can also provide a good example and can be used as models for the investigation of the way the career problem can be perceived, internalized and represented.

The above presentation and discussion of the social context from which data for the present study has been collected actually addresses one of the basic assumptions of the research: that career decision making has to be seen as relevant to the social context in which it takes place (see 1.7). The assumptions that career decision making is a dynamic process containing the characteristics of personal decision problems in real life situations, and that it is based on the subjective meaning representation of the decision situation of each decision maker, have been discussed previously in Chapters 1 and 2.

The next chapter will deal with the pilot work which has aided in the clarification of some of the concepts which have been used for the construction of a process model of career decision making.

PART TWO
CAREER DECISION MAKING AS A PROCESS

CHAPTER 4

ON THE METHODOLOGY

"The time has come for researchers and experts
to abandon their ivory tower and go down
into the action of the real world..."
Kurt Lewin, 1946

OVERVIEW

Chapter 4 includes the pilot work for accumulation of data which has enabled the identification of concepts that have been used for the construction of a process model of career decision making. The issues involved in career counselling and the role of the career counsellor are also addressed in this chapter.

The pilot work included 90 students (age 16-20) seen over a period of two years. The students were consulted about their career problem in personal interviews and open group discussions. The Decision Balance Sheet (Janis and Mann, 1977) and a computer based decision aid (MAUD) were given to help the students in their decisions and to provide data about how they could construct and evaluate their alternative solutions.

Assessment of the information obtained from the pilot work indicated that students are constrained by several external factors, and represent their problems in different ways. This assessment was used to define the specific ways they handle their problems and move towards solving them. In addition, the data collected from the pilot work showed that individuals did not always follow a linear path in processing their decision making for a career choice.

4.1. Issues involved in individuals coming for Career Counselling

"What do you want to be when you grow up ?" This is a question which is often addressed to children and adolescents during the course of their life. Although in early childhood the answer to this question does not require any personal involvement, during adolescence it becomes increasingly significant. The individual tries to identify with adult roles by trying them out either in real life or in fantasy (Super & Hall, 1978). Thus, since identity formation is the greatest concern in his

life during this period, a decision about his future career is identified within his view about himself. In fact, when the adolescent is struggling to decide about his future career and occupation, he is engaged in the process of defining himself as an adult in the world (Richardson, 1978).

In addition, cultural predispositions, parental influences, the structure of the educational system, the individual educational investment and the actual career possibilities are some of the issues raised by individuals facing the career problem. From this diverse agenda, certain themes have been extracted to form the basis of this study. Furthermore, what is important in this study, as was mentioned earlier, is the way the individual structures and represents the knowledge of his problem and how this representation can be used by counsellors in order to be able to help him in his career choice (see Chapter 1.6, Chapter 2).

Young adolescents in Greece are faced with the career decision problem in two important periods of their school life (see Chapter 3.2). The first period is during the third year of Gymnasium (High School) around the age of 14-15, and the second is during the third year of Lyceum, around the age of 17-18. This latter period is particularly significant since it coincides with graduation. At this time students are "forced" to make definitive and sometimes irreversible decisions. They are faced with the questions "Shall I continue schooling or not ? Shall I take a job ? What do I like? What is available in the labour market ?" If they continue education they are still faced with similar questions regarding the choice of studies which will influence their future job choice. For Greek males the situation is even more serious, since after finishing secondary school, at the age of 18, they are required to go into the army for two years. If, however, they enter university or another technical school they can postpone their military service until the end of their studies.

While trying to answer the above questions, the individual exhibits different patterns of behaviour with regard to career decision making. These patterns have been investigated by various researchers, and are broadly conceived as the apparent changes during adolescence, and also as the types of behaviour which exemplify the individual's progress towards a set of career commitments (Warner & Jepsen, 1979;

Super, 1980; Herriot, 1984). In particular, Warnen and Jepsen have specified three such types of behaviour which change during adolescence. They are: (a) attitudes towards career decisions (affective aspect); (b) planning activity (cognitive aspect); and (c) choice basis complexity (behavioral aspect); change during the years of adolescence.

In Greece, a study by the Center of Planning and Economic Research (KEPE, 1985) has shown that adolescents change their occupational preferences over time, especially during the three years of Lyceum. It was found that only 18% of the 18 year old students continued to want the same occupation as they did previously. It was also noted that these changes followed certain patterns of preference in descending order between fields of study like science, medicine, humanities, social sciences and teaching. Similarly, Dimitropoulos et al. (1985) observed that Lyceum students who had chosen for example the field of science as their area of study, and were satisfied in general with their choice of field at first, tended to be less happy with this choice when the specific occupations in this field were described to them.

It would appear that changes occur in individuals' occupational plans as well as in the representation of the knowledge of the career problem, and that these changes follow the developmental stages of the career decision making process over time and through development (Super, 1957). This argument, together with the notion that career decision making is a dynamic process and not a distinctive moment in an adolescent's life, justifies the use of longitudinal studies for the investigation of career decision making. In order to capture the different conceptualizations of the adolescent about his career problem, and in order to be able to help him or to be able to construct a model or a decision aid, it is important to follow his development by marking the changes he may exhibit over time.

Furthermore, it was noticed in the present study that most of the students coming for counselling often present a vague, unsatisfactory view of their problem with unspecified alternative solutions or courses of actions. Sometimes, they even challenge their own perspectives. They do not have enough information nor have

they explored their problem adequately. Frequently, in response to the question "What are you going to do if you fail the entrance exams to the university?", a number of students may answer : " I just don't know what I will do if I fail". They simply do not want to proceed in exploring further any unpleasant consequences of taking the exams. This behaviour is in agreement with Sieber (1974) who said that, in the worst case scenarios when the individual finds himself closer to an outcome - for example, the possibility of not passing the exams, then he will either decrease his abilities to evaluate the various options accurately or will refuse to explore other scenarios.

Students coming for personal interviews in my office, during the pilot work (5.2.2), would usually find themselves in a situation of crisis, experiencing anxiety over their commitment to a decision which to them appeared to be unattainable. They were in a post regret phase (Janis & Mann, 1977), and their request for consultation had more to do with them wanting reassurance that they had made the right decision, than with the need to change their options.

Overall, the individuals' assumptive world appeared to define their own knowledge representations of their career problems. The constraints and received wisdom which they had from family, educational and social environment, were also apparent. Parental influence was experienced by all individuals irrespective of age. Although their parents had set goals for them, these were not necessarily the students' own goals. A small number of students showed high aspirations and had ambitious plans for their future. The most significant attributes they gave for their future jobs were money, free time or an interesting and easy job. They had a tendency to say: "All I want is to have a job at hand", without being able to give a concrete explanation as to what kind of job or for what reason. For students who wanted to continue their education by going to university, their achievements at school, as well as the structure of the university entrance exams, were additional constraints. The fact that they were committed to a profession by having to choose in advance one of the four areas of studies before the entry exams, made them feel very restricted in terms of the career options which may be on offer in the future (see Chapter 3.2).

4.2. The Pre-Establishment Phase

Introduction

From the previous section, it appears that the issues involved in career decision making embrace a wide range of factors and variables, both psychological and sociological in nature. Obviously young people's careers and career choices vary according to their socioeconomic background, age, or whether they come from a rural or urban area. In attempting to design the present study, all these factors had to be taken into consideration, even though the actual statistical significance of the contribution of each factor was not necessarily considered. I am aware that, in similar kinds of research, the kind of methodology usually employed requires a large number of representative samples of young people at different stages of their compulsory education and from different parts of the country. However, my intention to work at the micro level of analysis of the career decision making process has narrowed down the above considerations. In particular, since the focus of the present study was to see how individuals represent their career problem, the analysis focuses mainly on individual case studies. In other words, the decision was mainly to work more in depth than in width. Actually, the holistic nature of the case studies help both to investigate the different ways in which individuals represent their problems in their language discourse, and to reveal the causal complexity in the life of the individuals (Banks et al. 1992).

4.2.1. Working as a counsellor

In career counselling the most prominent question posed to those working in the field is: "...What can career advisors realistically hope to achieve within the constraints of their job?" (Warnath, 1975). Career counsellors are faced with two problems: on one hand, there is the controversy over which techniques are considered to be appropriate for career counselling and, on the other hand, there are the unrealistic expectations held by the client (sometimes even by the parents or the teachers) that the counsellor always has the right approach and will be able to handle a difficult situation and be able to come up with a solution to the crisis. Most important of all, there are the constraints the counsellor faces as a result of the changes which take

place in the rapidly changing environment within which the socialization of the young occurs. What was obvious ten years ago may no longer be now. For example, in studies conducted in England in 1978, it was considered natural to state that "...most adolescents join the labour market at 16 years of age; it is the normal life experience of the adolescent " (Schaffer & Hargreaves, 1978). Ten years later this no longer applied. Recent studies in England have shown that, in the 80s, job entry for school leavers was restricted to 20% (Courtenay, 1988), whereas training schemes extended their duration and most of the students attending them became employer-based (Banks et al., 1992). In addition, since 1988, English legislation has made it impossible for young people, up to the age of 25, to be able to claim social security or state benefits when living away from home. Consequently, adolescents are not always able to find employment, and unemployment "...could only be a viable option if parents were prepared to provide support" (Banks et al. 1992).

In Greece, the statistical figures concerning changes in the unemployment rate do not seem to differ, although the factors related to it may do so. For example, statistics have shown that the average age of the labour force has increased in the last three decades: In 1951 the percentage of young people - up to the age of 25 - employed was 32.3%, 18.4% in 1971, and 11.5% in 1985 (Doukakis, 1987). Thus, at present fewer young people have jobs. These changes can be attributed to a number of economical and social problems. However, it is more interesting to look at the results of these changes, especially with regard to the shaping of social roles and the changing identity of Greek youths. What appears to be the predominant role among young adults in Greece is that of student (Kassotakis et al., 1986). The role of worker, spouse, or "stay-at-home" (if this can constitute a social role) are found to be rare among 18 year old people. Even at an older age and after graduation, young people retain this "role" of "student" since it is very common among Greek families to support their offspring -if they can- until they are able to find a good and respectable job. These changes, in both the job market and the delay in entering employment, mean that the desire of young adults for independency are suppressed. How can the counsellor cope with the way young people have to face life in Greece under the present conditions?

In addition to the above, studies on rationality and rational decision modelling have indicated that the decision making processes are not characterized by "omniscient" rationality which involves rigorous and perfect information processing from the part of the individual. Instead, people are "bounded" in their decision making processes and their information processing capabilities. They either choose the best possible action by following a normatively correct model (optimizing), or stop at the first alternative that seems good enough (satisfying) without taking into consideration a larger number of alternative solution (Simon, 1983; Janis and Mann, 1977; Hosking and Morley, 1991) (see Chapter 1, 1.2.1.4; Chapter 2, 2.1.1.2; 2.1.3). These realizations make the counsellor's task even more difficult. Moreover, in today's world, with the complexities of the various characteristics of socioeconomical problems and of personality differences, it would be difficult for the counsellor to give best solutions to decision problems objectively: And it would be even more difficult to find ways of helping clients become more rational in their decision behaviour, as traditional rational models try to do. Instead, new decision strategies and new counselling procedure have to be established, which must be flexible and able to encompass the ambiguity that the amount of information today's world brings (Gelatt, 1989). It is possible that within the constantly changing world of today, dealing with the concepts of "change" and "relativity" may be proven to be the most prominent task in the career counsellor's work.

As Gelatt postulates:

"If everything is changing, ought not the strategy for decision making and the counselling frame of reference be changing? I believe the answer is yes... What is appropriate now is a decision and a counselling framework that helps clients deal with change and ambiguity, accept uncertainty and inconsistency, and utilize the nonrational and intuitive side of thinking and choosing" (Gelatt, 1989).

4.2.2. The pilot work

During the two years of the preliminary work - which actually turned out to be a very interesting period of this project - I came into contact, in three different settings, with young adolescents ranging in age from 16 to 20 years old. The three different

settings were: (a) Working as a part-time career counsellor on a regular basis in the "Manpower Service Career Planning Center" located in Athens; (b) Running two different groups for adolescents, one in a youth center located in Athens and the other in the town of Larissa, and (c) As a private counsellor, having students come to me on their own initiative, usually having been informed about me by their teachers, or referred to me by their parents (see Appendix 1).

The social background of the students was middle and working class. The age range of people coming to the Manpower Service Centre was from 16 to 20 years old. Most of them would come, not only for career counselling, but to ask for a job as well. People coming to see me personally at my office were of the same age range. Students coming to the youth centres were generally in their last two years of Lyceum (16-18 years old). The same counselling procedure was followed to all students in both settings (groups and individual cases). Group sessions were lasting approximately two hours, where as individual sessions were lasting one hour.

Working with the **groups of young people** was a challenging experience. The first hour of each session was devoted to free talk on the students' job preferences, on their interests and on the difficulties they were facing at school or within their families. During the next hour, they had to put the main discussion themes of the day on a big board and explore them for the remaining time. A summary of each session was kept on another board where any member of the group could put any additional information concerning jobs, university studies or further training.

The students were encouraged to argue about each other's opinions and preferences, and to present their arguments as clearly as possible. There were times when the whole session was devoted to theoretical explanations of what 'an argument' is or 'how can I present my opinions under various circumstances'. At the end of the year each individual had to construct a table of the attributes (see Table 4.1) which he found to be the most significant for his future careers, and to work on the Balance Sheet procedure (reviewed below).

Table 4.1: Type of summary taken for each individual with a list of considerations that might affect career choice.

Goals - Desires - Preferences

- Goals: I want to continue studies after university
I want to succeed in my life
I want to study abroad
- Desires
- Dreams: I wish I could become an actor
I wish I could live and work away from home
In 20 years I will be established with a nice job and a family

Social Constraints

- Parental influence
Parents very close to me
Place of education and work not to be away from home
Friends with whom I would like to work or to study
Decisions affected by information from relatives or other person in the immediate environment
- School problems
Difficulty in entering university
Disagreement with the grading system
Relationships with the teachers
Difficulties at school
- Job Alternatives - Job Attributes
- Alternative solutions:
Attributes: Free time
Good income
Creativity
Interesting job
.....
- Unemployment: Difficulties in finding a job later
Information about the job market

Personal Constraints

- Achievements
Efforts
Abilities
Like - dislike themselves

The **Decisional Balance Sheet** (see Appendix 2) was proposed first by Janis in 1959, and has been used by Janis and Mann (1977) as a "descriptive schema comprehending both the cognitive and the motivational aspects of human planning for future action". The main assumption of the decisional balance sheet is that a person will not take any decision unless he expects that the gains of his action exceed the losses. In fact, this

assumption is the same as that of other gain-loss models proposed by others (i.e. Gergen, 1969; Thibaut and Kelly, 1959; Vroom, 1966). The decisional balance sheet can help the individual to conceptualize the different types of potential benefits, costs and risks of his alternative courses of action, first, in relation to himself and his ego-involvement and, second, in relation to those persons of his social environment who are more important to him. According to Janis and Mann (1977), this multivalued schema has its origin in the expectancy theory of Kurt Lewin (1938; 1946; 1948). In his theory, Lewin has postulated that a person can change his decision in relation to the strength of two psychological forces or vectors which arise from the expectancies of the decision maker. One is the net vector which motivates the individual to seek the expected gains derived by the summation of all the positive valances; the other is the net vector which motivates the individual to avoid the expected loss which is derived from the summation of all the negative valances. In the decisional balance sheet schema there are four major categories in which according to Janis and Mann, the consequences, i.e. the pros and cons, of each alternative course of action can be "exhaustively classified":

1. Utilitarian gains and losses for self:

This category includes all the expected positive and negative effects of the decision taken with regard to personal utilitarian objectives. For example, what are the costs or benefits in choosing to study medicine in the university of Athens or in a university abroad (prestige of the university, prospects for a career after obtaining the medical degree, positive or negative living conditions, financial costs etc.). Or, what will be the cost or benefits of the decision to try to continue towards higher education or to enter the labour market (difficulties of passing the exams, cost of preparation to enter the exams, gain of having a personal income and becoming economically independent).

2. Utilitarian gains and losses for significant others:

This category includes all the instrumental positive and negative effects of a decision taken in relation to the goals of persons and groups with whom the decision maker identifies or is affiliated. For example, if the individual decides to continue his studies and become an educated person (a medical doctor or a professor at a university), the social status of his present or his future family will be raised. If he decides to enter the labour market, he will be able to contribute to the family income and alleviate his father's financial situation.

3. Self-approval or -disapproval:

This category pertains to all the "internalized moral standards, ego ideals, and components of self-image" which, as Janis and Mann said, are implicated in every important decision. According to Janis and Mann, the questions that a person might put to himself are: "Will I feel proud or ashamed of myself if I make this choice? Will I be living up to my ideals? Will this decision enable me to become the kind of person I want to be?"

4. Approval or disapproval from significant others:

The last category focuses on the potential approval or disapproval of the groups of persons to whom the individual is related and who are expected to evaluate "either the decision itself or the individual's competence as a decision maker". For example, in this category, the questions which could be asked of a student trying to decide about his career future would be: Will my parents approve of my decision to become an actor instead of becoming a literature teacher? Will the people at my village approve of my decision to study art instead of becoming a botanist and helping my parents in the fields?

The students, after working as a group on the balance sheet procedure, had to complete their own Balance Sheets (slightly modified from the Janis and Mann balance sheet) for at least four alternative career options. An example of a student's "balance sheet" is given in table 4.2. below. Additional examples are given in Appendix I. Counselling was completed for the individuals after having a final session with MAUD -a computerized decision aid- which provided a print-out summary of their preference order on their career options (MAUD is presented below in section 4.2.3.).

Working with the students in the youth centre, as described above, I had the advantage of getting involved in their everyday life, of taking part in organizing some of their activities, and in this way, spent time with them in a variety of situations. This ethnographic way of approaching young adolescents is, as Hammersley postulates, full of "naturalism" and "holism" (Hammersley, 1987). It gives the researcher the opportunity to better understand the subjects, to observe their behaviour, and to follow their personality changes.

TABLE 4.2: A schematic Balance Sheet Grid as modified from Janis and Mann (1977) -

-----||
NAME: Manos S. AGE: 17 SEX: Male
JOB ALTERNATIVE: Primary School teacher

TYPES OF ANTICIPATION	POSITIVE	NEGATIVE
A. Utilitarian gains or losses for self	<ul style="list-style-type: none"> -Regular Salary -Interesting job -Possibilities for promotion -Good pension -Free time -Contact with children 	<ul style="list-style-type: none"> -A level of responsibility because you are involved with children's education and upbringing -You have to be very good in you job -requires a lot of patience, persistence and good mood
B. Utilitarian gains or losses for significant others	<ul style="list-style-type: none"> -The status of the family in the society is good -You have free time for your family -You can help your children in their education 	<ul style="list-style-type: none"> -You can't make your family rich -
C. Self-approval or disapproval	<ul style="list-style-type: none"> -A job which is high in moral values . You don't have to compromise your personal beliefs. -You can fulfil personal goals and help in the intellectual development of your immediate social environment 	
D. Social approval or disapproval	<ul style="list-style-type: none"> -Social approval from parents, friends, and the society in general 	

For the **individual cases** handled at the Manpower Service Centre and at the counselling office, I attempted to follow up the progress of the youngsters by using the same procedures and seeing them at least six times before the end of the academic year. Records were kept of their Balance Sheets and tables containing the attributes considered the most significant for their future careers.

The whole study involved 90 adolescents: 55 representing individuals from groups and 35 individual cases. In a preliminary analysis, the records of the subjects (data from Balance Sheets, attribute tables and summaries from the group sessions) were content analyzed (see Table 4.3).

TABLE 4.3: Number of propositions given by the individuals

	Size of subjects	Balance Sheets No of propositions	Summary Tables No of propositions	Total No of propositions
Individual cases	35	227	295	522
Groups(1-4)	55	266	198	394
Total				916
Groups: 4 groups of students Gr.1 =16 subjects Gr.2=12 subjects Gr.3=17 subjects Gr.4=10 subjects Balance sheets: Each individual gave 2-4 balance sheets From those in groups 39 individuals gave from 1-4 balance sheets Summary tables: 2 large summary tables were collected for each group				

The propositions derived from the analysis were sorted out under three main headings deriving their origin from the questions "Who am I; where am I going; why and how". Thus the three headings were "Desires and preferences", "Social constraints", and "Mental Constraints"(see Table 4.4.).

TABLE 4.4: Number of propositions allocated in the three main areas

	No of Propositions
SOCIAL CONSTRAINTS	332
DESIRES - PREFERENCES	281
PERSONAL CONSTRAINTS	258
TOTAL	871*
* 45 propositions were allocated to the area of change which was encountered as one of the twelve domains (see below)	

TABLE 4.5: Categorization of the domains in the three main areas of concern

SOCIAL CONSTRAINTS	
---	Parental Influence
---	Peer Influence
---	School Constraints
---	Social Approval
---	Disapproval
---	Unemployment
---	Marriage
---	Entrance to Un.exams
---	Grades
---	Not good guidance
DESIRES - PREFERENCES	
---	Future Plans
---	Goals
---	Dreams
---	Job alternatives
---	Fears about future
---	Job attributes
---	Job Satisfaction
PERSONAL CONSTRAINTS	
---	Personal efforts
---	Educational Achievements
---	Personal abilities
---	Like - dislike themselves

Next, the propositions were sorted under 12 main domains which were chosen on the basis that they represented the most common factors appearing in the individuals' data. In particular, the statements were initially categorized under the three main

headings by the teachers and the counsellor. This categorization involved a career counsellor working at the Manpower Service Center and two teachers working at the youth centres (see Table 4.5). The results obtained were then compared by all of us working together as a group. This resulted in the final form of the twelve domains as they appear in Table 4.6.

TABLE 4.6: Domains defined from the main areas of concern of subjects facing the career decision making problem

1. PARENTAL INFLUENCE

(Influence for their career decision from parents; belief that career must satisfy parental interests; Feelings of responsibility for parents; Parental opinion for the individual about his interests, his life-style, his decision, his future.

2. SCHOOL PROBLEMS

(Issues on the structure of the educational system; the knowledge they get from school; the grading system; the entrance exams; the teachers and students relations)

3. EDUCATIONAL ACHIEVEMENT

(Success or failure at school; Motivation for education and achievement)

4. PROFESSIONS

(Job alternatives; job attributes; satisfaction from job)

5. FUTURE PLANS

(Scenarios for the future; goals, dreams; satisfaction of goals and dreams in the future)

6. DIFFICULTIES & FEARS

(Statements about any difficulties and fears about the present and the future).

7. CHANGE

(Any change from past to now; possible changes in the future; desired changes.

8. PERSONAL EFFORTS

(Personal abilities; personal success or failures; personal inabilities and misfortunes.

9. SOCIAL APPROVAL

(Approval or disapproval from the social environment about types of behaviour or types of working life and activities; Influence on personal interests and decisions from social beliefs).

10. UNEMPLOYMENT

(Reference to unemployment problems; issues about difficulties in finding a job).

11. RELATION TO OTHERS

(Reference to any influence from peers or relatives)

12. MARRIAGE

(Reference to marriage and to any constraints that marriage may put on the individual)

The basic goal of the structuring and analysis of any decision problem is to find the ideal alternative. One of the problems that students had to face, as soon as they started discussing their alternative career solutions and the most relevant attributes, was how to evaluate these attributes. Were all attributes equally attractive? How could the value placed on them affect their preferences on their most important alternatives? For the present study, the Greek version of MAUD -a computer based decision aid- was used to help the students in their career decision making process and in the evaluation of their alternative solutions. In the following section I will introduce MAUD, giving some examples and some results from the pilot research.

4.2.3. MAUD

Introduction

MAUD, standing for Multi-Attribute-Utility-Decomposition, was developed by Humphreys and Wisudha between 1977-1986 (Humphreys and Wisudha, 1982). It is an interactive computer program for the structuring, decomposition and recomposition of preferences between multi attributed alternative solutions. It is based on Multi Attribute Utility (MAU) theory which postulates that, for the solution of a problem, the decision maker's preferences have to be described and then assessed: (a) according to the utility functions of their attributes and (b) according to the ways that determine the input of each attribute on the aggregate utility. Models based on MAU theory put more emphasis on the clarification of the decision maker's preferences and problem description and less on prescriptions for action. In fact, MAUD, by working interactively with the individual and his intuitions

- a) establishes a set of choice options;
- b) elicits a number of criteria or attributes possessed in varying degrees by the choice options;
- c) helps the individual to evaluate the elicited attributes and to assess accordingly his preferences among the established choice options.

The advantage of MAUD is that, although it uses a Multi Attribute utility based composition rule to permit comparisons between the various alternatives, it works interactively with the decision maker helping him in the subjective representation of

his decision situation without predisposing a normative preference order among the various options (Humphreys & Wisudha, 1982; Berkeley et al., 1989).

As a result, the subject is able to use his intuitive rule without being "bootstrapped" by automated decision aids. Usually, these give a ready made solution always presumed to be superior than the one the subject may make.

4.2.3.1. MAUD limitations and MAUD effectiveness

There are some limitations, however, concerning the use of MAUD. These limitations stem particularly from the fact that MAUD is based on the client's representation of the problem. Thus, if the client neglects some important aspects of the career decision problem, MAUD has no means of confronting these omissions. It is not capable of recognizing whether the client's understanding of the career problem is incomplete, or whether he has neglected important issues which may result in a career decision based on incomplete enumeration of relevant criteria (Wooler, 1982). In addition, when the client is not satisfied with the options he has chosen, MAUD is unable, on its own, to generate new alternative solutions.

Pitz & Sachs (1984) argue that one major problem with the Multi Attribute Utility (MAU) theory on which MAUD is based is that it can lead "to an infinite regret", since the cost-benefit analysis of the possible evaluation strategies imposed by a MAU model may themselves require cognitive effort. They point to the risk of a state of indecision or a vicious circle in which the individual may find himself by the extensive and repetitive investigation of the costs and benefits of a decision. Whereas this problem could be solved by assuming that the analysis occurs automatically without deliberate control.

Larichev (1983), in questioning the elicitation techniques of the models based on MAU theory argues that the information processing capabilities of humans are rather limited in estimating probability events correctly, even though they are not always noticed by the researcher. He says, "...only the flexibility of humans, their ability to adapt conceals these constraints from researchers". In a similar way, Mehle et al. (1981) have suggested that people are usually reluctant or unable to retrieve more

than a small amount of plausible options.

However, these arguments by no means underestimate the effectiveness of MAUD. They identify only the weak points of the models based on Multi Attribute Utility theory, and indicate the need for further expansion to generate more global models and theoretical paradigms. Actually, MAUD has been found to be effective in a variety of contexts. Humphreys & McFadden (1980) have shown that MAUD can be particularly helpful in cases where people were experiencing goal confusion and found it difficult to differentiate themselves between the objective and the subjective criteria of their problems and to order the preferences of their alternative solutions. In these cases, they argue that MAUD, by working interactively with individuals, helps them to raise their consciousness and enhances their ability to restructure their situation (by introducing and subsequently deleting dimensions). In this way goal confusion is reduced, and the preference structure is clarified.

Wooler & Lewis (1982), have incorporated MAUD in their model called CDAS - Career Decision Aiding System-. The CDAS is principally concerned with improving the quality of the decision making strategy rather than matching people to careers. It focuses on two things: first, it tries to help the subject to become aware of what is the basis of his career choice and second it checks the basis for coherence realism and completeness. Except from MAUD the system comprises the SELSTRA program. According to Wooler and Lewis both programs attempt to construct an understanding of the client's career problem through the process of interaction between the client and the computer. SELSTRA unlike MAUD presents the client with a pre-built "core" set of factors (hierarchically organized), and thus gives the client some guidance on what factors to employ in evaluating his career options. MAUD, on the other hand concentrates entirely on working with the subjectively important factors which the client brings to session. As Wooler (1982) adds, the effectiveness of MAUD is mostly attributed to the fact that it has an open flexible system by which it can handle different material, and accept the client's structure of the problem rather than imposing one.

4.2.3.2. Joanna's case

A presentation of the case of Joanna, one of the subjects from the pilot work, will show how MAUD works and how it has been used in the present study in the career decision making process.

Table 4.7 presents a modified print out summary of Joanna's results received at the end of her session with MAUD. This summary was given to Joanna at her first session with MAUD, when she was in her second year of Lyceum, in the town of Larissa. Throughout the meetings before the session with MAUD, it appeared that she was really confused with regard to her future career options. She was in conflict between her father's wish that she should get married, her mother's suggestion to study literature, and her own desires. She had registered to take the university entrance exams for the third DESMI (Literature, Law, Psychology and Art studies in general, see chapter 3, 3.2). Although she was a relatively good student, she was feeling tired and unwilling to face the difficulties of the preparation for the exams.

Table : 4.7 Summary table taken from MAUD session with Joanna

Options Attributes	Psychology	Literature	Shop selling records	Actress	Marriage	Importance of factor
Human contact	100	100	67	33	0	0.31
Routine life	71	100	86	100	0	0.35
Less stress	100	100	0	40	80	0.16
Free time	100	100	100	100	0	0.04
Specific task	75	0	0	0	100	0.14
Overall preference	98	88	59	51	18	

MAUD steps

1. In the **first step**, MAUD requests the options the individual wants to evaluate. As shown in Table 4.7, working with MAUD, Joanna first suggested three new options to try out in addition to the options of marriage and of literature studies, suggested by her parents. They were: a) to become a psychologist, b) to open a shop with a friend selling records - this was a solution she had in her mind for a long time, and c) to become an actress - this was a secret preference she had never told to anybody. Thus Joanna typed into MAUD 5 alternative solutions.

2. In the **second step**, MAUD proceeds to elicit from the individual the attributes which are affecting the subjective evaluation of the specified options. In fact, in order to elicit attributes, MAUD presents the clients with randomly selected triads of the options they wish to evaluate, asking them to specify important differences and similarities between these options. Then the criteria for evaluation of the options elicited in this way are, each in turn, represented in bipolar scales and the client is asked to rate his options in a way which will reflect the relative attractiveness of each option on the basis of the criterion in question.

As is shown in Table 4.7, MAUD elicited from Joanna five attributes. She answered for example, that some of her career options involved having more "social contact" than others. Then, according to the above, MAUD asked her to rate her alternative solutions in terms of the extent to which they might involve having "social contact": This rating is then transformed by MAUD to give the option having the most "social contact" a value of 100 and the option with the least "social contact" the value of zero. Thus, the option of marriage was rated zero, on the basis of Joanna's evaluation, whereas becoming a psychologist or teaching literature were rated equally high on this attribute, and were both given a score of 100.

3. In the **third step**, MAUD, through a new procedure, tries to find out how relatively important the client believes each of the criteria in question to be. For example, in Table 4.7, it is shown that the attribute "social contact" is the most important to Joanna, followed by the factor "routine" and so on.

4. **At last**, the program, having all the necessary inputs, applies an algorithm based on decision theory, which recomposes the information into an overall

preference-ordering across the options. Summation of the session and output are given to the client in a form of a printed summary (see, Appendix I), including the preference-ordering of the options derived from it. The client may then check for any disparity between this preference ordering and his own intuitive feelings of preference for his alternative solutions. If any disparity is noted, additional attributes can be added with the help of the counsellor, and previous data can be amended until the computer contains a complete picture of the individual's decision problem.

In Joanna's case, all her alternative solutions, with the exception of marriage, were perceived as allowing a lot of "free time" and thus were given the score of 100, while the solution of marriage scored zero. Is this true however? Moreover, it is clear that the overall preference for the option of "becoming a literature teacher" very much depends on the way this solution has been rated in relation to the factor of 'a concrete occupation'. Does this indicate that she needs more information concerning her alternative solutions? It is obvious, that if the relative importance of this factor was changed, the overall preference order of the options would change, and the 'Psychologist' option would no longer be first. This may also suggest that the attribute 'concrete occupation' has to be reconsidered. On the other hand, she may have to consider to what extent is it realistic to believe that 'marriage' has the least 'social contact'. Maybe this attribute has to be reevaluated and clarified as well. These, amongst others, are issues which the client can discuss with the advisor after the session with MAUD.

4.2.3.3. Is MAUD enough ?

In the present study, during the pilot work, the Greek version of MAUD was given to 65 students. More than half of them (No=35 students) were either satisfied with, or indifferent to, the results. Some of the more common statements made after the completion of MAUD sessions were:

- "Now I know why I want to become an optician" or,
- "I feel better now because I know that what I have decided is what I always wanted to do in my life" or,
- "I have changed my decision, but I am satisfied because now everything is more

clear" or,

- "There is nothing new in the results, but I feel more ready now to strive for my goals, do you think I can persuade my parents about this?"

However, for the rest of the students (No=30) the outcome was different. They were neither satisfied with the results, nor did they know what their actual problems were. Ten (10) students were not satisfied with their alternative career options. They expressed the wish to discuss their problem again and to obtain more information about different career solutions. Nine (9) students found it very difficult to evaluate the attributes as well as the preferences they had declared. They appeared to have mixed feelings about what was the right thing to do, and what they really wanted to do. The rest (11 students) said that MAUD had not offered them what they had expected and argued that "machines cannot give you solutions and help you with real life problems". They asked to have further consultation and most of them agreed to come for more sessions at the beginning of their next school year.

In conclusion, looking at all the stages of contact with the subjects included in the pilot work, three kinds of difficulties could be distinguished with which the students needed help, and for which MAUD could only provide partial help.

First, they had problems with career attributes, i.e. they had difficulties in choosing and evaluating the criteria for their alternative solutions. Therefore, they could not decide whether their own criteria or those of their family, or even those their counsellor offered them, were best. They wanted to negotiate whether they could explore things further or let the counsellor decide. In most cases, they wanted to keep active more than one criterion at the same time. They were confused by the advice they had received from different people and were unable to see the differences of the various criteria. Thus they were unable to continue developing the structure of their problem. After working with MAUD in the evaluation of the criteria (step 2 and 3), more than half of the students felt they had clarified their subjective preferences, as well as the objective demands of their problem situations. In Joanna's case, for example, after re-evaluation and reconsideration of the various attributes, the solutions were rated differently, and the overall preference order had changed.

Second: students very often appeared to have problems with the nature and the

number of their alternative solutions. They didn't like the ones they had chosen, but they were unable to think of something different. They were confused about their own goals (e.g. "I want to become an artist"), their parents' goals (e.g. "To work in my father's business and make money"), or even the goal suggested by the counsellor (e.g. "You are good, you should try to get into university, and thus you have to consider which subject you should choose").

In cases like these, the individual was found to have a conflict with regard to his own subjective goals and the goals suggested by other people. This dilemma can lead to a goal confusion state resulting in complex preference-structures in terms of the criteria attributed to each goal, because the individual is trying to maintain both subjective and objective criteria at once in his decision problem (Humphreys and McFadden, 1980). As Humphreys and McFadden (1980) have suggested, complex preference structuring, resulting from goal confusion are "...of necessity incoherent and no composition rule applied within them (intuitive or bootstrapped) can resolve such incoherence and form an acceptable preference ordering of alternatives" (see, Chapter 2, 2.1.3).

To resolve goal confusion, there is a need for the individual to rethink his overall problem, get some more information, expand his areas of exploration, or even express his overall problem in a different way. In these cases, although MAUD was unable to generate new alternative solutions, it did help the individual in the clarification of his preferences and aided the removal of any incoherence between the preference order of the various alternatives. This, in turn, usually resulted in a fruitful discussion between the student and the counsellor in an attempt to find a more acceptable solution to his problem by the elicitation of more alternatives, or the elimination of those which were not satisfactory.

Third: students seemed to have problems with or feel unsatisfied about, the manner in which their problems were expressed. They found MAUD and MAU models incomplete for their problem representation. Could they, or were they able to, express their problem in a different way? and how can we detect that? These questions will be addressed in the following section where the need for a more global way of career problem representation will be established.

Conclusion

From the above observations, it is apparent that MAUD could only represent and provide support for part of the career decision making process. Using MAUD was not the solution for every student. Inadequate preparation for a session with MAUD made MAUD useless by itself. Lack of information, a highly complicated problem, or unconscious 'blocking' can give an incomplete and insufficient representation of the problem, without giving any real solutions to it (Wooler, 1982). As Berkeley et al. (1989) have stated, MAUD "...can be used only at a stage in the decision making process where the structure of the problem is fully developed (in terms of alternatives, criteria, assessments of attributes of alternatives on criteria) and is considered to be fixed".

In reference to the five Levels framework (Chapter 2, 2.5.1.3), MAUD, as a decision aid, is to be used at Level three in order to help the individual structure the knowledge of his career problem under a Multi Attribute Utility frame of problem expressing language. However, to represent all the stages of problem formulation, there is a need to consider how to address a more global way of facing the career problem.

4.3. The need for a more global way of Problem Representation

In addition to the above, during the pilot work, various other observations were made with regard to the way students were approaching their career problems. Age differences, as well external constraints stemming from their school or family environment, appeared to characterize their career decision making process. For example, students who came for career counselling -usually in the 2nd year of Lyceum -were frustrated and anxious. They were pressurised by their performance at school, by their idiosyncratic desires and goals for their future, and by their urge to enter university. Even those with good grades in all subjects at school had problems and needed further help in their career decision making, since they were faced with a larger choice of occupational alternatives than they could cope with. Usually, they made a lot of claims without being able to scale their thoughts and

desires within frames. But, once they were helped to go through this phase, they could easily think about their future and elaborate future scenario contingencies.

Bad performance at school, on the other hand, restricted the area of interest in exploring other alternatives for some of the subjects. This resulted in the predominant use of rule-based frames which enabled them to represent their career problems. In these cases, the rule generally used was: "Since I am good on this subject, for example mathematics, my only solution is to be a mathematician and I don't want to explore any further" or "I will follow this career because I have good grades on this subject".

In contrast, students in the 3rd year of Lyceum, who had already registered for the type of university entrance exams they were going to take, had fewer ambivalent feelings. Although some of them were not satisfied with what they had chosen, most of them, however, accepted their situation. They justified this attitude by stating that their choice was the only one which could permit them to enter university. They believed that as soon as they entered university things would sort themselves out, and that they would have plenty of time to decide.

Students who, after one or two unsuccessful attempts at entering university, were again in the position to rethink their career decision, had even more problems. Their situations seemed far more difficult to handle since the regret for the lost time and effort (Parkes, 1971) hindered their ability to cope with facing a new situation. Most often in these cases, students would talk a lot about their past, trying to explain the position they found themselves in and to justify their new choice on that basis.

From these general observations I was able to identify specific ways of representing of the career problem, in addition to the MAU frame (analyzed by MAUD). For example, in the case of Elias (individual case) who presented his career problem in the following way: "I make plans for my future but I hesitate more than last year. It may happen that I will not get good marks in the exams. If I enter Computer studies, then I will study there get the degree and then go abroad for postgraduate studies for one year. If I enter the department of Physics and Chemistry I will get a degree and then I will work in a preparatory school until I will find a place as a High school teacher, although I am not sure if I really want to do this. If I don't succeed in entering anywhere I will try again and take the exams for a second time because it will be too late then to learn a trade".

Elias is making scenarios about his future, connecting his various actions in a future scenario frame to represent his problem.

In another case, Maria (groups) (age 15, first year of Lyceum) said:

"I want to become a high school teacher either in Greek or English literature. I have no doubts about that. Everybody is saying that this is the best profession for a woman. To work in the public sector, to have a permanent job, and to have a lot of free time for my future family. Because I want to have a family later on".

In this example Maria is presenting her career problem in a rule based frame. For her to work as a high school teacher in the public sector is the only and best solution for her career problem (school teachers in Greece are public servants). She does not have any doubts about what to do with her future, since the rules of what is the proper profession for a women prescribe the career solutions for her.

From the above and additional cases, it became apparent that individuals, while talking about their problems were using at least three different ways of representation in their language discourse. They were either discussing the alternative solutions of their problem in a MAU frame or they were exploring their problem by making future scenarios (Future Scenario frame) or, lastly, were imposing rules which prescribe a solution to their problem (Rule-based frame).

Further observations of the pilot work showed also that the process of decision making for these subjects was not always carried out in a linear way, i.e. first exploring the problem, then structuring it, then evaluating alternative options to take action.

Some students, instead, would enter the problem exploration by giving specific alternative solutions and asking for help as to how they could differentiate between them, or as to how they could decide which was the best solution for them. Having more information about their alternatives, either from the counsellor or from other sources, helped them rethink their problem and make different scenarios or even give additional alternative solutions.

In other cases, unexpected events forced them to go back and reconsider their problem. For example, when Panos was at his last year of Lyceum preparing for

exams to enter university, his father died and his mother, with his three younger brothers, had to move back to their home town. After dealing with the initial shock, Panos decided to continue his preparations to go to university (this was actually his father's wish). However, he had to rethink what he was going to study at university and which career could get him a job easily. Unemployment was a serious concern for him now. He also had to reconsider the location of the universities he was considering. It was very important for him to be closer to his family in order to help them now.

In the case of Maria, mentioned earlier, it was evident that she had a solution ready for her problem. As she said, she had come to the group sessions only because her friends were coming and because she wanted to be informed about her options for early retirement. She justified this by saying that "there were so many other things that she wanted to do in her life". Maria finally decided to stay in the group sessions. Although, at the end of the year, her first choice was still to become a high school teacher, she had formulated five alternative solutions for her future. This was possible since she had the opportunity to explore what were the other things she wanted to do in her life. To achieve this, Maria was encouraged to go back from the action point (decision to become a school teacher) to explore other areas and restructure her problem.

The above examples show that, in the process of career decision making, there are not exactly static stages which are followed by the individual in a linear way in his problem solving behaviour (Levinson et al., 1978). Instead, there are progressive "passages" (Sheehy, 1976) through which the individual moves by accomplishing the necessary operations for each passage via looping back every time it is needed. This appears to take place as he is experiencing the continuous and dynamic transactions and social exchanges within his environment.

4.4. Summary

The main purpose of the pilot work was to identify the main factors which constrain

the students in their career decision making process. These factors were considered as the main areas of concern stemming from the individual's immediate and external environment as well as their internal world, i.e. social constraints, desires and preferences, and personal constraints. On the basis of these three broad categories 12 domains were extracted as representing the most common factors appearing in the individuals' data (see Table, 4.4, 4.6).

From the pilot work observations, it was indicated that the subjective meaning representation of the decision situation of each individual defines the decision process and the way he is going to handle his problem. It became apparent that the way students were proceeding from becoming aware of their problem to the solution of it was progressing forward. However, it was also observed that when the problem was not adequately explored, not adequately evaluated or not well represented it was difficult for the individual to continue in his process for the solution of his problem. In this case it was necessary for the individual to go back and reexplore or reassess his problem. At which point of this process the individual had to go back, it was indicated to depend on the subjective way of perceiving his problem and on the problem situation.

Consequently, in order to be able to identify when and where the individual had difficulties in proceeding to the solution of his problem, as well as how the individual was representing these difficulties, it was necessary to address the above in a procedural schema. Such a schema could show how the individual operates in his process of decision making and when and what kind of support is needed.

In the next chapter the development of such a procedural schema will be discussed. For this purpose the "five level framework" together with the "circular logic" of choice based on decision theory and soft systems (introduced in Chapter 2, 2.3) were incorporated in a process model of career decision making which will serve to investigate the way students proceed to the solution of their career decision problem.

CHAPTER 5

DEVELOPING A PROCESS MODEL AND METHODOLOGY FOR CAREER DECISION MAKING

OVERVIEW

Chapter 5 focuses on the development of a general methodology for modelling the process of career decision making. The model is intended to apply to the investigation of the career problems of adolescents, undergraduate as well as postgraduate students. It is based on the way individuals represent their career problems and on the process they follow to solve these problems. The methodology which underlines the model is intended to enable the researcher:

- (a) to track individuals in the process of decision making;
 - (b) to see how their problem representations are organized; and
 - (c) to identify the rules and items used in the various stages of the decision process.
- The latter can be used as indicators of the stage the individual is at his decision making process, and of whether and when the individual is ready to move forward to the next stage.

5.1. Introduction

The indications we had from the pilot work presented in the previous chapter are in agreement with the two basic assumptions made in the beginning of the study:

- (a) The students were using different ways or representations of their career problems (different frames in their language discourse).
- (b) The process through which the students were trying to solve their career problems was not following a linear path.

In Chapter 2, the development of concepts based on decision theory, systems thinking and soft system methodologies concerning the modelling and representation of the decision making process was presented. Some of these models were found as particularly useful for the structuring and representation of the career decision making process. In particular, it was discussed, how the operations involved in the five levels framework of knowledge representation (Humphreys and Berkeley, 1982) allow for the identification of the different ways by which individuals structure and

represent their career problem within the bounds of their small world (Chapter 2, 2.2). Also, it was discussed how in decision theory, decision making can be represented as a circular logic of choice linking the various frames of knowledge representations of the decision problem (Nappelbaum, 1994, see chapter 2, 2.1.4). In addition, it was discussed how the combination of these two models allows the representation of the decision process in a more "holistic" way, as a system with certain interrelated fundamental elements which correspond to the problem representation components given by the individual when he is talking about his problem: i.e. it allows for a conceptual model building for the career problem (see Chapter 2, 2.3.1). In fact, the combination of these two models enabled me to establish that the same problem can have more than one representations - which is in agreement with the first of the above assumptions -, and to distinguish the different representations used by the individuals in their language discourse; i.e.: the three frames: MAU, Future Scenario, Rule based which correspond to the three different components of the circular logic of choice, i.e. the value judgments, option descriptions and instrumental descriptions.

However, in Chapter 2, it was also discussed, that both of these models were too restricted following the stages of problem solving cycle without providing the rules of how to make the transition of one stage to the other, and without being able to make looping backs at any stage of the procedure. In order to address this limitation it was considered necessary to have a model in the form of a procedural schema which allows: first, to take into account not only how the problem is represented but also how the problem is constrained and how is intended, and second to take into account, how to move effectively through the various types of problem representation to the solution of the problem (see Chapter 2, 2.3.2, Fig.2.6). Such a procedural schema could capture the process of deciding and satisfy the second of the above assumptions.

Such a model and the definition of its components is introduced in this chapter after a clarification of the terms, model and methodology.

5.2. Model and Methodology

The terms "model" and "methodology" were used in a distinctive way in the present

study for the purpose of enabling the author to demonstrate the different ways that the career decision process can be approached.

A model is generally understood to be an abstraction of the components or the elements that make up a system (Humphreys & Berkeley, 1992; Checkland, 1981), whereas a methodology prescribes actions within a model. Thus, models specify what the components are which constitute the system, how they are structured and what the links between them are; whereas, methodologies specify what happens within each of these components.

In addition, there is a distinction between models. Structural models show the general structure of the activities involved, as well as the links of the elements embedded in these activities. Whereas, dynamic models, not only identify these elements and the relationships between them, but also show the transformation processes between these elements and activities.

5.3. The development of a General Process Model of Career Decision Making

Fig. 5.1 below, shows how, both the circular logic of choice, as well as the different ways of problem representation under the five levels framework, are incorporated into a process model of career decision making. This procedural schema is a refinement of the soft system methodologies, and in particular of the problem definition cycle developed to represent the problem solving process (see Chapter 2, 2.3.2, Fig. 2.5). It is proposed to represent the career decision making process, and it is created for the career decision making problem. The advantage of this model is that it combines the generic phases of the process of problem solving i.e. Exploration, Structuring and Evaluation, with the possibilities of different representations of the problem situation. It also permits the possibility of rounds and various looping backs, as well as the possibilities of different entry points in the process of deciding.

In fact with regard to the first refinement of the problem definition cycle followed by most of the structured problem definition methodologies (see Chapter 2, sec. 2.3.2, Fig. 2.6; sec.2.3.3), the General Process model of career decision making appears as follows:

1. The Exploration phase of the model corresponds to the area of "expressing the

issues of concern" of the problem and to the awareness of the problem (Chapter 2, Fig.2.6); it consists the Activity area 1 of the model (Fig. 5.1). It refers in establishing the context in which the career problem is embedded and defines the individual's small world and his future scenario exploration. It is the area in which the individual expresses the desire to make improvements in his current situation.

2. The Structuring phase corresponds to the "building and exploration of a conceptual model" which defines how the problem is represented (see Chapter 2, Fig.2.6); it consists the Activity Area 2 of the model (Fig. 5.1). It refers to the formation and investigation of the alternative options which define the alternative ways of the solution of the career problem according to the different subjective ways of problem representation (as have been initially expressed by the problem owner in the previous area).

3. The Evaluation phase corresponds to the evaluation of the options and the "determination of the preference structure" with which the options described in the previous area are to be expressed (Chapter 2, Fig. 2.6). It consists the Activity area 3 of the model (Fig. 5.1). It defines the individual's preference ordering for the various alternative solutions and his intention for the choice of the best alternative which will lead him to the resolution of his career problem.

In fact, the proposed process model of career decision making can be seen as a board game. It comprises three activity areas, which lead to the end of the game through paths, links and looping backs. Traversing through the model is like playing in a board game where the schema of the model is the board and the players are the problem stakeholders trying to finish the game and find a solution for their problem. The way the individual moves on the board can be traced through the identification of the paths he follows. We can identify the path which will get the individual to the exit quickly and in the most efficient way, as well as, the preferred path which the individual will choose to exit the game and solve his problem. In addition, because the game has links and ladders, the individual may have to make some looping back to places marked on the board game before he can exit successfully. The Action point is the point in which the best chosen option is reviewed and leads either to the implementation of the option or back to a new cycle of the problem solving process.

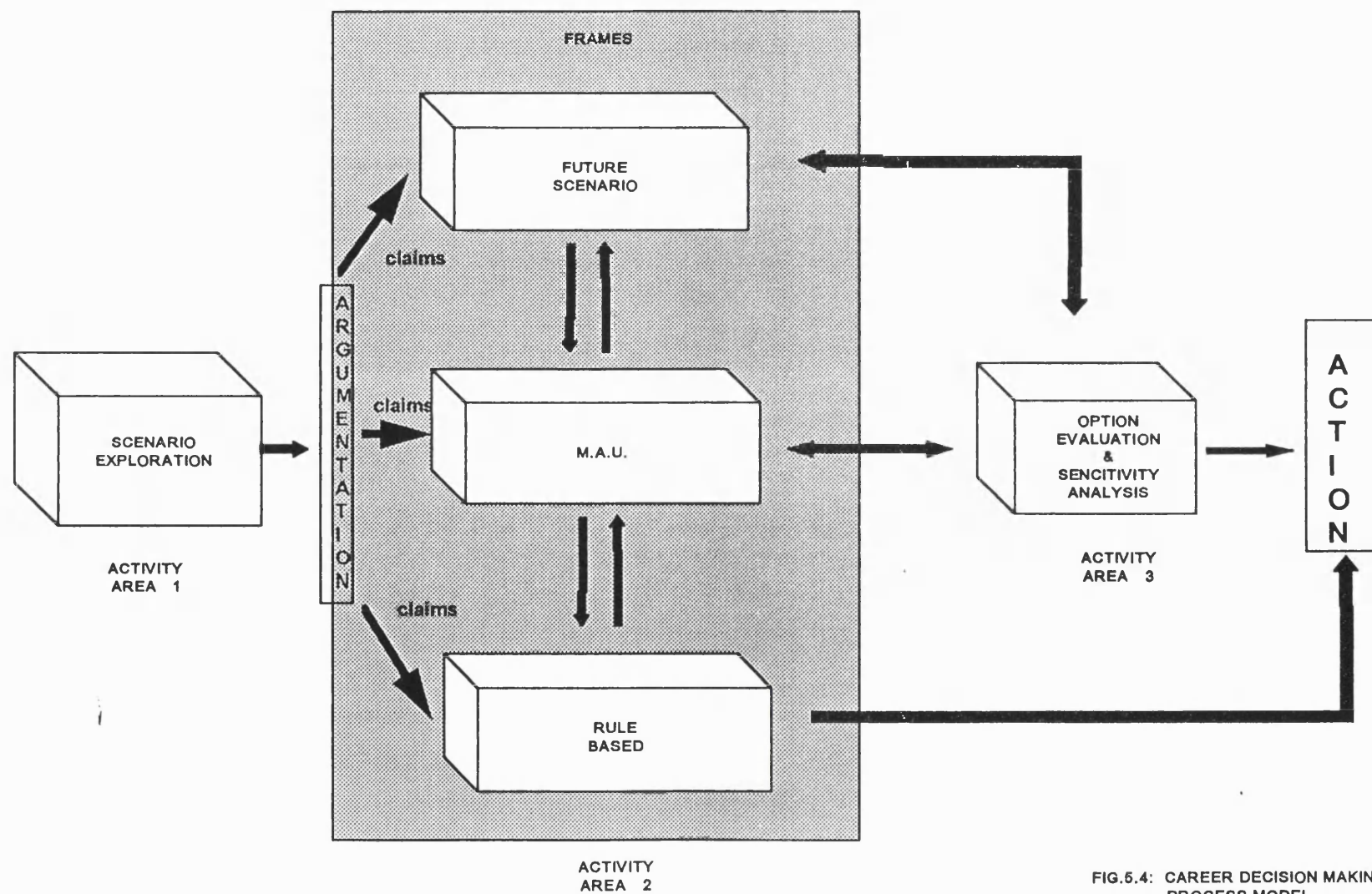


FIG.5.4: CAREER DECISION MAKING
PROCESS MODEL

In the above process model, we can trace the student's movement from one area to the other, being able to follow at the same time why he is moving in a particular direction, as well as what he is doing in each area; also, what links he makes and what enables him to move from one area to another. In this sense, the model is both structural and dynamic. It can reveal the what and the how of the career decision making process.

5.3.1 Activities - Operations in the process model of career decision making

As it was said, the process model for career decision making consists of three activity areas, with different elements and operations in each area. The three main activities illustrated in Fig. 5.4 which represent the individual's movement to action are :

Activity area 1 (A1): Scenario exploration area

Activity area 2 (A2): Option formation area

Activity area 3 (A3): Option evaluation area.

Activity area 1 (A1) refers to the problem exploration activities.

It corresponds to Level 5 (the problem recognition) and Level 4 (the problem definition) areas of the five levels framework, and includes the operations involved in these levels for the solution of the problem. The individual in this area elaborates the initial scenarios for his problem depending on the different small worlds which he explores. (For the present study, small worlds of the subjects were defined according to the different domains identified during the pilot work (chapter 4, 4.2.2.)). The individual's elaboration of his scenarios results in the specification of the boundaries in which the individual can express and identify the relevant structures in order to come up with a solution to his problem. This is facilitated through guidance, by giving to the individual the appropriate information about his problem and by precipitating arguments and claims concerning the way the individual wants to proceed to solve it.

The argumentation which people use when talking about their problem, are the assertive statements found in their language discourse (Chapter 2, 2.2.2.1). The

individual's argumentation stands as the bridge from the A1 to the A2 area. The individual can only enter A2 if he is able to form arguments about his problem.

Activity area 2 (A2) refers to problem structuring activities.

It corresponds to the Level 3 operations of the five Levels framework. These operations:

First, refer to the use of the three frames (Multi Attribute Utility frame, Future Scenario frame, Rule-Based frame), found to be used by the individuals in the pilot study as ways of representation of the knowledge of their career problem.

Second, address the development of structure within each of the frames.

Third, address the links between these frames and the interplay between them, while the individual tries to formulate the various options and the various alternative solutions for his problem.

Activity area 3 (A3) refers to the problem evaluation activities.

It corresponds to Level 2 (problem evaluation) and Level 1 (problem solution) operations. It involves the necessary operations (answer to "what if questions"; sensitivity analysis) for the evaluation of the alternative solutions to the problem, for the formation of an order of preference for the various alternatives and for the extraction of the output of what is the best alternative for the problem solution.

5.4 How the model can be operational to serve as a Methodology for the process of career decision making

This section focuses on how the frames which individuals use to represent their career problems can be identified as necessary elements of the process model of career decision making. It also focuses on the activities and the demand characteristics involved in each area of the process model. The purpose of this discussion is to show how the model can be operational so that it can be used as (a) a procedural methodology for the investigation of the career decision making problem, and (b) as a guide to the counsellor, giving indications of when and what particular help the individual needs.

The use of the three frames

Frames were defined in Chapter 2 as the semantic representative units of the individual's linguistic expression. These units represent the actual structured knowledge of the problem, and constrain propositions and claims which, when structured in a coherent whole, can indicate that a process takes place towards a course of action (section 2.2.2.2 and 2.5.2.1).

In the pilot study, it was found that students were using more than one way to represent their career problem. They were representing their problem by identifying different alternative solutions and establishing them through different criteria (Multi Attribute utility frame). They were also either making scenarios about their future, or they were basing their alternative solutions on a number of beliefs or principles they felt obliged to follow. These three ways of representations, i.e. Multi Attribute utility frame, Future Scenario frame, Rule based frame, have therefore been considered as necessary elements of the process of career decision making, for the definition of the way the individual wants to proceed to the solution of his problem.

The demand characteristics of each area of the process model

As stated above, in **Activity area 1** of the process model of career decision making, the individual is exploring his problem and tries to define it under the boundaries of his small world. To be able to say that the individual is operating successfully in this area and is able to move to the next, he has to be able to make constructive arguments with claims about the possible alternative ways he wants to solve his problem.

The operations that the individual has to complete in **Activity area 2** refer to him being able to put his claims into frames (Multi Attribute utility frame, Future Scenario frame, Rule based frame), and to him being able to develop structures within each of these frames. In activity area 2, we also expect an interplay in the individual's arguments between the different frames in which he is constructing his ideas. The individual may express and elaborate his problem in only one frame, or he may make use of all of them.

For example, with regard to the frames chosen for this study, the subject may choose to represent his problem within a Multi Attribute utility frame by selecting and evaluating the various alternative solutions for his problem. Such alternative solutions may be revealed in the language discourse of the subjects, as in Alexis' case:

"I am interested in Economics. I think I will find a job after studying Economics and that is what I like most. There is also Sociology, which is a different career from Economics. In sociology you can find a job in a school or in a company".

Alternatively, the individual may want to represent his problem in a Future Scenario frame, exploring the contingencies of the various possible actions which may represent possible solutions of his career problem. For example, in the case of Larissa who said:

"If I become a dentist I will go abroad for further studies. I don't know if financially I will be able to do that. If I become a biologist, I have not thought about it yet. I will see if I like it, and then I may go for postgraduate studies. If I continue as a Biologist I plan to get a place at the university, to be able to do an academic career".

Or, the individual may want to consider his problem in a Rule based frame. In this case rules have to be sufficient and able to discriminate between the alternatives the individual is talking about. For example Anna said:

"Although I would like to become a journalist, I decided to study literature and become a literature teacher, and to teach in high school. I think this is a right profession for a woman".

Consequently, the individual can be considered as operating in A2 when he is able to formulate his thoughts in any of the above frames. Otherwise he might be making only claims. These may not be precise, and would not lead him to an effective decision. It became apparent from the pilot work that a lot of students, particularly young ones, make a lot of claims but with a minimum amount of structuring.

As for example, in the case of Vassilis (age 16) who said:

"I wanted to be a pilot...Anyway, I want to become an agriculturalist now. I will register first for that, then there is also computer science and chemical-engineering. All these you see, are in the first group of studies and I want to pursue this group".

It is obvious here that Vassilis fails to order his thoughts. He makes a lot of claims

in his statement without being able to formulate them into frames. He is not able to differentiate between the various alternative solutions by comparing them in terms of a number of relevant criteria. It is more likely that, if he continues to do this, he is going to have problems with his career decision, since he has no structured future plans.

There were other students, for example Effi (age 18) who said:

"I don't know what will happen in the future, but I am determined to strive and I hope I will do more than just finish University, create a family and then say stop, whatever I have done is done, I will not go any further. Anyway, I think that if I enter University, I will be able to see things more clearly. Now everything is just dreams, now all I can say is that I want to succeed".

In fact, Effi, in her argument, is making few claims, but formulates a future scenario frame while linking it also with other abstract thinking.

In **Activity area 3**, there is an evaluation of the various alternative solutions of a MAU frame, or of the terminal events of an act-event future scenario frame, which are decomposed into multiattributed outcomes. Thus in this area using either a MAU frame or a Future Scenario frame, we arrive at "Multi Attribute outcomes" which are evaluated further through sensitivity analysis. Consequently, the demand characteristics for this area are for the individual to be able to form an order of preference for his alternatives and to assess these alternatives in order to arrive at a solution to his problem.

Overall, the model can represent the individual's movement from the identification of the problem to the solution of it and to action. The way that the process model is structured implies, also that movement from one area to the other is permitted upon completion of the tasks and operations involved in each area, following the principle of the top to bottom hierarchical analysis of the five Levels framework mentioned earlier. However, in the proposed process model, one also has the possibility of starting his problem investigation by entering any area where he feels his problem is expressed. Looping back is possible if this is necessary or, alternatively, one can continue forward.

Furthermore, as can be seen from the above examples, the claims-to-frames analysis, as well as the exploration within each frame, are important for two reasons.

First it helps to differentiate the ways adolescents perceive and represent their problem

Second, to investigate whether the individual can really make decisions, and to predict whether he is going to have problems about his future. This is possible since, whatever decision the individual must take, this decision has to be structured within some sort of frame.

The claims-to-frames analysis can also give us an idea about the differences between adolescents of different age groups; older individuals may put more claims into frames than younger ones.

Moreover, the rules which facilitate the individual's movement from Activity areas A1 to A3, when taken into consideration, can guide us on how and when to provide help to the individual in his career decision making process. Constraints put, for example, from the counsellor in the form of suggestions or questions, can help the individual to formulate and structure his ideas, his knowledge, and his desires about his problem and put these into frames at any point in activity area A2. Or, the counsellor can help the individual find various attributes concerning the alternative solutions considered appropriate for the solution of his problem, and thus help him to move from area A2 to A3 and encourage him in the evaluation of his alternative solutions.

5.5. How to plot the three frames

From the above discussion, it appears that structuring the claims into frames is a major task in the process of decision making, since it reveals the subjective way the individual chooses as the most appropriate for the representation of his decision problem. This section deals with some technical and methodological issues concerning the investigation of the use of the above mentioned frames. It refers to:

- (a) the ways we can identify whether individuals develop structure within the frames
- (b) the ways we can use to plot the structure of the three different frames.

These methodological considerations were used in the analysis of the main study of this thesis.

Multi Attribute Utility frame (MAU)

To consider that the individual is using a MAU frame, he has to be able to:

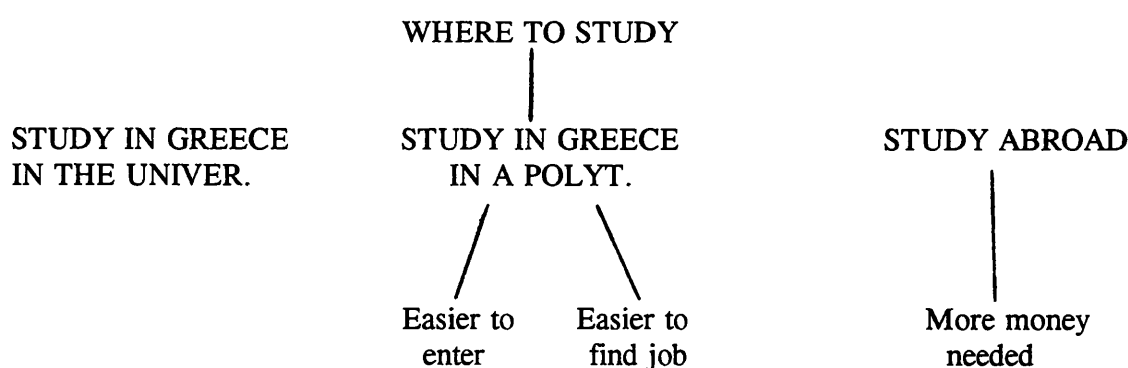
first, give two or more alternative solutions for his career problem such as, for example, "to become an architect, or a mechanical engineer or a computer analyst", or "to continue education or to find a job or to get married";

second, compare these alternative solutions, which have to be mutually exclusive, under a number of relevant criteria and make trade-offs on the basis of these criteria.

In other words, a frame is not accepted as a MAU frame if the adolescent simply says that this alternative is good in one case and puts the other alternative in another case by giving it attributes. Instead, in a MAU frame, he must take two or more alternatives and compare or link them in one way or another. Otherwise, the individual is making claims without being able to structure these claims and take action. Fig. 5.2 shows a graphic representation of the Multi Attribute utility frame from a person who says:

"I am not sure whether I would like to go abroad for studies or stay in Greece and try to enter university or study in a Polytechnic; it would be easier to enter the polytechnic and easier to find a job later; I am not sure if my parents could afford the expenses during my studies abroad".

Fig. 5.2: Three Altern.solutions: Study in Greece in UNIV.
Study in Greece in POLY : 2 attributes
Study ABROAD : 1 attribute



The process by which a MAU frame is structured can be addressed within the technology given by Multi Attribute Utility theory (Von Winterfeldt, 1975; Kenney

& Raiffa, 1976) (see Chapter 2, 2.5.1.3). This is based on the operations involved in the elicitation and definition of different criteria or attributes by the individual which, in turn, can be used to describe and evaluate his subjective representation of his choice of alternatives.

In the present study, the graphical representations which resulted from the analysis of the data produced from the computer program MAUD were used to plot the MAU frame (Chapter 8, 8.2.3). MAUD, a computer based decision aid, was used first in the pilot work and then in the main study, to help individuals in the structuring of their career problems under a Multi Attribute Utility frame (Chapter 4, 4.2.3, Chapter 8, 8.2).

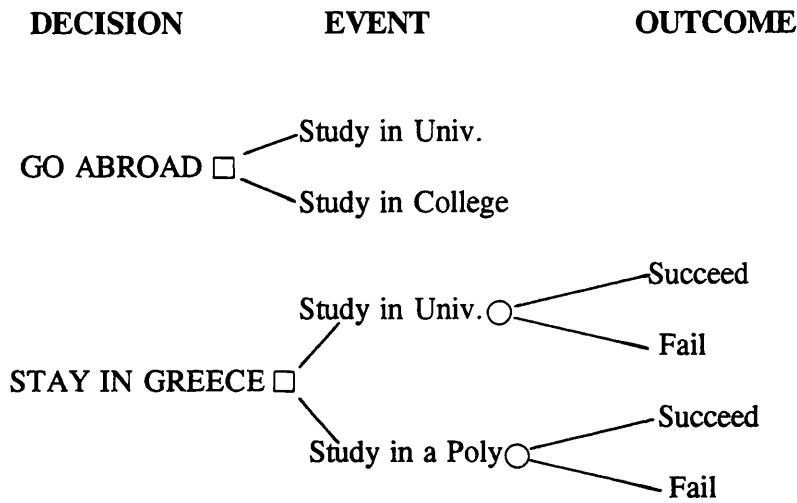
The Future Scenario frame

For the identification of Future Scenario frames in the adolescent's language discourse, I have tried to consider how often he explores the contingencies of the various possible actions which may represent possible solutions to his career problem. Whether he was able to present one future possibility but not another or whether he was able to cope with one future alternative and not another was taken into consideration. If, for example, the adolescent was faced with the event "fail to enter university" , I had to ask *is he able to give alternative solutions?* In addition, it was considered important that the individual was able to order the contingencies of his future action as a coherent whole. In the above case he had to be able to say something of this nature: "in the event "that I may fail in the exams", then, I will go abroad to study or try again next year; if it does not happen and "I pass the exams", then I will enter university and finish my first degree. Thereafter, I will either stay in Greece for further studies or go abroad".

If the individual presented only various disconnected possible futures: for example, 'I can do this and that and the other', i.e. "I can enter university, or study abroad, or study in a polytechnic", he was considered unable to form links and explore them and thus unable to take a decision and follow a course of action.

A representation of a Future scenario frame in the form of a decision tree is shown in Fig. 5.3.

Fig. 5.3: An act-goal future scenario



For the present study, in order to develop more integrated technical representations of how decision stakeholders perceive their problems and formulate their scenarios, it was important to define the following concepts by incorporating some of the terms used by Jungermann (1985), Beach & Mitchell (1987), Vari et al. (1987), and Fox (1985):

A. states which characterize the state of the objects or events within a given time (Vari et al., 1987). Amongst the states we can distinguish:

a) The exogenous states ExS : States which cannot be influenced by the decision maker, but can affect his decisions and any subsequent action.

b) The Endogenous States EnS which result from the decision taken.

B. actions which refer to active operations which transform one state into another.

C. events which refer to passive occurrences (Vari et al., 1987). Von Winterfeldt and Edwards (1986) have defined these as "states of nature of things that can happen to you and thereby change the outcomes of your decisions directly". Events include:

a) The endogenous events EnE which result from the decision taken.

b) The exogenous events ExE These refer to either (a) events which, although extraneous to the act-event sequence, could be structured by the person in an influence diagram because they represent events which the individual has used to make claims. (For example the possibility of the adolescent's family moving abroad);

or (b) events which have happened subsequently, and are exogenous to the person's problem formulation. These events were neither anticipated nor claimed and thus are framed. (An example would be a serious illness or the death of a member of the family). Yet, they can affect the decision taken and any subsequent actions. If these events happen during the decision making process, then either the decision problem has to be restructured or these events have to be left out of consideration.

D. goals . The concept of goal must exist in addition to the concepts of states and actions, in order to provide direction to the problem-solving (Fox,1985). Goals which can be either concrete states, like getting a job, or abstract states, like feeling satisfied (Beach & Mitchell,1987), are particularly helpful in the individual's construction of scenarios. By moving forward or backward from a fixed state to a fixed goal, the individual works out his plans formulating the scenario of his decision problem situation (Toda,1976).

For the purpose of being able to analyze further the individual's scenario exploration, I have used two different types of scenarios which were identified from the pilot work:

Future scenarios which consist of a) act ---> to goal scenarios;

b) goal ---> to act scenarios of the future

Past scenarios which consist of a) act ---> to goal scenarios;

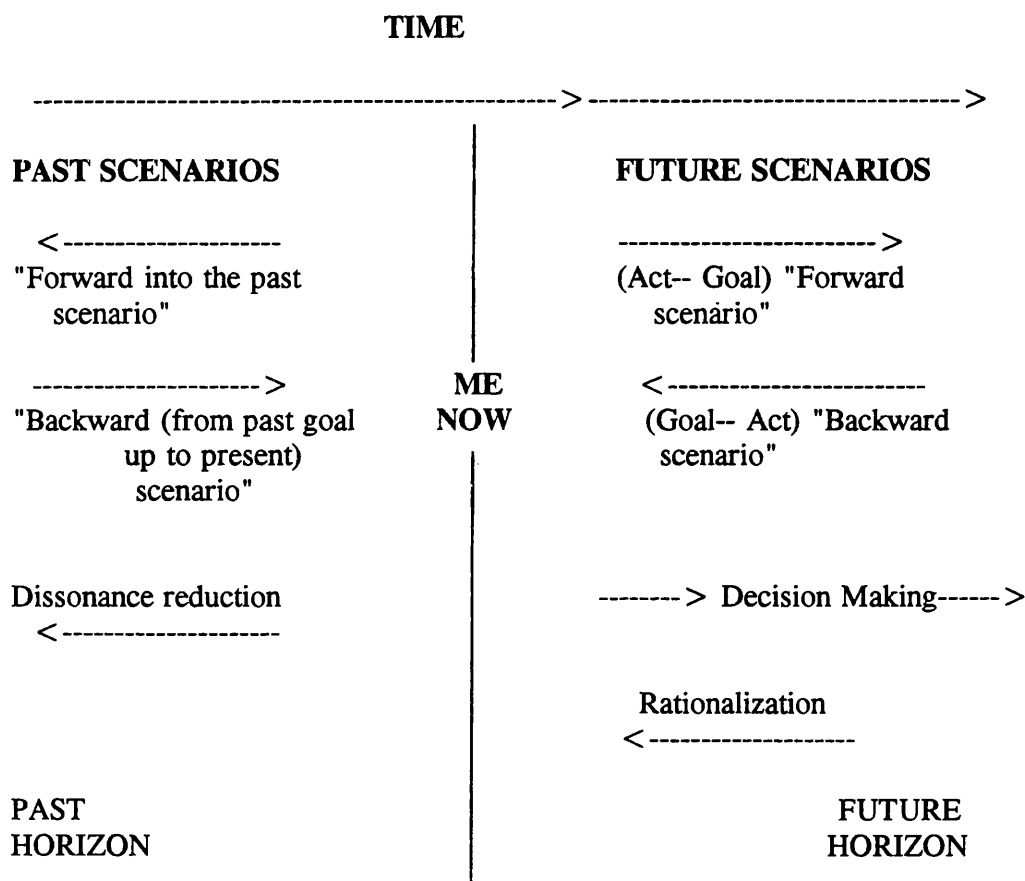
b) goal ---> to act scenarios of the past

In Fig. 5.4 there is a schematic representation of how scenarios are formed through the time sequence. Future scenarios start from "me now" to "me in the future". They cover the decision making process and end at the decision horizon where the future goal state is set. During this process, the individual moves either forward from an immediate action to a goal, or backwards from the goal state to an action, during his attempt to structure his decision problem (Jungermann,1985). Moving forward, the individual tries to capture all the potential events which appear more probable to him (Kahneman & Tversky,1982), by exploring intuitively and subjectively all the possible alternative actions and solutions to his problem. Moving backwards, the individual actually rationalizes what he wants to do: "Why should I be aiming for this goal". Jungermann (1985) has defined backwards inferences as "...a diagnostic reasoning

process", in which the individual, on the basis of some known effects, "infers the unknown conditions that have led to these effects".

Past scenarios start from "me now" and move to a past goal state and then beyond the past horizon into the past (act--- > goal). Or they start from a past goal and move up to the present state (goal--- > act).

Fig. 5.4: Past and Future Scenarios



In the present study Future and Past Scenarios are represented in the form of Inference Diagrams (Figures of Inference Diagrams can be seen in Chapter 5, section 5.8).

Inference diagrams were used to plot the individual's representations of a Future Scenario frame. They consist of "goal-action-event-state" chains in which the concepts introduced above are incorporated. In these chains, the relationship between the goal states, the actions and the events, are represented graphically either in a forward or in a backward moving direction. Consequently, by creating an inference diagram we

can link together any hierarchy of data, actions and events the individual is claiming, when he is talking about his career problem. We can also link any hypotheses or possible actions the individual wants to take for the completion of his goals.

Research in decision analysis presents the study of inferences as a process of scenario exploration. Usually this analysis is focused on well defined problems, since formal technology useful for real world inferences is as yet not being developed. As von Winterfeldt and Edwards (1986) suggest, the missing key element of the technology of inference is a set of rules and procedures that specify how to translate scenarios into structural representations.

The application of Inference diagrams in this study has to be distinguished both from the way inference trees and influence diagrams are used. Influence diagrams are used as decision analytic structuring techniques (Howard and Matheson, 1980; Miller et al., 1976), which present a graphic picture of the interactions of decision and random variables in the form of cognitive maps of a decision problem. Although inference diagrams can also be seen as cognitive representations of a decision problem, they have several advantages. First, their sequence does not depend on a probabilistic influence relation of one element with the other. Second, their construction requires the use of more elements in addition to events and outcomes. Furthermore, influence diagrams can only be constructed by experts assigning probabilities to events and outcomes, whereas Inference diagrams can be constructed by the decision maker himself, as long as the elements of the inference chain sequence are established.

Also, inference diagrams have the advantage that their structure provides the possibility of interconnections and looping back between elements. They can be developed into inference trees by assigning probabilities and values to the events and outcomes. Thus, they can aid the initiation of the next stage in the process of problem representation and problem structuring, that is namely problem evaluation.

Vari et al., 1987) have used inference diagrams in group decision making to explore the uncertainties of the decision stakeholders concerning the decision making problem, and to demonstrate the differences between them in their problem structuring process. According to Vari et al (1984) and Jungermann (1985), the advantage of the inference diagram is that it is a suitable tool for representing both backward and forward

moving scenarios and for mixed scenarios as well.

The Rule-Based frame

This study considers that for a rule based frame to exist, the rules have to be of the type that can discriminate between the individual alternatives; or they have to be useful rules, linked by a principle relevant to the situation (Chapter 2, 2.5.2.1). No technical representations will be used for the rule based frames. Rules will only be listed in respect how often they were used by individuals when talking about their career problems.

5.6 Conclusion

The generic model for career decision making which was proposed in this chapter forms the basis of the procedural methodology followed in the present study for the investigation of the career decision making problem. The aims of this methodological procedure are:

- (a) to track subjects through the different phases (Activity areas) of their career decision making process;
- (b) to analyze within each one of these phases how subjects represent their problems, and how these representations affect their movements through the various areas;
- (c) to investigate how people can get through the career decision making process effectively so that they can resolve their problems.

This putative generic model helps us to see how people operate in their process of decision making. By defining a methodology based on this model, it facilitates constraining and putting in order the process sequence people follow by themselves when they are talking about their problem. This procedure enabled me to refine the model so that it can also provide the rules on how to move through the model towards the resolution of the problem.

The next chapter is devoted to a description of how this methodological procedure has been applied in the present study for the investigation of the career problem of Greek adolescents at the age of 16-20 years.

CHAPTER 6

GENERAL PROCEDURE

OVERVIEW

This chapter describes the application of the procedure which is put forward in this study for the investigation of the career decision problem. It is accomplished in three steps, on the basis of the three activity areas (Scenario exploration, Option formation, Option evaluation) through which the individual proceeds, and which are identified in the process model of career decision making developed in the preceding chapter. The data were collected from interviews of 24 adolescents who were divided into three groups according to age.

The analysis of the interviews was based on the five-Level framework by the incorporation of a number of techniques used as tools. These included: Argumentation analysis; Propositional analysis; MAUD; Inference diagrams.

6.1. The research questions

In Chapter 1 (1.6), three basic research questions were posed.

The first was to select a methodology and, within that, to define an appropriate language for the representation and structure of the adolescent's career problem. For this purpose the five-Level problem representation framework introduced in Chapter 2 (sec. 2.2), as well as the circular logic of choice (section 2.1.4) and the procedural schemata based on the three definition cycles problem solving representation (2.3.3) were selected. The language necessary for the representation of the career problem at each level was defined from the operations involved at that level.

The second research question addressed was to find the main factors which constrain and influence the adolescent's career decision making process. In the pilot work (Chapter 4, 4.2.2), 12 main Domains were identified as those which capture the diversity of factors influencing career decision making in the fairest way.

The third research question was, first to assess the selected methodology and, second, to identify the "how" and "when" to mobilize available resources (Humphreys, 1986), which can provide the necessary support for the problem solution. This was

actually addressed by the implementation of the process model presented in Chapter 5. For the implementation of this model two steps were required:

- (a) to follow the process prescribed from the activities and operations of the process model (Chapter 5, section 5.3.1) and,
- (b) to analyze the individual's language discourse in terms of the methodology and the incorporated analytic techniques given by the 5 Levels of knowledge representation as defined in Chapter 5, section 5.4.

In the rest of this chapter, the sample, the interviews, the procedure and techniques used for the analysis of the present study will be covered in detail.

6.2 The Sample

In this study the sample consisted of 24 subjects divided into three groups according to age difference and school grade.

GROUP 1 (Gr.1) : students, 18-20 years old, who have finished the Lyceum (upper secondary school) and have sat for their entrance exams to the university.

GROUP 2 (Gr.2): students, 17-18 years old, attending the last year of Lyceum.

GROUP 3 (Gr.3) : students, 16-17 years old, attending the second year of Lyceum (see 3.2).

The subjects were living in the Greek city of Larissa (population 200,000), and were attending public schools. They came from both, working and middle class families. To keep a balance of sexes, each group included 4 males and 4 females. The students were informed about the study either by their teachers, their tutors in the preparatory schools, or by the Manpower Counselling Centre.

The decision to take students who had previously had attended, or were attending, General Lyceum was based on large scale surveys carried out in Greece. These surveys showed that the vast majority of students want to attend some type of upper secondary school, especially the general Lyceum which is a prerequisite for entrance to university. As was discussed in Chapter 3 (section 3.2), this tendency derives mainly from the trend of Greek families to encourage their children to continue with higher education, and from the belief that a university education gives students a

social role and a social identity as they progress from early to late adolescence.

6.3 Interviews

In the present study individual cases were interviewed and their data analyzed. Collection of data from case studies was decided to be more suitable for the in depth analysis of the career decision problem which is the aim of the present study. This decision was based on the experience that I had in the pilot work. Moreover, in the literature reviews concerning the investigation of career development and the career decision making process, it has been noted that, often, statistical pictures produced from big surveys could be extended and challenged through case studies. As Banks et al. (1992) suggest, "...the holistic nature of case study allows the causal complexity in the life of an individual (or group) to be revealed".

A combination of structured and unstructured methods were used for the interviews of subjects. Several standard questions were addressed to all students (see Appendix 2). At the same time, attention was paid to establishing a good rapport with the students, and they were given plenty of freedom to express and describe their problems in their own way. The questions were designed to cover the domains established in the pilot work (see 5.2.2). In addition, a large number of specific questions were asked with the intention of priming or constraining the individual in both his scenario exploration and his attempt to frame his ideas in the three frames identified from the pilot work.

6.4 Procedure

Students were interviewed several times within two defined periods; starting from September, the first period was before, and the second after, the university entrance exams (June) (see Fig. 6.1). During these periods, students were interviewed three or more times depending on their needs. In these interviews, the operations involved in the three activity areas of the process model described in 5.2.1 were followed (see Table 6.1).

The University entrance exams were chosen as the target event. Firstly, because as discussed in Chapters 3 and 4, they appear to constitute a seminal point in the adolescent's career decision making process and secondly, since students can take the exams several times and, since each year the exams grades can affect the entrance requirements for the next year, they may contribute to the way individuals perceive their future and their goals each time (Chapter 3, 3.2, Chapter 4, 4.1).

Table 6.1: The three steps in the procedure

STEP 1: Awareness of the problem

Exploration of individual's small world.

_____ Scenario exploration :

_____ "Talk about your future, your future career"

_____ Constraints on the areas of exploration

_____ Perceived need for change.

STEP 2: Option formation

Identification of the problem : Option formation

_____ Establishment of the alternative solutions

_____ Constraints on claims that lead to frames

_____ Constraints on structures relevant for the
solution of the problem

_____ Prime on MAU frame, Future Scenario frame,

Rule Based frame

_____ Give MAUD

STEP 3: Option Evaluation

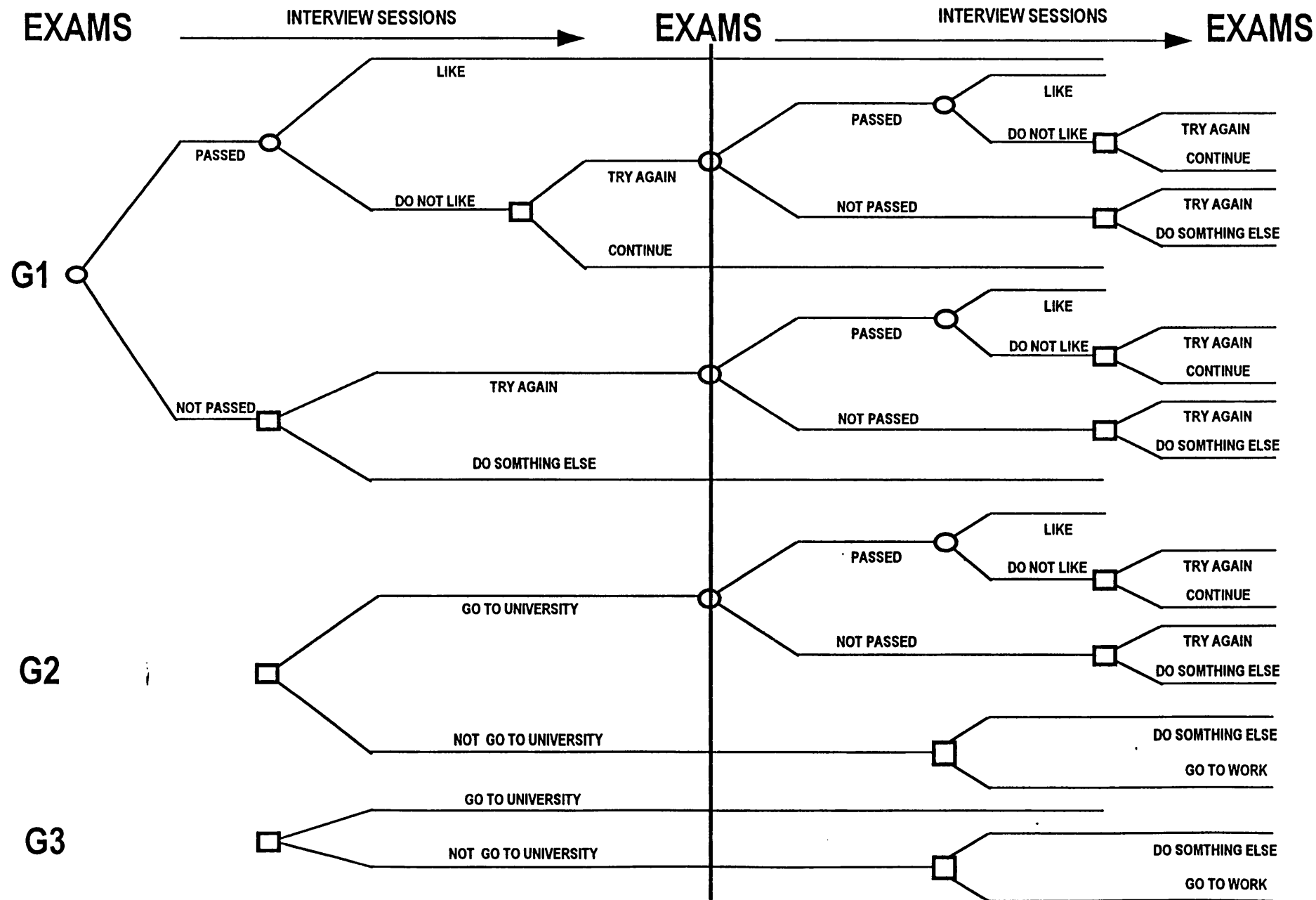
Evaluation of the alternative solutions

_____ Constraints on criteria and attributes

_____ Explore what if questions

_____ Give MAUD

Fig. 6.1. Time table of Interview Sessions for the three Groups.



STEP 1 Awareness of the problem

Scenario Exploration

In the first session, all case students were encouraged to explore their problem, talk about it and express their thoughts about the various aspects and factors which may influence their career decision making.

Usually the session started with the counsellor constraining and probing the individual with the question:

- *"Tell me about your future, how do you see your future career?"*

The initial question was followed by several probes, for example:

- *"Have you made any plans about your future?"*.

In the next part of the interview the subject was asked to explain how he saw himself in respect of the various issues which affect his career decision making. In the first interview, there was an attempt to cover the domains concerning school, social and personal constraints, (i.e. difficulties, fears, personal capabilities and educational achievement) as well as parental influence. These were established in the pilot work as the main areas of concern for adolescents with reference to their career decision making problem (see Chapter 4, 4.2.2). Discussion on the particular topics was initiated either by the subject himself or by the counsellor who was probing the individual with additional questions if this was necessary. Thus, if the subject brought up a relevant topic first by saying:

- "The university entrance exams are organized in a very bad way", then there would be more probing from the counsellor of the type:

- *"Do you think this has affected your career choice and in what way?"* Or, if the subject said:

- "It is my mother who does not let me become a pilot", or

- "My father keeps telling me that I will be very good in computing because I was always good in Maths", the counsellor would probe with the question:

- *"Do you think your parents have influenced you in your career choice?"* or

- *"Would you like your future job to satisfy your parent's interests?"* or,

- *"In what other subjects do you think you are good?"*

If the subject was not responding by showing concern for any impact that any of the above areas may have on his career plans, then the counsellor would propose one,

using questions of the type:

- *"Tell me about the structure of the educational system",*
- *"Do you think the way the educational system is structured had an effect on your career decision making?"* or
- *"Would you like your future job to satisfy your parental interests?"* or even
- *"Do you think that adolescents can do whatever they want?"*

(The complete protocol of the questions proposed at the various stages of the procedure is presented in Appendix 2.)

Obviously this exploratory activity was intended to focus primarily on the establishment of the boundaries of the individual's small world (Chapter 2, 2.5.1.2), as well as on the areas in which he was feeling unsafe and found difficulties in proceeding (Chapter 2, 2.5.1).

In addition, there was an effort to bring the individual to acknowledge the "need to change and to make a decision". In other words, an attempt was made to establish both the internally assigned objectives, like values, preferences, beliefs and goals accompanied by explicit or implicit priorities, as well as the externally assigned objectives, for example, requirements to enter Lyceum, or university, time for the entrance exams. Thus, relevant probing questions would be as follows:

- *"What are your priorities now?"*, or
- *"Do you have any other goals for your future?"*, or
- *"When do you finish school?"*, or
- *"Do you know when the registration for the university exams are?"* or,
- *"Is there a deadline you have to register for the exams?"*

Or, if the individual started talking about the past by saying for example:

- *"When I saw my grades of the university entrance exams I felt awfully",* the counsellor would probe further by posing questions like:
- *"Can you tell me the reasons you failed the exams?"* or
- *"Do you think you have changed from last year?"*

Or, if he said:

- *"I have changed my plans since last year, I don't want to pursue studies in Physical Education any more",* the student would be asked: *"What other alternatives would you like to think about?"*

At the end of the session the subjects were given encouragement and instructed to get

additional information about their goals and future plans and to discuss their problem with friends, teachers and relatives. A time table for the next counselling sessions was set.

STEP 2 Identification of the problem : Option formation

The main part of the second session involved the establishment and elaboration of the subject's alternative options and alternative future scenarios concerning his career.

The session started with the counsellor asking the individual questions:

- *"Do you think you feel more ready to talk about your future? "* or,
- *"Tell me about your future alternative career solutions".*

If the individual replied, for example, -"I think I have two alternatives I want to explore", the counsellor would probe him with the question:

- *"Would you like to name them?"* or,
- *"Is there anything else you want to propose? "*

Every time the individual made claims about his alternative solutions or his preferences, he was constrained by the counsellor to frame his ideas either in a MAU or in a Future Scenario frame with a number of questions. For example, when the individual was saying: -"I want to study medicine, but studying biology or dentistry would not be too bad", the counsellor would constrain him so that he had to put his claims "studying biology", "studying medicine", "studying dentistry" in a frame structure. The questions posed were of the type:

- *"What is the difference between these three alternative solutions" or,*
- *"What is it that you like more in medicine?"*

Or, for a Future Scenario frame, a question could be:

- *"What are you going to do in order to become a medical doctor or a biologist? or,*
- *"What are your future plans on becoming a dentist?"*

Moreover, if the individual was presenting a bounded scenario or an unsafe area, the counsellor would probe him with questions which would focus on the extension of his background of safety and in the framing of his ideas. For example, if the individual said:

- *"I would like to go abroad to do my specialization in medicine unless something might happen which would not permit me to do that",*

The counsellor would probe him with the question:

- *"What do you think might happen and how this is going to affect you?"* Or, if the individual was giving a rule, for example, by saying:
 - *"There is no way that a woman can succeed as a surgeon",* the counsellor would prime him/her with the question:
 - *"What do you think are the reasons for that?"*.

In addition, during this stage students were encouraged to find criteria and attributes which could characterize their preferred goals in a similar manner as was described for the pilot work (Chapter 4, 4.2.2). The individual would be asked to write down the pros and cons of his alternatives or the consequences of his acts upon the completion of his goals. In this process the questions posed were of the type:

- *"What kind of satisfaction do you expect that the future job will give you?"* or, even more specific questions were put when there was a need, like:
 - *"Do you think the possibility of getting married will affect your career and in what way?"*

The Balance Sheet (Chapter 4, 4.2.2) was given to them to help towards a better evaluation of the positive and negative consequences of their decisions. In addition, at the end of the second session or at the beginning of the third -depending on individual needs- and when an adequate number of alternative solutions was established, MAUD (Chapter 4, 4.3) was introduced and the students had their first session with it.

STEP 3 Evaluation of the alternative solutions

In the third step, the focus was mainly on the reconsideration, re-structuring and re-evaluation of the subjects' alternative solutions and of the criteria they had attributed to them. The counsellor would also try to help the individual to explore the "What if questions" such as for example:

- *"If this event happens ... then what else..."*, or,
- *"If this event does not happen... then what else..."* .

In most cases (20 out of 24) the first session with MAUD was followed by a

second one. During the second session the students would be encouraged to further reconsider and re-evaluate their alternative solutions.

During the entire procedure, there was always the possibility of reshuffling the sequence of steps, since it was important to keep a natural flow of conversation and to give priority to the specific needs of each individual. Consequently, since the interview could be adapted to the student's needs, the student could start his counselling procedure at any of the three steps. For example, some of the students wanted to talk, at the outset, about the different criteria of their alternative solutions. In these cases step 1 and step 2 were omitted or passed over quickly and MAUD was given to them. Subsequently, if it was considered necessary, or if he had difficulties in completing the tasks of this step, the student was encouraged to go back to the earlier steps of the procedure. In other cases, particularly with students of group 3, a lot of time was spent on steps one and two. It was found that students of group 3 needed a lot of time to discuss and formulate their alternative solutions. Step two appeared to be particularly important and very helpful to them.

6.4. Techniques used in the Analysis

The five Levels of knowledge representation discussed in Chapter 2 (sections 2.2 and 2.5.1) became the basic framework used for the analysis of the interviews in the present study. In this framework the following techniques were incorporated :

(1). The propositional analysis based on Gerbner's (1964) propositional analysis Following the propositional analysis, the interviews were transcribed and sorted into propositions by focusing on the content rather than the context of what people were prepared to reveal in their conversation. The propositions were subsequently coded and classified according to the operational activities specified by the 5 Levels framework. For example, for the level 5 analysis, the propositions were coded under the 12 domains identified in the pilot study (Chapter 4, 4.2.2) as:

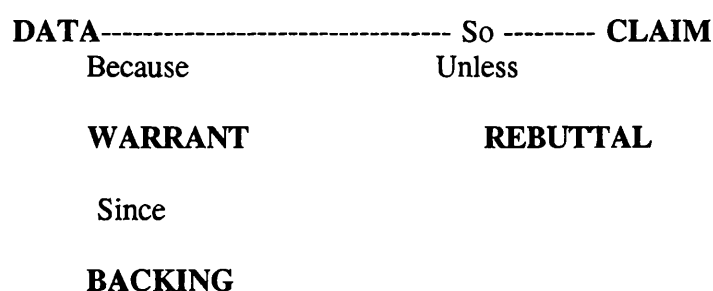
- "My mother was opposed to me becoming a pilot" _____ Domain : Parental Influence.

"To be an architect is a nice profession"-----Domain : Profession

(2). The "**Argumentation Analysis**" discussed in section 2.2.2.1. was introduced to illustrate the process of reasoning used by individuals when they are discussing their career problem. Argumentation (first introduced by Toulmin, 1958) has been used as an analytic framework by Mason and Mitroff (1981) to analyze the individual's language discourse in group problem solving situations. In the present study, arguments were analyzed in terms of **Data**, **Claim** , **Warrants**, and **Backings** (Chapter 2, 2.2.2.1). In some cases **Rebuttals** and **Qualifiers** were added, although in general they were not used by the students very often (see Fig.6.2). An example of a student's argument is demonstrated in the following:

"If I become a dentist I will go abroad for more studies (**Claim**); My uncle studied in Berlin to become a dentist and then he went to U.S.A. for postgraduate studies (**Backing**); technology in U.S.A. is more developed (**Warrant**) and they have better methods of research (**Warrant**) and I would like to go there to learn but not to work there (**Claim**).

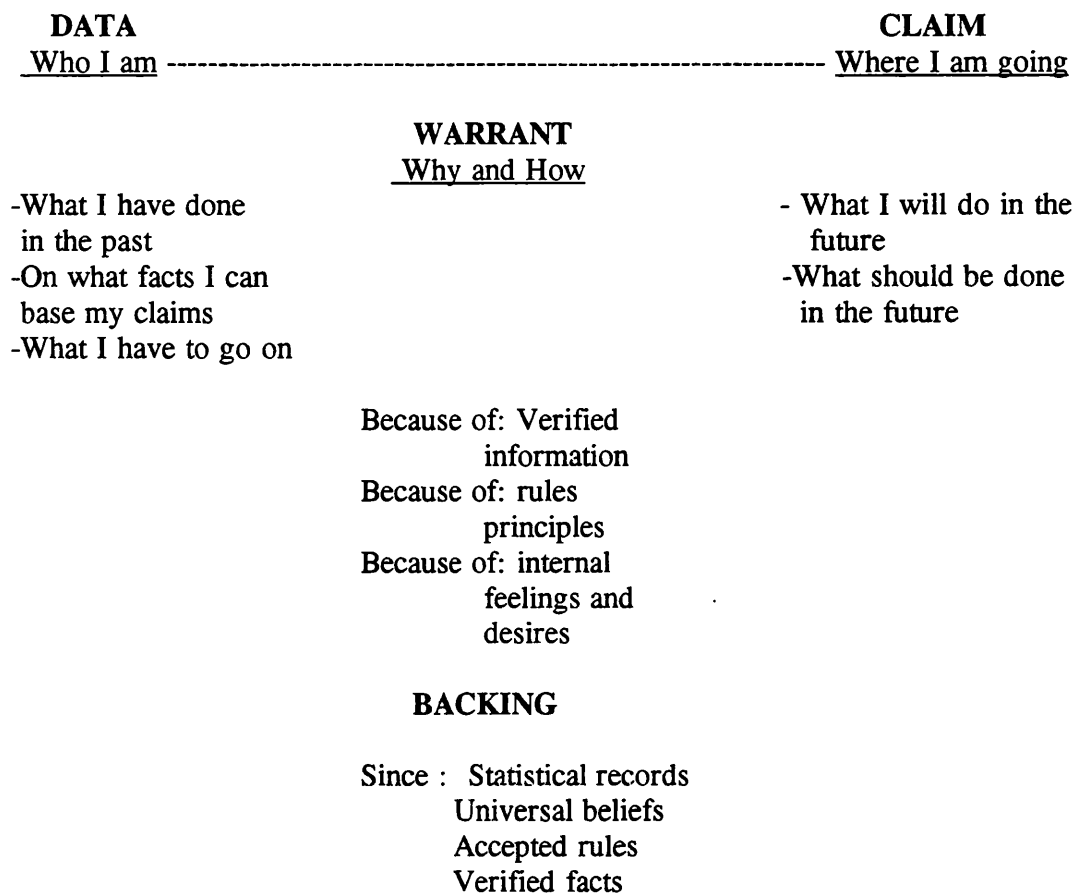
Fig. 6.2: The basic structure of an argument



Given the fact that arguments are not always presented in the formal form discussed by Toulmin (1957) and Mason and Mitroff (1982), in order to analyze arguments and study how they operate and what is their lay out, I have followed the main pattern implicit in the questions the adolescent addresses in his main dilemma during his transition from adolescence to adulthood:

- "**Who I am, Where I am going, Why and How**" (Table 6.3).

Fig. 6.3: The main pattern of the subjects' arguments



The question "**who I am**" refers to the individual's small world and his interpretation of his social environment and his abilities. It constitutes the **DATA** of the argument.

DATA refers to:

1. Individual observations about people, events, objects and the interrelations between them.
2. The individual's past conditions or achievements.
3. Statements of opinion given by an identified source.

(Examples of arguments made by students are given in Chapter 7, 7.3.4.)

The question "**Why and How**" constitutes the **WARRANT** of the argument. Warrants are statements of justification which the individual uses to justify his movement from the DATA to the CLAIM. WARRANTS can be classified into three main types:

TYPE I: Statements of justification in which the individual is referring mainly to the information he has from the real world concerning the DATA and the relationships of these statements to the real world.

TYPE II: Statements of justification based on rules, principles or social values stemming from the individual's belief system or his traditional background.

TYPE III: Statements of justification based on the individual's internal feelings, desires and achievements.

BACKINGS for the warrants are categorical statements of assurance, which try to establish the verification of the warrants and consist of the "credential of the Data" (Toulmin, 1957). Backings vary from one argument to another, and are usually statistical records or statements referring to conditions similar to the warrants. These conditions have already been established or are considered to be true and, thus, they have to continue to be so. They can also be universal beliefs which enhance and back the rules given by the warrants. Or they can be statements about verified facts which took place in the individual's immediate environment.

The question "**Where I am going**" consists of the **CLAIM** of the argument. CLAIMS are conclusive statements which assert:

1. That an action or a value should be or will be adopted.
2. That a relationship exists between different events or people or that objects.

(3). The computer based decision aid MAUD

MAUD was introduced and discussed in Chapter 4 (section 4.2.3). It was used both in the pilot work and in the main study to help individuals structure their career decision making problems and evaluate their various solutions. The graphical representations taken from the analysis of MAUD are the results of the main study (Multi-Dimensional-Analysis, see Chapter 8, 8.2.3), and were used to plot the students' knowledge representation of their career problems under a Multi Attribute utility frame.

(4). The inference diagram was discussed in Chapter 5 (section 5.4). It consists of "goal-state-event-action" chains, and it is used as a way of illustrating the individual's future scenarios over time. For the inference diagrams, the analyses of the transcripts were made according to the procedure of Payne, Bramstein and Carroll (1978) for the recovering of the information processing strategies from verbal protocols. This procedure has also been used in a similar way by Achenbrenner et al.(1980). For the analysis, after the literal transcription of the interview protocols, the transcripts were broken up into short phrases "each referring to a single task of assertion or reference" (Achenbrenner et al., 1980). Using this procedure "excerpts" were extracted from the interview data and used as a guide to the inference diagram analysis. (Examples of Inference Diagrams and 'excerpts' are in Chapter 8, 8.1.)

To build the inference diagrams the following principles were used:

1. Listing of the hypotheses or states about which inferences should be made.
2. Definition of all the intermediate factors -events or states- extraneous, exogenous or endogenous to the individuals' actions.
3. Definition of all the goals and the actions the individual should take for the completion of these goals.

The construction of inference diagrams, used to represent the student's movement through his career decision making process and his career exploration, are discussed in more detail in Chapter 8.

The following chapters will be devoted to the analysis of the interviews and the conclusions derived from this research.

CHAPTER 7

ANALYSIS OF THE RESULTS

OVERVIEW

Chapter 7 deals with the actual analysis carried out in the present study. It begins with the analysis of how the activities of the decision making process are structured in each of the five levels framework for operations to take place. The definition of the terms used and the way the coding of transcripts is approached are given. On the basis of these terms and the coding given, indices are analyzed at each Level of the five Levels framework.

The results obtained are discussed with regard to the different operations involved at each Level, and with regard to the three activity areas which are followed during the process of decision making. In addition, results are discussed and compared to the interviewing role of the counsellor and the possible paths the decision maker follows in the process of arriving at a solution to his career choice.

7.1. Main Issues addressed in the Analysis

The general hypothesis of the present study is that, if we can understand and define how students explore, structure and represent their career problems, it would be possible to give them more substantial help. The multi-Level framework presented in Chapter 2 (sections 2.2, 2.5.1) as well as the other techniques incorporated, as described in Chapter 6 (section 6.4), offered a particularly rich variety of possibilities for the analysis of data in support of the above general hypothesis. The content of the data obtained from students faced with career problems was mainly investigated and analyzed qualitatively. The input received from interviewing the three different age groups of students, before and after the university entrance exams, was used to investigate how changes with time or age differences affect the representation of the individuals' career decision making problems. The process model, established in Chapter 5 (section 5.3), formed the basis of the procedural methodology used for the investigation and the definition of the issues and the questions related to the investigation of the career decision making problem. These issues are addressed and

analyzed in this chapter and are discussed at length in the following chapters (Chapter 8,9,10). Thus, with regard to the three activity areas of the process model of career decision making the analysis, of the data has focused on the following issues:

Activity area 1:

Issue 1 : This issue addresses the areas the individual explores and how these areas constrain his career decision making.

For this issue the individual's propositions transcribed from the interviews were analyzed according to the fifth Level of the 5 Levels framework.

Issue 2 : This issue addresses the mechanism by which we can establish the individual's background of safety and identifies the bounded scenarios he uses.

The propositions marking the "unsafe" area were analyzed with reference to the operations involved in the fifth level of the 5 levels framework.

Activity area 2 :

Issue 3 : This issue addresses whether the individual uses arguments to represent the knowledge of his problem, what kind of claims he uses, and whether he elaborates his arguments by using specific backings and warrants.

Argumentation analysis was used here.

Issue 4 : This issue addresses the way that individuals structure their career problems by evaluating the number of claims made and differentiating those which are not put into frames.

Level 4 **analysis** of the 5 Levels framework was used.

Issue 5 : This issue addresses the kind of frames used; the extent to which they are structured and elaborated; the number of nodes and attributes used; the extent a frame is elaborated upon when the individual is directed towards a particular frame; and to what extent rule based frames, when used, reduce his search space.

Level 3 **analysis** of the 5 Levels framework was used .

Issue 6 : This issue addresses the way individuals represent the career decision making process in an inference diagram by looking at whether individuals frame an extraneous event or state, or an anticipated event, and whether the 'goal-action-event-state' sequence can provide us with further information.

Analysis of Inference diagrams.

Issue 7 : This issue addresses how the individual resolves his cognitive dissonance of past events by rationalizing and by restructuring past situations.

Inference diagrams and analysis of past scenarios was used here.

Activity area 3

Issue 8 : This issue addresses the way individuals elaborate the bases of their inferences and evaluate their alternative solutions.

Level 2 and Level 1 **analysis** of the five Levels framework was used as well as **Analysis** of MAUD decision aid.

7.2. The Five - Levels framework of analysis

As discussed in Chapter 2 (sections 2.2, 2.5) and in Chapter 6, the five levels knowledge representation was selected to use as the main framework for the analysis of individuals' language discourse concerning the way they represent their career decision making problems. The first (24) and the second (24) interviews (Total 48) - before and after university exams- were transcribed and coded according to age groups (see Chapter 6, 6.2, 6.3). The coding was based on the operations involved within the framework of each of the five levels. For the analysis of these operations, a number of indices were specified which were taken to represent the way each individual had handled his career problem at each Level. The analysis was carried out by moving from Level 5 to Level 1. It is represented in a hierarchical order since, according to the five Levels' basic principles, the results of the operations carried out at one Level constrain the way operations will be carried out and structured at the next level (Chapter 2, 2.2). The index of items on which the analysis of each level was focused is shown in Table 7.1. For the coding of the indices the propositional analysis as was defined in Chapter 6 (section 6.4) was used.

Table 7.1: Indices analyzed at each level

LEVEL	HANDLING OF THE PROBLEM	INDEX
5	Small world Exploration	Number of different propositions/domains
4	Identification of relevant structures for the solution of the problem	Number of propositions --> claims, Number of claims --> frames
3	Developing structure within frames	Number of frames within which structure is developed
2	Making judgments within frames	Number of conditional judgments
1	Making "best assessments about the ideal solution	Number of unconditional judgments

7.2.1 Unit of analysis and unit of counting

To analyze the data and establish the coding of transcripts content analysis was used. For this kind of analysis a distinction has to be done between the unit of analysis and the unit of counting. The unit of analysis is the text unit which includes the codes upon which comparisons are based. The unit of counting is the text unit which is coded by a single code and which reflects the unit of analysis (Krippendorff, 1980). For the present study, in the interview transcriptions the units of counting are: (a) propositions and (b) paragraphs. Propositions, normally demarcated by a fullstop and identified through the propositional analysis (Chapter 6, 6.5) were categorized into the following units of analysis: domains, unsafe propositions, claims, claims that lead to frames, judgments. Paragraphs were identified as the units of language in which propositions are structured in a coherent whole and called frames. Frames were categorized into the following units of analysis: Multi Attribute Utility frame, Future Scenario frame (Chapter 5, 5.5). In the five levels framework the units of analysis reflect the indices analyzed in each level which were identified by the operations involved in the five levels framework. (see Table 7.1).

Coding of the units of counting to the units of analysis was done in steps following the five levels framework in a descending order from level five to level one. This is done as follows:

Level 5 analysis

- (1). Transcription, identification and listing of the propositions.
- (2). Classification of the propositions into the 12 Domains identified in the pilot work (Chapter 4, 4.2.2).
- (3). Identification of those propositions that lead to the "unsafe area".

Level 4 analysis

- (1). Argumentation analysis: analysis of the arguments into CLAIMS- WARRANTS - BACKINGS.
- (2). Classification of the propositions which lead to claims.
- (3). Classification of claims that lead to frames.

Level 3 analysis

- (1). Classification of frames into MAU frame, Future Scenario frame, Rule Based frame.
- (2). Identification of the explored and non-explored frames, primed and non-primed.

Level 2 and Level 1 analysis

- (1). Identification of the conditional judgments made inside or outside the frame.
- (1). Identification of the unconditional judgments inside and outside the frame.

The following section gives the definitions of the units of analysis at the basis of which coding of transcripts was conducted.

7.2.1.1. Definition of units of counting

(a). **Propositions** were coded at the same time to the following units of analysis: Domains, Unsafe propositions, Claims, Claims that lead to Frames, Judgments. Thus for each unit of analysis coding of the propositions was exhaustive but not exclusive. A proposition was coded first whether in the categories of Domains, then whether it belonged to the category of Unsafe, and subsequently whether it represented a Claim or a Claim to Frame or a Judgment. A proposition is defined as follows:

Proposition: A statement about the problem or the topic of discussion. No grammatical or other form of structure is necessary.

e.g. "My parents have influenced me on my decision".
"To be an architect is a nice profession".
"I want to succeed"
"I like travelling very much"
"I believe I can do a lot in my life"

Unsafe propositions: Propositions were coded as unsafe according to whether they were represented

- (a) difficulties and fears,
- (b) refusal to continue a scenario,
- (c) anxiety.

Examples for the definition of each category are given to the section 7.3.1.1.

Domains represent twelve mutually exhaustive categories which were defined during the pilot work. Exhaustive means that every counting unit (i.e. every proposition) is

coded in one category. Definitions of the twelve categories is given in Table 7.2.

A domain is defined as follows:

Domain: An area or a topic proposed by the students in relation to the problem under consideration. The sentence is free of structure.

e.g. "I like travelling very much"

Domain: Job Alternatives

"What people say really affects me a lot".

Domain: Social Influence

"I want to become a doctor".

Domain: Profession

"My parents have influenced me in my choice"__

Domain: Parental Influence

Claims were identified through the Argumentation analysis (see Chapter 2, 2.2.2.1; Chapter 6, 6.5). (A thorough account of how the claims were defined and identified in the subject's language discourse is given in the section 7.3.2). Propositions were coded to each particular domain first as claims and then as claims to frames when they were defined as follows:

Claim: An assertive statement which represents the outcome or conclusion of an argument. It contains structure.

e.g. "I think that the way examinations are held causes a lot of trouble to students".

Domain: Educational System

e.g. "I have some doubts about studying law because I am afraid I have nothing to do when I finish university.

Domain: Profession

claim to frame: An assertive statement which contains structure and leads to a frame

e.g. "Last year I entered Biology, but I will try again this year to enter the Medical school since this is my first choice"

Claim to Frame: Future Scenario

e.g. "I decided to choose the 4th group of studies because everybody says that it is the easiest way to enter university.

Claim to frame: Rule Based

Judgments refer to the judgmental propositions used by the individuals about how their problem is to be handled and solved. Judgments were coded according to the following definition:

Judgment: An evaluation statement about good or bad ,conditional or unconditional to the subject matter.

e.g. "I think that the educational system is not bad".
"A relationship must have sincerity and mutual respect".

Judgments were coded as **conditional** or **unconditional** according to the operations involved in level 1 and level 2 of the five levels framework.

At Level 2, judgments are given conditionally, so one can investigate "what if questions", and explore different points of view, or different alternative solutions in a sensitivity analysis (Chapter 2, 2.2.4, 2.5). In fact, the more conditional judgments the subject is making, the more 'what if analysis' he is doing. Consequently, the number of conditional judgments the individual makes while he is talking about his problem can reveal the extent to which he is really prepared to explore the "what if" questions.

At Level 1, judgments are made unconditionally, since the aim at this level is to determine the best alternative solution amongst those identified, by structuring and analyzing the problem in the previous levels (statements of "what is the best solution" in an unspecified way). A more thorough account of the way judgments were identified in the individual's language discourse is given in the section 7.3.5):11

(b) Paragraphs identified as frames according to the following definition:

Frames: the semantic representative language units in which propositions and claims are structured in a coherent whole, which indicates that a process takes place towards a course of action (Chapter 2, 2.5.3). Three frames were identified: Multi Attribute Utility frame, Future Scenario frame, Rule Based frame. The definition and the way these frames are identified in the individual's language discourse is given in Chapter 5, 5.4 and in the Argumentation analysis, section 7.3.2.

Multi Attribute Utility (MAU) frame:

It is a frame in which two or more alternative mutually exclusive solutions are given by the individual and are compared under a number of relevant criteria.

e.g. "If I enter the university of Thessaloniki my parents will not feel bad. I believe it will be better because we can be in contact more often. If I enter the university of Ioannina it will be more difficult for me to help them.

Future Scenario frame:

It is a frame in which the individual explores the contingencies of two or more possible courses of action which may represent possible solutions to his career problem.

e.g. "I make plans but more tentatively than last year, because it may happen that I don't have good results on the exams. If I enter Computers I may go abroad one year for postgraduate studies. If I enter Physics or Chemistry I will continue working in a Preparatory School. Then there are also the Military schools"

Rule - Based frame:

It is a frame in which one or two rules linked by a principle relevant to the situation discriminate the different alternative solutions given by the individual.

e.g. "I think that it is good to start a job early, but it is different to have finished High-School and to know Math and to be able to calculate; this is necessary in your life".

Each frame was also identified as explored or non-explored, and as primed or non-primed according to their structure and the experimental condition.

Explored frames: Frames were counted as explored by the subject when more than one element was given.

e.g. "If you want to enter university, you should study all day (1), you should stop seeing your friends (2), and you should confine yourself to home (3), and say this is it, there is no way out".

Frame: Rule Based:

Elements : Three

Non-explored frames: were the frames which did not contained more than one element.

e.g. "If I enter Dentistry I will finish my degree here".

Primed frames: Primed or constrained by a question or a statement from the counsellor (see Procedure, 6.4)

Non-primed frames: Frames given without the counsellor's priming.

7.2.2. Reliability of the coding frame

The problem of reliability is raised in any form of content analysis since it is a measure of the quality of the data. By definition content analysis must be objective. For this to be achieved, however, the analyst's subjective way of coding the data has to be minimized in an effort to obtain an objective description of the content of analysis (Berelson, 1952). If this can becomes possible, then the same data, regardless the analyst and the time of the analysis, should be secured under similar conditions. This premise implies that in any content analysis there must be

consistency between the measurement instrument of the analysis, i.e. the coding frame and the person making the judgments; in this case different coders produce the same results when they apply the same coding frame to similar context. In fact, reliability of the content analysis indicates the quality of the above premise. The problem of the content analysis as Burgelin (1972) argues, is that the analysts seems to be interested in the manifest content of the messages without taken into consideration the content can be a "reflection" of a hidden meaning. When the analyst however decides which coding frame to use, he has already formed a hypothesis and made inferences which are to be drawn from the collected data. A way to overcome this and thus to improve the reliability, would be to train more than one coders, work on the category system, redefine the categories and thus improve the coding frame. Hence, a degree of objectivity could be achieved, since more than one coders - who in fact will be interested more for the manifest content than for the hidden meaning of it - will code the same context. In addition categories have to be kept simple and the set of rules as precise as possible.

Usually, reliability is measured in two ways. Intra-coder reliability which measures the consistency of a single coder who is coding the same content twice with a time interval. Inter-coder reliability which measures the agreement of two or more coders on the same content.

For the present coding frame the **inter-coder reliability** has been calculated for the following units of counting: Claims, Claims that lead to frame and Frames (e.g. MAU, Future Scenario, Rule Based frame). Coders were trained to become as familiar as possible with the definitions of the units of analysis and the units of counting. Discussion concerning the rational and the history of the study was considered necessary.

To evaluate consistency, or repeatability, two measures were used. Firstly, the mean pair agreement (MPA) was used to determine the proportion of agreement between two different observers in evaluating units of counting (claims, frames) of subjects under study. Then, to establish to which extend this agreement was not determined by chance alone, the Cohen's *Kappa* coefficient (k) was calculated (if there is complete agreement $k=1$; if agreement is greater than chance $k > 0$; and finally if agreement is equal or worst than chance $k < 0$). Tables of data used for the

reliability tests are found in Appendix II. The reliability estimate for each unit of counting was as follows:

CLAIMS

	Gr.1	Gr.2	Gr.3
A	MBA=78.43 % <i>Kappa</i> =.57	MPA=90.23 % <i>kappa</i> =.80	MPA=94.44 % <i>Kappa</i> =.88
B	MPA=85.32 % <i>kappa</i> =.71	MPA=92.59 % <i>kappa</i> =.85	MPA=90.13 % <i>kappa</i> =.80

CLAIMS TO FRAMES

	Gr.1	Gr.2	Gr.3
A + B	MPA=93.60 % <i>kappa</i> =.84	MPA=88.57 % <i>kappa</i> =.72	MPA=86.81 % <i>kappa</i> =.70

FRAMES

	Gr.1	Gr.2	Gr.3
A + B	MPA=89.66 % <i>kappa</i> =0.83	MPA=95.65 % <i>kappa</i> =0.93	MPA=98.27 % <i>kappa</i> =.97

Intra-coding reliability was calculated for the rest of the units (i.e. Unsafe propositions, Judgments). In this case the index is the number of consistent codings in relation to the total number of codings. Two interviews of two different subjects were randomly selected and recorded with two months interval. Problematic categories and units not well defined were noticed and necessary alterations were made. The reliability was calculated at .77 which is indicated as an acceptable level of reliability for intra-coding situations (Krippentroff,1980).

7.3. Indices analyzed in each Level: Results and Discussion

7.3.1. LEVEL 5 : Problem exploration

Level 5 analysis focuses first on the exploration of the individual's small world and second, on the identification of his background of safety, i.e. answers to questions addressed in issues 1 and 2 outlined previously (section 7.2). When exploring the individual's perception of his career problem, during the pilot work, it was found that the most common areas which appeared to constrain decision making were related to "desires and preferences, social factors, and personal constraints" (Chapter 4, 4.2.2.). The classification of the propositions given within each area resulted in the definition of 12 categories called Domains. These domains were used in the present study as the main areas of concern which define the content of the individual's small world, as well as the boundaries of his background of safety (Chapter 2, 2.5.1).

Consequently, the analysis at Level 5 consists of the following steps:

1. Transcription of the interviews, identification and listing of the propositions (see Chapter 6, 6.5).
2. Classification of the propositions into the 12 Domains.
3. Identification of the "unsafe propositions".

Level 5 analysis was intended to test:

first, the extent to which the subjects were exploring the main issues (Domains) which may constrain their subjective perception and representation of their career problems and,

second, the extent to which the "unsafe propositions" identified in the individuals' discourse can constrain their exploratory activity and the structuring of their career problems.

Two Hypotheses were tested:

Hypothesis 1. *Exploration of the 12 domains (main areas of concern) is related to the type of Domain and the age of individuals.*

Hypothesis 2. *Younger individuals feel more unsafe about their future. This can be influenced by the counsellor's intervention.*

As noted in the Procedure section (Chapter 6, 6.2), the subjects under investigation were Greek students classified into three different groups, according to their age and their grade at school: Group 1: 18-20y, Group 2: 17-18y, Group 3: 16-17y.

Table 7.2, below, shows the 12 Domains with typical examples of the propositions used by individuals in each domain.

Table 7.2: The 12 Domains as they were identified in the pilot work

DOMAINS

1. **PARENTAL INFLUENCE (PI)**
ex. "I don't think my parents have influenced me in my choice."
"I don't have any pressure from home but I think my parents have more knowledge".
2. **SCHOOL PROBLEMS (SP)**
e.g. "The problem with the system is that we have to make a big jump in a short time".
I don't think that grades show the reality, and I don't rely on them".
3. **EDUCATIONAL ACHIEVEMENT (EA)**
e.g. "My grades this year are very good".
"The most important thing in studying is the every day reading and to be able to review what you have read".
4. **PROFESSIONS (PR.)**
e.g. "Working as a teacher in a preparatory school will be the next step".
"I want to have a job which can make my life comfortable".
5. **FUTURE PLANS & GOALS (F.PI.)**
e.g. "After the final year exams I'll start studying".
"I have only one goal at the moment: to enter university".
6. **DIFFICULTIES & FEARS (DIF.F.)**
e.g. "I am afraid I will not be able to finish university".
"I am not sure if I'll have the money to go abroad".
7. **CHANGE (CH.)**
e.g. "My preferences have changed from last year".
"Last year I used to go out every night, this year I have changed, I don't like this any more".
8. **SELF CONCEPT (SELF.C.)**
e.g. "You think you are good, but in reality you deceive yourself".
"Sometimes, I can see myself as an integrated personality and I believe I can do a lot in my life".
9. **SOCIAL APPROVAL (SOC.AP.)**
e.g. "What people say really affects me a lot".
"I count on people's opinion as everybody does".
10. **UNEMPLOYMENT (UN.)**
e.g. "I will see what are the possibilities of jobs in the field I am going to study".
"To have a job at hand is what really matters".
11. **RELATION TO OTHERS (R.OTH.)**
e.g. "I am not influenced by my friends, I want to influence them".
"There are some family friends there, and I can see they are doing well with their jobs".
12. **MARRIAGE (MA)**
e.g. "To get married, the relationship has to be unique".
"Marriage is not the last solution for a woman".

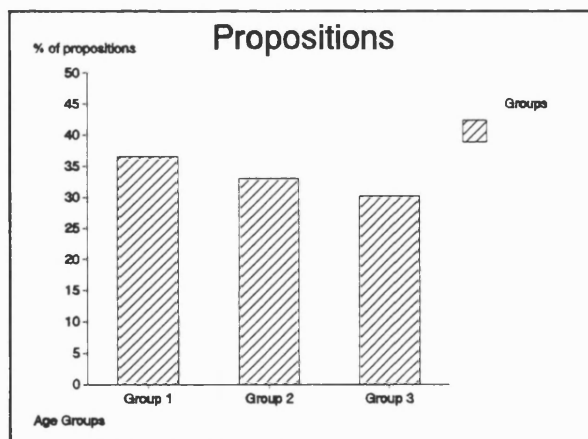
Analysis and Discussion

Table 7.3, below, shows the total number of propositions made by each group (Groups 1, 2, 3) during the interview sessions taken before (A) and after (B), the university entrance exams. In this table, as well as in Fig. 7.1, it is shown that there was a tendency in older individuals to give more propositions about their career problems than younger ones, regardless of the type of domains (Group 1: 36.6% > Group 2: 33.9% > Group 3: 30.5%). The difference in the number of the propositions among the groups is small and not statistically reliable although there is an indication that older students should be more capable of structuring their career problems than younger ones.

Table 7.3: Number of propositions given by each group in the first (A) and second (B) interview sessions

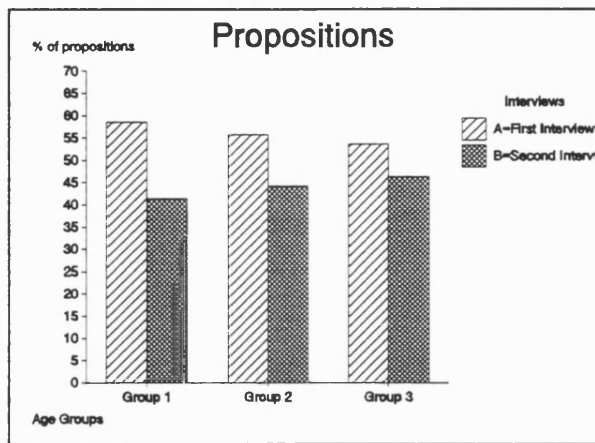
	Group 1	Group 2	Group 3
A	357	307	270
B	252	243	233
Total	609	550	503

Fig. 7.1: Graphical representation of the percentage of the total number of the propositions given by the three groups



Total No of propositions: 1662

Fig. 7.2: Graphical representation of the percentages of propositions given by the three groups in the first (A) and second (B) interview

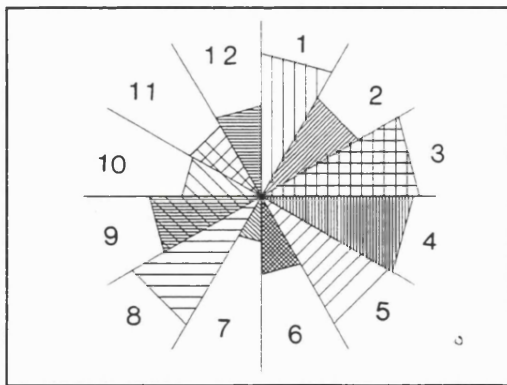


Looking at the differences in the percentage of the propositions between the first (A), and the second (B), interviews in each age group (Fig. 7.3 above), it is apparent that there were more propositions in the first interview. However, this difference appears to become smaller, the younger the individuals are.

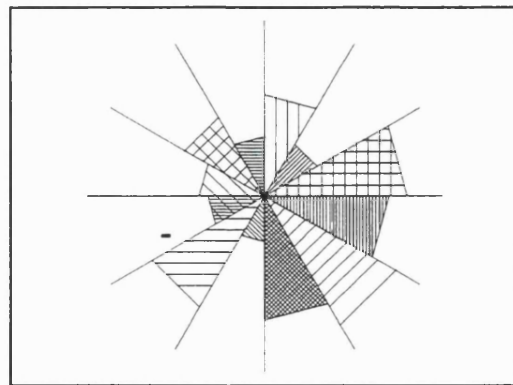
In fact, the above percentages of the identified propositions indicate the degree of exploratory activity the individuals were exhibiting regarding their career problems, as well as the particular issues which might have affected their subjective perception and representation of the problems. The latter is shown from the degree of exploration (i.e. number of identified propositions) in each of the 12 Domains. As was discussed in Chapter 1 (section 1.3), exploration in career decision making is considered to be an important process in the individual's career choice and development. Extensive research into the career problem has shown that areas of exploration are closely related to factors like family aspirations, socioeconomic status, occupational goals, educational abilities, and values and interests, which have been established as those particularly affecting the career decision making process (Cass & Tiedeman, 1960; Super, 1960, 1980; Dole, 1969; Herriot, 1984; Ball, 1984). The domains identified in the present study are those explored more often by the students, and are in agreement with the above mentioned factors.

In figures 7.3a-f, there is a graphical representation of the degree of exploration in each domain by the three different age groups in the interview sessions taken before, (A), and after (B), the university entrance exams.

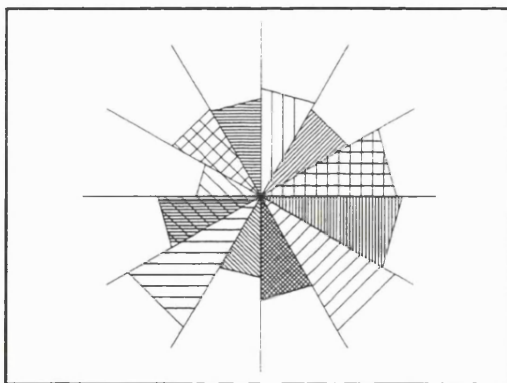
Fig. 7.3: No of Propositions identified in each Domain for each age Group



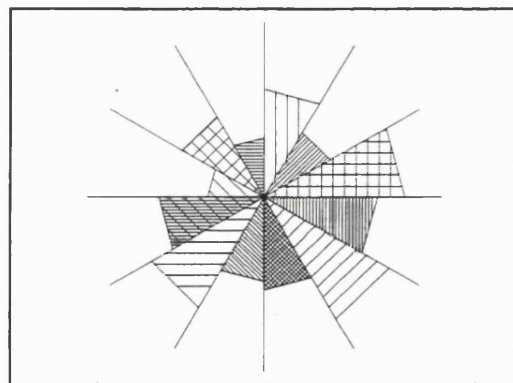
Group 1 (A)



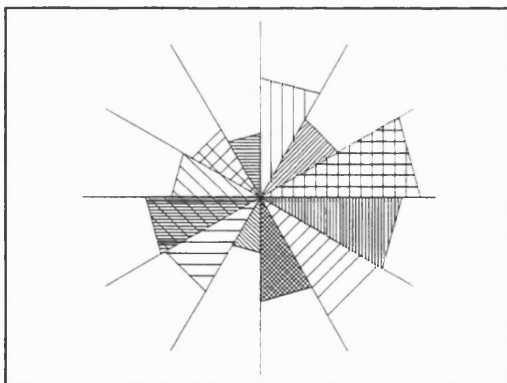
Group 1 (B)



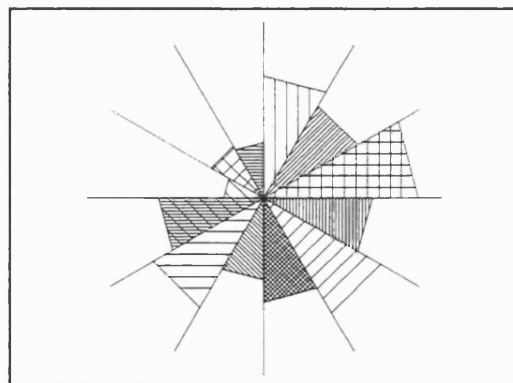
Group 2 (A)



Group 2 (B)



Group 3 (A)



Group 3 (B)

Domains: 1: Parental Influence	5: Future Plans & Goals	9: Social Approval
2: School problems	6: Difficulties & Fears	10: Unemployment
3: Educ. Achievement	7: Change	11: Relation to others
4: Professions	8: Self Concept	12: Marriage

Differences in the degree of exploration are indicated in the percentages of the propositions allocated to each domain, as is shown in Table 7.4.

Table 7.4: Percentages of the No of propositions allocated to each domain given in order of descending preference

1. - EDUCATIONAL ACHIEVEMENT:	15.3%
2. - FUTURE PLANS:	14.6%
3. - SELF CONCEPT:	12.2%
4. - PROFESSIONS:	12%
5. - PARENTAL INFLUENCE:	9.8%
6. - DIFFICULTIES AND FEARS:	7.5%
7. - SOCIAL APPROVAL:	7.1%
8. - SCHOOL PROBLEMS:	6.1%
9. - RELATION TO OTHERS:	5.1%
10. - MARRIAGE:	3.9%
11. - CHANGE:	3.2%
12. - UNEMPLOYMENT:	3.1%

Total No.: 1662

The importance given to the domains EDUCATIONAL ACHIEVEMENT (15.3%) and SELF CONCEPT (12.2%) was in agreement with a lot of other studies, which have shown that school performance and self concept are closely related to career choice and occupational attainment (Harren, 1979; Hesketh, 1982; Super, 1980; Herriot, 1984). O'Neil et al. (1982), in a study on the various factors affecting career decision making in young adolescents, showed that individual factors which emphasize internal correlates receive higher endorsement by youngsters. Individual factors included self expectancies, abilities, interests, attitudes and achievement needs.

In the present study the domain of Educational Achievement was closely related by the students to the domain of SCHOOL PROBLEMS. In particular, in my discussions with students, it became apparent that performance at school was often associated not only with an ability component but also with a motivational component or a school-quality component. For example, students would often say:

--" Concerning grades I think that we don't have equal opportunities in our school. For example, our teacher for ancient greek is very strict with us although we don't need to be examined in this subject, whereas the same doesn't apply to the students

attending the 3rd group of studies who really need this subject".

--" I couldn't become an agriculturalist although I like that and because we have land I could work there. However, I was not good in Physics and Chemistry which are required in the 1st group of studies and through which I could enter university to study Agriculture. Thus, I decided to join the 4th group since it would be easier and more possible for me to enter university from this group".

The domains of PROFESSIONS (12%) (i.e. Job alternatives, Job attributes) and FUTURE PLANS (14.6%), which contain plans, dreams and goals, were also explored by the subjects. Making plans and setting goals is actually the main task in the decision making process (Beach, 1985), especially in career decision making (Super & Hall, 1978). "Future plans" are related to the ability of the individual to form scenarios about his future (Montgomery, 1980), to find alternative solutions and to assign attributes to them, as well as to set goals which can be either specific events or abstract states. For example, "I want to become a journalist after I take my degree in literature", or "I want to finish university, find a job, then get married and have a nice peaceful job". Therefore, exploration in these areas is a positive indication. This is particularly shown in the lower Levels analysis, where the individual's ability to make plans and scenarios about his future is assessed, as well as the extent to which these plans and goals are structured and explicitly defined so that their execution is possible (sections 7.2.3, 7.2.4, 7.2.5).

The domain of PARENTAL INFLUENCE (9.8%) was also explored extensively by the students. Parents appear to be an important influencing factor in the individual's career decision making (Peterson et al., 1982; Lavine, 1982; Palmer & Cochran, 1988). However, relatively little is known about how parents influence different choices and how successful they are in this influence (Breakwell et al., 1988).

Banks et al. (1992), in their studies on parental influence, have found that, with the exception of choice of job or career, parents did not seem to influence the choices of students (age 17-20) on everyday personal decisions. For students aged 17-18, there was more influence than for those aged 19-20. However, they argue that, with regard to decisions concerning job or career, parental influence could seriously shape life choices .

The domains SOCIAL APPROVAL (7.1%), RELATION TO OTHERS (5.1%), MARRIAGE (3.9%), and UNEMPLOYMENT (3.1%) received less attention by individuals with reference to their career decision making problems and were explored less. Less exploration in these areas may indicate the inability of individuals either to perceive themselves as playing a role in these areas or their inability to perceive their external environment as an influential factor in their career decision problem. In accordance with the present findings, O'Neil et al. (1982), in their studies on the individual's perception of Familial, Societal, Socioeconomic and Situational factors, have found that these factors have little or no effect on the individual's perception of his career decision problem. They concluded that these findings may indicate that the contemporary student is "...sheltered from the hard realities of how these external factors operate and affect career decision making". They also suggested that counsellors may need to help students towards a better understanding and clarification of the effects of these external factors on their career decisions.

Little attention was given to the domain of DIFFICULTY- FEARS (7.5%), and even less to the domain of CHANGE (3.2%). Although, in the literature on career decision making, psychosocial and emotional factors have been identified as highly affecting the career decision (Osipow, 1975; Jannis & Mann, 1977; O'Neil & Bush, 1978; Latack, 1989), the fact that these factors may affect the individual's exploration of his small world has been given minimal attention. O'Neil et al. (1980), in the study mentioned above, found that a small number of students self-reported psychosocial emotional problems in their perception of the career decision making problem. In the present study, the domain of Difficulties-Fears has received further attention in the analysis of "Unsafe" Areas for the purpose of marking the boundaries of the individual's small world and his background of safety (see below, section 7.3.1.1).

As discussed in Chapter 1 (section 1.5), the lack of exploration in the domain of CHANGE may reveal the difficulties the individual may have in perceiving the changes and the requirements that the transition from school to work or to university demand. Data concerning research on transition and change from a previous status,

has been derived mainly from retrospective studies, which have (primarily) investigated the effects of transition upon career decision makers and their decisions (Janis & Mann, 1977; West & Newton, 1982; Herriot, 1984; Nicholson & West, 1989; Banks et al., 1992). Studies concerning the general attitudes, hopes and expectations of young people 'during the period of transition' have revealed that youngsters are usually aware that their lives appeared to have undergone a significant change (West & Newton, 1982). The extent to which young people are aware of these changes, 'before the transition period', has not previously been investigated. In the present study the notion of transition is discussed in the lower Levels analysis. Reference is made to what extent people, who are able to successfully structure their claims about future plans in coherent wholes, are able to cope with the difficulties and changes that the transition from school to work might cause.

In conclusion, exploration at Level 5 can reveal aspects of the career problem which individuals consider to be more important to them (i.e. Educational Achievement, Future Plans, Self Concept, Professions, Parental Influence), as well as aspects which they seek to avoid since they may yield only anxiety and regret. There is an indication of age differences, and differences between the first and the second interview, regarding the exploration of the 12 domains. Although further data will be required to show whether these differences are statistically significant, the results of this analysis were particularly useful for the present study, in establishing the main issues which may influence the individual's subjective meaning representation of his career problem. The domains can also provide the counsellor with a guide as to which areas of concern the individual may need help with. The differences between the first and second interview sessions will be discussed in the analysis of the lower Levels, in relation to the effect that the procedure followed during the interviews (by priming or not priming the individuals) had upon the subjects' ability to explore, and structure their career problems.

The rest of the analysis in Level 5 will concentrate on a more in depth analysis of what is left out of the decision maker's language - "the gaps and the resistance to exploration" (Manoni, 1972; Humphreys, 1986).

7.3.1.1 Analysis of the propositions into the "Areas of Unsafe"

In this analysis, the propositions are coded in terms of how often and in which domain individuals claim that it is **unsafe** for them to go any further in the scenario exploration of their future. Statements were coded as unsafe according to the following:

a) unstructured difficulties and fears

- e.g. "I am afraid I will not be able to pass the exams".
"I am not sure; I can't think about other alternatives".
"I am afraid that it is not possible to be free and have everything you want".
"I think there is always the fear of finding difficulties on being able to enter university".

b) refusal to continue a scenario

- e.g. "I think there will be difficulties in the future. Because, if I finish school and then get married and something happens, I may not have the will power to continue".
"I want to go abroad for postgraduate studies unless something might happen, an accident for example which will not permit me to do that".

c) anxiety

- e.g. "And now I am again in conflict as to whether to start preparation for the 1st or the 4th group of studies".
"I feel anxious because my parents say that if I am not accepted anywhere, someday they will die and I will not be able to do anything in my life "

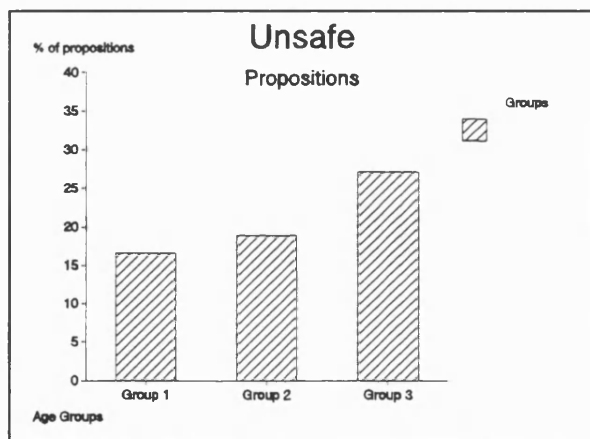
Results and Discussion

For the analysis of "unsafe propositions", a Chi-squared test carried out on a GLIM package was used in order to test whether there were any differences:

- (i) in the number of "unsafe propositions" used by the subjects of the different age groups;
- (ii) in the number of "unsafe propositions" used by the subjects between the first (A) and the second (B) interview, which were held before and after the university entrance exams.

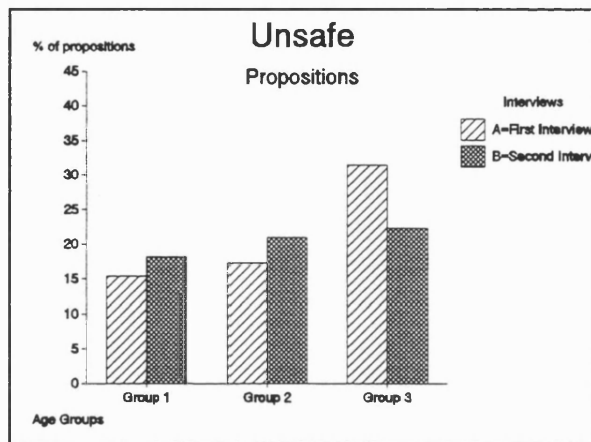
A significant difference was found between the three groups with regard to the number of unsafe propositions used ($\chi^2=18.97;df=2;p<0.01$) . This is also illustrated in Fig.7.4 which shows the percentages of "unsafe" propositions given by each group. In this figure (fig. 7.4, below), it appears that, of the three age groups, younger students (Group 3) give the highest percentage of unsafe propositions: Group 1=16.6%, Group 2=18.9%, Group 3=26.1%. This was expected under the hypothesis that younger students make more unsafe propositions than older ones.

Fig. 7.4: Percentages of the propositions under the areas of "unsafe". The percentages were taken out of the total No of propositions given by each group (see Table 7.3)



With regard to the total number of unsafe propositions given by the subjects in the first (A) and second (B) interview, no significant differences were found. However, testing the variation of the number of propositions between the first and second interview within each group, differences were found at the level of significance of $p<0.05$ ($\chi^2=6.84;df=2;p<0.05$) . This is also illustrated in Fig. 7.5 below.

Fig. 7.5: Percentages of the unsafe propositions given by the three Groups in the first (A) and second (B) interview.



In the above figure (Fig. 7.5), it is apparent that younger students (Group 3) made a lot more "unsafe" propositions in the first interview (A=29.6%) and, although fewer in the second interview (B=21.8%), the percentage was still higher than that of propositions made by older students (Gr.1 (B)= 18.2%, Gr.2 (B)= 21%). These findings will be discussed further in relation to the findings of the lower Levels analysis (section, 7.3.4; 7.3.5)

There is also an indication that the percentage of unsafe propositions given by older students (Groups 1 and 2) is higher in the second interview:

(Gr.1: (A)=15.4% < B=18.2%; Gr.2: (A)=17.3% < (B)=21%).

This finding could be explained by the situation in which the older students found themselves. In fact, students from these groups (Groups 1 and 2) were in an unfortunate situation when they had their second interviews. After their one or two unsuccessful attempts to enter university they found themselves in a situation where they had to rethink their career decisions. This was particularly evident in those students who had failed a second time and, as a result had, a lot of doubts and feelings of insecurity about their future. They had to face the fact that the time and effort invested had not brought them any success. From the eight students in Group 1, only three students were admitted to university after the second trial. One was not satisfied with the school she was accepted into. From those in Group 2, four out of

eight students entered university, one to a faculty which she didn't want to be in. For the rest of the subjects, the dilemma was whether they should take exams for a third time or not. If they decided not to retry, they had to consider doing something else. Consequently, the above results can be considered as a reflection of true feelings that the subjects were expressing. This is further demonstrated in the example of Larissa who wanted to enter Medicine but succeeded in entering Biology instead:

--"I felt awful, and although I was prepared and I was saying I would either be accepted in Biology or in Dentistry, I still felt awful. The second time around, when things are getting closer to reality, you feel stress and anxiety. I was very anxious. Then it is also the pressure from home. You can't think about giving it a try a third time".

Or in the case of George who said:

--"I think I am facing a dilemma now: Shall I register to attend a technical college and postpone my military service? If so, I can reconsider trying for a third time to enter university. I am afraid, however, that I will not have enough time to study. If I go for my Military Service then I'll have to think about my career in two years time".

Significance variations were found also between individuals in the number of unsafe propositions made, irrespective of the age of the individuals, or the time of the interview ($\chi^2=62.12; df=21; p<0.01$). This can be considered as an interesting finding because it shows that the individual's subjective factors predominate in the conceptualization of issues concerning the career problem.

In the domains of Educational Achievement, Professions, Future Plans, Self Concept and Parental Influence, individuals gave more unsafe propositions (75.7%) than in any of the other domains (24.3%). (Fig. 1 a-f in Appendix 2, demonstrate the allocation of the unsafe propositions to the different domains.)

With regard to Educational Achievement, most of the unsafe propositions were related to the university entrance exams. For example:

--"The entrance exams is like a monster; you go through that stage and you wonder what is going to happen".

The "monster" of the entrance exams is actually there for all students. It should be expected that, when this exam becomes the most important event in the student's life, resulting in the culmination of all his activities, failure would be a lot more difficult

to accept. This can be shown particularly in Greek students, for whom entrance to university becomes the ritual that will introduce them to the new world of adults. This is exemplified in Effi's statement:

--"I see now that there is an opening for me. I am more relaxed because I won the first big battle in my life. I succeeded to enter university".

If, however, they do not succeed, fears and insecurity arise.

In the domains of Future Plans and Professions, most of the unsafe propositions were related to the anxiety of students about what they would do if they failed to enter university. For those who had failed, their anxiety was related to what the future would be like away from school and family.

As for example:

Dina (Group 2): "The future is not secure if you are not accepted by the university. I might try for a second time; I am not sure because I am often tired and I can't study a lot".

Evaggelia Group 2): "I feel a little confused about my choice. I think I must continue music; Shall I try again?"

Effi (Group 2): "I am wondering how things at the university will be".

In relation to Parental Influence, unsafe propositions were usually addressed regarding the pressure the subjects were feeling concerning parental expectancies. For example:

Nikos (Group 1): "I hope I will have good results in the exams because I can't stay with my parents any more".

Apostolis (Gr.1): "I don't discuss with my parents what will happen if I fail. I think they are expecting me to finish as a Dental Technician and to start working. If only I could discuss with them...It is difficult for me to stay in the Dental Technical school".

With regard to the issues addressed in this study, the 'unsafe' propositions were found to denote the subjects' fear and reluctance to explore and make scenarios in areas where they felt unsafe. In the case of Nikos for example the statement that:

"If I don't pass, I will go abroad, unless I have an accident and I will not be able to go" shows that, Nikos blocks any consideration of further exploration by his reference to "accident". He does not want to make any plans about what it would be like if he were to go abroad *"because I have to face the idea that I might have an accident on the way there, and I may not go at all and there is no point in thinking about that"*.

Statements like these indicate that the subject believes there are 'unsafe' areas where he is unable to go. These unsafe areas may inhibit him from bringing anything to the level of framing, or it may result in the subject making an incomplete scenario. Even though Nikos may say that "I am prepared to go ahead and apply to be accepted by a university abroad", he does not want to think further than that. This way of problem structuring indicates that a subject like Nikos may have problems in the future with regard to his career decision making since he has built a future scenario frame, but he is not able to explore this further and thus he cannot decide whether it is a good or a bad thing to choose. A person in this situation can be considered to have reached his exploration potential and the boundaries of his small world. An "unsafe" statement can be taken as an indication that any further analysis should stop. Therefore, it is very important for the counsellor to be aware of the unsafe propositions students might give, so that he can help them.

7.3.2 Argumentation Analysis

Before proceeding with the level 4 analysis of problem structuring, individual transcripts were analyzed with reference to the arguments the subjects were using to represent their problem. The analysis of the individual's language discourse, using the Argumentation scheme, focuses on the identification of the structure of the arguments which can help:

(i) in the exploration of the differences between the assumptions, the information and the judgments of individuals concerning their career problems, and

(ii) in the identification of the operations and elements involved in Level 4 analysis.

These enabled me to establish the basis of Level 4 analysis (i.e. number of propositions that lead to claims, number of claims that lead to frames).

As stated in Chapter 6 (section 6.5), argumentation should stand as the bridge between problem exploration and problem structuring. It helps in understanding the statements and claims that individuals use in structuring their problems. For example, how they select the material derived from their small world exploration to put within frames, what frames they are using, what are the elements of these frames and what are the constraints in their problem structuring procedure.

To identify the structure of each argument in this study, arguments were first coded according to the method established in Chapter 6 (section 6.5) (following the question who I am, where I am going, why and how). Then they were analyzed in terms of the formal elements of Data, Claims, Warrants, and Backings. Rebuttals and Qualifiers are noted occasionally since they were found not to be used very often by the students. The discussion of the analysis is presented below:

First, with reference to how complete or incomplete the arguments are (i.e. to what extent all of the above elements are used by the different age groups during the different time interview sessions), and

Second, with reference to the types of warrants and backings used by individuals to support their claims. Overall, the main focus of the discussion which follows is how best to define and establish the kind of claims that lead to frames.

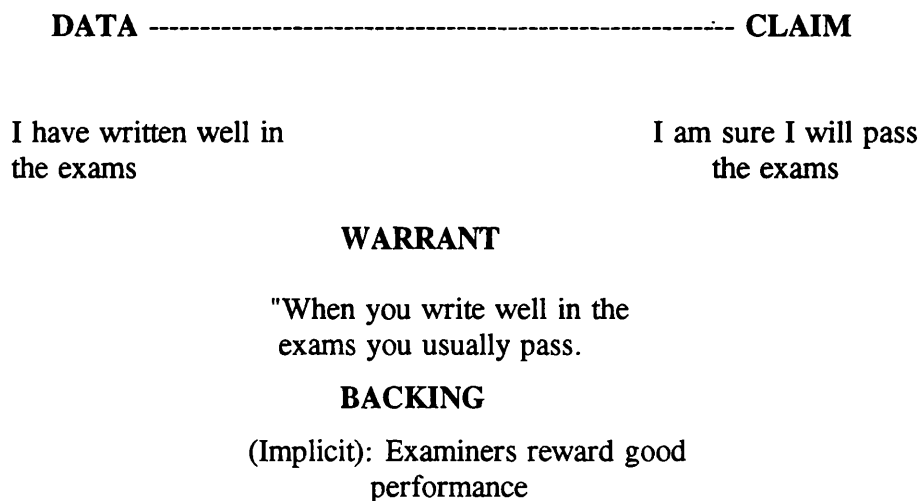
Complete versus incomplete arguments

In order to establish what we mean by a complete or an incomplete argument, it is important to try first to identify the types of claims, data, warrants and backings that appear in the adolescent's argument when he is talking about his career problem.

Students, while talking about their career problems, are making "assertions" and committing themselves to the claims which any assertion necessitates. They are making claims about what they want to do in their lives, what is important to them with reference to their career problems, and what should be done in order to succeed in their goals. The question in this study was to what extent can individuals establish these claims, make them appear good and show that they are justifiable. In fact, unless the claim is made quite wildly and irresponsibly, such as for example "I am sure I will pass the exams", students normally give certain facts to which they can point in order to support their assertions. In the case of a claim (C) "I am sure I will pass the exams" students must be able to answer the questions "*What makes you so sure that you will succeed?*" or "*On what grounds do you base your claim?*" or "*Do you have any facts which can support your assertion?*" or "*How do you think you can get there?*". By answering these questions, the individual gives either the foundations, i.e. the Data (D) on which he establishes his claims, or the justifications,

i.e. the Warrants (W) (see 7.3).

However, as Toulmin (1957) and Mason and Mitroff (1984) have noticed, it is questionable how absolute the distinction between the data and the warrants of an argument can be. It is difficult to draw any sharp distinction between the strength of the two questions: "*What have you got to go on*" and "*How do you get there?*". For the claim mentioned above, the premise "Because I know I have written well" can be a justification for the individual's claim and can be counted as the warrant for the argument. It can also be the data in the argument because for the individual it is a fact that he has written well in his exams, since he believes it to be so. In this case, the warrant could be the principle "Because when you write well in the exams you usually pass", and the lay out of the argument would be:



From the above example, in problems like career decision making which is an ill-structured (real world) problem, the claims or the conclusions of an argument cannot be definitive. Rather, they are more or less possibilities, depending on the way the individual weighs up the evidence he has, the assumptions he makes about the solution of his problem, or the information he has which can justify his claim. In the above example, however, although the individual's claim can be justified, his argument is rather incomplete in terms of the type of warrant, given since it cannot actually help him to frame his ideas and move towards a course of action. The argument is given in a rather deductive way, in which the warrant is used as a rule to generate the data and the claim is actually converted into data.

In such cases claims cannot be considered as being able to lead to frames.

Apart from the above type of argument disclosed in the individual's language discourse, other types of arguments exist, in which the claims actually move the individual towards a course of action (for example, the argument of Nikos given below). There are also cases in which arguments are complex structures consisting of various warrants and backings, forming a multiple chain of argumentation. In these cases, the outcome or the claim of one argument is often the data input, warrant or backing of another argument (Mason and Mitroff, 1984).

For example, in the argument below given by Nikos after the counsellor's priming *"What are you going to do if you pass the exams?"*

Nikos' argumentation continued:

"If I pass the exams (DATA), then I will continue my studies in the university and when I finish I will go for postgraduate studies (CLAIM). My uncle who did his PhD in USA, has a good position in the ministry of education, and I know that if you have postgraduate studies abroad you can find a job easily".

In this example Nikos' (age 20) argument has the following lay out:

DATA

I have taken the exams

CLAIM

I will continue my studies in
the university

I will go abroad for more
studies

QUALIFIER

If I pass...

WARRANT

- Because when you follow postgraduate studies abroad you can find a job more easily

BACKING

- As for example my uncle who did his PhD in USA and now he has a good position in the ministry of education.

The main interest in the present study and for the present analysis is to identify to what extent the claims given by individuals can actually lead to frames or not. In the above argument, Nikos is framing his ideas in a Future Scenario frame since he is connecting the event "pass in the university" to the action, "continuing studies in the university", and a to later action, "going abroad for postgraduate studies". Through the warrant, he is also giving an attributive element to this action by saying, "postgraduate studies help you find a job".

By analyzing individual arguments under the above considerations, I have tried to identify to what extent the presence of all or of some of the formal elements of the arguments, when combined, can identify whether the individual is able to frame his ideas or not. For example, in another case, Nikos (age 17) said:

"I like Military School (Claim). This comes to my mind now; but I have not decided about that definitely. I may change my mind and go to the 1st DESMI (Claim). However I am more sure that I will be accepted somewhere in the university through the 4th DESMI (Claim).

Nikos is making three different claims about his future without being able to give the justifications or the grounds or even the facts which can establish and move his claims forward. In response to the counsellor's question: "*How can you be sure?*" Nikos answered: "At school I got 16.5/20 and I think that this is a good average for the 4th DESMI. Also from the 4th DESMI, you can enter the Institute of Education where I would like to go.

After more probing from the counsellor: "*Is there anything else you like in the 4th DESMI?*" Nikos answered:

"There is also the School of Economics there. If I enter there, I could work later with my father, managing his business.

And to the counsellor's question: "*Is this what you would prefer to do?*"

Nikos answered: "No, I would prefer to become a teacher. You get a good salary and a permanent position as my uncle told me. I am not sure if I'll go the School of Economics after all. You see.. if only one member of the family works, it is difficult. And I am used to living comfortably".

And when, in turn, the counsellor asked: "*What other satisfaction do you expect from your future job?*" Nikos answered:

"I want to have a lot of free time, to be in contact with people, to have social status from my job, and be secure concerning employment".

In the above example, Nikos, with the counsellor's priming manages to form a more complete argument concerning his decision about which group of studies he wants to choose in order to take the exams to enter university.

This time, Nikos' argument can have the following lay out:

DATA ----- CLAIM

-In school I got a grade of
16/20

-I am more certain I will be
accepted somewhere in the
university through the 4th
DESMI

-(4th DESMI includes:
Economics, Sociology, Political
Science, Institute Of Education,
Physical Education, Polytechnics)

-I would prefer to become a
teacher
-I could work with my father,
manage his business

QUALIFIER

-If I enter the School of
Economics

WARRANT

Because -I think the grade 16/20 is a
good average for the 4th DESMI
-In the 4th DESMI there is also
the School of Economics and the
Institute of Education.
-I am used to living comfortably
-I want to be secure concerning
employment
-I want to have free time, contact with
people, social status.

BACKING

Since -(Implicit: People with a grade 16/20
at school can usually enter the 4th DESMI)
-Teachers have good salary; I know that from
my uncle.
-Being a teacher you have a permanent position
(Implicit: Teachers in Greece are employed by
the government on a permanent basis).

In the above argument, Nikos uses warrants and backings which can lead either to a Future Scenario frame: "If I enter the School of Economics (event) then I will work with my father (action)", or to a MAU frame: "I prefer to become a teacher (one alternative solution) than manage my father's business (second alternative solution), because, working as a teacher, you have a good salary (one attribute) and a more permanent position (second attribute). Here again, with the counsellor's priming, the individual is able to give additional attributes to his alternative solutions. In a lower Level analysis (Level 2, sensitivity analysis) having more attributes will help him towards a better evaluation of his preferences among his alternative solutions.

The claims made by Nikos in the beginning: "I like Military School" and "I may change my mind and go to the 1st DESMI" are not actually elaborated upon by him and they are not incorporated into any frame. The claims "I am more certain I will enter university through the 4th DESMI" and "I prefer to become a teacher" and "If I enter the School of Economics I could work with my father" are justified by the individual with Data, Warrants and Backings and, as we said before, they are incorporated into a Future Scenario and into a MAU frame.

There are additional cases in which the individual incorporates his claims into a frame structure by justifying them in his arguments with data, warrants and backings, with little or no help at all from the counsellor. For example, in the case of Larissa (age 19), who was preparing herself to take exams for the second time:

"I am preparing for the entrance exams in June (Claim). Last year I was accepted at the Institute of Education (Data) but I will try again so that I can enter Medicine (Claim) because this is my first choice (Warrant). In fact, I will be reexamined only in composition (Claim) where I got 13/20 last year (Data, Implicit Warrant). I will keep the grades I got for Biology, Chemistry, and Physics (Claim), because they were good (Data, Implicit Warrant). If I get 17/20 in Composition (Qualifier), I believe I will be accepted at least at the school of Dentistry (Claim, another alternative solution), and I will be still satisfied (Warrant). Thus, for the entrance exams I will register first for Medicine, then for Dentistry, then for Physical Education and then for Biology (Claims).

In fact, I don't know as yet what I will do regarding Physical Education. I am in conflict; at least I hope I will write well enough not to have to choose between Biology and Physical Education (Claim). Because I don't like physical education as

a profession (Warrant), but it is very easy to find a job in this profession (Implicit backing) and the salary is the same as if you are teaching Biology at high school (Implicit backing), and it is an easy profession; I thought it would be better to put it as my first choice before Biology. But, I have heard this year that people finishing Biology can also work in the Microbiology Laboratories and in Hospitals and not just wait for 10 years to be assigned a job as a high school teacher by the government (backing).

It depends on me what I will do at the end (Claim). Because to enter Physical Education depends on my performance in athletics (warrant), in which I will be examined after the writing exams (warrant). That is why I put physical education first (Claim); because I still have the alternative of doing well in athletics or not (Warrant). If I do well in athletics (Qualifier), which depends entirely on me (Warrant), I can enter the school of Ph. Education (Claim); if not (Rebuttal), I will enter Biology (Claim).

This extensive argumentation scheme was not very common among the students interviewed. In her arguments, Larissa is making a lot of claims about her future plans concerning her decision about which subjects to choose for her university exams, and has succeeded very effectively in putting these into frames. She is making the following Future Scenario frame (which will be illustrated in her inference diagram, see Chapter 8, 8.1.2):

Larissa's Future Scenario frame:

"I will register first for Medicine, then for Dentistry, then for Physical Education, then for Biology. If I get 17/20 in composition, I will enter in Dentistry. If not I can either be examined in athletics and enter Physical Education, or not be examined in athletics and enter Biology".

She also gives different attributes to her alternative solutions formulating a MAU frame:

"I decided to register for Physical Education first and then for Biology (Claim) because Attributes:

although I don't like Physical Education, it is very easy to find a job there (Atr.1), the salary is the same as that of a Biology teacher (Atr.2), it is an easy going profession (Atr.3). In Biology you can work in laboratories (Atr.4), or in Hospitals (Atr.5), and need not wait for 10 years to get a job in High School (Atr.6) (Total No of Attributes = 6)".

It can be seen, however, that Larissa is still in conflict with regard to her choice between Physical Education and Biology. A session with MAUD and a sensitivity analysis on the different values she wants to put on the different attributes and different alternative solutions could probably help her in this conflict (Chapter 8,

8.1.2). In answering the counsellor's question, she in turn elaborates even further on the rest of her alternative solutions and extends her Future Scenario frame.

Counsellor: "*What other satisfaction do you expect from your future job?*"

Larissa : "If I become a doctor (Qualifier) I don't want to have a private office (Claim); I would like to work at a hospital or in clinics (Claim). If I enter Medicine (Qualifier) I will specialize later in Gynaecology and have a successful career there (Claim). I would like to go abroad. I would like to do postgraduate studies, a PhD, or whatever else is possible towards my career (Claim). To become a gynaecologist I was influenced by a friend of mine who is a gynaecologist (Warrant) and who is very happy with her work (Backing), and she has become a fulfilled person through her work (Backing). As a woman she can come into contact with women easily, and women trust her and so she has succeeded in her career (Backing). She has her own private office, but I would prefer to work at a hospital (Claim) in order to have more intimate contact with people (Warrant).

If I enter Dentistry (Qualifier) I would like that very much (Claim), because I believe it is a profession suitable for a woman (Warrant). I will go abroad for more studies (Claim). My uncle studied to become a dentist in Berlin and then he went to U.S.A. for more studies (Backing). Technology is more developed there and they have better methods of working than we have here (Backing), and I would like to go there to learn but not to work (Claim)".

From the above arguments it appears that Larissa can give an extended scenario for each alternative solution with her frames nicely fitted into these scenarios.

She can even give a scenario for the worst case of not passing the exams:

Counsellor: "*What are you going to do if you do not pass the exams for a second time?*"

Larissa: "If after the entrance exams I am not accepted in any of the above, I will continue at the Institute of Education where I was already accepted last year, although I am not sure if I would like to work in that profession. On the other hand, I like to help others and to help small children. I would like to find a teaching method for small children so that they see me more as a friend. I would teach them in a different way from the one we have been taught. I will not wait to get a job in a public school, I will open my own school: nursery or primary school. I have not made a lot of plans for the possibility of becoming a teacher because I believe I will enter Medicine".

From this and other examples, it became apparent that students are not always as successful in incorporating their claims into frames. It was found, from the lower

levels analyses (Levels 4 and 3), that there seem to be age related differences in the ability of individuals to frame their ideas. However, because of the small number of subjects interviewed, no general conclusions could be drawn.

Warrants and Backings

As can be seen in the above examples, students give different types of warrants and backings when they want to establish and justify their claims. Warrants are the "because part" of each argument and are assigned to three main types (Types I, II, and III), as stated in Chapter 6 (section 6.5). Examples of the different types of warrants are given in Tables 7.5a -7.5c.

Backings are used to show why a warrant is acceptable. As stated in Chapter 6, (section 6.5) giving backing constitutes giving reasons for the warrants. The question is, can we distinguish between different types of backings? Toulmin believes that to evaluate arguments properly, we must identify the fields (areas of concern) to which they belong. In this way, the type of support which is needed for warrants in one field will be radically different from the support which is needed for warrants in another. In the examples taken from this study we can see that, although we cannot make a sharp distinction between the different types of backings, backings can usually be assigned to the type of warrants they support. Thus,for:

Type I warrants, backings are usually statements of assurance referring to statistical records or to warrants, similar in conditions, which have been verified and approved to be true;

Type II warrants, backings are also rules, principles, traditional or universal beliefs or even statements of assurance coming from an authoritative source with an expert knowledge of the matters under consideration. In fact the latter type of backings are also used for,

Type III warrants and are found very often in adolescents' arguments marking the influence the adolescent may have received from his immediate environment.

TABLE 7.5a TYPE I WARRANTS

-DATA:	"My grades this year were very good"
CLAIM:	"I don't rely on grades"
WARRANT:	"Because I don't think that grades show the reality"
BACKING:	"As you know nowadays all students get good grades at school, 19 and 20 out of 20, so you can't rely on grades".
-DATA:	"I have written well in the exams"
CLAIM:	"I was not really anxious about the results"
WARRANT:	"Because I knew I had written well" "Ancient Greek seemed very easy for me"
REBUTTAL:	"I was a little worried about history, because there was material I had not read".
BACKING:	"When I got the first results I was very pleased. I didn't expect such good grades.
-DATA:	"We have to learn the subjects by heart in order to enter university"
CLAIM:	"I don't think that we gain anything from our education at school".
WARRANT:	"Because everything we learn we just memorize and nothing else" "And even very good students will soon forget whatever they learn"
BACKING: (Implicit)	"This can be proven by a lot of cases; Lots of people agree on that".
- DATA:	"Last year I finished with grade 18/20" "And I have 20/20 in literature".
CLAIM:	"I have a lot of chances of entering university"
WARRANT: (Implicit):	"My grades are a good indication that I can succeed" "I am a little behind in maths, but I don't need maths.
BACKING: (Implicit):	Students with these grades usually succeed.

TABLE 7.5b TYPE II WARRANTS

Examples: DATA:(Implicit):	I have been registered for the entrance exams.
CLAIM:	"I would prefer to enter Literature"
REBUTTAL:	"If I do not succeed.."
CLAIM:	"I will become a teacher or a gym teacher"
QUALIFIER:	"If I could choose.."
CLAIM:	"I would like to become a journalist"
WARRANT:	"But it is not possible. There are a lot of difficulties in that job, and I don't know if I can overcome them". "Journalism is a profession more suitable for men than for women"
BACKING:(Implicit):	Women are entitled to the easier professions.

-DATA:(Implicit):	I got registered in the school of agriculture
CLAIM:	"My parents have influenced me in my choice"
WARRANT:	"Because they will not allow me to become a pilot" "My mother suggests that I should become an Agriculturalist because we have land where I could work".
BACKING:(Implicit):	It is a tradition to continue working in the fields or become a botanist when you have your own land. "After some thought I decided that she is right".
CLAIM:	"Basically I wanted to become a pilot"
WARRANT:	"But it is my mother who won't allow me to do this".
-DATA:(Implicit):	I got registered for the university entrance exams
CLAIM:	"I hope I will enter university" "I should succeed in that"
WARRANT:	"Because entering university is a personal success but also is a security for my future". "If I have a university degree, apart from my father's job, I would have alternatives in any difficult situation".
BACKING:	"Everybody is saying that the future will be difficult".
-DATA:(Implicit):	I have written well and I have a lot of chances to enter University
CLAIM:	"I will go abroad for further studies"
WARRANT:	"Because I believe that the countries are more developed there, and I also like the way of life there. I believe also that abroad your worth is better acknowledged"
BACKING:	"Certainly, I am influenced by what I have seen in the movies"

TABLE 7.5c.TYPE III WARRANTS.

Examples: CLAIM:	"I will register myself for the School of Physical Education"
WARRANT:	"Because I like it and because it is easy to get there" "But even if there were no exams, I think I would be still going there"
CLAIM:	"I will apply for the fourth group of studies" "I am interested in Economics"
WARRANT:	"Because it is what I like most" "Also I think with Economics I can find a job easier"
BACKING:(Implicit):	"Everybody says that you have more chances to find a job there".
CLAIM:	"I will try again to enter university even for a second time"
WARRANT:	"I believe that if I don't pass the first time I will pass the second"
BACKING:(Implicit):	"This happens usually to a lot of students".

DATA:	"My parents do suggest some professions to me".
CLAIM:	"I am not influenced by them"
WARRANT:	"I want my profession to please my parents but if something appears which I like more, I will not change my mind".

The different types of warrants and backings demonstrated above were found in the adolescents' arguments irrespective of age differences. A larger number of subjects would be needed if we want to find out whether there is any correlation between types of warrants and backings and the areas for which they are used or the age of the individual. For the purpose of this study, the analysis of the warrants and backings was used as a side analysis, the results of which have an implicit influence on the identification of the way the individual represents his career problem. They were used because they can show, on the one hand, how people are constrained in their decision making processes and, on the other hand, they can indicate the type of elements they used in the process of structuring the problem or in reshaping the problem, so that individuals can proceed towards a solution. Warrants and backings can also help the counsellor in the identification of which claims are incorporated into frames, and even in the identification of these frames.

In the example (Type II warrants), the rule given by the warrant "Journalism is a profession more suitable for men than for women" and by the backing "Women are entitled to have easier professions", actually put constraints on the individual in forming any other frame with which she could explore whether her most preferred alternative, "To become a journalist", could be brought into action.

Similar kinds of rules, principles, and statements about traditional beliefs, or statements coming from an authoritative source, were usually found in the adolescents' arguments. They result in rule-based frames (Chapter 2, 2.5.3; Chapter 5, 5.4) in which the individual actually follows the prescriptions for action he receives from his environment. As a result he is not able to structure his claims in any other frame, or have any other alternative solutions for his problem, since he has to follow only the solution that the rules prescribe to him.

Under the above considerations, argumentation analysis can become very useful for

the career counsellor (Chapter 9, 9.5.1). When the individual claims that "I should do this because my parents tell me so", and then finds difficulties in differentiating between his alternative solutions, or even in finding an alternative solution, it can be expected that this person is structuring his frames wrongly because of the types of elements he is using to support his claims. The counsellor can first help him at this point, in order for the individual to proceed with an evaluation of his attributes or his alternative solutions.

7.3.3 LEVEL 4 analysis : Problem structuring

While the focus of the analysis at Level 5 was on the way individuals were exploring their small world concerning their career problems, the analysis at level 4 and at the lower levels focuses on the way the individuals structure their career problems.

In the previous section, a way of analyzing the individual's problem expressing language was established through the argumentation analysis. This was done by identifying the elements of the arguments individuals use when they are talking about their decision making problems, i.e. data, claims, warrants, backings. It was also pointed out that the types of warrants and backings used by individuals to support their claims can help in the definition and establishment of the kinds of claims that lead to frames, which is in fact the basis of Level 4 analysis.

Consequently the analysis at Level 4 will proceed as follows:

1. Classification of the propositions which lead to claims within each domain
2. Classification of the claims that lead to frames (frames were discussed in Chapter 2 (section 2.5.3), Chapter 5 (sections 5.5))

Two hypotheses were tested:

Hypothesis 3: *The individuals differ in the way they perceive and express their career problem.*

For this hypothesis, by means of Level 4 analysis, I wanted to test whether there would be any differences among the individuals

- (i) in the number of "claims", as well as

- (ii) in the number of "claims that lead to frames" used by individuals when they were talking about their career problems.

Hypothesis 4: *The counselling procedure (by priming or not priming the students) affects the "claims" or "claims to frame" formation during the first and the second interview (students were interviewed before and after the university entrance exams).*

The results are discussed with reference to the three different age groups (Gr.1: 18-20y, Gr.2: 17-18y, Gr.3: 16-17y.) and to the type of domains favoured by individuals. Table 7.6, below shows the number of identified propositions that lead to "claims" (CL), as well as the number of identified "claims that lead to frames" (CL to Fr) given by subjects in the three different age groups in the first (A) and second (B) interview sessions.

Table 7.6 CL: Propositions that lead to claims
CL to Fr: Claims that lead to frames
A: First interview B: Second interview

	Gr.1		Gr.2		Gr.3	
	CL	CL to Fr	CL	CL to Fr	CL	CL to Fr
A	148	104	116	77	99	61
B	102	71	94	61	83	56
Total	250	174	210	138	182	117

Results and Discussion

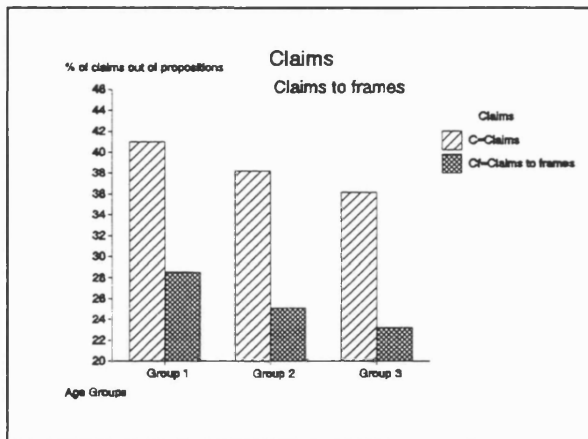
In a Chi-squared test (carried out on a GLIM package), no significant difference was found in the number of propositions that lead to claims (CL) (taken out of the total number of propositions), or in the number of claims that lead to frames (CL to Fr) between the three groups or between the first (A) or second (B) interview sessions. However, significant differences were found between individuals in the number of propositions that lead to claims ($\chi^2=81.4; df=21; p<0.005$), well as in the number

of claims that lead to frames ($\chi^2=50.87; df=21; p<0.005$) . This large variation among individuals can be considered important for this study because it supports the original hypothesis, that the way individuals perceive and express their career problems is subjective.

With respect to the number of "claims" or the number of "claims to frames" given by the three different age groups, we probably need a larger sample in order to find any significant differences or to formalize any conclusions. Nevertheless, as is shown below (Figs. 7.6; 7.7a; 7.7b), the observed differences in the proportion of "claims" and "claims to frames" between the three age groups may give some indications of the relationship between the age of the subjects, the counselling procedure followed (priming or not priming the students), and the subjects' ability to structure their arguments about their career problems. In fact, from the total number of propositions (Propositions total No=1662), only 38.6% are "claims". This indicates that less than half of the propositions concerning the subjects' career problems lead to some form of structuring of their problem. From the total number of "claims" (Claims total No=642), 66.2% are "claims which lead to frames"; this indicates that students, irrespective of age, were quite capable of structuring their claims into some form of frame.

With regard to the differences in the number of "claims", and of "claims that lead to frames", between the different age groups, there is an indication that Group 1 (older age group) individuals were able to formulate more "claims", as well as more "claims to frames" propositions than Groups 2 or 3 (younger groups). This is shown in Fig.7.6 below. (Percentages were calculated from the total number of claims: 100%=642.) These differences indicate that older students were more successful in the formulation of "claims" about their career problems as well as in the structuring of these claims into frames.

Fig. 7.6: Percentages of the "claims" and the "claims that lead to frames" propositions in the three different age groups.



100% = 642 claims

Regarding differences in the proportions of "claims" or "claims to frames" within the different age groups between the first (A) and second (B) interviews, students from Group 1 (older students) introduced fewer claims in the second interview than younger students (Groups 2 and 3). This is shown in Figs. 7.7 a,b below (percentages were calculated from the total number of claims from the first interview and second interview respectively: Claims (A): 100% = 361, (B): 100% = 281).

Fig. 7.7a: Percentages of claims in the three different age groups from the first (A) and second (B) interview.

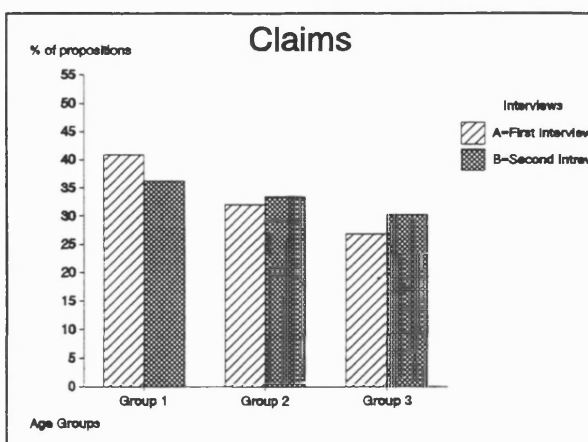
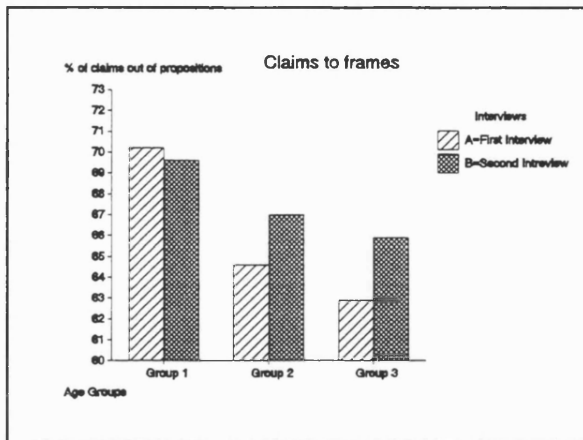


Fig. 7.7b: Percentages of claims to frames in the three different age groups in first (A) and second (B) interview.



The above findings have to be discussed in relation to the priming that each individual was given during the counselling procedure. In particular, as discussed in the procedure, in the first interview all students, irrespective of age, were primed with regards to the 12 domains, either by introducing them to an area of exploration or by priming them on a frame (Chapter 6, 6.4). In the second interview, students were left on their own to explore any area they wanted. Priming only took place by introducing a frame to them a frame when it was considered essential. From the above results, it appears that priming the students on the various domains during the first interview increased the breadth of their explorations resulting in more claims being elicited. The larger proportion of "claims that lead to frames" in the second interview for Group 2 and 3 individuals can be attributed to the fact that, being younger, they received relatively more help and priming than older subjects.

The domains addressed most frequently by the subjects in their claim formation, during both interview sessions, were found to be the same ones identified in Level 5 analysis (i.e. Educational Achievement, Future Plans, Self Concept, Professions, and Parental Influence, see Appendix 2).

These results suggest that these domains, being more important to the individuals than the rest of the domains, were chosen for exploration and frame formation.

7.3.4 LEVEL 3 Analysis

Level 3 analysis focuses on the establishment of the frames within which subjects were structuring their arguments about their career problems. Level 3 analysis addresses issue 5 of analysis, i.e. to analyze both the kinds of frames used by the subjects, and to what extent these frames were structured and elaborated upon by them. The individuals' arguments were analyzed under the three different frames which were identified in the pilot work, i.e. Multi Attribute Utility frame (MAU), Future Scenario frame, Rule-Based frame (Chapter 4, 4.2.3.3, 4.3).

An example of the kind of argumentation respondents used in developing each of these frames is given below (see also Chapter 2, 2.5.3, and Chapter 5, 5.4)

1. Multi Attribute Utility (MAU) frame

Example of content:

"I would like to choose a profession which gives you a lot of status, as for example being a doctor or a lawyer -because I am good in Ancient Greek as well-; I could develop a lot of initiative in these professions. But I am afraid I will encounter difficulties and I will not be able to pass the exams. That is why I decided that it would be better to follow a course which belongs to the third group (DESMI 3), and through which I have more possibilities to enter university."

2. Future Scenario frame

Example of content:

"If I become a dentist I will go abroad for further studies. I don't know if financially I will be able to do that. If I become a biologist I have not thought about it yet. I will see if I like it, and then I may go for postgraduate studies. If I continue as a Biologist I plan to get a place at the university, to be able to make a University career".

3. Rule - Based frame

Example of content:

"I will become a teacher or a gym teacher. If I could choose I would like to become a journalist. But it is not possible; there are a lot of difficulties in that job and I don't know if I can overcome them. It is a profession more suitable for men than for women".

The analysis at Level 3 consists of the following steps:

1. Classification of the arguments of each age group in the three frames according to the examples given above and in Chapter 5, section 5.4.
2. Coding the number of frames produced by the individuals who did not receive priming on any of these frames, and of frames produced after priming (see procedure

Chapter 6, 6.4).

3. Analysis of the structure of each frame. This means coding the number of elements in each frame, i.e.:

- (a) for the MAU frame coding the number of attributes the individual gave for each alternative solution;
- (b) for the Future Scenario Frame coding the number of act nodes and event nodes; and,
- (c) for the Rule based frame coding the number of rules given by the individual.

Three basic hypotheses were tested:

Hypothesis 5: *The individuals differ in the way they structure and represent their career problem.*

Hypothesis 6: *Multi Attribute Utility frame and Future Scenario frame are used more often from the individuals than the Rule based frame.*

Hypothesis 7: *The counsellor's intervention support the individual in structuring and expressing his problem.*

For the above hypotheses by means of level 3 analysis I wanted to test:

- (1) Whether there would be a significant variation among the individuals in the type of frames used
- (2) Whether there would be a significant difference between the three age groups in the number of frames used.
- (3) Whether my intervention during the interview sessions, by priming or not priming the subjects, had an effect on the number of frames used.
- (4) Whether there would be any differences in the number of frames produced by the individuals during the first and second interview sessions (students were interviewed before and after the university entrance exams, see procedure Chapter 6, 6.2);
- (5) Whether there would be any quantitative differences in the types of frames used (MAU frame vs Future Scenario frame vs Rule based frame), and
- (6) Whether there would be any differences in the degree of exploration of frames which did or did not have priming.

Results and Discussion

For the analysis of the data, the individuals' arguments, which have been counted as frames, were tested and evaluated against:

- a) the three different age groups (Gr.1 = 18-20, Gr.2 = 17-18, Gr.3 = 16-17 years old);
- b) the first (A) and second (B) interviews, held before and after the university entrance exams respectively;
- c) the primed and non primed condition (Frames primed = frames generated by the individuals after priming from the counsellor, Frames non-primed = frames generated by the individuals without priming);
- d) the three different types of frames used by the individuals in the first and second interview; and
- e) the number of elements identified by the individuals during the first and the second interviews.

Table 7.7 shows the total number of frames, primed and non primed, used by the individuals in the first and second interview.

Table 7.7: Total number of frames, primed and non primed, used by the three groups
A: First interview
B: Second interview

	Gr.1		Gr.2		Gr.3	
	A	B	A	B	A	B
Frames Primed	55	21	47	34	40	31
Frames Non primed	40	35	25	24	21	21
	95	56	70	56	61	52

In a one way analysis of variance no significant differences were found between the three groups with regard to the total number of frames ($F_{2,2} = 1.97$; $p < 0.14$). Comparing the means, we can see that Group 3 (the younger in age group) formed

fewer frames in total (Gr.1=1.58, Gr.2=1.35, Gr.3=1.19). This shows that older students were more successful in structuring their claims into frames.

A significant difference was found in the total number of frames used by the individuals in the first (A) and second (B) interview, ($t=2.66$, $p<.008$), which shows that students were forming more frames overall during the first interview. Also at a $p<.001$ level of significance, students were found to use more primed frames than non primed ones.

To test the main effects and interactions of the different variables (groups, types of frames, primed or non primed frames, first and second interviews) on the number of frames used, an analysis of variance was conducted, the results of which are presented in the following table (Table 7.8.)

Table 7.8: Interactions between the number and the type of frames measured in the first and second interviews when subjects were primed and when they were not primed.

Source of variation	Sum of Squares	DF	Mean Square	F	Signif of F
Main effects	193.52	6	32.25	27.00	.000
Group	7.58	2	3.79	3.17	.043
P,NP	13.34	1	13.34	11.17	.001
A,B	13.34	1	13.34	11.17	.001
Frame	159.25	2	76.62	66.66	.000
2-way interactions	47.48	13	3.65	3.05	.000
Group P,NP	6.69	2	3.34	2.8	.063
Group A,B	6.02	2	3.01	2.8	.082
Group Frame	13.29	4	3.32	2.78	.027
P,NP A,B	8.00	1	8.00	6.69	.010

The interaction effects show that, in general, priming the students in their framing formation affected the number of frames given in both interviews. This would suggest that students were influenced by the counselling procedure in accordance with the argument that priming can help the student to use more frames, which in turn helps him in structuring his problem better.

This is further confirmed by the significant interaction effect between primed and non

primed frames in the first and the second interviews ($F(1,252) = 6.7, p < .01$). The highest extent of priming in the first interview session elicited more frames, whereas less priming during the second interview resulted in the formation of fewer frames. The smaller interaction effect between the three groups of students and primed and non primed frames ($F(2,252) = 2.8, p < .06$), and between the groups and the number of frames used in the first and the second interview ($F(2,252) = 2.52, p < .08$), shows that the effect of priming was not always the same. This is expected considering that priming was given to the students according to their needs (see Chapter 6, 6.4). During the second interview the oldest students (Group 1) were not given any help in frame formation; however, help was given to younger students (Groups 2 and 3) and especially to those of the third group. (Similar results were obtained from the evaluation of claims to frames by Level 4 analysis.)

The response to priming the students according to their needs, could also explain the small difference found between the groups and the total number of frames used ($F(2,252) = 3.17, p < .04$).

The difference between the number of primed vs non primed frames, given by the oldest students in the second interview, is also of importance. As illustrated in Figs.7.8a and b, the subjects of the first group were very successful in the formation of non primed frames, although they had received very little priming during the second interview.

Fig.7.8a: Number of primed frames (MAU, Future Scenario, Rule Based), in the first (A) and second (B) interviews by the three different age groups (Gr

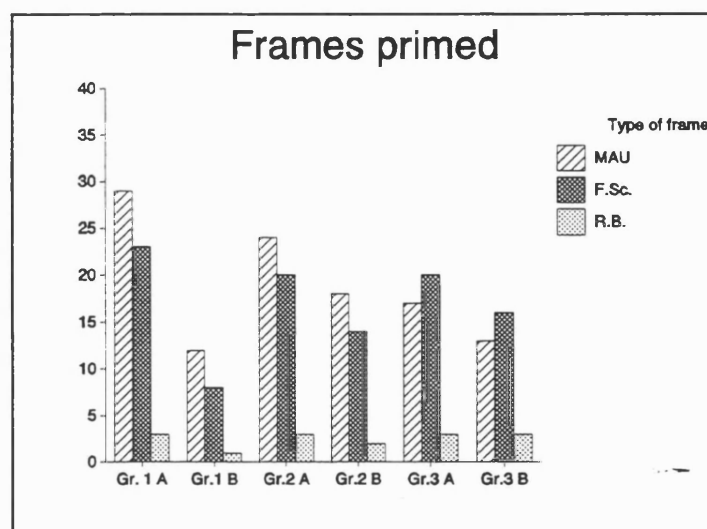
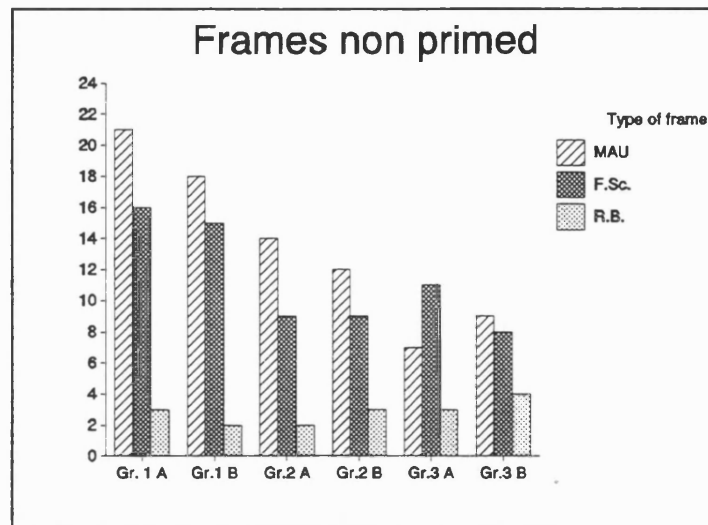


Fig.7.8b: Number of non primed frames (MAU, Future Scenario, Rule Based) identified in the first (A) and second (B) interviews by the three different age groups (Gr.)



As regards the types of frames used, a one way analysis of variance revealed a significant variation between the number of frames used by subjects in the three types of frames (MAU, Future Scenario, Rule Based $p < 0.05$). From the average number of frames per person (Table 7.9), we can see that the MAU frame is more commonly used by the subjects, whereas the Rule Based frame is used very little by all groups.

Table 7.9: Average number of the types of frames used.

	Gr.1	Gr.2	Gr.3
MAU	2.50	2.13	1.44
F.Sc.	1.97	1.63	1.72
R.B.	.28	.31	.41

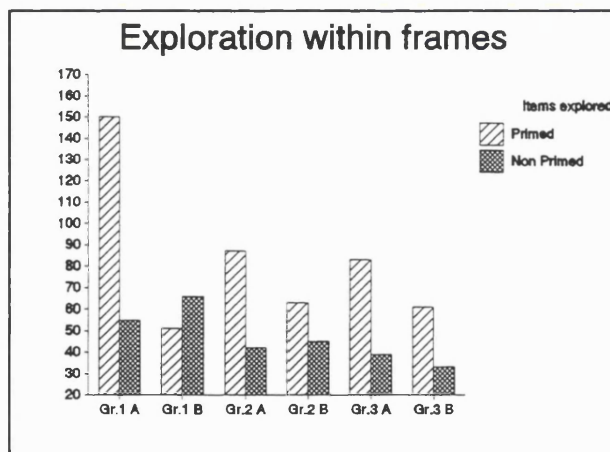
Also, from the above table (Table 7.9), it can be seen that Group 3 individuals use the F.Sc. frame more often than the MAU frame. This can be attributed to the counselling procedure since, in a two way analysis of variance, a significant interaction effect was found between the types of frames given under primed vs non primed conditions ($F(2,252)=3.36, p < .03$). Consequently, priming the students affected the types of frames they were using, especially the subjects of the younger

group, who were encouraged to talk and make future plans more often.

No significant interactions were found, however, between the types of frames used in the first and second interviews, primed or non primed in the three groups (3-way interactions; $F(12,252) = 0.682$; $p < .8$), which is expected, since it was intended that students were treated in a similar way in both interviews.

Regarding the degree of exploration within the three frames, analyzed for each frame in terms of MAU = number of attributes given, Future Scenario = number of act and event nodes, and Rule Based = number of rules given, all subjects irrespective of age developed more structure within the primed frames ($x = 11.566$, $p < .003$). These results indicate that priming the subjects in frame formation at this level encourages depth in structuring within the frames. These results are illustrated in fig. 7.9.

Fig. 7.9: Number of items explored within the primed and non primed frames



In **summary**, through Level 3 analysis we can get information on how individuals structure their career decision making problems and how they represent this structure in their language discourse. The Multi Attribute utility frame was found to be used to a greater extent than the other two frames for the individual problem representation. As mentioned earlier (Chapter 2, 2.5.3), this frame focuses on the way subjects wish to structure their preferences for alternatives. This is actually a

process which can be addressed within the technology given by Multi Attribute Utility theory.

The preference of the subjects to use the MAU frame justifies the use of a decision aiding technique to help the individuals in developing structure in this frame. For this purpose the computer decision aid, MAUD, which is based on Multi Attribute Utility theory, was used. The results of the use of MAUD, and how it can help us to plot the Multi Attribute Utility frame, will be discussed and analyzed further in the next chapter (Chapter 8, 8.2).

The frequent use of the Future Scenario frame shows that the subjects would also talk and think about their future plans in a Future Scenario frame. This type of response will be illustrated and investigated in more detail in Chapter 8 (section 8.1), with the construction of Inference Diagrams which give more details about how individuals link their claims about their future in a Future Scenario frame.

The operations involved in Level 3 analysis represent the operations involved in activity area 2 (A2) of the career decision making process model (Chapter 5, 5.3). The fact that priming individuals according to their needs can result in a better response justifies the type of counselling procedure followed during the interview sessions. The purpose of analyzing the results at this level, as well as at all other levels, is to define the demand characteristics of the general career decision making process model introduced in Chapter 5. Also it is used to form the basis for extending this model to a career counselling process model which will be presented and discussed in chapter 9.

7.3.5 LEVEL 2 and LEVEL 1 analysis

In Levels 1 and 2, structuring the problem is completed and judgments must be made about its solution. Judgments refer to the judgmental propositions used by individuals in their discourse about how the problem is to be handled and solved.

Consequently, analysis of responses according to Levels 2 and 1 will focus on counting the number of propositions given by the subjects when they were talking

about their career problems conditionally (Level 2) or unconditionally (Level 1) to the constraints set at all the higher levels. Constraints were put on either by the individual (depending on the way he perceives and represents the solution to his problem), or by the counsellor's intervention by priming and non priming him in a domain (Level 5) or in a frame (Level 3). Subjects were primed in both domains and frames during the first interview, whereas, during the second interview, priming was given more in frame formation and only when this was needed.

Level 2 and 1 analysis aimed to test the following hypotheses:

Hypothesis (8): *Older students are expected to make a higher proportion of unconditional than conditional judgments, since they should be closer to the solution of their problem and have more fixed ideas about their alternatives.*

Hypothesis (9): *Setting constraints, i.e. priming the subjects either in domains (Level 5 and level 4: exploration of different areas of concern), or in frames (Level 3: problem structuring) should elicit more conditional judgments.*

Hypothesis (10): *The number of conditional judgments is related to the number of unsafe propositions*

For the analysis of Level 2 and Level 1, the following procedure was adopted:

(1) Identification of the **conditional judgements** made inside or outside a frame in the two interview sessions. For example:

- | | |
|-----------------|---|
| Larissa (Gr.1): | "When the personal life is successful then the couple's life is successful". |
| George (Gr.1): | "If you go to work for NATO then you can travel to other countries and you can get extra salary and this is good". |
| Maria (Gr.1): | "Half of your future depends on the exams; because if I had entered a different school I would have had a completely different life". |
| Nikos (Gr.2): | "If only one member of the family works then this is bad". |
| Rania (Gr.2): | "It is good to have your own profession, because it gives you independency and helps you to integrate in the society". |
| Effi (Gr.2): | "I may succeed in many things, but if this conflicts with other issues, family for example, this is bad". |

- Alexis (Gr.3): "If the grades in the Lyceum didn't count, it would be better because you could concentrate earlier on some subjects and you would be forced to see clearly what you want".
- Anna (Gr.3): "I think that the school grades must count for the entrance exams, because in a way they show the knowledge of each student in the subjects".
- Christine (Gr.3): "If I have my own business it will be good; because I will be able to have economic satisfaction, self-confidence and social status".
- Aggelos (Gr.3): "I think that if you work hard and you don't have the possibility to achieve what you want this is bad".

(2) Identification of the **unconditional judgments** inside and outside a frame. For example:

- Larissa (Gr.1): "I believe that education is necessary for the individual".
- Nikos (Gr.1): "It is better to leave and live my own life".
- Vaggelis (Gr.1): "The best thing is to be educated".
- Apostolis (Gr.1): "Life is difficult".
- Christos (Gr.1): "There is nothing concrete about the future".
-
- Dimitris (Gr.2): "One develops better through the family".
- Rania (Gr.2): "I don't believe in grades".
- Haido (Gr.2): "It is good to go to the university".
- Aris (Gr.2): "The best thing is to find a job".
-
- Christine (Gr.3): "I think that all professions are good".
- Anna (Gr.3): "People must not be influenced by the others".
- Aggelos (Gr.3): "The course in Ancient Greek must change".
- Elias (Gr.3): "I think that it is better that the grades of Lyceum don't count in the exams".

Results and Discussion

In table 7.10, below, the percentages of the conditional and unconditional judgments made by the three groups of subjects in the first and second interviews are shown.

Table 7.10 :Conditional and unconditional judgments.

Percentages taken out of 152 total number of judgments.

A: First interview

B: Second interview

GR.1			GR.2		GR.3	
	Condit.	Uncond.	Condit.	Uncond.	Condit.	Uncond.
A	15.8%	11.2%	10.5%	9.2%	6.8%	7.2%
B	4.6%	5.9%	4.6%	8.5%	5.2%	10.5%
Total	20.4%	17.1%	15.1%	17.8%	11.8%	17.8%

In a one way analysis of variance, no significant differences were found between the total number of judgments (conditional and unconditional) made by the subjects in all groups at the level of $p=.050$ (although the number of unconditional judgments is slightly larger than the number of conditional ones: CON = 47.4%, UNCON= 52.6%). A larger number of observations would necessarily be needed for any significance to be found.

Comparing the percentages of the total number of conditional versus unconditional judgments made by the three groups, there is an indication that older students (Group 1) made more conditional judgments than younger students:

Group 1 = 19.2%, Group 2 = 17%, Group 3 = 11.6%.

This was unexpected since, due to age differences, subjects in Group 1 should have already formed fixed ideas about their future careers and thus made more unconditional judgments. It seems, however, that as people get older they may face more difficulties which would make them more cautious about their judgments. In

fact the subjects in the first group, even in the first interview, had already experienced one or even two failures in their efforts to enter university. This might have made them more cautious in the planning of their futures, and in considering more possible outcomes or misfortunes.

Some interesting conclusions can be drawn if we look at the number of conditional versus unconditional judgments between the first and the second interviews. Comparing the ratio of conditional to unconditional judgments, we can see that more conditional judgments were made in the first interview (see Table 7.11).

Table 7.11: Ratio of conditional to unconditional judgments

	Group 1	Group 2	Group 3
	CON to UNC	CON to UNC	CON to UNC
First Interview (A):	1.4	1.2	0.9
Second Interview (B):	0.7	0.5	0.5

These results could be attributed to the fact that all students during the first interview had a lot more priming either in the exploration of the different areas of concern or in the process of problem structuring (i.e. priming in frames), which resulted in the formation of more contingency plans about their future, more frames and thus more conditional judgments. During the second interview, why students gave more unconditional judgments can be considered as a positive result, showing that students have developed, through time, more fixed ways of thinking about their future careers. Also, it shows that students are more prepared to commit themselves to accomplish the decision which has been explored in the previous levels.

It is also interesting to compare the number of 'conditional judgments' and 'unsafe' propositions made by the subjects in all groups (see level 5 analysis, section 7.2). In the analysis of 'unsafe' propositions (section 7.2.3.1) it was found that Gr.3 (the younger age group) gave a larger number of unsafe propositions than the other two groups (Gr.1=16.6%, Gr.3=26.1%). The larger number of unsafe propositions, as

discussed in section 7.3.3.1, may result in less framing of the material, fewer contingency plans and fewer conditional judgments.

To test the hypothesis that the number of conditional judgments is negatively related with the number of unsafe propositions (Hypothesis No10), the Pearson correlation coefficient test was used. The hypothesis was supported in some of the experimental conditions as it is shown in Tables 7.12a and 7.12b. (The plots of the correlations are in Appendix II).

Table 7.12a: Correlations between the total number of unsafe propositions and the total number of conditional judgments (given by the three groups) in the first (A) and second (B) interview:

First Interview A = $-.529^*$ (Gr.1+Gr.2+Gr.3)
 Second Interview B = $.756^{**}$ (Gr.1+Gr.2+Gr.3)

Significance at the level of $* p > .01$, and $** p > .001$. N of cases = 24

The results shown in the above table (Table 7.12a), support the Hypothesis No10, and show that in total in the first interview students were making more unsafe propositions and less conditional judgments. In the second interview, however, it appears that a positive correlation exists between the number of conditional judgments and the number of unsafe propositions; this indicates that in the second interview, although students were doing more unsafe propositions, the number of their conditional judgments was increased.

Table 7.12b: Correlations between the number of unsafe propositions and the number of unconditional judgments in the first and second interview in the three different age groups of students.

	Gr.1	Gr.2	Gr.3
A	-.210	-.538 *	-.830 *
B	.601 *	.056	-.128

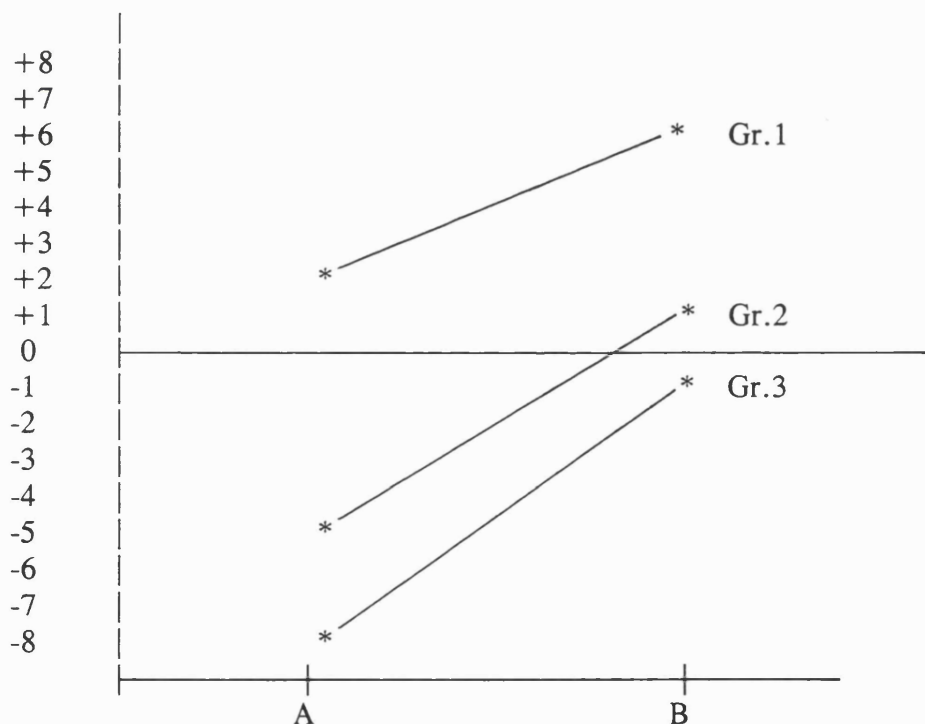
* Significance at the level of $p < .05$. N of cases = 8

In the above table (Table 7.12b), it is shown that, there is a negative correlation between unsafe propositions and conditional judgments (in support of the Hypothesis No10) only in the results of the younger students (Gr.2 and Gr.3) in the first interview. In the results of older students, a positive correlation (more unsafe propositions - more conditional judgments) it is shown in the second interview. This indicates, that in the second interview older students were doing more unsafe propositions and more conditional judgments.

The results of the above analysis are plotted in Fig. 7.10 and are discussed below:

Fig.7.10: Results of the correlations between the number of unsafe propositions and the number of conditional judgments given by the three age groups in the first and second interview).

More unsafe prop. =
More Conditional judg.



More unsafe prop. =
Less conditional judg.

In the above figure it is shown that there is an increase in the number of unsafe propositions and the number of conditional judgments as the age of the individuals

increase. Also it is shown that there is an increase in the number of conditional judgments within the groups between the first (A) and second interview (B). These results can be attributed to the counselling intervention during the first and second interview, as well as to the aging of the individuals.

For example, priming the individuals in making future scenarios frames during the first interview helped them to make more contingency plans about their future, which may have resulted in more conditional judgments during the second interview. Other factors as the aging of the students as well as the experience that they had of the university exams during the interval between the two interviews may also had an effect in the number of unsafe propositions given by the individuals (see 7.2.3.1) and the number of conditional judgments. For example, most of the students of the two older groups, when they came for the second interview, they had either failed the university entrance exams or they had passed in a field of studies they were not happy. This might have increased their feelings of unsafe, but at the same time make them think more conditionally about their future. Concerning the youngest group (Gr.3) counselling during the first interview, on one hand may have helped them to feel more safe and give less unsafe propositions during the second interview; on the other hand priming in the future scenario frame may have helped them to make more contingency plans about their future and thus more conditional judgments during the second interview. (This was also discussed in reference to the table 7.11).

With the Level 2 and Level 1 analysis, the analysis of the five levels framework was completed by addressing most of the issues raised at the beginning of this chapter (issues 1;2;3;4;5; and part of issue 8, see section 7.1). The rest of the issues will be addressed in the next chapter. This chapter ends with the basic conclusions drawn from the entire analysis of the five levels framework; the implications of these results on the general career decision making process model introduced in Chapter 5 is discussed further in Chapter 9.

7.4 Conclusions

The general hypothesis of this study is that, if we are able to understand and define

the way students structure and represent their career decision making problems, it should be possible to give more substantial help to them. To achieve this, a general career decision making process model was introduced in Chapter 5 and used as the basis for the procedure followed in this study. The five Levels of knowledge representation which were introduced in Chapter 2 were incorporated into this model, and served as the basic framework in the present study for the analysis and investigation of the above hypothesis.

In particular, the main focus of the five Levels analysis was to understand the operations involved at each of the five Levels by investigating how students explore, structure and represent their career decision making problems.

Table 7.12 (an extension of Table 2.1 in Chapter 2) summarize the operations involved at each level and gives an index of the main indices analyzed at each level:

Table 7.12: Operations involved at each level of Knowledge representation

LEVEL	PROBLEM STATE	OPERATIONS INVOLVED AT EACH LEVEL	INDEX
5	Problem recognition Problem situation unstructured	- Exploration of the individual's small world - Formulation of boundaries	No of propositions to domains
4	Problem definition Problem situation expressed	- Identify the relevant structure for the solution of the problem - Three frames identified	No of prop. to claims claims to frames
3	Problem simulation Conceptual model building	- Develop structure within each frame	No of frames within which structure is developed
2	Problem evaluation Conceptual model building	- Sensitivity analysis Explore what if questions	No of conditional judgments
1	Problem Solution Decision	- Best Assessments	No of unconditional judgments

The analysis was carried out from Level 5 to Level 1 in descending order since, as was mentioned before (Chapter 2, 2.2), the operations and activities at each level set the constraints which (a) define the discretion that the individual has in order to carry out these activities, and (b) set the boundaries of the lower level problem formulation.

Level 5 analysis (section 7.3.1) focused on the exploration of the individual's small world, and on the identification of the individual's background of safety. From the pilot work, by exploring the individual's perception of his career problem, it was found that the most common factors which appeared to formulate his background of safety and constrain his decision making process, derived from school, social and personal areas. These areas were subdivided into 12 Domains which were found to best represent the areas of concern in individuals' arguments about their career problems.

By means of level 5 analysis, hypotheses No1 and No2 were tested.

Level 4 analysis (section 7.3.3) was focused on the establishment of a way of facilitating the understanding of the individual's language discourse and on the identification of the type of frames as the relevant structures to the solution of their career problems.

Using Argumentation analysis (as discussed in Chapter 6, 6.5 and in this chapter in section 7.3.2), I was able to establish the formal elements of individuals' arguments which included Data, Claim, Warrant and Backing, and to establish the types of their arguments (complete vs incomplete). The identification of these elements enabled the definition of the type of propositions that lead to "claims" used by students to "frame" and structure their knowledge about their career problems.

By means of level 4 analysis hypotheses No3 and No4 were tested.

Level 3 analysis (section 7.3.4) focused on how students were using the three frames identified in the analysis of level 4 in the structuring of their arguments about their career problem, and how structure was developed within each frame.

Hypotheses No5, No6 and No7 were tested by level 3 analysis.

Level 2 and Level 1 analysis (section 7.3.5) focused on the investigation of the type of judgments (conditional or unconditional) made by individuals.

Hypotheses No8, No9 and No10 were tested by means of level 2 analysis.

Hypothesis No1. *Exploration of the problem is related to the type of the 12 DOMAINS (main areas of concern) and the age of individuals.*

This hypothesis was partly supported. The results indicated that there were no significant differences in the number of propositions in each domain between age groups. However, analysis of the results gave some interesting indications:

- * Certain domains were found to be of particular importance to individuals irrespective of their age and were explored more than other domains (Chapter 7, 7.3.1). These domains were: Educational Achievement, Self Concept, Professions, Parental Influence and Future Plans.
- * There was an indication that older students (18-20 years old) explore more (37%) within the different areas of concern (domains) related to their career, than younger ones (16-17 years old: 30.5%).

Hypothesis No2. *Younger individuals feel more unsafe about their future. This can be influenced by the counsellor's intervention.*

The first part of this hypothesis was supported. The second was partly supported since other factors independent from the counsellors intervention may affect the feelings of 'unsafe' (Chapter 7, 7.3.1.1).

- * Irrespective of which domain was explored, younger individuals made more 'unsafe propositions' than older ones.
- * Differences were found within each group between the first and second interview. It appeared that younger students in the second interview were feeling more confident than the older ones about their future (i.e. younger students gave less unsafe propositions). There may be two possible reasons for that: (a) the counsellor's support may have affected their feelings of unsafety and lessen them, (b) the experience and the aging of the students may have had an effect.

Although the same would be expected to apply for the older students, the indication of 'feeling less confident' in the second interview could be attributed to unpleasant experiences in the interval between the interviews, as for example their failure to enter university or their acceptance to fields of studies they were not happy with.

Hypothesis No3. *The individuals differ in the way they perceive and express their career problems.*

Hypothesis No4: *The counselling procedure (by priming or not priming the students) affects the "claims" or "claims to frame" formation during the first and the second interview (students were interviewed before and after the university entrance exams).*

The hypothesis No3 was supported. There was a large variation among individuals in the number of propositions that lead to 'claims' and the number of 'claims that lead to frames' in the different areas of concern (domains).

- * Overall, students, irrespective of age, appeared to be capable in structuring their claims into some sort of frame (66.2% of the total no of claims led to frames).
- * No statistically significant difference was found in the number of propositions that lead to claims or in the number of claims that lead to frames between the three age groups or between the first (A) and second (B) interview. Yet, in order to formalize any conclusions with regard to the effect of age in way the career problem is perceived and expressed by the students a larger sample is needed.
- * Observed differences in the proportion of 'claims' and 'claims to frames' between the three age groups indicate that older students were more able to formulate their thoughts into "claims" and "claims to frames", than younger ones.
- * In addition, observed differences in the proportion of 'claims' and 'claims to frames' within the three groups in the first and second interview indicate that except from aging, the counsellor's intervention may had an effect in the way the individuals perceive and express their career problem (in support of the hypothesis No4): Priming the students in the various domains increased the breadth of their exploration resulting in more claims being elicited.

Hypothesis No5: *The individuals differ in the way they structure and represent their career problem.*

The hypothesis was supported. A significant variation found between the number of frames used by the subjects in the three types of frames i.e. MAU, Future Scenario, Rule Based frame, suggest that the way the individual structure and represent his problem is subjective.

Hypothesis No6: *Multi Attribute Utility frame and Future Scenario frame are used more often from the individuals than the Rule based frame.*

This hypothesis was supported. From the results it can be concluded that the MAU frame and the Future Scenario frame were used more extensively by the students for the structuring of their frames about their future. One has to be cautious about the results because of the small number of sample in this study. In addition although the choice of these three frames is supported substantially by what has been documented in the literature review, it does not exclude the possibility of assigning additional types of frames as semantic representatives in the language discourse of the individual.

Hypothesis No7: *Counsellor's interventions support the individual in structuring and expressing his problem.*

This hypothesis was supported. Priming individuals had, in general, a positive effect unrelated to age. The hypothesis was supported in the following more particular aspects.

- * More frames were used by the individuals in the first interview irrespective of age (individuals had more priming in the first interview, see procedure, chapter 6, 6.4).

- * More primed frames were used by the individuals irrespective of age and interview.

More primed frames were used by the individuals in the first interview (where they had more priming) than in the second interview.

Older individuals were found to be very successful in the formation of non primed frames during the second interview, although they had received very

little priming.

- * There was an indication of differences in the number of primed and non primed frames between the three groups, and between the first and second interview.

With respect to the counsellor's intervention, this can suggest that the effect of priming was not always the same. This was expected considering that priming was given to the students according to their needs (Chapter 6, 6.4).

- * Significant differences were found between the type of frames used (MAU vs F.Scenario vs Rule Based) under primed versus non primed condition. This suggests that priming the students affected the type of frames used.
- * Regarding the degree of exploration within the three frames it was found that all subjects irrespective of age developed more structure within the primed frames.

Hypothesis No8: *Older students are expected to make a higher proportion of unconditional than conditional judgments, since being closer to take an action about their career problem they would be expected to have more fixed ideas about their alternative solutions.*

Hypothesis No9: *Setting constraints, i.e. priming the subjects either in domains (Level 5 and level 4: exploration of different areas of concern), or in frames (Level 3: problem structuring) should elicit more conditional judgments.*

The hypothesis No8 was not supported from the sample size used in this study. However, the indications drawn from the results are worthy of discussion and emphasize the need for further research in this kind of analysis as particularly useful for helping individuals to prepare themselves for the implementation of any decision.

- * The unexpected finding that older students made more (19.2%) conditional judgments than younger students (11.6%) may indicate that as people get older they experience difficulties which would make them more hesitant about their judgments.
- * The indication that students gave more unconditional judgments during the

second interview can be considered positive showing that students have developed more fixed ideas about their future careers and were more prepared to commit themselves in implementing the decision explored previously. This can imply that the effect of counselling had an influence upon the individuals in two ways: on how to explore "what if" questions about their problem (more conditional judgments in the first interview), as well as on how to help the individuals to make "best assessments" about their alternatives and take action (ability to make unconditional judgments). This is in support of the above hypothesis No9. Of course aging could also be a factor in this progress.

- * The discrepancy appeared in the findings from testing the hypothesis No8 can be treated with caution. In fact the findings from this hypothesis as well as the findings from the hypotheses No 2 suggest that, to make a decision that leads to action, it is essential that a person is able to make contingency plans (i.e. to think conditionally about his problem) and, at the same time, that he is able to make unconditional judgments which could lead him to make best assessments about his alternative solutions and then to proceed to action.

Hypothesis No10. *The number of conditional judgments is related to the number of unsafe propositions.*

This hypothesis was supported in most of the experimental conditions.

- * In the first interview a negative correlation was found between the total number of unsafe proposition and the total number of conditional judgments given by all groups. This indicates that in the first interview all students were feeling more unsafe and were giving less conditional judgments; this suggests that they were less able to make contingency plans about their future. Looking at each group separately, similar results were observed only in the findings of younger students (Gr.3).
- * In the second interview a positive correlation was found between the total number of unsafe propositions and the total number of conditional judgments given by all groups (more unsafe propositions-more conditional judgments). This suggests that in the second interview individuals were still feeling unsafe about their future; however, this response was balanced by them making more

contingency plans about their future (and thus more conditional judgments). Similar results were observed only in the findings of older students (Gr.1). As it was said in the discussions of Hypotheses No 2 and No7, the above results can be attributed either in the counselling procedure or in the aging of the students and the experiences they had in the interval between the two interview sessions.

In Summary the results from testing the above 10 hypotheses suggest that: (a) the adolescents differ in the way they perceive their career problem and use different types of representations to express their problem; (b) they differ in the way they structure and elaborate these representations; (c) the counsellor's interventions influence the way the adolescents express their career problem and support them in their structuring process. The different ways of problem representation appear to reflect primarily the subjective way of perceiving and understanding one's career problem. Factors as the age of the adolescents and their experiences during the time they had to make their career decision were found to affect this decision.

Overall, the five Levels analysis, enabled me to identify the kind of operations involved in the process of career decision making. The identification of these operations allowed the conceptualization and the definition of the differences among students in the structuring and representation of their career decision making problem, and the realization that the same problem can have more than one representation.

In fact, these operations correspond to those involved in the three activity areas of the general process model of career decision making introduced in Chapter 5. Level 5 operations belong to those taking place in Activity area A1 of the model (see Fig. 5.3); Level 4 operations form the bridge between Activity areas 1 and 2; Level 3 operations belong to those in Activity area A2, and levels 2 and 1 to those in Activity area A3.

The definition of the operations, as well as the conceptualization of the different ways in which individuals structure their problems, describes the process of career decision making, and provides answers to the question of **what** is involved in the career

decision making process. In the following chapters, how this can help in the establishment of the necessary rules about **how** the individual proceeds to the resolution of his problem will be discussed.

PART THREE
HELPING IN PRACTICE

CHAPTER 8

HELPING IN PRACTICE

OVERVIEW

In the previous chapter, by investigating the way individuals proceed towards the solution of their problems, we have arrived at two main conclusions:

First: students in the present study prefer to use the Multi Attribute Utility frame and the Future Scenario frame in their problem structuring and representation;

Second: priming individuals according to their needs can result in a better response in both the use of more representative frames and in the development of a structure within each frame.

On the basis of these conclusions, the next objectives were to establish techniques which can be used to support individuals in their structuring process of their career problems. Two decision aiding techniques were used: Inference Diagrams and the computer decision aid, MAUD. Inference Diagrams were chosen because they give more details about how individuals link their claims about their future and how they represent their future plans in a future Scenario frame. MAUD, was chosen as a technique to help individuals structure their problems within a Multi Attribute Utility frame. The results from using these two techniques were analyzed in depth to establish whether they could support the general process model of career decision making, introduced previously (Chapter 5) for the investigation of the process of career decision making.

8.1 Inference Diagrams

Inference diagrams, introduced in Chapter 5 (section, 5.5), are used here as a specialized illustration for a more in depth analysis of part of the findings which resulted from the analysis of the five levels. In particular, they were used with the purpose of illustrating how individuals use the Future Scenario frame when they are talking about their career problems. In other words, they provided the means of investigating how individuals link their claims into frames when they are making

plans and scenarios for their future. They were also used to enable me to capture and to explore more thoroughly the idiosyncratic material attributed to each person as an individual.

8.1.1 The construction of the inference diagrams

Inference diagrams are chains of the elements, "goal-action-events-states", which were connected in a sequential order to represent problem structuring in an inference way (The definition of these elements is given in Chapter 5, 5.5). Table 8.1 shows the interpretation of the elements of the inference diagrams' chains using as an example the transcripts of a subject.

Table 8.1: The inference diagram elements.

	Dependent on the decision maker (can be chosen)	Independent of the decision maker (exogeneous states or events)	Indirectly dependent on the decision maker (consequences)
	(Goals)	(ExS)	(EnS)
Goals States	1. Gynaecologist	1. Job availability	1. I like to work as a gynaecologist
	2. Work in Hospital	2. Hospital's environment Human contact State of people who have the same job	2. I like to work in a hospital
	(Actions)	(ExE)	(EnE)
Actions States	1. Take the exams	1. Serious illness of mother Cannot continue studies Have to work	1. Not accepted to Medical School
	2. Go to preparatory school	2. Getting married Difficult to become a gynaecologist	2. Passed in Biology

Inference diagrams were built by extracting 'excerpts' from the subjects' transcripts. These 'excerpts' represented the individual's arguments in short statements, each one containing a simple task of assertion or a reference on which the individual was

basing his claims. These statements were then categorized under the elements which constitute the inference chains (act-event-goal-state) according to the principles stated in Chapter 6 (section 6.5). (An example of such excerpts is given in Table 8.2. It belongs to the subject "Larissa" whose case is commented upon in the next section, 8.1.2.)

Table 8.2: Larissa (A) Group 1: Excerpt extracted from Larissa's first interview session.

Action: I am preparing for the entrance Exams in June
 Past Event: Last year I entered Institute of Education
 Action: I will try again to enter Medicine..
 Goal: ..since this is my first choice
 EnE: If I get 17/20 I will be accepted in Dentistry..
 EnS: .where I will be satisfied

Past Scenario: Last year, I was sure I had written well except from composition
 I had not been to preparatory school for composition because I thought
 I was good. My teacher at school said so. I thought I had good marks
 and at least I could enter Biology.

EnS: I like Biology because
 ExS: it is a prestigious science.
 Goal: My goal is first to enter Medicine, then is Dentistry, then is Biology
 and Physical education.
 EnS: I don't like Physical Education as a profession
 ExS: ..but it is easy to find a job there and
 ExS: the salary is good.
 ExS: Biologists can work in laboratories, or in hospitals, or to teach in
 High school..
 ExS: however, you have to wait ten years or even more to get a position
 in High School.

Action: I have to be examined in athletics and entering the Physical Education
 school depends on my performance in athletics.
 EnE: If I do well I can enter Physical Education, if not I will enter Biology.

EnE: If I enter Medicine
 Goal: I will be specialized in Gynaecology and make a successful career
 there.
 ExS: To become a gynaecologist I was influenced by a friend of mine.

Action: I would like to go abroad for further studies....
 Goal: and then to work in a hospital.
 ExS: In a hospital you can be more in contact with people.

ExS: As a medical doctor you can have your private office, but I want to work in a hospital.

EnE: If I pass the exams..
 Goal: and enter Dentistry, I would be very satisfied.
 ExS: It is a profession suitable for women.
 Action: I will go abroad for further studies..
 Goal: ..and then come back and have my private office as a dentist.
 ExS: My uncle is a dentist; he studied in Berlin; he thinks technology is more developed abroad.

EnE: If I am not accepted in any of the above,
 Action: I will continue at the Institute of Education
 Goal: ..and become a primary school teacher.
 Action: I will open my own school..
 Goal: I want to teach in a different way.

EnS: I like travelling very much
 Goal: I would like to work as a travel agent..
 ExS: ...however, it is not a secure profession

State: I could also teach Physics or Chemistry
 ExS: It is easy to enter University in these schools.
 ExS: There is high rate of unemployment in these professions
 EnS: I don't like to become a teacher in physics or Chemistry.

The focus of the inference diagrams analysis

Inference diagrams were used to identify whether individuals form a scenario for each of their alternative solutions. This was investigated by the following means:

(a) By dissecting the way in which subjects represent and structure their career decision making problems within the future scenario frames: i.e. how they link the claims about their future into frames. For this purpose, Inference diagrams are judged as 'complete versus incomplete' according to more specific issues, as follows:

The extent to which the individual

___ examines the means available to him of obtaining the desired **goals**.

___ considers the actual **state** of his present situation or any possible

Exogenous states which may affect his scenario formation.

___ is able to review possible **actions** he has to take to accomplish his goals.

___ incorporates exogeneous or endogenous **events** which may occur and change his entire plan.

(b), by identifying major differences between individuals in the exploration and representation of their career problems in the above issues. The roots of these differences have been already examined in the analysis of the subjects' argumentation within the 5-Levels framework (particularly at Levels 4 and 3).

(c) by investigating how we can detect the reasons why individuals make particular claims and whether or not they incorporate them into frames; for example, how different factors (domains) influence their career decision making process, what warrants and backings they are using to ground their decisions, or what conditional or unconditional judgments they can make.

Three representative cases one from each of the three different age groups of students are presented to illustrate the construction of inference diagrams.

8.1.2 Larissa's case (Gr.1)

Larissa is a 19 year old female who has referred to me by her preparatory school teacher. When she first came she was about to finish her preparatory class and to

register for a second time to take the university entrance exams. In the previous year, she had tried to succeed in Medicine but she had failed. Her grades were only good enough to enter the Institute of Education to become a primary school teacher. At the time of her visit, her first choice was still to go to Medical School. Her second choice was Dentistry because it required lower grades than Medical School. She was in considerable conflict, under stress over what alternative studies she could take which might lead to alternative career solutions. For example, should she register in Biology, as a third choice, which would be closer to her first preference (to go to Medical school), or register in Physical Education? The latter, although different from medicine, was included in the same group of studies (DESMI, see Chapter 3; 3.2) but required an extra test in athletics. The grade point average to enter Physical Education was approximately equal to that needed to enter Biology. At the beginning of the year, she had started training in athletics in case she would have to be examined in this subject.

Larissa had in total three sessions with me, two hours of interview and one session with MAUD. At the end of her third session, it was agreed that she come back in a year, approximately six months after the university exams, which are held once a year, at the end of June.

The Procedure

The interview sessions followed the procedure outlined in Chapter 6 (section 6.4). At the beginning of the first interview, Larissa was asked to talk in general terms about her future and her future career. After an unframed claim "I want to become a medical doctor", with no further priming, she started talking about her failure the previous year. She gave possible reasons why she had not succeeded. While she was talking, she did not appear to be sad about her failure; still, there was a lot of regret and disappointment about it. As she said:

"I was very disappointed, because I was sure I could enter Biology since the average entrance grade for Biology was very low and I was sure I had written well".

After my probing her *to talk about her present position*, she very quickly referred to the actions she had taken to get registered to take the exams again and to her various alternative solutions. She was able to make claims about her alternatives very

effectively by putting them within frames. She mentioned, Medicine, Dentistry, Physical Education and Biology, trying to give attributes and justifications about her preferences. When she talked about physical education she said:

"I don't know what I will do with Gymnastics yet, I don't like Physical education as a profession. But it is an easy job, you can easily find a place to work, and the salary is the same. I am in conflict between Physical Education and biology, I like Physical education but not as a profession".

However, when she started talking about Biology, she soon realized that she was not well informed about what one can do as a biologist. She said:

"You have to wait 10 years to get a position as a Biology teacher in High School and the salary is the same as that of some in Physical Education".

She had some fixed ideas about which professions were socially acceptable and others that she thought were not. Biology was one of the professions people didn't know a lot about and often didn't see as a viable option. Larissa talked more easily about the other alternatives, stressing the social status of a job, and the social approval that one can get from a job. Her parents' opinion about her choice also mattered a great deal. Although, as she said, her parents would let her do whatever she wanted, she seemed to be very much concerned about their wishes. The first interview ended with her commitment to explore the pros and cons of each alternative solution in the Balance Sheets (see Chapter 4, 4.2.2), to discuss her real feelings and wishes with her parents. Above all, she was very concerned with finding out more about Biology : *"Do people know about it?* (an attribute that seems to matter a lot to her); *"What are the job opportunities as a Biologist?"*

During the second interview Larissa was more relaxed when she talked about her future. She was still in conflict about choosing between Physical Education and Biology, but at this time she was more positive about the attributes she valued as more important in any job. After some probing, she was able to make scenarios about all the possible career alternatives (Larissa's argumentation is given in Chapter 7, 7.3.2). This interview ended with Larissa's commitment to have a session with MAUD for the evaluation of her alternative solutions (section 8.3). In fact, after the second interview and the session with MAUD, she decided to exclude Physical Education as an alternative solution and pursue Biology as her third choice, after

Dentistry, although she was still somewhat uncertain about Biology as a profession.

The three steps of the procedure

As discussed in Chapter 6 (section 6.4), the procedure of the interviews followed three main steps: scenario exploration, option formation, and option evaluation. Each one contains certain tasks which need to be accomplished at each step. These three steps, in fact, represent the three Activity Areas of the methodological model of the process of career decision making proposed in Chapter 5 (section 5.3). A more detailed discussion about the way that subjects operate in the three Activity areas is given in Chapter 9 after the analysis of MAUD.

During the whole procedure of the interview sessions, it was always possible to reshuffle the sequence of the three steps, adapting the interview to the individual's needs. For example, when Larissa first came, she seemed to be ready to accomplish the tasks of the third step, to evaluate her different alternative solutions according to the various attributes. She was making complete arguments about her alternative solutions by incorporating her frames either into a MAU or into a Future Scenario frame. It seemed that she was ready to take MAUD immediately. When, however, the MAUD procedure (Chapter 4, 4.2.3) was explained to her, she found it difficult to rate the Biology alternative. In fact, she soon realized that she also had a limited scenario for this alternative. She had to go back to the first step of the procedure in order to explore the factors which were of real importance to her. She had to identify the backings and warrants she could rely upon and to find out more about possible alternative solutions. Based on this exploration, she could then put her claims into frames and make scenarios about how her future alternatives could be put in action. Then she could best differentiate what would be the outcomes of these actions, and she was able to explore "what if questions". The last steps were achieved in the 2nd and 3rd interviews.

One year later

Larissa came to see me at the beginning of December of the following academic year. She had failed to enter Medicine or Dentistry but she had managed to enter Biology.

In the beginning, she was very disappointed at the results. But at the time of the interview, she had already decided to register in Biology and see if she liked it or not. There was no conflict this time concerning the Physical education alternative. She did not even want to think about it. She said that if, at the end, she did not like Biology, she would try to enter Dentistry but not Medicine because, as she said, Medicine requires many years of study. She said:

"People around me are very satisfied with the results, and my parents never really liked the fact of me becoming a medical doctor".

She was still uncertain about Biology as a profession, although she was more certain now that "it is a science with a lot of creativity". This time her alternative solutions were more fixed. She could either study Biology, or try again to enter Dentistry. She was happy that she would be away from home, although she was very worried about leaving her mother. She was coming to terms with these worries by saying that:

"My mother wants me to live alone because she believes that this is the only way for me to develop my personality", and, "the first thing that I have to do when I am away from home is to call her everyday".

At the second meeting, she had one interview session and one session with MAUD. In this session, she actually wanted to test different job opportunities within the field of Biology and not different career solutions. (This session is described below in section 8.3.)

Larissa's inference diagrams

To construct Larissa's inference diagrams, 'excerpts' were extracted from her interview sessions, before and after the exams. An example is illustrated in Table 8.2.

In Figure 8.1a is Larissa's inference diagram (A=first interview before the exams). Larissa structures within frames most of her claims in the inference network. She has an inference chain for each of her alternative solutions. The diagram show, that she is going to take the exams to enter university again (**Action**); if she enters (**EnE**) Medicine she will then specialize in Gynaecology (**Goal**); she will go abroad for postgraduate studies (**Action**) and then come back to work at a hospital (**Goal**). Exogeneous States, which in her argumentation appear in the form of warrants and

backings, complete the inference chain. She has similar inference chains for her other alternatives: Dentistry or Physical education or Biology. The alternative 'Biology' is not as elaborate as her other alternatives. She even has a scenario for what she will do if she does not enter university after all and, instead, decides to attend the Institute of Education where she has already been accepted. There were two other alternatives she could conceive of doing: "I can teach Physics or Chemistry or become a travel agent". However, although these claims are framed in a MAU frame, they are kept outside her inference network. They are possible solutions which she doesn't want to include in her future scenario exploration.

Figure 8.1b shows Larissa's inference diagram constructed after her interview session, following the exams (B). This diagram, although simpler, is still complete with regard to the consideration of possible events, states and actions she might have to take in order to fulfil her goals. This time, she considers only two alternative solutions: 'To continue her studies in Biology or try again to enter Dentistry'. However, this time she elaborates upon the alternative of becoming a Biologist: If she finds it interesting (**EnS**), she will continue her studies and then she will go on to postgraduate studies abroad (**Action**) and try to become an academic (**Goal**). She still thinks about two additional alternatives which she could consider: "I could become a beautician" and "I could work at a travel agency". This time, however, these claims are incorporated into her inference network as possible solutions in case she does not find a job as a Biologist. The existence of these alternatives is possibly expressed in order to help her to reduce her inner doubts and uncertainties about the Biology profession.

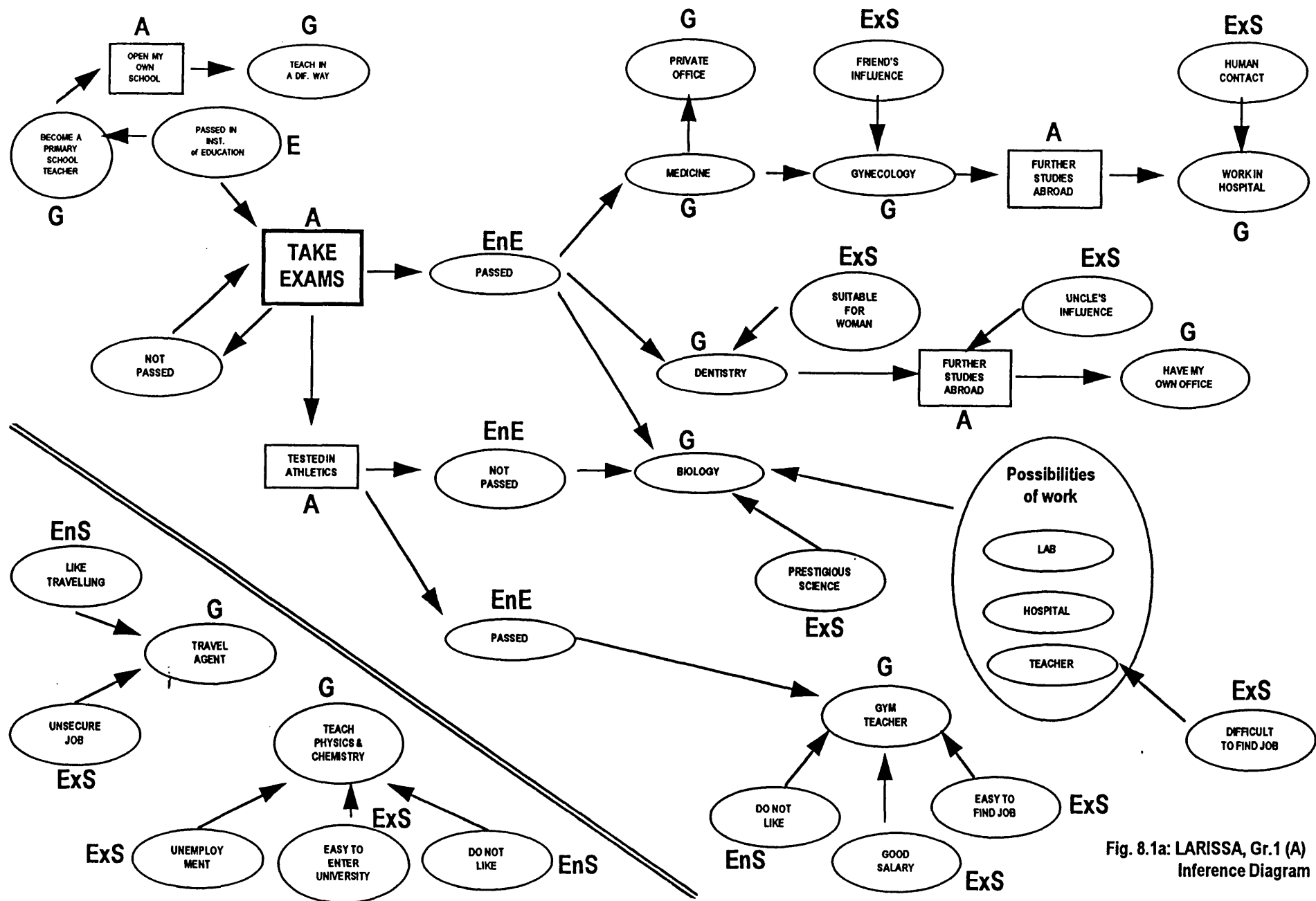


Fig. 8.1a: LARISSA, Gr.1 (A)
Inference Diagram

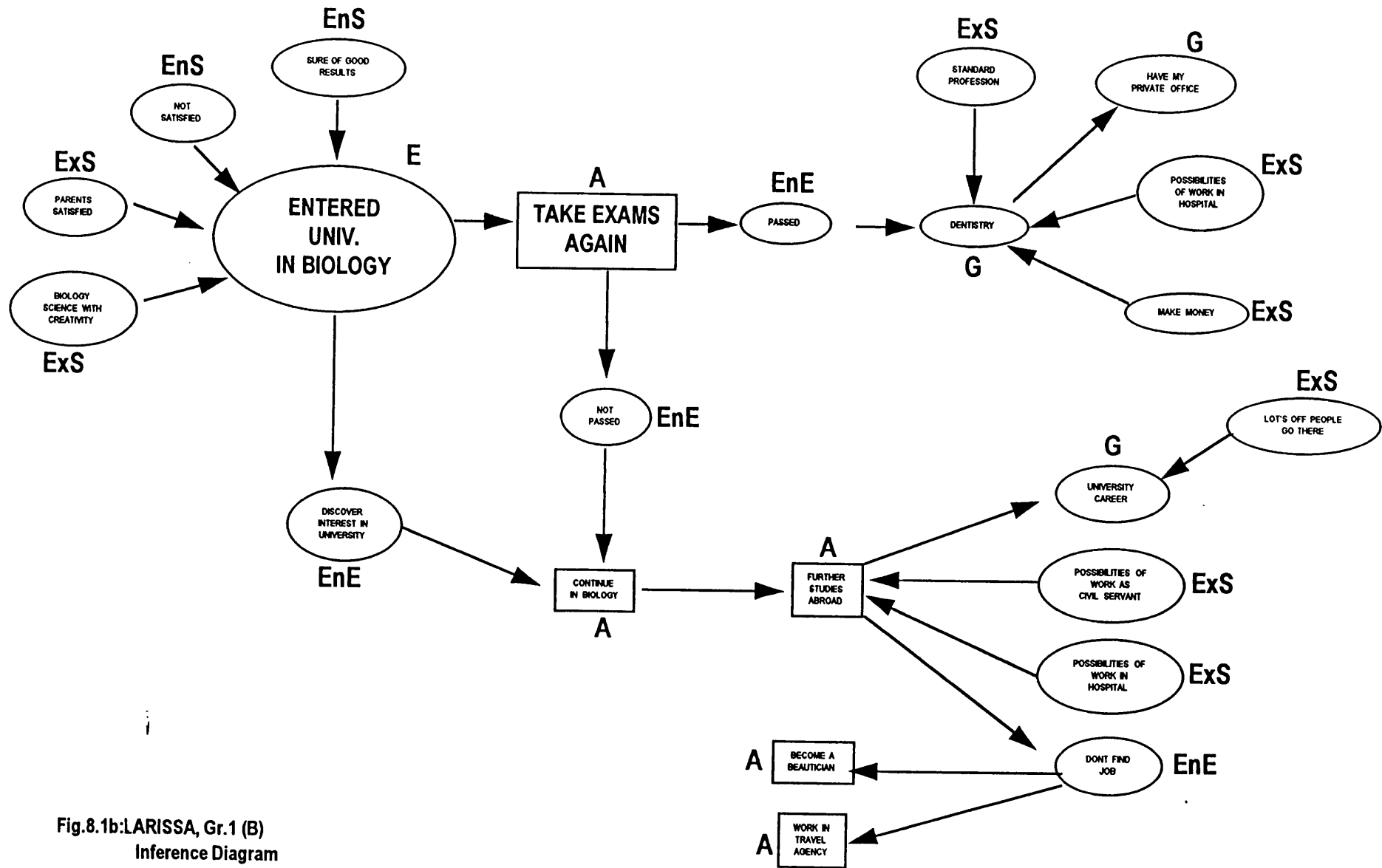


Fig.8.1b:LARISSA, Gr.1 (B)
Inference Diagram

8.1.3 ANNA's case Gr.3

Anna is a 16 year old student attending the second year of Lyceum. She came to me after being informed about the study by her literature teacher. As she said, she came only to see what it was all about and not because she had any problems with her career decision. However, she agreed to come for two interview sessions and then to use MAUD because, as she said, "I always like to try new things".

The Procedure

Anna had a totally different type of approach to her career decision making problem from Larissa (the previous subject). In fact, she said, she did not have any decision making problem since, "the first thing was to enter university", then everything would resolve itself. It was apparent that her decision horizon was bounded by the university entrance exams. She did not want to think about what she was going to do if she was not successful. To my question: "*What are you going to do if you do not get into university?*", she answered:

"I am sure I will succeed because I have good grades and because in addition to literature there are other departments, like Theology, where I can enter".

For the first choice, of becoming a literature teacher (**Goal**), she had a fixed scenario for her future. She had worked out all the intervening nodes. First she had to 'finish university (**Action**), then go to Australia (**Action**) where she had friends and relatives (**ExS**), and work there for five years (**Action**), have a family (**Action**) and then come back'. However, this definitive scenario indicates a very "small world". She had explored in one direction only, failing to see and explore other alternative scenarios. To my question: *Are there any other alternatives you could think about?*, she answered:

"To have alternatives you must have a ready solution or a job from your father and I don't have such kind of alternative so the only solution for me is to enter university".

She had a number of rules which bounded her way of thinking and her scenario exploration, for example:

"I would like to become a journalist but it is not possible because there are a lot of difficulties in this job, and I don't know if I could overcome them. Moreover, it is not a profession suitable for a woman".

Here Anna, is making a complete argument with warrants and backing. However,

the rule: "the profession I will follow must be suitable for women", bounds her exploration in areas of some other alternatives and puts constraints on her way of thinking.

The first interview with Anna ended with her promising to obtain further information and explore at least four alternative career solutions which she might pursue if she was not going to enter university and study Literature. She promised that she would discuss this with her literature teacher to whom she felt very close.

Anna had a first try with MAUD during the second interview. She completed MAUD in her third interview three weeks after.

One year later

One year later, Anna appeared to be more confused. Although her decisions and ideal alternatives did not change, she was no longer as sure about her decisions. As she said, "...now it is too late to change my plans". In her first interview session, she talked about her preparations for entering university. She said she was still not feeling anxious about the exams because, even if she was not able to enter literature, there were other departments in the same group of studies which she could definitely enter. She did not want to explore any scenarios further, since her decision horizon was still bounded by university success or failure. However, this time, she was not as sure as the first time about her success. Thus, she was thinking of trying again next year if she was not successful. She had not considered this previously.

Anna's Inference Diagrams

Anna's inference diagrams are shown in Figs. 8.2a for the first interview sessions and 8.2b for the second.

Both of Anna's inference diagrams are incomplete. In fact, she leaves out a lot of claims without elaborating on them in the inference diagram. Even in the exploration of her first alternative 'to enter the literature department', she is not exploring any of the exogeneous or endogenous events which may occur and change her entire plan. For example, what is she going to do if she does not go to Australia or if she does not find a job there? However, she has examined the means that will permit her to

achieve her goals. As she said:

"I know what you need to enter university; I have been collecting information for three years now, because my brother took the entrance exams last year, and thus I know what it is all about". And also "I have good chance of entering university because last year I finished with a grade 18.5/20 and I know that the grade point average to enter literature is 18/20, also this semester I had 20 in Literature".

Anna's second inference diagram is almost identical to the first one but it is still incomplete. However, this time, she does elaborate on her scenarios about her future, by incorporating some more exogeneous states and events. She also has a solution if she does not succeed in her entrance exams.

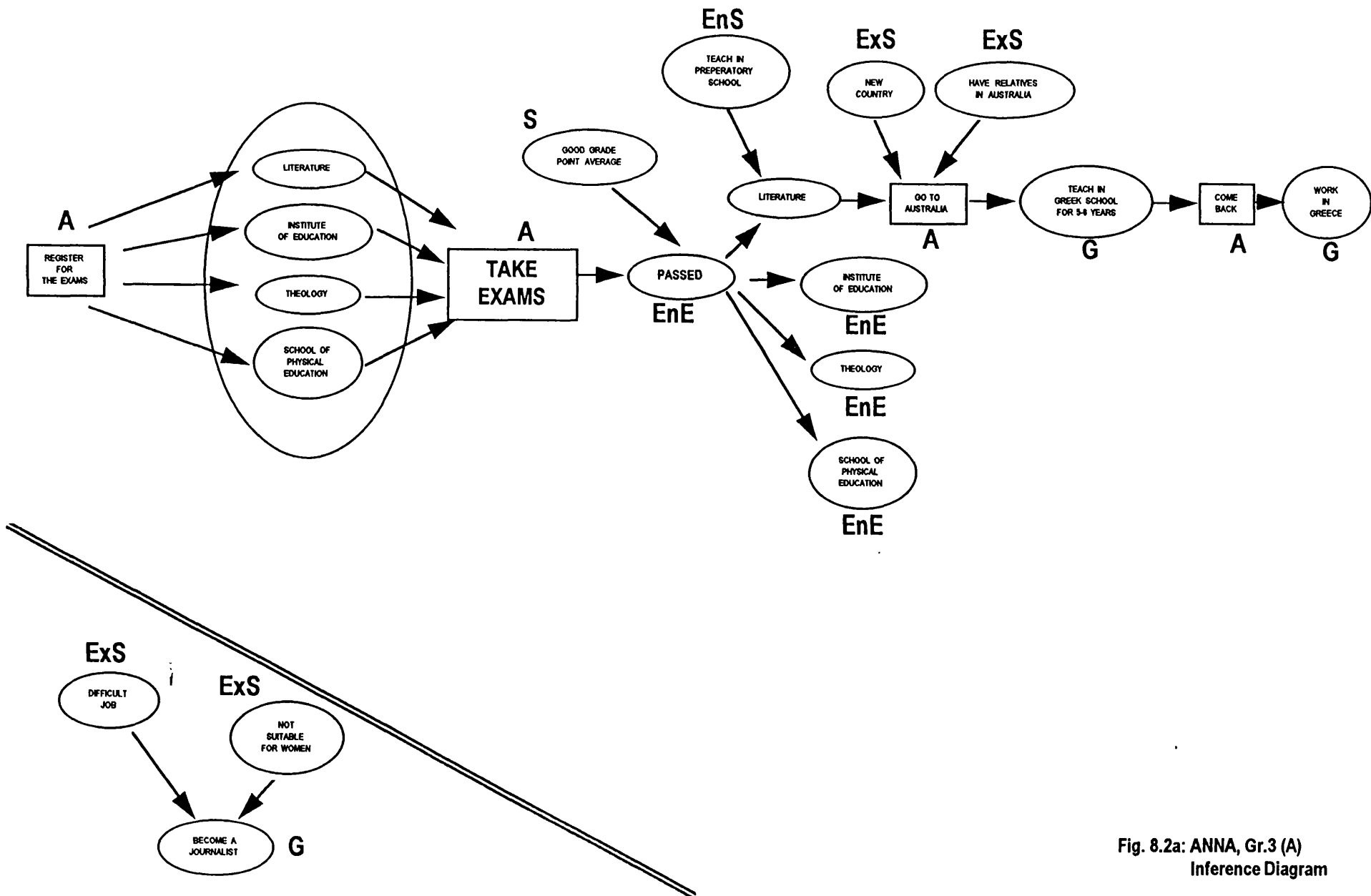


Fig. 8.2a: ANNA, Gr.3 (A)
Inference Diagram

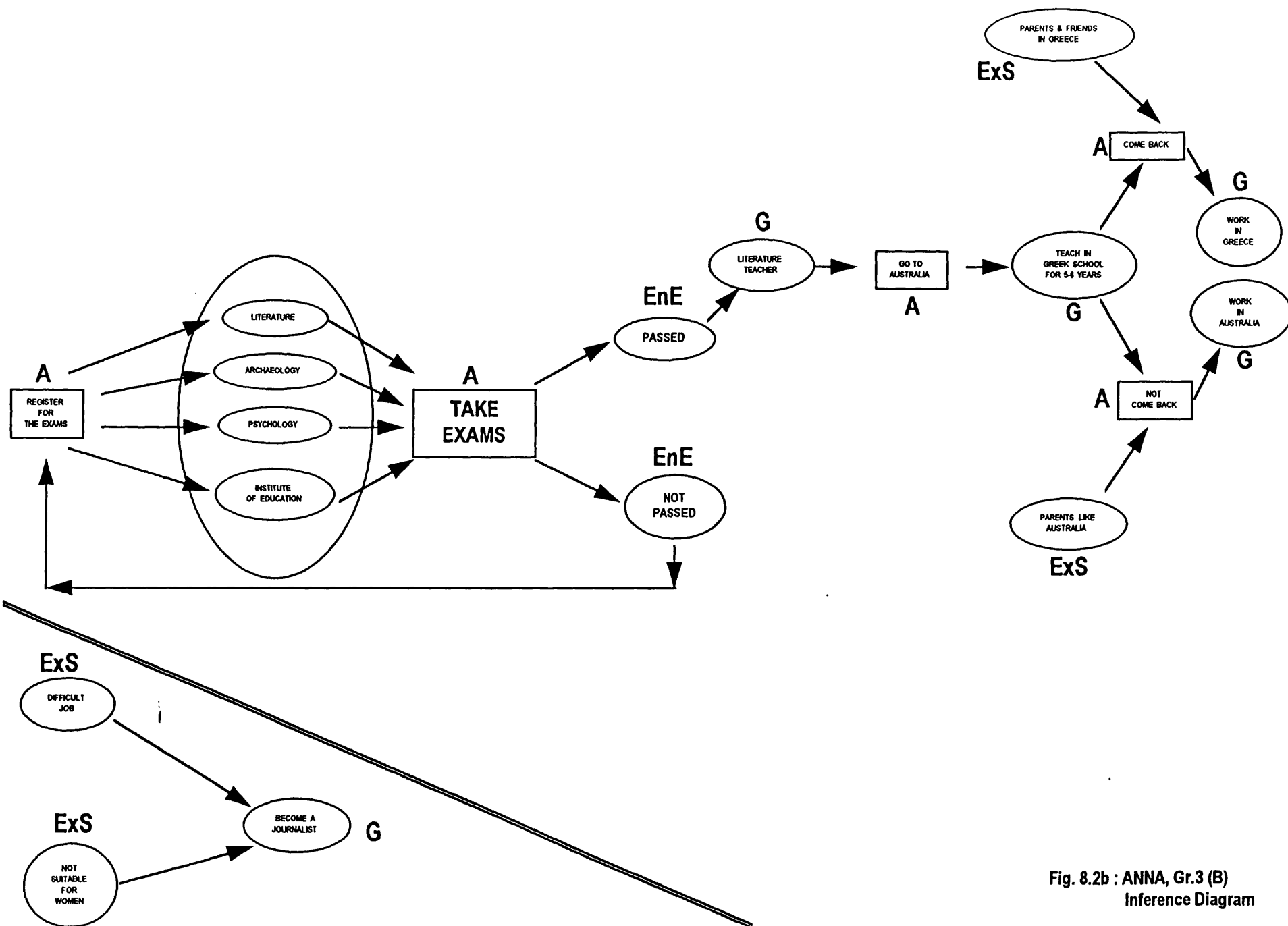


Fig. 8.2b : ANNA, Gr.3 (B)
Inference Diagram

8.1.4 NIKOS' case Gr.2

Nikos is 17 years old, attending his third year of Lyceum. He came to see me because he could not decide which of the four groups of studies to choose in order to enter the School of Education. (Entering the School of Education is possible from all groups of studies (DESMI, see Chapter 3, 3.2).

He was willing to admit he was not a good student, but he was good enough to try maybe for the 4th group of studies.

The interview sessions

During his first interview Nikos talked in a fairly happy way about his future trying to explore all possibilities. It was evident that he did not know what kind of career he wanted, partly because he was constrained by his parents who insisted that he did something academic, such as being "a primary school teacher". He was also constrained by his instinctive feeling that he would not be able to achieve that. However, he was brimming with ideas about what a job like that of a primary school teacher could offer. He thought it ought to be "...a secure profession with a good salary, not very tiring, and with social status". He thought that he could also work in his father's business (grocery shop). He had plans to improve and divide the shop in the middle, but his parents insisted that he should "...try to enter university and be something". He also thought that he could study Economics at a polytechnic and then pursue his father's business. What was most interesting were his fantasies about becoming an actor or a writer. He started to talk about this without a lot of priming. He made up a story about how he was going to meet someone who would be interested in his writings or his acting and through them he could become famous. When he was asked *whether he was going to try to follow this, if he did not go to university*, he said: "I would like to become an actor, but if I don't pass the exams I will work at my father's store".

Nikos said that he was happy to have had the opportunity to discuss his future and to think about what he really wants for his future. He said:

"You cannot always succeed where others want you to succeed, and if you don't have

someone with whom to discuss what it is you really want, it is very bad".

Nikos agreed to work on MAUD in the third session although, as he said, "...these things are too much for me".

One year later

Nikos came to see me approximately six months after the exams. He had failed to get into university. He thought he had performed well enough to gain 1800 points, but actually, he managed to get only 1200 points. He started preparing to take the exams for a second time. This time he was elaborating on his alternatives more extensively, making more complete arguments with warrants and backings, justifying his claims and trying to incorporate them into frames. He did not agree to work on MAUD, because he didn't want to deviate from his previous alternative solutions. He had a lot of doubts about his possibilities for success: "It is very difficult to succeed, however, I will be satisfied to work at my father's job, it is my parents that want me to go to the university". In fact, as he said: "His parents were very disappointed by the results".

He asked if it would be possible to come back again because, as he said, he wanted to talk about things that matter to people of his age.

Nikos' inference diagrams

Nikos inference diagrams completely match his argumentation and his problem representation. In the first diagram (Fig. 8.3a), he incorporates his goals and his claims to become a teacher (Goal), or to work in his father's job and separate the store in the middle (Goal) into a future scenario frame. He leaves out the goal of becoming a writer or an artist, for which he has a separate inference network since it is not connected with his reality. He is aware of his abilities: "...I have an average grade of 16/20, good for the 4th study program", or "...I have to organize myself better if I want to pass". These statements may show his awareness of his present situation, and maybe his intention to review the actions he has to take to accomplish his goals. On the other hand, he seems to be in conflict between his desires, the wishes of his parents, and what he thinks that he could realistically achieve.

In his second diagram (Fig.8.3b), he elaborates more extensively on the solution of becoming a teacher, incorporating into his future scenario more Exogeneous and Endogenous events and states. This time he succeeds in bringing into his real world his inner wishes, 'to become a writer and to become famous', connecting them to the goal of becoming a teacher: "I want to become a teacher (**Goal**), write a book (**Action**) and become famous (**Goal**). Still, there are some claims which are left out from his inference diagram, such as: "There is the school of nursing which I don't like but you can have your military service postponed if you register there", or "I want to become an actor but you must know a lot of people to succeed in that" and, lastly, "I want to become a grocery shop owner but my parents don't like that". These indicate that he is still experiencing conflict and goal confusion concerning his future alternative solutions.

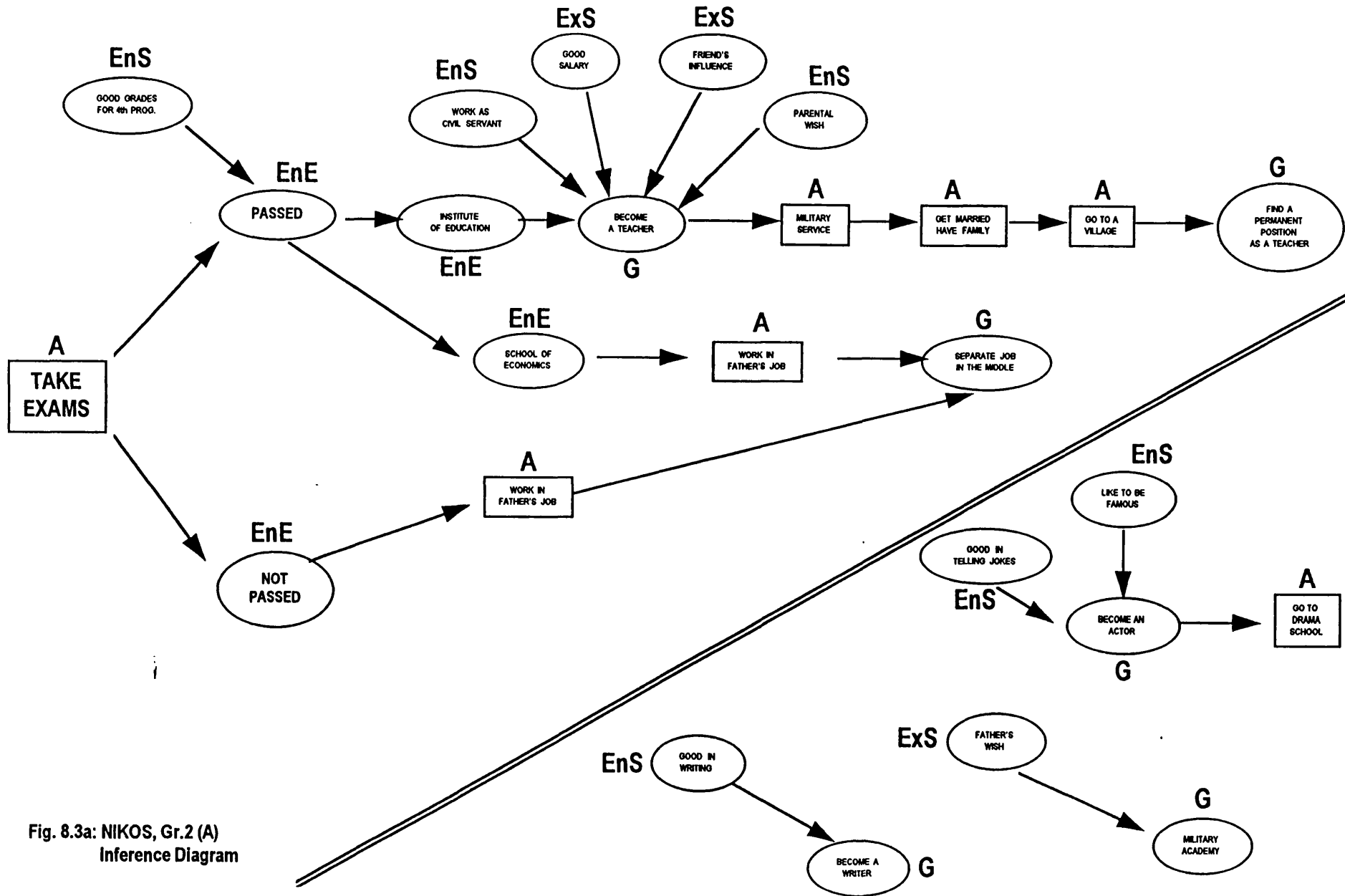


Fig. 8.3a: NIKOS, Gr.2 (A)
Inference Diagram

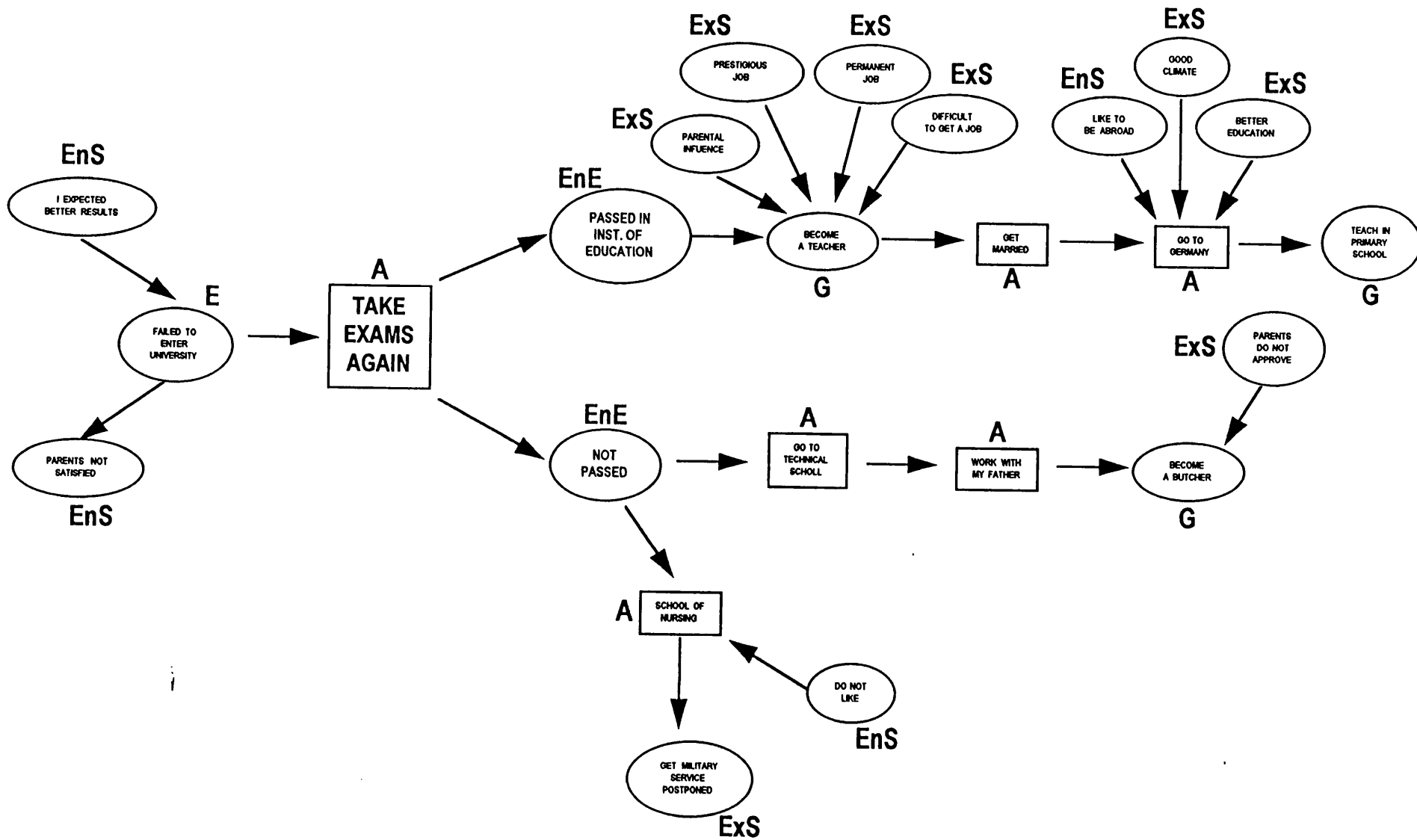


Fig. 8.3b: NIKOS, Gr.2 (B)
Inference Diagram

8.1.5 Past Scenario Construction

Very often students from the three age groups, and especially from the first and the second group, would talk about their past, about the decisions they had to make and what might result from these decisions. In these cases, it was more suitable to draw a construction of a past scenario in the form of a decision tree in addition to the inference diagrams for the representation of the way they have handled their problems. Although this is a minor part in the investigations used for the analysis of the data, it is nevertheless very useful because it illustrates how people restructure their past situation in order to reduce the dissonance they feel about decisions taken in the past. Cognitive dissonance in career decision making, as discussed in Chapter 1 (section 1.4), precipitates from the way the individual, after having selected one course of action over another, tries to come to terms with the regret or dissonance from the loss of the benefits he could have had from the alternative choices.

From the construction of students' past scenario it became apparent that students select pathways in their past scenario formation which support their action. They were found to restructure their problem situations from an act node to an event node (see Fig. 8.4), in order to make things more acceptable. This is illustrated in the cases of Larissa and of Nikos described below.

Larissa's past scenario for failing to enter university

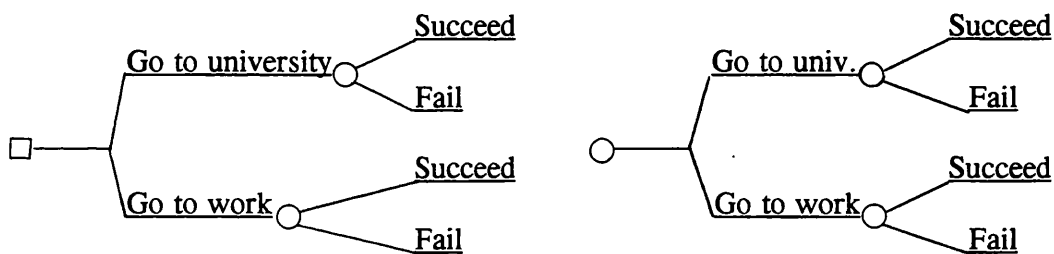
"I was very disappointed in the results, it was as if I had been deceived. I had not been to the preparatory school to have some extra help for the subject of composition, because I thought I was good and because my teacher in composition told me that I could succeed without having extra help, but this was not correct".

In this case Larissa appears to be trying to reduce the dissonance which she feels because she made the wrong decision and did not go to the preparatory school. Instead of saying: "I was wrong to rely upon my teacher's suggestion and thus I failed", she said, "I have been deceived". Talking about the past, she actually changed the decision node: "I decided not to go to the preparatory school" to an event node "I did not go (happened not to go) because they told me not to do so and thus I failed".

Nikos' past scenario for his failure to enter university

Similarly, Nikos is also exploring his past scenario trying to reduce the dissonance he feels from his failure to enter university. He said: "I always wanted to work in my father's business but it is my parents that do not like that idea". He implies that his parents forced him to go to university, instead of letting him work and this is the reason he failed. "It was not my decision, it was my parents' decision that I go to the university and I failed", he said.

Fig. 8.4.: Past Scenario construction



In his statements, Nikos is restructuring his past by changing the act node: "I decided to go to university", to an event node "So I went to the university because of my parents' wish and thus I failed". His reconstruction of the past situation makes things more acceptable to him, resolving the dissonance he feels in thinking that he has made the wrong choice, and makes him feel more comfortable.

8.1.6 Analysis and Discussion on the Inference Diagrams

In summary, inference diagrams analyze and illustrate in depth the way in which the individual is trying to handle and represent his career decision making problem in a future scenario frame. In this illustration, differences between individuals can be detected in terms of the way they link their claims, incorporate them into frames and form their future scenarios.

Inference diagrams were drawn from the interviews taken from the subjects before (A) and after (B) the university entrance exams. Inference diagrams were classified by two independent judges into:

- (a): **‘Complete’**, (b): **‘Complete ?’** with some problems, and (c): **‘Incomplete’**
- (a): As **‘Complete’** were classified the inference diagrams in which the individual incorporates two or more alternative solutions, and develops a scenario for at least two of the alternatives solutions he is claiming, incorporating at least once each of the elements of the inference chain (act-event-goal-state, see 8.1.1). For example Larissa’s Inference diagrams (A) and (B) (see 8.1.2).
- (b): As **‘Complete?’** with some problems, were classified the diagrams in which the individual incorporates two or more alternative solutions in his inference diagrams, but develops a scenario (with all or some of the elements of the inference chain) only for one alternative solution. For example Anna’s Inference diagram (B) (see 8.1.3).
- (c): As **‘Incomplete’** were classified the diagrams in which the individual develops a scenario for only one alternative solution leaving out the rest of the alternative solutions of his problem. For example Anna’s Inference diagram (A) (see 8.1.3).

Table 8.2a contains the results (type of Inference diagrams) from the 24 interviews taken in the first (A) and second (B) interview (before and after the university entrance exams). The same it is shown graphically in Fig. 8.4a.

Table 8.2a: Number of inference diagrams taken from the first (A) and second (B) interview (A) before and after the university entrance exams.

	Compl		Compl?		Incompl		Total
	A	B	A	B	A	B	
Gr.1	4	6	2	2	2	0	
Gr.2	2	4	3	2	3	2	
Gr.3	2	2	2	3	4	3	
Total	8	12	7	7	9	5	48

The change in the type of inference diagrams from the first to the second interview are graphically presented in Fig.8.2a and encompass four subjects from each age group (the same subjects are used to show the changes in the type of preference structure plots obtained from the analysis of the data from the sessions with MAUD, see next section 8.2., 8.2.4). The Inference diagrams of those subjects are in Appendix III.

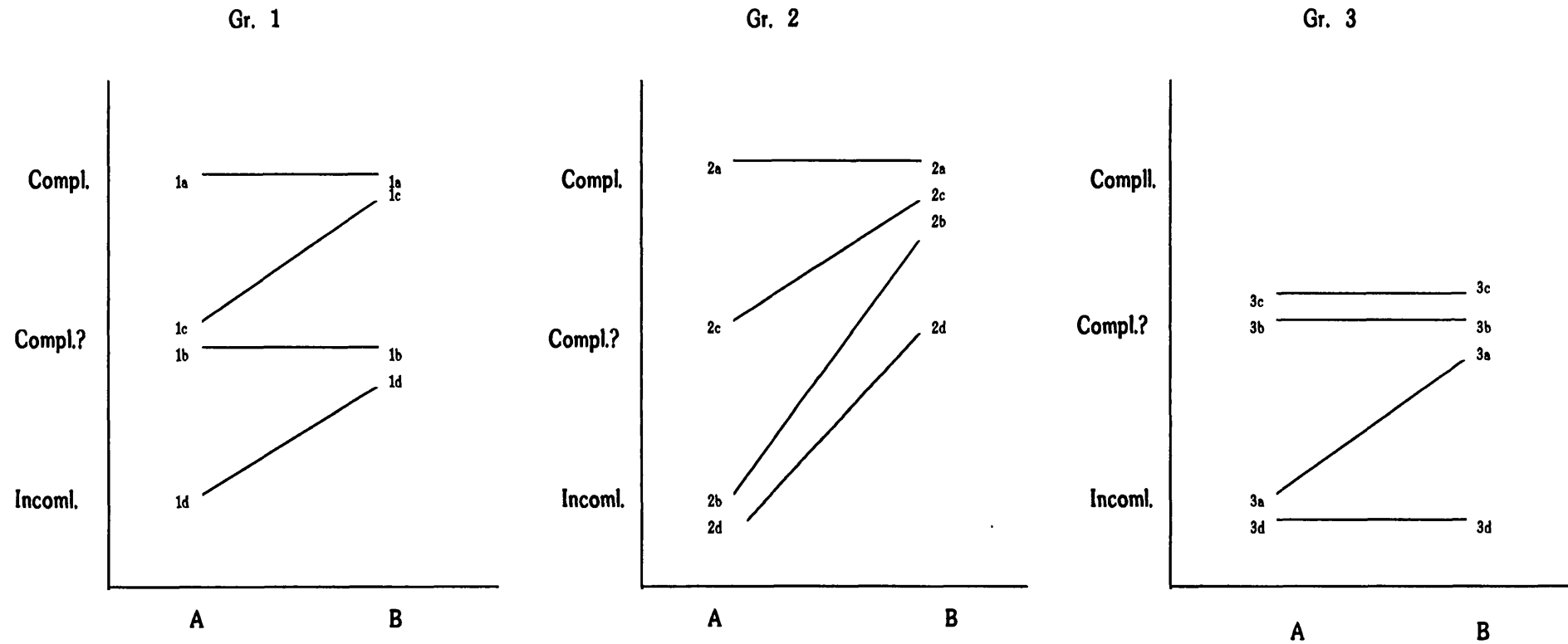


Fig. 8.4a: Changes in the Inference diagrams in four subjects of the three Groups

Complete
 Complete? with problem
 Incomplete

1a, 1b, 1c, 1d = subjects of Group 1
 2a, 2b, 2c, 2d = subjects of Group 2
 3a, 3b, 3c, 3d = subjects of Group 3

In the above figure (Fig.8.4a) it is shown that in Group 1 (older age group) half of the students showed improvement in the type of inference diagram and half remained the same. In Group 2, three students showed improvement, one remained the same. In Group 3 (the younger group), only one student showed improvement.

From the inference diagrams of the three cases discussed above, it can be assumed that the more complete and elaborated inference diagram an individual has (by taking into consideration a lot of states and events), the better he is able to cope with the uncertainties of his future. This means that he should be able to cope better with the transition and changes he has to face in moving from school to university and from school to work, as well as to coping with the regret of choosing one career alternative while leaving out others. A fairly elaborate inference diagram also indicates that the individual has already thought about possible means towards the completion of his goals, of his actions and the possible outcomes, and that he has thought of alternative solutions which will make the transition period easier.

Consequently inference diagrams can become a very useful tool to the counsellor helping him to detect:

- ___ whether the individual is structuring his claims about his career alternative solutions in a frame
- ___ how the individual links his claims into a future scenario frame: the possible actions he has to take, the desired goals he wants to achieve
- ___ how he articulates his claims: does he give attributes to his alternative solutions in the form of Extraneous States? Is he thinking about possible outcomes (Events) which may happen and affect his entire plan?

Consequently, we can also conclude that, working through an inference diagram the individual can extend his background of safety (see Chapter 2, sec. 2.5.1.1) since he is operating in the uncertain area of the future, linking and combining various possible events and actions to achieve the desired goal.

It has been found, however, that students represent their problem not only in a future scenario frame, but also in a MAU frame and, therefore, by taking into consideration both of these representations, counselling will be more complete.

The next section is devoted to the analysis of the results from the computer decision aid, MAUD, given to the students as an aiding technique, to help them in the structuring of their problems under a MAU frame. This will be followed by a discussion of the three cases presented above in relation to MAUD results, and by the integration of the Inference diagrams and MAUD results for each subject in the above cases.

8.2. MAUD

8.2.1 Introduction

MAUD - Multi-Attribute-Utility Decomposition, was introduced in Chapter 4 (section, 4.2.3) as a decision aiding technique used in the pilot work to help students in their career decision making process. From the observations made and the results obtained, it became apparent that MAUD, as a decision aid, can provide limited support to the individual when it is used on its own. However, it can assist the individual to structure his decision problem under a Multi Attribute Utility frame of problem expressing language. In fact, the indications from the pilot work where MAUD was used contributed to the construction of a methodological career decision making process model in which MAUD could be included as a problem structuring decision aid (Chapter 5, 5.5).

In the following sections of the present chapter, the results obtained when MAUD was used in the main study will be further analyzed and discussed. Emphasis was placed upon how students structure their decision problems with the help of MAUD, and upon whether this structuring process enhances their capability of making choices and their ability to cope with the reality of their decision situation.

The three cases presented in the Inference diagrams analysis (section 8.1) will also be compared and discussed with reference to the MAUD results.

8.2.2 The procedure of MAUD sessions

According to the general procedure followed in the main study (see Chapter 6, 6.4), MAUD was given to subjects during the second and third interviews before the university entrance exams and again to the same individuals approximately six months after the exams. If the individual was not able to use MAUD in his first experience with it, a second or a third chance was given to him after suggestions were made from the counsellor to obtain more information about his alternative solutions or even to consider different alternative solutions. As explained in Chapter 4 (section 4.2.3), MAUD is more suitable in situations where the decision maker has some intuition about relevant aspects of the decision problem (i.e. number of alternatives), but has difficulties in evaluating his preference for the different attributes posed in varying degrees by those alternatives.

All subjects interacted with MAUD in the structuring of their career decision making problems. Table 8.3 presents a fairly typical print out received at the end of a student's session with MAUD. For each session, the procedure remained the same as described in detail in the pilot work (Chapter 4, 4.2.2). First MAUD, after asking the subject for a set of options between which he wishes to choose, elicits from him the criteria or attributes which are important in making his choice, and asks him to rate each choice option on each criterion separately. In the example given below (Table 8.3), Vanessa (Group 1), in her first interview, gave eight attributes (factors) upon which she evaluated her six alternative solutions (options). In a second step, MAUD transforms the ratings, giving to the most preferable alternative a value of 100, and to the least preferable a value of zero. In Table 8.3 the numbers in the columns under the "options" represent Vanessa's ratings for her alternative solutions with regard to the various factors.

In a third step, the subject is asked to judge the importance of each criterion in relation to the others. (In Table 8.3, this is represented by the numbers in the column under the heading "Importance of factors".) Finally, once the program has all the necessary information, it applies an algorithm, based on decision theory, for recomposing the information into an overall preference ordering across the options.

(In Table 8.3, this is represented by the numbers in the row entitled "overall preference".) A summary of the session is produced for the decision maker, showing the assessed preference values, the value-wise importance of the attribute dimensions, as well as the ratings on the attribute dimensions. An example of an elicited print out summary appears in Table 8.3 (The summary is slightly modified for the purpose of space. Examples of full print out summaries exactly as given to subjects are included in the Appendices.)

Table 8.3: Summary table of Vanessa's (Group 1) input and MAUD output.

Vanessa Gr.1 (A)

Options Factors	Dance teacher	Dietologist	Teacher in primary sc.	Lawyer	Law Judge	Secretarial studies	Importance of Factor
Like Dance	100	67	33	17	0	33	0.21
Relation to health	100	83	33	17	0	50	0.04
Punish the antisocial b.	0	0	60	100	100	0	0.10
Human contact	100	50	100	100	50	0	0.16
Free time	75	100	75	25	0	100	0.08
Interesting Job	100	60	20	100	80	0	0.08
Personal Satisfaction	100	25	0	50	75	0	0.15
Initiative Creativity	80	100	100	40	20	0	0.18
Overall preference	84	60	58	55	39	17	

Vanessa Gr.1 (B)

Options Factors	Dance teacher	Lawyer	Dietologist	Clerk in a bank	Importance of Factor
Human contact	100	100	60	0	0.07
Free time	67	0	100	100	0.19
Interesting job	100	100	60	0	0.16
Personal Satisfaction	100	71	57	0	0.24
Initiative Creativity	100	83	67	0	0.14
Good Salary	100	50	0	0	0.19
Overall preference	94	62	56	19	

In the print out summary the subject may check whether there is any disparity between the resulting preference ordering and his intuitive feelings of preference for his career options. If any disparity is noted, he can carry out further restructuring or conduct sensitivity analysis in another session with MAUD. In the case of Vanessa above, during her second session with MAUD, she restructured her problem by cancelling some attributes and some alternative solutions. She changed her absolute values in the ratings of her options, and thus she obtained a more acceptable overall preference order for her alternative solutions.

Each session with MAUD was closed with a debriefing interview. During this interview the student had the opportunity to discuss his intuitive, versus MAUD-prescribed, preference orderings of alternatives; the nature of the revealed preference structure; whether or not he liked MAUD, and how and where he felt that MAUD had helped or frustrated him in the modelling of his decision problem.

In total, 40 MAUD sessions were run for the three groups (8 subjects in each group). 24 sessions were held before the university entrance exams (one session for each subject), 23 of which are complete and one incomplete (one subject from the third group). In the interviews held after the university entrance exams, 8 subjects refused to take MAUD and 4 subjects gave incomplete results, so that there are only 12

complete sets of data from MAUD taken from the same subjects for before and after the exam period. Overall 35 sets of MAUD data were completed (inclusive of the 12). Print out summaries of these are included in the Appendices.

8.2.3 Analysis of MAUD data

The rationale of the analysis

As discussed earlier, MAUD, through each structuring process, forms a decomposed preference structure within which the individual has to make trade-offs between alternatives on the basis of attribute dimensions, by choosing a particular alternative over another. The analysis of MAUD results focuses on the investigation of these preference structures.

The preference structure of any multiattributed decision problem, also indicates a regret structure to express what a person is giving up when he chooses one alternative and loses another (Humphreys and McFadden, 1982). If the individual is able to clarify his regret structure so that he knows why he is giving up an alternative, then he will be more able to cope successfully with the reality of his situation. Coping with reality means coming to terms with the regret or dissonance one feels in giving up alternatives of greater value on some attribute dimensions (Humphreys and McFadden, 1982). Consequently, if the regret structure is clarified and simplified, the individual can cope more easily because he has given up goals which were causing him confusion.

In Chapter 2 and 4 (sec.2. 4.2.2) how the individual can be in a goal confusing state when he is trying to decide between two or more incompatible goals or alternative solutions was discussed. For example, a student may subjectively prefer to go to the art school to express his artistic talents but the objective demands of his financial situation and family require that he goes to a technical school and starts earning his living as soon as possible.

Regret structure is, of course, internal to the decision maker, and difficult to analyze. Humphreys and McFadden (1982), however, have suggested that, performing multidimensional unfolding analysis, we can get a rough index of the complexity of the regret structure. In the present study, multidimensional unfolding analysis was

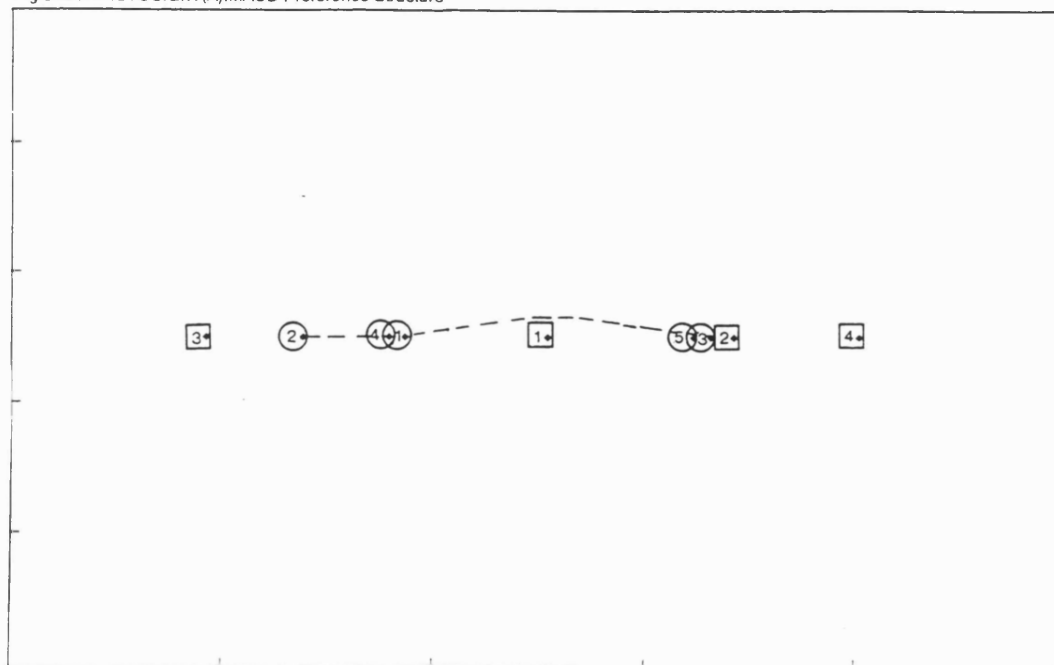
used to investigate whether students, by structuring their career decision problems through the use of MAUD, were helped in their choice process and became more capable of coping with the reality of their decision situation (Chapter 4, 4.2.3.1; Chapter 1, 1.2.1.4).

Multidimensional unfolding analysis

Multidimensional unfolding is a general non-metric multidimensional scaling technique by which we can obtain the individual's preference structures of his career options in two dimensional preference spaces. To obtain this, both choice alternatives defined in terms of ratings on attribute dimensions, and the ideal points on those dimensions, are considered to exist within the same preference space (Young, 1972). The 'lower corner matrix' option of KYST (Kruskal et al., 1973) is applied to obtain two dimensional preference space plots as shown in Fig. 8.5; Kruskal's (1964) stress formula was used to obtain the stress value for each individual preference structure.

In Fig.8.5. numbers in circles indicate the positions of the ideal points on the attribute dimensions in the preference space (e.g. 1 marks the position of the 'ideal' point of the 1st choice). Numbers in squares are the person's intuitive preference ordering for the items (e.g., 1 marks the position of the person's most intuitively preferred item, 2 the next most preferred item, etc.).

Fig.8.5:CHRISTOS:Gr.1(A):MAUD Preference Structure



The degree of complexity of the regret structure represented in each preference space can be estimated by looking at the locus of the position of the 'ideal' alternative, within the preference space, over all possible tradeoffs and how far from it the actual alternatives are located (Humphreys and McFadden, 1982). Although, potentially, the position of the ideal alternative can be anywhere in the preference space, in practice it is constrained by the relations between the alternatives on the attributes dimensions. The greater the constraints, the simpler the decision maker's regret structure.

8.2.4 Results

The data from the 36 sessions with MAUD (see Appendix 3 for MAUD print out summaries) were analyzed by the Multidimensional unfolding technique. 36 two dimensional preference space plots were obtained; 24 of these plots were from sessions before, and 12 from sessions after, the university entrance exams (see Table 8.3). (The plots of the print out summaries are in Appendix 3).

Table 8.4: Total number of preference space plots obtained from sessions with MAUD in each age group.

A: MAUD sessions held before the university exams
B: MAUD sessions held after the university exams

	Gr.1	Gr.2	Gr.3	
A	8	8	7	23
B	4	4	4	12
Total	12	12	11	35

Plots were classified by two independent judges according to the degree of complexity of the regret structures. The classification was made according to two main types of plots differentiated as a '**line plot**' (Fig. 8.5) and as a '**loop plot**' (Fig.8.6 (A)). In the '**line plot**' the ideal points have the same attribute dimension weight and therefore they all fall in a line within the space. The ideal points constrain the dimension in which the ideal alternative can move. In a line plot, the ideal alternatives can only move along the line of the ideal points of the attribute dimensions. Therefore, the person has less regret in trading off some actual alternatives over others, as long as

the actual alternatives fall on or are close to this line. In a 'loop plot', the ideal points of attribute dimensions enclose a two dimensional preference space (as trade offs are varied) and we have a more complex structure, since the ideal alternative can be anywhere within that space. This type of plot shows us that the regret is bigger because the individual has to trade off actual alternatives in more than one dimension.

Line plots are classified as **simple (S)** regret structures. Fig.8.5 illustrates the preference plot of Christos (Group 1 student A, first interview). Christos' plot forms a line and represents a very simple structure. His most preferred item, marked as No. 1, appears right in the middle of the line on which his ideal points fall, showing that 1 is clearly the best alternative solution. Christos does not appear to have conflict or regret in his preferences among his alternatives. His most preferred actual alternative can be traded off with any of his other alternatives and remain at the same attribute dimension as his ideal alternative. This particular plot, in which the individual's first choice is away from the other actual alternatives, can be easily distinguished as representing a simple preference structure.

Loop plots are classified into three different types according to their degree of complexity:

- (a): complex with no problems (Cv),
- (b): complex that might cause some problems (C?) and,
- (c): complex that can cause a lot of problems (Cx).

Figs. 8.6(A),(B), and 8.7(A),(B) show the preference plots of students from the first and third age groups. Figs. 8.8(A) and (B) represent the plots of a subject from Group 2. Fig. 8.6(A) exemplifies what I have called a complex loop plot that might cause a problem (C?). This was derived from Vanessa's session with MAUD (Group 1, A: first interview before the exam period). Vanessa's regret structure is fairly complicated since her ideal points on the attributes she chooses to use enclose a large space. This space indicates the area within which her ideal alternative should lie. However, her actual most preferred alternatives (1, 2) are outside this space. This means that the alternatives she values as most important, although they are close to the ideal points highest in priority, still remain outside her ideal solution. What this means is that there is some concern, since the alternative solutions she has chosen are in contradiction to her inner wishes.

Fig.8.6:VANESSA.Gr.1(A): MAUD Preference Structure

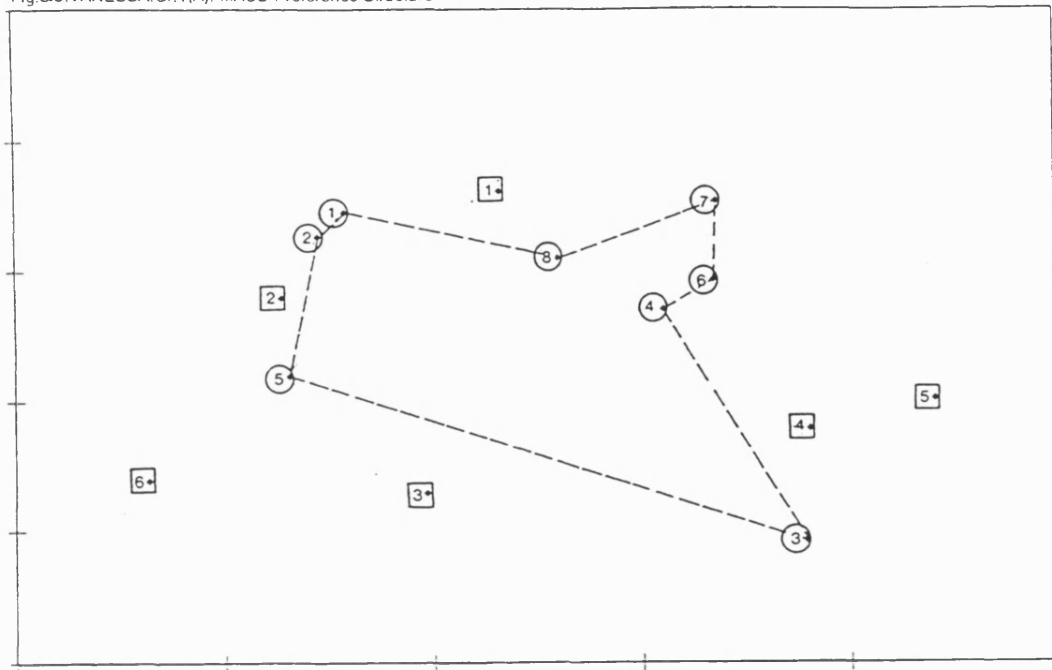
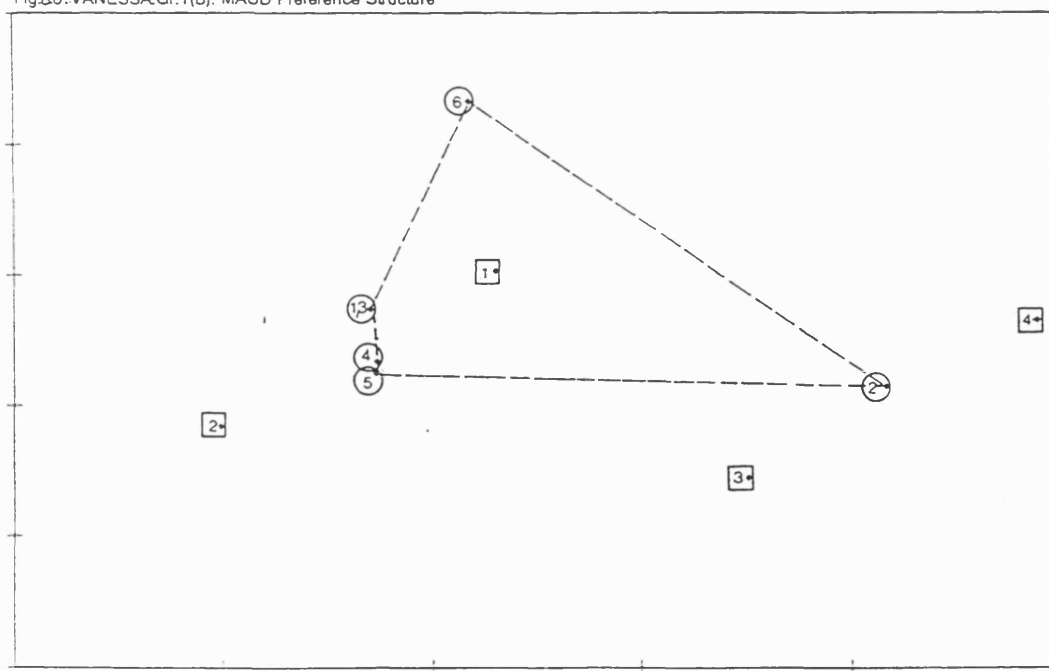


Fig.8.6:VANESSA.Gr.1(B): MAUD Preference Structure



In the second interview (Fig.8.6, B) Vanessa again produced a complex loop structure (Cv). However, this time, she does not appear to have any confusion since her most preferred actual alternative now falls within the space where her ideal alternative can be. In addition, three out of five ideal points are close to her most preferred actual alternatives 1 and 2. Her stress value is also less this time (stress value A, first interview = 0.295, B: second interview = 0.211).

The preference structures of the student **Alexis** (Group 3, 1st and 2nd interviews) are illustrated in Figs. 8.7 (A),(B). In the first session, Alexis gave a complex (Cv) plot structure with no conflict. His most preferred actual alternative falls within the space in which his ideal alternatives can move. Therefore, he has no problem. In addition, his other actual alternatives are far away, and so he will have no confusion in trading off his first choice.

In the second interview, Alexis' plot structure indicates complexity and shows that there may be some problem with his choice. Problems will arise because all his actual alternatives fall outside his preference space, and the two most preferred choices are closer to 3 out of 5 of his ideal points. This type of preference structure suggests that he may have some difficulties in making the necessary trade-offs in choosing between his two most preferred alternatives.

Fig. 8.7: ALEX: Gr. 3(A): MAUD Preference Structure

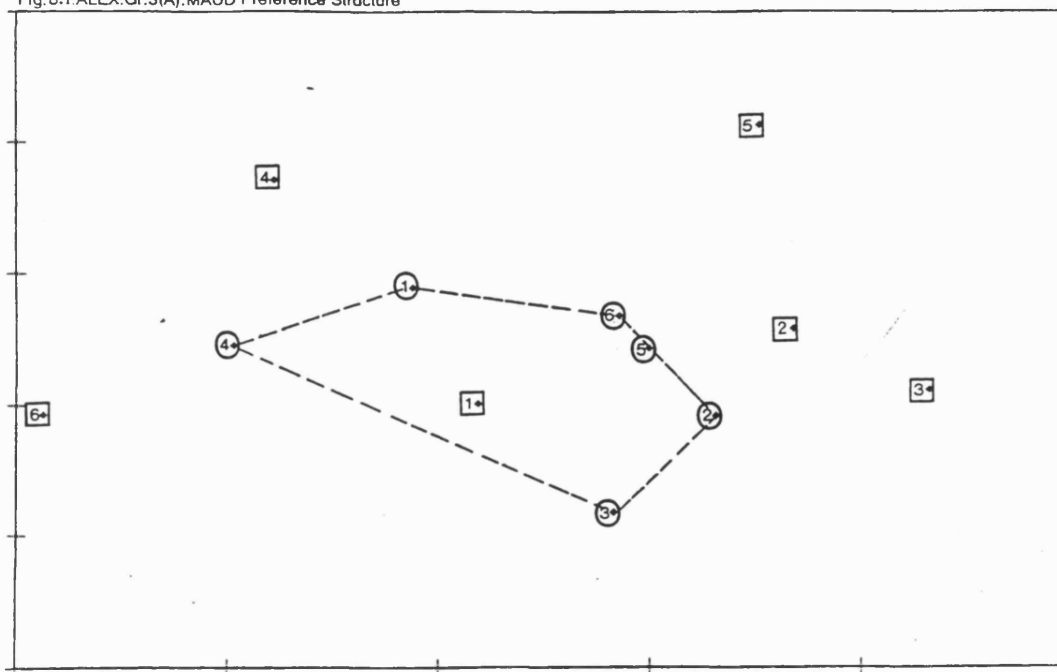


Fig. 8.7: ALEX: Gr. 3(B): MAUD Preference Structure

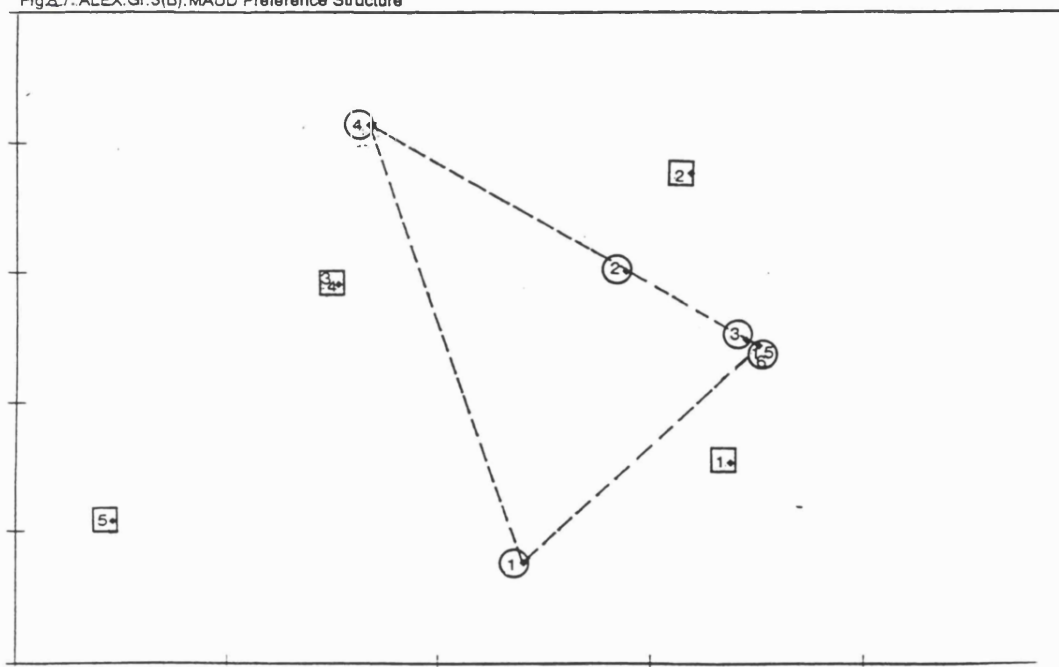


Fig 8.8 EVAG..Gr.2(A) MAUD Preference Structure

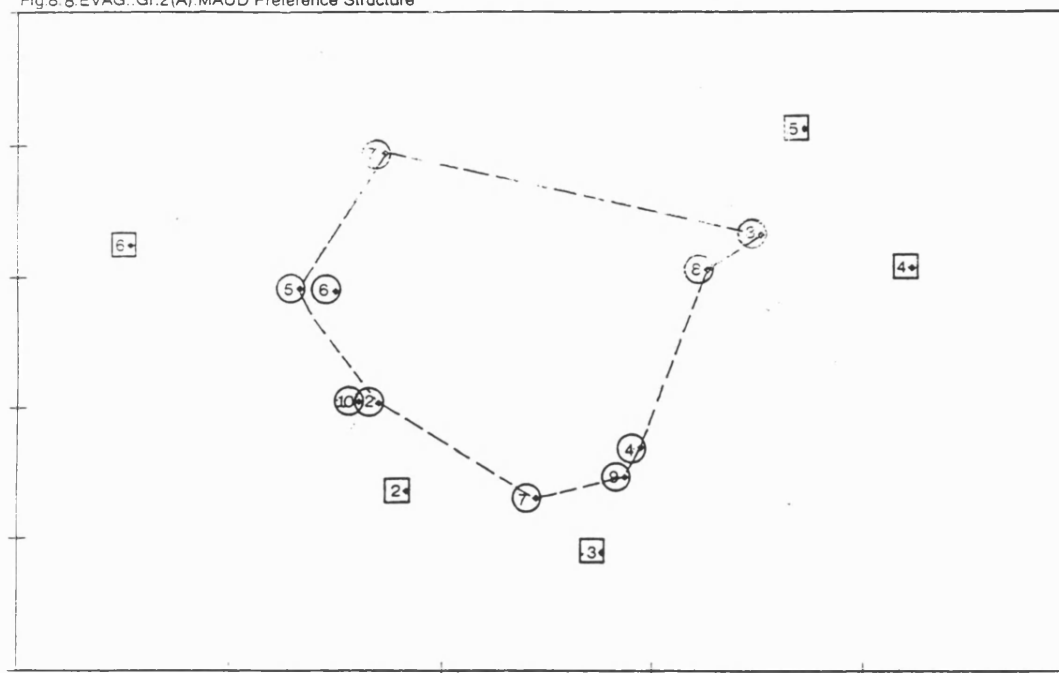
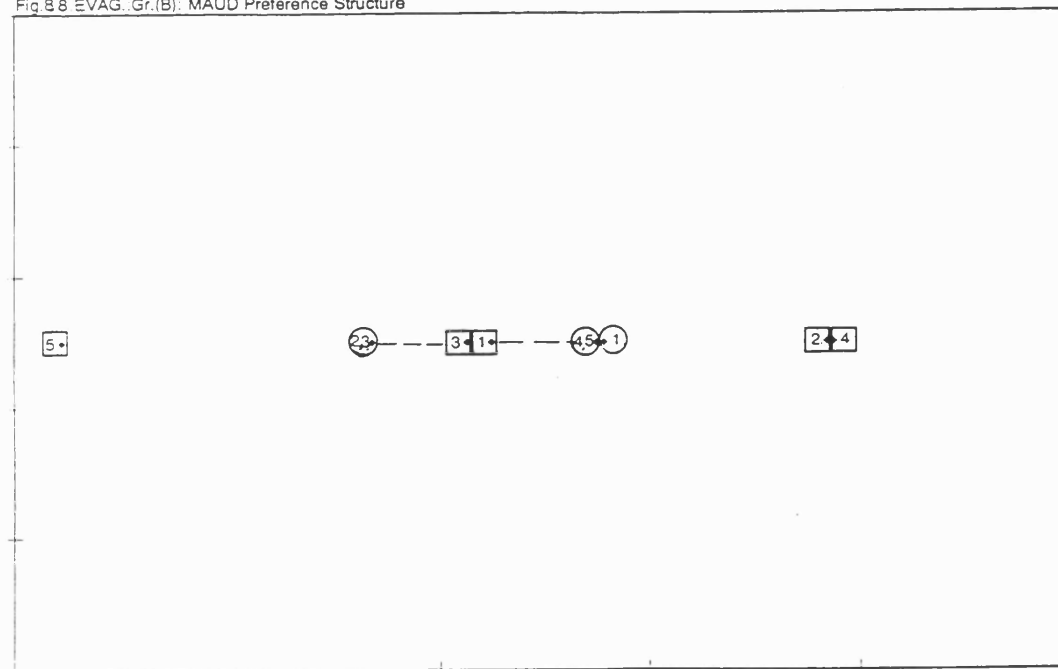


Fig 8.8 EVAG..Gr.(B): MAUD Preference Structure



Figs. 8.8 (A), (B) illustrate Evaggelie's (Group 2) preference plots which are interesting because the plot obtained from her session with MAUD after the exams (second interview) was considerably different from that of the first session. The plot obtained from the 1st session (Fig. 8.8, A) is a complex (Cx) one which indicates that she has a lot of problems in structuring her choice. Her many ideal points of attribute dimensions enclose a large and irregular preference space, within which none of Evaggelie's actual alternatives fall. In addition, her first most preferred alternative is further away than her second and third best. This preference structure suggests that she will have greater confusion in making a choice (stress value 0.315). The large number of actual alternatives would be expected to contribute to increased confusion.

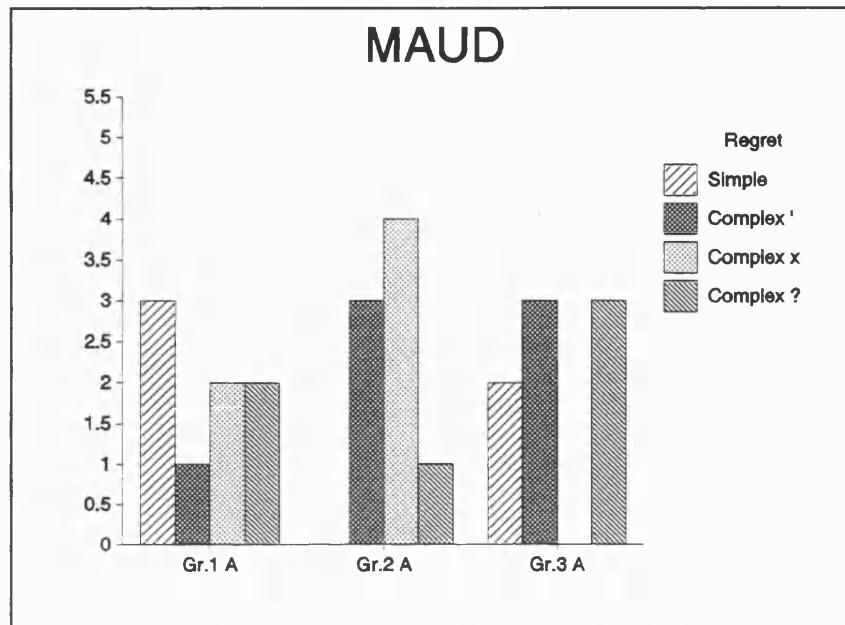
In her second session, after the university entrance exams, Evaggelie gave a simpler structure, as illustrated in Fig. 8.8b (stress value 0.244). This time, her ideal points constrain her ideal alternative in one attribute dimension which results in a simple line plot. Thus, she can trade off two actual alternatives without much confusion. However, since these two actual alternatives are close to each other, choosing one over the other is expected to cause some regret. This time, she has also minimized the number of her actual alternatives and the number of the ideal points of the attribute dimensions.

Table 8.5 contains the results (type of plots) from the 24 MAUD sessions taken in the first interviews (before the university entrance exams). The percentage occurrence of each type of plot is shown graphically in Fig. 8.9.

Table 8.5: Number of Preference plots from MAUD data obtained from first interviews (A) before the exams.

A					
	S	Cv	C?	Cx	Total
Gr.1	3	1	2	2	
Gr.2	0	3	1	4	
Gr.3	2	3	3	0	
Total	5	7	6	6	24

Fig. 8.9: Type of plots from MAUD results of the three age groups from interview sessions before the university entrance exams.



In the above figure, we can see that in Gr.2 there is no simple (S) line plot, whereas in Gr.3 there is no complex (Cx) loop plot. Group 1 had the highest percentage of simple line plots, whereas Group 2 had the highest percentage of more complex (Cx) loop plots.

The changes in the type of plots, obtained from the analysis of MAUD results from the first and second interviews, are graphically presented in Fig.8.10 and encompass four subjects from each age group. This figure shows that in Group 1 (older age group) only half of the students showed improvement in their second session with MAUD. One subject remained the same and for another there was increased complexity. In Group 2, all subjects showed improvement. In Group 3 (the younger group), the complexity of their preference structures increased.

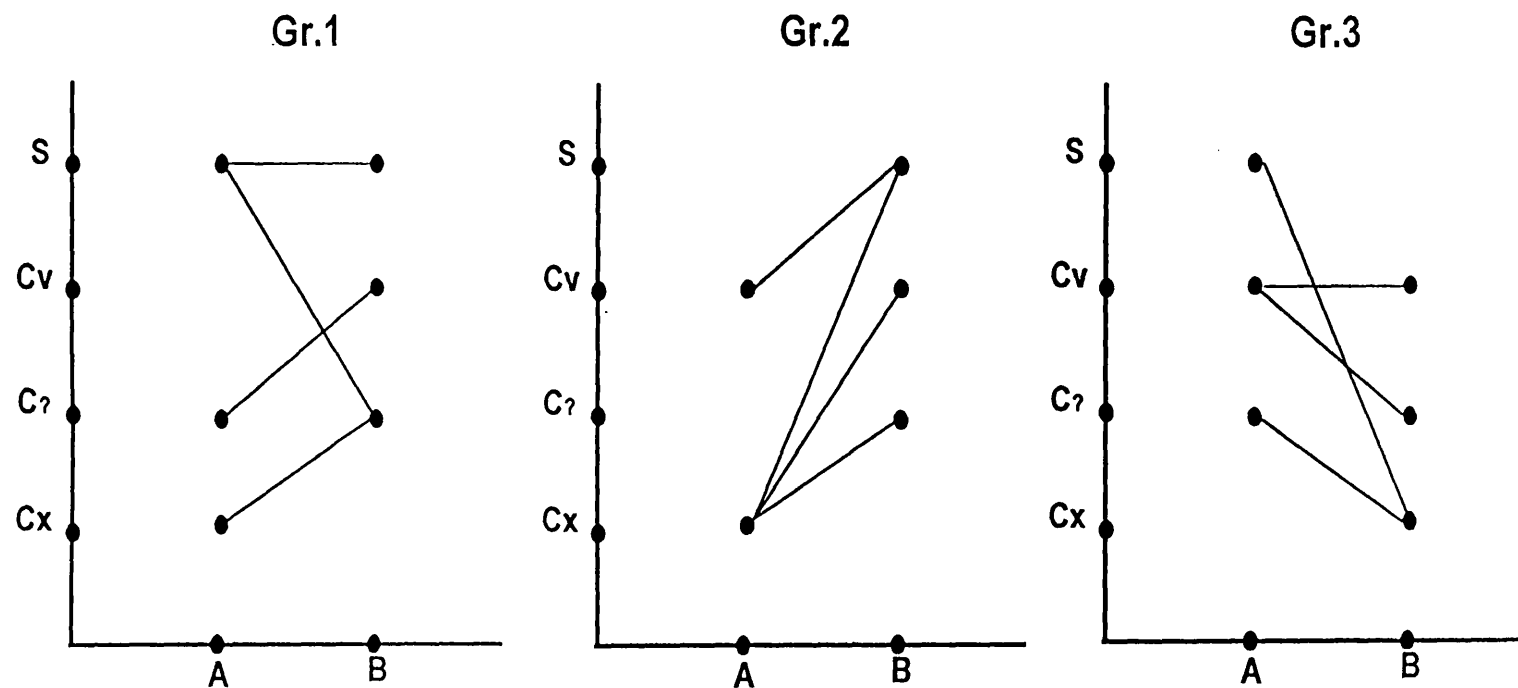


Fig. 8.10 Changes in the type of plots given by MAUD in the three Groups.

S = Simple plot
 Cv = Complex no problem
 C? = Complex with some problem
 Cx = Complex with problem

8.2.5. Discussion

The analysis of the results obtained from the MAUD sessions before and after the university entrance exams was intended to help me investigate:

- (a) whether or not MAUD aids the students in their career decision making problems, and, if it does, how.
- (b) whether MAUD can be used as an analytic tool to describe how the individual structures his problem and to detect what the individual's needs are in this structuring process.

The number of students who had sessions with MAUD before and after the university exams is small. However, since each subject was considered as an individual case and because we assume that career decision is idiosyncratic, we can conclude the following:

Overall, subjects from the older age groups appeared to show improvement in their problem structuring process six months after their first session. The opposite trend observed for the younger group could be explained by the fact that students from this group did not consider their career problems as imminent and possibly they were not aware of the real difficulties. When they first took MAUD, they probably had more fixed ideas about their future careers and gave less complex preference structures. In the second session, almost a year after, they were more realistic. They had reconsidered their problems, and had started to have doubts about the outcomes of their choices.

The above results can be related to the results from the Level 2 and Level 1 analyses where it was found that the younger individuals gave less conditional judgments the first time and more subsequently. More conditional judgments resulted in more 'what if' questions and thus in more complex regret structures. More unconditional judgments, on the other hand, indicate that students developed, through time, more fixed ideas about their future and were more prepared to make a decision (Chapter 7, 7.3.4). More fixed ideas resulted in less complex regret structures.

The above results have to be considered in relation to the counselling procedure. Although priming was given to all age groups, according to needs, the response has to be looked at in the context of the individual's perception of his problem at the time of the interview. Older groups perceived their problem in a more complex way. Priming within a MAU frame helped them to clarify their preferences. This resulted in them producing simple preference plots the second time. The decrease in the complexity of their preference plots has also to be attributed to the help the individuals had from MAUD in the evaluation of their preferences on their career alternatives, and the clarification of the importance of the attributes they had assigned to each alternative. The clarification of their preferences decreased the confusion about goals and priorities.

Younger individuals, on the other hand, in the first interview, had more fixed preferences with limited scenarios about their future. Thus, priming within a Future Scenario was considered more appropriate for them. This type of priming had the effect of expanding their exploration of their career problems and making them consider more alternative solutions to it. Priming in a Future Scenario frame, also resulted in increasing their conditional thinking ('what if questions') and the number of conditional judgments given in the second interview. However, the increase in their conditional thinking and the consideration of more alternative solutions might have caused a state of confusion, which resulted in the elicitation of more complex preference structures the second time.

In this case, individuals may have needed more help from the counsellor and additional sessions with MAUD for the clarification of the new alternative solutions.

Nevertheless, because of the small number of cases, we cannot talk about any specific trends between age groups. Nor we can compare them, or identify any changes which define any specific ways the students structure their problems in the first vs the second interview. In fact, a Goodman-Kruskal test revealed that knowledge of the age of the group reduced uncertainty about the type of plot produced by only 18% ($B = 0.18$).

Also, for any specific conclusion to be drawn, we have to take into consideration that the results taken from the plots are not really diagnostic of the people but of the picture. Thus, any change in each specific plot produced by an individual cannot be attributed only to MAUD intervention, since additional factors may have played a role. This implies that the individual perceives his decision problem in his own subjective way, which will depend on personal experience and perception of his real world. Consequently, taking into consideration only the MAUD results in the investigation of the individual's problem structuring process will be limited. Instead, such results have to be related to additional ways in which the individual represents and structures his career problem.

8.2.6 Conclusion

The results and the observations from the use of MAUD within the career interview procedure show that MAUD can support the individual in structuring his career decision making problem within a Multi Attribute Utility frame. Also, it can reduce the regret he might feel at the need to choose a particular alternative over others of greater worth on some attribute dimension. This is possible mainly through the clarification of the subjective and objective goals through which the individual conceptualizes his problem. The rationale behind this is that, whereas people find it extremely difficult to make complex judgments which involve assessments and trade offs over many factors, they are more able to cope and make more reasonable judgments if the problem is broken down into manageable parts by the use of the MAU frame.

Therefore, MAUD can be very helpful to the counsellor in two ways:

First, as a decision aid which can be used to help the individual in the evaluation of his alternative solutions, and

Second, as an analytic framework useful in detecting individuals' ways of structuring their problems under the MAU frame. In the latter case it can aid the counsellor in identifying the kind of help the individual needs. The counsellor, by looking at the type of preference plots, cannot differentiate whether a simple plot means that the

individual is ready to make a decision and take action, or whether the individuals fixed ideas are the result of a limited investigation and elaboration of his alternative solutions. In order to make this differentiation, the counsellor needs to consider additional ways of representations and techniques. For example, Future Scenario frames and Inference Diagrams can be used to complement and enhance the use of MAUD as an effective tool in counselling. In the following section, the three cases presented in the analysis of Inference Diagrams will be looked at in relation to the results taken from the multidimensional analysis of MAUD sessions of those individuals.

8.3. The relation of students' Inference Diagrams to their MAUD results

In the first section of this chapter, Inference diagrams were discussed as a specialized illustration of a more in depth analysis of how the individual links his claims into a Future Scenario frame when he is making plans and scenarios about his future. Line and loop plots resulting from the MAUD analyses are also specialized illustrations of how individuals link their claims in structuring their career decision problems under a Multi Attribute Utility frame. The relation of these two types of illustrations in the three cases presented previously is discussed below.

Larissa (Group 1, 19 years old) was the first case analyzed in section 8.1.2. In her inference diagrams, Larissa explored and successfully elaborated on different future scenarios for her alternative career solutions. She was in great conflict between the alternatives 'physical education' and 'Biology', one of which she may have had to pursue if she failed to enter medicine or dentistry. She decided to get more information about the profession of Biology and to have a session with MAUD for a better evaluation of her alternative solutions.

Her MAUD session resulted in the summary shown in Table 8.6 (A) and (B).

Table 8.6: Summaries from Larissa's MAUD sessions before (A) and after (B) the university entrance exams.

Larissa Gr.1 (A)

Options Factors	Dentistry	Biology teacher	Physical education	Biology research	Importance of Factor
Social Approval	100	20	60	0	0.30
More money	100	0	80	40	0.19
Stability security	75	100	38	0	0.42
Creativity	33	100	0	100	0.09
Overall preference	84	57	49	17	

Larissa Gr.1 (B)

Options Factors	Ecology	Genetics	Dietologist	Molecular biology	Importance of Factor
General Interest	100	50	0	50	0.41
Offer to society	100	100	0	0	0.02
Unemployment	100	50	100	0	0.35
Creativity	100	50	0	50	0.22
Overall preference	100	51	35	32	

A Multidimensional unfolding analysis of the above data produced two simple line plots from both interview sessions (before and after the university entrance exams, Figs. 8.11 A and B). As shown in these figures, she gives a fairly straightforward simple line in the first session. However, her first and second alternatives are at the end of the line, which means that she still has to make up her mind between these two alternatives. Nevertheless, it seems that this will be an easy choice since she has a complete scenario for both of these solutions (see Inference diagram, Fig. 8.11 A).

Fig.8.11: LARISSA.Gr. 1(A): MAUD Preference Structure

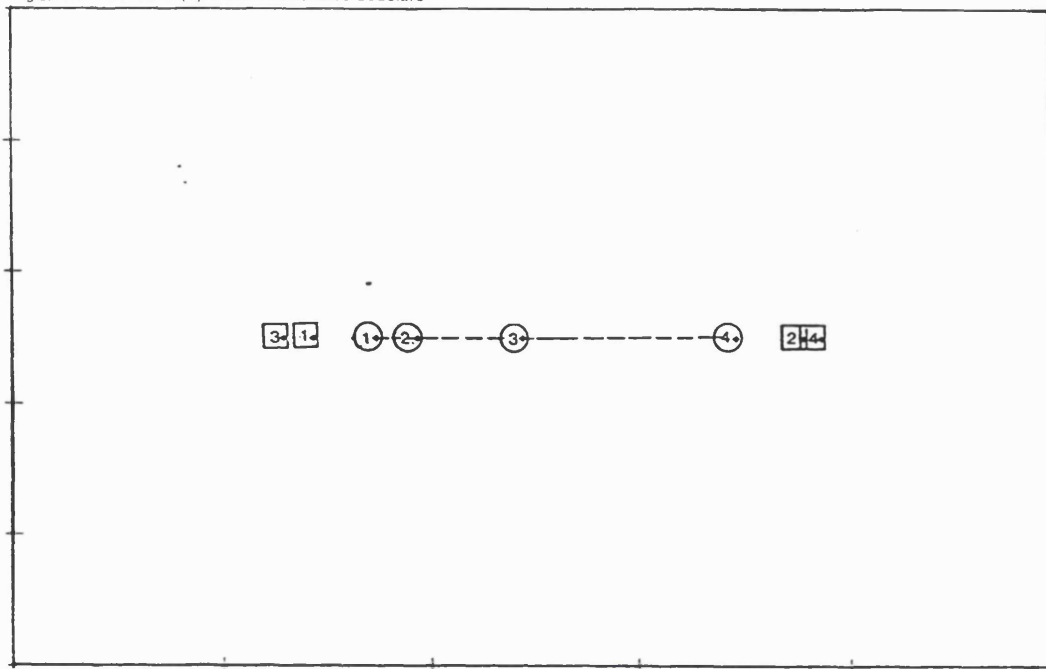
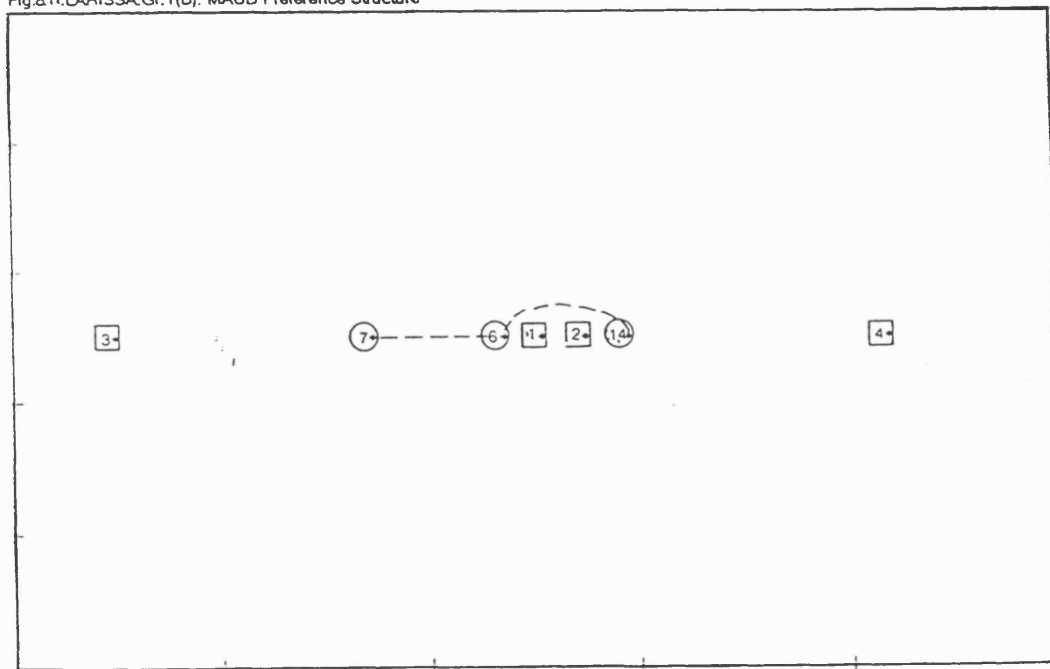


Fig.8.11: LARISSA.Gr. 1(B): MAUD Preference Structure



In her second session with MAUD (after the university entrance exams) Larissa had already succeeded in entering the Biology School. Although she was still thinking about trying to enter Medicine for a third time, in her session with MAUD she decided, instead of different career solutions, to test different job opportunities within the field of Biology (see Table 8.6,B). The multidimensional unfolding analysis resulted this time in a very simple plot (Fig.8.11,B) which shows Larissa's clear choice. In fact, as she said in the debriefing interview, her session with MAUD strengthened her decision to continue Biology and to abandon the idea of studying Medicine.

Nikos is the next case that was analyzed in section 8.1.4. In contrast to the above subject, Nikos appeared to be very confused and uncertain about the preferences of his alternative solutions. In his inference diagrams (see section 8.5), Nikos explores only some of his alternative solutions. They were: 'to become a school teacher', 'to go to economics', or 'to work in his father's job', if he fails to enter university. He leaves out those which were his inner desires but difficult to attain: 'to become an actor' or 'to become a writer'. He agreed to work with MAUD only in his interview before the university entrance exams. The summary of his session with MAUD is shown in Table 8.7.

Table 8.7: Summary of Nikos's MAUD data taken from the interview before the university entrance exams

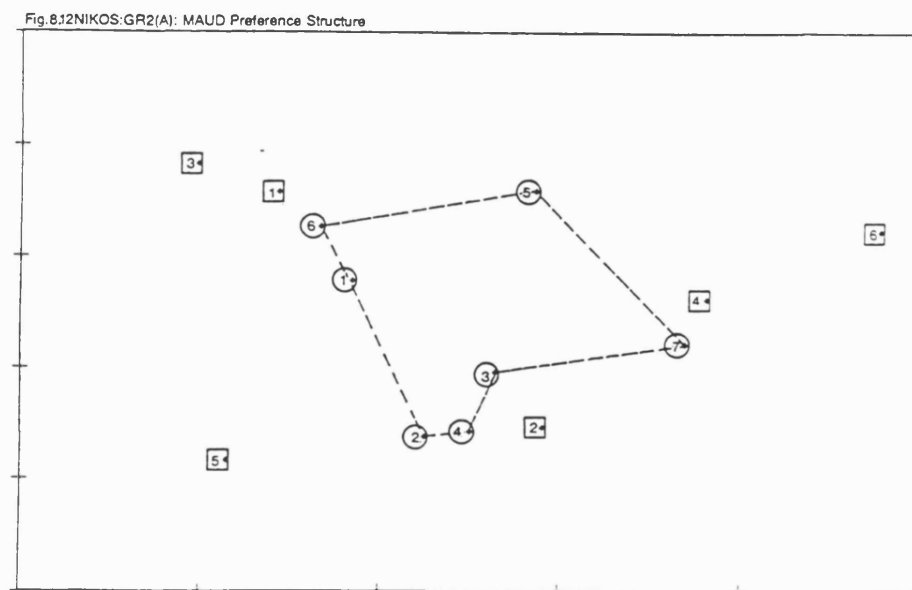
Nikos V. Gr.2 (B)

Options Factor	Economics	Sc.Teacher	Computers	Army	Navy	Actor	Importance of factor
Good Salary	100	67	100	67	67	0	0.32
Free Time	20	100	40	40	60	0	0.06
Human Contact	100	100	0	67	67	33	0.06
Stability	50	100	13	88	88	0	0.14
Work Conditions	100	50	25	75	0	50	0.14
Unemployment	100	50	100	25	50	0	0.22
Interesting J.	0	100	20	80	20	60	0.06
Overall preference	83	71	63	61	53	12	

As shown in the above Table, in addition to the alternatives investigated in the Inference diagrams, Nikos, in his session with MAUD, tested four other alternatives, some of which he had 'claimed' but not put in a Future Scenario frame (Computers, join the Army, join the Navy, become an Actor). He left out the option "to continue in his father's job and become a butcher". This option was against his parents' wishes (because of the low status of this job), but it was put as his last choice since, as he said, it would be very difficult for him to enter university.

The multidimensional analysis of his MAUD data resulted in a very complex loop plot (Fig.8.12). He has a large preference space but none of his alternatives are inside it. His first, second and fourth most preferred alternatives (1st: Economics, 2nd: School teacher, 4th: Army) are closer to some of his ideal points. His 6th alternative "to become an actor" is far away from his ideal space, showing the goal confusion state in which he was.

After failing the university entrance exams, he decided to try to take the exams again. At this point he did not want to have a session with MAUD. Although he was still in conflict and very anxious about his career, he was more decided this time that, if he failed again, he would continue in his father's job. This was indicated in his Inference diagram where he included a scenario to continue his father job and become a butcher.



Anna (Group 3, 16 years old, section 8.1.3). Anna, in her interview sessions, appeared to have no conflict over her choices and her career alternatives. She was certain that all she wanted was to become a literature teacher and to go to Australia. However, she produced, two incomplete inference diagrams where she elaborated only the above solution.

Working with MAUD, in addition to the "Literature" alternative, she tested four other career alternatives which she had mentioned in her interview but had not explored in a future scenario frame (i.e. Physical education, Journalist, Primary school teacher, Theology) (see Tables 8.8 (A) and (B)).

A multidimensional unfolding analysis of her MAUD data (before the exams interview session) resulted in a very simple line plot (Fig. 8.13,A) with her first alternative (Literature teacher) right in the middle of the line of her ideal points. For her this choice was very straightforward.

However, in her second interview session, Anna was not as certain about her career choices. She was still trying hard to prepare herself to enter university but she was unsure about her success. In her inference diagram, she makes scenarios for only one solution i.e. "to become a literature teacher"., although in MAUD she tries to evaluate more career options (see Table 8.8,B).

A multidimensional analysis of her MAUD results gave a more complex preference plot than the first time (Fig.8.13,B). Her preference space is large with her first, most preferred item (to become a gym teacher) found in the middle. However, this is in contradiction to her inference diagram in which she does not make any future scenario frame for this solution. Interestingly, the position of the last three alternatives were closer to her preference space although they were valued lower.

In the debriefing interview, Anna said that she was satisfied with her experience with MAUD because she was able to clarify which attributes were more important for her in her career choice. This enabled her to consider and evaluate more than one alternative solution for her future. She justified the fact that she made scenarios only for one solution, by saying that "all she wanted was just to enter university, and it was of less importance to her if she finally ended up becoming a literature teacher or

a gym teacher, or even a theologist or a nursery school teacher", even though the last professions did not interest her at all.

Table 8.8 (A): Summary of Anna's MAUD session

Anna Gr.3 (A)

Options Factors	Literature Theology	Physical Educ.	Journalist	Primary sch. Teacher	Importance of Factor	
Interesting job	100	67	67	33	0	63
More money	100	67	33	33	0	16
Offer to society	50	50	50	100	0	16
Possibility of travelling	100	100	0	0	0	.05
Overall preference	92	66	55	42	0	

Table 8.8 (B): Anna Gr.3 (B)

Options Factors	Physical Educ.	Theology	Nursery Teach	Literat.	Journ.	Prim. Teach	Importance of Factor
Interesting job	67	0	0	100	67	33	0.05
More money	67	0	67	100	33	33	0.10
Offer to society	100	100	100	0	0	0	0.64
Possibility of travelling	100	75	0	100	75	75	0.16
Free time	50	0	67	100	100	67	0.05
Overall preference	93	76	74	36	75	20	

Fig.8.13.ANNA:Gr.3(A): MAUD Preference Structure

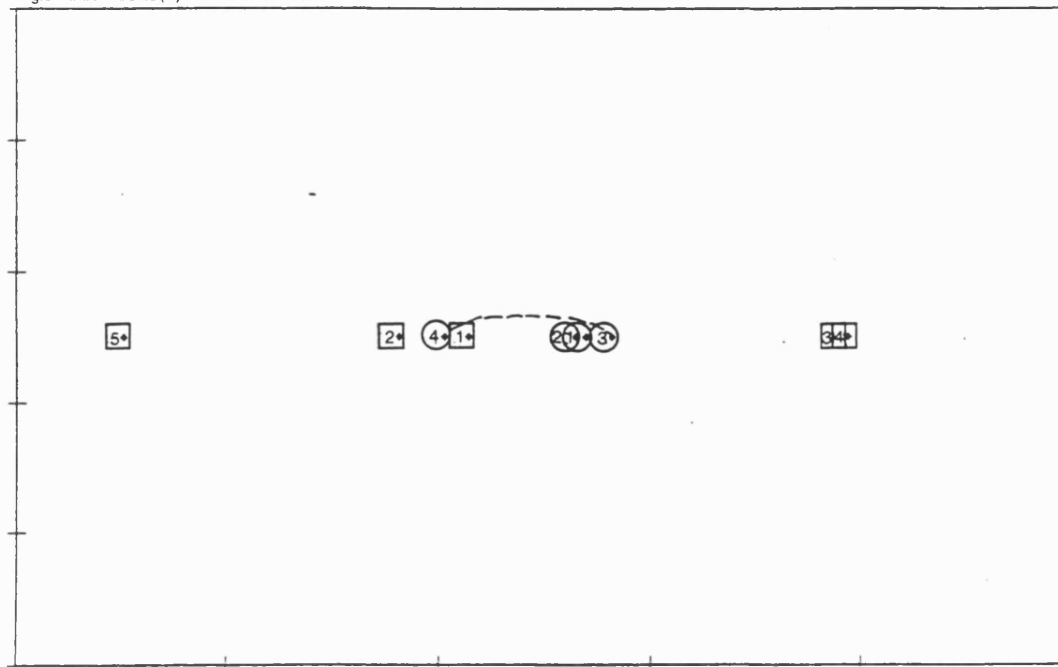
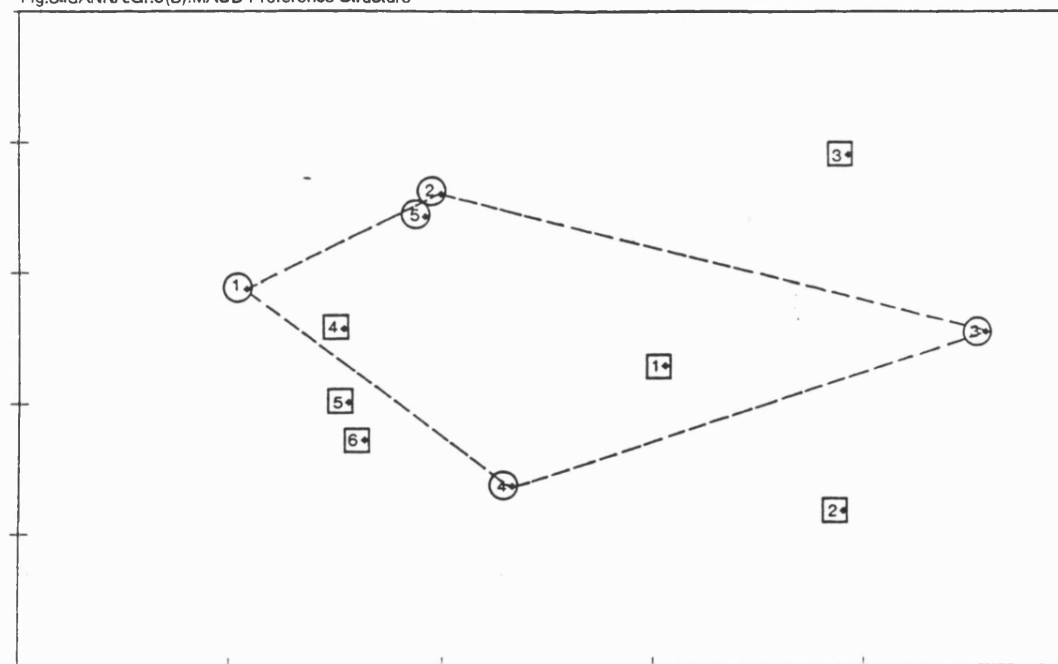


Fig.8.13.ANNA:Gr.3(B): MAUD Preference Structure



8.4 Discussion and Conclusions

In the cases presented above it can be seen that the Inference Diagrams and preference structures (MAUD analysis) support each other in establishing the way individuals structure and represent their career problems. As techniques, they can be used to help the individuals in the process of their career decision making.

In particular, when an individual has a well elaborated scenario he can, in turn, be more effective in the evaluation of his alternative solutions under a MAU frame. Therefore, he has less goal confusion and less regret or dissonance about his choices. This is indicated in Fig. 8.4 and 8.10 where the same four subjects of each age group appear to have similar improvement in the type of inference diagram and the type of preference structure plot (taken from MAUD data) from the first to the second interview.

In order to understand how the inference diagrams and MAUD results are related, we have also to take into consideration the counselling procedure followed. In fact, students received help in the structuring of their problems in the following ways:

First, students were aided in their frame formation by helping them to structure their problem in a future scenario frame. This means that they were helped to explore more possible solutions to their career problems, and form scenarios for these.

Second, they were primed to structure their problems under a MAU frame, in order to define their alternative solutions by giving attributes to these alternatives.

In addition, they were helped by taking MAUD in the evaluation of their alternative solutions on these attributes, which enabled them to be more prepared to commit themselves to a decision and to take action.

Consequently, both the inference diagrams and the preference structures plots can be used as good detectors of the state the individual is in, during the process of his career decision making. If both give a positive picture, then they can be used as indicators of further elaboration, if the individual wishes to do so. Or they can be used to reassure him that his choice is in accordance with the subjective way in which he wishes to solve his career problem. If there is a contradiction (for example

Anna's case), the counsellor should be able to see this and to help the individual by suggesting that he reconsider and re-evaluate his problem.

For example, in Anna's case, the counsellor should suggest that considering only one solution for her career is limiting and produces anxiety and it may create problems for her in the future. Also, at this point, he should prime her to formulate scenarios about what she will do if her single solution fails, or if she enters another field of studies. By formulating scenarios about other alternative solutions, she can extend her background of safety and reduce her anxiety about the uncertainty that a possible failure can create.

In Nikos' case, the counsellor can help him to reconsider preferences, according to his abilities and his goals, so that he is able to see what really matters to him. This could help to bring him closer to reality. By reducing his goal confusion he may be able to be more decisive.

An interesting conclusion that can be drawn from the above discussion is that both Inference diagrams and the resulting preference structure from the Multidimensional analysis can be used as complementary ways of representation of the individual's cognitive knowledge related to the ways he explores and structure his career decision problem. Both of these representations can be used by the counsellor as tools for detection, and as a means of providing support to the individual in the process of solving his career problem.

In the following chapter, the findings from the Inference diagrams and MAUD analyses, and the conclusions drawn from their interrelations, as well as the results from the five levels analyses (Chapter 8) will be discussed and incorporated into the general process model of career decision making introduced in Chapter 6.

CHAPTER 9

PRACTICAL CONSIDERATIONS FOR THE PROCESS OF CAREER DECISION MAKING

OVERVIEW

This thesis set out to develop ways of knowledge representation in the process of career decision making and ways of helping the individual in this process.

In Chapter 6, a general process model of career decision making was proposed, the complete representation of which is shown in Fig.9.1. This model became the basis of the methodology used for the investigation of the way adolescents perceive and represent their career decision making problems. This methodology included the follow up of the activities and operations involved in the three activity areas of the model (A1, A2, A3). The five levels framework of knowledge representation introduced in Chapter 3 was incorporated into the three activity areas of the process model and used to analyze the operations involved in each activity area and to establish the elements of each area.

In this chapter the results from the five level analyses (Chapter 7), as well as the findings from the use of the Inference diagrams and MAUD analyses, were used as helping techniques in dissecting the process of career decision making (Chapter 8) and will be discussed in the context of the general process model of career decision making. This will be followed by a proposal for a counselling model which incorporates the above findings into a general model for support and counselling.

9.1 The General Process Model and Methodology for Career Decision Making: Objectives - Elements - Activities

The general process model for career decision making consists of three main activity areas interconnected by pathways which link these areas, and the elements in each area, to demonstrate the processes individuals go through in the investigation of their career problems. These elements are distinct only in the sense of representing identifiable activities and are not rigidly separated from one another (Fig. 9.1).

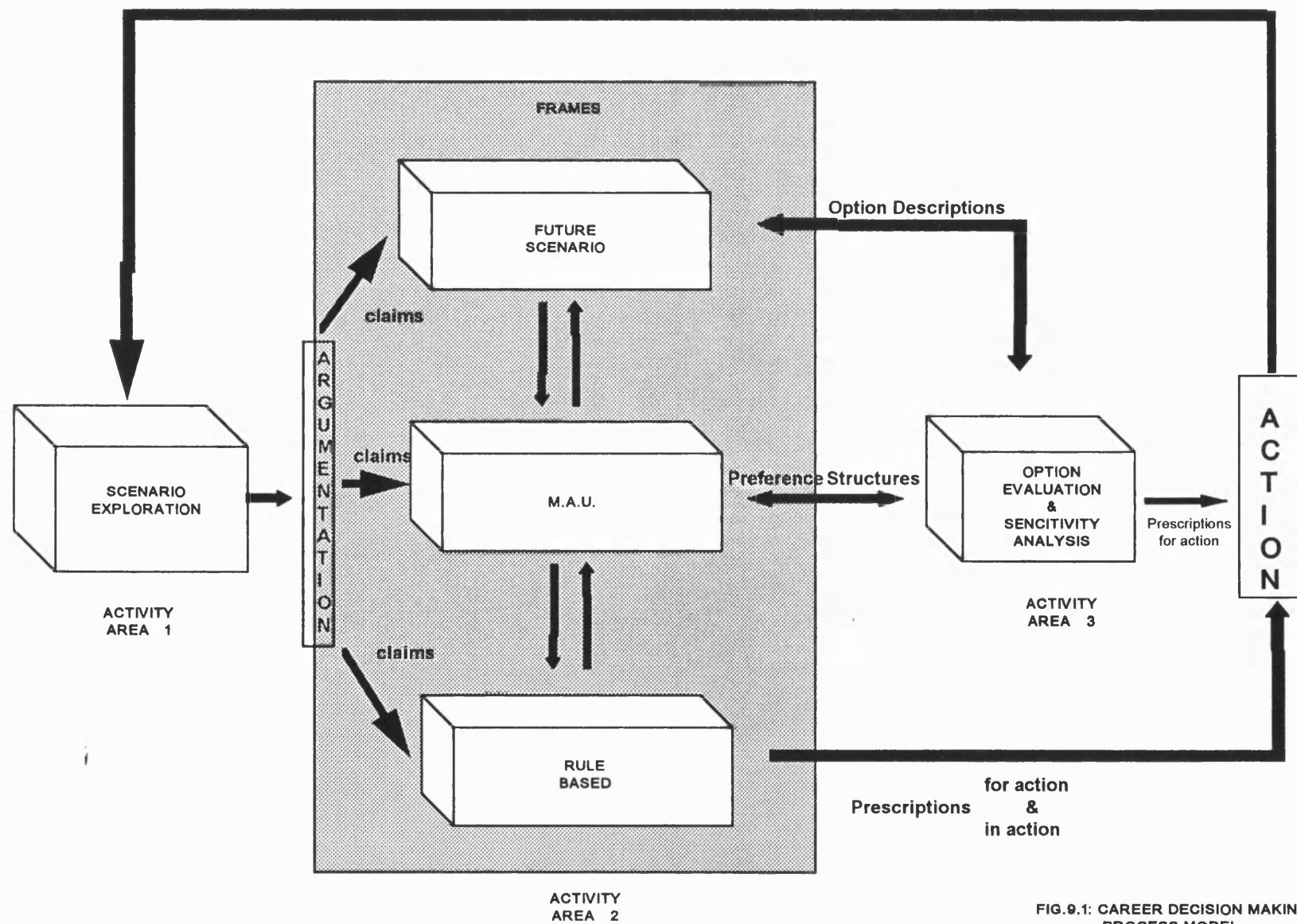


FIG.9.1: CAREER DECISION MAKING
PROCESS MODEL

Activity area 1 (A1):

Objective : Scenario exploration

Activity area 1 of the process model addresses the awareness of the decision problem and the attempt to express it and build up the richest possible picture of the situation within which the problem is perceived. The individual, operating in this area, has the feeling that something has to be done concerning his career or that he is in a problematic situation which has to be resolved. This problematic situation is expressed by the individual talking and representing his problem in his own way and within the boundaries of his own small world. He talks about his internally or externally assigned objectives (his preferences, desires, goals for his future, his fears, his uncertainties and his difficulties), as well as about his relationship with his immediate or broader social environment. Both of these affect the representation of his career problem and his career decision.

The elements of this area were established through the analysis of Level 5 and Level 4 operations (Chapter 7, 7.3.1, 7.3.3) and include: The individual's "small world"; the "domains" as the main areas of exploration of his small world, and the individual's "background of safety" as it is established in the exploration of the areas of "unsafe".

The individual's activities to get through this area in the process of decision making are operational in reference to the above elements and address the individual's ability to:

- (a) explore the domains which are considered important for his decision situation;
- (b) expand through this exploration the boundaries of his small world and his background of safety, and
- (c) make arguments and formulate scenarios and take alternative pathways for the solution of his career problem.

Through these activities (of Area 1), the individual is in a continuous social exchange process with his environment in his attempt to explore and conceptualize his problem. The individual exits from Activity area 1, when he is able to make claims in his arguments about the possible alternative ways he can take, to move from his present

status towards a desired goal state. The attainment of this goal, he believes, will alleviate his problem. In this case, Argumentational analysis (Chapter 7, 7.3.2) was used to establish the elements of the individual's arguments (claims, warrants, backings), by which the individual expresses his formulated scenarios about the possible solutions of his future. Consequently, the individual's argumentation stands as the bridge between activity area 1 and activity area 2, and gives the individual the ability to move into and operate in activity area 2.

Activity area 2 (A2):

Objective: Option formation

Activity area 2 addresses the formulation of the alternative options which represent the individual's preferred solutions to his problem. The elements for this area are the three main cognitive structures found to be used in the individual's way of representation of the knowledge of his career problem through the analysis of level 4 and level 3 operations (Chapter 7, 7.3.3, 7.3.4). These are the three frames i.e. "Multi Attribute Utility" frame, "Future Scenario" frame, and "Rule based" frame (Fig. 9.1).

In addition, the analysis of the operations involved in level 3, helped us to establish the operational processes and the individual's activities in this area. The operational processes identified address the following:

- (a) the individual's ability to put his claims as to how he wants to solve his problem within the above frames, and to develop structure within these frames, and
- (b) the interplay between the different frames which have been identified.

Individuals were found to express their problems within any one of the above frames, or to use all of them or some of them. The links and the pathways that exist in this area (Fig.9.1) show that there is an interplay in the way these three frames can be used by the individual when he is talking about his career problem. Therefore, all three frames are included as essential components of the 2nd activity area.

By developing a structure within a Future Scenario frame, the individual is formulating descriptions of his options. These were identified as the link in the pathway the individual will take to move to the next activity area for the evaluation of these options. By developing structure in a MAU frame, he formulates preference

structures which again can lead towards Activity area 3. However, if the individual is expressing his problem in a rule based frame, then there is no need for structure, since rules by themselves give prescriptions which lead straight to action.

In fact, Activity area 2 was found to be the most important area in the whole process of decision making. When individuals could frame and structure their decision problems, it was found that they were then able to proceed to the next activity area III. On the other hand, if they had a lot of claims, but could not fit these within any frame, it was found that the solutions which they tended to give to their problem, were not satisfactory to them. Therefore, it was concluded that whatever decision the individual makes has to be made within some sort of frame in order to be operational, in order for the individual to move from activity area 2 to area 3.

The use of only a rule based frame was also found to inhibit the individual during the solution of his problem. This is because rules do not permit any further exploration in area 2 or any trade-offs between the frames, since they restrict the problem space and force the individual to move directly to action. Individuals operating in the rule based frame were also found to accept the rules prescribed to them without evaluation.

Activity Area 3 (A3):

Objective: Option evaluation

Activity area 3 addresses the evaluation of the career options which are identified and developed through the operations and activities of the previous area (see Fig. 9.1). Through the analysis of the operations involved in Levels 2 and 1, it was possible to establish the elements and the operational processes of this area. The elements are the conditional or unconditional judgements which individuals were found to use when expressing their best assessments about the various options already being evaluated.

The operational activities identified as important for proceeding to action in this area were:

- (a) the individual's ability to form an order of preference for his options, and

(b) his ability to estimate the degree of preference and make best assessments about these options.

The results of these activities were found to prescribe action to take place. These prescriptions constitute the pathways which move the individual towards taking action and solving his problem. If the individual, after evaluating his career options, is not satisfied with them, he has the option of going back to the previous activity area. He can do this either through the pathway of option description, so that he can reformulate and restructure his problem in a future scenario frame, or through the pathway of preference structure so that he can restructure his problem in a MAU frame. On the other hand, having decided on his most desirable solution, if he is still not satisfied and is still unable to take any action, then the model allows him to go back to activity area 1 and reconsider his problem.

9.1.1. The principles of the process model of career decision making

There are two fundamental principles of the general process model of career decision making:

The first one claims that the movement of the individual through the model towards the solution of his problem (which in fact represents **the decision process**) is based on the **subjective meaning representation** of the decision situation of each decision maker.

The second principle refers to the **iterative** nature of the model with the links and the looping backs among the different areas. The links and pathways between the various activity areas, and between the various elements of each area, permit interplay and interactions to take place and show that iteration is possible at all points of the model. In fact, these interactions allow activities which are necessary for the completion of tasks and objectives in each area to take place, thus reflecting the processes by which the individual is dealing with his problem as he tries to proceed towards solving it.

The above basic principles of the general process model indicate that the individual can start his problem investigation at any point of the process, depending on how he subjectively represents this problem at the moment that he is required to investigate

it. Consequently, according to this model, the individual can start the process by entering into any of the three activity areas, and he can move backwards or forwards through the model until he finds the best way out of it. For example, if the individual initiates his problem investigation when he is in conflict about which alternative solution for his career is best and why, he is considered to be operating in Activity area 3, since he is and should be trying to evaluate his alternative solutions. If he cannot accomplish this through the activities of this area, then he can proceed by going back to activity area 2, where he is allowed to restructure the frames under which he has expressed his problem.

It has to be emphasized that, in this model, the activity areas do not represent static stages but progressive "passages" in which the individual moves. He does so by accomplishing the necessary operations, while experiencing the dynamic transaction defined by his social exchanges with the environment. On the basis of the structure of this model, it is apparent that progress in any area of the decision process depends on the completion of the objectives and the tasks involved in that area. If the objectives of one activity area are not satisfied, the individual is expected to experience difficulties in the next area and should go back. Failing to do so may result in a state of confusion and dissatisfaction and in an escalation of the difficulties, to the point where he may withdraw from the process, leaving the problem unresolved.

9.1.2 Conclusions about the general process model of career decision making

The iterative nature of the model represents the process of career decision making. It describes the activities used by the problem owner and checked by the problem analyst in understanding "**what**" is essential in the problem resolution, and "**how**" this has to be done. In this sense, the model is **structural** because it is composed of the activity areas and their elements which are involved in the process of decision making, as well as the sequence of these activity areas. It is also **dynamic** because it shows the **process** of decision making. That is, how transition from one activity

to another takes place during problem formulation, or how the state of problem representation changes.

The iterative nature of the model and the individual's subjective meaning representation of his decision problem have a lot of implications for the kind of help the individual requires and for the adoption of a more suitable counselling procedure.

In the following section an extension of the model is proposed. The model can serve as a procedural guide to the counsellor, giving examples and establishing the time when, and the possible ways in which, the counsellor can help the adolescent in his career decision.

9.2. A Counselling Process Model for Career Decision Making

A fundamental requirement of effective decision aiding is that help should be given at the point of the process of problem structuring and decision making where the decision maker has difficulties in proceeding (Humphreys and McFadden, 1980).

The general process model of career decision making developed in the present thesis demonstrates the meaning of the above statement: how and when support can be provided to the individual during this process. In fact, the proposed model concentrates on how the individual proceeds in his decision making on the basis of his perception of the problem. The latter emphasizes that there cannot be a normative way of looking at a decision problem which can prescribe the best way for its solution, since the problem is defined by the individual's small world (preferences, beliefs, perceptions, interests, habits, needs).

The counselling process model proposed here (Fig. 9.2) is based on the general process model of career decision making established in this thesis. In fact it is a representation of the methodology and procedure followed in the present study for the establishment of the general process model. It follows the basic elements and principles of the three activity areas defined in this model and has the same objectives in each area.

The overall objectives, as well as the main activities needed to achieve these objectives, were defined on the basis of the results and conclusions of the research conducted for this thesis. These activities will now be presented as the tasks the individual has to achieve under the counsellor's guidance.

For the sake of convenience, the model will be presented by starting from the individual's small world exploration (activity area 1), to the point at which the individual can commit himself to an action (activity area 3). This method of presentation does not mean that career decision making has to be seen by the counsellor as a linear choice. Counselling can instead begin at any point of the process, depending on the way the individual first presents his problem.

9.2.1 Areas, Objectives and Tasks

The counselling process model consists of three activity areas drawn in a similar sequence order to the areas of the general process model of career decision making (Fig. 9.2).

The objectives (enclosed in squares) and the main activities involved in each area are linked by arrows, which indicate the pathways down which the individual has to be guided when he needs to move from one activity to the next or from one area to another. The activities, which have to be accomplished in each area and the ability of the individual to do this, serve as a guide to the counsellor on how to guide him in order to achieve the objectives of each area. Arrows also indicate at which points main questions have to be asked, by the counsellor, in order to maintain the process in sequence or to guide the individual to loop back when necessary.

The main activities, listed below, are broken into simple tasks. In order to demonstrate how both parties can have a better knowledge of the problem, both, the individual's and the counsellor's tasks are presented, although there is some overlap.

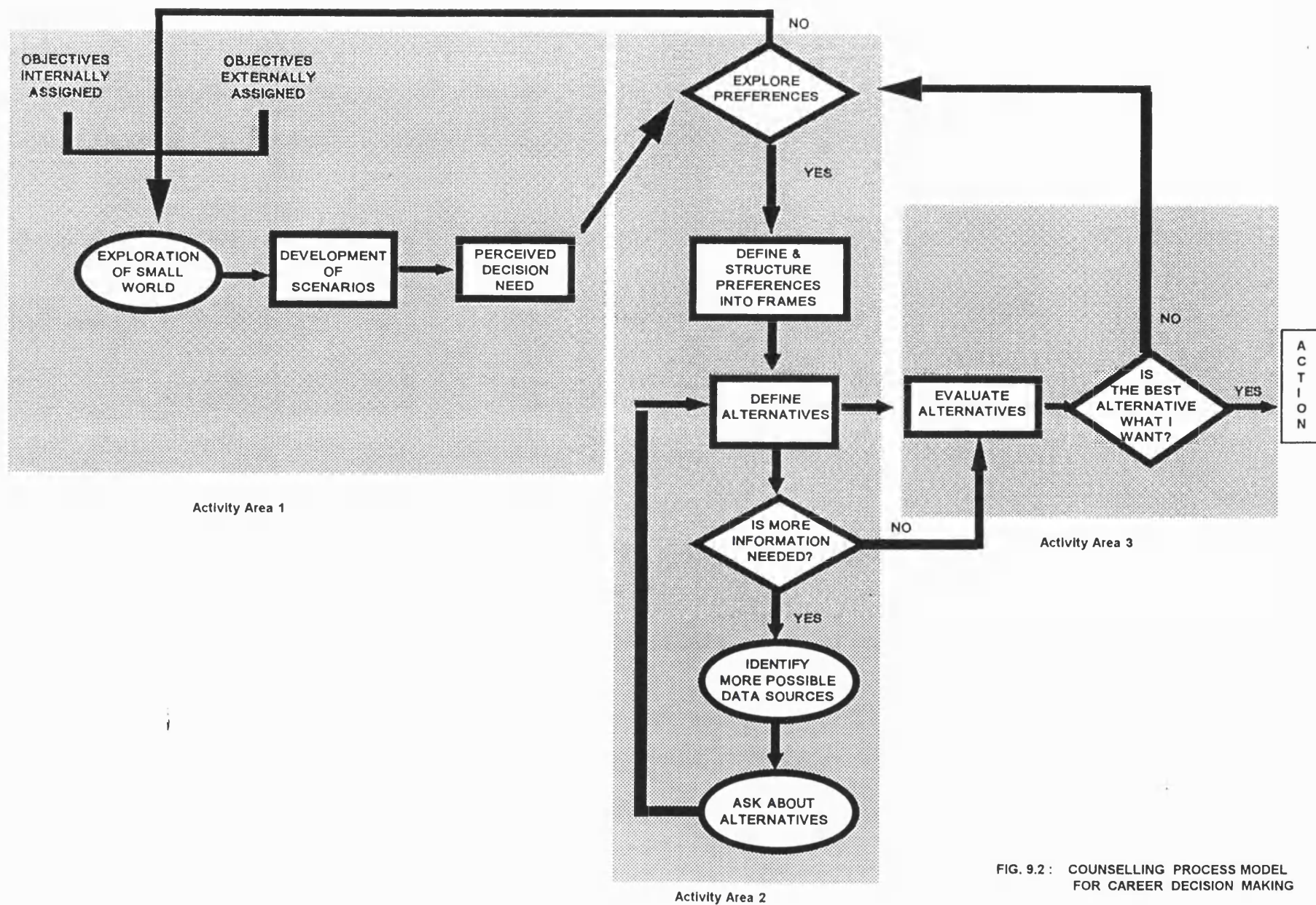


FIG. 9.2: COUNSELLING PROCESS MODEL FOR CAREER DECISION MAKING

Activity Area 1

Objective

Exploration of the individual's small world and acceptance of the need to change

Main activity: Development of scenarios for the solution of the problem

Tasks for the student

- Gather all relevant information
- Identify your own areas of concern and their relative importance
- Identify your own goals and objectives
- Develop scenarios about the solution of your problem
- Defend the way you want to solve your career problem

Tasks for the counsellor

- Prime the individual to talk about his future and his future career
- Prime the individual in the exploration of the main areas of concern related to the problem
- Identify which areas of concern constrain the individual's problem representation and which need further exploration
- Identify the individual's background of safety
- Prime the individual to gather more information and to develop more understanding about his main areas of concern
- Prime the individual in the formation of arguments about how he wants to solve his career problem
- Identify the claims the individual is making concerning the alternative solutions he wants to give to his career problem

Activity Area 2

Objective

To establish possible alternative solutions

Main Activity: Define and structure preferences into frames

Tasks for the student

- Identify and give possible alternative solutions
- Identify and give ways of achieving possible alternative solutions
- Develop scenarios for the possible alternative solutions
- Identify and give attributes in order of importance for your future career
- Identify and give the criteria and attributes for the possible alternative solutions
- Identify possible information data sources
- Gather more information for possible alternative solutions

Tasks for the counsellor

- Prime the individual on the generation of options
- Prime the individual to frame his claims into a future scenario or a Multi attribute utility frame
- Identify rule based frames that may constrain the individual's generation of new frames
- Prime the individual to identify the attributes and criteria relevant to the possible options
- Prime the individual to state the desirable options
- Prime the individual to seek more information and to ask about more data sources
- Give Decisional Balance Sheet or similar decisional aiding devices to help him to a more thorough consideration of the effects and the consequences his most preferable alternative solutions might have for him.
- Give to the individual MAUD or similar decision aiding techniques
- Help the individual in the structure of his inference diagram

Activity area 3

Objective

To evaluate the possible alternative solutions and make best assessments about the most preferable one.

Main Activity: Evaluate alternatives

Tasks for the individual

- Explore "what if" questions
- Identify differences between attributes
- Identify differences between alternative solutions
- Identify which alternative solutions are more important
- Give the ideal value for each of the attributes
- Give the importance of each attribute to the most preferred alternative solution
- Give the best alternative solution

Tasks for the counsellor

- Prime the individual to explore "what if" questions
- Prime the individual to evaluate different attributes
- Prime the individual to evaluate the different alternatives
- Prime the individual to seek more information about attributes
- Give MAUD or any other decision aiding technique to help in the evaluation of the alternative solutions
- Generate and create all possible courses of action the individual has to take in order to get from the present position to the ideal position
- Prime the individual to define the actions that have to be taken for the resolution of the problem situation

9.2.2 Discussion on the counselling model

According to this model, it is assumed that not all of the tasks need to be performed by the individual in order to accomplish the set objectives. In fact, the number of tasks that have to be undertaken may differ across the model depending on the individual's subjective meaning representation of the problem and will depend on the entry point of which he starts his investigations.

The great advantage of this model is that it enables the counsellor to direct the individual back to any one of the areas during the counselling procedure. Priming the individual for any of the tasks listed above is, in fact, based on the counsellor's subjective evaluation as to whether the individual is able to undertake the task or not. In the model presented in Fig.9.2 three main questions were incorporated, with the purpose of enabling the counsellor to ascertain whether the individual could be directed to the next Activity area or needed to loop back.

The first question is in Activity area 2, i.e. "*Can the student explore his preferences concerning the ways of solving his decision problem?*"

If the answer is yes, the individual should be prompted to proceed with the structuring of his preferences into frames and with the definition of his alternatives. If the answer is "no", then he should be primed to go back to the first activity area and to start reconsidering his problem by exploring his small world and developing scenarios for the solution of his problem.

The second question lies again in activity area 2 and its purpose is to enable the individual to go back and forth in the same area, especially if the counsellor feels that the individual has not adequately defined his alternative solutions. In this case, the individual should be asked, "*whether he needs more information or whether he wants to proceed straight away with the evaluation of his alternative solutions.*" If the answer to this question is positive, the individual is prompted to identify more data sources and obtain further information. On the basis of the new input, the individual should be requested to redefine his alternatives prior to proceeding with their evaluation. If the answer is negative then he goes to A3 for the evaluation of his

alternative solutions.

The third question is posed in activity area 3 after the evaluation of alternative solutions and the individual's assessment of his best alternative. Its purpose is for the counsellor to ensure that the best alternative is the ideal or close to the ideal alternative for the individual. The individual should be asked "*whether he is satisfied with his chosen alternative or not*". If the answer is "yes", the individual is encouraged to proceed to action for the resolution of his problem. If the answer is "no", then the counsellor has to consider whether the individual needs to explore further his preferences and restructure them into frames (Area 2). Or has he to explore, more extensively, his small world and develop scenarios for his future career (Area 1).

An important aspect that has to be taken into account in this study is that originally the study was not intended to test the counselling model proposed above. As stated previously, the present study set out to study the process of career decision making and to investigate how individuals represent their career decision making problems. However, the methodology used to study the process of career decision making, as well as the fact that the counselling procedure followed had an effect on the students' process of decision making, became the basis for the construction and proposition of the above model. Consequently, the above counselling model can be seen as the methodology which can guide the counsellor in his work. It can comprise a prescriptive procedure, useful in guiding the counsellor about how to act in the particular context of helping the individual resolve his career decision making. In order for the model presented above to be established, it needs to be tested and further developed and modified.

The next section is devoted to a discussion of the experiences obtained through the methodological procedure followed in this study. It concerns how the counsellor should track the individual in his process of deciding, and how he can detect the best ways to help him.

9.3. The Process of Counselling through the Methodology of the General Process Model for Career Decision Making.

The difference between the counselling model and the process model of career decision making is that, while the first provides a useful guide to the counsellor on **how to act** in his career counselling procedure and **how to help** students to move from one activity area to the other, the latter provides the characteristics which define **when** this has to be done. It enables the counsellor to track individuals in their movement through the model, in order to understand how they handle their problem. Consequently, he can extract from the model exactly where the individual needs to be helped and what type of help he requires.

The methodology used, together with the analysis of the operations involved at the five levels framework, showed that priming the students in all the steps of the procedure had an effect on the individual's problem representation and on the way he proceeded to find a solution. All areas of the model were found to be of equal importance in the process of deciding. Therefore, the counsellor has to ensure that the tasks of the operations in each area have been accomplished before he can guide the individual to the next area.

For example, working in **Activity area 1**, the counsellor has to establish, through the individual's argumentation (i.e. the types of warrants and backing the individual is using), which issues in particular constrain the individual's problem exploration. When the counsellor detects this, he has to prime the individual about these issues (i.e. he has to prime the individual to talk or to go and find more related information). So then the individual is able to extend his background of safety. By extending his background of safety (Chapter 2, 2.2.1) the individual is more able to extend his decision horizon and formulate scenarios for his future. Analysis of Levels 5 and 4 operations showed that, in fact, priming the students in different issues of concern induced them to obtain more information about the various alternative ways of approaching their problems. In turn, this priming resulted in more extensive arguments from the students, and more claims concerning the solutions to their problems.

In Activity area 2, the individual has to formulate his claims about how he wants to solve his career problem within frames. This activity will help him to structure his problem and proceed to action. A large number of students, particularly young ones, were found to make a lot of claims but with a minimum amount of structuring of these claims within frames. It is very important that this is detected by the counsellor, since the individual's inability to achieve this should be taken as an indication that he will have difficulties in solving his problem. It has been established in this study (Chapter 8) that for any decision to be taken it has to be under some sort of a frame. An example from the procedure followed in this thesis can illustrate how the counsellor can respond in such a situation:

Anna, at the beginning of her session, responding to my (counsellor: C) suggestion:

C: - *"Tell me about your future plans"* (primed in domain), replied:

- "The first thing is to enter University. I am thinking about trying for the third group of studies, Literature, education and all these. And if I pass ...whatever happens..., the important thing for me now is to enter University. I think I have a lot of chances of entering University (**Claim**). Last year I finished with a high grade 18.5/20 (**Warrant**), and I have 20 in literature (**Backing**). I am a little behind in maths, but I don't need maths".

In this argument, Anna is making a claim (C) with a warrant (W) and backing (B) and she is actually trying to frame her ideas into a Multi Attribute Utility (MAU) frame (literature, education and all these), but without success and without exploring this frame.

C: - *"Is there any other career alternative you have in mind ?"* (priming in frame).

Anna is constrained to form a frame and she responds:

- "I would prefer to study Literature (**Claim 1**). If not I will become a teacher or a Gym teacher (**MAU frame**). You see, I can enter all these departments in the university if I register in the third group of studies. If I could choose, I would like to become a journalist (**Claim 2**), but it is not possible. I like that, but there are a lot of difficulties in this kind of job and I don't know if I can overcome them. But it is a nice profession" (**MAU frame**).

In this argument Anna is using more claims and is framing her ideas into a Multi Attribute Utility (MAU) frame, and she even gives some attributes (nice profession, difficult job).

C: - *"What kind of satisfaction do you expect your future job might give you ?"* (priming in the structure of Multi Attribute Utility frame).

Anna elaborates her frame and she actually moves to the A3 area, giving four attributes (indexed as **Attributes 1,2,3,4** below) to her alternatives by saying :

- "I want to like my job (**Atr.1**). Because if I don't, I will feel alright for two or three years and then I will start getting bored. I want to be able to offer something (**Atr.2**) and also make money (**Atr.3**). I think that, nowadays, to have your own profession (**Atr.4**) is much better.

C: "*What are you going to do if you succeed in entering university?*" (priming in the structure of Future Scenario frame)

Anna: -" I don't know where I will be accepted. If I enter Literature, (**event node o**), I would rather teach in a preparatory school (**act note _**), or I will go abroad to Australia to teach in the Greek Schools there. That will be for five to six years. Then I will come back. I would like that. We have some relatives there. In Greece I think I have seen everything, I have no interests here".

In this argument she is framing her ideas into a future scenario frame with act and event nodes. Thus, by framing her claims in either of the two types of frames (MAU, Future Scenario), Anna is now more able to move into the activity area A3 where she can evaluate her preferences, if she wants to do so.

Also, it is important that the counsellor is able to detect the rules that the individual may use which constrain his problem representation within certain solutions. Rules in fact restrict the problem space, as illustrated in Anna's case below:

C: - "*Do you have any other alternatives?*"

Anna: -"Alternatives ? ...Job alternatives? In order to have alternatives you must have a job ready, for example from your father. But I don't have this kind of an alternative. The only thing is to get into University ".

In this argument she is actually framing her ideas under the rule : "You can only have job alternatives if you have a job ready from your father, or if you study in the university." She has constrained her alternative solutions only within the possibilities of what "a university degree" can offer her. She is elaborating her ideas only within this frame and she doesn't want to think of any other job alternatives, since she believes that they do not exist for her. In similar cases, the counsellor has to encourage the individual to break the rule by asking him to find alternatives which may exist, other than the ones the rule imposes on him. For example, in Anna's case, this could be achieved by probing her to get more information about " what she could do if she fails to enter university". By becoming aware of the ways in which

she could handle her failure, her stress about "taking the university exams" would be alleviated, and "studying at the university" would not be the only value alternative. In some cases even the counsellor can impose a rule. For example, if a student says:

Student: - " Well, I could go to technical school straight away or I could try hard to get into the university".

And the counsellor answers :

C: - *"Forget about university, you will never make the grades you need to get into university"*.

The counsellor here imposes a rule by telling the individual to leave out all possibilities of getting into university. Or, as in other cases, the counsellor can help the individual change a rule if he thinks it is too restrictive: he may, for example, try to present it as a possibility which could be traded-off for either a future scenario frame or a MAU frame.

Concerning the structure development within the frames, the key point is that, once the counsellor discovers which particular frames best fit the individual's arguments, then he should continue priming the individual to develop structure within those frames. Results from Level 3 analysis showed that priming the students at this level had a positive effect in the development of structure within the defined frames. This suggests that any conceptual model or any decision aid (e.g. MAUD), at this point, can help the decision maker organize his thoughts about his alternatives and make more explicit the alternatives he finds preferable.

In fact, the use of MAUD and of Inference diagrams in this study were found to help individuals in both their structuring and in their evaluation processes (Activity area 3). MAUD results showed that most of the students gave more simple regret structures in the second interview sessions (six months later). This shows that they had been helped in the clarification of their preferences and their ideal values concerning their alternative solutions for their careers.

It became evident, during the analysis of the data drawn from this study, that at any area of the model, irrespective of the means by which help is given, this help has to be related to the way the individual represents his problem. This help should

not be restricted to only one frame, since it was found that the individual represents his problem in more than one frame at a time.

In addition, it became apparent that taking action for the implementation of a decision will depend on the extent to which the individual has worked on the operations involved in the various areas of the conceptual model, and particularly in the second area, where his claims must be represented within frames. Making a lot of claims and incorporating just a few of them into frames may not provide the individual with a concrete representation of what is needed or what tactics have to be executed for the completion of his goals, even if these goals have been set in concrete terms.

The decision to take the best alternative (Activity area 3) brings the individual to the moment of action which will resolve his problem. At this point the counsellor has to ensure that the individual will implement the decision taken. This can be achieved by means of a debriefing interview either straight after the decision is made (as was done in the present study), or after a time period during which the individual can think further about the implementation of this decision. The general process model allows both the counsellor and the individual to start the process again, either at the beginning or at any other point according to requirements.

9.4. Conclusion

This chapter discussed how the counselling process in career decision making can be facilitated using the proposed general process and counselling process models of career decision making. Emphasis was put upon the differences between the counselling process model, which provides the methodology which can guide the counsellor in his work, and the general process model, which prescribes to the counsellor how to track individuals in their process of decision making and how to find ways to help them.

The next chapter is devoted to the general conclusions drawn from this research. The limitations of this research are discussed, and suggestions for further research in the field of career decision problems are made.

CHAPTER TEN

CONCLUSIONS - DISCUSSION

OVERVIEW

The aim of the present study was to investigate the way adolescents represent the knowledge about their career decision making problems, with the objective of developing a methodology for studying these representations and defining how these representations can be used in order to help individuals in their process of career decision making.

To achieve this, a general process model of career decision making was constructed at the beginning of the research, based on a synthesis of elements of the decision theoretical approach and the systems theory approach. The basic assumptions of the model were formulated through the observations and the results of the pilot work. They are: (a) that decision making is based on the subjective meaning representation of the decision situation of each decision maker, who uses different ways of representing his career problem, and (b) that career decision making is an ongoing process rather than a one time event. These two assumptions were used in defining the elements of the model which prescribed the methodology followed in the investigations of the way adolescents perceive and represent their career decision making problems. This methodology involves the following up of the objectives, elements and activities in the three activity areas which constitute the model.

The methodology was tested in the investigation of the career problem of Greek adolescents of 16 to 20 years old. The data were analyzed by using the five levels framework of knowledge representation, which is incorporated in the general model and defines the operations involved in the three activity areas of the model. The findings of the analysis confirmed that individuals indeed operate in these levels when they try to represent their knowledge of their career problems. Subsequently, these findings supported the use of the five levels framework, as an analytic tool, for the investigation of the career decision making process, in order to establish the objectives, activities and elements of the general process model.

The findings also confirmed the basic assumptions of the model and established it as a descriptive tool of how individuals should proceed in finding a solution to their problem, and as an original methodology able to contribute to the investigation of the process of career decision making. Furthermore, the use of this model as a methodology has enabled me to initiate a counselling process model for career decision making. This putative counselling model is proposed as a useful prescriptive procedure to guide the counsellor on how to proceed in giving support to individuals in their career decision making.

10.1 Main Findings

The main issue addressed in this thesis is that career decision making as a process has to be investigated in relation to the individual's subjective way of problem representation. Under this issue the main questions addressed were:

- (a), What are the areas (domains) the individual explores when he is talking about his career problem;
- (b) What kind of frames he uses in his arguments when he wants to proceed to the solution of his problem;
- (c) How he structures, elaborates and evaluates the alternative solutions for his career problem within these frames; and
- (d), To what extent the methodological procedure used for the investigation of the above has an effect on the individual's decision making process.

With respect to the above questions, the major findings resulting from the analysis of the research data suggest that adolescents use more than one representation for their problems. These findings support the original assumptions of the research. Differences were found in the way that individuals structure, elaborate and evaluate these representations. These different ways of responding appear to reflect, primarily, the subjective way of perceiving and representing one's career problem. Priming the individual, however, was found to influence the way the individual represents, structures and elaborates his career problem.

The main findings are summarized in this section in reference to the hypotheses stated in each of the five levels of the main analysis concerning the individual's subjective way of perceiving and represent his career problem, as well as the hypotheses stated in relation to counsellor's intervention and the decision aiding techniques.

(i) Problem Exploration
(Activity Area 1)

- * From the pilot work, by exploring the individual's perception of his career problem, it was found that the most common factors which appeared to formulate his background of safety and constrain his decision making process, derived from school, social and personal areas. The results from the main study showed that these areas constrain the individual's exploration of his career problem irrespective of age. Of greater importance to the students were: Parental Influence, Educational Achievement, Professions, Future Plans, and Self Concept.

(Level 5 analysis, Hypothesis No1, Chapter 7, 7.3.1; 7.4)

- * Concerning the students' background of safety (section 7.3.1.1), the number of unsafe propositions made were dependent on age, with the younger students making more than the older ones. As the students became older they appeared to feel more unsafe propositions than before the exams were taken. However, this response was balanced by them making more contingency plans for their future, as was shown from the larger number of conditional judgments they made

(Level 5 and Level 2 & 1 analysis, Hypothesis No2; No8; No10, Chapter 7, 7.3.1.1; 7.3.5; 7.4).

(ii): Structuring and Evaluation of the problem
(Activity area 2 and 1)

- * The way the individuals perceive and express their career problems is subjective.
- * Individuals were found to structure, explore and evaluate their problems mainly within three frames, i.e. Multi Attribute Utility frame, Future Scenario frame, and Rule based frame. The first two frames were found to be used more than the third one.

- * The findings concerning the number of conditional and unconditional judgments used by the individuals to evaluate the different alternative solutions (which imply the number of contingency plans made), suggested that, to make a decision that leads to action, it is essential that a person is able to make contingency plans (i.e. to think conditionally about his problem) and, at the same time, that he is able to make unconditional judgments which could lead him to make best assessments about his alternative solutions and then to proceed to action.

Level 4 and level 3 analysis. Hypotheses No2; No4; No7; No9 (Chapter 7, 7.3; 7.4)

(iii): Counselling intervention

- * Counsellor's interventions support the individual in expressing, structuring and evaluation of his problem.

* Priming the students resulted in increasing frame formation and structuring within the frames, irrespective of age. In particular, priming students in structuring their claims within some sort of frame, resulted in (a) the formation of more plans about their future, more frames and thus more conditional judgments, and (b) the clarification of their desires and preferences which resulted in better establishing their preferences and their decisions about their future careers (i.e. more unconditional judgments). This can help the individual to take a decision and proceed to action.

Hypotheses No2; No4; No7; No9 (Chapter 7, 7.3; 7.4).

Techniques used to support the individuals in their decision making process

- * The computerized decision aid, MAUD, was found to best support individuals in structuring their career problem under the Multi Attribute utility frame. The results from the MAUD analysis showed that older students benefit more from MAUD than younger students, with regard to the clarification of their preferences and the elimination of their goal confusion (Chapter 8, 8.2).
- * Preference structure plots derived from the MAUD analysis, and the Inference diagrams technique used to plot the Future Scenario frames, were found to provide complementary means of tracking the individuals in their process of career decision making (Chapter 8, 8.1; 8.3).

10.1.1 Discussion and Conclusions on the findings

(i):Problem Exploration

The twelve **domains** were selected in this study as the main areas of concern for young adolescents regarding their career problems because they appeared most frequently in the individuals' data. In fact, they are subdivisions of the three main headings "Desires and Preferences, Social Constraints and Mental Constraints", which were investigated in the pilot work (Chapter 4). The twelve domains were used in the main study as an appropriate context within which individuals could formulate arguments to the questions: "**Who I am; Where I am going; Why and How**". These arguments were considered to be useful in the investigations of how the adolescent expresses his dilemma as he experiences the transition from school to work, or to higher education. Extensive research on career development and choice have suggested that these domains directly affect the process of solving career problems (see review in Chapter 1). They may have an effect on both the process of decision making itself, and on those processes which take place in the socialization of the individual within his immediate and external environment. All twelve domains appeared to have an influence on the individual's decision making in this study. However, the domains Parental Influence, Educational Achievement, Future Plans, School Problems, Self Concept, and Relation to Others were found to be explored more. It was concluded that these domains may have greater influence in the individual's conceptualization of his career problem and thus can be considered to best define the boundaries of his small world. This conclusion has to be conceptualized within the social context of where this study was conducted. In Chapter 4, I discussed how the environment of Greek society, where this study took place, may shape the individual's idiosyncratic conception of his environment regarding his career choice. In particular, I discussed how traditional ideas about achievement and motivation, together with the importance the Greek family puts on education, as well as the structure of the Greek educational system, can considerably constrain the way young adolescents perceive of and represent their career problem. We can assume that these same domains are of equal importance to adolescents in other societies, but further investigations will be needed to verify this.

These domains did not only helped me define the boundaries of the individual's small world but also to understand which areas of concern shape his idiosyncratic conception of his career problem. Analyzing this was important, since the idiosyncratic conception was found to constrain the individual and to restrict his ability to explore his problem. This was indicated by the number of **unsafe propositions** identified in the individual's language discourse (Chapter 2, 2.5.1.1; 2.5.1.2; Chapter 7, 7.3.1.1).

In this study, the identified 'Unsafe propositions' indicated the areas about which subjects either did not have a lot of information and so were feeling insecure, or in which they were very much involved emotionally so that they were experiencing a lot of stress and anxiety. In such cases subjects were found to be afraid to talk about anything that was related to these areas or to make any contingency plans. The existence of these unsafe propositions denotes the issues which are more problematic to the individual, concerning the conceptualization and representation of his career problem. From this study, it can be suggested that any intervention on the part of the counsellor at this point may help the individual to change the idiosyncratic conceptions about his problem so that he can expand his background of safety and make more contingency plans about alternative solutions to his problem.

An interesting relationship was also found to exist between the number of unsafe propositions vs the number of conditional judgments. When there were more unsafe propositions there were fewer conditional judgments. This suggests that individuals, who were using more unsafe propositions were unable to make contingency plans and put these into frames. This was particularly evident in the case of younger individuals, who were found to give, in total, more unsafe propositions and more unconditional judgments. The existence of unsafe propositions indicates the point at which intervention is necessary to enable the individual to expand his background of safety in the areas in which he feels unsafe.

Regarding the expectation that, as individuals get older they should have less unsafe propositions, analysis of the interviews of older individuals a year after their first

interviews, suggested the opposite. This could be attributed to the fact that students, at the time of the interview, had experienced some difficulties concerning their career decisions, such as for example, failure to enter university. It is possible that this failure had created feelings of insecurity because of the regret for the time and effort they had previously invested. However, this response was balanced by the students making more contingency plans for their future, as is shown from the larger number of conditional judgments they made. This opposite relationship can be interpreted in terms of the fact that as people get older, they may face more difficulties which can make them more cautious about their judgments. These findings suggest that to take a decision that leads to action it is essential that an individual is able to make contingency plans, i.e. to think conditionally about his problem and at the same time to be able to make unconditional judgments which can lead him to best assessments about his alternative solutions and to action.

(ii): Structuring and evaluation of the problem

Using Argumentation analysis (as discussed in Chapter 6, 6.5 and in Chapter 7, 7.3.2), I was able to establish the formal elements of individuals' arguments which included Data, Claim, Warrant and Backing, and to establish the types of their arguments (complete vs incomplete). The identification of these elements enabled the definition of the type of propositions that lead to "claims", and the claims that lead to "frames", used by students to "frame" and structure their knowledge about their career problems.

To identify these frames, the individuals' arguments were analyzed by means of Argumentation analysis according to the pattern implicit in the questions "Who I am, Where I am going, Why, and How?" (Chapter 7, 7.3.2). Three different frames were identified as the language partitions used by individuals to collectively represent their career problem, i.e.: the Multi Attribute Utility frame, the Future Scenario frame and the Rule-Based frame (level 3 analysis, Chapter 7, 7.3.4).

Although the choice of these three frames is supported substantially by what has been documented in the literature review, it does not exclude the possibility of assigning additional types of frames as semantic representatives in the language discourse of the individual.

The *Multi Attribute Utility frame*, (which focuses on the way subjects wish to structure their preferences for alternatives) was found to be used to a greater extent than the other two frames. This lends validity to the framing assumptions made (but not tested) in previous studies, in which the models deriving from Multi Attribute Utility Theory have been applied in the evaluation of real-life decision problems and in particular of career decision making problems (Humphreys, 1977; Wooler & Lewis, 1982; Ekehammer, 1977; Zakay & Barak, 1984). Multi Attribute Utility Theory researchers have tried to represent and solve decision problems only through the use of Multi Attribute Utility models.

However, this thesis has shown that, the fact that individuals use other ways of representation in addition to MAU frame should be taken into consideration. The present findings also imply that in decision making the use of only the MAUT frame would be inadequate to capture the essence of the problem solving process involved. Consequently, in this context, the implication for practice is that the counsellor should intervene by priming the individual and by directing him to use more than one frames.

In accordance with the above, it was found that the *Future Scenario Frame* was also used quite extensively by the students. In the literature on behavioral decision theory, contributions which describe the use of scenarios (i.e. structuring problems in thinking about the uncertainties associated with alternatives) in personal decision problems are rare. The present results, however, suggest that this way of representation is as important to individuals as the MAU frame and, in particular, they suggest that these two kinds of representation are complementary and not alternative. Thus, the use of both frames should always be taken into consideration in personal decision making. Moreover, the nature of the Future Scenarios used within the frame need to be explored rather than prescribed in each case. Humphreys and Berkeley have criticized the use of prescribed scenarios and have stressed the need to approach the problem by taking into consideration the individual's subjective meaning representation. They have proposed that, in the absence of a normative view of what a problem structure should be, the initial scenarios of the problem owner have to be seen as personal fantasies about the future which may be in need of reality

testing. In the case of career counselling, such reality testing can be undertaken through a dialogue with the counsellor, who can help the individual gain more information about what constitutes his future scenario (alternatives, attributes, actions, consequences), and thus help him to have a more realistic picture of his problem.

Another important observation concerning the individual's representation in a Future Scenario frame is the construction of **past scenarios** (Chapter 5, 5.5, Chapter 8, 8.1.5). Although past scenarios do not appear in the above findings, since the analysis was based mainly on the consideration of future scenarios, occasionally they can be detected in the individuals' "Inference diagrams" (see Chapter 8, 8.1). In fact I found that, in these cases, past scenarios were used by students when they were trying to restructure their past problematic situations, in order to make them more comfortable and more congruent with their present thinking and their present state of affairs. This finding is consistent with the postulates of cognitive dissonance theory (Festinger, 1954, see Chapter 1, 1.4). In fact, this activity was particularly prominent among older students who, having failed to enter university, were trying to rationalize their past decisions and their acts. They were trying to rewrite their history in order to reduce the dissonance produced by their original choices, which had led to the failure. In other words, they were trying to change act nodes, to event nodes reconstructing their past into an acceptable present situation.

Recently, decision theorists have attempted to investigate how people change the representation of their problem by creating the dominance of one alternative solution over the others, or by defining the relationships and compatibilities between the individual's images and his major life decisions (Montgomery, 1983; Beach & Mitchell, 1987). With the exception of these attempts, although there is plenty of research and discussion on how individuals rationalize their past decisions, previous dissonance theorists and researchers (apart from Brehm and Cohen 1962, who considered only social not personal problems) have not investigated how people try to reduce dissonance through reconstructing rather than merely rationalizing their past situation. It is suggested here that this particular way of past scenario representation is indeed important for the interpretation of the cognitive dissonance phenomenon,

and should be further investigated.

The *Rule-based frame* was found to be least used by individuals. However, a more in depth analysis of the arguments of the individuals revealed that early detection of this frame is important for an adequate understanding of the representation of the problem for both the individual and the counsellor (Chapter 2, 2.5.3, Chapter 5, 5.5, Chapter 9, 9.2). In this study, family background and various social beliefs and principles appeared to constrain career problem representation through the rules they were imposing on individuals. Use of a rule based frame was usually found to reduce the individual's research space in structuring future scenarios and in having trades-off concerning the evaluation of alternatives. So, my argument in this study is that every rule adduced by a subject adds an additional constraint. It seems to restrict the problem space which he or she explores and leaves the individual without the discretion for any exploration right from the beginning of the problem consideration. Following on from this argument, the primacy of rule based models, embraced by proponents of expert systems as the only "correct" way to arrive at a solution, may simply be a prescription for the construction of systems which would constrain the individual to an inadequate conceptualization of his situation.

Further research is definitely needed on the individual's argumentation (see discussion in 10.2.2), for the identification of the main areas of concern which can restrict the individual's conception of his decision problem under rule based frames, also for the identification of ways which could help individuals expand their problem exploration and representation within more than one frame.

(iii) Counselling intervention

The findings of the effects of priming have been discussed in the previous chapter (Chapter 9, 9.2) in relation to the construction and implementation of a counselling process model for career decision making. This putative model is based on the process model and the methodological procedure used in the present thesis for the investigation of the career problem (Chapter 5). Emphasis was placed on how the effects of priming can indicate "when" and "how" the counsellor should support the

individual in the process of career decision making; also on how this support can be implemented through a number of tasks and objectives set for the individual .

The findings from the use of the computerized decision aid, MAUD, for the structuring of the Multi Attribute Utility frame, as well as from the use of Inference Diagrams for the structuring of the Future Scenario frames as tools employed for analysis purposes and for aiding individuals, are discussed in the next section (10.2).

10.2 Issues on Models and Techniques employed

This section, after clarification of the terms model and methodology, is devoted to a critical appraisal of the models and techniques employed in the present study, to the limitations of the research, and to issues regarding further development of the present study.

10.2.1 Model and Methodology

The terms model and methodology were used in a distinctive way in the present study to indicate the different ways of approaching the investigation of the career problem and the process of career decision making. As already discussed in Chapter 5 (section 5.1.1), the term model refers to the stages, objectives and elements of a system which is used to model the process under investigation. The term methodology refers to the tasks within the framework of the model which have to be followed for the investigation to be completed. Following this distinction, the model can aid in defining **what** is essential to the investigation of a problem, whereas the methodology can provide help on **how** this investigation can be achieved (see Chapter 9, 9.1.2, 9.2.2).

10.2.2. General Process Model of Career decision Making

The general process model was first used in the present study as the basis of the

methodological procedure (Chapter 5; Chapter 6, 6.4). It was subsequently established through the findings of the analysis of the results (Chapter 9, 9.1). Finally, it became the basis for the proposition of a counselling model of career decision making (Chapter 9, 9.2).

In the general process model of career decision making, the three Activity areas, together with their objectives and their elements, are the main components of the model representing the process of problem solving behaviour for career decision making (Chapter 5, 5.3.1). The methodology refers to the tasks needing to be accomplished in order to function in these areas. In fact, it constrains the actual orderly sequence that people bring about themselves, when they are talking about their career problems.

The general process model is proposed as being both structural and dynamic, showing what is essential for the problem resolution (main areas of concern, elements, activities), and how this has to be done, i.e. the processes needing to be accomplished for the transition from one area to another towards the solution of the problem.

The components of the model (i.e. the three Activity areas, and the elements of each area), the basis on which they were established, and the way this model was used as a descriptive tool of the process of career decision making, have already been discussed in the previous chapter. Here, I will focus more on the limitations and the scope of the model.

There are two distinctive features of the model:

First, it is based on the individual's subjective perception and representation of the decision problem. By subjective meaning representation, we are referring to the individual's intuitive way of proceeding towards a solution to his problem. This subjective representation specifies how the decision process varies according to the characteristics of the decision maker, the context of the decision, and the type of decision involved.

Second, it is a process model involving certain activities and operations, through which the person progresses in making and carrying out decisions. It is possible to

enter the model at any point of the decision process, moving forward and looping back to previous areas of problem exploration according to needs. Such a process model meets the needs discussed in chapter 2 (sec. 2.3.3) of a general procedural schema which could capture how the problem is constrained, how is represented and how it is intended, i.e. to capture the three problem solving cycles (situation definition problem (representation) definition, and project definition cycles). Such a model can describe how the individual represents his problem, as well as how he is moving while he is proceeding to the solution of his problem and to action. It can also prescribe the rules for an effective movement through this process, and shows the ways that a counsellor can intervene and help the individual in this movement.

In essence, the model provides a description of the psychological processes by which the individual organizes information about his career problem, then deliberates between alternatives and makes a commitment to a course of action. As such, it can actually be viewed as a descriptive model of career decision making under the umbrella of the descriptive approach for the study of occupational choice. It examines how people actually make their career choices, and cannot be considered as belonging to the rational models which usually address how decisions ought to be made.

However, the methodological procedure which is embedded in this study makes the model not only descriptive but also prescriptive. It does so by providing rules on what to investigate when we want to address a career problem, and how to proceed in this investigation. As discussed in Chapter 2 (section 2.3.3; 2.3.4; 2.4.2), the process model developed in the present study was proposed as being both prescriptive and descriptive. However, as a prescriptive model, it should be distinguished from those which only prescribe ways in which people should make choices according to the normative paradigm. The prescriptive models, which are based on this paradigm, usually focus on the choice process itself. Their main concern is with the individual's perceptions of the outcomes of his choice and with the importance of these outcomes to the individual (Brown & Vari, 1992, Watson, 1992). The present process model

of career decision making, has the advantage that, instead, it encompasses the whole decision process. It addresses not only the evaluation and selection of options but, also, the identification and formation of these options.

In this sense the present process model of career decision making resembles prescriptive models like Egan's helping-skills model (Chapter 2, 2.4.1.1) which guide the counsellor and give the rules on how to proceed in helping his client in the whole process of decision making and problem solving. The present model goes beyond that, because as was said above, it is also descriptive showing what is involved in the decision making process and defines how the counsellor can identify what are the needs of the client at each particular stage of the process.

In addition, the assumption that career decision making is based on the individual's subjective meaning representation suggests that, for the solution of a problem, there is no single, correct way but, rather, several possible paths; these paths are derived from different perceptions of the problem by each individual and lead to different prescriptions for action. The above suggests that, for the investigation of a decision problem, the context of the decision, within which the individual's representations are formed, has to be taken into consideration. This view is supported by Watson who suggests that the appropriate research question should not be "what the correct way is to prescribe how to make a decision", but rather "what a good prescriptive procedure should be in the particular context of the decision" (Watson, 1992). The model in the present study has been developed for application in career decision making contexts; in particular, in the context of adolescents moving from school to work or to higher education. Further research would be needed to validate the use of the model in other settings.

Also, while most of the prescriptive models concerning personal decision making have been developed with "research and by researchers" and not through "practice and practioners" (Brown and Vari, 1992), the development of the present model benefited greatly from having access to the real world of the participants, and from my own involvement as a researcher and as a counsellor. In the process of the investigation, it soon became necessary to self-participate in the study and not only

make observations and analyze data as a researcher. In fact, the methodological procedure which I followed and, in particular, the framework of the analysis used, allowed me to act as a researcher and to intervene as a counsellor. This was possible because the framework of the analysis used does not exclude the counsellor from the investigation, since it does not focus only on the subject's behaviour, but also on the interactions between the participant and the counsellor. In addition, the basis of the analysis used gave me the opportunity, first, to study the career problem in the real setting of the participants and, second, to investigate and analyze it from the relative way that the participants were representing their problems in their attempts to solve them.

The use of the decision aiding techniques (for example Inference Diagrams, MAUD), which were incorporated in the methodological procedure, helped me in the process of counselling as well as in the process of analyzing and investigating the data. In fact, the parallel investigation of the career decision process, first through the analysis of the way the career decision problem is represented by the problem owner and second, through the application of the decision aiding techniques used in the present study on individual cases, implements validity to the research model. This parallel investigation also enhances the dynamic characteristic of the model showing technical ways and aiding procedures of how and when to intervene and provide help in the process of career decision making.

10.2.3. Five levels framework of knowledge representation

The main framework used for the analysis of the data in the present study derives from the **five Levels framework of knowledge representation** developed by Humhreys and Berkeley (1983), in order to conceptualize differences among people in the structuring and representation of a decision problem. The operations involved in the various levels of the framework, as well as the way these operations are related to the career decision making process, were described in Chapter 3 (section 3.2, 3.4). This framework was incorporated into the construction of the general process model of career decision making, and used to define the activities involved in the three main

areas of the model.

The five levels framework for the investigation of knowledge representation is founded on three basic principles: 1) The cognitive operations which take place at each level are qualitatively different. 2) The results of these operations constrain the ways operations are carried out at all lower levels. 3) Any decision problem is potentially represented 'in the real world' at all levels. These principles were considered so that they could also be applicable to the investigation of the career problem.

The second and the third principles actually predispose that decision problems have to be examined in terms of how they are handled at each level in a 'top to bottom' analysis. This means that, during the analysis, one moves down the levels until a single judgment has to be made which commits the individual to one action. As one moves down the levels and the problem becomes more structured, the discretion of the decision maker over various solutions is reduced. Since the five Levels framework can represent individual decision making in problems of increasing structure, it was considered that it would be particularly useful for the investigation of the career problem which is a problem of this nature. This supposition is also indicated in the literature reviews about career decision making models. These models usually approach the career problem from the general area of problem recognition to the most narrow area of problem evaluation and problem solving (Chapter 1 and Chapter 2, sections 2.3, 2.4).

In addition, the multi Levels framework assumes that problem situations are seen individually by each stakeholder and that each stakeholder is likely to believe that the way he views the problem is the only correct way to see it. In this study, using the five levels framework allowed the identification of the operations involved at each level, through which it was possible to identify the different ways individuals structure and represent their problems within the bounds of their small worlds. 'Small world', was defined here according to Toda (1976) as the world which includes the individual's interpretations of past experiences and his conception of his future, as well as his plans and his prejudices.

In addition, the third principle of the five Levels framework has been developed with the purpose of being applied to 'real world' problems. The career problem can be considered as a real world problem according to the definition that 'Real world' problems (in contrast to well defined laboratory problems) are those which arise from the everyday world of events and ideas and may be perceived differently by each individual. Accordingly, the career problem is expected to be associated with different type of activities and to differ in how it is intuitively perceived and represented.

In conclusion, the three basic principles of the five Levels framework (Chapter 3, section 3.2) can inform the development of a methodology for the investigation of the cognitive operations involved in the process of career decision making. Therefore, this framework was used as the most appropriate structure for the analysis of the data obtained in this study.

The five levels framework, however, can only be used to show how the processes and the operations involved in the solution of a problem are represented in the various levels of abstraction. It can give answers to the question of what is involved in the decision making process, but it does not provide any rules on how to move through the levels. Thus, it cannot be regarded as a dynamic decision process model. This drawback was overcome in the present study, through the development of a process model which specified the rules of how to move through the levels in anyone particular case. This enabled me to include both aspects, that of structure and that of process, in the definition of the present model of career decision making.

10.2.4. Argumentation analysis

Decision making can also be seen as a search for good arguments, through which people try to establish a well stated set of reasons to support their claims and their intended acts (Montgomery, 1983, Mason & Mitroff, 1981). In the present study, argumentation analysis was introduced to investigate the process of reasoning used by individuals when they were discussing their career problems. For this to become possible, the individuals' arguments were investigated in terms of the elements of the argument, i.e. data, claims, warrants, backings.

In fact, it was through the argumentation analysis that it became possible to bridge the individual's movements from problem exploration to problem structuring activity which, in the process model of career decision making, are represented by the two activity areas necessary in handling the career decision problem [i.e. activity area I (scenario exploration) and activity area II (option formation)]. For this purpose the claims individuals use about the solution of their career problems were identified. Through the investigation of individuals' arguments, it also became possible to identify how many of those claims individuals can incorporate into frames structuring career problems.

Not all of the components of argumentation (claims, warrants, backings etc.) were incorporated as separate elements in the proposed general process model. Only the "claims" and "the claims that lead to frames" were used:

(a) to enable me to establish the ways individuals use of representing and structuring their problems and,

(b) as parameters to measure differences between individuals in these representations. 'Warrants' and 'backings', although they do not appear as elements of the model, were, however, used in the analysis of arguments to establish the claims and frames used by the individuals. They were considered essential because:

(i) They serve to back up individuals' claims and justify their choices of alternative solutions;

(ii) They can help to identify which areas of concern (domains) constrain individuals in their problem representation and

(iii) They provide a way to indicate to an individual how his arguments can become operational for the solution of his problem.

For example, in cases when an individual uses a rule based frame, his warrants and backings may indicate the reasons why the individual uses this frame. The identification of the type of warrants and backings can help the counsellor to define the issues regarding the individual's problem conceptualization which could benefit from counselling; counselling in this case can also help the individual to reshape his arguments and use additional relevant frames (i.e. Future Scenario frame, Multi

Attribute Utility frame, as well as Rule Based frame).

The implementation of warrants and backings in the general process model, while successful in the context of the present study, would benefit from further research. It would be important to see whether they can be used as detectors of areas of concern in the wider context of decision making, and to research their validity as parameters for measuring differences between individuals in their formulation of claims and frames.

The extent to which the process of rational argumentation underlies the beliefs people hold, and the judgments and decisions they make, should also be considered (Kuhn, 1991). How can we be certain, for example, whether people know why they believe what they do, or even whether they are consciously aware of whether their choices are based on a particular belief (amongst many different ones they may hold). Questions like these, in fact, imply philosophical analysis and thus have become issues for debates for both philosophers and sociologists, for decades. In the present study, however, argumentation analysis was used, and provisionally established, as a tool to understand and investigate the individual's 'process of reasoning' towards the solutions to his problem. Our concern here is not whether the argument is rational - good or bad. Instead, we are interested in the individual's way of reasoning and thinking while he is trying to support his course of action as he proceeds from problem exploration to problem structuring and problem evaluation. This places particular importance on argumentation as a diagnostic tool for the investigation of the process of problem solving. It also justifies the reason for its use in the present study as a bridge between the areas of problem exploration (Activity area 1) and problem structuring (activity area 2), as defined in the proposed model.

10.2.5. Maud

MAUD, a computer based decision aiding technique, was also used in the present study to support individuals in structuring their career decision-making problems under a Multi Attribute Utility frame. The findings from the analysis of data have

shown that individuals use, in their discourse, three different ways of problem representation: Multi Attribute Utility frame, Future Scenario frame, Rule Based frame. Of these three ways of representation, the first two were used more extensively than the third. Because of these findings, the computer decision aid, MAUD, which is based in the Multi Attribute Utility theory (Chapter 5), was used to support the individual in the structuring of his alternative options and the ordering of his preferences over a number of criteria within the Multi Attribute Utility frame.

Maud, as a decision aid, has been extensively investigated and found to be useful in a number of applied settings, i.e. in personal decision making, as an aid in career choices (Humphreys and Wooler, 1979), in purchasing (Humphreys, 1983), and in group decision making in a variety of different industries and situations (Humphreys & McFadden, 1980). In most of these studies, MAUD was found to be able to aid people through reduction of goal confusion, and through raising consciousness about the structure of value-wise importance of attributes possessed by choice alternatives (Humphreys & McFadden, 1980; see Chapter 2, 2.1.3). In fact, when MAUD was used in cases of career choice, it resulted in raising the client's self awareness of the determinants of choices. In particular, in transition from school to work, it helped individuals to appreciate the losses (for example those of value activities and rewards) which inevitably accompany any transition (Wooler & Humphreys, 1979; Herriot, 1984; Ball, 1984).

Humphreys and McFadden (1980) argue that MAUD aids individuals in a more general way, by making a person more capable of deciding in general, rather than merely solving an immediate decision problem. However, both the pilot work and the main study in this thesis have shown that the use of MAUD alone is not adequate to achieve this. This is because MAUD is limited to representing the decision problem according to only one way of knowledge representation, that of a Multi Attribute Utility frame.

This limitation was overcome in the present study by:

(a) using MAUD as a tool to support development of structure within the MAU frame, which was defined as an element of Activity area II of the general process

model of career decision making;

(b) by taking into consideration other ways of representation (i.e. the additional frames students were using for their career problems);

(c) by relating the MAUD derived data to the data from the Inference Diagrams, a technique employed to analyze the aspects of the individuals' decision problems which were presented under a Future Scenario frame (see below).

Under these conditions, the analysis of the MAUD produced data indicated that MAUD can be a useful tool:

(i) as a decision aid which can help the individual in the structure and evaluation of his alternative solutions;

(ii) as an analytic tool useful in describing and plotting how the individual structures his problem under a MAU frame.

The latter was achieved through the interpretation of the preference structure plots obtained from the multidimensional unfolding analysis of the MAUD data. These plots can serve as a prescriptive tool to show the counsellor the kind of help the individual needs. These plots provide an indication of the complexity of the regret a particular individual feels when, in the evaluation process of his alternatives, he has to give up one alternative in favour of another which has greater value in some attributes (see Chapter 2, 2.1.3). On the basis of these indications, the counsellor can decide whether that individual needs to focus on the elaboration and evaluation of his inadequately defined options, or on the consideration of additional alternative solutions which can involve reframing the problem. In reference to the general process model, these preference structures were used to define a pathway from Activity area 2 (Option formation area) to Activity area 3 (Option evaluation area).

10.2.6. Inference Diagrams.

The construction of Inference Diagrams is a technique which was used in the present study to help individuals to construct their future scenario frames (Chapter 8,8.1). As discussed in Chapter 7 (section 7.3.5), the findings indicated that the Future Scenario frame was the second choice of frame by individuals when they were talking

about their career problems. The elements of the Inference Diagrams, i.e. goal, action, event, and state, were defined in Chapter 5 (section 5.5). These elements were linked together into a goal-action-event-state chain sequence to represent, in the process model, the different pathways through which the individual approaches the solution to his problem.

In research on decision analysis the study of inferences, usually presented as a process of scenario exploration, has focused on well defined problems, since formal technology useful for real world problems is underdeveloped. As von Winterfeldt and Edwards (1987) suggest, the key missing element of the technology of inferences is a set of rules and procedures that specify how to translate scenarios into structural representations. The difference in the present study is that inference diagrams were used for real world personal decision problems, as ways of representation of people's future scenario frames concerning the elaboration and structure of their career problems. The techniques used here for the construction of inference diagrams and for the definition of their elements were originally used in the analysis of real world problems in group decision making by Vari et al. (1987).

In addition, because of the way Inference Diagrams were established in the present study, they have an advantage (over other representations of inferences, see Chapter 5, 5.5) in that they can be constructed by the decision maker himself, as long as, he has explored and defined the elements of the inference chain. Also, they have the advantage that their structure provides the possibility of interconnections and looping back between the various elements. Furthermore, Inference diagrams were used in the present study to provide a way of describing the individual's representations under a Future Scenario frame and to plot this frame. For this purpose, the individual's alternative career options were described in his forward and backward moving scenarios (following the goal-action-event-state chains, see Chapter 5, 5.5). The resulting descriptions of the options constitute another pathway for the individual's movement from activity area 2 to the 'option evaluation' activity area 3 in the general process model (Chapter 5). Thus, Inference diagram construction aided in identifying the path and the beginning of the next stage in the process of problem solving, i.e.

problem evaluation.

In conclusion, from the findings of the present study, inference diagrams are proposed both as descriptive and prescriptive tools, for the investigation of the career problem under a Future Scenario frame. As descriptive tools, they enable the differentiation of the options which are explored and are ready for evaluation. As prescriptive tools, through descriptions of the options, they define the kind of help the individual needs for his problem exploration (in terms of the identification of the individual's goals, actions, events and states) and where (in which option) help is needed.

The present study also indicated that there is a relationship between the Inference Diagrams and the preference structure plots from the analysis of MAUD data. For example, individuals with elaborated scenarios (Future Scenario Frame) were more effective in the clarification of their preferences and in the evaluation of their alternative solutions (Multi Attribute Utility frame). These findings also provide support for the hypothesis that individuals represent their problems in more than one way of representation (i.e. Future Scenario frame and Multi Attribute Utility frame), as discussed above. Thus, in order to provide adequate support to individuals for the solution of a similar kind of decision problem, tools which aid the individual in both of these representations are necessary.

Further research, and further application of Inference diagrams in personal decisions, in addition to career decision making, would be necessary for their establishment as ways of representation of personal decision problems in general, and as decision aids to aid these representations.

10.3. Implications for practice

The results of this study have highlighted at least two major determinative characteristics of career decision making. First, that the individual's career decision is based on the subjective meaning representation of his career problem; and, second, that the career decision can be seen as a process and not as a one time event. Both of these findings have implications for the methods and practice of career counselling (discussed also in Chapter 9), and for the investigation of the career problem.

The importance of man's individuality, as a determinative factor in career counselling, has also been acknowledged by other researchers, as is shown in the recent review of Oliver and Spokane (1988) on the evaluation of the effectiveness of career interventions. In this study, it was suggested that career counsellors should be careful not to group clients and apply to them a treatment or a counselling model, without taking into consideration that people are not all alike and that they will not react similarly to any given situation. It was noted that there is a need for diagnostic procedures and standardized diagnostic instruments which should take into particular consideration the individual factor and the individual's needs in career counselling. Their evaluation indicated that individual treatments were the most effective, but also the most costly, whereas workshops or structured group treatments, although least expensive, were less effective.

I believe that the process model of career decision making developed in the present study can be suggested to career counsellors as a diagnostic tool to provide the rules on how to detect when and what kind of help the individual needs in his decision making process, as well as a counselling tool to prescribe what are the best ways to achieve this.

The assumption that career decision making is based on the subjective meaning representation of the career decision maker, suggests that individuals represent their problems in more than one way, relative to their own personal characteristics and their cultural background, and to the context and type of decision involved. On the basis of this assumption, counsellors should be aware, and prime individuals to talk about their problems in different problem representations. This will help individuals explore their problems further and make more complete arguments about the way they want to resolve them. Also, this study indicated that the individual's different problem representations specify the stage the individual is at the process of his problem resolution, and the different objectives he wants to achieve from the process of counselling. For example, if the client seeks career counselling because he wants to narrow down a set of possible career preferences to only one, the counsellor, (taking into consideration the individual's particular need) should support him, specifically in this particular activity, by defining the necessary tasks the individual

has to accomplish to achieve this objective. The counsellor should also ensure that the individual is satisfied with the outcome of the counselling process. If not, the counsellor should encourage the individual to define his problem in different ways. This will help the counsellor to identify what are the most appropriate activities and tasks the individual may then need to accomplish in order to proceed to a satisfactory solution of his problem and to action.

Furthermore, the present study has shown that decision aiding techniques, like the construction of Inference diagrams or the computer based decision aid MAUD, can help the individual in the structuring and evaluation of his career alternative solutions. Therefore, the counsellors should be encouraged to use these techniques if they want to improve the effectiveness of career counselling. Care should be taken, however, that these techniques, or any other decision aiding tools, are used at the appropriate time during the process of counselling and according to the individual needs. Also, care should be taken that decision aids are used only as tools which can facilitate the accomplishment of specific objectives, and not as alternative ways of conducting the whole process of career counselling (Watts, 1990). I believe that the proposed general process model provides the counsellor with the rules on how to identify when the individual needs a decision aid and when he is ready to use it, as well as the gains such an aid will bring.

In addition, the methodological procedure based on the model provides the counsellor with the possibility of working with clients in groups and thus minimizing the cost of individual treatment which, as was mentioned above, is more costly (Oliver and Spokane, 1988). For example, the counsellor can have group discussions during the stage at which they need to explore the various issues of concern, in order to formulate their arguments concerning the way they want to solve their problems. The counsellor, at any time of the procedure, should be ready to help any client individually if he needs additional information about a subject. Some of the decision aiding techniques (as for example Inference Diagrams) can also be constructed and given to clients in a class setting under the counsellor's instructions.

A relativistic view for the investigation of the career problem

"The choice of action is where the decision makers express their individuality; it should not be done by formula. The counsellor of the future must help clients imagine and invent their own future."

H.B. Gelatt, 1989

The results of this study suggest a relativistic framework of looking at and investigating the way people proceed to the solution of their problem. As was discussed in Chapter 2 (section 2.1), the relativistic framework has to be differentiated from the normative, as well as from the merely descriptive or prescriptive paradigms on which most of the models and approaches which investigate the decision process have been based. The relativistic approach takes particularly into consideration the individual's subjective meaning representation of the decision problem, which is relative to the individual's personality and his cultural background, and is determined by the context of the behavioral situation in which the decision has to be taken. Thus, the relativistic approach, in contrast to the rational models which imply that there is only one normatively correct way to solve the problem, accepts different solutions to the problem according to the different problem representations. This does not mean that the rational decision strategies based on classical decision theory are wrong. It simply means that they are insufficient and, although they can become increasingly complicated, they may not grasp the complexity and dynamics of the decision process under the changes of today's social world.

As Gelatt (1989) has suggested, the old decision strategies were appropriate for the linear, objective, scientific methods of the past, but new strategies have to be flexible, and able to adapt to the new realities that may appear, while taking into consideration that "reality is a subjective creation in a personal frame of reference".

Gelatt, in a recent account of the process of career decision making, has reevaluated his old rational paradigm and proposed "Positive Uncertainty" as a new Decision making Framework for Counselling. According to this paradigm, he suggests that, in today's rapidly changing world, changing one's mind will be an essential decision making skill in the future. This implies that any new counselling procedure should

be able to help individuals accept inconsistency and utilize the intuitive side of thinking and choosing.

Also, the relativistic approach implies that looking at career decision making only through the matching models, or only through the developmental models or social models, is not enough. An integration of all of these approaches is necessary. For example, by investigating the career problem only through the developmental approach, although it can help identify the developmental stages of the individual which may affect the way he will proceed to the solution of his problem, it ignores the realities of the individual's immediate and more extended social environment. However, any changes in the individual's social environment may affect both the individual's career opportunities, as well as the individual's perceptions of them. At the same time, the encouragement of self-awareness and the implementation of the individual's self concept implied in the developmental models, are very useful. They can help the individual, not only in finding a job in which it would be possible to implement his self-concept (such job can in fact hardly be found) but, most importantly, in perceiving the reality of his decision situation in a more suitable way.

What has to be taken into consideration in any approach trying to investigate or provide help in, the career decision making problem, are the dynamics of the changing society in which the individual lives, as well as the interrelationships and transactions which take place between the individual and his social environment, because these may affect his perceptions about what kinds of jobs are closer to his interests and more suitable for him.

To investigate and help the individual in his decision making process, an integration of the above mentioned paradigms under the relative way the individual sees and understands his problem would be more suitable. The general process model developed in the present study, as well as the proposed counselling model, since they are based on the assumption that career decision making is related to the individual's subjective meaning representation, are closer to the relativistic approach. The process model can guide the investigator on how to study the intuitive way in which the

individual proceeds towards the solution of his career problem. The career counselling model can provide the counsellor with the rules of how to approach the individual and adapt his counselling procedure to the specific needs of each individual.

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APPENDICES

Appendix I. Pilot work

Table 1:	Time Table of the pilot work
Table 2:	The Balance Sheet Grid
Table 3:	Joanna's print out summary from MAUD data

Appendix II. Main Study

Table 1:	Types of questions used in the interviews
Table 2:	Number of the propositions given by the individuals in each domain
Fig. 1:	Number of Unsafe Propositions identified in each Domain for each age Group
Fig. 2:	Number of Propositions which lead to Claims identified in each Domain by each age group
Tables 3a and 3b:	Number of primed and non primed frames used by the three group
Tables 4a,4b,4c:	Reliability analysis of claims, Gr.1, Gr.2, Gr.3.
Tables 5a,5b,5c:	Reliability analysis of claims to frames, Gr.1, Gr.2, Gr.3.
Tables 6a,6b,6c:	Reliability analysis of frames, Gr.1, Gr.2, Gr.3.

Appendix III. Decision-aiding techniques

- 1. Larissa's** print-out summaries from her sessions with MAUD*
- 2. Nikos'** print-out summary from his sessions with MAUD
- 3. Anna's** print-out summary from her sessions with MAUD

Table 1:	Group 1: Summary tables and Preference Structure plots from MAUD data
Table 2:	Group 2: Summary tables and Preference Structures plots from MAUD data
Table 3:	Group 3: Summary tables and Preference Structures plots from MAUD data

* The rest of the print out summaries are available and can be requested from the author.

Ap.1 Table 1 :TIME TABLE OF THE PILOT WORK

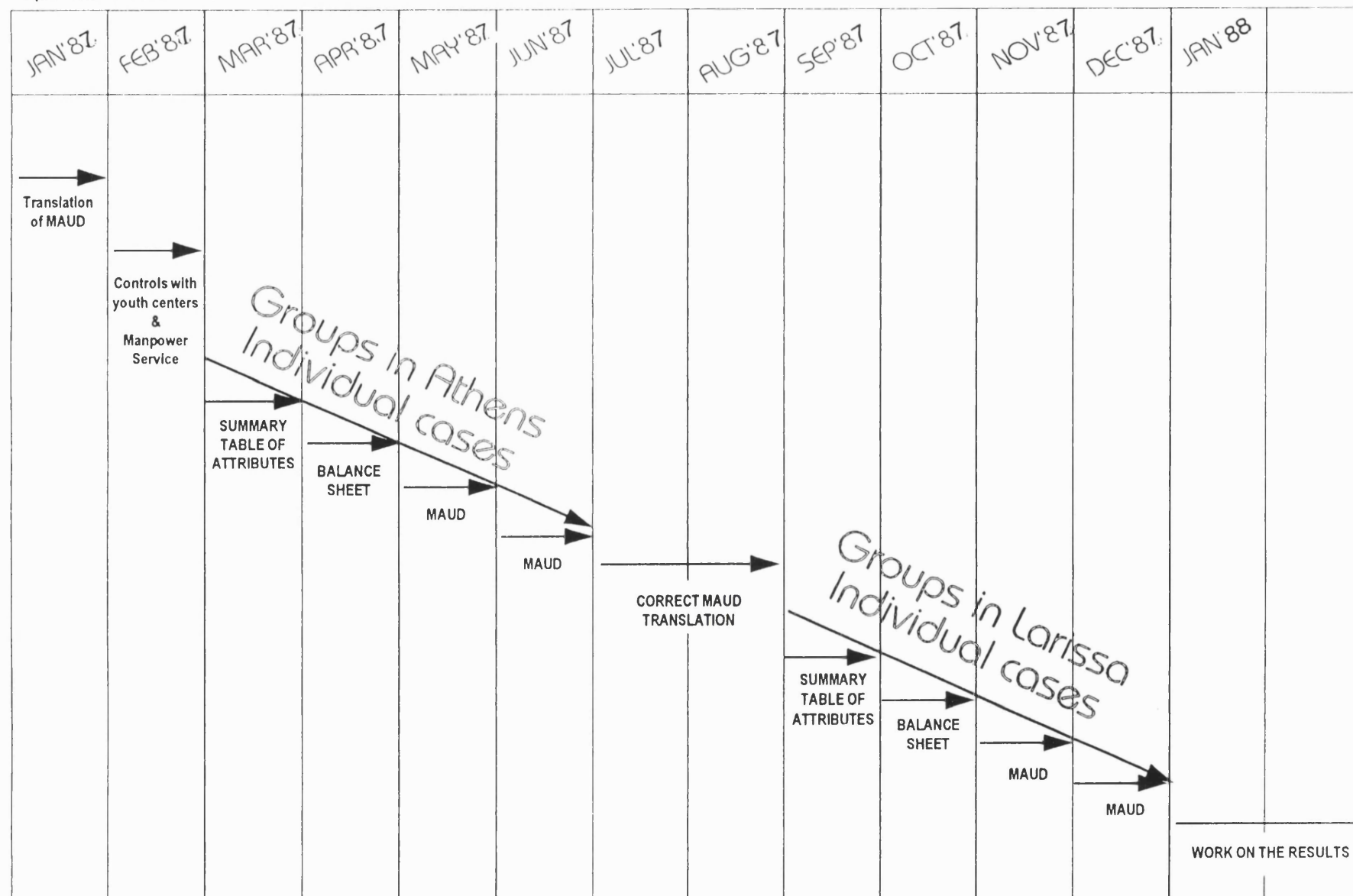


TABLE 2: A schematic Balance Sheet Grid as modified from Janis and Mann (1977)

NAME: _____ AGE: _____ SEX: _____
 JOB ALTERNATIVE: _____

TYPES OF ANTICIPATION	POSITIVE	NEGATIVE
A. Utilitarian gains or losses for self ex.-Personal income -Place of work		
B. Utilitarian gains or losses for significant others ex:-Social status of future family -Help to parents -Help to future children		
C. Self-approval or disapproval ex:-Moral considerations pertaining to ethical legal practices. -"Ego-ideal" of being an independent thinker -Self-image towards types of work		
D. Social approval or dissaproval ex:-From partner -From close friends -From local community.		

Joanna's print out summary from MACB data

Σειρά προτεραιότητας που έχουν οι παράγοντες για κάθε εναλλακτική λύση από το καλύτερο στο χειρότερο (Οι προτεραιότητες επιτυχίας δίνονται σε παρενθέσεις.)

ΤΥΧΟΛΟΓΟΣ (0.97) <BEST

ΕΥΔΟΛΟΓΟΣ (0.76)

ΠΟΡΠΙΟΣ (0.56)

ΕΛΙΣΤΗΝΑ ΔΙΣΤΡΩΝ (0.55)

ΓΑΜΟΣ (0.27) <WORST

Βαθμολόγηση των εναλλακτικών λύσεων στις κλίμακες που εξετάζεις 5

Φ	Ψ	Κ	Η	Γ
Υ	Υ	Α	Θ	Α
Δ	Χ	Τ	Ο	Μ
Ο	Ο	Α	Π	Ο
Δ	Δ	Σ	Ι	Σ
Ο	Ο	Τ	Ο	
Γ	Γ	Η	Σ	
Ο	Ο	Μ		
Σ	Σ	Α		
		Δ		
		Ι		
		Σ		

Βαθμολόγηση
Κλίμακα

Κ

Q

ΠαράγοντεςΑριθμό

N

(1)	1	6	1	9	5	ΑΠΑΣΧ.ΜΕ ΚΑΤΙ ΣΥΓΚ.(1) to ΔΕΝ ΥΠΑΡΧΕΙ ΣΥΓΚΕΚ.(9)
(2)	6	6	1	3	5	Ισονική τιμή= 5 ΑΓΧΩΔΕΣ(1) to ΛΙΓΟΤΕΡΟ ΑΓΧΩΔΕΣ(9)
(3)	1	1	3	5	7	Ισονική τιμή= 9 ΕΝΑΣΧΟΛΗΣΗ ΜΕ ΑΝΘΡΩΠΟΥΣ(1) to ΜΟΝΑΧΙΚΕΣ(9)
(4)	7	9	8	9	2	Ισονική τιμή= 1 ΡΟΥΤΙΝΑ(1) to ΕΝΔΙΑΦΕΡΟΥΣΕΣ(9)
(5)	5	7	5	7	9	Ισονική τιμή= 9 ΕΛΕΥΘΕΡΟΣ ΧΡΟΝΟΣ(1) to ΠΕΡΙΟΡΙΣΜΕΝΟΣ ΕΛΕΥΘ. ΧΡ.(9)
						Ισονική τιμή= 6

* Οι κάτωθι αριθμοί αναπαριστούν τις εκτιμήσεις σου για τις υπό εξέταση εναλλακτικές λύσεις :

1.00 αναπαριστά την καλύτερη και 0.00 αναπαριστά το χειρότερο εναλλακτική λύση σε κάθε παράγοντα .

* Αν θέλεις να αλλάξεις κάτι,μπορείς να το κάνεις στο τέλος αυτής της περιλήψης.

Φ	Ψ	Κ	Η	Γ
Υ	Υ	Α	Θ	Α
Δ	Χ	Τ	Ο	Μ
Ο	Ο	Α	Π	Ο
Δ	Δ	Σ	Ι	Σ
Ο	Ο	Τ	Ο	
Γ	Γ	Η	Σ	
Ο	Ο	Μ		
Σ	Σ	Α		
		Δ		
		Ι		
		Σ		

Βαθμολόγηση
Κλίμακα

Κ

Q

ΠαράγοντεςΑριθμό

N

(1)	0.00	0.75	0.00	0.00	1.00	ΑΠΑΣΧ.ΜΕ ΚΑΤΙ ΣΥΓΚ. to ΔΕΝ ΥΠΑΡΧΕΙ ΣΥΓΚΕΚ.
(2)	1.00	1.00	0.00	0.40	0.80	ΑΓΧΩΔΕΣ to ΛΙΓΟΤΕΡΟ ΑΓΧΩΔΕΣ relative importance = 0.14
(3)	1.00	1.00	0.67	0.33	0.00	ΕΝΑΣΧΟΛΗΣΗ ΜΕ ΑΝΘΡΩΠΟΥΣ to ΜΟΝΑΧΙΚΕΣ relative importance = 0.16
(4)	0.71	1.00	0.86	1.00	0.00	ΡΟΥΤΙΝΑ to ΕΝΔΙΑΦΕΡΟΥΣΕΣ relative importance = 0.31
(5)	1.00	1.00	1.00	1.00	0.00	ΕΛΕΥΘΕΡΟΣ ΧΡΟΝΟΣ to ΠΕΡΙΟΡΙΣΜΕΝΟΣ ΕΛΕΥΘ. ΧΡ. relative importance = 0.35
						relative importance = 0.04

END OF SUMMARY.

Appendix II: Main Study

Table 1: Type of questions used in the interview in relation to the 12 domains established in the pilot work.

PARENTAL INFLUENCE (P.IN.)

(Primed in domain)

-- Do you think your parents have influenced you on your career?

(Primed in frames)

-- Would you like your future to satisfy your parents' interests?

-- Do you find yourself responsible for your family?

-- What do you think is your parents' opinion about you?

-- How are your family background and the expectations of your parents going to affect your choice of work?

School constraints

--- SCHOOL PROBLEMS (S.PR.)

--- EDUCATIONAL ACHIEVEMENT (ED.ACH.)

(Primed in domain)

-- What is your opinion about the structure of the Educational System in Greece?

(Primed on frame)

-- Do you feel ready from the education that you have had up till now to go out to the world of work?

-- Do you think that children must follow compulsory education?

-- Which according to you are the main reasons that students fail the exams to enter university?

-- Do you think that grades you get in the Lyceum should count towards the entrance to the university exams?

-- Do you think that the grades you obtain at school affect your career choice?

-- What are your chances of entering this particular school in the university?

-- If you fail the entrance exams are you going to take exams again? Are you going to do anything else?

Job alternatives - Job attributes

JOB ALTERNATIVES (J.AL.)

(Primed in domain)

-- Tell me about your different career alternative solutions?

-- What are you interested in?

(Primed in frame)

-- Can you name any alternative solution about your career problem?

-- Can you name at least four alternative solutions about your career problem?

-- What kind of alternative solutions do you have in mind?

-- What kind of satisfaction do you expect your future job might give you?

-- Is there anything else you would like to have from your future job?

Future scenario - Goals - Dreams - Self-Concept

FUTURE PLANS (F.PL.)

DIFFICULTIES-FEARS (DIF.F.)

SELF-CONCEPT

CHANGE

(Primed in Domain)

- Tell me about you and your future
- Have you made any dreams about your future?
- If you had a magic wand would you like to change anything in your life?

(Primed in frame)

- Do you have any plans about your future?
- Have you thought what are you going to do in your future?
- Do you feel that your goals will be satisfied in your future?
- Do you think there will be difficulties in satisfying your goals in the future?
- Can you see yourself in 10 years? In 20 years?
- Do you think you have changed from last year?
- What is the most important thing for you for your future?
- Would you like to tell me how you would imagine the best possible future for you?
The worst possible future?

Social constraints

SOCIAL CONSTRAINTS (SOC.CON.)

MARRIAGE (MA.)

UNEMPLOYMENT (UN.)

RELATION TO OTHERS (R.OTH.)

(Primed on Domain)

- Are you interested in what is happening around you?
- Do you discuss with your friends about your future career plans?
- What does "marriage mean to you?

(Primed in Frame)

- Do you think that adolescents can do whatever they want?
- Do you think that students must be punished for any antisocial behavior?
- How would you like the world if you could change it?
- What are your thoughts about good and bad, right and wrong?
- Do you think that your teachers have influenced you in your career choice?
- Do you think of the possibility of getting married in the future?
- Do you think that getting married may contradict with your future career?
- Do you think you will find a lot of job opportunities when you have finished your studies in the university?
- What are the job opportunities that this option (e.g. studying sociology) might provide?

Table 2: Number of different propositions explored in the 12 domains by the three groups

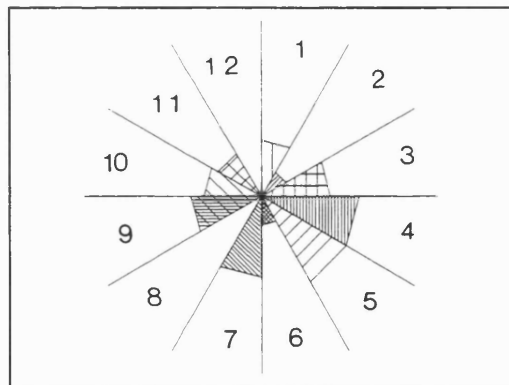
PROPOSITIONS						
DOMAINS	Gr.1		Gr.2		Gr.3	
	A	B	A	B	A	A
PARENTAL INFLUENCE	43	21	23	22	27	27
SCHOOL PROBLEMS	28	8	19	10	16	20
EDUCATION-AL ACHIEV.	52	39	35	36	49	43
PROFESSIONS	48	30	39	24	38	20
FUTURE PLANS	46	44	47	39	35	32
DIFFIC.FEARS	15	31	21	17	21	20
CHANGE	5	5	13	14	5	11
SELF CON-CEPT	46	33	43	30	22	29
SOCIAL APPR-OVAL	27	7	20	21	24	19
UNEMPLOY-MENT	13	9	8	6	14	2
RELATION TO OTHERS	15	17	20	17	11	5
MARRIAGE	18	8	19	7	8	5
TOTAL	357	252	307	243	270	233

Number of propositions explored in each domain

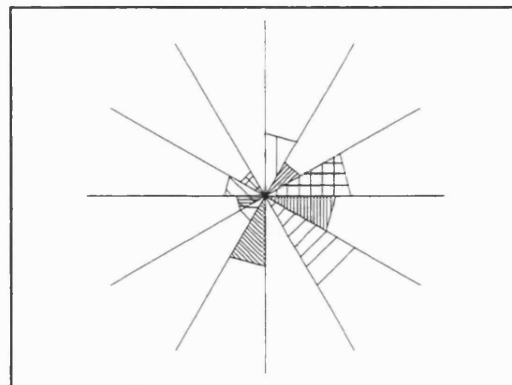
A : First Interviews: before the exams

B : Second Interviews: after the exams

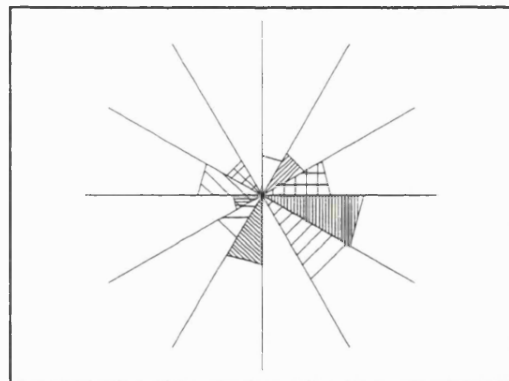
Fig. 1: No of Unsafe Prop. identified in each Domain for each age Group



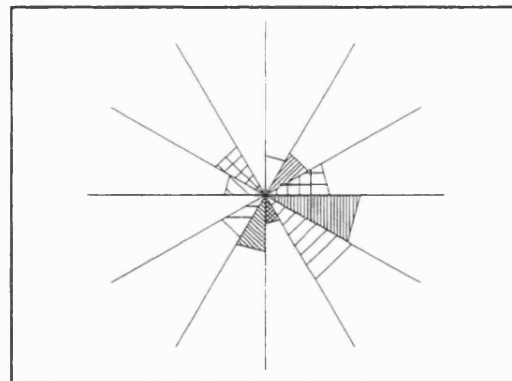
Group 1 (A)



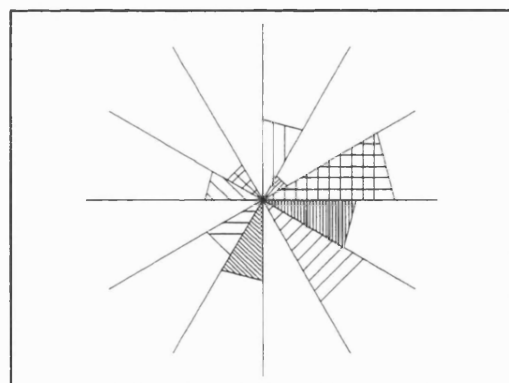
Group 1 (B)



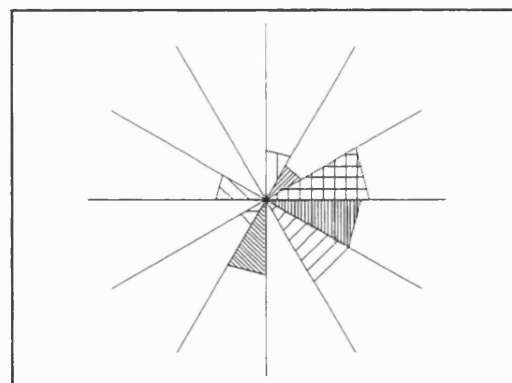
Group 2 (A)



Group 2 (B)



Group 3 (A)



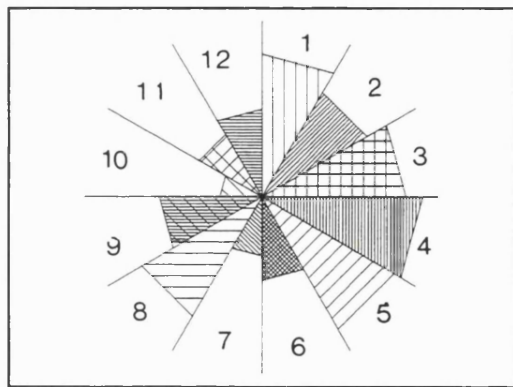
Group 3 (B)

Domains: 1: Parental Influence
2: School problems
3: Educ. Achievement
4: Professions

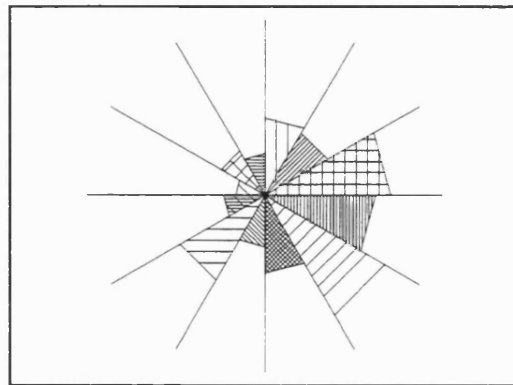
5: Future Plans & Goals
6: Difficulties & Fears
7: Change
8: Self Concept

9: Social Approval
10: Unemployment
11: Relation to others
12: Marriage

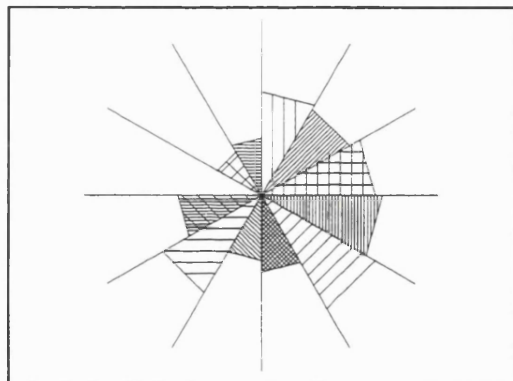
Fig. 2: No of Prop. that lead to Claims identified in each Domain for each age Group



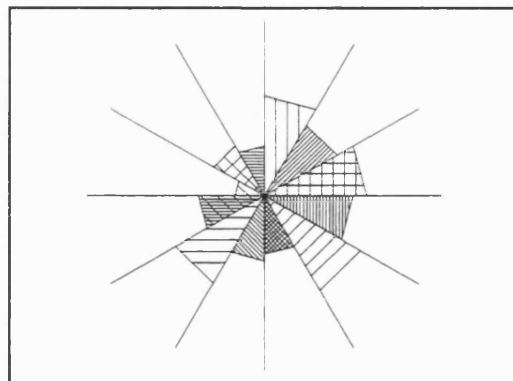
Group 1 (A) Claims



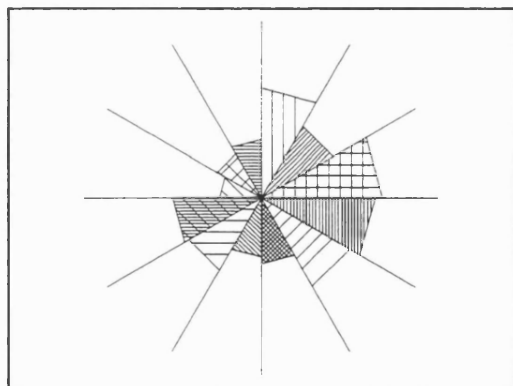
Group 1 (B) Claims



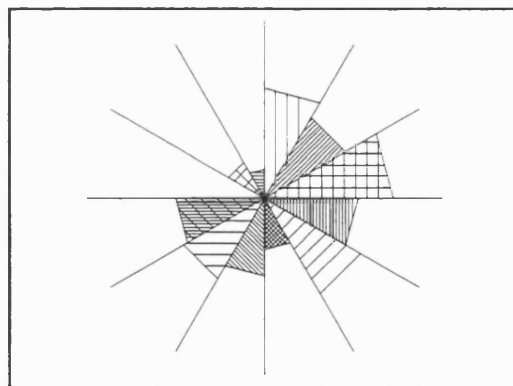
Group 2 (A) Claims



Group 2 (B) Claims



Group 3 (A) Claims



Group 3 (B) Claims

Domains: 1: Parental Influence
2: School problems
3: Educ. Achievement
4: Professions

5: Future Plans & Goals
6: Difficulties & Fears
7: Change
8: Self Concept

9: Social Approval
10: Unemployment
11: Relation to others
12: Marriage

Table 3a: Number of the three different types of primed frames used by the three groups of subjects.

A: No of primed frames used by the subjects in the first interview

B: No of primed frames used by the subjects in the second interview

FRAMES PRIMED						
	Gr.1		Gr.2		Gr.3	
	A	B	A	B	A	B
MAU	29	12	24	18	17	13
F.Sc.	23	8	20	14	20	16
R.B.	3	1	3	2	3	3
	55	21	47	34	40	31

Table 3b : Number of the three different types of non primed frames used by the three groups of subjects.

A: No of non primed frames used by the subjects in the first interview

B: No of non primed frames used by the subjects in the second interview

FRAMES NON PRIMED						
	Gr.1		Gr.2		Gr.3	
	A	B	A	B	A	B
MAU	21 2.63	18 2.25	14 1.75	12 1.50	7 .88	9 1.13
F.Sc.	16 2.13	15 1.88	9 1.13	9 1.13	11 1.38	8 1.00
R.B.	3 .38	2 .25	2 .25	3 .38	3 .38	4 .50
	40	35	25	24	21	21

Table 4a, 4b, 4c: Reliability analysis of claims given by the individuals of the three groups in the first (A) and second (B) interview

GROUP 1

Claims (A)				Claims (B)			
Coder a Coder b	+	-			+	-	
+	148	34	182	+	102	16	118
-	43	132	175	-	21	113	134
AG=280	191	166	357	AG=215	123	129	252
MPA= 78.43 % (73.80-82.59)				MPA= 85.32 % (80.33-89.45)			
KAPPA=0.57 (0.48-0.65)				KAPPA=0.71 (0.62-0.79)			

GROUP 2

Claims (A)				Claims (B)			
Coder a Coder b	+	-			+	-	
+	116	16	132	+	94	7	101
-	14	161	175	-	11	131	142
AG=177	130	177	307	AG=225	105	138	243
MPA= 90.23 % (86.34-93.31)				MPA= 92.59 % (88.55-95.55)			
KAPPA=0.80 (0.73-0.87)				KAPPA=0.85 (0.78-0.92)			

GROUP 3

Claims (A)				Claims (B)			
Coder a Coder b	+	-			+	-	
+	99	6	105	+	83	14	97
-	9	156	165	-	9	127	136
AG=255	108	162	270	AG=210	92	141	233
MPA= 94.44 % (91.00-96.86)				MPA= 90.13 % (85.56-93.64)			
KAPPA=0.88 (0.83-0.94)				KAPPA=0.80 (0.72-0.87)			

Tables 5a,5b,5c: Reliability of claims to frames propositions given by the three groups

GROUP 1

Claims to frames			
Coder a Coder b	+	-	
+	174	10	184
-	6	60	66
AG = 234	180	70	250
MPA= 93.60% (89.82 - 96.30)			
KAPPA= 0.84 (0.76 - 0.91)			

GROUP 2

Claims to frames			
Coder a Coder b	+	-	
+	138	15	153
-	9	48	57
AG = 186	147	63	210
MPA= 88.57% (83.47-92.54)			
KAPPA= 0.84 (0.62-0.82)			

GROUP 3

Claims to frames			
Coder a Coder b	+	-	
+	117	9	126
-	13	41	54
AG = 158	130	50	182
MPA= 86.81% (81.02 - 91.37)			
KAPPA= 0.70 (0.59 - 0.82)			

Tables 6a, 6b, 6c: Reliability of the three different types of frames given by the three groups

GROUP 1

Frames					
Coder a Coder b	MAU	F.Scenario	Rule based	Others	
MAU	80	4	0	2	86
F.Scenario	2	62	0	1	65
Rule based	0	0	9	0	9
Others	5	3	1	5	14
(AG=156)	87	69	10	8	174
MPA = 89.66% (84.14 - 93.75)					
KAPPA = 0.83 (0.75 - 0.90)					

GROUP 2

Frames					
Coder a Coder b	MAU	F.Scenario	Rule based	Others	
MAU	68	0	0	1	69
F.Scenario	0	52	0	1	53
Rule based	0	0	10	0	10
Others	3	1	0	2	6
(AG=132)	71	53	10	4	138
MPA = 95.65% (90.78 - 98.39)					
KAPPA = 0.93 (0.87 - 0.98)					

GROUP 3

Frames					
Coder a Coder b	MAU	F.Scenario	Rule based	Others	
MAU	46	0	0	1	47
F.Scenario	0	55	0	0	55
Rule based	0	0	13	0	13
Others	0	1	0	1	2
(AG=115)	46	56	13	2	117
MPA = 98.29% (93.96 - 99.79)					
KAPPA = 0.97 (0.93 - 1.00)					

Appendix III: Decision Aiding Techniques

Larissa: Group 1 (A): MAUD print out

SUMMARY OF SESSION ΕΠΑΓΓΕΛΜΑΤΙΚΗ ΑΠΟΚΑΤΑΣΤΑΣΗ SO FAR:

Σειρά προτεραιότητας που έχουν οι παράγοντες για κάθε εναλλακτική λύση από το καλύτερο στο χειρότερο (Οι πιθανότερες επιτυχίες δίνονται σε παρενθέσεις.)

ΟΔΟΜΗ ΙΑΤΡΟΥ (0.84) <BEST

ΒΙΟΛΟΓΟΣ ΚΑΘΗΓΗΤΗΣ (0.57)

ΜΙΚΡΟΒΙΟΛΟΓΟΣ ΕΡΓ. (0.49)

ΒΙΟΛΟΓΟΣ ΕΡΕΥΝΗΤΗΣ (0.17) <WORST

Βαθμολόγηση των εναλλακτικών λύσεων στις κλίμακες που εξετάσεις

	B	B	M	O	
	I	I	I	Δ	
	O	O	K	O	
	Α	Α	P	N	
	O	O	O	T	
	Γ	Γ	B	I	
	O	O	I	A	
	Σ	Σ	O	T	
			Α	P	
	K	E	O	O	
	A	P	Γ	Σ	
	Θ	E	O		
	H	Y	Σ		
	Γ	N			
	H	H	E		
Βαθμολόγηση	T	T	P		
Κλίμακα	H	H	Γ		
(1)	5	6	3	1	ΠΕΡΙΣ.ΚΟΙΝΩΝΙΚΗ ΑΝΑΓΝΩΡΙΣΗ(1) to ΛΙΓΟΤΕΡΗ(9)
					Ισονική τιμή= 1
(2)	6	4	2	1	ΠΕΡΙΣ.ΧΡΗΜΑΤΑ(1) to ΛΙΓ.ΧΡΗΜΑΤΑ(9)
					Ισονική τιμή= 1
(3)	1	9	6	3	ΠΕΡΙΣ.ΣΙΓΟΥΡΙΑ(1) to ΜΙΚΡΟΤΕΡΗ ΕΞΑΣΦΑΛΙΣΗ(9)
					Ισονική τιμή= 1
(5)	1	1	4	3	ΔΗΜΙΟΥΡΓΙΚΟΤΗΤΑ(1) to ΛΙΓΟΤΕΡΗ ΔΗΜ.(9)
					Ισονική τιμή= 1

* Οι κάτωθι αριθμοί αναπαριστούν τις εκτιμήσεις σου για τις υπό εξέταση εναλλακτικές λύσεις :

1.00 αναπαριστά την καλύτερη και 0.00 αναπαριστά το χειρότερο εναλλακτική λύση σε κάθε παράγοντα .

* Αν θέλεις να αλλάξεις κάτι, μπορείς να το κάνεις στο τέλος αυτής της περίληψης.

	B	B	M	O	
	I	I	I	Δ	
	O	O	K	O	
	Α	Α	P	N	
	O	O	O	T	
	Γ	Γ	B	I	
	O	O	I	A	
	Σ	Σ	O	T	
			Α	P	
	K	E	O	O	
	A	P	Γ	Σ	
	Θ	E	O		
	H	Y	Σ		
	Γ	N			
	H	H	E		
Βαθμολόγηση	T	T	P		
Κλίμακα	H	H	Γ		
(1)	0.20	0.00	0.60	1.00	ΠΕΡΙΣ.ΚΟΙΝΩΝΙΚΗ ΑΝΑΓΝΩΡΙΣΗ to ΛΙΓΟΤΕΡΗ
					relative importance = 0.30
(2)	0.00	0.40	0.80	1.00	ΠΕΡΙΣ.ΧΡΗΜΑΤΑ to ΛΙΓ.ΧΡΗΜΑΤΑ
					relative importance = 0.19
(3)	1.00	0.00	0.38	0.75	ΠΕΡΙΣ.ΣΙΓΟΥΡΙΑ to ΜΙΚΡΟΤΕΡΗ ΕΞΑΣΦΑΛΙΣΗ
					relative importance = 0.42
(5)	1.00	1.00	0.00	0.33	ΔΗΜΙΟΥΡΓΙΚΟΤΗΤΑ to ΛΙΓΟΤΕΡΗ ΔΗΜ.
					relative importance = 0.09

Larissa: Group 1 (B)

Σειρά προτεραιότητας που έχουν οι παράγοντες για κάθε εναλλακτική λύση από το καλύτερο στο χειρότερο
(Οι πιθανότητες επιτυχίας δίνονται σε παρενθέσεις.)

ΟΔΗΓΗΓΙΕΣ (0.94) <BEST

ΒΙΟΛΟΓΟΣ ΕΑΡΗΓΗΤΗΣ (0.57)

ΠΕΡΙΤΕΡΩΟΝΟΣ ΕΡΓ. (0.49)

ΒΙΟΛΟΓΟΣ ΕΡΕΥΝΗΤΗΣ (0.17) <WORST

Βαθμολόγηση των εναλλακτικών λύσεων στις κλίμακες που εξετάζεις

	B	B	M	O	
	I	I	I	O	
	O	O	K	O	
	A	A	P	N	
	O	O	O	T	
	Γ	Γ	B	I	
	O	O	I	A	
	Σ	Σ	O	T	
			A	P	
	E	E	O	O	
	A	P	Γ	Σ	
	H	E	O		
	H	Y	Σ		
	Γ	N			
	H	H	E		
Βαθμολόγηση	T	T	P		
Εκτίμηση	H	H	Γ		
				ΠαράγοντεςΑριθμός	Σ
(1)	5	6	3	1	ΠΕΡΙΣ.ΚΟΙΝΩΝΙΚΗ ΑΝΑΓΝΩΡΙΣΗ(1) to ΛΙΓΟΤΕΡΗ(9)
					Ισονική τιμή= 1
(2)	6	4	2	1	ΠΕΡΙΣ.ΧΡΗΜΑΤΑ(1) to ΛΙΓ.ΧΡΗΜΑΤΑ(9)
					Ισονική τιμή= 1
(3)	1	2	6	3	ΠΕΡΙΣ.ΣΙΓΟΥΡΙΑ(1) to ΜΙΚΡΟΤΕΡΗ ΕΞΑΣΦΑΛΙΣΗ(9)
					Ισονική τιμή= 1
(5)	1	1	4	3	ΔΗΜΙΟΥΡΓΙΚΟΤΗΤΑ(1) to ΛΙΓΟΤΕΡΗ ΔΗΜ. (9)
					Ισονική τιμή= 1

* Οι κάτωθι αριθμοί αναπαριστούν τις εκτιμήσεις σου για τις υπό εξέταση εναλλακτικές λύσεις :

1.00 αναπαριστά την καλύτερη και 0.00 αναπαριστά το χειρότερο εναλλακτική λύση σε κάθε παράγοντα .

* Αν θέλεις να αλλάξεις κάτι,μπορείς να το κάνεις στο τέλος αυτής της περίληψης.

	B	B	M	O	
	I	I	I	O	
	O	O	K	O	
	A	A	P	N	
	O	O	O	T	
	Γ	Γ	B	I	
	O	O	I	A	
	Σ	Σ	O	T	
			A	P	
	E	E	O	O	
	A	P	Γ	Σ	
	H	E	O		
	H	Y	Σ		
	Γ	N			
	H	H	E		
Βαθμολόγηση	T	T	P		
Εκτίμηση	H	H	Γ		
				ΠαράγοντεςΑριθμός	Σ
(1)	0.20	0.00	0.60	1.00	ΠΕΡΙΣ.ΚΟΙΝΩΝΙΚΗ ΑΝΑΓΝΩΡΙΣΗ to ΛΙΓΟΤΕΡΗ
					relative importance = 0.30
(2)	0.00	0.40	0.80	1.00	ΠΕΡΙΣ.ΧΡΗΜΑΤΑ to ΛΙΓ.ΧΡΗΜΑΤΑ
					relative importance = 0.19
(3)	1.00	0.00	0.38	0.75	ΠΕΡΙΣ.ΣΙΓΟΥΡΙΑ to ΜΙΚΡΟΤΕΡΗ ΕΞΑΣΦΑΛΙΣΗ
					relative importance = 0.42
(5)	1.00	1.00	0.00	0.33	ΔΗΜΙΟΥΡΓΙΚΟΤΗΤΑ to ΛΙΓΟΤΕΡΗ ΔΗΜ.
					relative importance = 0.09

Οι ακόλουθες κλίμακες δεν λαμβάνονται υπόψη για τις αιτίες που δίνονται κατωτέρω

(4) ΥΠΕΡΒΟΛΙΚΟΤΗΤΑ to ΛΙΓ.ΥΠΕΡΒΟΛΙΚΟΤΗΤΑ

Αυτή η κλίμακα έχει διαγραφεί επειδή υπήρχε μικρή διαφορά στις προτιμήσεις σου για τις διάφορες εναλλακτικές λύσεις πάνω αυτή.

ΕΠΙΛΟΓΗ ΣΥΜΠΛΟΥΣ

ΕΠΙΛΟΓΗ ΣΥΜΠΛΟΥΣ

* Οι κάτωθι αριθμοί αναπαριστούν τις εκτιμήσεις σου για τις υπό εξέταση εναλλακτικές λύσεις :

1.00 αναπαριστά την καλύτερη και 0.00 αναπαριστά το χειρότερη εναλλακτική λύση σε κάθε παράγοντα .

* Αν θέλεις να αλλάξεις κάτι, μπορείς να το κάνεις στο τέλος αυτής της περίληψης.

Δ	Σ	Ο	Π	Σ	Η
Α	Τ	Ι	Ρ	Υ	Θ
Σ	Ι	Κ	Ο	Δ	Ο
Κ	Α	Ο	Γ		Π
Α		Ν	Ρ		Ο
Λ		Ο	Α		Ι
Ο		Μ	Μ		Ο
Σ		Ι	Α		Σ
		Κ	Τ		
		Α	Ι		
			Σ		
			Τ		
			Η		
			Σ		
			Η		
			Λ		
			Ε		
			Κ		
			Υ		
			Π		

Βαθμολόγηση
Κλίμακα

0

Λ

ΠαράγοντεςΑριθμό

(1)	0.67	0.67	1.00	1.00	0.67	0.00	ΥΨΗΛΕΣ ΟΙΚ.ΑΠΟΔΟΧΕΣ to ΧΑΜΗΛΕΣ ΟΙΚ.ΑΠΟΔΟΧΕΣ	relative importance = 0.32
(2)	1.00	0.60	0.20	0.40	0.40	0.00	ΠΕΡΙΣ.ΕΛΕΥΘΕΡΟ ΧΡΟΝΟ to ΛΙΓ. ΕΛΕΥΘΕΡΟ ΧΡΟΝΟ	relative importance = 0.06
(3)	1.00	0.67	1.00	0.00	0.67	0.33	ΠΕΡΙΣ. ΕΠΑΦΗ to ΛΙΓ.ΕΠΑΦΗ	relative importance = 0.06
(4)	1.00	0.88	0.50	0.13	0.88	0.00	ΣΤΑΒΕΡΟΤΗΤΑ ΕΠΑΓΓΕΛΜΑΤΟΣ to ΧΡΕΙΣ ΣΤΑΒΕΡΟΤΗΤΑ	relative importance = 0.14
(5)	0.50	0.00	1.00	0.25	0.75	0.50	ΚΑΛΕΣ ΣΥΝΘΗΚΕΣ ΕΡΓ. to ΜΕΤΡΙΕΣ ΣΥΝΘ.ΕΡΓΑΣΙΑΣ	relative importance = 0.14
(6)	0.50	0.50	1.00	1.00	0.25	0.00	ΛΥΓ.ΔΥΣΚΟΛΙΑ ΣΤΗ ΑΠΟΚ.ΕΠΑΓΓΕΛ. to ΠΕΡ.ΔΥΣΚΟΛΙΑ	relative importance = 0.22
(7)	1.00	0.20	0.00	0.20	0.80	0.60	ΠΕΡ.ΕΝΔΙΑΦΕΡΟΝ to ΛΙΓ.ΕΝΔΙΑΦΕΡΟΝ	relative importance = 0.06

END OF SUMMARY.

SUMMARY OF SESSION BIBLIOGRAPHY (EPAGGELMATOS SO FAR:

STUDIES ON THE EFFECTS OF LITERATURE STUDIES

$$C_{\text{eff}}(P) \subseteq C(P) \cap \{0, \pm 1\}$$

CTVM TEACHER

*1995 LOGFATS (0.55)

JOURNALIST

Journal of Interpersonal Violence 60, 429

TEACHER IN GRADUARY SCHOOL

THE CLOUDS (0.00) (40KST)

THE OLD GOS

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F	E	P	T	D
I	T	A	H	I
L	H	S	E	M
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O	E	L	O	I
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Παραγούρες Αρτέμιος

PERIOD	1	2	3	4	5	6	PERIOD DESCRIPTION
1991							PERIOD DESCRIPTION: 1991-1992
1992	4	5	6	7	8		Isolation time= 2 PERIOD DESCRIPTION: 1992-1993
1993	2	3	4	5	6		Isolation time= 2 PERIOD DESCRIPTION: 1993-1994
1994	2	3	4	5	6		Isolation time= 3 PERIOD DESCRIPTION: 1994-1995
1995	2	3	4	5	6		Isolation time= 4 PERIOD DESCRIPTION: 1995-1996

4. Die letzten drei Möglichkeiten des Entschlusses sind jedoch ohne zählenden Stellenwertes ;

1.00 αναπληρωτά την καλύτερη και 0.00 αναπληρωτά το χειρότερη εναλλακτική λύση σε κάθε υποερώτηση.

† An effort to address this issue is to have the
trial judge disqualify.

F	C	D	I	D
I	7	6	H	I
L	H	5	E	H
O	H	6	O	O
L	6	6	L	S
O	5	6	O	I
b	I	6	6	O
O	6		O	G
S	I		5	K
	O			O

100710-10, 100710

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

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HIGLEY, G. J. & HIGLEY, M. D.

| | | | | | | |
|---|------|------|------|------|------|---|
| 1 | 1.00 | 0.25 | 0.33 | 0.00 | 0.42 | PERIS.ERUGAERON to LIG.DIOLOPHUS
relative importance = 0.17 |
| 2 | 1.00 | 0.25 | 0.33 | 0.00 | 0.42 | LIGS.FRUSULOFORD to LIG.DIOLOPHUS
relative importance = 0.17 |
| 3 | 0.50 | 0.50 | 1.00 | 0.00 | 0.50 | PERIS.FRUSFURA to LIG.FRUSFURA
relative importance = 0.11 |
| 4 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | PERIS.DINATOTITA NETALPHIS to
LIG.DINATOTITA NETALPHIS
relative importance = 0.05 |

Table 1: Group 1: Summary tables and preference Structure plots from MAUD data

George B. Group 1 (A)

| Options Factors | Study Econ. Sch. in Greece | Study Econom. Abroad | Go to College | Army | Importance of factor |
|------------------------|----------------------------|----------------------|---------------|------|----------------------|
| Make money | 100 | 0 | 67 | 67 | 0.14 |
| Good Salary | 100 | 50 | 50 | 0 | 0.38 |
| Many years of studies | 67 | 67 | 100 | 0 | 0.04 |
| Creativity | 100 | 100 | 100 | 0 | 0.14 |
| Initiative | 100 | 100 | 100 | 0 | 0.06 |
| Possibility of success | 0 | 100 | 50 | 0 | 0.24 |
| Overall preference | 75 | 65 | 64 | 10 | |

George B. Group 1 (B)

| Options Factors | Go to College Army | Army Sch.and Univ. | Army Sch. | Go to | Importance of factor |
|---------------------|--------------------|--------------------|-----------|-------|----------------------|
| Being in the Army | 0 | 33 | 0 | 100 | 0.15 |
| Creativity | 100 | 100 | 50 | 0 | 0.25 |
| Unemployment | 100 | 80 | 80 | 0 | 0.07 |
| Invest into studies | 100 | 40 | 20 | 0 | 0.14 |
| G.Salary | 100 | 100 | 80 | 0 | 0.13 |
| Free Time | 100 | 100 | 33 | 0 | 0.13 |
| Satisfaction | 100 | 86 | 57 | 0 | 0.12 |
| Overall preference | 85 | 79 | 43 | 15 | |

Vaggelis Simop. Group 1 (A)

| Options Factors | School Teacher | Economics | Psychology | Political Science | Farmer | Importance of Factor |
|--------------------|----------------|-----------|------------|-------------------|--------|----------------------|
| Education | 100 | 75 | 100 | 100 | 0 | 0.08 |
| More money | 0 | 100 | 50 | 50 | 100 | 0.28 |
| Free Time | 100 | 0 | 25 | 25 | 75 | 0.13 |
| Self approval | 100 | 50 | 50 | 50 | 0 | 0.50 |
| Social approval | 75 | 75 | 100 | 75 | 0 | 0.02 |
| Overall preference | 72 | 60 | 52 | 51 | 37 | |

Vaggelis Sim. Group 1 (B)

| Options Factors | School Teacher | Computers | Assistant in x-rays | Farmer | Importance of Factor |
|----------------------|----------------|-----------|---------------------|--------|----------------------|
| Education | 100 | 75 | 50 | 0 | 0.18 |
| More money | 0 | 50 | 0 | 100 | 0.15 |
| Free time | 100 | 0 | 0 | 67 | 0.10 |
| Self approval | 100 | 67 | 33 | 0 | 0.17 |
| Social approval | 100 | 50 | 100 | 0 | 0.15 |
| High cost of studies | 0 | 50 | 100 | 0 | 0.25 |
| Overall preference | 60 | 44 | 39 | 21 | |

Fig VAGGELIS Gr 1(A) MAUD Preference Structure

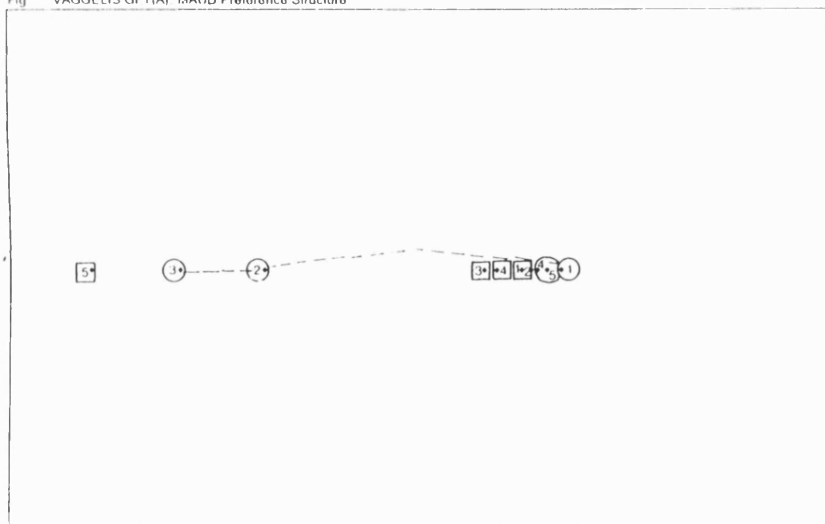


Fig GEORGE Gr 1(A) MAUD Preference Structure

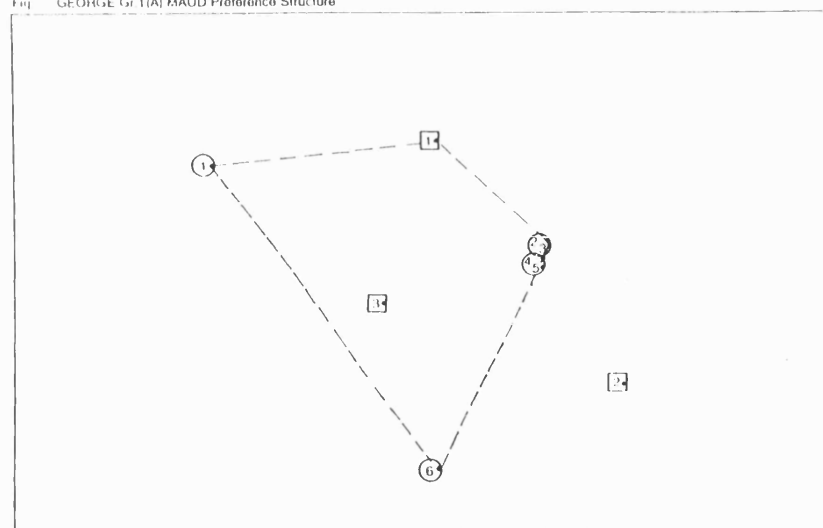


Fig VAGGELIS Gr 1(B) MAUD Preference Structure

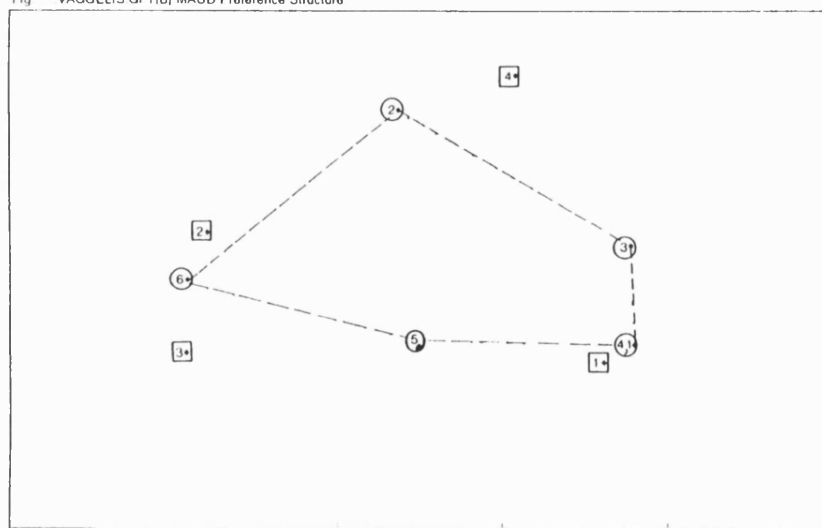
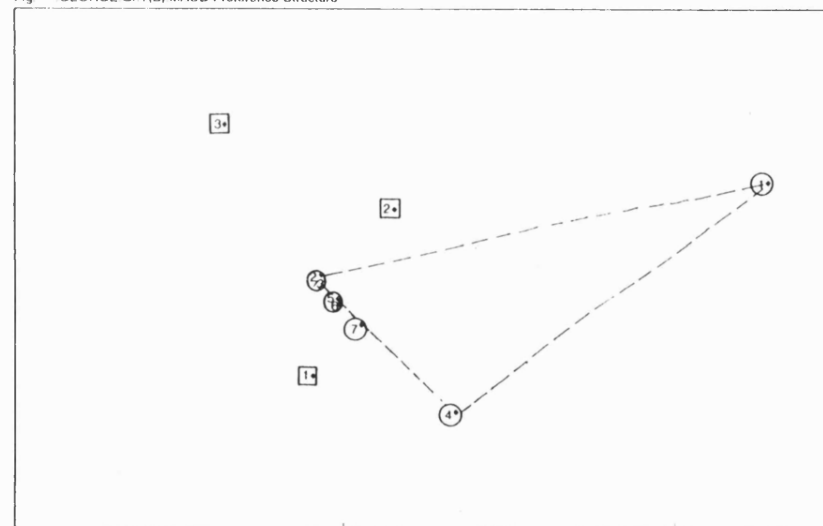


Fig GEORGE Gr 1(B) MAUD Preference Structure



Nikos Bon. Group 1 (A)

| Options Factors | Studying | Enlisting in US Navy | Working Abroad | Studying Abroad | Importance of Factor |
|-----------------------------------|----------|----------------------|----------------|-----------------|----------------------|
| Non premanent to more perm. | 33 | 0 | 67 | 100 | 0.03 |
| My last solution I will need help | 100 | 0 | 57 | 86 | 0.05 |
| Travell.& Work Learning a Job | 33 | 0 | 100 | 67 | 0.01 |
| Satisfaction to non satisfaction | 100 | 67 | 33 | 0 | 0.68 |
| Self respect to non self respect | 100 | 0 | 50 | 67 | 0.05 |
| Free time for socialization | 100 | 0 | 67 | 0 | 0.17 |
| Overall preference | 97 | 46 | 43 | 12 | |

KAFIA Group 1 (A)

| Options Factors | Medicine | Phys.education | Biology | School Teacher | Home Economics | Importance of Factor |
|--------------------|----------|----------------|---------|----------------|----------------|----------------------|
| Interesting job | 100 | 67 | 83 | 0 | 50 | 0.16 |
| Offer to society | 33 | 0 | 100 | 67 | 33 | 0.20 |
| Unemployment | 100 | 67 | 0 | 67 | 0 | 0.20 |
| Satisfaction | 100 | 100 | 33 | 0 | 33 | 0.29 |
| Free Time | 0 | 67 | 100 | 33 | 33 | 0.15 |
| Social Status | 0 | 100 | 100 | 100 | 100 | 0.01 |
| Overall preference | 71 | 63 | 58 | 32 | 30 | |

Fig. :NIKOS.Gr.1(A): MAUD Preference Structure

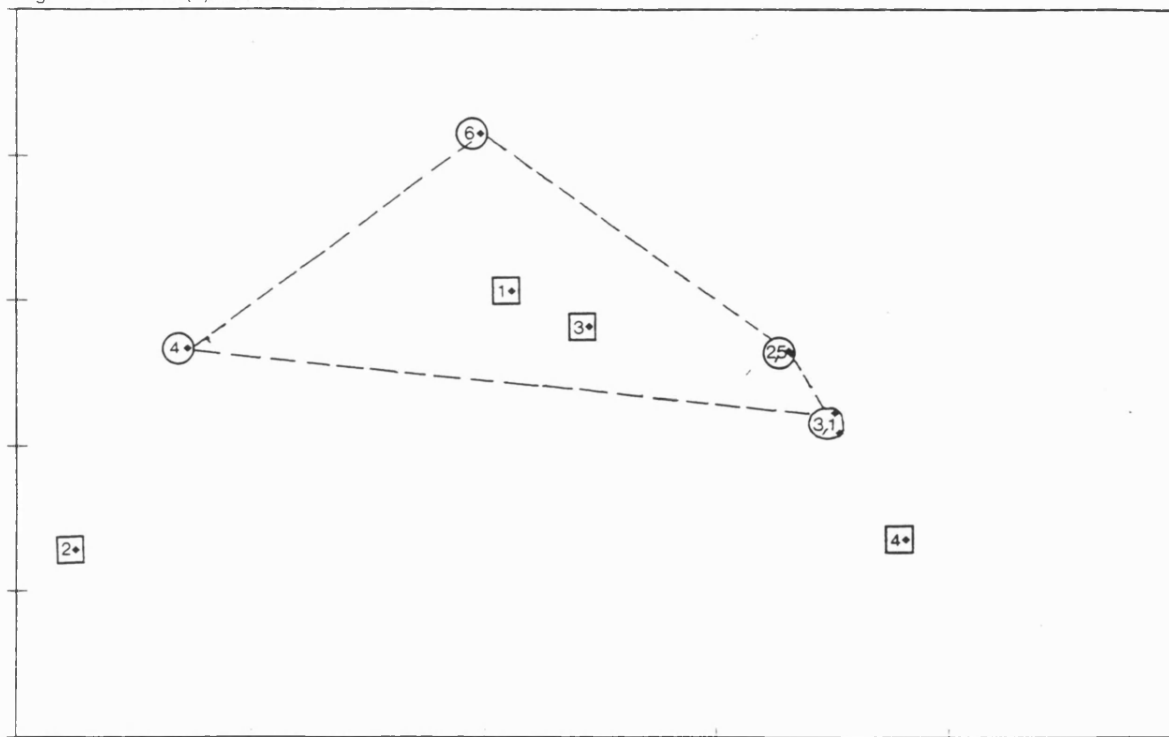
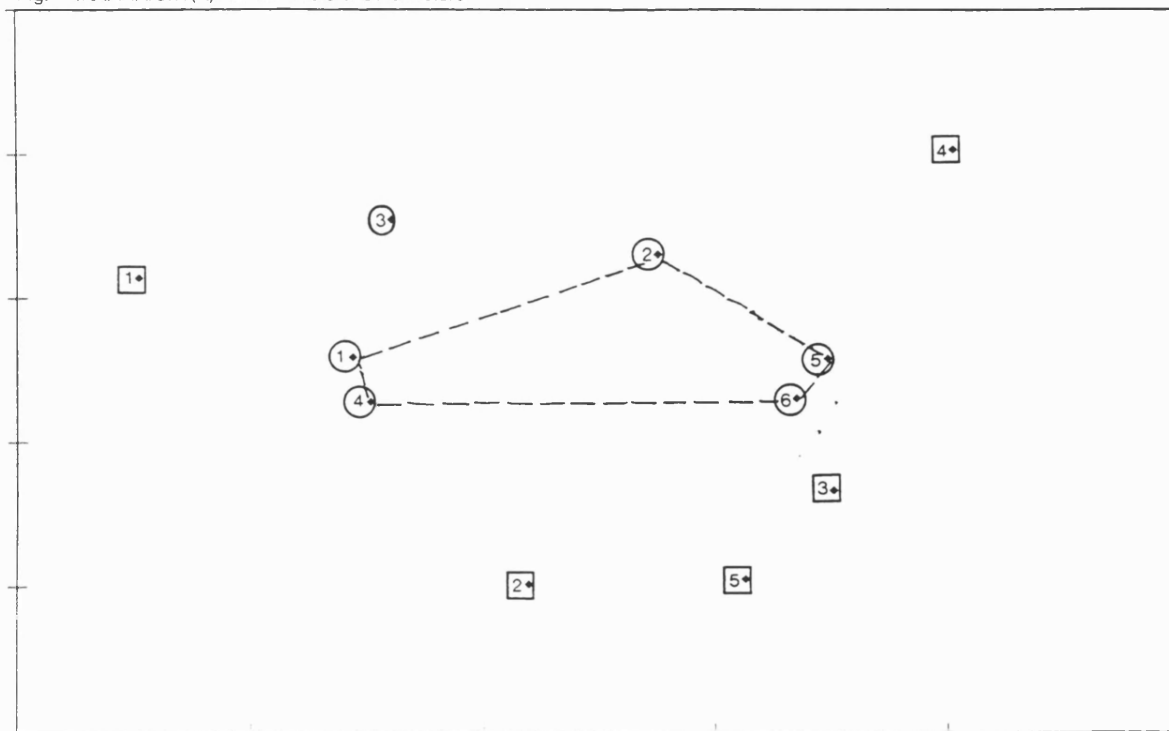


Fig. :KAFFIA.Gr.1(A): MAUD Preference Structure



Apostolis Croup 1 (A)

| Options Factors | Baker | Lawer | Economics | Philosophy teacher | Theology teacher | Importance |
|--------------------|-------|-------|-----------|--------------------|------------------|------------|
| Money | 100 | 83 | 100 | 0 | 0 | 0.35 |
| Social approval | 80 | 100 | 80 | 20 | 0 | 0.16 |
| Good education | 100 | 50 | 100 | 100 | 0 | 0.16 |
| Initiative | 100 | 43 | 57 | 14 | 0 | 0.10 |
| Security | 67 | 100 | 0 | 33 | 33 | 0.03 |
| Entertainment | 50 | 100 | 0 | 0 | 0 | 0.13 |
| Success | 100 | 40 | 80 | 20 | 0 | 0.05 |
| Responsibility | 67 | 100 | 100 | 67 | 0 | 0.01 |
| Tiring job | 33 | 100 | 100 | 100 | 0 | 0.01 |
| Overall preference | 88 | 77 | 75 | 24 | .01 | |

Factors cancelled: Free time (no difference in preference order in the alternative solutions)

Fig. APOSTOLIS:Gr.1(A): MAUD Preference Structure

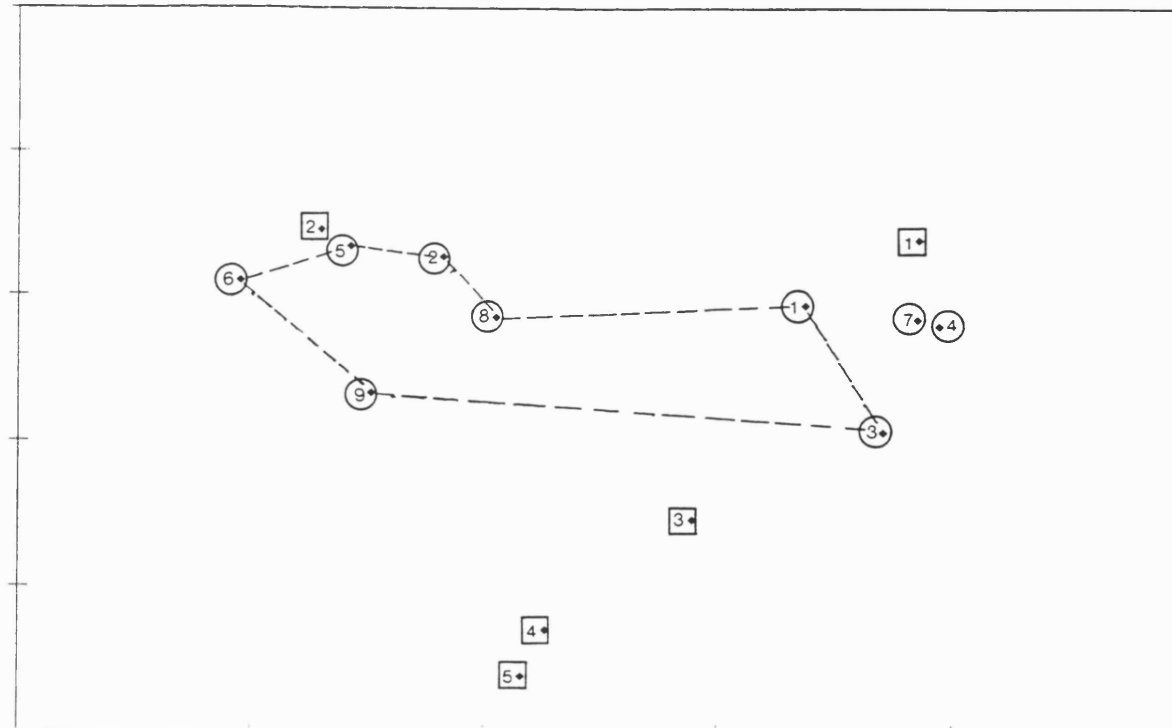


Table 2: Group 2: Summary tables and Preference Structure plots from MAUD data

Rania Group 2 (A)

| Options Factors | History teacher | Hostess | Model | English teacher | Nursery teacher | Importance of Factor |
|---------------------------|-----------------|---------|-------|-----------------|-----------------|----------------------|
| Interesting job | 100 | 100 | 100 | 0 | 0 | 0.14 |
| Good education | 100 | 25 | 0 | 75 | 75 | 0.13 |
| Money | 100 | 0 | 0 | 100 | 100 | 0.01 |
| Needs higher education | 100 | 0 | 0 | 83 | 17 | 0.18 |
| Social status | 100 | 100 | 100 | 0 | 0 | 0.05 |
| Possibility of travelling | 25 | 100 | 88 | 38 | 0 | 0.31 |
| Responsibility | 33 | 100 | 67 | 0 | 33 | 0.03 |
| Human Contact | 100 | 100 | 100 | 0 | 0 | 0.05 |
| Overall preference | 75 | 62 | 54 | 45 | 16 | |

Rania Group 2 (B)

| Options Factors | Army | History teacher | Literature teacher | Nursery teacher | Civil servant | Importance of Factor |
|--------------------|------|-----------------|--------------------|-----------------|---------------|----------------------|
| Interesting job | 83 | 100 | 67 | 33 | 0 | 0.29 |
| A lot of activity | 100 | 100 | 80 | 0 | 40 | 0.04 |
| Money | 100 | 33 | 33 | 33 | 0 | 0.64 |
| Responsibility | 0 | 0 | 0 | 100 | 0 | 0.01 |
| Human contact | 100 | 0 | 0 | 100 | 100 | 0.03 |
| Overall preference | 94 | 54 | 43 | 35 | .05 | |

Dina Group 2 (A)

| Options Factors | Nurse Polyt. | Home Economics | Pr.School teacher | Nursery teacher | Nurse Tech.school | English Lit. | Importance of Factor |
|--------------------------|--------------|----------------|-------------------|-----------------|-------------------|--------------|----------------------|
| Spiritual profession | 50 | 50 | 50 | 100 | 50 | 0 | 0.03 |
| Tiring job | 0 | 0 | 100 | 100 | 0 | 0 | 0.14 |
| Money | 100 | 33 | 33 | 67 | 0 | 33 | 0.04 |
| Social status | 0 | 100 | 100 | 100 | 100 | 100 | 0.14 |
| Working hours(Steady) | 100 | 100 | 100 | 0 | 0 | 0 | 0.09 |
| Free time | 100 | 100 | 0 | 100 | 100 | 0 | 0.17 |
| Possibility of promotion | 33 | 0 | 33 | 33 | 100 | 33 | 0.02 |
| Chances to make friends | 0 | 0 | 100 | 0 | 0 | 100 | 0.07 |
| Social welfare | 100 | 0 | 0 | 0 | 0 | 0 | 0.17 |
| Location of job | 100 | 25 | 25 | 0 | 100 | 25 | 0.04 |
| Overall preference | 61 | 53 | 51 | 51 | 45 | 40 | |

Dina Group 2 (B)

| Options Factors | Home Economics | Pr.School Teacher | Greek Liter. | Nursery teacher | Nurse Polytech. | Importance of Factor |
|---------------------------|----------------|-------------------|--------------|-----------------|-----------------|----------------------|
| Offer to human pain | 0 | 100 | 50 | 0 | 0 | 0.11 |
| Responsibility | 33 | 100 | 33 | 33 | 0 | 0.17 |
| Working hours (steady) | 100 | 100 | 100 | 100 | 0 | 0.09 |
| Free time | 60 | 60 | 0 | 100 | 20 | 0.06 |
| Possibility for promotion | 60 | 80 | 100 | 0 | 100 | 0.09 |
| Money | 0 | 0 | 100 | 0 | 100 | 0.04 |
| Social status | 33 | 67 | 100 | 67 | 0 | 0.07 |
| Unemployment | 100 | 0 | 0 | 50 | 0 | 0.30 |
| Location of job (steady) | 50 | 50 | 100 | 0 | 67 | 0.07 |
| Overall preference | 60 | 56 | 48 | 40 | 19 | |

Fig RANIA Gr 2(A) MAUD Preference Structure

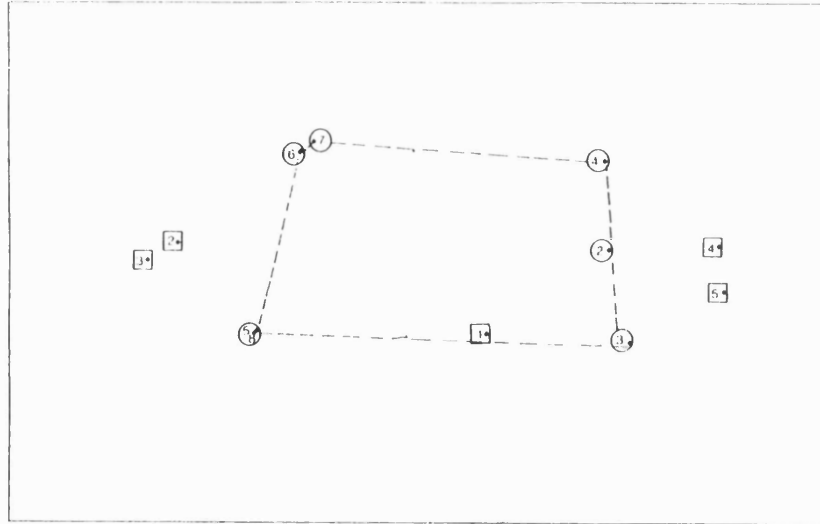


Fig DINA Gr 2(A) MAUD Preference Structure

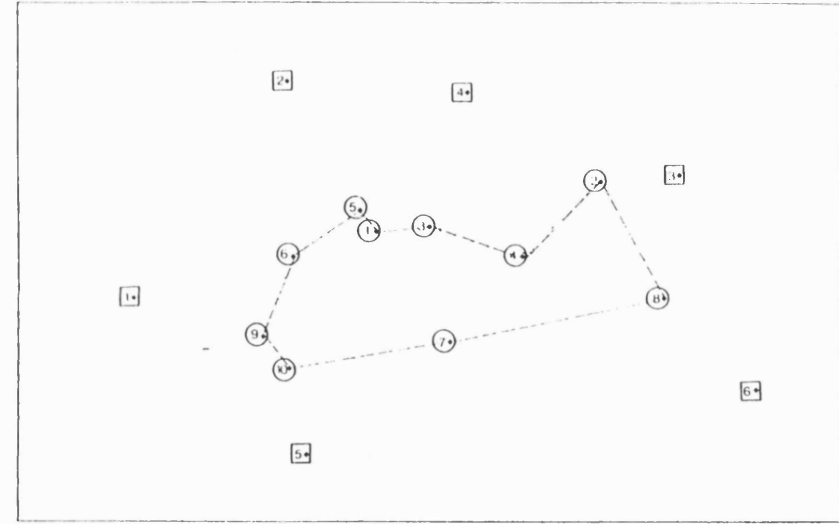


Fig RANIA Gr 2(B) MAUD Preference Structure

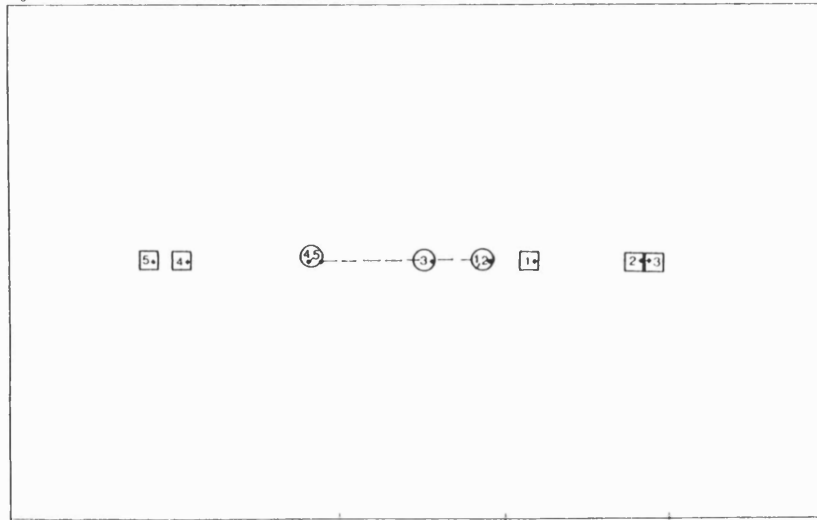
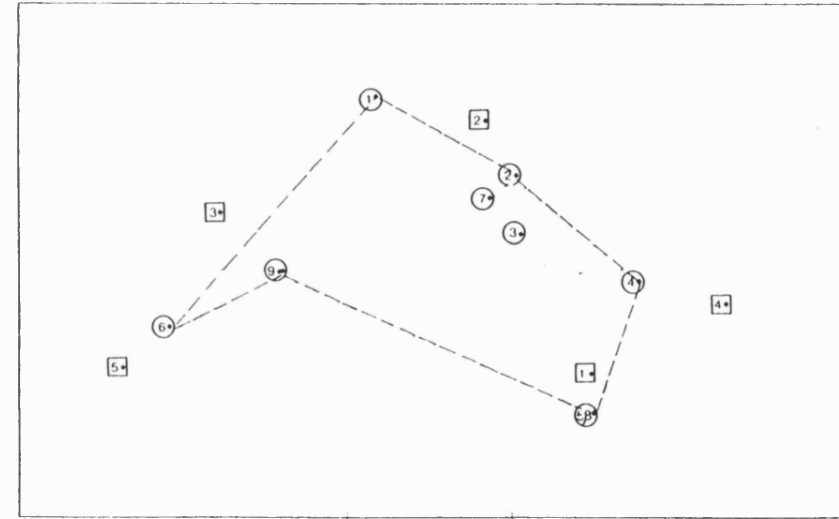


Fig DINA Gr 2(B) MAUD Preference Structure



Aris Group 2 (A)

| Options Factors | Robotics | Computers | Physics
Hum.Vasc.Sys. | Medicine | Electrical
Engineering | Importance
of Factor |
|-----------------------------|----------|-----------|--------------------------|----------|---------------------------|-------------------------|
| Personal Satisfaction | 100 | 50 | 100 | 50 | 0 | 0.16 |
| Money | 0 | 50 | 50 | 100 | 0 | 0.05 |
| Known profession | 0 | 100 | 50 | 50 | 0 | 0.02 |
| Social Approval | 100 | 50 | 50 | 0 | 50 | 0.05 |
| Initiative | 100 | 100 | 0 | 0 | 0 | 0.42 |
| Possibility for research | 50 | 0 | 100 | 100 | 50 | 0.02 |
| Creativity | 100 | 50 | 0 | 0 | 0 | 0.16 |
| Useful for the future prof. | 100 | 50 | 100 | 50 | 0 | 0.03 |
| Years of study | 100 | 50 | 100 | 50 | 0 | 0 |
| Offer to society | 67 | 33 | 100 | 100 | 0 | 0.09 |
| Overall preference | 89 | 69 | 36 | 26 | .04 | |

Dimitris Group 2 (B)

| Options Factors | Army school | Computers | Physic teacher | Chemistry teacher | Mathematics | Importance of Factor |
|----------------------------|-------------|-----------|----------------|-------------------|-------------|----------------------|
| Money | 100 | 83 | 17 | 0 | 33 | 0.35 |
| Offer to soc. | 40 | 100 | 40 | 60 | 0 | 0.32 |
| Easy to find a job | 67 | 100 | 33 | 33 | 0 | 0.15 |
| Possibilities of promotion | 100 | 43 | 43 | 57 | 0 | 0.08 |
| Working hours (steady) | 100 | 50 | 0 | 25 | 0 | 0.02 |
| Personal Satisfaction | 100 | 67 | 0 | 33 | 67 | 0.10 |
| Overall preference | 75 | 58 | 27 | 32 | 18 | |

Fig. :ARIS:Gr.2(A):MAUD Preference Structure

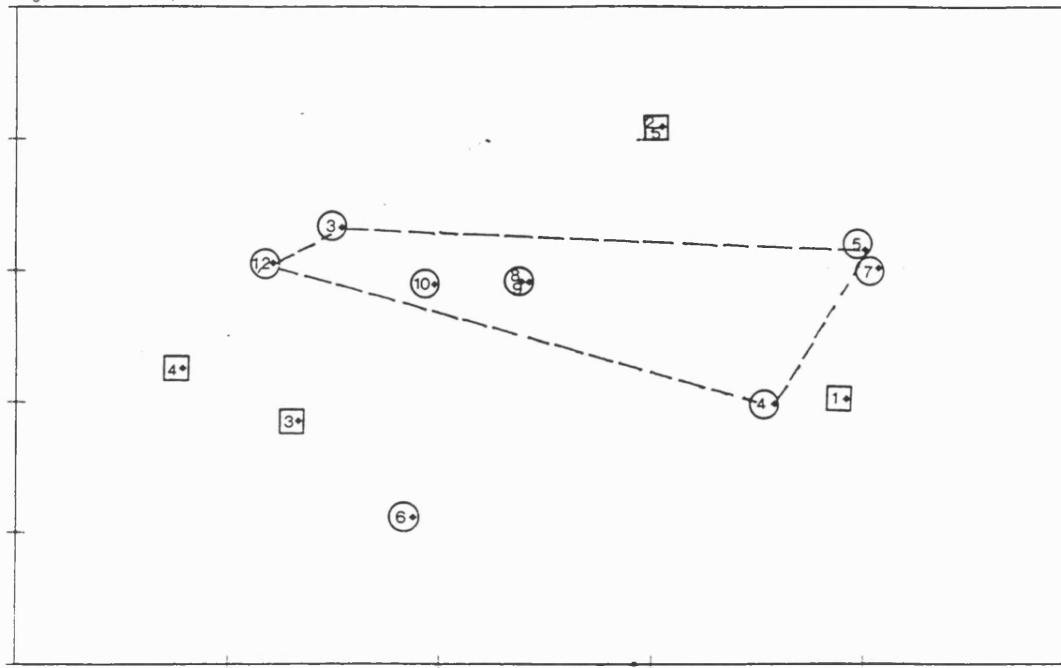
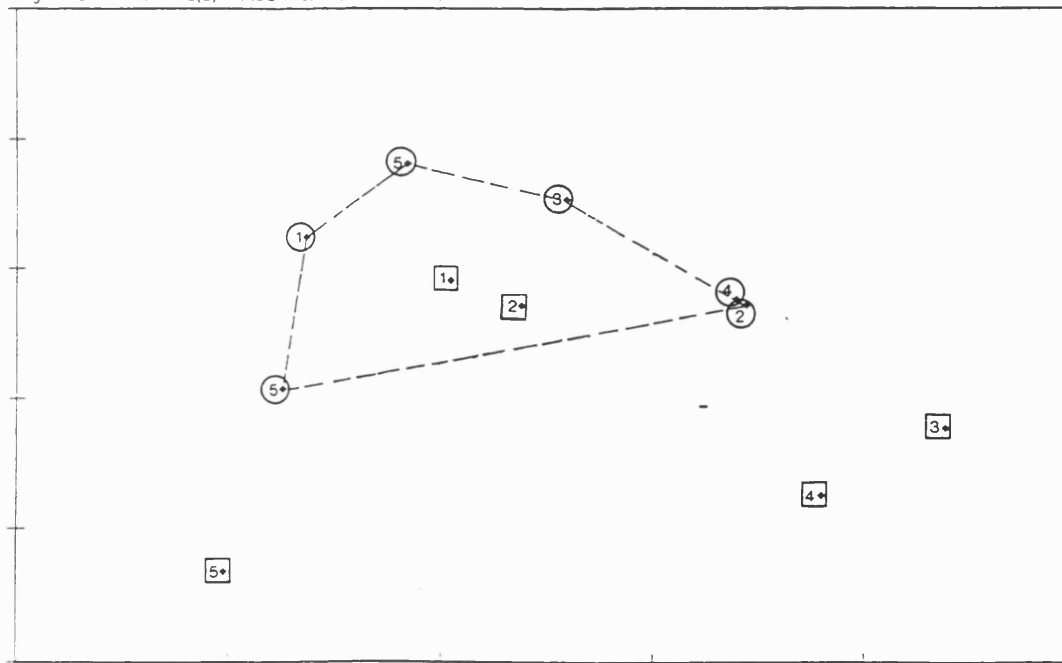


Fig. :DIMITRIS:Gr.:2(B): MAUD Preference Structure



Effi Group 2 (A)

| Options Factors | Literature (teacher) | Archaeologist | Lawyer | Writer | Teaching English | Importance of Factor |
|--------------------------------|----------------------|---------------|--------|--------|------------------|----------------------|
| Interesting job | 50 | 75 | 25 | 100 | 0 | 0.12 |
| Money | 50 | 0 | 100 | 0 | 50 | 0.13 |
| Working with people | 100 | 0 | 100 | 100 | 100 | 0.07 |
| Possibility for more ed.& cult | 67 | 67 | 0 | 100 | 33 | 0.08 |
| Social welfare syntaxi | 100 | 80 | 40 | 0 | 40 | 0.36 |
| Unemployment | 100 | 0 | 50 | 0 | 50 | 0.08 |
| Cost of studies | 100 | 0 | 0 | 50 | 0 | 0.16 |
| Overall preference | 85 | 43 | 41 | 36 | 35 | |

Haido Group 2 (A)

| Options Factors | Drama school | Advertisement | Graphics | Translator | Law | Importance of Factor |
|------------------------------|--------------|---------------|----------|------------|-----|----------------------|
| Initiative | 75 | 100 | 100 | 25 | 0 | 0.25 |
| Creativity | 100 | 100 | 100 | 50 | 0 | 0.11 |
| Money | 50 | 50 | 0 | 50 | 100 | 0.07 |
| Possibility to become famous | 100 | 75 | 25 | 0 | 25 | 0.26 |
| Human contact | 100 | 100 | 100 | 0 | 100 | 0.04 |
| Influence by parents | 20 | 20 | 0 | 100 | 80 | 0.26 |
| Overall preference | 69 | 69 | 47 | 42 | 38 | |

Fig. EFFI:Gr.2(A):MAUD Preference Structure

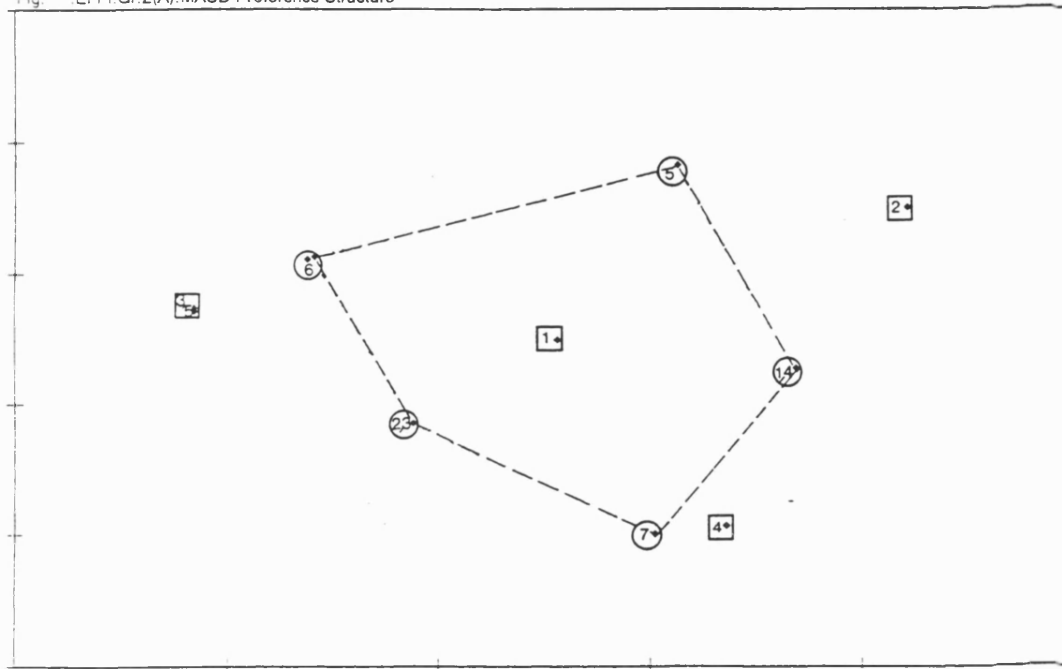


Fig. HAIDO:Gr.2(A):MAUD Preference Structure

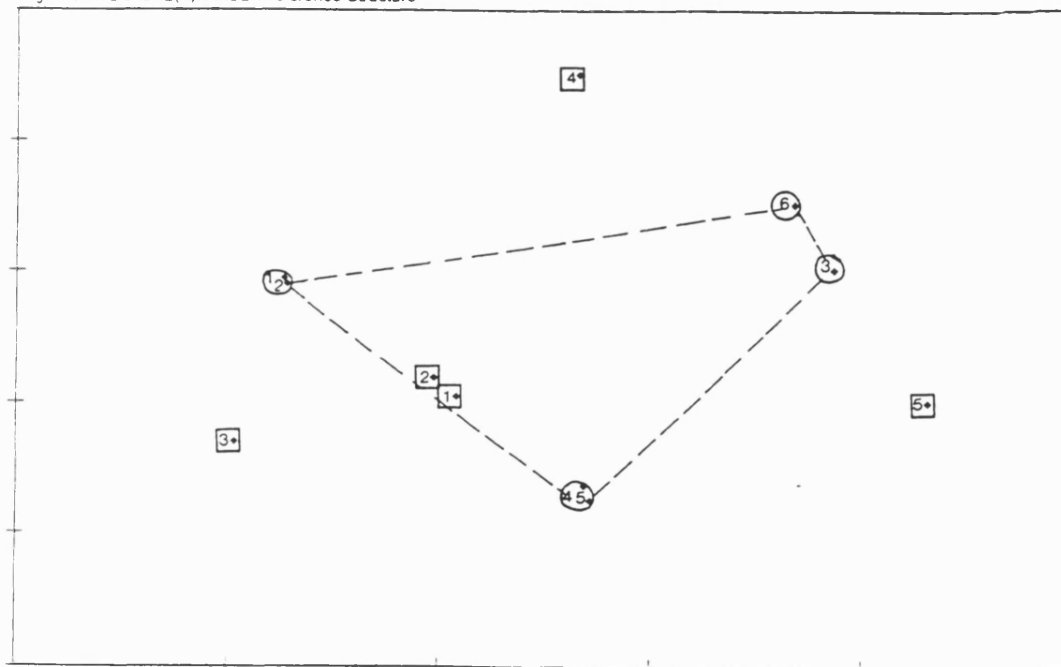


Table 3: Group 3: Summary tables and Preference Structure Plots from MAUD data

Leteris Group 3 (A)

| Options Factors | Computers | Electronics | Pilot | Physics (Teach.in H.Sc.) | Importance of Factor |
|--------------------------|-----------|-------------|-------|--------------------------|----------------------|
| Possibility for research | 100 | 67 | 50 | 0 | 0.05 |
| Easy to find a job | 60 | 40 | 100 | 0 | 0.01 |
| Good salary | 100 | 33 | 67 | 0 | 0.12 |
| Free time | 100 | 100 | 0 | 100 | 0.19 |
| Like | 100 | 67 | 67 | 0 | 0.43 |
| Security | 0 | 33 | 100 | 67 | 0.19 |
| Overall preference | 80 | 62 | 60 | 32 | |

Leteris Group 3 (B)

| Options Factors | Pilot | Computer Analyst | Electronics | Physics (teach.in H.Sc.) | Importance of Factor |
|--------------------------|-------|------------------|-------------|--------------------------|----------------------|
| Possibility for research | 100 | 83 | 67 | 0 | 0.13 |
| Easy to find a job | 100 | 60 | 40 | 0 | 0.15 |
| Good salary | 100 | 75 | 50 | 0 | 0.20 |
| Free time | 0 | 100 | 100 | 100 | 0.11 |
| Like | 100 | 83 | 67 | 83 | 0.17 |
| Security in my job | 100 | 0 | 33 | 0 | 0.08 |
| Movement | 100 | 0 | 67 | 0 | 0.09 |
| Security of my life | 100 | 25 | 25 | 25 | 0.09 |
| Overall preference | 89 | 61 | 57 | 17 | |

Sarita Group 3 (A)

| Options Factors | Beautician | Secretarial studies | Family shop | Find another job | Importance of Factor |
|--------------------|------------|---------------------|-------------|------------------|----------------------|
| Interesting job | 100 | 57 | 43 | 0 | 0.23 |
| Work environment | 100 | 60 | 20 | 0 | 0.17 |
| Free time | 100 | 100 | 0 | 100 | 0.16 |
| Initiative | 0 | 0 | 100 | 0 | 0.17 |
| Meet people | 100 | 75 | 0 | 25 | 0.19 |
| Need studies | 100 | 86 | 14 | 0 | 0.08 |
| Overall preference | 83 | 60 | 32 | 20 | |

Sarita Group 3 (B)

| Options Factors | Beautician | Secretarial studies | Family shop | Find another job | Importance of Factor |
|--------------------|------------|---------------------|-------------|------------------|----------------------|
| Interesting job | 100 | 57 | 43 | 0 | 0.30 |
| Work environment | 100 | 60 | 20 | 0 | 0.16 |
| Free time | 100 | 100 | 0 | 100 | 0.16 |
| Initiative | 0 | 0 | 100 | 0 | 0.16 |
| Meet people | 100 | 75 | 0 | 25 | 0.16 |
| Need for studies | 100 | 86 | 14 | 0 | 0.07 |
| Overall preference | 84 | 60 | 33 | 20 | |

Fig :SARITA:Gr.3(A): MAUD Preference Structure

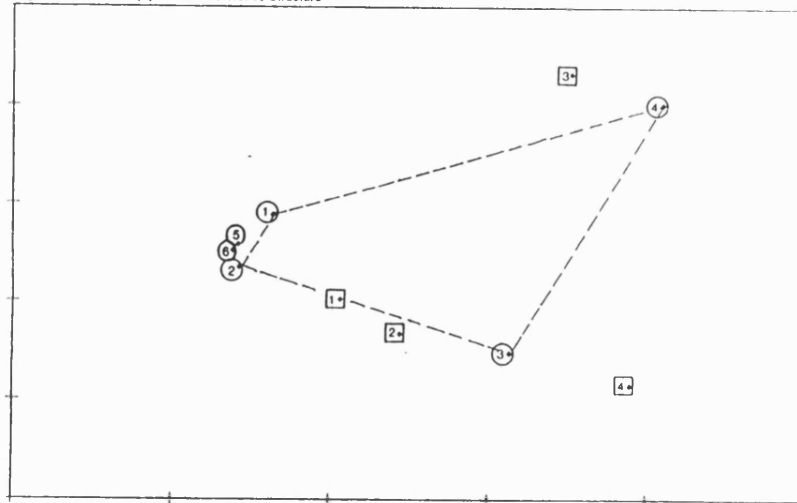


Fig :LETERIS:Gr.3(A) MAUD Preference Structure

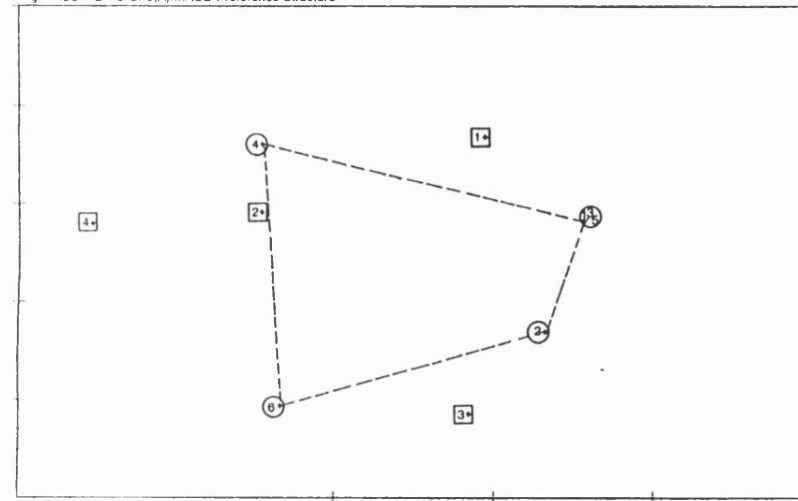


Fig :SARITA:Gr.3(B): MAUD Preference Structure

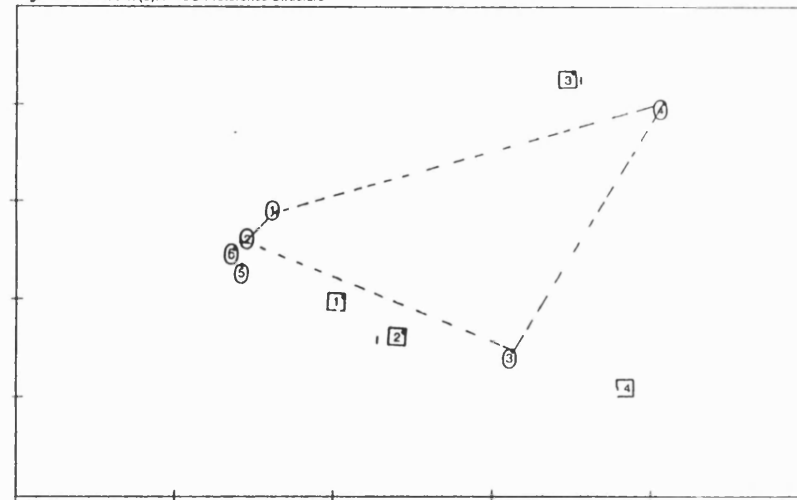
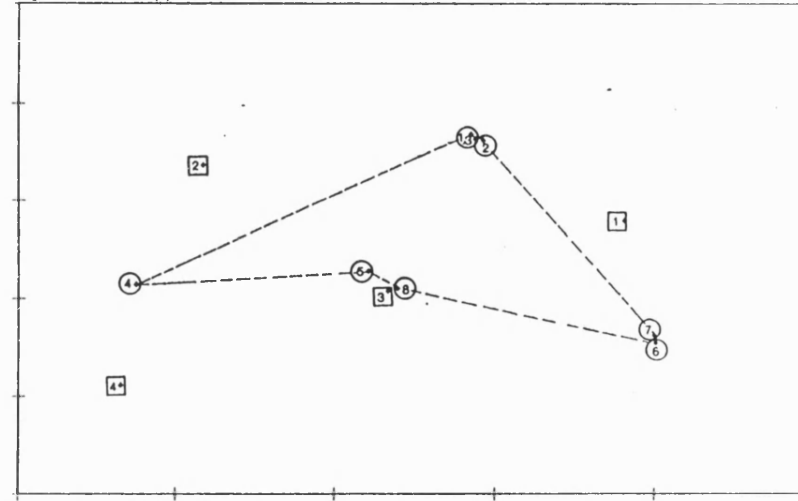


Fig :LETERIS:Gr.3(B):MAUD Preference Structure



Effi Ar. Group 3 (A)

| Options Factors | Nursery teacher | Economics in Lower Poly. | Job in Bank | Secretarial studies | English teacher | Importance of Factor |
|------------------------|-----------------|--------------------------|-------------|---------------------|-----------------|----------------------|
| Difficult job (tiring) | 100 | 67 | 33 | 33 | 0 | 0.12 |
| Good salary | 100 | 100 | 100 | 0 | 50 | 0.28 |
| Socially approved | 100 | 100 | 50 | 0 | 0 | 0.32 |
| Free time | 100 | 0 | 0 | 100 | 50 | 0.28 |
| Overall preference | 100 | 68 | 48 | 32 | 28 | |

Factor: Interesting to Difficult Job : Cancel

Elias Group 3 (A)

| Options Factors | Computer Analyst | Computer Progr. | Aircraft Engineering | Pilot | Importance of Factor |
|-----------------------|------------------|-----------------|----------------------|-------|----------------------|
| Promotion Development | 100 | 75 | 100 | 0 | 0.16 |
| To become well known | 60 | 60 | 100 | 0 | 0.06 |
| More money | 100 | 100 | 100 | 0 | 0.19 |
| Like the job | 100 | 100 | 0 | 50 | 0.42 |
| Work environment | 100 | 0 | 100 | 0 | 0.01 |
| Meet different people | 100 | 25 | 50 | 0 | 0.16 |
| Overall preference | | | | | |

Fig. :ELIAS:Gr.3(A): MAUD Preference Structure

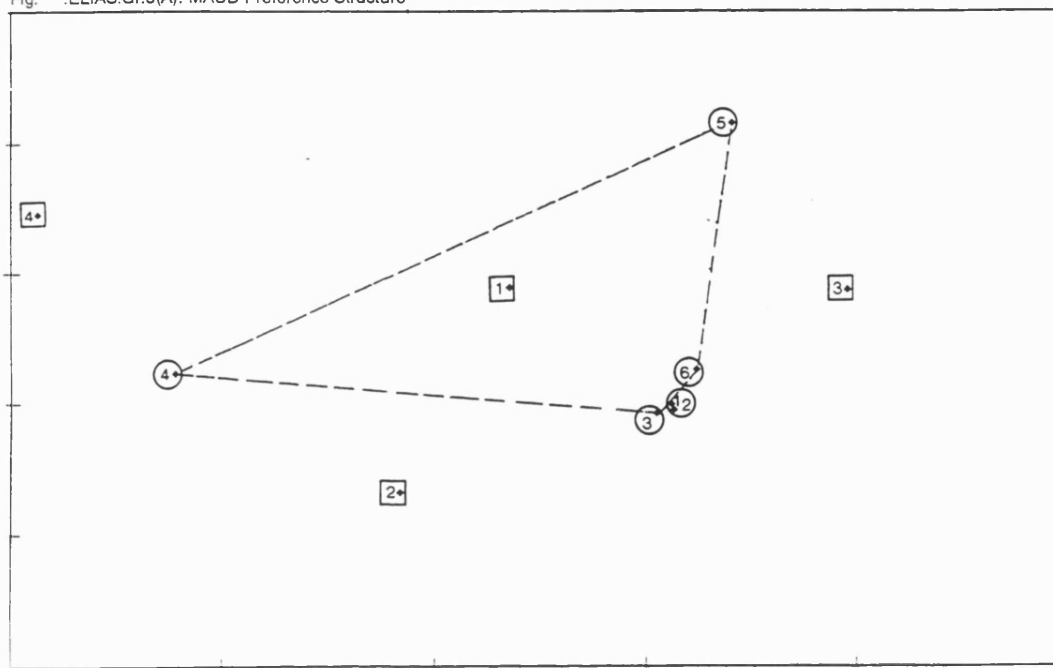
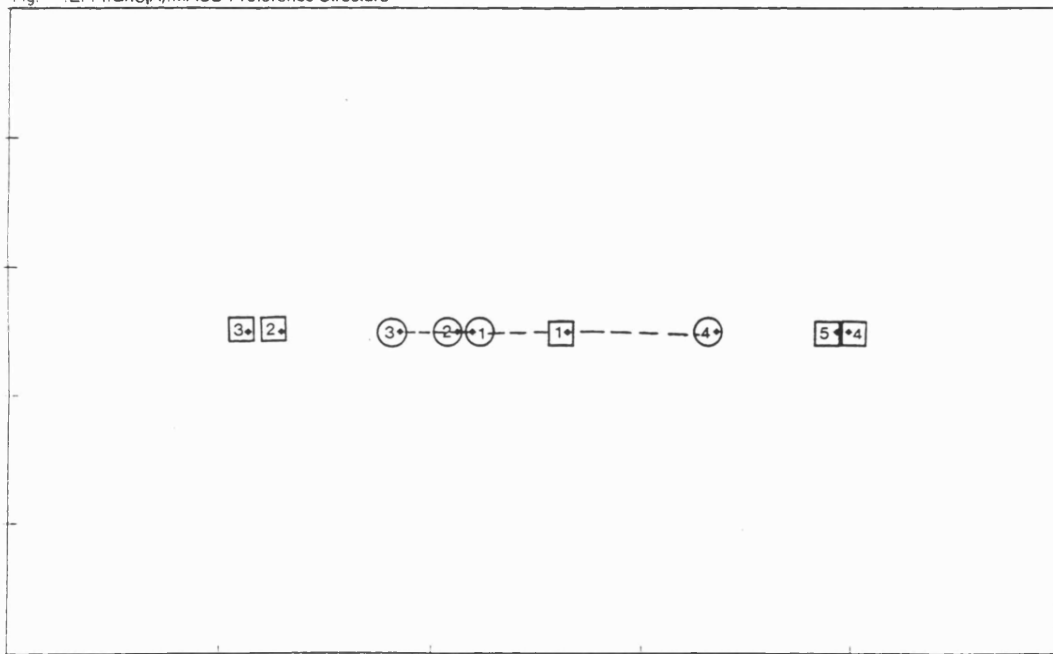


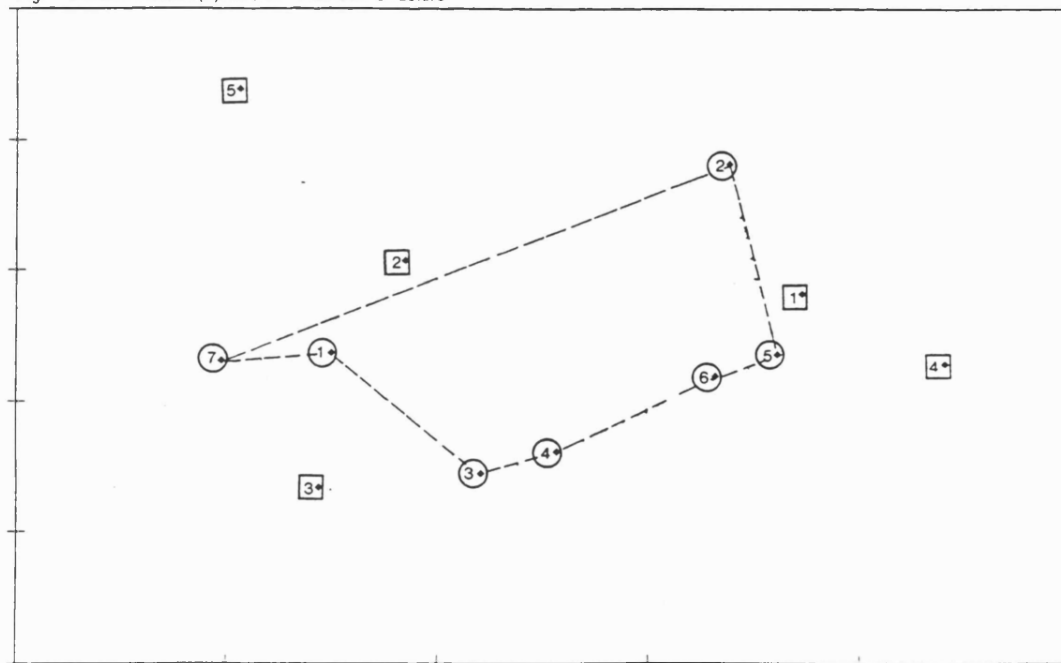
Fig. :EFFI:Gr.3(A): MAUD Preference Structure

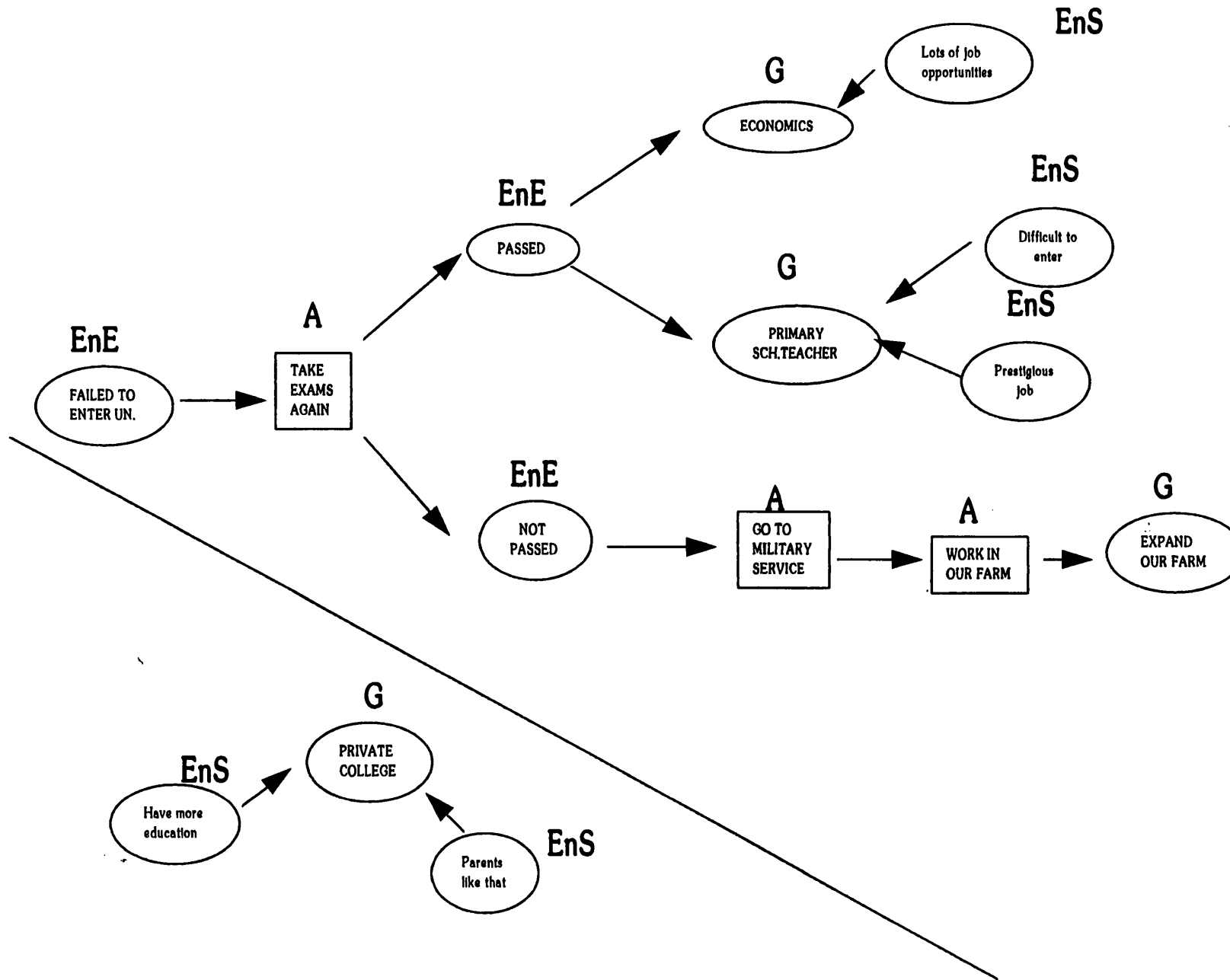


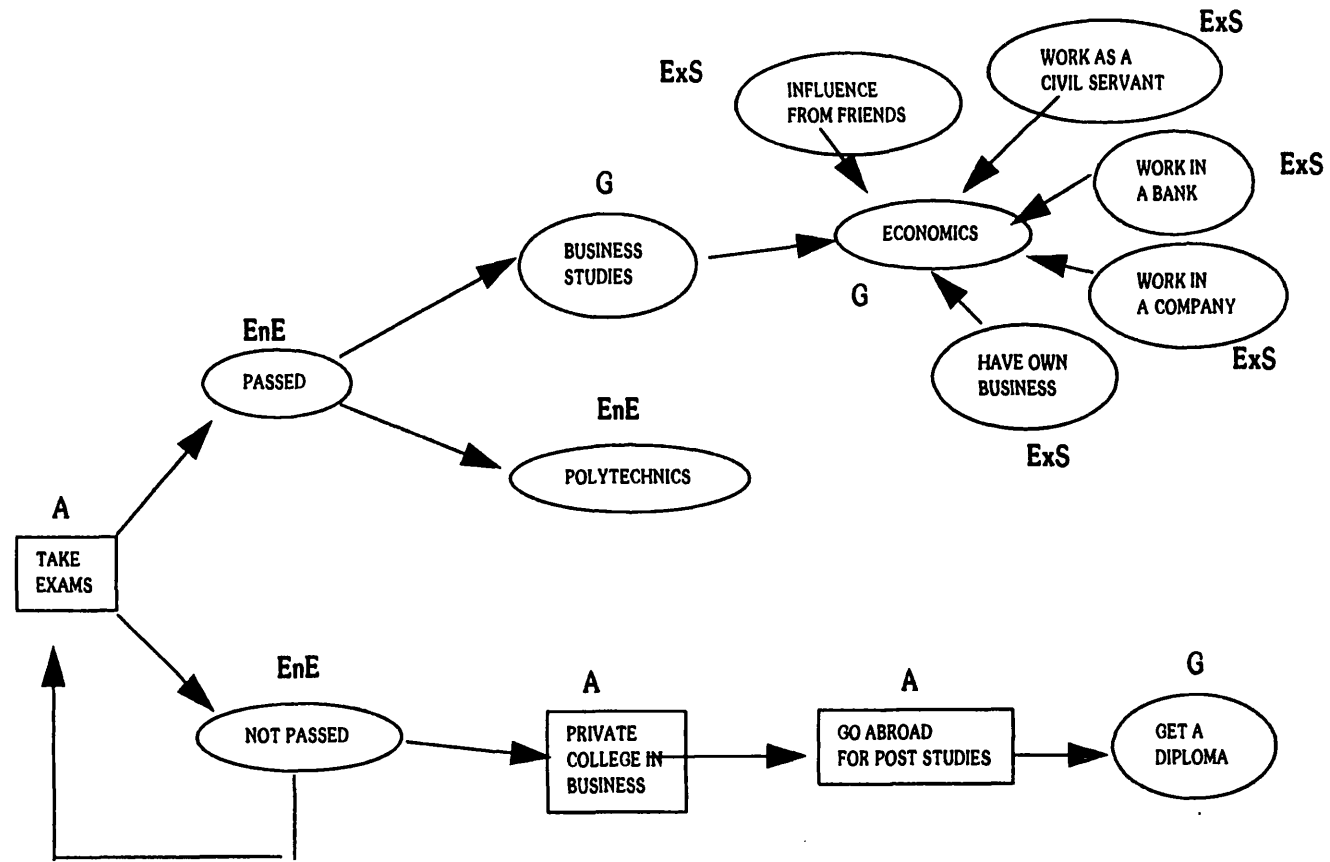
Aggelos Group 3 (B)

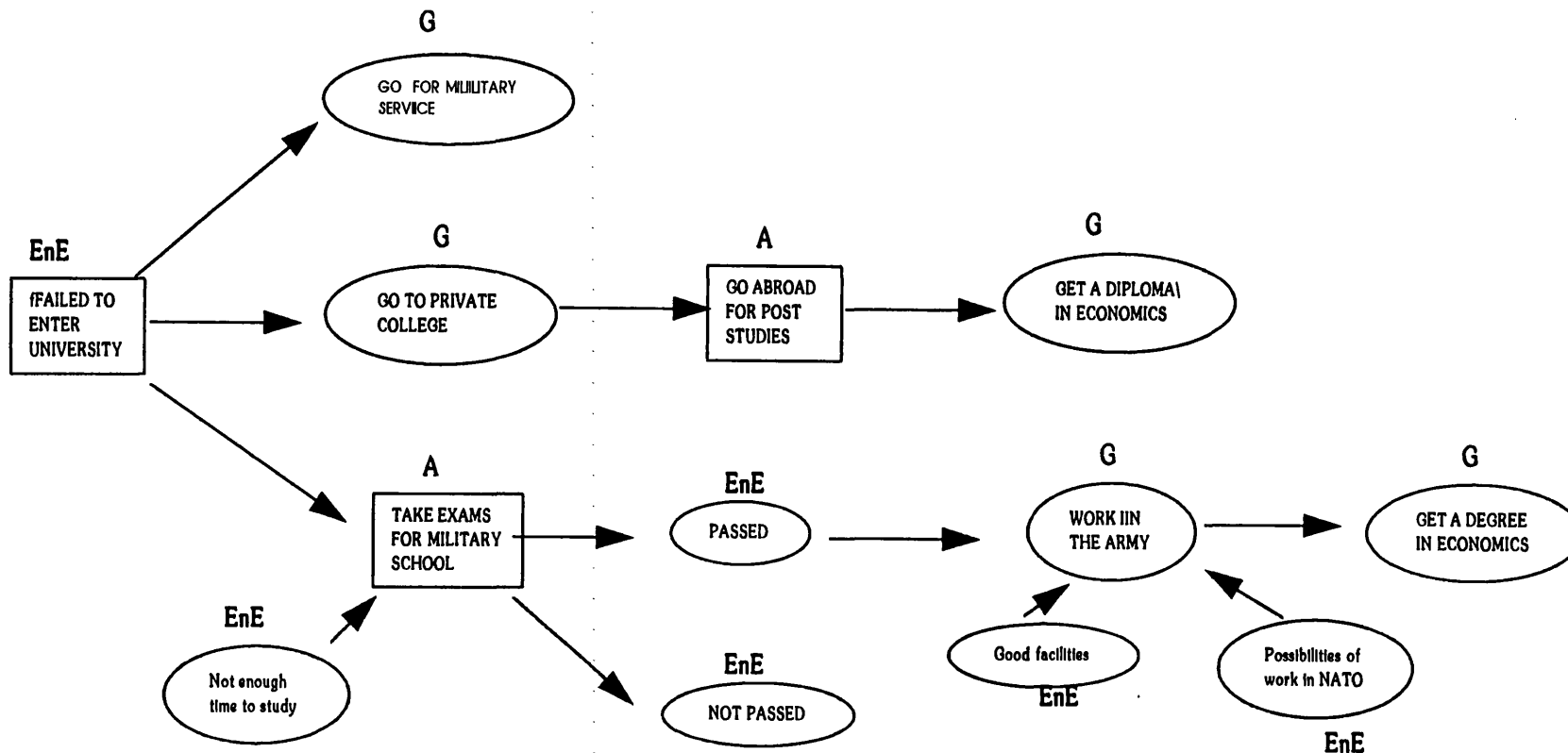
| Options Factors | Botanist | Army School | Pilot | Chemical Engineering | Computer Statistics | Importance of Factor |
|-----------------------|----------|-------------|-------|----------------------|---------------------|----------------------|
| Difficult to enter | 75 | 75 | 100 | 0 | 50 | 0.15 |
| Security in job | 100 | 60 | 0 | 40 | 20 | 0.34 |
| Adventure action | 40 | 60 | 100 | 20 | 0 | 0.15 |
| Personal satisfaction | 80 | 60 | 100 | 40 | 0 | 0.10 |
| Social status | 75 | 50 | 25 | 100 | 0 | 0.10 |
| More money | 100 | 75 | 50 | 100 | 0 | 0.12 |
| Free time | 0 | 100 | 100 | 0 | 50 | 0.04 |
| Overall preference | 79 | 65 | 52 | 43 | 16 | |

Fig. :AGGELOS:Gr.3(B): MAUD Preference Structure

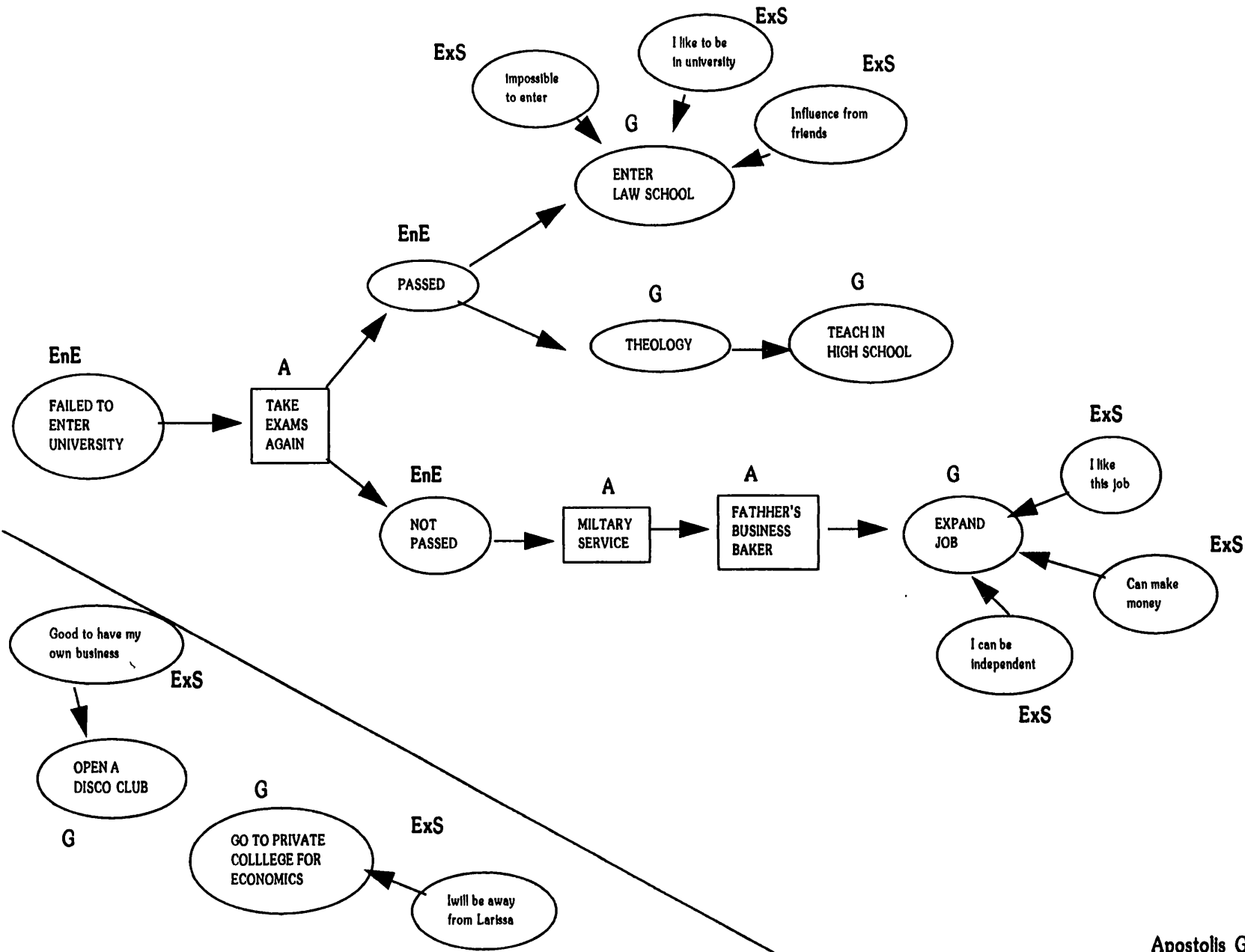


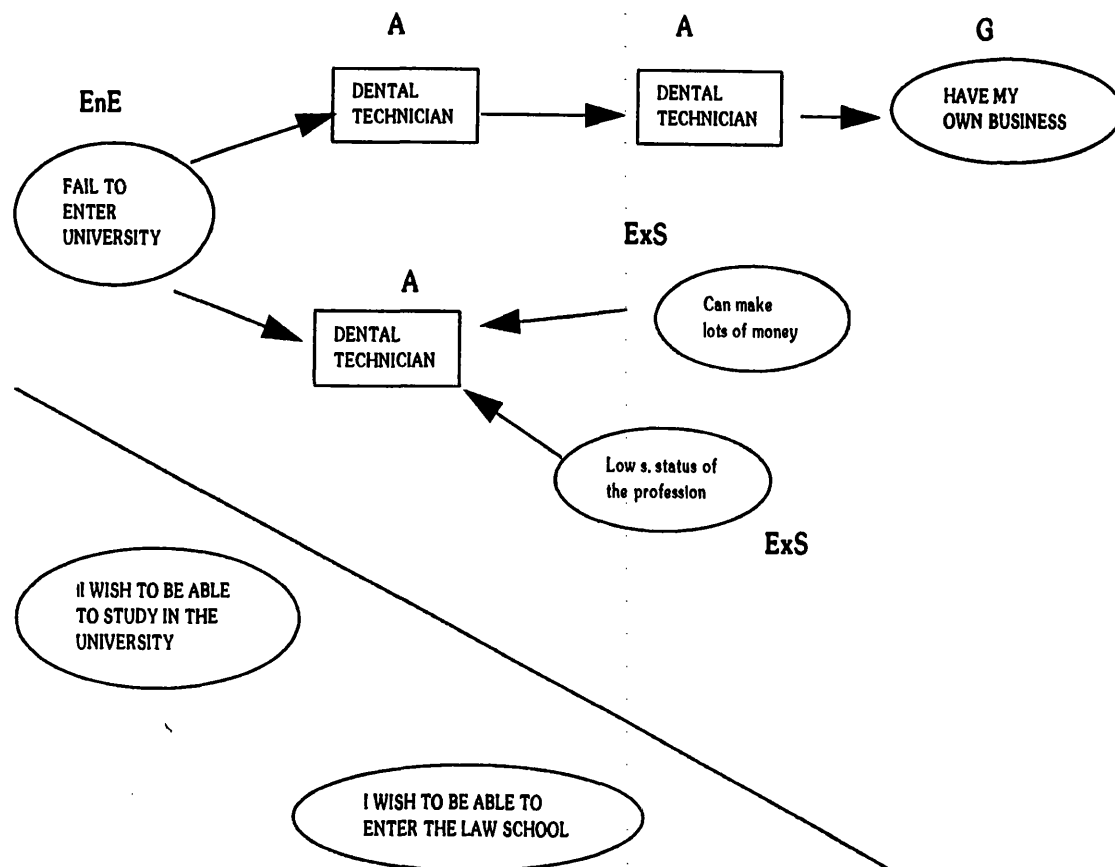


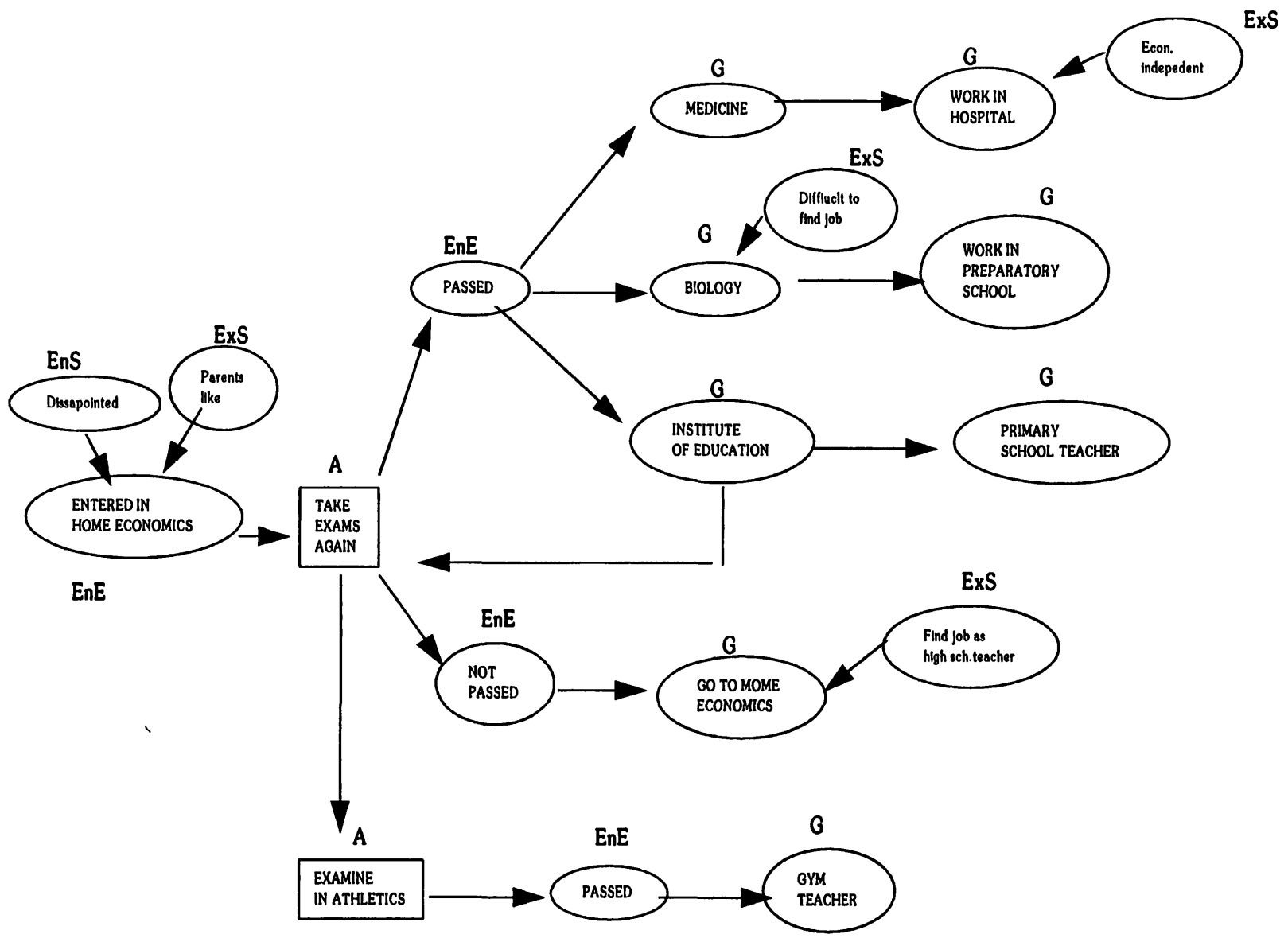


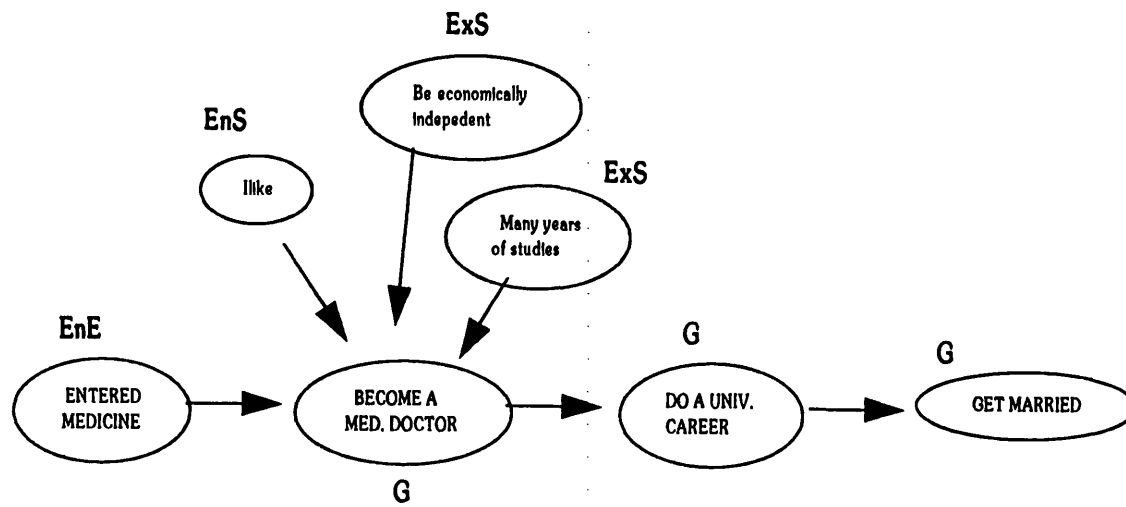


George Gr. 1 (B)

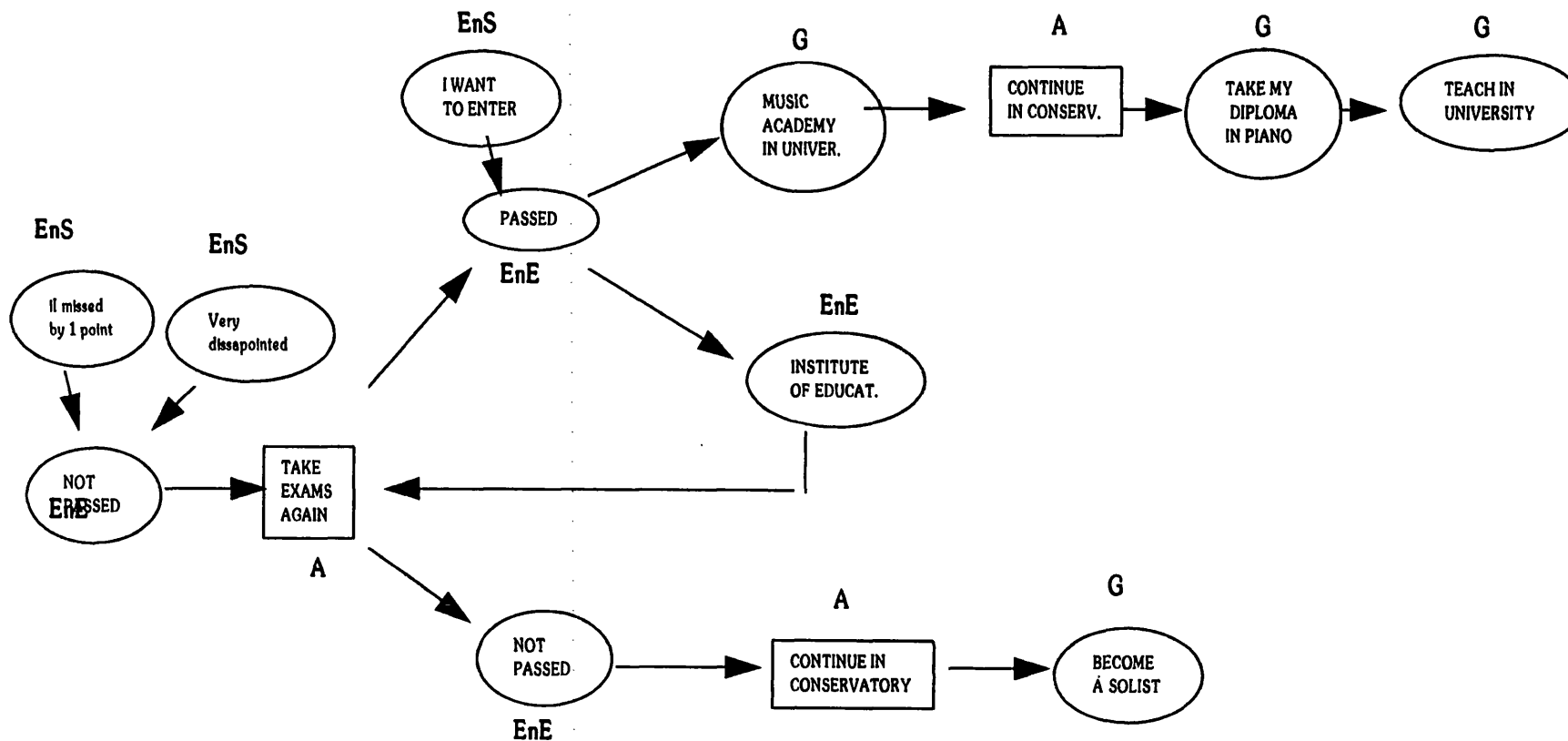


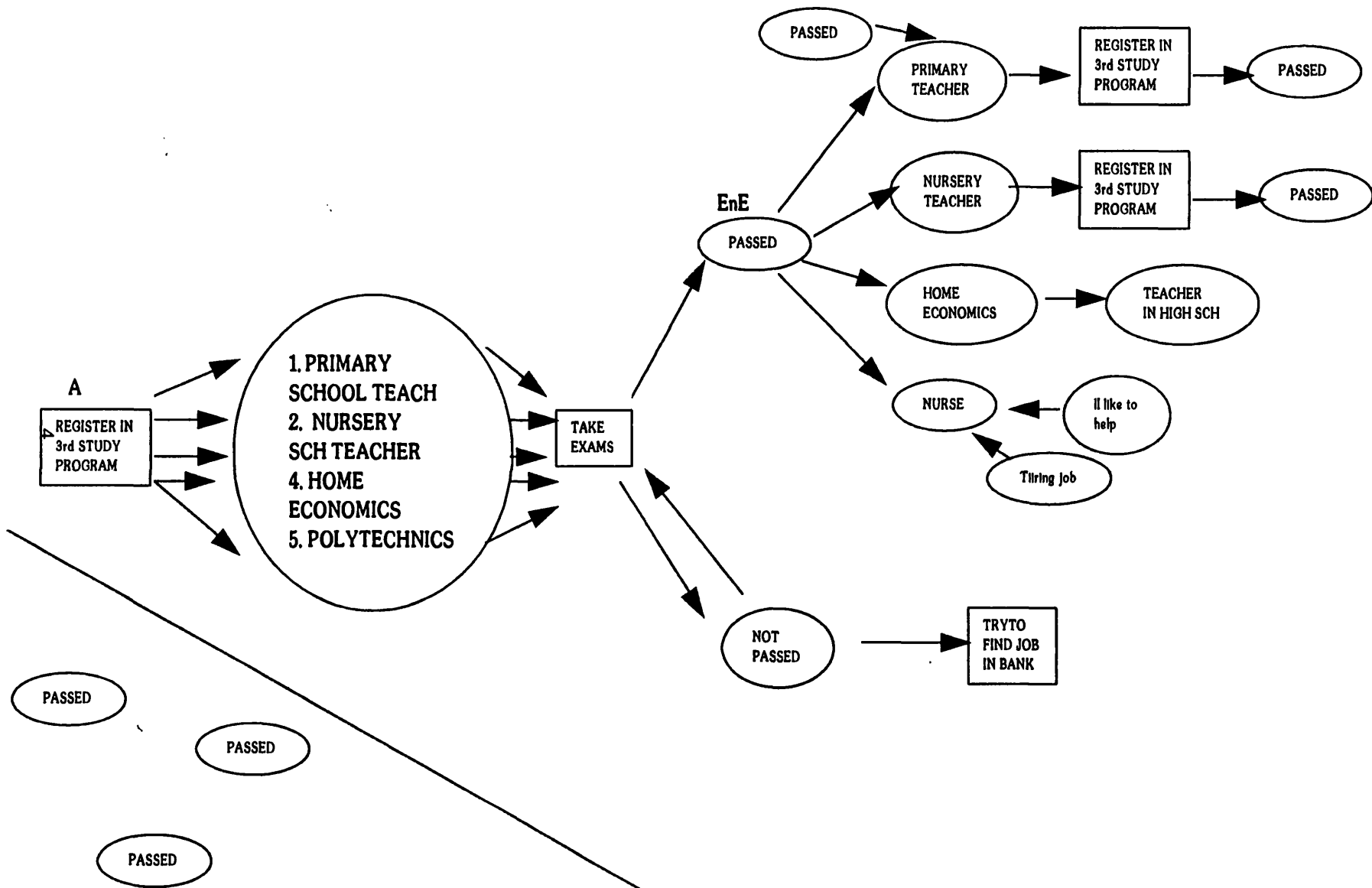


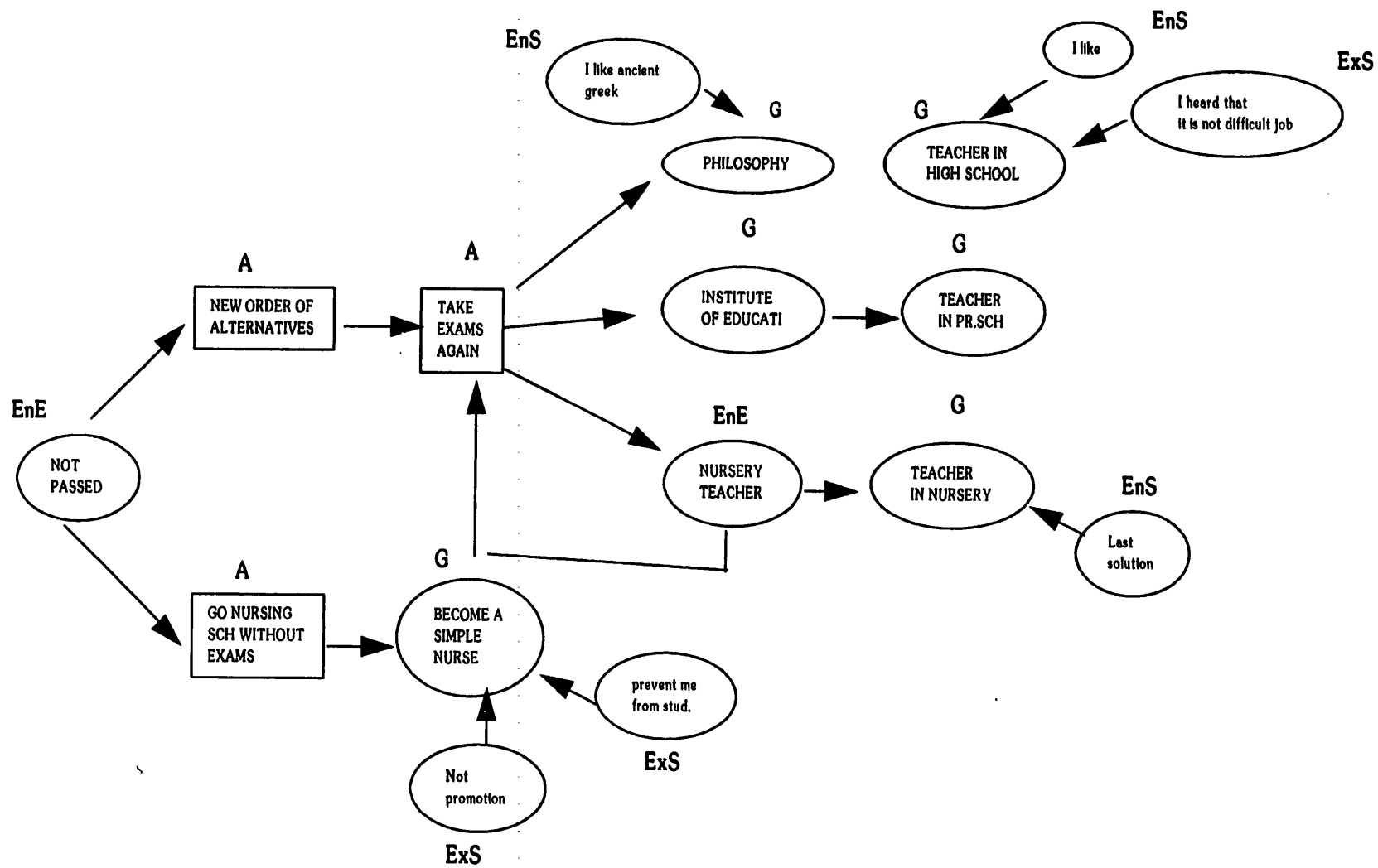


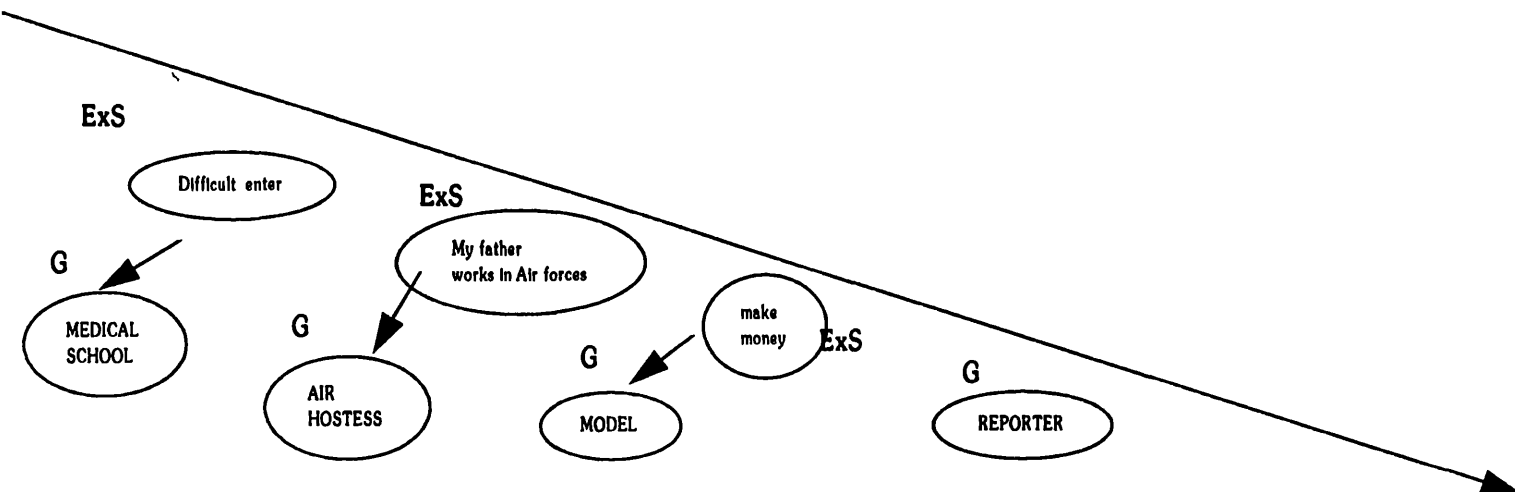
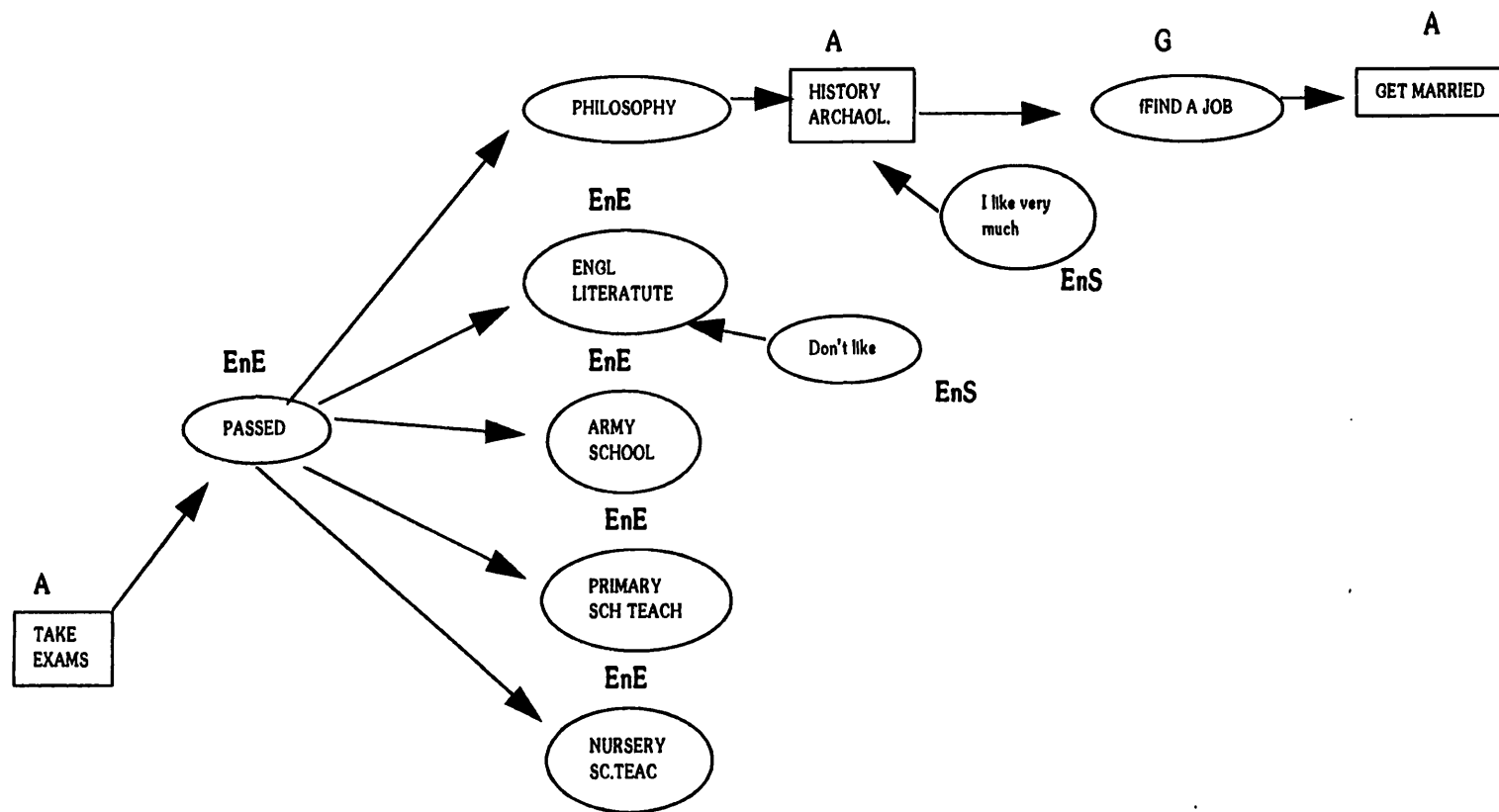


KAFFIA Gr.1 (b)

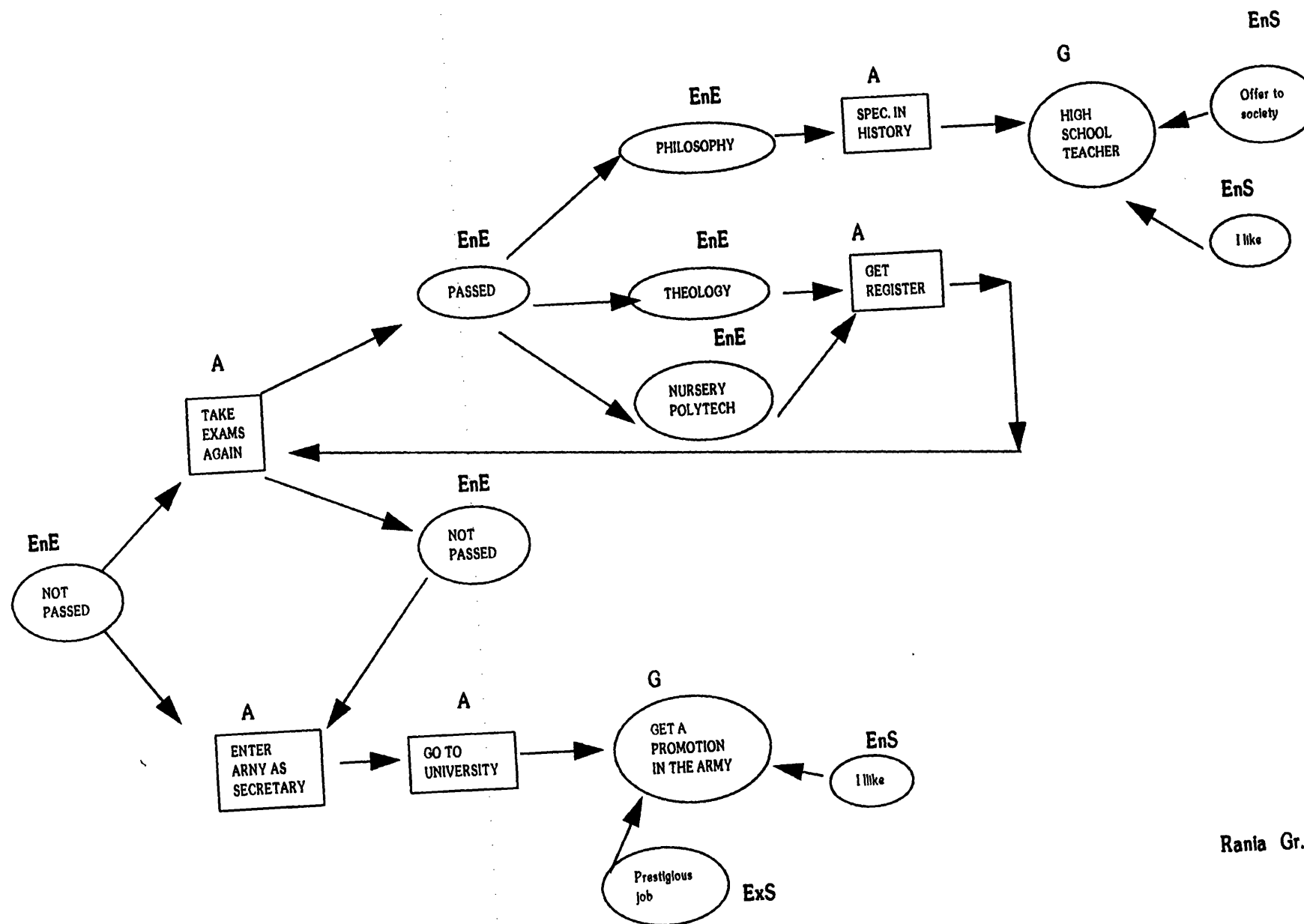




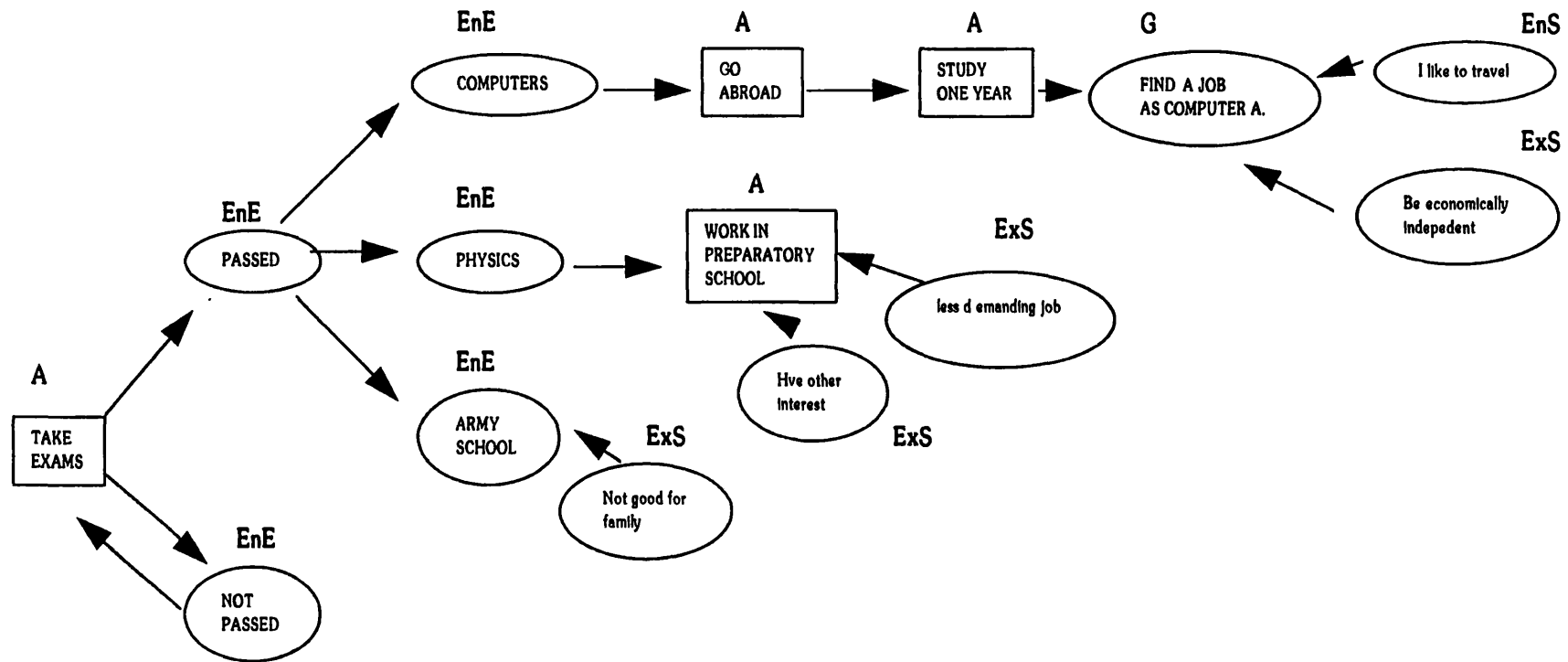


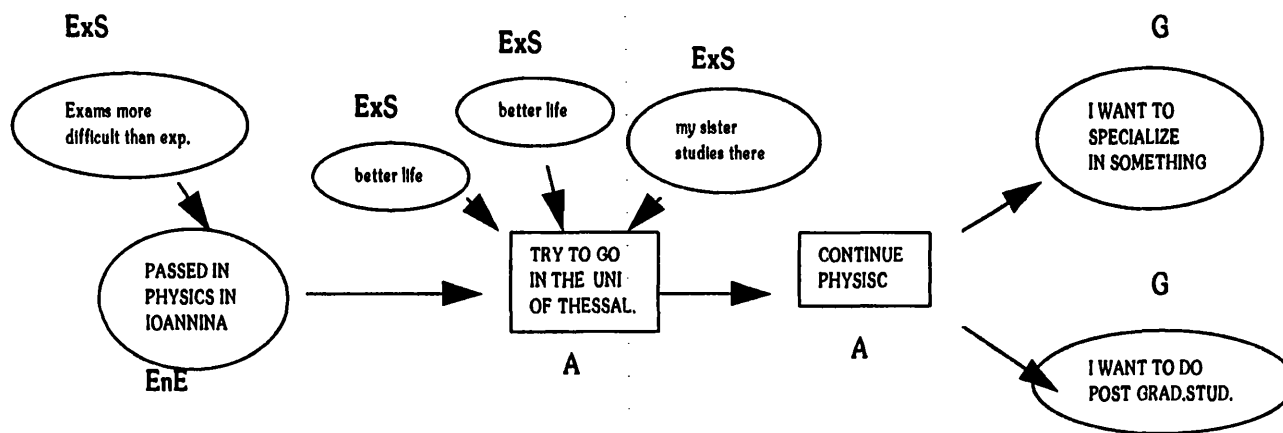


Rania Gr. 2 (A)

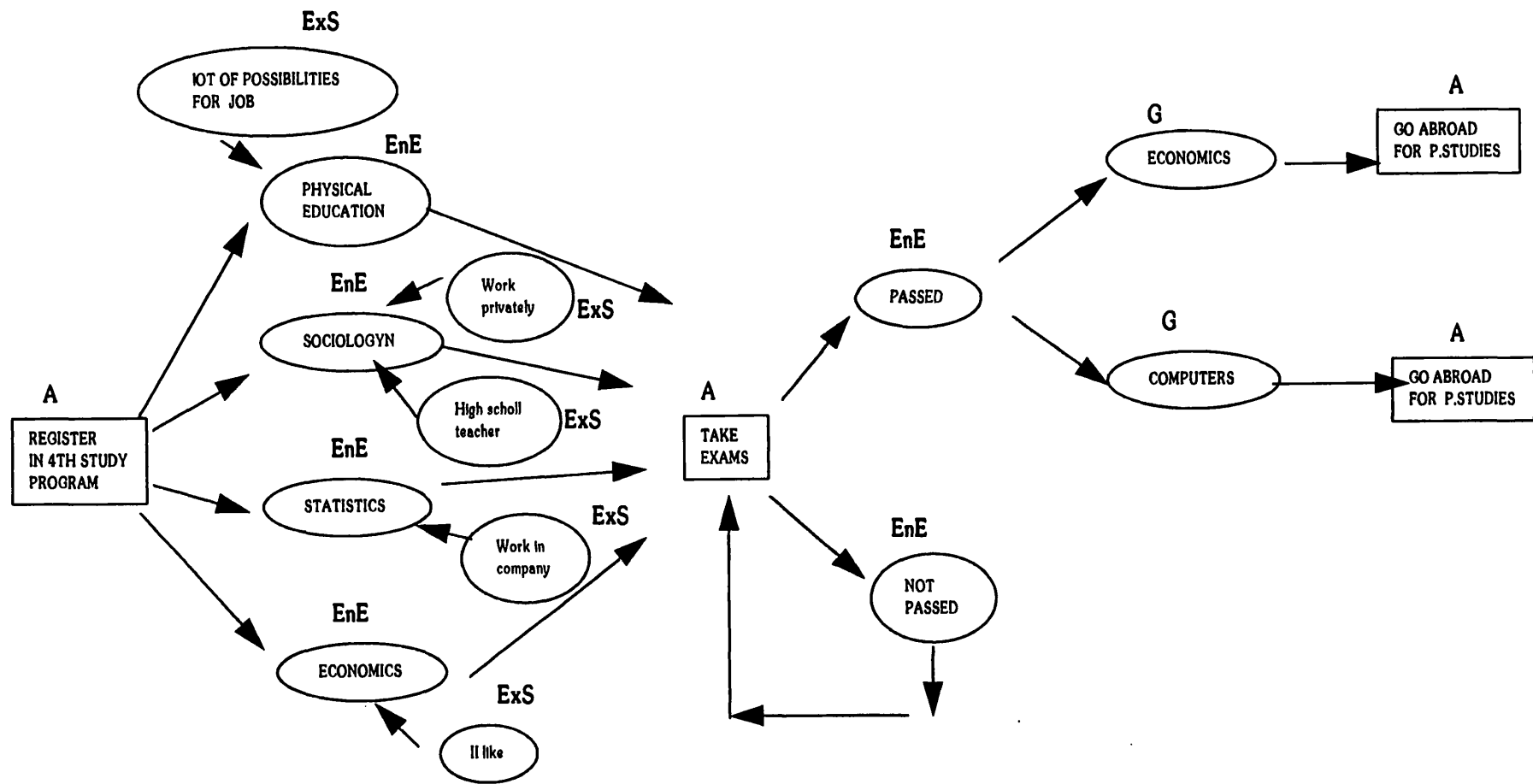


Rania Gr.2 (B)

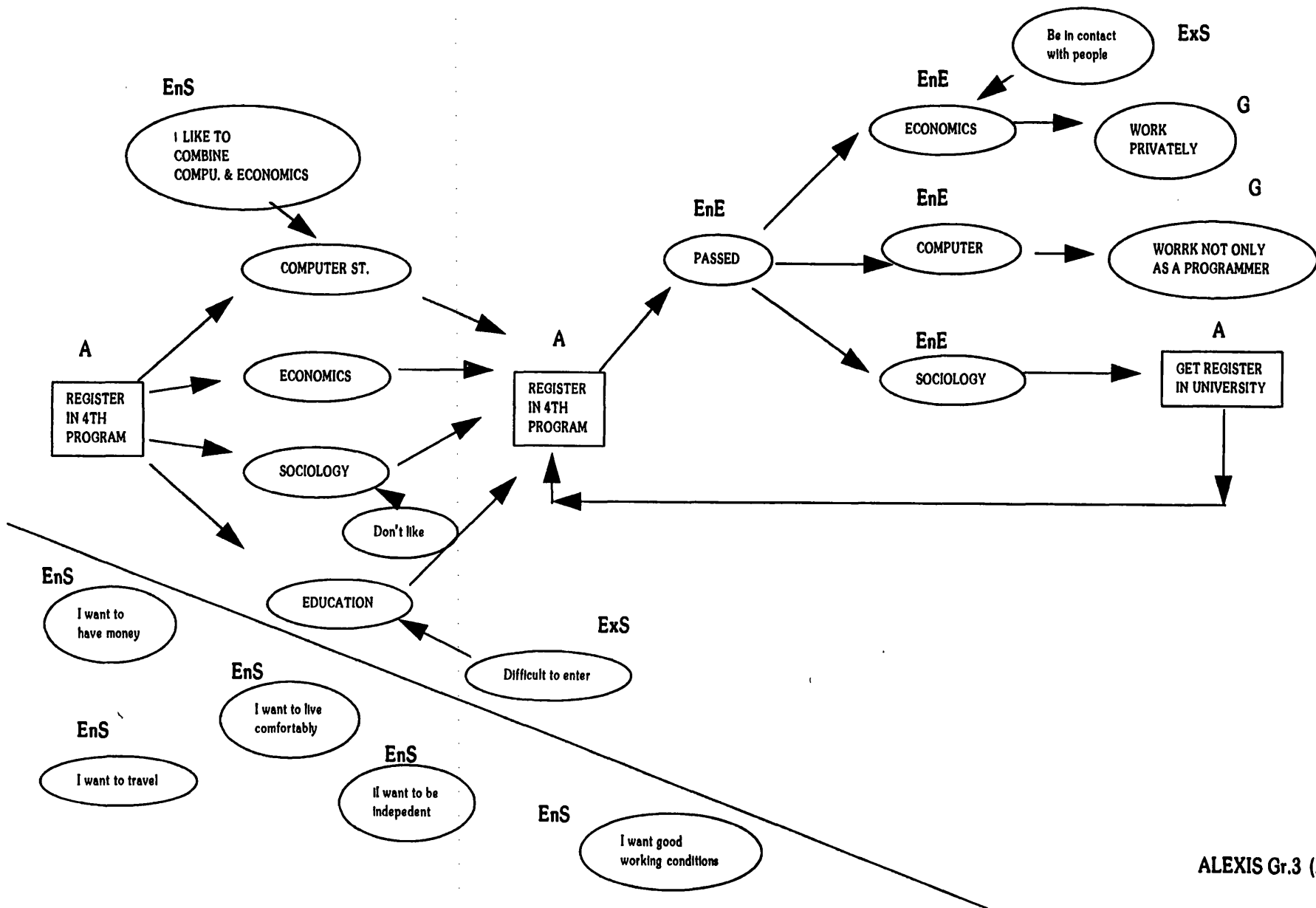


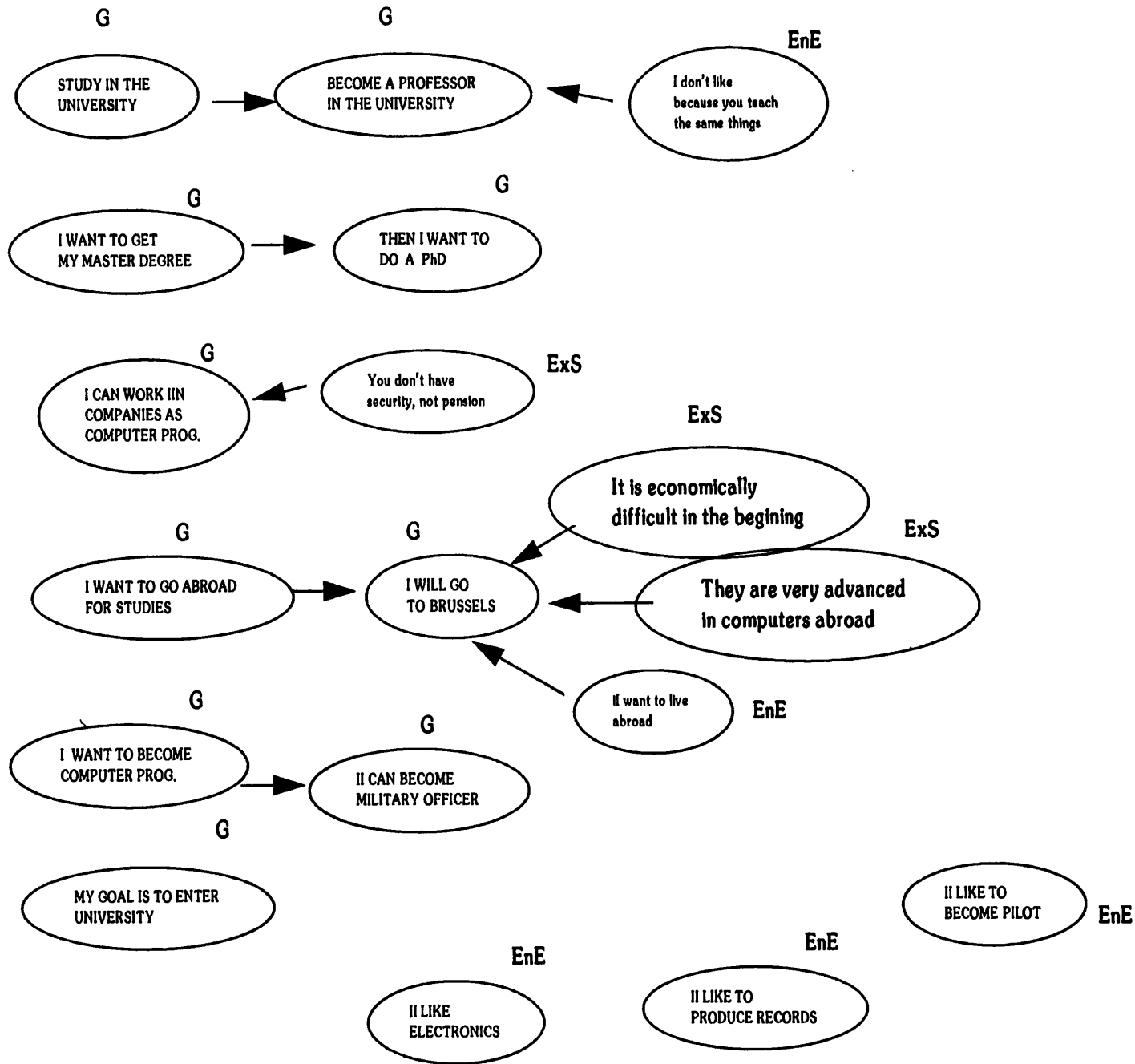


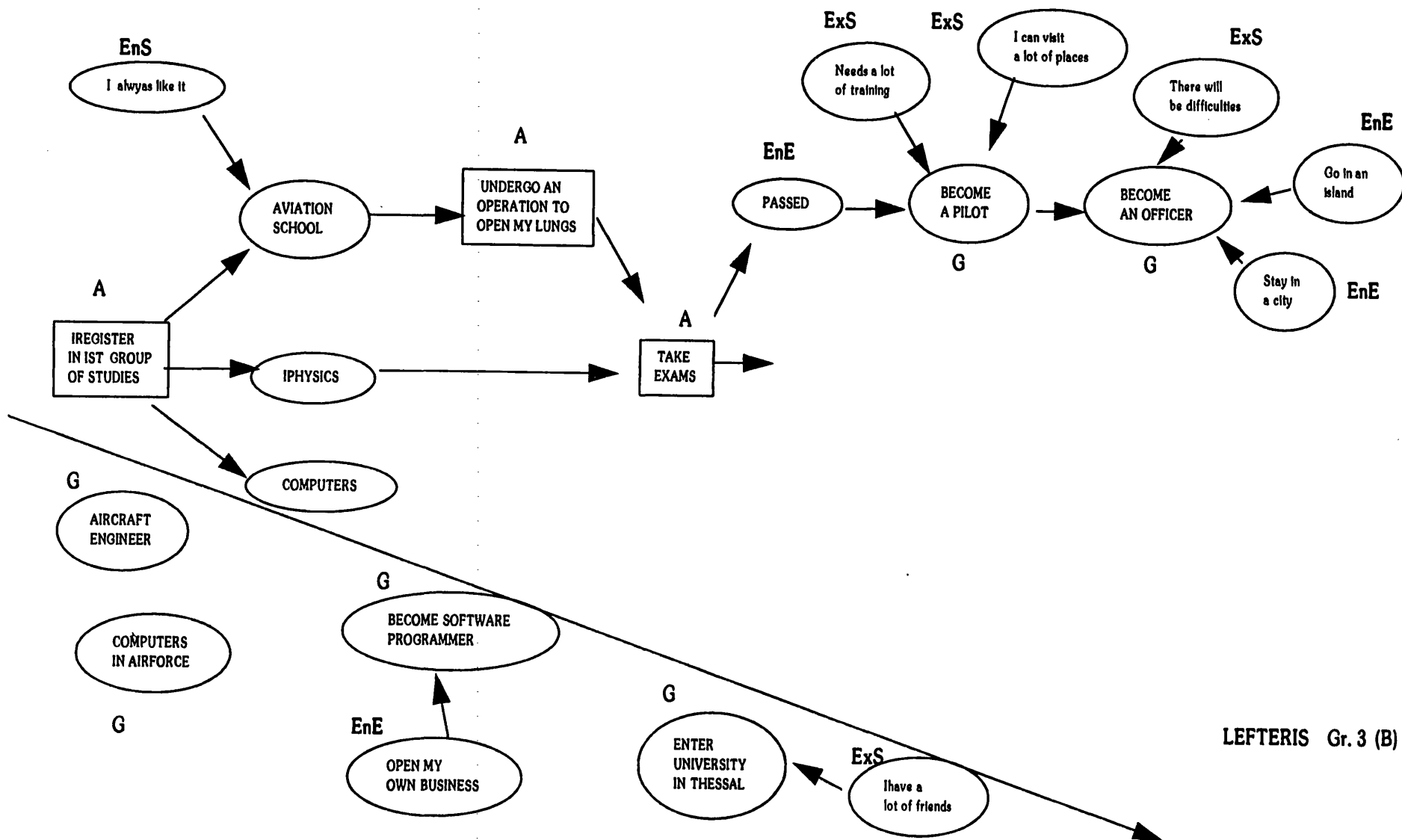
DIMITRIS Gr. 2 (B)



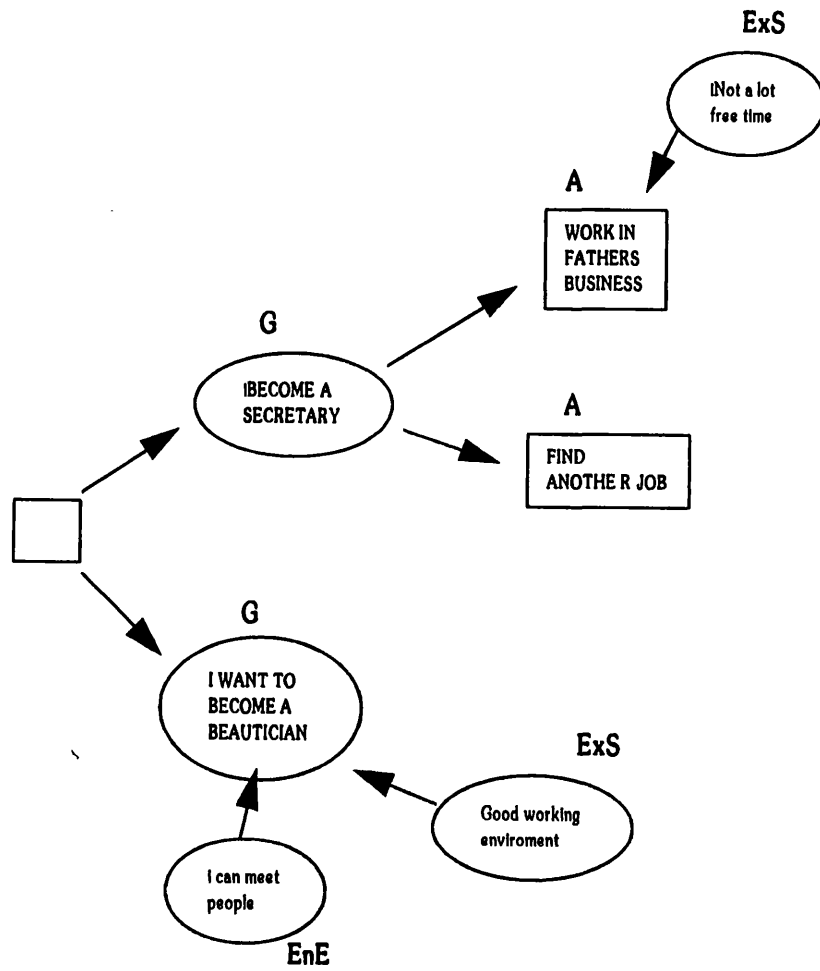
ALEXIS Gr.3 (A)

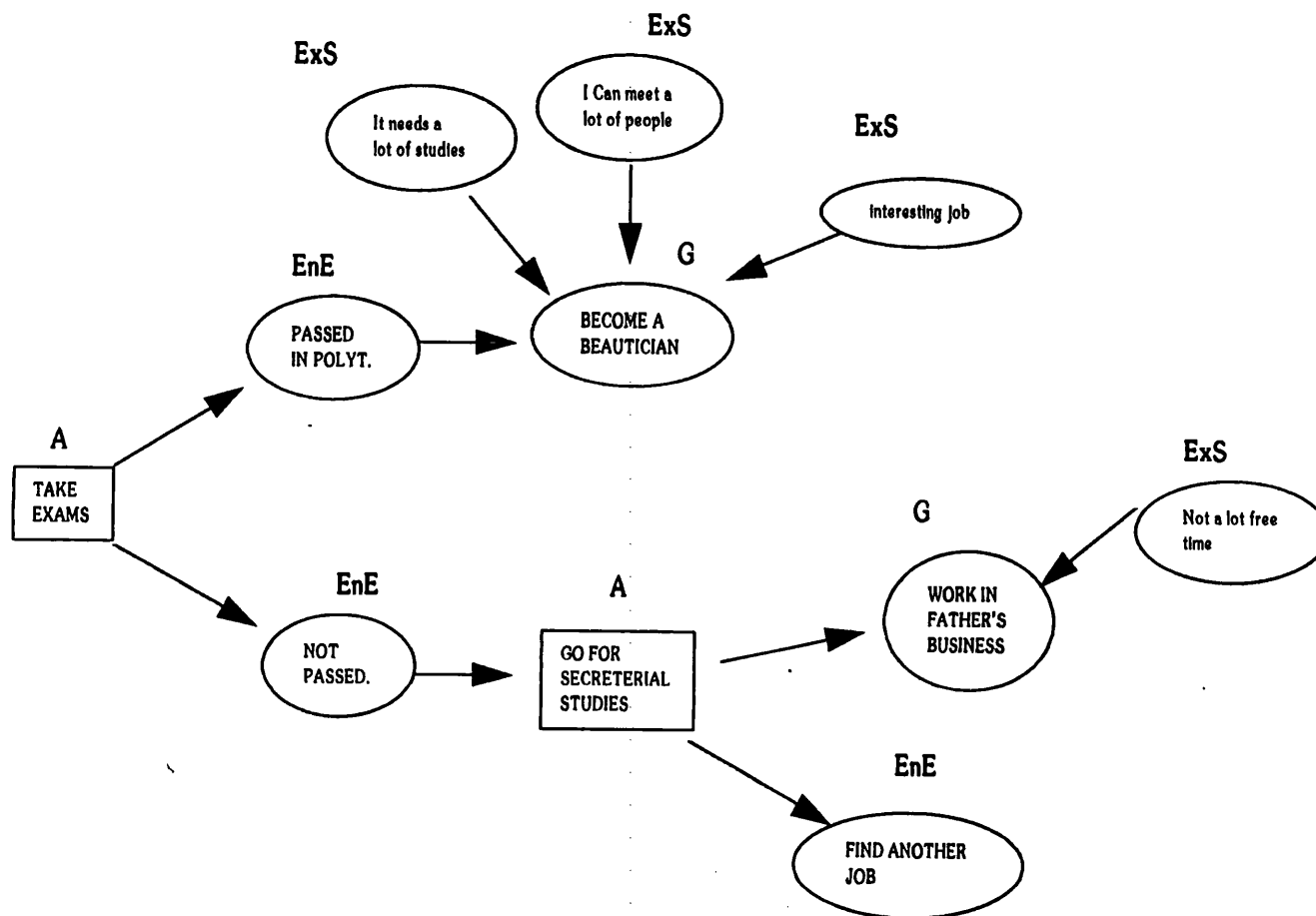






LEFTERIS Gr. 3 (B)





SARITA Gr.3 (B)