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DECISION MAKING:
SOCIAL AND CREATIVE DIMENSIONS

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PREFACE

Decision making is a complex phenomenon which normally is deeply integrated into social life. At the same time the decision making process often gives the decision maker an opportunity for conscious planning and for taking a reflective stance with respect to the action considered. This suggests that decision making allows creative solutions with a potential to change the course of events both on an individual and a collective level. Given these considerations, we argue that in order to more fully understand decision making the perspectives of different disciplines are needed. In this volume we have attempted to draw together contributions that would provide a broad view of decision making.

Much work has been carried out in the writing and editing of this volume. First of all we would like to thank the contributors for their efforts in producing interesting and important texts and for their patience in the editorial process. Each chapter was edited by two or three reviewers. These reviewers are listed on a separate page in this book. Our heartfelt thanks go to them for their time and for their incisive and constructive reviews! We are also grateful to the publishing editors at Kluwer Academic Publishers, Christiane Roll and Dorien Francissen, who have been generous with their encouragement and patience throughout the editorial process. We are also indebted to Ole Boe, Louise Miller Guron, and Karin Näslund for their invaluable technical and language assistance in connection with the production of the book. Finally, our appreciation goes to the Swedish Research Council for the Humanities and Social Sciences (HSFR) from which we have received financial support in connection with the preparation of this book.

Carl Martin Allwood and Marcus Selart

ABSTRACT

The present volume deals with social and creative aspects of decision making. Such aspects have, to some extent, been neglected in previous behavioral research. The volume contributes to the integration of theories, concepts and empirical results from different research traditions and in this way helps to better our understanding of the decision making process. The chapters hereby complements research achievements that have been presented under different headings such as 'naturalistic decision making', 'distributed decision making', and 'applied creativity'. Most of the contributing authors are from psychology, other come from management science, health science, education, policy and planning, and informatics. Several of the chapters address basic and general issues with regard to the social and creative dimensions of decision making. Other chapters deal with personal decision making and different aspects of decision making in organizations.

ACKNOWLEDGEMENT

The production of the present volume may be characterized as a highly collaborative effort. We are grateful for help from several colleagues in the review process of the chapters. Our principal reviewers were Anders Biel, Berndt Brehmer, Ray Crozier, Ulf Dahlstrand, Britt-Marie Drottz-Sjöberg, Steve Fuller, Tommy Gärling, Erik Hollnagel, Gideon Keren, Maria Lewicka, Ranaan Lipshitz, Ingvar Lundberg, Reijo Miettinen, Henry Montgomery, Torsten Norlander, Rob Ranyard, Waymond Rodgers, Jim Shanteau, Ola Svenson, Karl Halvor Teigen, Suzanne Vosburgh, and Dan Zakay.

PART I INTRODUCTION

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CHAPTER 1

SOCIAL AND CREATIVE DECISION MAKING

Research on human decision making is at the present time undergoing rapid changes. From previously being much focused on models and approaches with an origin in economy, much of the present day research finds its inspiration from disciplinary approaches concerned with incorporating more of the context that the decision making takes place in. This context includes psychological aspects of the decision maker and social-cultural aspects of the situation he or she acts in. All human decision making occurs in dynamically changing contexts. One factor contributing to this is that human beings or groups in many situations act as entrepreneurs trying to improve the situation for themselves or their organization. Given that this is the case, it is of increasing interest for both researchers and practitioners interested in the social aspects of decision making to consider the relation between creativity and decision making.

In the present volume we have included chapters that deal with social and creative aspects of decision making. Such aspects have, to some extent, been neglected in psychological research on decision making. This is partly due to the historical domination of the SEU (Subjective Expected Utility) tradition in judgment and decision making research. The SEU tradition has its roots in economic theory. This may be one reason why this tradition appears as quite static and too limited in its nature to be able to explain such phenomena as, for instance, innovation. By improving our understanding of the creative and social aspects of decision making the present volume contributes to the integration of theories, concepts and results from different research traditions and in this way helps to better our understanding of the decision making. The volume hereby complements research achievements that have been presented under different names such as *naturalistic decision making*, *distributed decision making*, and *applied creativity*. The chapters help to provide a more realistic understanding of the conditions for creative social decision making. For this reason they also have important practical implications, for example with respect to how creativity can be promoted in organizational decision making.

Given the disciplinary specialization that, just as in other research fields, has developed in decision research in different disciplines, we have found it important to gather in one place a somewhat broader spectrum of contributions to decision making research compared with what is commonly found in a single volume. Most of the contributions are from psychology but there are also contributions from management science, health science, education, policy and planning, and informatics. Different perspectives on decision making will, just as different measurement methods, help to bring out more aspects of the phenomenon and thus improve our understanding.

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 3-11.

Several of the authors to the chapters in this volume address basic and general issues with regard to the social and creative dimensions of decision making. For instance, Stoycheva and Lubart provide an interesting review in which they describe important general features of creative decision making. Wilke and Kaplan, in their review, especially focus on group processes, whereas Basadur reviews the literature relevant for organizational and managerial decision making while making theoretical extensions of his own. Taking their point of departure from the research literature, Pfister and Böhm's give interesting arguments for why new scientific approaches are needed in the area of environmental decision making research.

Other authors in the volume are more concerned with aspects that are especially relevant for our personal lives. Among others, Willén provides an example of how theories of decision making and creativity may be applied in the area of family studies. Salo and Svenson highlight features of the decision process that play an important role in health care students' choice of education. In addition, Takemura shows that notions of decision making, which stress the importance of descriptive variance, are highly relevant for understanding the behavior of everyday consumers.

Finally, several authors in this volume are concerned with aspects that are of importance for management and the organization of work life. For instance, Badke-Schaub and Buerschaper focus on how professional designers solve problems and make decisions in the organization. Selart and Boe give an account of how CEO's of small information technology companies view their use of different aspects of creative thinking in their daily work. Vinkenburg, Koopman and Jansen present a field experiment and describe important features of managerial efficiency. The aim of Jönsson, Edström and Ask's contribution is to draw conclusions from a micro analysis of the accounts given by the various members of the project team of an incident in an R&D car industry development project. Hedelin and Allwood present a study in which they stress the selling in of a decision alternative as a fundamental and under-researched aspect of decision making processes in organizations. Finally, Engeström shows how the development of a structure for the social framework for health care administration and decisions takes place through a struggle between the different involved parties where the parties aim to establish their own platforms in the decision process.

DIFFERENT DIMENSIONS IN THE CHAPTERS

The chapters in the book can be located on a number of different dimensions. Some of these will be discussed next.

INDIVIDUAL AND INSTITUTIONAL PERSPECTIVES

As noted, all of the chapters share a concern with decision making in social contexts. However, the chapters differ with respect to whether they treat decision making from the perspective of the individual or from that of a socially organized institution. When decision making is seen from the perspective of the individual, his or her mental processes are brought to the foreground. Research questions pursued from this perspective concern for example how a possible decision starts to develop in an individual's mind (chapter by Willén), how the individuals weigh together evidence at the final stage before the decision

is taken (Takemura), how the decision is viewed by the decision maker after the decision is made (Salo & Svenson) and which features of the individual's cognitive and motivational properties, decision making process, or of the decision itself, contribute to making it creative (Pfister & Böhm; Stoycheva & Lubart). Although these contributions concern social decision making in the sense that they concern decisions taken in a social environment, they do not to any large extent consider how different features of the social environment, institutional or other, affect the decision process.

The chapter by Wilke and Kaplan takes more of a middle position on the dimension from individual to institution. Here the authors describe processes in connection with creative decision making that occurs in small group settings. Somewhat more towards the other end of the dimension, some chapters report studies on decision making in organizations (Basadur; Selart & Boe; Vinkenburg et al) but without very much relating to the institutional features of organizations. Closer to the end of the dimension more of the institutional context that the decision maker operates in is brought into focus. For example, the chapters by Badke-Schaub and Buerschaper and by Jönsson, et al. describe and analyze creative decision making in industrial design processes, and the chapter by Hedelin and Allwood analyzes the decision making processes occurring within organizational settings of different kinds. Finally, at the very end of the continua, the chapter by Engeström analyzes the development of an institutional framework for the distribution of responsibility for decisions concerning the care of child patients with long-term diseases, between the home, the specialist physician and the open care unit.

DIFFERENTIAL EMPHASIS ON DECISION PROCESS AND ON CREATIVITY

The different chapters also differ with respect to the focus they put on creativity and on decision making. Five of the chapters focus foremost on the decision making process and draw conclusions about creativity in the decision process mostly on the basis of the findings about the decision process. Here are the chapters by Engeström on the development of social structures for decision making, by Willén on divorce decisions, by Hedelin and Allwood on organizational decision processes, and by Jönsson et al on the decision process in a design context. Likewise, the focus in Takemura's chapter on the unidimensionality of the decision criterion is foremost on the decision process. Other chapters with a focus on decision making put greater emphasis on attempts to identify the creative aspects of the decision making process. Examples here are the chapters by Salo and Svenson on individuals' choice of professional education, by Pfister and Böhm on environmentally friendly decisions, and by Selart and Boe on the role of habits in decision making.

In four of the chapters an approximately equal amount of attention is paid to creativity and decision making. In one chapter (Basadur) this is accomplished by focusing on problem solving (or thinking) and seeing creativity and decision making as integral parts of this larger process. Basadur's chapter focuses on how thinking in organizations can be organized to become more creative. In a similar manner, the chapter by Badke-Schaub and Buerschaper deals foremost with a larger collective design process and analyzes which points in this process are the more creative. The chapter by Vinkenburg et al. focuses on the question of why managers do what they do. Here, decision making and creativity are seen as integral parts of the processes leading up to managers' behavior. Finally, the

chapter by Stoycheva and Lubart also provides a fairly good balance between creativity and decision making but by use of a different approach. Here, the authors very conscientiously analyze the relation between creativity and decision making. First they analyze the role of creativity in decision processes and then the role of decision processes for creativity.

Finally, the chapter by Wilke and Kaplan, dealing foremost with creativity in group processes, focus more on creativity as such. Decisions and decision processes are here seen as part of the group problem solving or thinking process and are not focused on specifically.

DIFFERENT THEORETICAL PERSPECTIVES

The chapters in the book represent a range of theoretical perspectives. Not all of them are easy to classify. However, at least one chapter, the one by Takemura, to a large extent represents the, by now, classical behavioral decision making paradigm. Some of the other chapters represent more recent specific approaches in psychological decision making research. This is the case for the chapters by Salo and Svenson and by Willén which represents applications and developments of Svenson's Diff-Con theory and of Montgomery's dominance structuring theory, respectively. Both of these approaches concern the mental work of individual decision makers and can be seen as located within the naturalistic decision making approach, broadly taken. Other chapters (Badke-Schaub & Buerschaper; Pfister & Böhm; Selart & Boe; Stoycheva & Lubart) are clearly inspired by the parts of cognitive psychology dealing with problem solving, creativity theory, process tracing approaches to decision making and theory concerning the automatization of skills. The chapter by Wilke and Kaplan relays on theories from social psychology on group interaction. One chapter uses organizational theory (Vinkenburg et al.) and two others are at least inspired by it (Basadur; Hedelin & Allwood). Finally, two chapters use other approaches from the social sciences, more specifically ethomethodology (Jönsson et al) and activity theory (Engeström).

THEORETICAL AND EMPIRICAL FOCUS

The chapters can also be located on a dimension running from theoretical to empirical. An indication of this is that the chapters differ with respect to the extent to which they present a specific empirical study. Five of the chapters are foremost theoretical (Basadur; Pfister & Böhm; Stoycheva & Lubart; Takemura; Wilke & Kaplan). However, all of these chapters use previous empirical research to substantiate their ideas. Possibly the distance between the theoretical arguments and the empirical data is somewhat greater in the chapter by Pfister and Böhm on environmental friendly decisions and to some extent also in the chapter by Basadur presenting a program for creative decision making in organizations, compared to the other three chapters in this group. Theses chapters, i.e., the chapter by Wilke and Kaplan on different types of creativity in group processes, the chapter by Stoycheva and Lubart on the relation between creativity and decision making, and the chapter by Takemura presenting a theory about information integration in decision making all push theoretical ideas. However, there is also an emphasis on providing an

overview of previous research in their respective areas.

The chapters by Selart and Boe on the role of conscious and controlled habits in human decision making and by Vinkenburg et al on the role of situational and personal factors in organizational decision making, first present literature overviews of their areas and then describe an empirical study by the authors that further expands the argumentation in the chapter.

The remaining six chapters, presented by Badke-Schaub and Buerschaper on design processes in organizations, by Engeström on the development of institutional structures for distributing responsibility and power in the care of a specific medical patient category, by Hedelin and Allwood on features of high level organizational decision making, by Jönsson et al. on a specific event in the design of a car model, by Salo and Svenson on individual's choice of professional education and finally by Willén on couples' decisions to divorce more clearly focus on a specific empirical study. The conclusions from these chapters are to a large extent drawn from, or mediated via, the empirical data in the presented study.

The empirical research methods of the more empirically focused chapters differ. Four of the chapters use questionnaire data, collected either by the use of an electronical questionnaire (Selart & Boe) or by the use of a traditional booklet (Badke-Schaub & Buerschaper; Salo & Svenson; Vinkenburg et al.). In the chapter by Salo and Svenson questionnaire data was collected for the same individuals on several occasions. The other chapters in this group relay either on interviews (Badke-Schaub & Buerschaper; Engeström; Hedelin & Allwood; Jönsson et al.; Willén), document analyses (Badke-Schaub & Buerschaper; Engeström), direct observation of the decision process studied (Badke-Schaub & Buerschaper; Jönsson et al.), or on computer simulation (Badke-Schaub & Buerschaper). Thus, some of the chapters presenting empirical studies (Badke-Schaub & Buerschaper; Engeström; Jönsson et al.) combine different types of data collection methods.

Most of the chapters mainly take a descriptive or an explanatory approach. However, at least two of the chapters (Basadur; Pfister & Böhm) take a more normative or "prescriptive" standpoint. As will be further detailed below, this relates to their definition of creativity.

CREATIVE ASPECTS OF THE DECISION PROCESS

The stance taken in the chapters towards creativity show both similarities and differences. Most of the chapters agree that creativity can pertain both to the decision process and to the decision product. Considering the decision process first, it is clear that many parts of the decision process have a potential for being creative. Starting with the early stages, identifying what is the decision problem (or *decision opportunity*, as argued by Keeney, 1992) to be solved is pointed out by many of the authors (e.g., Badke-Schaub & Buerschaper; Basadur; Salo & Svenson; Selart & Boe; Stoycheva & Lubart) as having a high potential for creativity (the highest according to Badke-Schaub and Buerschaper, Basadur, and Stoycheva and Lubart).

Next, the construction of new decision alternatives, or the restructuring of old ones, is also identified as liable for creative thinking (Pfister & Böhm; Salo & Svenson; Selart & Boe). Some of the authors point out that these aspects can be affected by a creative restructuring of one's values, or goals (Pfister & Böhm; Salo & Svenson; Selart & Boe).

Stoycheva and Lubart suggest that a creative formulation of the decision problem "is related to the construction of a holistic, relational representation of the problem" (p. 23), and that the creative generation of alternatives includes "focusing attention on the more unusual aspects of the stimulus problem when searching for alternatives." (p. 22). Vinkenburg et al. suggest that creative managers have a well-developed ability to read the situation in order to identify relevant aspects of the situation. Stoycheva and Lubart suggest that "intuitive" processes are important for the creation of decision alternatives and Engeström talks about improvisation and bricolage.

After this follows the evaluation and choice of a decision alternative. Here creativity is assumed to involve for example the generation of *many* evaluation dimensions (Stoycheva & Lubart) and to integrate attributes in a creative way (Takemura). With respect to integration of attributes, Takemura notes that this involves a creative construction, or "envisionment" of a criterion ("mental ruler") against which to evaluate the different alternatives considered in the decision situation. Such a construction involves being creative when finding out which attributes are important to integrate and in the next step to ingrate these attributes in creative way.

The idea held in much previous research that evaluations are counteractive to creativity is not accepted by most of the authors in this book. In contrast, for example Badke-Schaub and Buerschaper claim that "the essence of creative thinking is not to withhold judgment but may be to evaluate critically with respect to the problem content." (p. 192).

Although sometimes allocated foremost to specific parts of the decision process, some aspects or processes common to all or most stages of the decision process seem to be important opportunities for creativity. Creative idea generation and evaluation are both considered to be carried out in a "flexible" and "adaptive" way. Further suggestions of this kind given by Stoycheva and Lubart are "to discriminate between salient and significant attributes [...], to reason at a high level of abstraction, [... to] tolera[te] ambiguity during decision making to avoid premature closure [... and] being motivated to invest as much cognitive effort as necessary to make creative choices." (p. 29). In the latter context Selart and Boe discusses the necessity of deep *involvement*. In addition to these suggestions, Willén stresses the importance for creativity of "restructuring and perspective shift" (p. 131) and Jönsson et al. and Badke-Schaub and Buerschaper mention the application of a good solution from one area to another.

CREATIVE ASPECTS OF THE SPECIFICALLY SOCIAL PARTS OF THE DECISION PROCESS

Some authors specifically discuss creativity in parts of the decision process that are foremost social. For example, Badke-Schaub and Buerschaper note that "we often find creativity in a joint problem solving process, as an explicitly collaborative activity" (p. 177). For Basadur creativity in organizations is associated with adaptivity and innovation but also with open system organization. The opposite approach is a closed system organization, aiming at internal efficiency and optimizing day-to-day routines.

Wilke and Kaplan discuss *social creativity* which is said to refer to "methods to coordinate group members' effort and to enhance their motivation to produce ideas in groups that are unexpected and novel." (p. 35). These authors contrast creative and non-creative (group) processes. Creative processes are characterized as being influenced by properties in the stimuli ("informational influence"), i.e., information in the decision task

per se and non-creative processes are regarded as highly influenced by pressure to conform to the group majority ("normative influence").

Hedelin and Allwood perceive creativity emerging as an interaction between the decision maker and the situation, in the sense that "when there are difficulties there may be more need for creativity." (p. 274). More specifically, they argue that "Skill in on-line handling of the unexpected can be seen as an important type of creativity in organizational decision making." (p. 278). They also stress that creativity often is important in the social communication carried out when selling in a proposed decision to other parties inside and outside of the organization. Basadur mentions a similar aspect. Jönsson et al. also relate creativity in the decision process to the wider range of *social processes* going on, pointing out that creativity "in one part of the project may generate frustration in another." (p. 253). For this reason, these authors suggest that creativity may be easier to allow in early phases of a project than in later parts.

CREATIVE ASPECTS OF THE DECISION PRODUCT

Most of the chapters explicitly argue that *creative products* (including decisions or problem solutions) involve novelty (Badke-Schaub & Buerschaper; Basadur: Engeström; Pfister & Böhm; Salo & Svenson; Stoycheva & Lubart; Willén Wilke & Kaplan). Stoycheva and Lubart argue that the creative option, being novel, is also risky. In addition, most of the chapters contend that decisions or problem solutions, in order to be creative, have to have high quality (e.g., Basadur; Pfister & Böhm; Selart & Boe; Stoycheva & Lubart; Takemura; Willén). For many of the authors this means to be socially useful and adaptive (Basadur; Selart & Boe; Stoycheva & Lubart). For instance, Stoycheva and Lubart note "that the creative approach to social issues recognizes the importance of people's values and preferences, focuses on understanding each of the interacting/conflicting parties as well as societal norms, and seeks win-win solutions." (p. 16). They also note that the creative option "is both unusual and useful." (p. 17). For Pfister and Böhm high quality is synonymous with being environmentally friendly.

It seems clear that the demand for a creative decision or problem solution to have high quality to some extent involve *a value judgment* and because of this may involve taking a normative approach. As noted above, the chapter by Pfister and Böhm openly take such a normative approach in a prescriptive variety. However, they also argue that by making environmentally friendly decisions the individual can free him- or herself "from being stuck in a social or moral dilemma." (p. 103). Likewise, Badke-Schaub and Buerschaper argue that "The dimensions of creativity seem to be categories which initiate growth and progress of mankind." (p. 177). Willén suggests that a decision in order to be creative should be anchored in reality, it should be practical and realistic. Stoycheva and Lubart concur: "thinking and acting go hand in hand." (p. 16).

One way of introducing normative claims without introducing one's own values is to let a panel judge whether the product is of high quality or not. A few of the chapters also discuss different societal processes that may determine whether a product is *seen* as of high quality in specific social arenas (Stoycheva & Lubart; Wilke & Kaplan).

It is of interest to note that the authors of one chapter (Salo & Svenson) explicitly deny that a decision has to have high quality in order to be creative, According to these authors "A creative decision is not necessarily a prescriptive or normatively good solution.

Creative solutions can be quite poor both for the decision maker her or himself as well as for others." (p. 149). For example, Salo and Svenson suggest that self-deceiving reasoning may be regarded as creative. However, these authors do not clearly argue why quality aspects should not be considered as a constitutive part of creativity.

CONCLUDING REMARKS

This volume presents research that relates decision making to creativity with a focus on the social context in which these processes occur. The volume is addressed to academic readers as well as to professionals with a scientific interest in the field. The organization of the volume is primarily based on the individual/institutional continua. Thus, the first chapters are mainly written from theoretical and, mostly, individual perspectives whereas the last chapters are more written from an empirical and organizational viewpoint. The major goal for the present volume has been to give recognition to the fact that human decision making typically occurs in changing, dynamic, social contexts, and that researchers interested in decision making in a social context therefore will benefit by considering the relation between creativity and decision making.

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PART II BASIC AND GENERAL ISSUES

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CHAPTER 2

THE NATURE OF CREATIVE DECISION MAKING

During the construction of a specialised home for people with disabilities, the committee overseeing the project ran into a problem: they went over budget to build the house and had almost no money left to furnish it. The future residents were due to arrive soon. Facing this difficult situation, the supervisory committee made a creative decision. It chose to pursue an innovative idea proposed by one of the committee members rather than asking for a budget extension and delaying the opening date. The idea consisted of asking people from the community to participate in a « painted furniture » contest. People were to paint artistically their old, unwanted furniture (beds, chairs, tables, desks, dressers, etc.) and to bring these pieces to the new home. Local merchants donated the paint and supplies and a local newspaper publicised the event. Contest prizes were to be paid from the limited funds that the committee still had for buying furniture. All the furniture entered into the contest became the property of the home and the donors could claim an income tax credit for their donated furniture. The response was overwhelming and soon the home was full of colourful furniture. A panel of local artists awarded the prizes for the best painted furniture. Thus the whole house was furnished and the new residents had an unique, stimulating environment. Additionally, the contest was so successful that there was too much furniture and the extra pieces were eventually sold at an auction with the proceeds going toward the operating budget of the home.

This example illustrates one of several ways in which decision making in a social setting can be creative. The committee chose to pursue a creative option (the painted furniture contest) instead of a more conventional option (such as asking for a budget increase). This notion of a creative option or choice will be analysed in the first part of this chapter. What do theory and research tell us about the creative outcomes, what are their specific features?

From a different perspective, decision making can also be considered creative if a person (or group) uses a non-standard process to make the decision. This second approach examines the creative making of the decision. The focus is on the novel nature of the decision making process rather than the end product, the decision itself. In the second part of this chapter we will examine the implications of the different models of the creative process for understanding and describing the process of creatively making decisions.

Following this section, we will consider the role decision making plays in individuals' creativity. From this third perspective, decision making is creative because it constitutes a component or resource for creative achievements. These and related ideas about decision

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 15-33.

making and the creative individual in the social world will be examined in the final part of this chapter.

CHOOSING CREATIVE OPTIONS IN THE SOCIAL WORLD

What does it mean to say that a decision (or any other social action) is creative? How can we define what is a creative option in the social world? Summarising the results of the Institute of Personality Assessment and Research (IPAR) studies on eminent creators, MacKinnon (1978) noted: « A critical issue for future research in creativity is to find ways and means of studying creativity that eventuates not in objective, palpable, enduring objects but in subjective, intangible, and sometimes fleeting interpersonal relations, educational, social, business, and political climates which permit and encourage those in them to develop and to express to the full their creative potentials. What does it mean to speak of a leader, a business manager, a teacher, a governor, a general, a college president who is creative? The creativeness of such persons centers more in the realm of interpersonal and social relations than in the realm of ideas and theoretical problems while obviously not ignoring the latter. » (p. 188)

Creativity in the social world pertains to domains and activities in which performance and outcomes directly affect the behaviour of other people. There are many occupations in which social and interpersonal relations play a central role. Much of the success of political leaders and statesmen, industrial managers and supervisors, public administrators, school teachers, counsellors and social workers depends on the quality of interactions with others and the decisions that they make based on these interactions. For Howard Gardner (1993), the core of the creative work of political leaders lies in the capacity to mobilise other human beings in the service of a wider goal, often undertaken at great personal risk. Personal actions are their medium of expression, central to their mission. Gandhi is an example of a social creator whose novel solution to particular social conflicts ultimately made sense to a much larger community (Gardner, 1993). The creative approach to social issues recognises the importance of people's values and preferences, focuses on understanding each of the interacting/conflicting parties as well as societal norms, and seeks win-win solutions.

However, social creativity is not only a public activity taking place in the societal arena but can also be relevant to the very core of each individual's lifestyle. For example, ingenuity in running a household, organising a small group of people to accomplish a task, or redefining one's life goals and one's way of relating to others are examples of social creativity at a personal level (see Torrance, 1981).

Wherever social creativity occurs, thinking and acting go hand in hand. The predominant mode of operating is interactive, relational and experiential. Brief series of activity and reflectivity follow in a dynamic environment, plugged into the context of everyday activities and real-life exchanges of information. Social actors use, in addition to common verbal and written forms of communication, information such as impressions, feelings about other people, facial expressions, tones of voice and gestures (Mintzberg, 1991). They have to handle problems and crises quickly, to act with an incomplete picture of the situation in order to discover what is really going on, to find out how other agents involved in the issue will react, and to understand their thoughts and needs. The picture is further complicated by the fact that people's explicitly expressed values do not necessarily

indicate their actual preferences and behaviours (Shiloh & Rotem, 1994). Thus social creativity can be viewed as a kind of active experimentation because it involves reflective action, purposely initiated to provoke effects which are observed and actively processed in order to achieve goals.

Among all the possible options in a social setting, the creative option is the one that can resolve a problematic situation in a novel and adaptive way. The novelty of an option refers to its originality with respect to what has been previously proposed or other currently available options. Originality may be measured by the statistical infrequency of an option or, more intrapersonally, by the subjective feeling of surprise that it provokes. The originality of a response is thus relative to norms, either statistical or psychological. The degree of originality of a social option depends specifically on how different it is from the conventional way of perceiving, thinking, and acting on social issues.

The adaptiveness of an option refers to its capacity to respond to the demands and constraints of the problem to be solved. The creative option is not just unusual; it is both unusual and useful. It is judged worthy by users (or external observers) because it gives them satisfaction, it meets their needs. For a decision to be creative, it should provide an adequate solution to the problem situation and appropriately answer people's physical, psychological or social needs. When a complex social action is initiated, both the internal appropriateness (i.e. the elements cohere together) and external appropriateness (contextual fit) are important.

The rarity and fit of an option are established with respect to a given audience or population. Options that are considered creative in one setting may go unnoticed as such in another. Judgements of creativity have been found to be relative to a particular time and place and show strong cross-cultural variations (Lubart, 1999; Simonton, 1984). The creativity of an option (in this case a particular social action that could be pursued) can also be affected by additional parameters such as the skill with which the basic idea is expressed (Lubart, 1994a). For example, the complexity and elegance of an idea can be admired when the idea's basic message is effectively communicated and clearly understood (Besemer & Treffinger, 1981). Typically, a creative option is also a risky one. If followed, the option involves deviating from what most people would do in the same situation. If the creative option does not lead to a successful result, the decision maker may incur criticism and losses beyond what would have been incurred if the « standard », non-creative decision option had been selected.

The decision to organise a "painted furniture contest" was an original and effective option for solving a particular problem in the social world (a shortage of resources). It showed a positive transformation of the constraints of the reality. Instead of looking (probably in vain) for more money, the committee decided to follow a different path and use a non-traditional way to reach their final goal - providing furniture for the new house and opening it on time. When the new approach to the goal was adopted, even better than expected results were obtained. First, the residents of the house had a unique, aesthetically-pleasing setting. Second, after furnishing the house there was a monetary benefit. Third, community participation in the painted furniture contest created conditions for active involvement with persons having disabilities (which may be extended on future occasions). The committee took a risk in deciding to pursue a creative option but the gamble paid off. A creative option surprises by its unusualness, satisfies through its appropriateness and stimulates by its potential to generate further creative implications (Jackson & Messick, 1965).

THE CREATIVE MAKING OF A DECISION

Why do some of the decision processes have creative outcomes, and others result in mere repetitive behaviour or ineffective choices? What makes decision behaviour creative? In this section we will examine creative problem solving in order to identify those processes within the individual and his or her social environment that potentially contribute to making the decision process itself creative.

THE CREATIVE PROBLEM SOLVING PROCESS

Descriptions of the creative process—the sequence of thoughts and actions that leads to an original, useful production—often include both idea generation and idea evaluation or selection (Finke, Ward & Smith, 1992; Lubart, in press; Runco & Chand, 1995). The creative problem solving models that have been proposed by, among others, Osborn, Parnes, Isaksen and Treffinger (see Isaksen, 1995; Sapp, 1995) differentiate between the stages of understanding the problem (defining what is the problem to be solved), idea production (exploring many possibilities and trying out different approaches), idea evaluation (comparisons of the alternatives, weighing strengths and weaknesses, choosing the best solution) and planning for implementation. Additionally, these models take into account the balance between divergent thinking (generating many alternatives) and convergent thinking (focusing on one possibility). Consider now each component of the problem solving process. Although described as consecutive, these phases do not necessarily evolve linearly or follow a step-by-step pathway toward the final solution; at times they may be iterative or interacting in a random or a more complex way (Isaksen, 1995).

Data finding and mess finding. Divergent and convergent thinking participate in a first activity that Osborn (1953) called fact finding. The informational input for creative problem solving is rich and varied: data come from senses, experience, knowledge, feelings, opinions, emotions, memories, fantasies and future projections, interactions with others, information on social roles and the situation itself. Whether or not the stimuli will trigger an individual's interest depends on his or her sensitivity to problems (Torrance, 1979). Even when a problem is explicitly presented, the data gathering can be purposefully unstructured and random; the « mess » is discovered, created, and re-created. The divergent exploration of information is complemented by evaluation of its relevance, interconnectedness and importance.

Problem finding. Problem finding is a key phase of problem solving: posing the right question may be the most creative part of the whole process (see Brown, 1989). Training programs have been designed to foster problem identification skills (e.g., Clinton & Torrance, 1986). A study by Getzels and Csikszentmihalyi (1976) showed that a problem-finding orientation has both short-term and long-term predictive potential in relation to artistic creativity. Their work suggests that the originality of finished artistic work was linked to a relatively long period of problem exploration and a late decision between competing definitions of the artistic problem to be solved in a still-life drawing. Creative people may try out many formulations and interpretations until one is found that best fits the available data and provides the best opportunities for actually solving the problem.

Idea finding. Generating a large number of ideas is, for many authors, the key moment

in the creative process. Different ideas may be more or less clear, more or less conceptual or experiential, may present the problem from different points of view and may be eventually judged to be more or less useful. New ideas emerge, simultaneously or in succession, out of the exploration of the problem space. Among the many ideas that have been generated, the most promising options are identified for further elaboration.

Solution finding. During this stage selected alternatives are examined from different perspectives, assessing their pluses, minuses and other interesting aspects. Many possible criteria for evaluating available solutions are identified and the most appropriate of them are chosen. After the adoption of a set of criteria, these criteria are applied to assess and compare possible solutions and determine the best one.

Acceptance finding. Acceptance finding deals with the successful implementation of the chosen solution. It is important to envisage how different groups and environments will react to the innovation, what difficulties may arise during its presentation to a wide audience and what can be done to prevent or alleviate these difficulties, who might be allies in this process, and what are the costs and benefits of the potential implementation policies. The final refinement of the solution should take into account all these considerations.

Once the novel solution takes its final form, a new social option emerges. To the extent that it is accepted and gradually adopted by others, it becomes a social fact. In time, this new social fact may itself become the focus of a future problem-solving process.

Therefore, both the ability to generate original ideas and to evaluate their appropriateness influence creativity. The interdependence of idea generation and idea evaluation moves the dynamics of the creative search. Below we will examine some of the factors influencing the processes of idea generation and evaluation both in positive and negative ways.

Factors influencing idea generation. Research on creativity has focused on idea generation processes such as remote associations, use of analogy, and divergent thinking. Guilford describes this process as transformed use of retrieved information in a new context and in novel ways; the transformation consists of freely and flexibly reclassifying, reinterpreting or redefining the available information in relation to the present problem situation (see Brown, 1989). Through analogical thinking past experience and prior information are brought to bear on the present in a nontrivial, nonobvious way (Sternberg & Lubart, 1995). Suggesting that creative solutions could occur through serendipity, similarity or mediation, Mednick (1962) defines the creative thinking process as "the forming of associative elements into new combinations which either meet specified requirements or are in some way useful. The more mutually remote the elements of the new combination, the more creative the process or solution" (p. 221).

Mednick (1962) as well as Wallach and Kogan (1965) believe that the individual who can produce a large number of associates will also produce a large number of unique ones. Quantity breeds quality, suggested Osborn (1953) - the greater the number of ideas generated, the greater the possibility of arriving at a significant solution. Wallach (1970) further suggested that the process of attention deployment was underlying the generation of many associates. Creative individuals can attend to many aspects of a given stimulus and thus produce a large number of varied associations (see Brown, 1989). There may also be that a blind, or chance variation among knowledge elements produces creative ideas (Campbell, 1960). However, Simonton (1988) argued that the process of generating novel ideas is not completely random. Certain lines of thought are more probable than others due

to the content matter involved and characteristics of an individual's knowledge base.

Factors influencing idea evaluation. In addition to the production of new ideas, people can vary on the ability to evaluate these ideas. Evaluative abilities are part of a broader array of cognitive, personality-motivational and environmental resources that are hypothesised to contribute to creativity (Barron & Harrington, 1981; Lubart, 1994a; Lubart & Sternberg, 1995; Mumford & Gustafson, 1988; Sternberg & Lubart, 1991, 1995). Perkins (1981) claimed that sometimes a failure to achieve highly creative ideas may be limited by one's judgment of ideas that are generated rather than by an inability to generate ideas.

What is the nature of this evaluative ability? Evaluation can be described as a high-level analytical activity that draws on other intellectual abilities such as selective encoding and comparison of information (Lubart, 1994b; Sternberg & Lubart, 1991; 1995). Creative thinkers may be able to keep track of and apply several criteria at a time to evaluate solutions (Campbell, 1960) or to avoid premature closure of the on-going evaluative process (Brown, 1989).

Wallach and Kogan (1965) emphasised that the production of associations that are both abundant and unique requires a context that is "relatively free from the stress of knowing that one's behaviour is under close evaluation" (p. 24). Evaluation by outside judges often leads to detrimental effects on creativity. For example, individuals who believed that their work in progress was being observed and evaluated by outside judges or that judges would evaluate the work when it was completed were less creative on collage-making and poem-writing tasks than those who participated under no-evaluation conditions (Amabile, 1990). Similarly, the desire to make a good impression (see Mumford & Gustafson, 1988) and a strong orientation towards achievement (Stoycheva, 1994) were found to be negatively related to creativity.

THE PROCESS OF CREATIVE DECISION MAKING

Creative problem solving can thus be viewed as a particular kind of problem solving where creativity is applied to the task at hand (Isaksen, 1995). Similarly, we will treat creative decision making as a kind of decision making where creativity is applied to the decision problem being faced.

Consider first the decision making process. When there are different ways to reach a goal, a choice has to be made. People adapt their decision behaviour to the task, the context of the task and their goals with concern to both decision effort and decision accuracy (Payne, Bettman & Johnson, 1992). The internal consistency of the decision and its empirical outcome are also important. Individual factors such as risk perception and risk attitudes may additionally influence one's decision behaviour (Mellers, Schwartz & Cooke, 1998).

People's preferences for a given option relative to one's goals are often constructed dynamically during the decision task when a response is generated (Payne et al, 1992). The answer to how much you like a decision option depends greatly on how you ask the question. When, for example, the problem is framed in terms of gains, it elicits different preferences compared to when the same problem is framed in terms of losses (for comments on the framing effects, the role of the stimulus context and response mode in decision making see Payne et al, 1992; Mellers et al, 1998).

What factors lead to creative success in the decision making process? Why do some decision making processes bring novel and appropriate solutions whereas others fail? Drawing on the creative problem solving process reviewed above, we propose that for the decision making process to be creative, restructuring of the decision task, generation of alternatives and evaluation of the decision options are important. Below we will examine these three aspects of the decision making process in which creativity can occur.

Restructuring the decision task. When setting the vision of a problem and, thus, the nature of the decision task, the philosopher John Dewey noted that a problem well-put is already half solved. People may choose relatively un-important cues as the focus of their judgment because these cues are very salient in the presented problem-related information (Payne et al, 1992). The creative approach to decision making involves trying out different problem definitions and constructing task representations from different points of view before a final problem statement is achieved. This process can decrease the reliance on salient cues (those on which most people focus) in favour of a different, and perhaps novel problem conception within which decisions will be made. Reformulating the problem space can also lead to better decision making because figure/ground framing effects are avoided in this way (Einhorn & Hogarth, 1981).

A common source of many decision biases is the tendency to separate the decision task at hand from its broader context. Also, complex decision problems are often solved by decomposing them into a series of cognitively simpler judgements (Payne et al, 1992). However, this divide-and-conquer approach is unlikely to lead to very creative solutions because it is a common decision making tactic and favors choices made within the limited context of each small decision. A more appropriate restructuring strategy would be to see the decision task at hand as a part of a broader social and personal context, to synthesise rather than analyse, and to build a more holistic, relational mental model (Mintzberg, 1991). The holistic perception of a problem focuses on how it is related to its environment and how its parts interrelate. When a larger frame of reference is applied to a decision problem, the available set of options increases and the comparisons among them are made more accurate. Simplifying the problem does not always better its solution, while putting it into a more complex set of interrelations does not necessarily increase the cognitive effort for solving it. It might be just the other way around. For example, having an organised mental map of problems has been found to allow senior managers to be more effective; they can attain economy of efforts and accomplish more in less time (Isenberg, 1991).

Finally, it should be noted that re-thinking a problem situation in the social world is not purely an intellectual activity, action is often part of defining the problem. It is often necessary to act in the absence of clearly specified goals, allowing these to emerge from the process of clarification of the nature of the problem. This way of thinking while acting helps to achieve a fuller comprehension of what is going on and to discover the goals that truly meet the needs of the individual or the group rather than achieve prescribed ones (Isenberg, 1991). Thus, creativity in restructuring the problem space comes from re-definition of the problem as well as from re-definition of the goals. Jackson and Messick (1965) also mention that high-level creative achievements do not just fulfill one's expectations but rather make one aware of what these expectations should be.

Generating alternatives. Once the decision task has been structured, alternatives from which to choose can be generated (Mann, Harmoni, & Power, 1989; Shiloh & Rotem, 1994). When this crucial step of idea generation is reduced to a minimum, the decision making process evolves into standard, non-creative decision making.

In the construction of the set of choice options, the options that are highly representative, readily available or easily accessible in memory have more chance to be selected because people feel comfortable with familiarity. It also is known that people often anchor their thinking on cases from their experience and try to adjust options already explored in these cases to the present situation. Often, however, the adjustment is insufficient (Payne et al, 1992). The generation of a large set of options from which to choose contributes to the quality of decision making. The more and varied alternatives one has, the more likely it is that an original option will be considered during the decision making process.

Creative decision making thus involves generating many potential solutions to the decision task. Unusual options may come out of focusing attention on the more unusual aspects of the stimulus problem when searching for alternatives. While the generation of alternatives takes time and effort, the cost of adding new options makes sense in view of the potential benefits of having a larger set of options from which to choose.

Evaluating choice options and selecting decision strategies. Choosing among a set of alternatives involves specifying the evaluative dimensions on which options will be compared and selecting (consciously or unconsciously) a decision strategy. With regard to specific evaluative dimensions, people vary on the number of evaluative dimensions that they use and the diversity of these dimensions. Thus creative decision making, in part, may be characterised by the generation of numerous, diverse and perhaps novel and useful criteria for choosing among options. This generation of comparative criteria is distinct from the generation of potential solutions to a task.

With regard to decision strategies, sometimes one just takes the first available option which is satisfactory, thus saving further efforts (i.e., the outcome meets one's aspirations and provides an acceptable solution). In cases where there is a clearly dominating option (i.e., one that is better on all or at least most of the key attributes) the choice of the dominating option is easy. However, when decisions involve a choice among options that have each advantages and disadvantages and where no option best meets all of the objectives, decision makers may use one of several strategies to solve the conflict with which they are faced. In some cases, the decision maker examines the different characteristics (attributes) of the options, then chooses the most important attribute and picks the option that maximises this particular aspect, eliminating from further consideration other aspects and thus avoiding conflict. In other cases, people use compensatory decision strategies in the sense that they have to give up something to obtain something else: first they weigh the importance of each attribute and then they trade off more of one valued attribute against less of another valued attribute (Einhorn & Hogarth, 1981; Payne et al, 1992; Mellers et al, 1998).

The creative decision making process may involve using a large set of strategies, using less popular strategies, and shifting between or combining diverse strategies during the evaluation phase (see Svenson, 1979). During the standard decision making process people can get stuck with their initial strategy. They tend to overestimate the benefits of the present course of action and see the losses related to change as greater than the respective gains, even if this is not the case (Baron, 1994). Changing decision strategies can increase performance because it decreases the effect of the status quo bias.

Additionally, experimenting with different strategies prevents premature closure on a single option (Brown, 1989). The creative decision making process involves maintaining an open-ended approach long enough to find the optimal strategy for a particular decision

task. The costs of exploring multiple strategies and shifting between or combining them during the evaluation process can be justified in view of the benefits gained in terms of improved decision performance.

One procedure for creative decision making may involve using intuition and insight before logic and analysis. The first step is to evaluate decision options intuitively without much reliance on expert knowledge and traditional thought and then proceed with rational analysis of alternatives and logical implications of each option. According to Kuhn and Kuhn (1991), intuition and logic are best used together in a recursive process.

Social decision making often requires non-compensatory strategies, meaning that a good value on one attribute cannot compensate for a bad value on another. Some choice situations do not allow for trade-offs because they involve so-called protected values which have no equivalent price and cannot be sacrificed (Mellers et al, 1998). Having an ideal outcome in mind to guide decision making is one strategy that can be very effective in preventing suboptimal decisions. The alternative-focused thinking that is used in most decision problems starts with the alternatives at hand and asks which one should be chosen. People could, however, benefit more from a value-focused approach which asks: could we achieve better in this situation than with the best available alternative (see Payne et al, 1992)? Whereas the standard decision making process searches for the best you can get from the available alternatives, the creative decision making process searches for the best way to get what you want.

We may conclude that decision making is creative when it uses novel, adaptive processes for making decisions. These processes impact on the restructuring of the decision task and the generation and evaluation of decision options. Creativity in decision making is related to the construction of a holistic, relational representation of the problem, generation of a large pool of alternatives from which to choose, generation of a number of evaluative dimensions on which to choose among the alternative options, and the flexible and adaptable use of different evaluation strategies. Creative decision making in the social world may integrate intuitive perception with logical reasoning and is guided both by reality and the vision of an ideal solution.

An important note is due before we end this part of the chapter. The model of creative problem solving described above implies that the individual is the main actor. However, this model is often used in group problem solving situations. Because a great deal of decision making about social issues occurs in groups, it is worth emphasising this point, although its detailed discussion does not fall within the scope of this presentation. The basic factors that operate in group problem solving and decision making are postulated to be the same as those involved in individual thinking. Factors influencing idea generation and idea evaluation relate to individuals as well as to groups. Conditions for creativity in group decision making relate to the definition of the problem and to the generation and evaluation of decision options in a similar way as for individuals. On the other hand, the outcome of group processes may differ significantly from that of individual's creative thinking processes, in both positive and negative directions. In general, a stimuli-rich, evaluation-free environment that rewards creativity and cooperation, and provides freedom of choice as to how one works on the problem is seen as more conducive to creativity than a overcontrolled impoverished context that restricts the freedom of choice, encourages competition, and emphasises evaluation of one's progress and outcomes (Amabile, 1994; Sternberg & Lubart, 1995). Group's advantages in decision making lie in the possibility to combine individuals' creative strengths and make use of mutual creativity enhancement in

a resourceful and collaborative context. The free exchange of ideas stimulates interest in one's proposals, the interaction between different points of views and building on other's ideas thereby contributes to a higher quality of the group's decisions. Research on creativity in organisations has shown that divergent thinking attitudes like preference for ideation and valuing new ideas may be enhanced through appropriate training (Basadur & Hausdorf, 1996; Runco & Chand, 1994). Also, the group can attempt to extend their opportunities for creativity by adopting, as is the case with brainstorming, special rules as to how problem solving and decision making will be organised (Osborn, 1953). On the other hand, the group may fail to recognise and choose a creative option or hinder the creative process of decision making in it's members. A creative new idea could be disregarded, for example, if it comes from a minority or a powerless member of a hierarchically organised structure or simply because it does not conform to group's standards and norms. Also, a non-creative option could be preferred if it is communicated by a formal or informal authority figure within the group. Conformity pressures may also influence the process of making decisions in a way that limits the range of explored alternatives, diminishes the willingness to take risk and restricts the creative output of the individual members because of the fear to be sanctioned as "different". The phenomenon of "groupthink" is another disadvantage of group settings (Janis, 1972). Thus, decision making in social groups may differ from decision making in individuals, being subject to both positive and negative effects of the social situation inherent in a group's functioning.

THE ROLE OF DECISION MAKING IN INDIVIDUALS´ CREATIVITY

So far we have considered different ways in which decision making can be creative: first, when a creative option is chosen; second, when the decision making process follows an original, non-standard pattern for making decisions. In these approaches we applied creativity research and theory to the understanding of decision making in the social world. However, another point of view is to consider how decision making impacts on creativity. In other words, decision making can be considered creative because it is an integral part of creativity itself. First, we will discuss how decision making is inherent to the achievement of creative results. Throughout the creative process there are crucial decision points: whether to maintain the work in a given direction or give up and look for another possibility; when to present the piece of work to the public. Additionally, we will note certain abilities, traits and characteristics that can help people to engage in a creative decision making process. After treating these issues, we will examine how the recognition of creative ideas, acts, or productions involves inherently a social decision.

DECISION MAKING AND THE CREATIVE PROCESS

Decision making may or may not involve creative thinking, but creative acts always involve decision making processes. The French mathematician Poincaré (1908) believed "invention is discernment, choice" and having a sense when to leave a stubborn problem for a while is seen as a creativity relevant skill that is as important as the persistent, energetic pursuit of one's work (Amabile, 1987). When does decision making occur during

the creative process? Some crucial moments in the creative process when decision making intervenes are: judging the originality and appropriateness of the generated ideas; deciding to continue along the initial direction or to look for new possibilities; deciding whether the adopted solution satisfies the problem requirements best; and, deciding when the creative product is ready to be communicated publicly. The divergent exploration of facts, problems, ideas and solutions requires evaluation and decision making about their relevance, significance, interrelatedness, appropriateness and creative potential (Runco & Chand, 1994; Sapp, 1995).

One important decision in the creative process is when to evaluate ideas and solutions that have been generated. This issue is a subject of debate. Osborn (1953) argued for "deferring judgement" during the process of idea generation. He believed a concentration of evaluation during the initial period of creative work will stop imagination and prevent creative breakthroughs. Newly formed ideas need time to mature, unusual approaches need time to become acceptable even to their creator, novel ideas need time to let their potential be discovered. Later evaluation not only allows for "freewheeling" with ideas; it also allows one to compare different ideas on multiple criteria, and may help refine the best idea into a workable solution.

Early evaluation can, however, be stimulating for creativity too: it prevents the loss of time and energy in pursuing paths of little value; it is more likely to have an impact because the individual is still willing to make changes early on in the work; early evaluations also tend to focus on the basic, fundamental features of an idea or approach. Perhaps the most important benefit of early evaluation in the problem solving process is the prevention of satisficing (stopping after the first acceptable idea comes to mind) (Parnes, 1962). According to Gordon (1956), "the noncreative problem solver gets an idea, sees it as a possible solution to his problem, and settles for it without further ado." Lubart (1994b) conducted two experimental studies of the effect of evaluating relatively early or relatively later during work on a task. University students wrote short stories and made still-life drawings, which were evaluated for their creativity. Participants were instructed to evaluate at different points in their work (either early, late, or at an even pace throughout the work). The early evaluation condition showed a higher mean creativity than the other evaluation conditions. A similar pattern was observed for short stories and drawing productions but the results were stronger for the short story task. In addition, the early evaluation condition showed significantly higher creativity on the short stories than a control condition which received no instructions to evaluate at a certain point in the work. Thus, some empirical evidence supports the value of early evaluation.

Finally, with regard to decisions about when to evaluate to foster creative thinking, the investment approach to creativity (Sternberg & Lubart, 1991; 1995) offers some suggestions. The investment approach builds on the idea that creativity involves "buying low" and "selling high" in the realm of ideas, analogous to behaviour observed in financial markets. Early evaluation can facilitate the buy-low strategy of discovering ideas which are actually of low value (unknown or underestimated) but have considerable growth potential. This is an important moment when a person or a group has to decide about investing their creativity-relevant resources. Another important moment that also involves evaluation is choosing the moment to sell high, deciding when to put an idea out into the public realm, evaluating when the social conditions are optimal for the idea to be accepted and to yield a significant return. Thus, evaluations and the decisions that ensue are potentially important at several moments during the creative process.

DECISION MAKING AND THE CREATIVE PERSON

Embarking on a creative project and maintaining one's creativity is not an easy task. People are faced with choices throughout life which are integral to their creativity. What decisions are relevant to individual's creativity? These may involve life choices like the one of Paul Gauguin who left his job at a stockbroker's office in Paris to become a full-time painter and at the age of 43 set off for Tahiti dedicating himself to an artistic career which brought him world fame (Gowing, 1983). Also, Mahatma Gandhi at mid-life chose to abandon his quite successful professional life in order to devote himself to spiritual growth, self-improvement and public service which brought him later to the position of an eminent political figure of the 20th century (Gardner, 1993).

Although it may boost a person's creativity, it is difficult to change once we have begun a plan or course of action. Habit is an important part of our professional and every day decision making. Change is difficult per se, and certain types of biases or errors in the way people think about plans can exacerbate the difficulty of changing them (Baron, 1994). It is also difficult to keep following the same track in the face of many failures or simply the lack of results. Some choose to do it, nevertheless. Today Stephen Leahy is Chairman and CEO of Action Time, the world's largest TV game show company, but at the beginning of his career he wrote to every company he could think of asking for a job in television. Finally, Granada Television gave him one as an assistant trainee technician (Harris, 1998).

Creative individuals wish to be creative and often they organise their life so as to heighten the likelihood that they will achieve creative breakthroughs. Sometimes staying on the creative path means deliberately choosing isolation and opposing others, which is never an easy decision to make. According to Gardner (1993), whatever the psychic and other costs of exploring an opportunity, creative people will do it, even if deliberately choosing a marginal path. For Gandhi such a challenge was the decision to go to study in England which set him outside of the social community that he knew. This experience opened Gandhi to a far greater set of options, exposed him to a diversity of ideas, life styles, patterns of social interactions and to the necessity to deal with novel and uncommon situations. Similarly, in a 22-year follow up of elementary school children, Torrance (1981) found that having experience with foreign study and living is positively related with later real-life creative achievements and quality of life indicators.

It appears that creative people often make "deviant" life decisions, decisions that most people would not make. Decision making usually involves choices that can be justified both to oneself and to others (Mellers et al, 1998). Often, a person's choice to pursue a creative path can hardly be justified logically. Decisions to pursue a creative path often don't seem to be as promising as they turn out to be in the end. Making such choices requires social risk taking because they may depart from social norms and not to meet others' expectations. Having a willingness to take risks, a resistance to conformity pressures, a capacity to withstand conflicts and failure, persistence, and the capacity to think in terms of possibilities are a set of psychological factors that help people to choose the creative path. In this sense decision making under risk is something individuals need to do to maintain their creativity and ensure their creative productivity.

DECISION-MAKING-RELATED CHARACTERISTICS OF CREATIVE PEOPLE

Are creative people better decision makers than most people? What is the source of their decision making competence? Studies of creative individuals have identified patterns of cognitive, personality and motivational characteristics associated with creativity that broadly imply a particular decision making style (Barron & Harrington, 1981; MacKinnon, 1978; Mumford & Gustafson, 1988; Sternberg & Lubart, 1995). Below we will discuss some of these characteristics of the creative person and outline the corresponding decision making style.

Cognitive resources. One of the interesting empirical facts that has emerged from research on decision making is that people seem, in general, to be concrete thinkers (Hastie & Pennington, 1995). The concreteness principle implies that people often accept and use information in the form in which they receive it. They prefer task-specific, reality-based mental representations when making decisions. The reliance on abstract task representations and transfer of learned solutions on the basis of abstract relationships will be, therefore, rare, and problems that only admit abstract solutions will be difficult to solve. We can hypothesise that abstract reasoning abilities, a preference for complexity, broad interests, high aesthetic and theoretical values (truth and beauty are abstractions of the highest order) and appreciation for the intellectual pursuits in their own right which are often-cited characteristics of creative people give them an advantage in forming judgments, making choices and solving decision tasks. Ward (1994) reports research evidence that those who are less bound to pre-existing conceptual structures produce more creative solutions to open-ended tasks. Also, he emphasised that the level of abstractness in concept representations relates positively to the production of relatively novel variations in task responses.

Expertise. Creative people tend to have a long, sometimes life long history of practising problem solving and decision making in their relative domains, which may allow them to enjoy a strong cumulative benefit of experience. Hayes' (1989) and Gardner' s (1993) studies of eminent creators of the modern era showed that at least a decade of sustained activity and work in a domain is required before high-level innovative achievements have coalesced. Decision making research however showed (Payne et al, 1992) that expertise does not necessarily improve judgment. Experts do not always perform better than novices and lay people on experimental decision tasks. On the other hand, there is research (see Shiloh & Rotem, 1994) suggesting that highly experienced leaders compared to less experienced leaders make superior decisions under pressure whereas in situations of low stress the performance of the two groups does not differ.

Intuition. There is a controversial attitude towards intuition in the decision making literature. Some see intuition as a shortcoming and a source of biases which operate to produce quick and acceptable but far away from maximally desirable outcomes. Others (see Payne et al, 1992) argue that both intuition and logical modes of thinking are available to the decision maker; with logical analysis leading to fewer but larger errors than intuition. Accordingly, lay conceptions of decision making competence (Shiloh & Rotem, 1994) involve systematic and thorough information search and analyses, as well as good intuition.

Some decision making circumstances are more conducive to intuitive decision making than others (Agor, 1991), such as those with a high level of uncertainty, a high degree of risk, and either informational deficit or informational overload. When facts are limited, do not indicate clearly the way to go, or are of little use, intuition may help to synthesise

isolated bits of data and experience into an integrated picture often in an "aha" experience. The intuitive choice among several plausible alternative solutions which have all good arguments can be more effective than their systematic evaluation. Intuition helps to sense when a problem exists much before more rational analyses will point to it and to perform well-learned behaviour patterns rapidly (Isenberg, 1991). Intuition is used as an explorer of the unknown or of the future and as a generator of unusual possibilities and new options that might not normally emerge from an analysis of past data or traditional ways of doing things. Intuition can also be used at the end of the information processing to synthesise and integrate (Agor, 1991).

Creative people are often reported to rely heavily on intuition (Policastro, 1995). For example, Einstein suggested that it was intuition more than logical thinking that led to scientific discoveries. Henri Poincaré, the French mathematician, claimed that intuition was a basic instrument for creative work, which helped him to recognise the novel, useful ideas and separate them from the large number of uninteresting ideas. In some work, the intuitive search for solutions has been investigated as a component of the creative problem solving process (Penova, 1987). Factors that impede intuition in managers (Agor, 1991) were also found to impede decision making performance (Baron, 1994). It is possible that intuitive decision making plays an important role in creativity, acting perhaps, as Poincaré suggested, as an unconscious filter to separate good and bad ideas and to direct further work.

Tolerance of ambiguity. Ambiguity is a prevalent feature of real-world decision making (Payne et al, 1992). Decision tasks involve different kinds of ambiguities. For example, decisions have to be made based on information that is uncertain, incomplete, contradictory or allows for multiple interpretations. Also, people can have conflicting values or be uncertain about their preferences, thereby making their goals ambiguous.

There is a generally held belief that people seek to avoid uncertainty, and experimental studies of decision making show that individual choices often exhibit an aversion to ambiguity (Baron, 1994). Creative people, on the other hand, are often described as having a high tolerance of ambiguity. For example, Antoine Lavoisier, a founder of organic chemistry, had incoherent results for a long time concerning the composition of air due to his imprecise measuring tools. Rather than rush to a conclusion, his notebooks indicate that accepting this ambiguity was an integral part of his creative work (Holmes, 1985). The ability to live with and even thrive on high degrees of ambiguity and apparent inconsistency is considered a core element of the creative personality (Lubart & Sternberg, 1995; Sternberg & Lubart, 1991; 1995).

How does ambiguity tolerance relate to being a good decision maker during creative work? Tolerance of ambiguity helps a person withstand the discomfort of the conflict induced by the decision situation itself (Einhorn & Hogarth, 1981). Tolerant individuals can better handle cognitive and affective complexity since they avoid rigid categorisations in their thinking and premature closure in their decision process (Jonassen & Grabowski, 1993). Because such individuals do not find ambiguity particularly uncomfortable and may even enjoy it, they are able to keep their attention focused on the problem to be solved and explore its meanings in a playful style (Tegano, 1990). In a study of ambiguity tolerance in adolescents, Stoycheva (1998) compared high and low ambiguity tolerant high school students on several cognitive and personality measures. Students were identified as high and low ambiguity tolerant on the basis of their scores on an ambiguity tolerance questionnaire. High tolerance of ambiguity was related to better performance on

intelligence tests, generation of more unusual ideas and original solutions to open-ended verbal tasks and inventing more imaginative and abstract titles to pictures. Low ambiguity tolerant students, on the other hand, were more anxious and felt less positive about themselves and their relations with others. Thus, people who tolerate well ambiguity will, in principle, show more optimal decision making than people who are stressed or distracted by ambiguity.

Motivation. To make a creative contribution, it is not enough that a person have all the necessary knowledge, abilities and expertise. Curiosity and excitement about the novel and unusual, dissatisfaction with the state of art within a domain and an attitude of exploring and searching for original ideas and solutions are needed as well. A discovery orientation keeps the involvement with the work open and flexible and also contributes to the achievement of creative results (Csikszentmihalyi, 1988a). Creative motivation manifests itself in persistence, task commitment and intrinsic enjoyment of complex and novel problems (Amabile, 1996). Creative people get absorbed in what they do, devote a great deal of energy to their work and mobilise fully their cognitive, emotional and social resources in the decision making processes it requires. In routine decision making, the time and energy devoted to decision behaviour is often seen as a balance between minimising cognitive effort and desire for accuracy. People who are intrinsically motivated, who love their work, will be willing to invest the energy necessary to make not just good but truly satisfying decisions. They will set high standards for the quality of their decision and be willing to devote the necessary effort to achieve these standards.

A decision-making style for creativity. To summarise, we can begin to characterise a decision making style for being creative. This style involves, among other things, (1) using cognitive abilities to discriminate between salient and significant attributes on which to base a decision, to reason at a high level of abstraction, and to identify (perhaps intuitively) the best solution to a decision problem; (2) tolerating ambiguity during decision making to avoid premature closure on a non-optimal problem solution; and (3) being motivated to invest as much cognitive effort as necessary to make creative choices.

Now, following this examination of how decision making is involved in an individual's creativity, we will consider how decision making participates in the social recognition of creative products. The intrapersonal evaluation individuals perform while doing their creative work is one important aspect of creativity, yet another is the interpersonal judgment of creative achievements (Runco & Chand, 1994).

CREATIVITY AS A SOCIAL JUDGMENT

In this final section on the role of decision making in creativity, we explore the idea that the recognition of creative productions itself involves social decision making. Creativity involves a communal or cultural judgment (Amabile, 1996; Csikszentmihalyi, 1988b, 1990; Gardner, 1993; Lubart & Sternberg, 1995; Sternberg & Lubart, 1991, 1995). Societal agents make decisions about what is creative and what is not within a particular domain of expertise. An individual may claim that his or her production is creative. However, most people would require that this individual's claim be validated by an appropriate group of judges, called a « competent field » (Gardner, 1993).

This field consists of individuals and institutions sanctioned to evaluate the originality, appropriateness and quality of the contribution made by an individual or a group of

individuals (Csikszentmihalyi, 1988b). The members of the field are, for example, judges, professors, prize committees, editors, agents, media professionals, encyclopaedia writers, and other evaluators such as supportive or jealous peers. They make initial, provisional assessments as well as, over a longer perspective, more authoritative judgements. Sometimes the field consists of a small number of trained experts; but in areas like popular entertainment or religious movement, the field may number in the millions (Gardner, 1993). Amabile (1990, 1996) has emphasised the consensual nature of creativity judgements in her work on a social psychology of creativity. Amabile (1990), based on the view that creativity depends on social judgements of a work within a specific community or culture, developed empirically the consensual assessment technique for creativity based on the following definition: "A product or response is creative to the extent that appropriate observers independently agree that it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated" (p. 65).

Difficulties in making judgements of social creativity may arise because of the complexity of the outcomes and the context in which social actions occur. Judgements of social creativity may involve evaluating transitory actions such as those within a particular social relationship as well as long lasting social inventions that can change lifestyles over the long term. The evaluative criteria are complex, sometimes conflicting and may make the achievement of a consensus more difficult than in other creative domains. Evaluations of the creativity of decisions in the social realm are probably best made by several people with established decision making competence, such as people with experience in public positions (Shiloh & Rotem, 1994).

CONCLUSIONS

This chapter has explored the meaning of creative decision making. We have examined possible answers to the question of how decision making may be creative. From a decision-making perspective, creativity can come into decision making because people may choose a creative option, and/or because people may use a non-standard decision process to select a course of action. On the other hand, from the perspective of creativity, decision making comes into the phenomenon of creativity because decision making is part of the creative process, because creative people often choose to pursue a novel path in their life work, and because the social environment makes decisions about what is creative or not. Thus, the concept of creative decision making can be conceived and studied in several complementary ways.

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CHAPTER 3

TASK CREATIVITY AND SOCIAL CREATIVITY IN DECISION-MAKING GROUPS

Task creativity is involved when unexpected, non-obvious ideas and solutions are generated. Generation may have two sources (or a combination). First, the unexpected solution may arise out of the stimulus itself, or more precisely, novel information about the stimulus, the task, or the solution. In this paper this will be called *informational influence*. Informational influence is implicated when judges (or producers) of information focus on the information itself. A novel and non-conventional solution may also be based on the judgments and preferences of relevant others. This will be called *normative influence*. Normative influence is implicated when one accepts the judgments of relevant others to assess reality, in this case to assess the viability of novel or conventional solutions. The critical distinction is whether the solution flows from qualities of the stimulus and the task, or from the solution preferences of relevant others. An important theme of our chapter is that in group decision making, normative influence may impede the generation of creative ideas. This will be demonstrated at two levels of analysis. From an individual perspective we will present a selective review of the social conditions, notably minority and majority status in the group, under which creativity or divergence of ideas is enhanced. From a group perspective where the group is the unit of analysis, we will show that the creativity of (brainstorming) groups rarely is equal to the creativity of an average group member. We will show that this is due to suboptimal coordination based on normative influence in groups and to the reduced motivation of group members to produce creative ideas, and to coordination features of group discussions.

Social creativity refers to methods to coordinate group members' efforts and to enhance their motivation to produce ideas in groups that are unexpected and novel. We suggest that due to normative processes in groups mainly conventional methods are employed, and that the use of conventional methods is detrimental for task creativity. Several suggestions to improve the methods to coordinate brainstorming in groups will be made.

INFORMATIONAL AND NORMATIVE INFLUENCE

Before we discuss creativity in decision-making groups, it is worthwhile to elaborate on the more fundamental question of what we mean by creative task solutions whether in individuals or groups. Or, in contrast, when are task solutions conventional and routine? We argue that to define a task solution as more creative and more novel, or less conventional and less routine requires a judgment. Such a judgment can be based in part on the judgment of relevant others. For example, when relevant others deem using a spoon as a

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tool for small-scale gardening creative, and the use of a small spade as conventional, one may comply with this judgment (Asch, 1951). Another way to conclude that a spoon is a creative solution is to reason that the use of a spoon for micro-gardening deviates from one's previous expectations, since before one was not aware that a spoon could be used that way, and one was not aware of any occasion that a spoon could be used for small-scale gardening (see Jones & Davis, 1965; Kelley, 1967). This means of determining creativity is based on an intrinsic *creativity rule*, rather than the preference "votes" of others.

Thus, we argue that to define a task solution as creative and novel entails a comparison with its opposite, i.e. routine and conventional. Moreover, it is based on human judgment, but within the confines of a rule (e.g., is it unexpected?). Two often complementary methods to make a judgment are available. First, one can conform to expectations of relevant others. This type of basing one's judgment has been coined normative influence (Asch, 1951; Deutsch & Gerard, 1965). In that case one adheres to a group norm, because one wants to be an accepted group member. Second, one can more closely scrutinize the task itself. In that case one acts more as an independent judge who focuses on the information about the task solution and the context of the task solution itself. This has been coined informational influence, since it is the task information itself that is considered.

Interestingly, and in line with the foregoing, social psychologists have employed both types of judgments to identify creativity. As we will see later, in the brainstorming literature (see, e.g. Mullen, Johnson, & Salas, 1991) judgments of outsiders were employed to estimate which ideas were more novel and creative versus routine and conventional. In contrast, in the minority-majority influence literature, Moscovici (1980) and Nemeth (1986) argued that some participants were more creative by showing that their task solutions were more unexpected, conveying more novel task information as compared with the information presented before.

The distinction between normative and informational influence is not only useful to characterize the (meta) nature of creativity judgments, it is also quite instructive to describe major processes in decision –making groups. As suggested by Katz and Kahn (1978), a group has two functions that are quite often difficult to reconcile. Its internal function is to maintain group cohesion and group identity, so that the group can act in unison. Its external function is to solve external demands, i.e. to find optimal solutions for its tasks. It is self-evident that in order to meet the internal function, normative influence should be optimized. However, to meet its external function, the task itself should be central, i.e. informational influence should be optimal (see Kaplan, 1989; and Rugs & Kaplan, 1993 for empirical evidence).

An important theme of the present review on creativity in decision-making groups is the tension between pressures stemming from normative influence and pressures focusing on the task itself, i.e. informational influence.

Creativity, whether in individuals or in groups, requires generating information and ideas (Mednick, 1962). But not just any ideas are required for creativity. Thought that encourages divergent thinking, the ability to think in novel, non-conventional ways, lays the groundwork for creativity (Guilford, 1977). Moreover, the information and ideas that are generated require sufficient judgment to be put to creative use (Lubart, 1994). Put another way, information requires elaboration, or systematic thought (Eagly & Chaiken, 1993). Creativity requires the ability to form analogies, unusual associations, and new combinations of diverse knowledge elements (Mednick, 1962). Thus, our focus in this chapter will be on the conditions of group decision making that facilitate both the

generation of information and ideas in large and diverse quantities, and the *examination of ideas in depth.*

As we will see, normative pressures to act in unison are likely to have two related consequences: suppression of novel ideas in favor of conventional ideas and the use of conventional coordination devices that are detrimental for examining and selecting creative ideas, i.e. normative pressures may impede the detailed, systematic informational processing that is needed for task creativity. An important question to be addressed is what methods promote optimal information generation and processing in groups? In contrast to the conventional methods often employed, we ask how social creativity may be facilitated, i.e. which coordination methods favor the emergence and selection of novel ideas in groups?

In the following we will illustrate that the interplay between social and informational influence has intriguing consequences for group decision making in two areas: decision making in pseudo-groups and decision making in intact groups.

In pseudo-groups, group members receive (bogus) information from other group members and then the question is how that information affects the information generation and evaluation of the participants when no further coordination is necessary. From the perspective of the study of pseudo-groups (see the section on the perspective of the study of individual performance under social conditions), we will present a historical overview of the study of minority and majority influence. We will show that, due to greater impact of normative influence, recipients of majority influence are more likely to process conventional ideas, but that recipients of minority influence are more likely to process novel or creative ideas as a consequence of a greater impact of informational influence.

In intact groups, members of groups have to generate task information, they have to evaluate that information collectively and they usually have to make collective decisions. As compared with task behavior in pseudo-groups, usually the group is the unit of analysis, and not the individual. It will be shown that usually normative influence dominates informational influence in intact groups. From the perspective of intact groups the main emphasis will be on the creativity of brainstorming groups. A short historical review will be presented. We will show that only under very specific circumstances the creativity of groups is equal to the creativity of an equal number of separate individuals, mainly because normative influence counteracts adequate information processing. From both perspectives, creativity of individuals under social conditions and intact groups, we will draw explicit references to how the issues under consideration affect breadth and depth of idea generation and evaluation.

DECISION MAKING UNDER SOCIAL CONDITIONS: PSEUDO-GROUPS

To what extent individuals are influenced by arguments and judgments of other group members is a question that has long intrigued social psychologists (see Eagly & Chaiken, 1993; Higgins & Kruglanski, 1996). Considerable attention has focused on effects of disagreeing majorities and minorities.

Initially, the emphasis was on the effects of disagreeing majorities. Asch (1951, 1952) introduced a classic paradigm. In a typical Asch study, four to nine people meet to estimate the length of lines at eighteen trials. In each trial a card with a standard line is presented, which has to be compared with a card depicting three other lines. One after another, group

members have to state aloud which of the three lines has the same length as the standard line. This task is simple enough: one of the three lines corresponds exactly with the standard line and it is extremely difficult to make an error. A specific ingredient of the paradigm is that all group members are confederates of the experimenter, except one, who has to respond last. These confederates are instructed to give incorrect answers on twelve trials. The results usually show that about a third of the naive participants yield to the incorrect answer of the majority. Subsequent work revealed that conformity of recipients of majority influence was greater, when stimuli were more ambiguous, when naive subjects felt less competent, when the group was more attractive, and when the naive participant has to render a public rather than private response (see Allen, 1965; 1975; Kiesler & Kiesler, 1969; Levine & Russo, 1987).

These results were convincingly interpreted by the interplay of normative and informational influence. Conformity is due to normative influence. It occurs because the majority is an important source of outcome, such as esteem in the eyes of the majority and avoidance of being perceived as a deviant. However, there are conditions that discount the influence of majorities, such as when the stimuli are non-ambiguous, when the group is not attractive, when one has to give responses in private, and when one is confident. In such cases one strives for an accurate estimate of the reality, i.e. informational influence is relatively stronger. Although there was criticism (see Levine & Russo, 1987) until the mid-seventies (see also Jones & Gerard, 1967), the dominant view was that majority influence is due to normative influence, and it was established that normative influence in decision-making groups could be discounted by participants' focusing on task information. Conversely, informational influence could be discounted by participants' desire to be a perfect group member, requiring adherence to the group norm (see, e.g., Rugs & Kaplan, 1993). The critical distinction between the two forms of influence for our purpose is that normative influence focuses attention on the *group's* normative preferences, which are unlikely to be novel or unconventional, whereas information influence focuses on the pertinent facts about the *task and issue*, thus permitting generation and evaluation of ideas and information.

Undoubtedly, Moscovici (1976; 1980; 1985) has broadened the debate about social influence in decision-making groups (see Maass, West, & Cialdini, 1987). As we see it in retrospect and in view of our topic, Moscovici's major contribution is that he contrasted majority influence with minority influence in a more systematic way than endeavored until then. More specifically, he proposed that majorities elicit 'comparison processes' in which one's opinion (or estimate) is compared with the opinions (or estimates) of the majority, without further attention to the issue in question, a process called social validation. On the other hand, recipients of minority influence engage in active thinking about the issue in question and that may give rise to novel ideas. Thus, in line with our conceptualization, recipients of majority influence would be subject to normative influence and recipients of minority influence to informational influence. Why? Moscovici argues that social validation processes in case of majority influence are relatively stronger, because recipients of majority influence assume that the majority is correct. On the other hand, this is less so for recipients of minority influence. Instead they focus on the task information itself and think of arguments and counterarguments. This may increase the likelihood of the generation of new arguments.

According to Moscovici (1985), recipients of disagreeing majorities and disagreeing minorities differ in attention and in cognitive activity. As for their differential attention, it

has been established quite often that disagreement with a majority receives more attention and is experienced as more stressful than disagreement with minorities. Moreover, it has been established that during group discussion recipients of majority disagreement experienced an increasing *interpersonal* conflict, whilst recipients of minority disagreement reported an increasing *cognitive* conflict (see, also Guillon & Personnaz, 1983; Nemeth, Mayseless et al., 1990). Interpersonal conflicts were fueled by membership concerns, whereas cognitive conflicts were conceived by accuracy concerns.

As for the difference in cognitive activity, Moscovici (1980) suggests that a judgment raised by a minority is more likely to elicit arguments and counterarguments than a judgment by a majority. Recipients of majority influence would only inspect the standpoints of their fellow (majority) group members. This latter proposition was not supported by empirical evidence collected by Clark and Maass (1988). They established that recipients of majority influence generated as many thoughts as recipients of minority influence. However, further evidence shows that indeed minority influence is more likely to evoke novel ideas, as Moscovici (1980) maintains, but it was also shown that recipients of minority influence generate thoughts that are qualitatively different from thoughts and ideas elicited by recipients of majority influence. In three experimental studies, Nemeth (1986) demonstrated that recipients of majority influence become involved in convergent thinking, whereas recipients of minority influence focused on divergent or creative thinking. In her first experiment (Nemeth & Wachtler, 1983), a majority or a minority in the group discovered an embedded figure in two of the six comparison figures. When exposed to a confederate majority, participants adopted the majority's solutions without discovering additional figures. In contrast, when confronted with a minority, participants were less likely to name the two figures that had been identified by the minority. Rather, these recipients of minority influence discovered additional embedded figures that had not been chosen by the minority of confederates. Similar results were obtained in a second study (Nemeth & Kwan, 1987) in which naive subjects were exposed to minority or majority influence in a task involving the identification of three-letter words. In the minority and majority conditions the confederates employed backward sequencing (e.g. DOG was identified as GOD). Subsequently, individual participants were instructed to form all possible words from each of 10 letter strings. It appeared that recipients of majority influence mainly employed the backward sequencing strategy, but recipients of minority influence also used other strategies, such as forward, backward and mixed sequencing of letters. Understandably, recipients of minority influence found more correct solutions than recipients of majority influence. According to Nemeth's (1986) reformulation, recipients of minority influence are better decision makers in that they show greater creativity (divergence). They are involved in thinking that goes beyond the message received. By contrast, recipients of majority influence focus their attention on the message from the majority. They only reflect narrowly on the majority's position without considering further alternatives.

Recently, a similar pattern of results was observed in a study of Crano and Chen (1998). They exposed participants to an opposite minority or to a disagreeing majority's opinion about a focal topic: mandatory student service. They found evidence that recipients of majority influence processed more information about, and showed more attitude changes on this focal topic, than recipients of minority influence both immediately and after a delay. In contrast, recipients of minority influence generated more thoughts about a related topic: increase of tuition. Their interpretation of this differential effect is that majority influence

gives rise to processing of information that directly pertains to the focal task, but that recipients of minority influence apparently are more free to develop related thoughts, which subsequently affect their attitudes on the related topic. Recipients of majority influence are more led by social comparison, i.e. normative influence, and therefore they process information that is consistent with the majority's position. Recipients of minority influence are reluctant to identify with the minority, and therefore are likely to develop alternative ways of looking at the minority's message.

The distinction between normative and informational influence processes seems tenable in view of Nemeth's data (Nemeth, 1992), suggesting that recipients of majority influence are mainly subject to normative processes to develop conventional thoughts, whereas recipients of minority influence are more subject to information gathering that goes beyond the judgments of the minority, which leads to novel solutions. However, the recent data of Crano and Chen (1998) suggest a more delicate interplay of normative and informational influence. These data suggest that for recipients of both minority and majority influence, normative and informational influence play a role. Recipients of majority influence are eager to identify with the majority and therefore they generate ideas that are biased (see also Wood et al., 1994) towards the majority's position. Recipients of minority influence are normatively reluctant to identify with the minority and therefore biased information processing also takes place. As a consequence, recipients of minority influence become engaged in biased information processing in that they develop creative, unexpected, and novel ideas that are related to the ones implied in the minority's message. From a broader perspective it may be suggested that conventional ideas are raised in situations in which there are stronger pressures to identify with the present status quo. Creative ideas are raised where there are stronger pressures to look away from the present status quo. The latter may be at the heart of creative processing.

DECISION MAKING IN INTACT GROUPS

In intact groups, group performance is rarely equal to the sum of what all group members together could produce when they would live up to their full potential. In his classical analysis of task performance in groups, Steiner (1972) provides ample evidence that actual group performance is poorer than the potential collective performance of group members because quite often (a) the coordination in the group is lacking, and (b) group members' motivation is reduced, i.e. coordination and motivation losses may occur. Measures may be introduced that attenuate these production losses. The implementation of these methods demands social creativity, since these methods have to counteract conventional pitfalls of group decision making. In accordance with our review of creativity under social conditions, we will argue in the following that in intact groups information processing about the task and task communication may be inhibited by normative processes because group members in intact groups are reluctant to share new information. Due to normative pressures they favor the exchange of shared or conventional information, and this may affect actual group performance in a negative way. In addition, in brainstorming groups the production of creative ideas is hampered by (a) free-riding, (b) lack of evaluation apprehension, and (c) communication blocking. Methods that groups may, and actually do employ to overcome conventional coordination and motivation losses will be discussed.

Adequate information sharing

Normative influence processes stem from the desire in groups to agree, i.e. to reach consensus and reduce conflict. Informational influence originate in the desire to gather information necessary to perform the group task. In a group in which each member has the same pieces of information, both motives coincide. By exchanging or discussing all information, group members can reach consensus while making optimal use of all information.

Stasser and his collaborators (Stasser, 1992; Stasser, Taylor, & Hannah, 1989; Stewart & Stasser, 1998) introduced a paradigm in which some clues to make a group decision were shared (known) and other clues were not shared by all group members. The data show that a greater percentage of shared information than unshared information was discussed. The tendency to communicate shared information has been replicated (see Stasser, 1992). It suggests that consensus seeking, a normative process, may produce inefficient information sampling in groups. Moreover, it has been shown that neglecting unshared information leads to production losses in groups, i.e. suboptimal task solutions. What measures can be taken to overcome the negative consequences of normative pressure? Stasser et al. (1989) found that procedural instructions to group members to discuss all information available to them led to more discussion about unshared information, but also increased the difference between shared and unshared information. For example, in six-person groups, 19 per cent of unshared items were discussed, but with the procedural instructions, this number increased to 23 per cent. Without instructions, 58 per cent of shared items were discussed, but with the instructions this number increased to 67 per cent, suggesting that the pooling of unshared information cannot easily be enhanced by procedural instructions.

Stasser and Stewart (1992) have argued that the way group members perceive the task affects the pattern of communicating shared and unshared information. They showed that when the task is presented as one with an obvious solution ('solve set'), informational processes are stronger than when group members are led to believe that preferences and values ('judge set') are involved. That is, when group members believe that there is no correct solution, normative processes are more dominant. Thus, focusing on the task itself may counteract the undesirable sampling of conventional ideas by promoting the exchange of creative, unshared ideas.

Lastly, Stasser, Stewart and Wittenbaum (1992) demonstrated that when all unshared information was assigned to one group member, the amount of unshared information discussed increased when it was announced that one of the group members had additional (unshared) information. Moreover, it enhanced the chance of a correct solution (see also Stewart & Stasser, 1998). In short, these results suggest that informational influence may be strengthened and normative influence weakened by stressing the problem solving nature of the task, and by emphasizing that some members may have more creative ideas available than others. Thus, believing that the task has a correct solution and knowing that alternative knowledge exists in the group attenuates the tendency to discuss only shared information (Gigone & Hastie, 1993).

In addition to characterizing the task as having a correct solution, the actual nature of the task may counteract consensus seeking. Davis (1973; 1982; see also Kerr, 1992; Laughlin & Ellis, 1986) sought to explain the definitely achieved group solution by looking at the a priori preferences and insights before group discussion. In agreement with the

notion of consensus seeking (normative influence) Davis found that when a majority of group members favored a specific solution before discussion, that solution was likely to become the group solution. However, for tasks having a correct solution such as Eureka tasks, in order to become the group's solution it is sufficient when one group member proposes that solution. Thus, as also shown in the following section on normative and informational influence, certain tasks may also counteract normative influence in favor of informational influence processes.

Conditions producing normative and informational influence

Any communication within the decision making group that promotes discussion of issue-relevant facts in *breadth*, and evaluation of these facts in *depth,* will permit creativity. In contrast, forms of influence that revolve around inter-group relations and norms will, at the least, distract from creative solutions. Therefore, it is important to ask what conditions will evoke informational influence, and what conditions produce normative influence? The fundamental point is that conditions of any sort that focus the group on the decision task will produce informational influence whereas conditions that focus on the group and its internal relationships will favor normative influence (Kaplan, 1989). These conditions include, but are not limited to, personal characteristics of group members, individual or shared motives, group goals, and characteristics of the issue. We will briefly review each set of conditions.

The concerns that underlie informational and normative influence are, respectively, concern for solving the task, and concern for group relations. This dichotomy is mirrored in a dichotomy that has been proposed with regard to leadership styles (Bales & Slater, 1955; Fiedler, 1972; Stogdill, 1974). The *socio-emotional* leader is characterized by concern for harmony, cohesiveness, and welfare of others. Such an orientation in group members, particularly in the leader, may foster normative influence, and could well predict a "group think" outcome. In contrast, an *agentic* or task orientation centers on achieving optimum solutions by adhering to task and issue demands. Such an orientation is likely to evoke informational influence.

In their interactions with others in a task setting, individuals have intrinsic motives that they bring to the group task. They may, for example, desire harmony, acceptance, or making a good impression in their interpersonal relations. Such motives would enhance sensitivity to the needs and preferences of other members, and would make such people susceptible to normative influence and acceptance of the conventional. Alternatively, other members may be motivated toward task completion and accomplishment, desiring to achieve the best possible solution and to be informed of all aspects of the issue. Such motivation would produce reliance on informational influence (Kaplan, 1989).

Interpersonal and accuracy motives have their counterparts on the level of the group in, respectively, *group* and *task goals* (Thibaut & Strickland, 1956). A group interactive goal accents harmony and cohesion, centering on socio-emotional relations, and aims to reach the most satisfying (to the group) decision. A task interactive goal emphasizes the task at hand and reaching the most factually correct decision. When the goal is to satisfy group members, acceptance of conventional solutions that satisfy the most group members would be a likely outcome. Goals may be a product of task requirements, e.g., instructions regarding the importance of harmony vs. accuracy, or group composition. For example,

groups composed of members who typically work together, or who share a strong, common social identity, would be prone to a group goal, and therefore, to normative influence and lowered creativity. Thus, it would benefit creativity to compose groups of people who normally do not make decisions as a group, and who do not have strong mutual identity ties. To illustrate this experimentally, Rugs and Kaplan (1993) instructed participants either that it was important to reach a mutually satisfactory decision and have harmony, or that it was important to reach the most accurate decision. Participants with a group goal appeared to be more influenced by normative influence whereas those with a task goal were more influenced by informational influence. In another study, participants were asked to choose data to be discussed in a subsequent group decision making session. Those who were provided with a group set choose data related to norms, but those with a task set chose data about the issue that would be decided (Kaplan, Schaefer, & Zinkiewicz, 1994).

A major determinant of influence mode is the type of issue being decided. Kaplan and Miller (1987) had six-person groups discuss either an intellective or a judgmental task. Intellective tasks are those for which there is a demonstrably correct answer within a consensual conceptual system (Laughlin & Ellis, 1986). For example, how economical is a car with regard to fuel economy? Judgmental tasks call for evaluative preferences (behavioral, ethical, aesthetic judgments). For example, how attractive is this car? The former demands a correct solution, and gathering facts would be most instrumental to the solution. The latter implies a preferred solution, and appeal to norms would be required to establish the group's preferred solution. In the study by Kaplan and Miller (1987), group discussions were recorded and the content was coded by means of a scheme that counted the number of direct statements in each group reflecting either normative influence, e.g., references to values, norms and preferences, or informational influence, e.g., discussion of facts and inferences from facts. The results indicated that discussion during the intellective task was more characterized by informational processing. However, discussants of the judgmental task employed stronger normative influence.

Similarly, Kaplan and Martin (1999) found that participants in mock juries discussing judicial cases used more normative influence with judgmental cases (e.g., harassment) but more informational influence with intellective cases (e.g., destruction of property). It is important to note that these intact groups were composed of two factions: one was lay persons (undergraduate students), the other was older psychology graduate students and law students who were experts in the university judicial system in which the trials were conducted. Thus, the latter faction could be considered a majority in power and prestige. The majority faction engaged less than the minority faction in informational influence during discussion, and was more active in discussing the judgmental case, and more influential in deciding the outcome of that case as well. Thus, majorities are more actively involved in normative than informational influence relative to minorities, and the reverse for minorities.

In the previous section we argued that recipients of minority argumentation in pseudo-groups are more subject to informational influence, whereas recipients of majority arguments are more subject to normative influence. Taken a step further, i.e., asking who the recipients of minority or majority influence would be in intact groups, this means that majorities would be subjected to informational, and minorities to normative influence. Thus, it is little wonder that in the study of intact groups (e.g., Kaplan & Martin, 1999) minorities were as influential as majorities in an intellective issue, but exposed to the normative influence of majorities in a judgmental task, were less effective than the

majority. Note that the greater impact of majorities occurred only in the judgmental task, which as shown before, is more subject to normative influence.

Although there are striking differences between the pseudo-group and the intact group domains, most notably that group members can mutually influence one another in the latter, taken together these results reveal that (a) majorities engage in more normative influence than minorities, (b) minorities engage more in informational influence than majorities, (c) given an intellective task, minorities will be at least as influential as majorities, and (d) given a judgmental task, majorities will be more influential. These results support the notion that majorities can enforce their normative will over minorities in judgmental tasks, which lend themselves to the normative influence practiced by the former, thus suppressing the informational influence of minorities, and consequently, enhancing adherence to conventional ideas. On the other hand, minorities, by virtue of their greater tendency to use informational influence, can influence majorities in intellective tasks, which are more amenable to informational solutions, thus increasing the likelihood of considering creative, divergent ideas. In short, unlike the case in pseudo-groups, intact groups allow for a mixture of influence types; the type that would be most effective, and therefore the possibility of informational influence by minorities to enhance creativity depends on the task.

Apart from type of task there are other factors that affect the type of influence used in discussion. In two experiments (Kaplan & Jendrek, 1992; Kaplan & Kickul, 1996) the moment at which a group took its first public vote was studied. In the first experiment, groups were instructed to either take an early vote, or to withhold voting until they had thoroughly discussed the issue. Male group members changed their initial, private decisions only when the first public vote was delayed. Thus, for men at least, an early public vote has the effect of locking them into their initial preferences, and thus would be counterproductive for creative solutions. Contrary to expectations, the timing of the vote did not affect the extent of normative vs. informational influence. However, once again, an intellective issue elicited more informational influence, and a judgmental issue elicited more normative influence.

In the second experiment, groups were instructed to either focus on resolving decision preferences in their discussion (normative focus) or to focus on understanding the issues of the judgment task (informational focus). The former focus increased use of normative influence only in a judgmental case (which would be naturally prone to normative influence), and the latter focus increased use of informational influence only in an intellective case, which would normally produce such influence. Thus, the preferred mode of influence that is associated with an issue type (judgmental or intellective) was exaggerated by focus. It was also found that the focus affected the time at which groups took the first public vote; normative focus groups took earlier votes than informational focus groups. In summary, breadth of information via informational influence is maximized if judgmental aspects of the task are minimized, public expression of decision outcome preferences are delayed, and instructions emphasize full discussion of the facts rather than reconciling outcome preference differences.

Brainstorming and creativity

As a technique for enhancing creativity in intact groups, Osborn (1957) has promoted brainstorm sessions, and since then this technique is widely used in decision-making committees (see, Stroebe & Diehl, 1994). The technique is based on two principles: 'deferment of judgment' and 'quantity breeds quality'. Deferment of judgment refers to the principle that group members should postpone their evaluation to later sessions. The quantity breeds quality principle reflects Osborn's conviction that when a large number of ideas is generated in group discussion the quality of the ideas generated is enhanced. Given the popularity of brainstorming, a relevant question is whether members of a brainstorming group indeed produce more and better ideas than a comparable number of individuals in isolation.

Systematic study of the production of brainstorming and interacting groups uses nominal groups as a control condition. In nominal groups separate individuals are asked to solve the same problems as brainstorming groups, such as 'how to improve campus security and safety'?, 'what would happen if everyone at a certain date had an extra thumb on each hand?', and 'how can we reduce gasoline consumption?' (Maginn & Harris, 1980). The nominal groups are of the same size as the interacting groups. In interacting (brainstorming) groups, members sit around a table, and the group as a whole is requested to generate as many solutions as possible. To compare the production of real and nominal groups, non-redundant (non-overlapping) ideas in nominal groups are compared with the production of all ideas generated in brainstorming groups. The underlying logic is that in interactive brainstorming groups it is inappropriate to voice the same idea several times (Stroebe & Diehl, 1994).

Studies comparing production in nominal versus brainstorming groups show that brainstorming groups are not superior to nominal groups. In contrast with Osborn's claim (Osborn, 1957), the production in brainstorming groups is inferior to the production of ideas in nominal groups. McGrath (1984) is quite specific in this respect: 'Individuals working separately generate many more, and more creative (as rated by judges) ideas than do groups' (McGrath, 1984, p.131). This conclusion has been corroborated in a recent meta-analysis of the results of twenty separate studies (Mullen, Johnson, & Salas, 1991).

One may argue that the inferiority of brainstorming groups has been shown in labs and may not be generalized to real life settings. In a recent study by Paulus, Larey and Ortega (1995), participants were employees of a corporation that had considerable training in group dynamics and who were involved in team work on a daily basis. They had to generate ideas about a job-relevant issue ('ways in which their company could be improved'). Consistent with past laboratory research, brainstorming groups generated only half as many ideas as a similar number of individuals in nominal groups. How can the inferiority of brainstorming groups as compared with nominal groups be explained? In the following we will focus on four explanations about the inferiority of brainstorming groups: Normative influence, free-riding, evaluation apprehension, and blocking.

As for the normative influence explanation, Nemeth (1986) and others (Hackman & Morris, 1975; Hoffman & Maier, 1961) have recognized that pressure for uniformity is an important impediment for creative problem solving, an observation that is consistent with Stasser's argument (Stasser, 1992) that in intact groups there is a tendency to sample conventional or shared arguments.

Diehl and Stroebe (1987) have explicitly investigated the plausibility of three other

explanations. According to the free-riding hypothesis (Harkins & Petty, 1982; Stroebe & Frey, 1992), brainstorming group members are tempted to free-ride on the efforts of others for two reasons: Identifiability and dispensability. In brainstorming groups, members' contributions are not identifiable because their ideas are pooled and expressed in one group product. In nominal groups, the performance of each individual can be assessed, producing greater individual responsibility for the product. Related to this is that brainstorming groups members may feel that their contributions are less important in view of the collective product, i.e. perceived dispensability may be high.

To investigate the plausibility of the free-riding explanation, Diehl and Stroebe (1987) instructed nominal and brainstorming groups to expect either individual or pooled assessment. The results indicated that assessment indeed had an effect: There was greater productivity among participants who had been led to expect individual as opposed to pooled assessment. However, the explained variance was only 8 per cent. Most of the variance was explained by type of group (80 per cent); brainstorming groups produced less than did nominal groups. Having thus discarded the idea that the free-rider explanation is a very important one, Diehl and Stroebe (1987) proceeded to test the other explanations.

The evaluation-apprehension explanation proposes that in brainstorming groups, despite instructions not to evaluate the ideas that are put forward, the fear of negative evaluations from other group members prevents members from presenting their ideas. In the study by Diehl and Stroebe (1987), nominal and brainstorming groups either followed the usual procedure or were videotaped, ostensibly for the purpose of presentation to a social psychology class which was attended by most of the participants. Moreover, pooled and individual assessment instructions were provided in this experiment. It appeared that the prospect of being evaluated indeed reduced group productivity, but again the type of group explained most of the variance (70 per cent); nominal groups outperformed brainstorming groups. From their study, Diehl and Stroebe (1987) concluded that 'although assessment expectations and evaluation apprehension have been shown to affect brainstorming productivity and can thus be assumed to contribute to productivity loss in brainstorming groups, their impact has been minor when compared to that of type of group' (p. 505).

Having discarded the idea that assessment and evaluation apprehension are crucial to explain production losses in brainstorming groups, they investigated the production blocking explanation. This explanation proposes that an important cause of the inferiority of real brainstorming groups is the rule of etiquette that only one group member may speak at a time, which induces non-participation by other group members, who may possibly forget their ideas or who may be prevented from developing new ideas. Diehl and Stroebe (1987) reasoned that because production blocking cannot be eliminated in real brainstorming groups, its role can only be examined by introducing blocking in nominal groups. In their study, four subjects worked in individual rooms. In front of each subject was a display with four lights, each light belonging to one specific group member. The subjects were instructed to express their ideas vocally. As soon as one person started to speak, a voice-activated sensor switched his or her light to green. The green light switched off when the person did not say anything for 1.5 seconds. In the meantime all other lights were red. Three experimental conditions were employed in which these light displays were used. In addition, the usual real group and nominal group conditions were run. In condition 1 (blocking with communication), participants could hear the ideas expressed by other ones, which was not possible in condition 2 (blocking with no communication). In condition 3 (no blocking without communication), participants were informed about the

function of the lights, but they were encouraged to disregard these lights and talk whenever they wanted to do so. The results indicated that quantitative production was lower in the conditions with blocking (real groups, condition 1 and condition 2) than in the two conditions without blocking (condition 3, nominal groups), suggesting that blocking is a major factor explaining production losses in brainstorming groups.

Which measures may be taken to overcome production losses in brainstorming? This is an important question given the observed inferiority of brainstorming groups as compared with nominal groups. Concerning the normative influence explanation, in a previous section we suggested that the creativity of groups may be enhanced when members are less under group uniformity pressures. This might be reached by suggesting to members that in the first stage of idea generation individual ideas count more than the production of the group at large. This enables the group members' individual contributions to become simultaneously visible and identifiable. Moreover, to prevent blocking, it might be more effective to develop their ideas in individual sessions and thereafter have these ideas discussed and evaluated in a group session.

It should be noted that these recommendations are already fulfilled in another technique, coined the Nominal Group Technique (NGT; see Van de Ven, 1974). NGT involves a two-stage process. Individuals first work separately in a generation stage without evaluation, and subsequently work as an interacting group in an evaluation stage. This technique has been employed successfully for the generation and evaluation of ideas (as in brainstorming), of goals to be set and decisions to be made.

A very promising technique to prevent mutual production blocking is provided by electronic brainstorming. 'In nominal groups, participants work on their own computer terminal. In brainstorming groups the terminals are connected. In that case, group members can enter their ideas as the ideas occur to them. Every time an individual enters an idea, a random set of groups' ideas is presented on the individual screen. The individual can continue to see new random sets of (collective) ideas at will by presenting the appropriate key' (Gallupe & Bastianutti, 1991, p. 139). It was shown that the usual inferiority of brainstorming groups did not occur; brainstorming groups appeared to be as productive as nominal groups.

Lastly, in addition to prevent coordination losses, Osborn (1957) proposed to install a leader or facilitator in brainstorming groups: The leader can act to 'prime the pump' (Osborn, 1957). If members stop presenting ideas, the leader may repeat the rules of the task and motivate the group by setting higher goals (e.g., 'Let's break 100') for the group (see also, Paulus et al., 1995). The impact of having such a leader on the productivity of brainstorming groups has recently been investigated in a study by Offner, Kramer, and Winter (1996). Their results show that installing a trained facilitator makes brainstorming groups more productive, i.e. production was higher in brainstorming groups having a facilitating leader than in brainstorming groups without one. In addition, it appeared that brainstorming groups with a facilitating leader performed at about the same level as nominal groups.

CONCLUSIONS

The generation of ideas in breadth, and their evaluation in depth, which is required for creative decision making, is enhanced by task-related information processing. Our selective

review of creativity in task groups suggest that task creativity quite often is impeded by normative influence processes. Our review of individual decision making under social conditions showed that majority influence gives rise to the generation of conventional ideas. In contrast, recipients of the ideas and standpoints of a minority faction may get involved in the generation of creative ideas, presumably because recipients of minority influence are less under normative influence than recipients of majority influence.

Our review of intact groups suggests conditions that promote counterproductive normative processes, and those that facilitate informational processes. In intact groups, including, but not limited to brainstorming groups, members rarely produce creative ideas that are at the level of their full potential. This is to some extent due to motivation losses, such as free-riding and lack of evaluation apprehension, but more importantly to coordination losses. Important coordination losses are due to normative influence processes involving the sampling of conventional ideas and the underutilization of creative ideas inspired by the etiquette that when one group member speaks, other group members should listen (blocking). The conclusion for intact groups is that motivational and coordination processes do not favor task creativity. Another conclusion connected herewith is that in order to increase task creativity in groups, it is necessary to introduce specific measures such as NGT and electronic brainstorming that compensate for the usual coordination and motivation losses in brainstorming groups. This implies that the social creativity implied by the usual motivation and coordination measures in groups fall short, and that extra social creativity measures have to be introduced before it can be expected that intact groups are as creative as an equal number of separate individuals.

It should be noted that our review concerned task creativity in decision making groups. We showed that normative processes weaken information processes that are important to enhance creativity. This is not to say that normative processes always are detrimental to decision making groups. Sometimes the consensus need is important, as when consensus must be reached on the goals of the decision before concentrating on the task for a creative solution. In that case a two-stage process may be recommended. In the first stage, an established group may reach consensus on the goals of a task as related to relevant norms. In the second stage, when creative solutions have to be found for the defined goals, task creativity may be enhanced in groups characterized by low interdependency among its members that act under interaction rules that favor information processing.

As for decision making in organizations, this two-stage process suggests that goals should be set by boards that are composed of people who have strong consensus requirements. Such is the case in boards of directors who meet regularly. However, on decisions that require creative task solutions subsequently, 'task forces' should be introduced which are composed of executives gathered only for that task, i.e. who do not regularly interact.

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CHAPTER 4

THE ECONOMIC, SOCIAL, AND PSYCHOLOGICAL OUTCOMES OF IMPLEMENTING A DELIBERATE PROCESS OF ORGANIZATIONAL CREATIVITY

Most individuals spend much of their lives working in some form of organization. They are dependent on organizations for their livelihood as well as for satisfaction of many of their psychological needs. How well an organization can meet individual needs is heavily dependent on its ability to prosper in its environment. The organization is dependent on its members for motivation to apply skills, knowledge, and creativity to their work. Individuals who work in organizations that cannot prosper, will not long be able to achieve their personal goals through the organization.

Beer (1980) suggested that the well-being of society is dependent on effective relationships between (1) individuals and their organization, and (2) between organizations and their external environments. If the first relationship is ineffective, the psychological well-being of the employees is in danger. Labor strife, job dissatisfaction (at all levels), turnover, and absenteeism are continued reminders that this relationship is a difficult one to manage. If the second relationship is ineffective, economic viability in global markets becomes a concern not only for organizations but also for whole societies world-wide. Fortunately, these two relationships are not mutually exclusive. The purpose of this chapter is to show how a process of innovative thinking and decision-making can be deliberately encouraged and applied as an organizational force to achieve important motivational, people-centered outcomes and important economic outcomes simultaneously, without sacrificing one for the other.

OPEN SYSTEM ORGANIZATIONS

An organization can be visualized as a transformational engine comprising people, equipment, and processes which continuously converts changing inputs from the external environment into changing outputs to the external environment. The extent to which organizations pay heed to their external environments is said to be a measure of how "open" or "closed" they are. The external environment includes things like customers, the ecology, the government, competitors, suppliers, technology and society as a whole. Closed-system organizations ignore environmental changes while open system organizations continuously transform environmental changes into improvements in effectiveness. A closed system survives only if the external environment remains stable, allowing the organization to continue to take in the same unchanging inputs and emit the same outputs endlessly.

Therefore, one requirement for an effective organization is to achieve an effective relationship with its *external* environment. However, another requirement is to achieve an effective relationship with its *internal* environment. An organization's internal environment

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 53-88.

can be considered to have three main components which shape the behavior of its employees. The three are its structures, its culture and its dominant coalition (Beer, 1980). Structures are the formal aspects of an organization which signal to people that certain behaviors are desirable and that rewards are likely to result if they practice them. Structures include training; organization design and job design; personnel policies and systems with regard to rewards, compensation, promotion, labor relations, performance evaluation, recruitment, selection, and transfer; and control systems covering management information, accounting, and budgeting.

Culture relates to an organization much as personality or self-concept relates to an individual. As individuals in organizations work with others, are trained and supervised, and are affected by policies and procedures, they develop a composite perception of their internal environment, expressed by such concepts as "open", "risk taking", "warm", "tough", "soft", "impersonal", "informal", and "rigid". Margulies and Raia (1978) defined the culture of the organization as the shared beliefs and feelings which form an informal set of ground rules about what is expected and what will be rewarded (formally or socially).

The dominant coalition is a group of key decision makers whose influence on the system is greatest (Kotter, 1978; Miles & Snow, 1978). It usually includes senior management but can also include others less obvious on the organization chart. Their collective job experiences, skills, cognitive orientations, personalities and values predispose these decision makers to define the internal environment in a way that is consistent with who they are as individuals and their own self-concepts. Similarly, they are likely to reinforce peoples' behaviors consistent with their own self-concepts and values.

An open systems model that includes the effects of the internal and external environments on the transforming engine is shown in Figure 1. It recognizes that the organization is both an economic and social system with multiple purposes and outcomes, and that the people and economic inputs and outputs must filter through both environments.

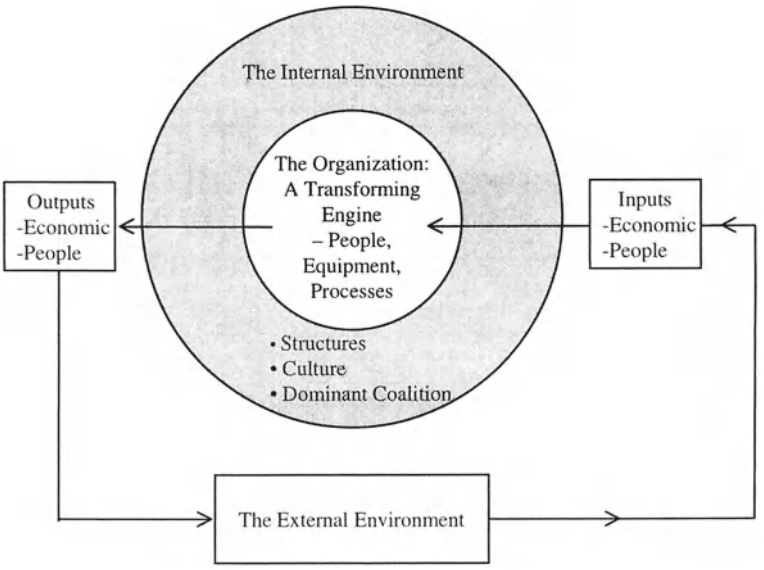


Figure 1. An Organization Operating as an Economic and Social System

Financial indicators such as profit and return on investment (R.O.I.) are typical economic criteria of organizational performance. People criteria are often summarized as quality of work life (Q.W.L.) and include things like job satisfaction, equitable pay, meaningful work, and a compatible social environment. Beer (1980) suggested that the organization must provide for a satisfactory quality of work life or it will ultimately be unable to attract, keep, motivate, and influence employees and that these two sets of criteria create conflicting demands. Managers often feel forced to tradeoff one objective against another such as reducing profits to pay people more or declaring a dividend while laying off people to reduce costs. Managers tend to weigh the impact of decisions on both sets of outcomes and try to balance them, usually sacrificing one for the other.

ORGANIZATIONAL EFFECTIVENESS, ADAPTABILITY AND CREATIVITY

The purpose of this chapter is to demonstrate how these two outcomes can be accomplished simultaneously without trading one for the other. The secret is to use the internal environment to deliberately encourage employees to participate in organizational creativity and apply a user friendly, simple process of innovative thinking to their jobs. By providing a common thinking and problem solving language, this process helps harness everyone's own unique approach to creativity. How and why this process of creativity works to realize the economic and people outcomes concurrently is best understood by first understanding the relationship between organizational effectiveness and organizational creativity and, second, understanding the impact of participation in creative work on people outcomes.

Mott (1972) showed that effective organizations have two very different major characteristics: efficiency and adaptability. Efficiency means optimizing, stabilizing and polishing current methods (routines) to achieve the highest quantity and quality at the lowest cost possible. Adaptability means deliberately changing current methods to attain new levels of quantity, quality and cost and new products, and is virtually synonymous with continuous creative and innovative thinking. In the past, organizations could be effective by concentrating only on efficiency. Adaptability is now equally important because of today's rapidly accelerating rate of change (Toffler, 1970). Adaptability, that is, creativity and innovation, is needed when the organization is unclear about what needs to be done, or when what needs to be done is constantly changing. A closed-system organization works diligently to master the routine, and focuses on internal efficiency. An open-system organization works diligently to deliberately change the routine to suit its environment, and focuses on both internal efficiency and external adaptability.

Three things make it difficult for organizations to increase their adaptability performance: outdated and inappropriate organizational structures; deficiencies in commitment; and inadequate thinking skills. Beer (1980) suggests that the twentieth century "bureaucratic" organizations, born out of the Industrial Revolution, are typically hierarchical in nature. They have centralized decision-making, achieve co-ordination through tight rules and controls, divide work by functional specialization, and emphasize standardization and control. Faced with changes in markets, technology, information and values, this bureaucratic organization is now under severe stress, as predicted a quarter century ago by Toffler (1970).

Employees' primary concerns have expanded beyond job security and survival to

include freedom, self-esteem, personal growth, and self-realization (Herzberg, 1966; Maslow, 1954). The traditional mechanism of bureaucratic organizations for attracting, motivating, and holding workers – the "economic contract" – has eroded. People have become increasingly more restive and dissatisfied with conventionally designed jobs, and less willing to obey orders without question. Young workers – particularly members of so-called Generation X who generally embrace change as the only constant in their lives – will expect more participative management and will migrate toward organizations with people-oriented work settings (Coupland, 1992).

Everywhere we look, traditional structures are being reshaped or are failing. People, and even whole communities, are finding the world moving beneath their feet as traditional markets, industries, and sources of employment disappear under the impact of new information technologies and a restructuring of the world economy (Morgan, 1993). It is not surprising that an organization whose main virtues were predictability and reliability and which operated as a closed system, should find it difficult to adapt to an increasingly dynamic environment. Many employees, too, are struggling to deal with these changes.

This chapter addresses the kind of creative, innovative thinking required to enable organizations to succeed in a turbulent world. Innovative thinking must be mainstreamed, that is, made a way of organizational life, not a "sometimes thing". Creativity is a foundation for a better balance of efficiency and adaptability. Optimizing the day-to-day routine often works against efforts to become adaptability-minded – to find new opportunities, to find new problems (called opportunistic surveillance by Simon, 1977), to develop new routines and products, to solve old problems in new ways, and to boldly seize unanticipated occurrences, emergencies and crises as opportunities for innovation. Such skill in thinking is not mainstreamed in many organizations. Many individuals display excellent analytical thinking skills but demonstrate inadequate innovative thinking skills. For example, they tend to make good short-term analytical decisions, like determining how many jobs a new piece of equipment can eliminate. The hard, innovative part is capitalizing on the opportunity by convincing head office not to lay people off but to reassign them into other important positions to build future business and improve operations, quality, and customer satisfaction. People often miss such innovative opportunities because they apply non-creative, analytical thinking routines to all situations. When situations require more than mere mathematical calculations, poor decisions or indecisiveness result.

HAVING THE KNOWLEDGE BUT NOT KNOWING HOW TO USE IT

Many organizations have installed expensive computer systems to ensure work-related information is readily and widely available to employees. However, merely *having* the information is not sufficient for innovative thinking by employees. Knowing *how to use* the information appropriately is also necessary. A major North American Airline recently ran into a situation where all of its employees had all the knowledge they needed but no one seemed to know how to use it innovatively. A snow storm paralyzed the home base airport on a Friday night. The snow had been expected all week, arrived on schedule, and continued through Monday. All but ten of the airline's two hundred scheduled flights were progressively cancelled as the weekend dragged on. Almost 20,000 increasingly angry customers spent a frustrating weekend in a survival mode. All of the airline's hundreds of ground employees *knew* everything there was to know about the planes, the de-icing plans,

the weather and the cancellations. None seemed to know what to do, how to turn this crisis into an opportunity, how to seize the moment and make their customers feel cared for and important.

Indeed, their actions indicated that they believed the important challenges were getting the snow cleared and trying to fly more planes in spite of the weather. In fact, the important challenges were thinking of ways keep customers feeling well-cared for, providing customers with nourishment and sleeping arrangements, keeping the channels of communication open and friendly, and keeping spirits up. However, no one at the airline took such creative action or thought up such innovative challenges. *Nobody knew a common procedure for turning a crisis into an opportunity.*

In this example, all the knowledge that was needed was available but a lack of innovative thinking skill on the part of the entire airline, top to bottom, made the knowledge useless. Thinking up innovative challenges and seeing the big picture is one of the most important parts of the innovative thinking process, a learnable process which converts mere information into creative action. There is such a learnable creative thinking and problem solving process.

THE THREE PHASES OF THE CREATIVE PROCESS

People in successful, adaptable organizations think creatively and make valuable changes deliberately. They use a three-phase, creative decision making process that enables them to continuously anticipate and find new problems (new inputs), develop new solutions and implement those solutions (new outputs) (Basadur, Graen & Green, 1982). Creativity in organizations can be defined as an ongoing cyclical process of problem finding, problem solving and solution implementation (Basadur, 1992). *Problem finding* means continuously finding new "problems" to address. Problems can be current or future internal or external changes, trends, challenges and opportunities for improvement and innovation, as well as things that are going wrong. Problem finding includes identifying new product or service opportunities by anticipating new customer needs. It includes discovering opportunities for improving existing products, services, procedures and processes, and for improving the satisfaction and well-being of the organizational members. It also means redefining seemingly insoluble problems in new ways. *Problem-solving* means developing new and useful solutions to problems found. *Solution implementation* means making new solutions succeed. Implementation usually leads to more new problem finding activity, hence the cyclical nature of the process. Thus, creativity in organizations is a process of continuous improvement, discovery and deliberate change – a continuous finding and solving of problems and implementation of new solutions – and turning unexpected crises into opportunities.

THE EIGHT-STEPS OF THE CREATIVE PROCESS AND THE FOUR CRITICAL THINKING SKILLS THAT MAKE IT WORK

This cyclical process in turn consists of eight steps as follows: 1) problem finding (anticipating future problems and seeking out current problems); 2) fact finding; 3) problem defining; 4) generating potential solutions; 5) evaluating potential solutions; 6) action

planning; 7) gaining acceptance; and 8) taking action. The entire process, called Simplex (Basadur, 1981), is circular and continuous: each action taken to implement a new solution automatically leads to new problems, changes and opportunities for a new round of creativity. Basadur (1995a; 1997) described how Simplex field research, practical experience and theory evolved from the basic Osborn-Parnes 5-step linear Creative Problem Solving Process (Parnes, Noller & Biondi, 1977).

Within each of the eight steps of the dynamic, circular creative process, individuals and organizations must apply specific attitudinal and thinking skills called "process skills". Active divergence, active convergence and deferral of judgment are process skills used *within* each of the eight steps of the creative process. A fourth process skill, called vertical deferral of judgment, is applied *between* the steps of the process. Figure 2 shows the four process skills which are further described next.

- Active divergence
- Active convergence
- Deferral of judgment
- Vertical deferral of judgment

Figure 2. The Four Critical Creative Process Skills

A. Active divergence

Active divergence enables individuals and groups to generate options without judging or analyzing them. Using this process skill, they continually seek new opportunities for change and improvement; view ambiguous situations as desirable; seek potential relationships beyond the known facts; show awareness of gaps in experience; recognize the importance of discovering the right questions before seeking the right answers; and seek additional, potential solutions to problems and seek additional factors to evaluate solutions and to create successful plans for implementation and for gaining acceptance. An important aspect of active divergence is the concept of extended effort, which means striving to generate as many options as possible and avoiding the tendency to stop with the early options that first come to mind (Gordon, 1956; Osborn, 1963). Parnes and Meadow (1959) and Parnes (1961) conducted laboratory experiments which showed that extending effort provides significantly more good ideas in a given time period. Basadur and Thompson (1986) did field research which confirmed the usefulness of extended effort on real world managerial and technical problems for individuals and groups.

B. Active convergence

Within each step, active convergence then allows individuals or groups to select options

to take to the next step. Using this process skill, they take reasonable risks to proceed on less-than-perfect options and drive each step and the process as a whole through to completion.

C. Deferral of judgment

Within each step, deferral of judgment separates divergent thinking and convergent thinking. By enabling individuals and groups to resist the tendency to prematurely evaluate and select options, this skill encourages active divergence. Skill in deferring judgment manifests itself in an open-minded attitude to new opportunities and facts; and a willingness to find alternative ways to define a problem, and to try unusual approaches to solve the problem and to implement the solution.

D. Vertical deferral of judgment

A fourth process skill, called vertical deferral of judgment, allows the individual or group to proceed systematically through the eight steps or the three phases of the creative process, instead of leapfrogging among phases or becoming bogged down in a particular step. Vertical deferral of judgment helps individuals resist the tendency to leap directly to their preferred phase or step of the creative process. This process skill enables them to understand the difference between a "fuzzy" situation and a well-defined problem; distinguish between defining and solving a problem; unearth pertinent facts before defining a problem; recognize that imperfect solutions are merely the starting point for another round of the creative process; recognize that team members prefer different parts of the creative process; and avoid leaping to action upon discovering a problem.

Basadur, Graen and Green (1982) showed that these process skills can be learned and deliberately developed. They identified a two-step mini-process called "*ideation-evaluation*" in which active divergence (ideation) and active convergence (evaluation) occur sequentially, separated by deferral of judgment. The two-step ideation-evaluation mini-process must be executed skillfully within each step of the Simplex process, and from step to step throughout the process. Figure 3 displays the eight steps within the Simplex complete creative process, beginning with problem finding and flowing through with action, with diverging and converging thinking skills in each step. In Figure 3, the two-step mini-process is represented by the "diamond" shape in each of the eight steps as the process flows clockwise. Mastering these skills enables individuals or groups to adapt the application of the process and to use the steps in different sequences as situations require. The dashed lines separating the steps attempt to indicate this flexibility. Synchronizing these skills is especially vital for group members attempting to work creatively together. They need to know which step of the process they are in and whether they (the team as a whole or individual members) are diverging or converging at any point in time in their deliberations.

Basadur and Finkbeiner (1985) identified specific attitudes that *enhance* these four process skills and suggested that, unless the two-step ideation-evaluation mini-process is *accepted* attitudinally, then the process will not likely occur. Thus, the process skills have both attitudinal and behavioral components. Basadur and Finkbeiner established a 14-item

questionnaire to measure two specific attitudes that make up the acceptance of ideation-evaluation: the preference for ideation (active divergence) and the tendency to (not) evaluate prematurely (preference for deferral of judgment). They suggested that these two attitudes enhance and encourage the practice of the two related behavioral skills.

Basadur, Graen and Green (1982) and Basadur (1979; 1994b) reported research that indicated that one's preference for and skill in applying the ideation-evaluation mini-

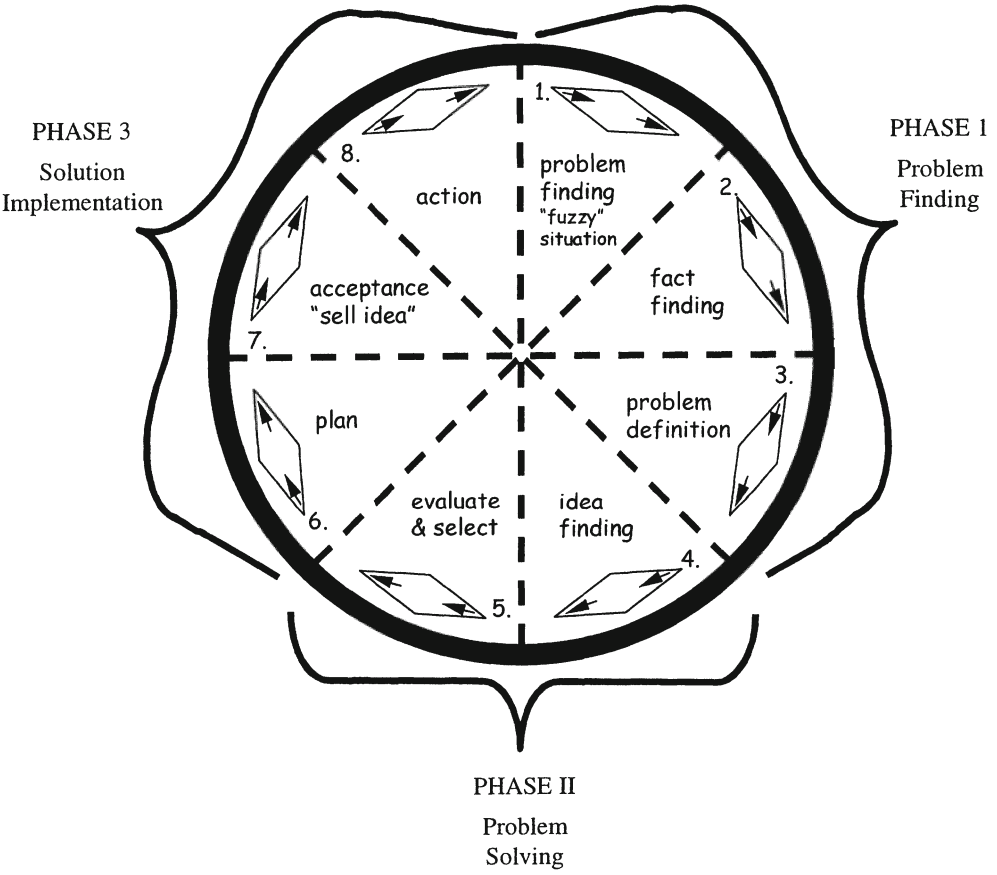


Figure 3. How the Three Phases Correspond to the Eight Steps of the Simplex Creative Process

process might differ in each of the three phases of the Simplex process. For example, someone might be more inclined to defer judgment and actively diverge more in the solution-finding phase than in the problem-finding phase, or vice versa. Basadur (1995b) provided evidence that there might be different optimal ratios of active divergence and active convergence in each of the phases for different fields of endeavor.

Skills, behaviors and attitudes are needed to make the process work

Basadur, Graen and Green (1982) tested the effects of the Simplex process in an applied setting. They expected that the training would improve five variables: (1) acceptance of the ideation-evaluation thinking mini-process; (2) deliberate practice of the ideation-evaluation thinking mini-process; (3) problem-finding performance; (4) problem-solving performance; and (5) solution implementation performance. Basadur et al suggested that the first two variables, which are attitudinal and behavioral, were necessary antecedents of the latter three performance variables. Unless a positive change in attitudes and behaviors occurred – motivating participants to deliberately separate and apply divergent and convergent thinking – training would not improve performance.

This belief was based on Basadur's (1979; 1994b) analysis of previous laboratory and field experiments, most of which had focused on testing the brainstorming technique. None of the brainstorming research had attempted to measure to what extent the subjects *accepted* the value of and *employed* any *skills* in ideation-evaluation. Participants said they *understand* brainstorming rules, but this is entirely different from *using* the brainstorming rules skillfully on real-world problems. Training in innovative thinking must be of sufficient quality, impact, and duration to effect *real* improvements in acceptance of the skill of ideation-evaluation and of the skill itself. This distinction explains several laboratory experiments in which interacting groups receiving brainstorming instructions did not perform as well as a collection of individuals receiving the same instructions but working alone (Bouchard, 1972; Bouchard & Hare, 1977; Dunnette, Campbell & Jaastad, 1963; Shaw, 1971; Taylor, Berry & Block, 1958). Unskilled group members would likely not only inhibit each other from attempting to apply the brainstorming rules but also dysfunctionally interfere with one another by mixing convergent and divergent thinking. Cohen, Whitmeyer and Funk (1960) showed that skilled groups outperform unskilled groups in creative thinking.

Measuring the needed skills, attitudes and behaviors

Basadur et al (1982) also systematically measured for the first time the impact of innovative thinking training on individuals both immediately after training and after their return to work. Their expectations are consistent with Kraut's (1976) traditional industrial/organizational psychology training model: training must go beyond *understanding* to change *attitudes* and to change *behaviors* in order to achieve superior *results*. The results of Basadur et al's research supported this line of thinking. Compared to a control group, the experimental training group achieved significant increases in the acceptance and practice of ideation-evaluation and significant increases in the performance variables measured.

Basadur et al extended the research to problem *finding* and solution *implementation* as well as *problem solving*. Their results suggested that, compared to simple brainstorming, a complete process such as Simplex was more useful and more credible for participants (Basadur, 1997; Basadur, Graen, & Scandura, 1986). Basadur, Wakabayashi, and Graen's (1990) field experiment supported the positive impact of building skills through hands-on practice using real problems in increasing the acceptance of creativity training among managers. Runco and Basadur (1993) supported these findings, showing that practicing

managers improved their real world performance in evaluating options and increased their acceptance and practice of ideation-evaluation after training in Simplex. Basadur and Robinson (1993) attributed the failure of so many new management techniques (ironically labelled "flavors of the month") to the lack of real improvement in skills.

HOW THE SIMPLEX PROCESS AND ITS FOUR CRITICAL THINKING SKILLS WORK

The following section describes the Simplex process as a whole and provides specific real world application examples experienced by the author. Indeed, the process was developed as much by such real world application experience and field research in organizations as by theory (Basadur 1974; 1979; 1981; 1982; 1983; 1992; 1995a; b).

A. Problem finding (Phase 1)

1. Problem finding (Step 1)

Problem finding consists of sensing and anticipating problems, changes and opportunities for improvement within and outside of the organization. The result: a continuous flow of inputs, in the form of new problems to solve, changes to address and capitalize upon, and opportunities for improvement.

A skilled problem finder takes initiative, anticipates and senses problems, and welcomes change as an opportunity to improve or gain competitive advantage. Their attitude of "constructive discontent" makes problem finders desire continuous improvement and adaptation and enables them to tolerate ambiguity and to address vague, unstructured, "fuzzy" situations. Rather than merely react to problems, they seek them out. They also view unexpected crises as positive opportunities to begin innovative thinking rather than as negative roadblocks.

Within the problem-finding step, individuals and groups continuously defer convergence and actively diverge to collect a wide variety of potentially relevant problems, changes and opportunities. Only then do they converge on a selected number for further exploration. Problem finders view even those selected problems as ambiguous, fuzzy situations.

Step 1 example: Trusting myself and my colleagues

One recurring pattern in organizations is the inability to trust oneself and one's colleagues. This results in no one wanting to ask for help or to surface organizational or interdepartmental problems needing solving. (These are called problems that fall "between the cracks".) Some thoughts that run through employees' heads are:

- "I fear asking for help as it might be seen as incompetence."
- "I don't dare mention my real problem before my fellow managers. That would be displaying weakness."
- "I don't think the group's members trust one another enough to share what is really going on."

• "This isn't really my problem, so why risk bringing it up?"

This pattern of behavior was illustrated vividly when a manufacturer's top management team once asked me to demonstrate how the eight step innovative thinking process (Figure 3) works. I told them the best way to learn was to apply the process to the team's own problems and they agreed. When we began work, we started with the first step in the process – generating and surfacing problems and anticipating, seeking and sharing opportunities for improvement. To my surprise, the team members were reluctant to risk exposing themselves to negative judgments about their handling of the problem to date. They preferred to say nothing. There was obviously no process in this company for surfacing organizational problems, that is, performing step 1 of the Simplex process.

2. Fact finding (Step 2)

During fact finding, the individual or group first defers judgment in order to gather potentially relevant information about a selected problem, change or opportunity. They then evaluate and select the particular facts most likely to be useful in developing fruitful problem definitions during the next step of the process. While diverging within fact finding, the individual or group defers evaluation and analysis, and accepts all points of view or versions of the facts. Establishing what is not known is as important as learning what is known or thought to be known. Only later during convergence does the individual or group choose the most relevant and potentially worthwhile facts.

A skilled fact finder avoids unwarranted assumptions, examines a situation from a wide variety of viewpoints, listens well to other versions of the facts and accepts those versions, extends effort to dig out further information, and asks fact-finding questions in simple ways designed to increase understanding. The fact finder can then converge upon a few key facts for further development.

Step 2 example: In too big a hurry (to get the facts)

Procter & Gamble's fledgling Industrial Division had decided to go after a developing market for automatic car wash products in the early 1970s. In our product development department, a small team of chemists and engineers was rushing to fill out our existing product line. My boss asked me to take over the car wash section to speed up our product development efforts, especially in a floundering "hot wax" project.

Fortunately for me, I could hardly spell hot wax, let alone profess to be an expert on the product. I rarely took my own car through an automatic wash; as a young engineer, I saved money by washing my car by hand. Why "fortunately"? Because I knew nothing about hot wax, I was free to display my ignorance, keep an open mind, and ask lots of questions to try to get a handle on what needed to be done and why the project had bogged down. Thus, my first question was a very simple one: "What's hot wax?"

The team explained that hot wax was a relatively new but potentially profitable idea: a liquid spray applied as an optional service at the end of an automatic car wash. Automatic washes dispense all their products in water-soluble form and, of course, wax doesn't dissolve in water. However, a small competing company had found a way to combine wax from the South American carnauba tree with certain solubilizing ingredients and water,

yielding a stable fluid that could be sprayed onto cars. The competitor had received a patent for its product.

Our team had spent 12 months trying to come up with a combination of carnauba wax, solubilizers and water sufficiently different from the competitor's to avoid violating its patent. When asked how well the competitor's product performed, team members replied that the product was a hot seller so it was obviously doing a good job. However, no tests had actually been done because the team had been in such a headlong rush to enter the market.

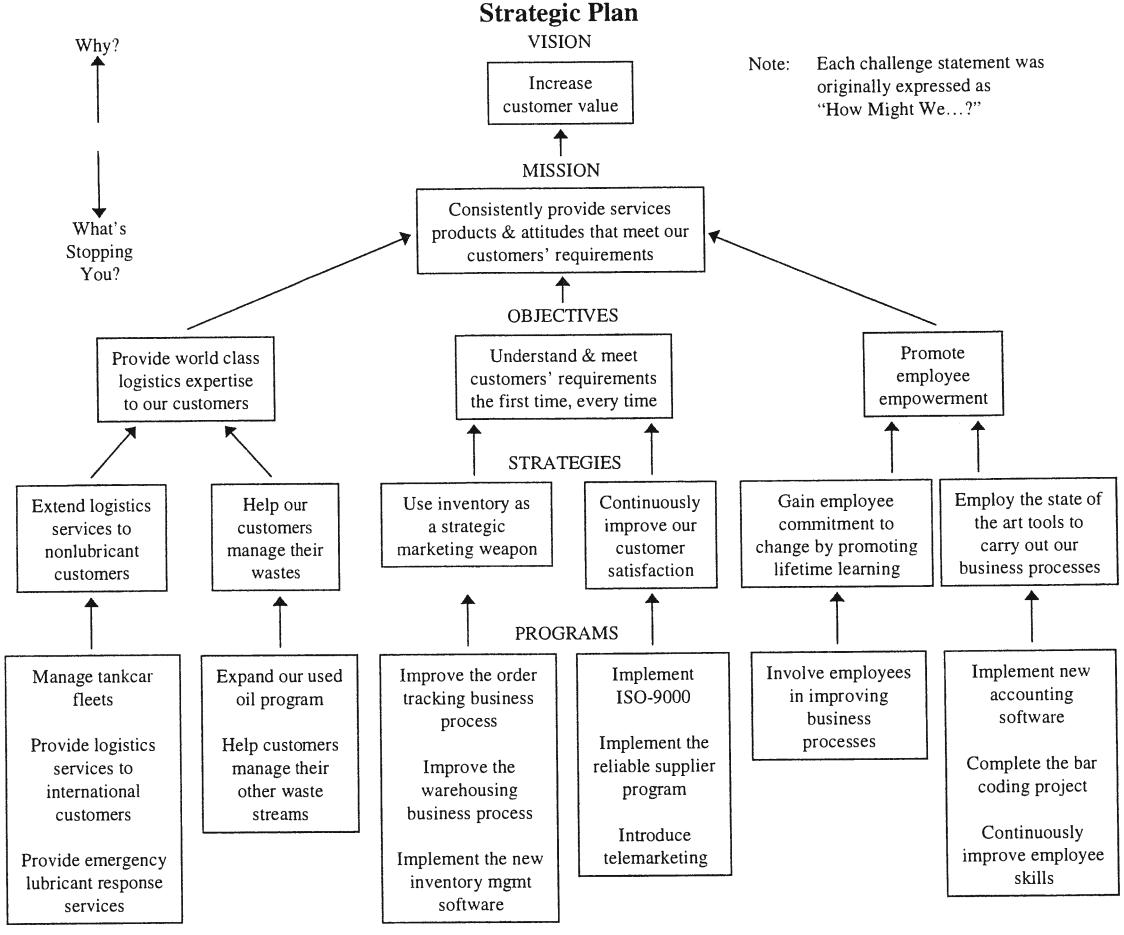
When we tested the competitor's product during lab simulations and in automatic car washes, we found no evidence that it adhered to car bodies. Our team had been trying for 12 months to duplicate a product that didn't work! By redefining the problem, we ended up discovering a totally different active ingredient that helped us create a totally different formula which proved a useful benefit to car surfaces. We not only avoided patent difficulties but were awarded a new patent of our own.

3. Problem definition (Step 3)

During problem definition, the individual or group first uses active divergence to convert the key facts selected during the preceding step into a variety of creative challenges, or problem definitions, then selects one or a few most promising problem definitions. Here, they create a direction for solving the problem. Persons skilled in problem defining create a wide variety of insightful challenges from a few key facts. They can broaden or narrow the problem. They can break down large problems into smaller components and, at the same time, can see how those parts fit into the bigger picture. They can defer convergence to develop new ways of formulating the problem until they find a clearly superior problem definition.

Basadur, Ellspermann and Evans (1994) said that this step requires skill in asking the right question, which will then be answered during the next step of the process. They fully described a special process called challenge mapping, in which problem definitions are first framed as challenges, using the question: "How might we...?" This is probably the single most important question in the Simplex process, as it provides a way around the numerous roadblocks that an individual or group will encounter in attempting to develop solutions to problems. Then these challenges are further developed and new challenges are created, using a special method of divergent thinking called the "why-what's stopping" analysis. By mapping challenges to depict the interrelationships among them, this method helps the individual or group to discover breakthrough challenges. The method involves a three-step process: asking "why" or "what's stopping" of a particular challenge; phrasing the answer in a simple, complete sentence; and creating a new challenge based on the answer. Asking these two questions repeatedly ("why else?"; "what else is stopping?") further broadens or narrows the problem's scope. This challenge mapping process yields a visual hierarchy of interrelated challenges that shows both the big picture and its components, as in Figure 4.

Figure 4
A Sample of Challenge Mapping™



Step 3 example: Redefining the problem

Still at Procter & Gamble, I was asked for help by a product development team also formed at short notice to respond to a competitor's new product. Colgate's green-striped Irish Spring had been the first striped soap bar introduced to North America. With its aggressive advertising campaign emphasizing "refreshment," Colgate's new product was finding ready consumer acceptance.

Procter & Gamble worked by the rule that, if we were the second entrant into a new market, we had to demonstrate a product's competitive advantage before we could carry out a market test. However, the team reported that it had been unable to produce a green-striped bar that worked better than Irish Spring in a consumer preference blind test. It was obvious that the team had chosen, probably unconsciously, to define its challenge as, "How might we make a green-striped bar that consumers will prefer over Irish Spring?"

During a creative problem solving meeting, we applied the "why - what's stopping?" analysis to help develop alternative ways to conceptualize our challenge. The flash of inspiration came from an answer posed from a consumer's point of view: "We want to make a bar that makes people feel more refreshed." This led us to the new challenge: "How might we better connote refreshment in a soap bar?"

This less restrictive challenge, which included no mention of green stripes, gave us more room for creative solutions. We broke this problem into three separate components – "How might we better connote refreshment in appearance, shape and odor?" – and then focused our imaginations on solutions (step 4 in the Simplex process). Beginning with the product's appearance, the team members visualized scenes, images and situations that suggested refreshment: the sea coast, a beach, looking at a blue sky and white clouds. Later, when the team sat back to evaluate its many solutions, these two ideas were selected and combined. The result was a blue- and white-swirled bar with a unique odor and shape. The product quickly achieved market success under the brand name Coast. Solving this problem once it had been properly defined took the team mere hours. By leaping prematurely into solutions, the team had wasted almost six months.

Successful teams and individuals are not necessarily the "smartest" or most "gifted" or the "best" problem solvers. More often, they're the ones that take the time to ask good questions and find exciting ways to define their problem before looking for solutions. They invest sufficient time and energy in creating fresh, creative definitions of the problem on which they can agree.

B. Problem solving (Phase 2)

1. Idea finding (Step 4)

During idea finding, the individual or group practices deferral of judgment while actively creating many potential solutions to the selected challenges. They then select the most fruitful potential solutions for subsequent evaluation. Skilled idea finders use imagination to create many possible solutions – including seemingly radical or even impossible ideas that can be developed into more workable yet novel solutions. Rather than stop with the first good idea, they assume that even better ideas await. They are also skilled in selecting a few potential solutions for closer scrutiny during the next step of the process.

Step 4 example: Breaking through patent barriers

After solving the refreshment bar problem, we still weren't finished. We had to conduct another round of innovative problem solving. Before we could sell the new soap formula, we had to overcome a patent problem in the machinery design. There were already no fewer than six worldwide patents restricting how you could blend blue and white soap pastes. We had to find a machine design in order to make our product without infringing on anybody else's technique.

We assembled diverse points of view in a small technical team of engineers, technicians, lawyers and even a few people who were unfamiliar with this technology. After the team had spent some time in fact finding, including discussing sketches of the patented processes, a breakthrough solution soon came from a simple observation by the team member with the least technical knowledge and education. This person noted a small detail that the others had completely overlooked in their search for more complicated solutions. The lesson: it's important to value the input of each member of a team, no matter their level of experience. Sometimes the best ideas come from people unencumbered by "too much" knowledge, people who can ask the simple questions that the so-called experts overlook.

2. Evaluate and select (Step 5)

Evaluation and selection involves open-minded generation of many criteria that might help the individual or organization make an unbiased, accurate evaluation of the potential solutions developed in the preceding step. The individual or group then selects and applies the most significant of these criteria to decide which potential solutions might be implemented during the next stage of the process. Skillful evaluators avoid leaping to conclusions based on a single, simple criterion. They can turn flawed ideas into workable solutions.

Step 5 example: Evaluating with an open mind

A grocery products company was looking for a way to help consumers better handle their household trash. The company felt it could improve upon the polyethylene bags that most people used. A product development team was assigned to the challenge: "How might we improve the handling of household trash?"

One of several interesting and imaginative solutions that I had helped the team develop was a cardboard product that resembled a pizza box. Pushing its top made the box telescope into a free-standing trash container with several polyethylene bags nested inside it. This stand-alone device eliminated many of the disadvantages of single polyethylene bags. It hid the trash beneath a hinged cardboard top, and was convenient and decorative to boot. When one of the bags was filled, you simply pulled a cord to tie its top and took it out of the box, leaving the next bag ready to use. The team members appeared excited about this idea's possibilities. Before leaving the team for another assignment, I made a mental note to follow up later on its progress.

To my surprise, when I checked back with the team members, they told me they had

dropped the idea. It had been evaluated through a standard company screening technique for new product ideas. Instead of designing a prototype and conducting field-tests, the consumer research department had written a single-paragraph description of the idea, including the fact that the new product would probably add about 10 cents to the cost of each bag. Asked for comments, consumers indicated the product sounded like a good idea but they would balk at paying the 10-cent premium for it. Without further consideration, the group had abandoned the idea.

I was disappointed that, after putting so much effort into generating ideas, the group had put so little emphasis on the evaluation process. Given the chance to experience the advantages rather than just read about them, consumers might have responded quite differently.

In retrospect, I felt that the team members had been almost afraid of the idea, and had been relieved to find a reason not to proceed with it. Here, creative problem solving had been used to come up with a unique product solution, only to have untested assumptions and lack of imagination kill the product before it ever got a real test. This story demonstrates the importance of keeping an open mind both in developing new ideas and in evaluating them.

C. Solution implementation (Phase 3)

1. Action planning (Step 6)

Having developed a good solution, the individual or group then enters the implementation stage, in which they exercise skills in preparing and implementing the solution. Implementing a solution carries its attendant anxieties. In effect, people are being asked to enter the unknown, which causes discomfort because of a lack of familiarity and a fear of failure. It requires creativity to gain support for risking change, to build commitment for entering the unknown, to adapt the solution to specific circumstances, and to ensure the necessary follow-up to cement the new change. During action planning, the individual or group develops specific action steps that will lead to successful implementation of the new solution. They first generate actions, then select the specific actions.

Step 6 example: Almost losing it at the last minute.

A large marketing company's senior managers devoted a full day off-site to identify its critical strategic and tactical challenges and then figure out how to finish the fiscal year "in the black" for the first time in three years. The original pioneer in its field, the company had generated excellent sales and profits in its earlier years, but now was bogging down due to stiff competition and a lack of attention to managing its costs and operating efficiently. After considerable problem definition work, the group unanimously selected "how might we increase cash flow immediately" as their most important challenge and began generating solution ideas. After evaluation, five very simple and specific solutions were selected for implementation. These included straightforward actions such as making a list and personally calling all customers owing the company substantial sums of money and offering an incentive to pay right away. All that remained now was to specify a simple action plan to implement these excellent solutions in the final 90 minutes of the day.

Under the facilitator's guidance, the group quickly diverged a list of simple, specific steps it could take to begin implementing their solutions. However, when it came time to converge upon the very best and assign names and dates to them, some of the members began to lose focus and visibly back away from this task. They shifted instead into a divergent mode, creating more solution ideas and offering alternative suggestions. It was only with the greatest difficulty that the facilitator induced the whole group to focus on a workable action plan to implement the selected solutions and avoid leaving the meeting empty handed. With the plan finally in place, the team was able to immediately begin implementing the solutions, and at year end (six months later) the company reported a substantial profit.

2. Gaining acceptance (Step 7)

The step of gaining acceptance recognizes that the best-laid plans can be scuttled by resistance to change. The best way to reduce this resistance is to begin involving people whose commitment is needed early in the process, about step 1 or 2. As they become part of the problem definition and the solution, the need for a separate gaining acceptance step disappears. However, this step is included in the Simplex process model to recognize its importance and to involve any individuals who were not able to be involved early in the process, for whatever reason.

Coch and French (1948) pointed out the importance of developing ownership of a new idea in order to win its acceptance. People will more likely accept change if they understand its benefits and if they see how attendant problems can be minimized. During this step, the individual or group generates ways to create ownership, explain the benefits and address objections. They then apply judgment to choose the best approach to gaining acceptance.

Step 7 example: Getting bogged down

Interfunctional teams formed to tackle a common problem often bog down in implementing good solutions for various reasons. Suppose a team gathers years' worth of test results to justify adopting a brilliant new method for shipping goods, but varying conditions make it difficult to obtain conclusive data. Even after it becomes obvious that the team will never amass all available critical data, it continues its investigations. The team finally realizes that its main problem is not how to collect more information, but how to face up to its fear of having to gain acceptance from top management for its recommendation with less than conclusive data.

Some thoughts running through team members' heads might include:

- "We have taken the problem as far as we can, but will senior management be happy with our results?"
- "How might we get senior management to share the risk with us?"

Good ideas often languish because people think they have to perfect their ideas before they can put forth recommendations or try winning acceptance for them. In this case, the team overcame its reluctance, and put forward a simple recommendation that summarized and weighed the benefits of moving ahead against the cost of continuing to wait for complete proof (which would never come). Top management accepted the recommendation

immediately.

2. Taking action (Step 8)

Carrying out action steps is an integral part of the creative process. At the organizational level, the result is a continuous flow of outputs in the form of products, services and processes to interact with the changing environment. Having carefully considered the specific steps in an action plan, the individual or group must still carry them out. It is at this step that individuals and teams often become mired in detail and in reasons for not taking action. Among these reasons:

- Tice and Baumeister (1997) noted that procrastination makes it difficult to take action even when the next step is obvious;
- the action plan might be too vague, complicated, difficult, distasteful or insufficiently challenging;
- fear of the unknown;
- fear of failure (and the stigma attached to failure);
- fear of implementing an insufficient or imperfect solution (compounded by a myth that answers to problems must be right or wrong);
- inability to say no to less important but easier tasks.

Lakein (1973) described techniques for overcoming hurdles to taking action, including the following:

- Start with even the most trivial step.
- Make action plans extremely simple, specific and challenging, yet realistic.
- Start with the least desirable step.
- Face fear of the unknown by writing down the worst that could happen, then creating ideas for coping.
- Address fear of failure by sharing the action plan with others and by developing strategies to minimize discomfort or even to turn failure to advantage.
- Learn to say no to distractions.
- Set written deadlines and share those commitments with others. Promise simple but significant rewards for meeting those deadlines.

Step 8 example: Wanting a new management style, but ...

In the Step 1 example above, the manufacturer's top management team finally was able to select an important and mutually agreed upon recurring problem. With tension now reduced, the fact finding and problem definition steps went very well and an excellent solution emerged that was simple and novel, and a simple action plan emerged. But as we moved to implement this plan, some members began to back away from it because they realized that non-management employees would be participating in developing and implementing the solution. They were actually afraid of straying into unfamiliar territory and would prefer the relative safety of the team's admittedly poor but more customary approach of leaving the problem unsolved.

Some thoughts that probably were running through these managers' heads were: • "I want employee involvement. But if I allow too much leeway for self-management and

creativity, I don't know where employees will take it."
• "Deep down, we fear getting involved. We fear the unknown. We might not be ready for more innovation."

The leader of the top team understood the fears and reluctance of the members and worked behind the scenes to coach them to final implementation. Many people would rather stay with the way things have always been done rather than take the risk of trying something new. But they can break through this fear with encouragement and the support of top management, and with practice.

INDIVIDUAL STYLES IN THE CREATIVE PROCESS

A good way to increase understanding of the eight step Simplex creative process above is to experience the Basadur Creative Problem Solving Profile (CPSP) inventory. Basadur, Graen and Wakabayashi (1990) published this instrument as a method of learning the circular eight step process and also as a method of learning one's own relative preferences for different parts of the process. They included reliability and validity data. Later, Basadur, Wakabayashi and Graen (1990), Runco and Basadur (1993), and Basadur (1995b; 1998a; 1998b) published extensive additional field reliability and validity field research on the CPSP.

THE TWO DIMENSIONS OF THE CREATIVE PROCESS: DIFFERENT WAYS OF GAINING KNOWLEDGE AND USING KNOWLEDGE

One basic idea behind the CPSP is that creativity can be understood as a function of knowledge, imagination and evaluation. Parnes, Noller and Biondi (1977) provided this idea in equation form: C = K H I H E.

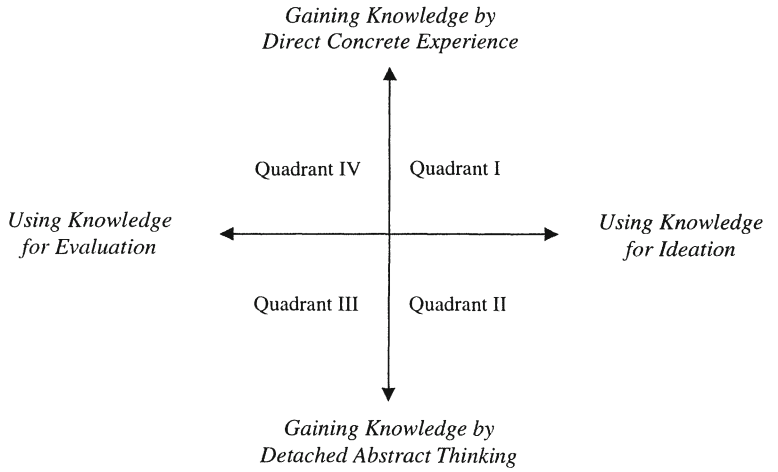


Figure 5. Differences in Gaining and Using Knowledge that Cause Differences in Creative Process Profiles

A second basic idea is that different individuals have different ways of gaining and using knowledge and therefore have different styles of using the creative process. As shown in Figure 5, one way of learning is by direct, concrete experiencing (doing). Some people prefer to gain understanding by such "physical processing". An opposite way of learning is through detached, abstract thinking (pondering). Some people prefer to gain understanding by such "mental processing". All individuals gain knowledge and understanding in both ways but the relative amounts of each differ from person to person.

Also as shown in Figure 5, one way of *using* knowledge is for *creating* options (ideation or active divergence). Another way to use knowledge is for *evaluating* options (evaluation or active convergence). Again, all individuals use their knowledge in both ways but the relative amounts of each differ from person to person.

The Simplex 8-step process can be divided into four stages or quadrants. Each stage of the process reflects a unique combination of one of two different ways of *gaining* knowledge and one of two ways of *using* knowledge. The creative process requires four distinctly different thinking styles represented by these four special combinations of how knowledge is gained and used.

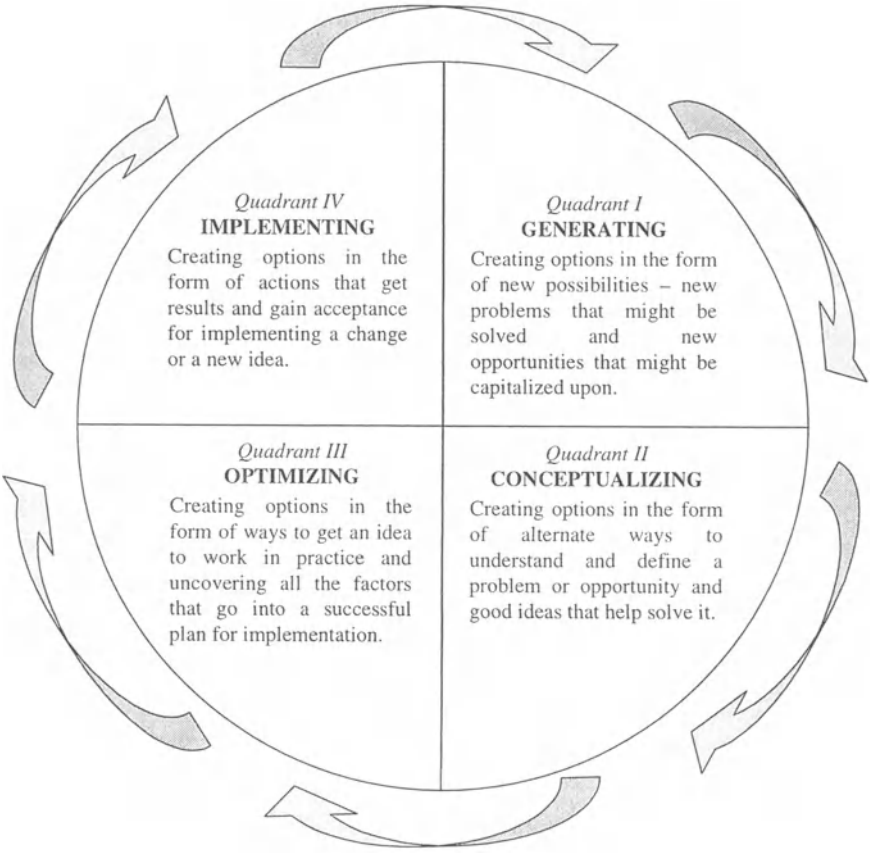


Figure 6. The Four Stages of the Innovative Process

The four stages or styles (Figure 6) are generating, conceptualizing, optimizing, and implementing.Following is a brief description of each stage or style. For a more complete description, refer to Basadur, Graen and Wakabayashi (1990) and the other references above.

FOUR DIFFERENT CREATIVE PROCESS STYLES OR STAGES

STAGE 1: GENERATING

Generating involves creating options in the form of new possibilities – new problems that might be solved and new opportunities that might be capitalized upon. Thinking in this quadrant includes *problem finding and fact finding*, the first two steps in Simplex, and begins the innovative process.

STAGE 2: CONCEPTUALIZING

Conceptualizing involves creating options in the form of alternate ways to understand and define a problem or opportunity and good ideas that help solve it. Thinking in this quadrant includes *problem defining and idea finding*, the third and fourth steps in Simplex, and keeps the innovative process moving.

STAGE 3: OPTIMIZING

Optimizing moves the innovative process further and involves creating options in the form of ways to get an idea to work in practice and uncovering all the factors that go into a successful plan for implementation. Thinking in this quadrant includes *idea evaluation and selection*, the fifth and sixth steps in the Simplex process, and action planning.

STAGE 4: IMPLEMENTING

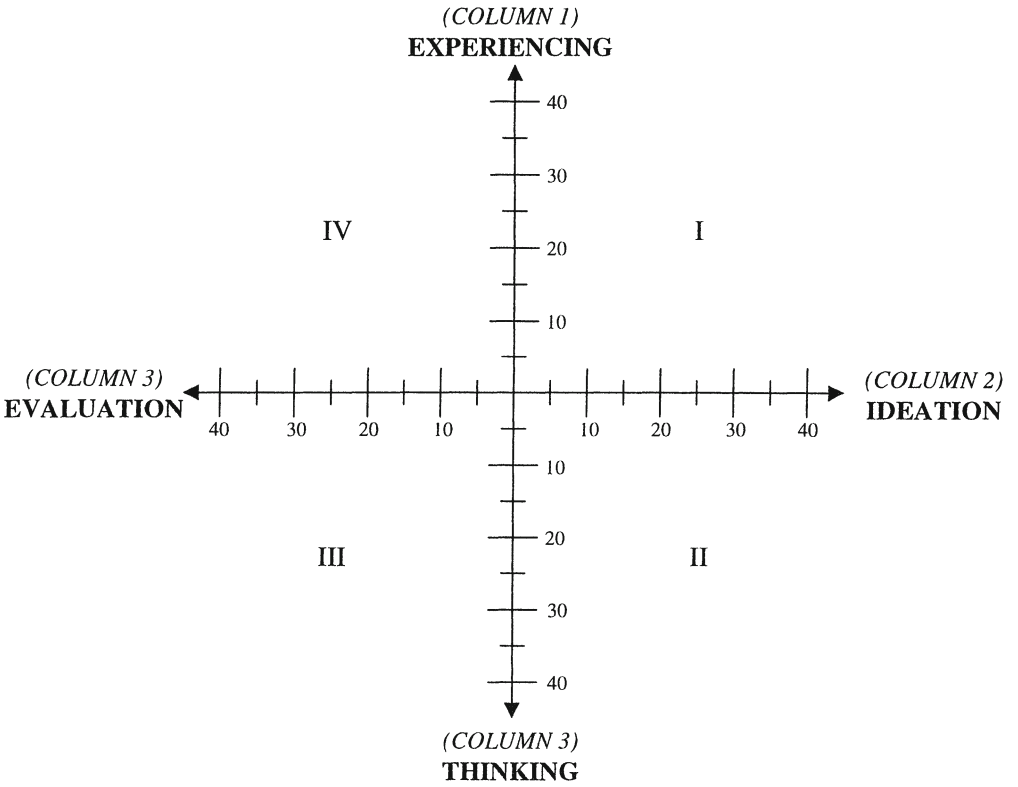
Implementing completes the innovative process cycle, and involves creating options in the form of actions that get results and gain acceptance for implementing a change or a new idea. Thinking in this quadrant includes *gaining acceptance and implementing*, the final two steps in the Simplex process.

THE FOUR STAGES AS A FLOW

Briefly, the innovation process as modeled in Figure 6 works as follows. Generating ideas for new products, services and methods and internal improvements must start somewhere. Individuals inclined toward generating are continually scanning the environment, picking up data and cues from customers, suppliers and others, and suggesting possible opportunities for change and improvement. Thus, the generator stage is

LEGEND: Column 1 scores indicate the orientation to getting knowledge by Experiencing. (Direct personal involvement).
Column 2 scores indicate the orientation in using knowledge by Ideation. (The generation of ideas without judgment).
Column 3 scores indicate the orientation toward getting knowledge by Thinking. (Detached abstract theorizing).
Column 4 scores indicate the orientation toward using knowledge for Evaluation. (The application of judgment to ideas).

Post your total scores for each column on the appropriate axis below.



To develop your personal creative process profile, simply connect the 4 points in sequence with 4 curved lines to make a distorted or "warped circle accordingly. (If you have identical column scores, you will have a perfect circle. This is unlikely.) The quadrant in which your profile is most dominant indicates your strongest orientation. The other quadrants represent secondary styles accordingly. Your profile is your own unique blend of the four quadrants.

Figure 7. CPSP Profile Graph

where new information and possibilities are raised as starting points for new projects. People who tend to have dominant conceptualizer styles lead the pulling together of the facts and idea fragments from the generator phase into well-defined, insightful problems and challenges and more clearly developed ideas and projects worth further evaluation. Good conceptualizers give sound structure to fledgling ideas and opportunities. People with optimizer preferences usually lead in taking these well-defined ideas and finding a practical best solution and detailing efficient plans for proceeding. Finally, those who enjoy the implementation phase of innovation will lead in carrying forward the practical solutions and plans to implement them. This includes convincing colleagues or customers of the worth of the changes, and adapting the solutions and plans to make them fit real-life situations and conditions.

The CPSP permits an individual's unique preference approach to applying the Simplex creative process to be identified. In order to better understand these orientations and to determine their own preferences, individuals complete a creative problem solving process inventory then plot their scores on each of the four dimensions of the graph in Figure 7. By connecting the four points on the four axes of the graph with four curved lines, one creates one's own unique blend of the four quadrants to determine their unique creative process profile.

CREATIVE PROCESS PROFILES

One's creative process profile will likely be skewed toward particular quadrants to reflect the individual's peculiar blend of styles. The largest of the four quadrants indicates the strongest orientation. The others represent supporting orientations. Figure 8 shows how individual differences in orientation can yield different creative process profiles, and illustrates different profiles in which there is more than one substantial style represented. Each of these styles reflects individual ways of gaining and using knowledge.

BLENDS OF STYLES IN INDIVIDUALS AND ORGANIZATIONS

All individuals, teams, and organizations can be characterized by their peculiar blends of these four distinct orientations or styles. An innovative team requires preferences and strengths in all four stages. Team members must learn to use their differing styles in complementary ways. An individual's, team's, or organization's unique blend may change over time or from one situation to another depending on circumstances. With rapid changes in markets and technologies, for example, some large corporations more recently have had to balance their traditional emphasis on optimizing and implementing with more generating and conceptualizing (Basadur, 1997). Current research on the CPSP includes investigating if optimal blends of styles may exist for teams in various kinds of innovative work.

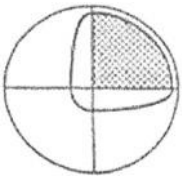
BY INCREASING CREATIVITY ORGANIZATIONS GET TWO FOR THE PRICE OF ONE

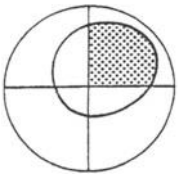
Organizations whose dominant coalitions provide the right skill training, create the right

(All Four Examples Below Have The Generator Style Dominant)

(All Four Profiles Below Have Different Styles Dominant)

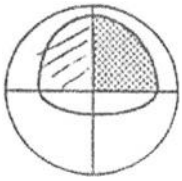
Generator style dominant with all three other quadrants relatively small.

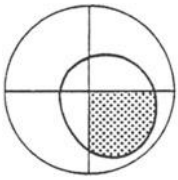




Generator style dominant with all three other styles relatively small.

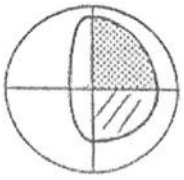
Generator style dominant with Implementer style as strong secondary.

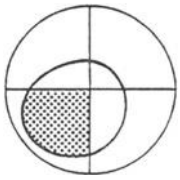




Conceptualizer style dominant with all three other styles relatively small.

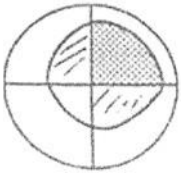
Generator style dominant with Conceptualizer style as strong secondary.

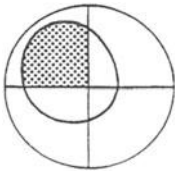




Optimizer style dominant with all three other styles relatively small.

Generator style dominant with Conceptualizer and Implementer as secondary styles of significant and equal strength.





Implementer style dominant with all three other styles relatively small.

Figure 8. Examples of Different Profiles of Creativity Problem Solving with the Same Style Dominant and with Different styles Dominant

infrastructure, and participate in and reward continuous problem finding and solution implementing, achieve several outcomes. Some creativity outcomes are directly economically oriented and others are not. As described earlier in this chapter, creativity leads directly to new and improved products and methods; these are economic outcomes associated with adaptability. However, creativity also leads to specific people outcomes which serve as intermediate steps leading to economic outcomes associated with efficiency (Basadur, 1993). The rest of this chapter will identify these intermediate outcomes, and describe the economic outcomes that result. The first of these people outcomes is motivation.

CREATIVITY FOR MOTIVATION

Creativity as a means for motivation is an important idea. Early animal research and later studies on humans showed that curiosity, activity, and exploration are enjoyed by organisms for their own sake. People develop negative attitudes toward repetitive tasks and experience fatigue and boredom. This suggestion is supported by Herzberg, Mausner, and Snyderman's (1959) research suggesting that challenging jobs are motivating in themselves. Herzberg et al propose that the way to motivate most people is by redesigning and enriching their jobs so that the work itself provides the opportunity for personal growth, challenge, stimulation, learning, and recognition. More recently, Amabile (1993) and Hackman and Oldham (1980) have reported research linking intrinsic motivation and creative work. Neher (1991) although critical of Maslow's motivation theory, supports Maslow's (1954) contention that although lower level motivations can provide important fulfillments and satisfactions, offering people the opportunity to satisfy their higher level needs for self-esteem and for self-actualization through work accomplishment is the best way to motivate them. Encouraging organizational members to use their creativity to seek out work related challenges of their own (problem finding) and achieve them successfully (problem solving and solution implementation) helps satisfy both higher level needs.

McClelland (1951; 1961) identified the need for achievement as a primary driving force for motivating people in organizations. McClelland showed that a high need for achievement is characterized by a strong desire to assume personal responsibility for finding solutions to problems and can be increased by stimulating people to set challenging work goals for themselves. Thus, by giving employees the encouragement and opportunity to find and solve their own challenging problems, and implement their own solutions, organizations can provide intrinsically rewarding work and tap into the need for achievement for motivation.

Problem-finding activity is also the key to other theories of motivation. One is the goal setting theory of Locke and Latham (1990) who showed that when people are given a chance to choose their own goals (problem finding), and the more clear and specific the goals (the problem-definition aspect of problem finding), the more motivated they become to achieve those goals.

SETTING UP THE INTERNAL ENVIRONMENT TO ENCOURAGE CREATIVE WORK

Despite research showing that most people at work are multimotivated, the majority of global business and industry is still organized and managed on the overly simplistic, "scientific management" concept made popular in the early 20th century by Frederick Taylor (1967). Taylor believed that employees are motivated by one dominant factor – money. Fortunately, using creativity as a formula for motivation can be almost as simple as using money. There are many straightforward ways to encourage people to be creative on the job and achieve a motivated organization.

The Japanese Employee Suggestion System (ESS) (Basadur, 1992) is one specific example of how an organization's culture, structure and dominant coalition can be deliberately employed to induce creativity. Employees are trained from the first day that research and development (R&D) is *everybody's* business. Creative activity is deliberately induced - from the beginning, employees are trained to be "constructively discontented" with one's job and with the company products, and to seek out ways to improve them. Employees are encouraged to publicly post problems that they sense or anticipate, and to interact with their coworkers to solve such problems and demonstrate that their solutions are implementable. Suggestions are submitted and automatically accepted; managers are trained to provide positive feedback and praise for every completed suggestion. Typically, small monetary awards are provided for each implemented suggestion.

It is not uncommon for each employee in ESS companies to devise and implement 60 new suggestions per year. For example, in one company of 9,000 employees, 660,000 employee suggestions were implemented in one year. Of these, 6,000 were new products or product improvements.

When the Japanese managers were asked what the primary objective of their employee suggestion system was, none mentioned new products or new methods, lower costs or higher profits. In fact, none of them mentioned any direct economic outcomes. All of them emphatically said that motivated people was the primary objective. Observable benefits include: motivated employees who want to participate in on-going creative activity; employees who work harder on their routine tasks; decreased absenteeism and turnover (Locke, 1976); increased group interaction and teamwork. Economic benefits include increased organizational efficiency and the creation of new methods, goods and services.

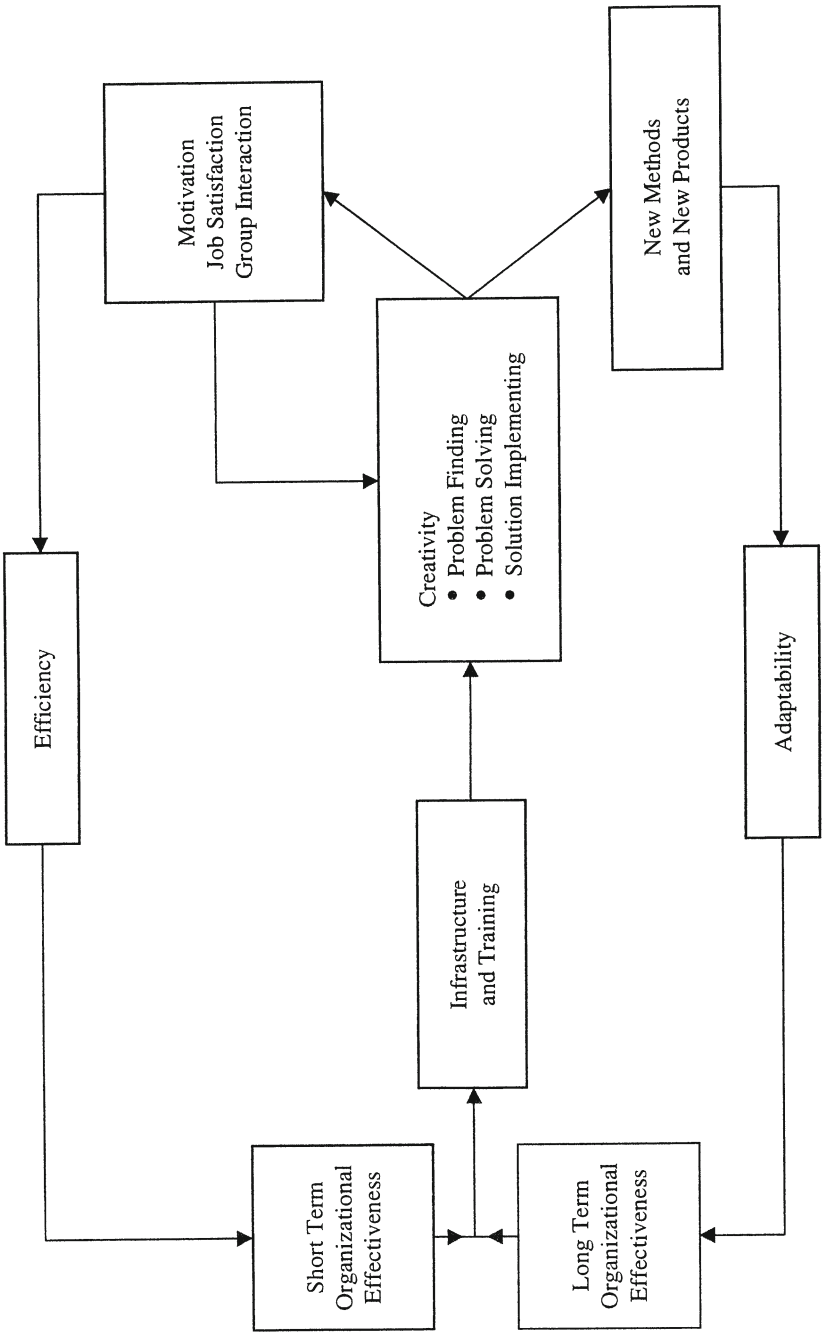
Figure 9 models how the variables discussed above relate to one another and how an organization can benefit from increased creativity. When asked how they had learned to concentrate on motivation first, and let economic outcomes fall into place afterwards, the Japanese managers replied, "Why, in your North American textbooks on management".
This example serves to point out that there *are* deliberate means that organizations can develop to induce creative activity on the job. The Japanese employee suggestion system is merely one way to do so.

CREATIVITY FOR JOB ENRICHMENT

As shown above, proactive creative activity leads to a continuous flow of new methods and new products. This is called adaptability. Because employees are finding and solving their own problems and implementing the changes themselves, their acceptance of the new solutions is assured because they have high ownership in them. In effect, they are

Figure 9

Fostering Creativity to Increase Motivation, Job Satisfaction, Teamwork, and Organizational Effectiveness



redesigning their *own* jobs, which is consistent with a well-documented axiom of social psychology: people do not resist change; they do resist *being* changed (Coch & French, 1948). Employees enrich their *own* jobs by being creative. Perhaps this is the missing link for companies who have tried elaborate approaches to job redesign and job enrichment and come up dry.

SUPERIOR TEAMWORK THROUGH CREATIVITY

Cohen, Whitmeyer and Funk (1960) showed that teams receiving significant training in creative thinking produced superior solutions to real world managerial problems than untrained teams. Basadur, Graen and Scandura (1986) demonstrated that the effects of training in Simplex last longer on the job when real, intact teams undergo training together. Teams trained learn to accept and share their members' diverse experience more completely, support differing viewpoints, and risk implementing novel ideas (Basadur, Graen & Green, 1982). This helps to avoid "group think", the tendency for members to follow the crowd into inadequate solutions instead of offering possibly controversial, superior viewpoints. Applying the Simplex process and process skills makes participation in problem solving safe and fun because people no longer fear advancing fledgling points of view and do not feel they must be constantly on guard.

BUILDING A BETTER BARGAINING TEAM

A company's union members and managers wished to avoid the kind of negotiating deadlocks and subsequent strikes that had shut down the plant four times within the previous ten years. They wanted to try a more collaborative approach. Here's how Simplex was employed in union-management contract negotiations to generate imaginative solutions that would have been stifled by the more traditional adversarial bargaining process (Basadur, 1988).

The bargaining process is often a "win-lose" contest, as illustrated in the conflict resolution model in Figure 10 adapted from Thomas (1976). What one side wins, the other automatically loses. When negotiations get really heated and both sides fail to compromise anywhere along the bargaining line, some of the pie is actually thrown away. Moving beyond the bargaining line into the "win-win" area requires creativity.

One contract item was "additional vacation time". Active divergence in fact finding revealed that many people hadn't been taking their full vacation time for fear that their job might be eliminated, or in the belief that they couldn't afford a vacation. Following the Simplex process, the group redefined these challenges into problem statements for which solutions could be found.

For each contract item in turn, the team alternately diverged and converged to create novel problem definitions, solutions, and action plans to revise the items. Within two months, the group had applied the process to twenty-five contract items, and had developed a more harmonious, cooperative atmosphere. Probably the most important lesson about creativity and teamwork from this example is that creative problem definition allows two groups that believe they have few common objectives – or even feel they have opposing objectives – to find out what they actually have in common.

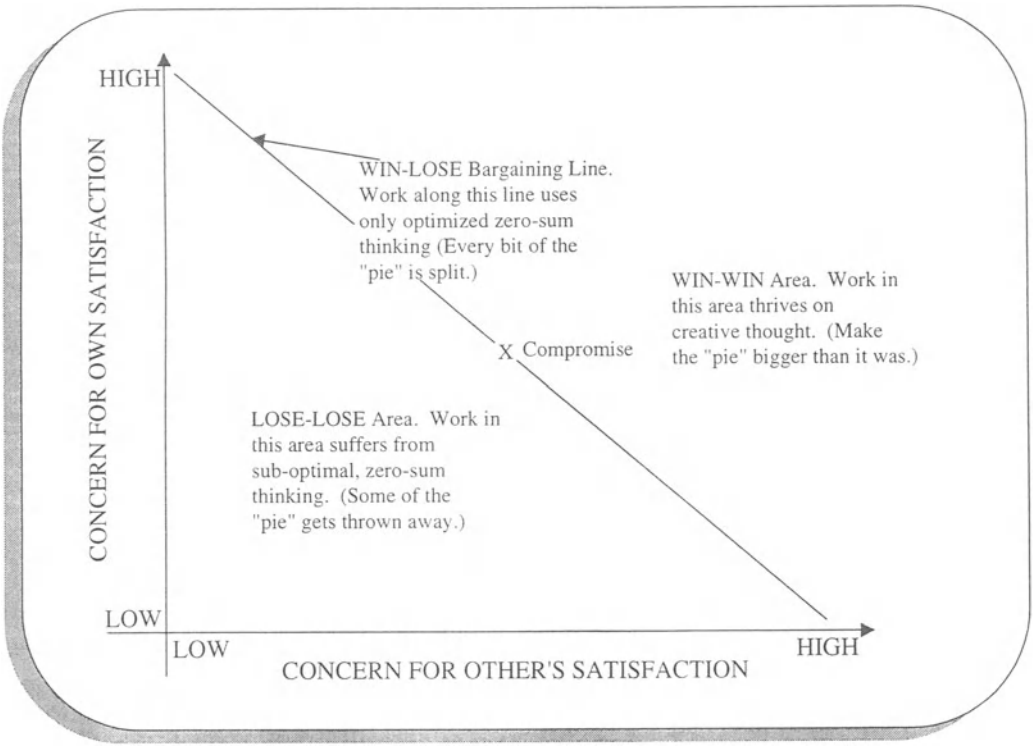


Figure 10. Conflict resolution Model

"WE'RE ON THE SAME SIDE"

A second example of creative problem solving and teamwork is provided in Basadur (1994a). Seven top managers and seven top franchise owners of a large consumer goods corporation had been assembled as a team to improve the entire organization's efficiency. For years, relations between the corporate managers and the independent franchisees had been strained by mistrust, conflicting goals and miscommunication. Each side blamed the other for mistakes.

After undergoing training (separately) in the Simplex innovative thinking process, the

two groups met for two and one half days along with an expert facilitator. The meeting succeeded, partly because the team members made a real effort to use the four process skills, no matter how painful. But the real key to success was a strategic problem definition map that the group developed after fact finding (Figure 11). The members agreed that their most significant challenge was, "How might we build two-way trust in order to come up with mutually agreed goals?" They felt that solving this problem and implementing the solutions would take them 80 percent of the way toward achieving their overall goal, which they re-defined as, "How might we help each other improve operating profitability?"

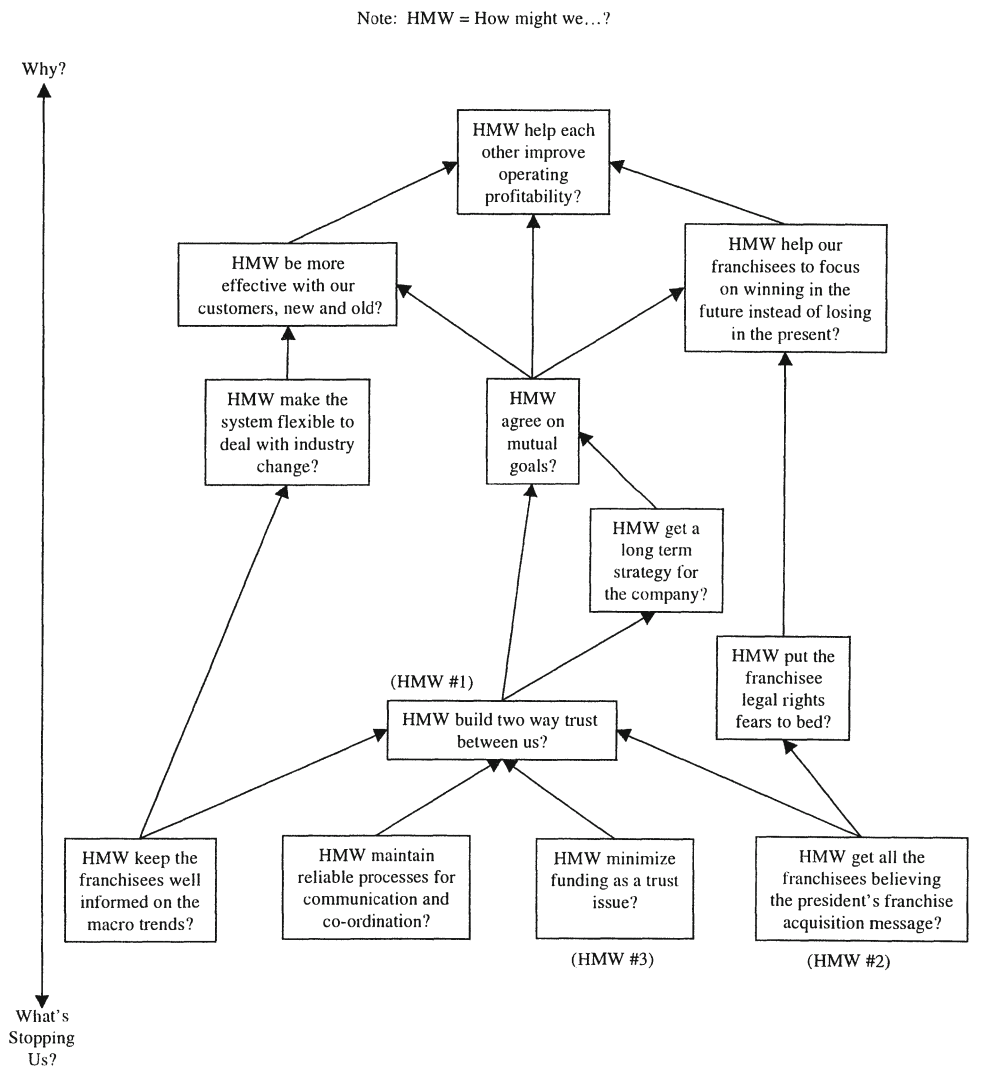


Figure 11. Corporate-Franchisee Top Management Team Problem Finding Map

TURNOVER, ABSENTEEISM AND PERSONAL DEVELOPMENT

The link between inducing creativity on the job and increasing job satisfaction and commitment is important not only from the perspective of having happier and more motivated people at work, but in other ways as well. As suggested above, some of these ways are directly economic. Industrial and organizational psychology research has found substantial correlations between job satisfaction and commitment and direct economic variables such as lower turnover and lower absenteeism (Locke & Latham, 1990; Organ, 1987). Other outcomes which are both people and economically oriented include better selection, placement, career planning, and personal development for organizational members. For example, if we understand peoples' unique individual thinking and creative problem solving process styles better, we can match them with jobs better.

FASTER MOVING PROJECTS

The innovative thinking skills of active divergence and convergence, deferral of judgment and vertical deferral of judgement enable projects to be completed more quickly. For example, the Frito-Lay Corporation used the Simplex process to reduce the time to test and implement a new packaging idea from 36 to 9 months (Basadur 1984a, b, c, d; Paton, 1986). Projects move faster, including new ideas for patentable products, cost improvement, meeting test market and national expansion deadlines, and generating new marketing ideas and brand strategies. Thinking is synchronized and the work of different departments is done simultaneously, in parallel, not sequentially. Not only can everyday functional work be done better with the informal use of creative thinking skills, but so can special work on major, targeted problems in formal creative application sessions as described earlier in this chapter. Application opportunities range widely in every function, including product development, marketing, personnel, engineering, manufacturing information technology, and purchasing. Application opportunities can also include suppliers (Basadur, 1989), and the finance and accounting functions (Basadur, 1998c).

THE CREATIVE PROCESS AS THE TRANSFORMATIONAL ENGINE

Increased creativity by applying the Simplex process thus can accelerate the identification and solution of problems and opportunities in every function and department of any organization. These problems and opportunities may originate in both the external and internal environments of the organization, and as they are moved through fact finding, problem definition and then solution optimization and implementation, the organization is operating as a true open system. How the Simplex innovation process acts as the transformational engine for an open social and economic system is modeled in Figure 12.

SUMMARY

In an era of rapidly accelerating change, thriving organizations are not merely efficient, but also innovative, acting as open systems sensitive to their environments and continuously transforming changing inputs into changing outputs. Organizational creativity

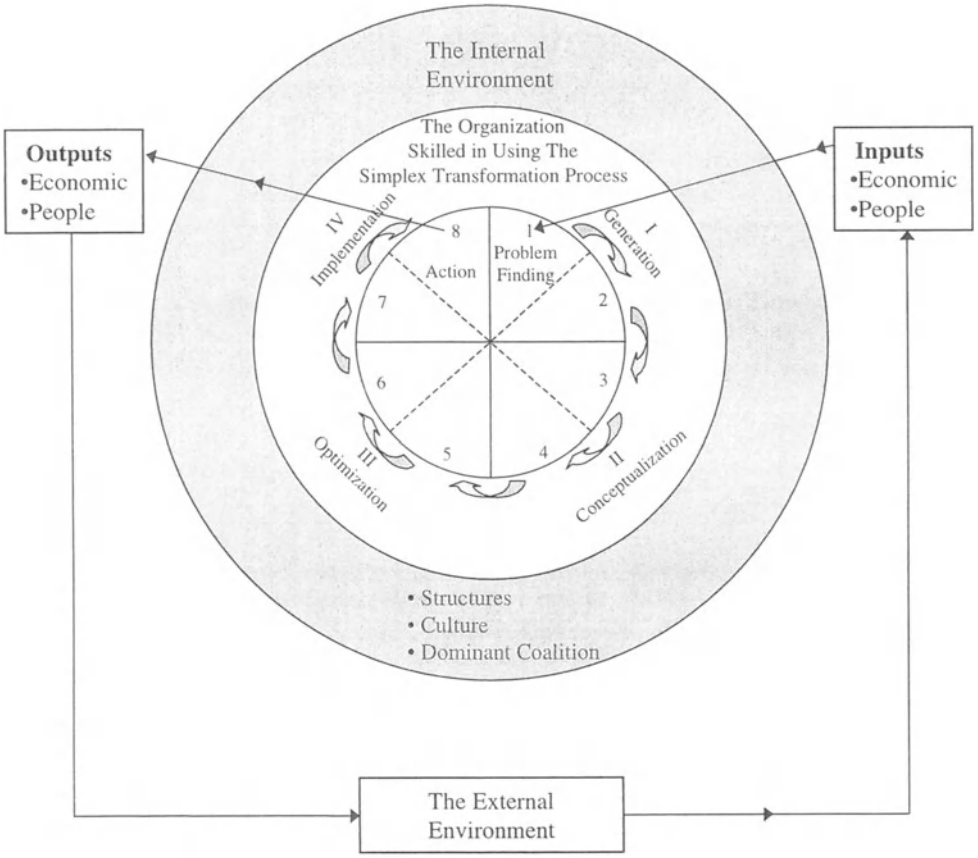


Figure 12. How the Simplex Process Permits an Organization to Operate as a Social and Economic Open System

or innovation can be modeled as a three-phase, circular transformation process: problem finding, solution development and solution implementation. The four stages of this process, called the Simplex process, are generation, conceptualization, optimization and implementation. Within this process are eight steps: problem finding, fact finding, problem defining, idea finding, evaluating and selecting, planning, gaining acceptance and taking action. Each step is activated by four specific attitudinal and thinking skills called active divergence, active convergence, deferral of judgment, and vertical deferral of judgment. Individuals have unique preferences for various stages of the process and these differences can be identified using the CPSP inventory. By deliberately encouraging people to respect individual differences in preferences, and to develop skills in applying the whole process to their work daily, an organization can simultaneously achieve both the economic outputs they crave and also the people outputs they must provide to assure continued economic success in the long run.

Creativity is an important tool which organizations can use to increase their

effectiveness, competitiveness, and long-term survival. To induce the innovative process in an organization is not an easy task. New thinking skills need to be taught and learned, structures must be created to get the new skills into everyday use on the job, and the dominant coalition must lead the way through their own innovative behaviors.

Innovation is not something that can be turned on and off; an organization must make it routine – and managers must lead proactively in making it so.

Increased creativity in organizations provides both economic and people outcomes. Although some of the economic outcomes result *directly* from creative activity, the majority are valuable by-products of placing priority on achieving people outcomes first. Creativity leads to such direct economic outcomes as a continuous supply of new and improved products and methods for the organization. It also leads to intrinsically motivated, committed, and job-satisfied people who enjoy getting involved and teaming up with others. These people outcomes are valuable in themselves but more importantly, they lead to the desired economic outcomes.

Improved organizations are eminently possible through creativity, and virtually every kind of organization can benefit. Commitment is needed, however, by senior management to do what it takes to carefully plan, create, and implement an approach to increasing creativity that makes sense uniquely for its organization. This means both a prior identification of the precise results expected and a trust that this effort will succeed. It also requires structural changes to ensure new creative skills will be solidified and nurtured. Creative behavior must become mainstreamed and institutionalized over the long term in order to make the outcomes identified in this chapter permanent realities.

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CHAPTER 5

DECISION MAKING IN THE CONTEXT OF ENVIRONMENTAL RISKS

Environmental problems, such as pollution or the destruction of forests, are among the most serious challenges of today's society. In recent years, increasing emphasis has been given to global phenomena, such as ozone layer depletion and climate change (e.g., Rayner & Malone, 1998a). These phenomena constitute global environmental risks, and it is one of the major problems for scientists as well as for policy makers how to assess, communicate, and manage these risks. Many of these environmental problems are anthropogenic, that is, they originate from human activities. Hence, the ultimate causes of global risks can be found in decision making processes -- on individual, organisational, and societal levels -- that lead to environmentally relevant behavior. Environmental problems arise from the fact that many individual choices are detrimental for the environment in the long run, such as car driving or overfishing, but are hard to change.

In this chapter we focus on the level of individual choice and behavior and argue that creative transformations of environmentally harmful behavior into pro-environmental behavior are important and feasible. Research in the domain of risk perception and risk management, as far as it is concerned with individual choice behavior, has largely been based on a decision theoretic framework (Yates, 1992). Decision theory focuses on the rational selection of given alternatives, and largely ignores the creative aspects of decision making, such as searching for new alternatives. There are some studies investigating conditions of creative innovations in the field of organizational decision making in firms (Amabile & Conti, 1997) or providing guidelines for overcoming typical biases and cognitive inertia in decision making (Russo & Schoemaker, 1989); also, some studies have demonstrated that positive mood can increase creativity in choice and negotiation (Carnevale & Isen, 1986). Hogarth (1987) has made an attempt to put general aspects of creativity into the context of judgment and choice. Generic techniques to support divergent thinking and systematic combinatorics, such as brainstorming (Osborn, 1957) and morphological analysis, are proposed as tools for more creative choices (Hogarth, 1987). However, these findings and recommendations do not relate directly to risky behavior in general or to environmental risk. Risk research and creativity research are still two non-overlapping research traditions. Starting with a descriptive model of environmental decision making, we try to bridge this gap and provide prescriptive guidelines to improve and support the creative handling and management of environmental problems. Our approach to

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 89-111.

creativity is specifically tailored to the process of decision making, and is related neither to popular methods of creativity training (DeBono, 1967) nor to dispositional theories of creativity (Guilford, 1967; Roe, 1952).

In the first section, we clarify the notion of global environmental risks. A five-level framework is outlined which elucidates the causal structure and the mental representation of environmental risks. In the second section, a psychological model of environmental decision making on the individual level is proposed, the main components of which are a causal mental model, moral-ethical considerations, and specific emotions. Each component, it is argued, provides leverage for specific creative transformations towards more pro-environmental decisions. The third section elaborates on the special structure of environmental decisions. It is shown that environmental decisions are a special case of social dilemma, which explains why environmental decisions are mostly environmentally harmful, why it is so difficult for individual decision makers to switch to more pro-environmental choices, and why a creative effort is needed to accomplish this. In the fourth section, the details of creative transformation processes are analyzed. We identify three major ways of how to deal creatively with environmental decision problems: searching for new options, changing one's values, and reframing the decision representation. The discussion section closes with a critical discussion of the limitations of a purely psychological perspective, and discusses the relationships between individual, organizational and societal decision processes in the context of global environmental risks.

ENVIRONMENTAL RISKS

Environmental risks can be seen from two perspectives. On the one hand, many environmental changes are caused by human actions. From this perspective, it is human activities that constitute risks for the environment. On the other hand, environmental changes -- anthropogenic or of natural origin -- can have perilous consequences for human living conditions. For instance, stratospheric ozone depletion enhances the risk of skin cancer, air pollution may cause respiratory diseases, and changes in climate may cause floods. From this perspective, it is environmental changes that constitute risks for mankind. Hence, three causal levels can be distinguished: (a) environmentally relevant human behavior, such as energy consumption, (b) changes in the natural environment and in global ecosystems, such as pollution or global warming, and (c) consequences on human living conditions, such as diseases or decreased quality of life. These three levels reflect that humans assume different roles with respect to environmental risks: they cause environmental changes as well as suffer their consequences (Kruse, 1995).

The three levels can be used to classify environmental risks according to the part of the causal chain that they represent (Böhm, Rost & Spada, 1998). Risks *for* the environment are those that go from human actions to environmental changes, such as cutting rain forests. Risks *from* the environment go from environmental changes to consequences for humans, such as respiratory diseases from air pollution.

Activities leading to environmental changes can be considered on an individual, organizational, and societal level. Often, decisions for policy strategies are made on one level, for example, a government's decision to increase tax on gasoline, whereas actions are taken on a different level, such as by the individual car driver. Those who make the decisions are often different from those who act accordingly. Furthermore, as in the cases

of air pollution and carbon-dioxide emission, the causal processes are cumulative: the existing environmental problem is the result of thousands of individual behavioral decisions made independently of each other.

Environmental risks vary with respect to the extent of their geographic and social impact. Environmental changes are called *global*, when their impacts are not limited to one specific geographic area (Stern, 1992). According to Turner et al. (1991) global effects of human activities can result either from an interference with global systems, such as the atmosphere, or from an accumulation of localized changes, such as river pollution. The most serious global environmental problems include the global warming phenomenon and damage to the ozone layer (Kruse, 1995; Pawlik, 1991). Among the most relevant human activities with global impact are burning fossil fuels, clearing forests, and consuming chemical products.

The distinction between global and local environmental risks is not clear-cut; local risks may become global if they accumulate and become ubiquitous (Turner et al., 1991). Global environmental risks, which are our main focus here, are characterized by complex causal processes (Pawlik, 1991), which in many cases are not yet completely understood. Their potential negative consequences are long-term and far-reaching, and changes develop in a non-linear, hard to understand fashion. They affect people in distant regions and future generations. The complexity of global risks has several aspects: (a) One aspect is the already mentioned complexity of the *causal processes* involved. (b) Closely related is the relevant *time horizon*, that is, when consequences are expected; time horizon is usually longer for global than for local risks. (c) Global risks are not only more far-reaching with respect to the size of the *geographic region* than local risks, they also concern a larger *number of people*. (d) This refers to more people who make a decision concerning environmentally relevant behaviors, as well as more potential victims who suffer from the consequences. In the case of global risks, these two groups of people, *decision makers* and *potential victims*, may not even overlap, or the potential victims may not yet be born.

Thus, environmental risks are different from personal risks such as smoking or mountain climbing. Personal risks are taken by the same person who will experience the negative consequences. For environmental risks, separate people or groups of people may assume the two roles; decision makers and victims are often more disparate for global than for local risks (Vlek, 1996a). Hence, environmental risks, and global risks in particular, touch upon considerations of social justice and equity. Furthermore, given the cumulative causation of environmental risks, personal control to prevent the risk is low.

Böhm and Mader (1998) proposed that in addition to the above mentioned levels of behavior, environmental change, and consequences for humans, two more levels should be introduced, leading to an extended framework with five causal levels of global environmental risks. On the first level, it starts with people's *attitudes* and goals, such as wanting a comfortable life. These attitudes motivate specific *activities*, for example car driving, constituting the second level. These activities cause *emissions* (third causal level), such as CO_2-emission, resulting in *global environmental changes*, in this case, the enhancement of the greenhouse effect. These global changes (fourth level) eventually cause negative, usually long-term, *consequences* (fifth level) that most likely affect *human health and living conditions* (for example, sea level rise, increase of skin cancer, and so on). These five levels, which were adapted from the causal structure approach to hazard control proposed by Hohenemser, Kasperson and Kates (1985), provide a framework for analyzing environmental behavioral decisions; a similar approach was used by van Lenthe,

Hendrickx, Vlek und Biesiot (1997) as a tool for policy-oriented assessment of climate change problems. Böhm and Mader (1998) empirically showed that the five-level framework is also useful to describe individuals' causal ascriptions of environmental risks.

A MODEL OF ENVIRONMENTAL DECISION MAKING

We will now sketch a model of individual decision making tailored to the context of environmental risks, which serves to indicate possible points for creative interventions (Figure 1). We remain on the level of the individual decision maker; what we refer to here as creative interventions or transformations can be applied directly by individuals or be instigated by societal institutions. These points will be elaborated in section four on creative transformations. We also assume that the direction of creative transformations should be towards pro-environmental actions, as will be elaborated in the section on environmental dilemmas.

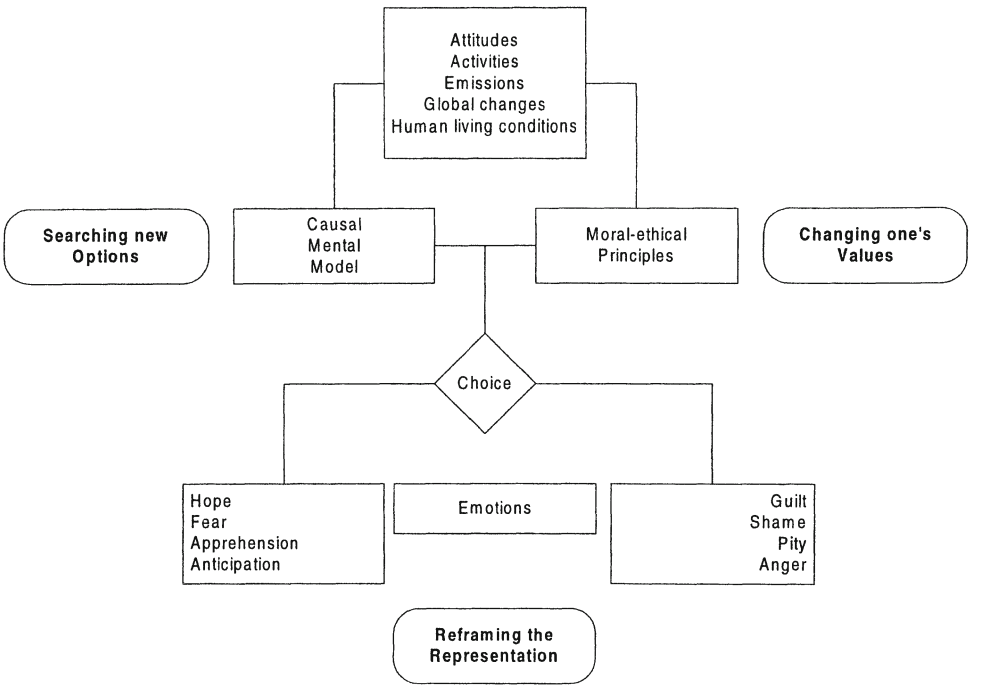

Figure 1. An Integrated Model of Environmental Decision Making. Processes of Creative Transformations are in Capital Letters.

MENTAL MODEL CONSTRUCTION

During the first phase of an environmental decision process, some environmental effect will be socially construed as a risk, and, accordingly, encoded by individuals (Thompson & Rayner, 1998), mediated by mass media and communications in social networks. The risk can be localized on any of the five levels discussed above. With respect to this focused level, a mental model is activated or constructed which represents some possible causes and consequences (Kempton, 1991). A common finding in the field of global risks is that the mental models of lay people are often incorrect, for example, where people confuse the causes of global warming and ozone layer depletion (Bostrom, Morgan, Fischhoff & Read, 1994). More important, Böhm and Mader (1998) have shown that mental models are causal and minimal; given a focused risk level, people easily generate causes on the level that immediately precedes the focused level, such as inferring human activities as causes of emissions. However, causal paths that include several levels are rarely found. With respect to consequences it is mainly the level of negative consequences for human living conditions that come to mind, thus skipping intermediate levels. Hence, inferences on causes and consequences are not processed symmetrically (Jungermann & Thüring, 1987).

If the mental model includes human activities, the cognitive representation of an environmental risk can be extended so as to include an environmental decision, even if the activity immediately associated with the risk is some habitual behavior such as car driving. However, if the focused risk is more remote, say, on the level of global environmental changes, only emissions as preceding causes may come to mind, without any further causal paths leading to activities; as a consequence, the mental model may not even contain an action from which a decision may ensue. This constitutes the first point of creative intervention: *searching for new options* by enriching the mental model. This provides an extended range of causal activities that serve in turn as decision options. Building on the methods of value-focused thinking (Keeney, 1992), individuals can expand the minimal mental model to a fully fledged five-level model, including a multitude of possible activities as causes of environmental effects. Furthermore, mentally "running" the mental model (Jungermann, 1985; Thüring & Jungermann, 1986) may then lead to additional alternative possibilities of pro-environmental behavior.

MORAL VALUES

However, enriching the mental model by including more information is often not sufficient for evaluating the potential options (Rayner & Malone, 1998b). Especially, increased knowledge about short- and long-term consequences might only increase the impression that the environmental decision has no feasible, let alone rational solution. Hence, we assume that after constructing the mental model the decision maker's focus will shift from knowledge about consequences towards ethics. The decision maker clarifies his or her moral principles and checks the existing options if they violate any one of his or her principles, or "protected values" (Baron & Spranca, 1997), referring to absolute and non-negotiable values. Empirically, it has been shown that the violation of a single strongly held moral principle is sufficient for most decision makers to reject an option immediately (Beach, 1990); no further judgements and trade-offs are made.

Moral principles that refer to global environmental issues such as preservation of biodiversity are usually pro-environmental. The realization of biospheric values, however,

has to be compatible with social-altruistic values, such as equity and fairness. Finally, these moral principles need to be aligned with other more mundane objectives. We propose that moral principles constitute meta-values, that have to be transformed to more concrete behavior guiding objectives in order to be applicable to environmental decisions. This constitutes the second point of creative intervention: *changing one's values* in the direction of pro-environmental decisions.

EMOTIONS

Once a mental model is constructed and appropriate moral values are activated, the available options are evaluated and a choice is made. We assume that emotions, elicited by cognitions derived from the mental model as well as elicited by moral considerations, constitute the basic carriers of evaluations, and thus determine the process of decision formation as well as the resulting preferences (Böhm & Pfister, 1996; Ortony, Clore & Collins, 1988; Pfister & Böhm, 1992; Zeelenberg, Beattie, van der Pligt & de Vries, 1996). Furthermore, recent research strongly supports the relevance of emotions for implementing choices into actual behavior (Damasio, 1994; Frijda, 1987). Hence, it is eventually via emotions that an environmental decision is resolved. We will not elaborate on the general function of emotions, but outline how one can reshape one's emotional patterns with respect to environmental decisions by what we call *reframing* (Tversky & Kahneman, 1981); this constitutes the third point of creative intervention.

Two types of relevant emotions can be distinguished: prospective and retrospective emotions. Prospective emotions mainly originate from causal inferences drawn by running the mental model in order to generate future scenarios with differing degrees of uncertainty. Figure 1 shows examples of typical prospective emotions elicited by focusing on future events: hope, fear, apprehension, and anticipation. Retrospective emotions, on the other hand, originate mainly from pondering over actions accomplished in the past with respect to moral values. For example, guilt arises from having violated a basic moral value oneself, or anger arises if someone else violated an ethical principal and thereby caused harm to oneself, or to a valued person or object. Pity and sorrow are retrospective emotions which focus on harm done to significant other people.

Reframing strategies can have a major impact on the pattern of elicited emotions. Prospective emotions usually come in pairs of positively and negatively valenced reactions, such as hope and fear about an uncertain event. Thus, reframing the consequences of a decision in terms of gains or in terms of losses leads to quite different emotions: I might, for example, hope that a change in mean global temperature is just a natural random fluctuation without serious consequences, or I might fear that it is human emissions that cause global warming with serious effects on the well-being of future generations. Reframing in terms of time-horizon, for example by extending possible costs and benefits beyond one's lifetime, also implies prospective emotions. Even retrospective emotions may be felt with respect to future events if the conditions after these events have taken place are mentally simulated. I might feel pity about the troubles to be endured by future generations or by my own children, and I might feel guilt if I construe the situation in a way that it is myself who is responsible for future harm. Finally, reframing a decision problem as a decision opportunity will emphasize positive emotions such as hope and anticipation, whereas framing the decision as an aversive problem will emphasize emotions such as fear and worry.

In sum, we propose a three-phase, three-component framework for environmental decisions. In the first phase, depending on the focused causal level, a mental model of the causal structure of the environmental problem is constructed. The mental model component provides the possibility of creatively transforming the representation by creating new options. In the second phase, moral-ethical values are focused on, enabling the decision maker creatively to transform the situation by changing his or her values involved. In the third phase, emotions are elicited as a result of prospective and retrospective considerations; emotions are specifically susceptible to the reframing of the mental representation of the decision. These phases are not strictly sequential, but rather involve iterative circles of a deliberate decision process. Also, creative interventions may be driven either by individual motivations for creative solutions, or stimulated externally by social and political institutions.

In the following section, we will analyze the structure of enviromental decisions, and why it is sometimes especially difficult to change harmful into pro-environmental behavior. This suggests that environmental decisions are in need of creative support. Then, the methods of creative transformation, introduced above, are elaborated in more detail.

ENVIRONMENTAL DILEMMAS

In the first section, we characterized global environmental risks as resulting from the aggregated effects of individual decisions. Even societal decisions are the outcome of multiple individual decisions; that is, they result from the complex negotiation processes of individual persons; there is no such abstract entity as "society" that makes decisions. For simplicity, we also focus on environmentally relevant actions that result from deliberate decisions, at least originally; if, of course, repeated, any deliberate action will eventually turn into habitual behavior. However, genuine cultural customs and traditions, important as they may be, will be neglected. But why are pro-environmental decision options so difficult to choose?

At first glance, it seems that these decisions can be characterized as decisions under uncertainty, modelled according to subjectively expected utility theory (Edwards, 1954; Jungermann, Pfister & Fischer, 1998; Yates, 1990), SEU-theory for short. We argue, however, that SEU-theory is not sufficient to understanding environmental decisions. One reason is that the consequences of individual decisions depend largely on the choices of others; this classifies global environmental decisions as a special case of social dilemma (Dawes, 1980; Hardin, 1968; Vlek, 1996b). Another reason is that environmental decisions are, as outlined above, often based on moral principles, which are not readily conceptualized in terms of expected utilities. Whereas expected utility theory treats decisions solely as a function of the consequences of actions, most moral considerations focus on actions *per se*, irrespective of potential positive or negative outcomes (Baron, 1994). Moral philosophers usually distinguish between deontological and teleological moral theories: deontological theories claim that moral thinking is based on specific action categories, whereas teleological theories claim that moral thinking is based on the consequences of one's actions, as seen, for example, in utilitarianism (see Scheffler, 1994, for a critical discussion). However, we will use these terms somewhat differently: the term moral (or, synonymously, ethical) as denoting a strictly deontological attitude, in order to emphasize the distinction with consequence based evaluations, which are at the core of expected utility thinking, and the term teleological or consequential as denoting a strictly

utility based attitude, which originates solely from the consequences relevant for the individual decision maker.

Another important aspect in the context of environmental decisions is the distinction between normative, prescriptive, and descriptive approaches (Bell, Raiffa & Tversky, 1988). We will not consider normative approaches, that is, those that deal with an ideal, rational decision maker; we will focus on the relation between prescriptive (how to advise real decision makers to do better in a pragmatic sense) and descriptive approaches (how people normally make unaided choices). The psychological model outlined above is descriptive; however, the creative transformations proposed are prescriptive.

SEU is not sufficient. If environmental decisions were compatible with SEU-theory, then a rational solution would be possible. However, if SEU-theory does not apply, a rational solution might be hard to find. As it turns out, SEU is not sufficient, and a technical solution in terms of utility maximization is not possible.

As an example, consider a person's transportation choice between either travelling to work by car or taking a train. His or her concerns might be time, cost, and convenience. The decision maker might also be concerned about air pollution, but after a short deliberation clearly prefers the car. Gains in time and cost outweigh those infinitesimally small increases in air pollution, which will go unnoticed and never be experienced. However, the person realizes that everybody else will come to the same conclusion, which will lead to delays due to traffic jams, and thus increase the relative convenience of a train ride. The decision maker feels incapable of judging the probability that other people will choose the car or the train. Being stuck by this line of reasoning, the person starts to re-evaluate his or her goals and values. It now becomes salient that, irrespective of what others are doing, one just "should not pollute the air, unless unavoidable". Following this principle, the person eventually decides to take the train. Later, however, standing in an overcrowded train, and watching all the cars smoothly pass by, she or he feels angry and doubts arise about the correctness of this decision.

This example demonstrates that SEU-theory is not sufficient to explain the decision maker's thoughts and behavior. First, the person does not come with a fixed and clear-cut set of preferences. Viewing the decision from different perspectives, preferences are constructed on the fly and not recalled from a mental master list (Slovic, 1995). SEU-theory, however, has nothing to say about how preferences are formed and change over time. In the example above, preferences even oscillate within a short time span. Second, the person feels unable to express probabilities of others' behavior. The environmental decision obviously is not a game "against nature", it is rather a "game against others". Uncertainty about others' intentions is psychologically different from uncertainty about natural events; the behavior of other people seems more predictable and more elusive at the same time. Hence, reflections on other people's intentions and preferences come into play: what we should do -- in the best of our own interest -- depends on what we think others think one should do; this type of decision is the domain of game theory (Luce & Raiffa, 1957). Third, the situation can be understood as a moral problem; relevant moral principles relate directly to the actions under consideration and are dissociated from the actions' consequences. SEU-theory, however, centers completely around consequences; actions are evaluated only with respect to their future consequences for the decision maker (Hammond, 1988). Furthermore, even if moral principles are related to consequences, they often cannot be rephrased as carriers of quantitative utilities, since many of them are commonly seen as reflecting "protected values" (Baron & Spranca, 1997) which are immune to being

weighted by probabilities (see also Jaeger, Renn, Rosa and Webler, 1998).

Environmental decisions as social dilemmas. Dating back to the work of Hardin (1968), it has been proposed by several authors that environmental decisions should be conceptualized as instances of a social dilemma (Parson & Ward, 1998; Roch & Samuelson, 1997; Vlek, 1996b; Vlek & Keren, 1992). The basic structure of a social dilemma is as follows. A large number of individuals choose independently between two options: a "non-cooperative" (defective) and a "cooperative" option. The individuals' pay-offs, however, are interdependent, that is, what one gets depends not only on which option one chooses, but also on what everybody else chooses. The pay-off-structure is such that the so-called defective option is optimal for the individual from an expected utility point of view (it is a dominant option), but leads to a worse collective outcome (everybody receives less than possible). Conversely, the so-called cooperative option is optimal for the collective; everybody will be better off if they choose the cooperative option than if they choose the non-cooperative option. This structure parallels the structure of the well known prisoner's dilemma (Luce & Raiffa, 1957; see Table 1a).

In contrast to the simple prisoner's dilemma, environmental decisions show a dissociation of positive and negative consequences. Three complicating aspects are implied by this: time and location of negative effects, and people affected by negative effects. The positive consequences are usually immediate and experienced personally, but the negative consequences are usually extremely delayed. And with respect to location and people, it might well be the case that, for example, climate change only significantly affects people living somewhere else, but is not experienced by those persons who cause global warming by car driving. Since location and affected people are correlated, for simplicity we just speak of the location of negative consequences.

Location: Individual concequences versus collective consequences. Environmental global risks constitute potential risks for all mankind. The typical situation, however, is that the causal agents and the victims of an environmental decision are not overlapping (Vlek, 1996a, 1996b). The victims of global warming will probably not be those nations whose inhabitants produce the majority of CO_2-emissions. Hence, a person making an environmental decision needs to trade-off individual benefits with others' losses, these others are not even other decision makers in a game theoretic sense.

The degree of concern about others depends on three factors. First, decision makers need to know about the causal structure that connects their decision with consequences somewhere else in the world. The mental model (Bostrom et al., 1994) that people construct on environmental issues should be comprehensive enough to include the implications on other people's well-being. Second, the well-being of others is relevant only in so far as the decision maker identifies with the affected other. This form of group identity or empathy extends to one's family and close friends, but may also be as extensive as involving people not personally known. Dawes, van de Kragt and Orbell (1988) demonstrated that relatively minor factors can induce group identity in social dilemma situations. Third, the degree of identification is further determined by the imaginability or concreteness of negative consequences as experienced by others (Femers, 1993). If the suffering of children caused by a flood is directly perceived (via television), the well-being of these children becomes relevant for one's own well-being. Both, identity and direct perception, relate to the intensity of specific emotions (Ortony, Clore & Collins, 1988), which in turn determine the impact of others' pay-offs when making an environmental decision.

Time: Short term versus long term consequences. Environmental risks are characterized

by a large gap between the implementation of an action and the manifestation of its negative consequences; cancer from increased UV-radiation caused by ozone layer depletion occurs many years after emitting CFC via hair spray use. In contrast, the individually experienced positive consequences occur immediately or with little delay. As with location, the consideration of long term consequences depends on the mental model, that is, on people's causal knowledge about environmental effects. But even if so, two factors attenuate the impact of delayed consequences. First, delayed consequences are usually confounded with a high degree of uncertainty (Roelofsma, 1996): if something will happen in the distant future, people will judge it as less likely. Second, future consequences are commonly subject to discounting processes (Koopmans, 1960): the utility of a pay-off will exponentially decrease with increased delay, independent of other factors such as uncertainty. Hence, negative effects that occur in the distant future are only marginally, if at all, included in a current environmental decision process. The psychological determinants of discounting are, however, not yet completely understood (Loewenstein & Elster, 1992).

Environmental dilemmas. Taken together, an environmental decision can be classified as a special type of social dilemma. The basic structure of dilemmas is given by the two-person prisoner's dilemma (PD: Table 1a). If the decision maker defects (chooses the option that is dominant for him or her), both are worse off. If the PD is iterated, the possibility of behavior shaping arises, for example, by employing a Tit-for-Tat strategy (Axelrod, 1984); but this is only likely if feedback is instantaneous and the causal agent is identifiable. The generalization of the two-person PD to N-person-dilemmas leads to a class of dilemma that is usually called social dilemma (van Lange, Liebrand, Messick & Wilke, 1992). One variant of this is *public good dilemma* (PG: Table 1b). As an example of the one-shot (non-iterated) version, participants can receive pay-offs by contributing a certain amount of money to a common pool. Each contribution of, say, one unit, will be doubled in the common pool (multiplied by a factor of 2), which is then equally shared by all participants. Hence, the higher the contributions that are made, the more money will eventually be shared, but the highest pay-off can be obtained by a "free ride", where all others except myself contribute. In a public good dilemma, uncertainty arises from not knowing what most others will do, but pay-offs are immediate. A structurally similar but psychologically different variant is *resource dilemma* (RD: Table 1c), considered in the iterated version. Here, the choice is between repeatedly taking only some reasonable amount from a common, free and replenishable resource, such as fish from a common lake (Ernst, 1998; Hardin, 1968), or taking as much as possible and thereby exhausting the resource in the long run. In a RD, negative feedback is delayed and associated with uncertainty. However, those who cause the negative consequences are knowledgeable about the consequences, and are also the victims of the destroyed resource. Non-cooperative behavior might be tolerable in the short-run, but is disastrous in the long-run. Finally, the third variant is what we call *environmental dilemma* (ED: Table 1d). In many cases, "most others" here means millions of people. The long-term negative consequences are delayed (in some cases, they become manifest only for one's children), they are highly uncertain, and the uncertainty refers to location and time, as well as people affected. Most importantly, the decision makers are usually not identical with the victims (victims' pay-offs are in parentheses in Table 1). Furthermore, the non-cooperative option is mostly a status quo option, or a "don't care" option, and the cooperative option implies a deviation from the status quo, or to "care" about those uncertain, long-term and negative consequences which affect others.

Table 1. Classification of Social Dilemmas and Environmental Decisions. Pay-offs are in Arbitrary Units; the First Pay-off Value Indicates the Pay-off for the Decision Maker (DM), the Second Pay-off Value Indicates the Pay-off Obtained by the Other Player(s)

(a) Basic 2-Person Prisoner's Dilemma (PD, One-shot):

		Other:	
		Cooperate	Defect
DM:	Cooperate	3/3	1/4
	Defect	4/1	2/2

(b) Public Good Dilemma (PG, One-shot; Assume that there are 100 Others, a Contribution is Doubled in the Pool, and „Most" Means 90%):

		Most others:	
		Contribute	Free ride
DM:	Contribute	0.8/0.8	-0.78/0.22
	Free ride	1.78/0.78	0.20/0.20

(c) Resource Dilemma (RD, Iterated; Short-term vs. Long-term; Assume that the Resource will be Depleted if Most Others Take > 50 Units for an Extended Period of Time):

		Most others:	
		Take some	Take most
DM:	Take some	50/50 50/50	50/100 0/0
	Take most	100/50 100/49	100/100 0/0

(d) Environmental Dilemma (ED, Iterated; Short-term [Upper Row] vs. Long-term [Lower Row]; in Parantheses Utilities for People Affected Outside the Decision Context; see text for Explanation):

		Most others:	
		Care	Don´t care
DM:	Care	1/1 10/10 (10)	1/15 1/15 (-10)
	Don´t care	15/1 15/1 (10)	15/15 15/15 (-10)

A rather pessimistic view on environmental decision making emerges from this analysis. From an individual decision maker's perspective, there is not too much incentive to choose the cooperative option. So, even if people do understand the dilemma structure of environmental decisions, it might not really be a dilemma for them, because the non-cooperative option seems so much more compelling. And since, for example with respect to global warming, millions of decision makers are involved, any simple method of negotiation and coalition formation seems futile.

One obvious way out of the dilemma is for an authority to attach costs to non-cooperative options. While these are effective societal policies, we argue that more creative measures can be taken to free individuals from the social dilemma trap. As sketched above in our model, this involves breaking the representation of the environmental decision as a rationally non-solvable social dilemma and reframing it into a challenging, but solvable problem. The impossibility of a strictly rational solution opens space for creative solutions. The dilemma representation puts unnecessary restrictions on the decision frame: (1) there are only two fixed options; (2) personal and collective benefits are not negotiable, and (3) negative consequences are discounted because they are externalities (from the decision maker's perspective), delayed and uncertain; these restrictions need to be overcome by creative transformations.

ENVIRONMENTAL DECISIONS AS MORAL PROBLEMS

As proposed in our descriptive model (Figure 1), and particularly in the area of environmentally relevant behavior, it is necessary to consider ethical evaluations as determinants of behavioral decisions. Environmental issues always affect other people and ecological systems, so that their evaluation entails not only individual cost-benefit considerations, but also ethical judgments, such as the equitableness of outcomes (Baron, 1994; Eckensberger, Sieloff, Kasper, Schirk & Nieder, 1992). In attitude research, values have been shown to be an essential component of environmental concern (Schahn & Holzer, 1990), and pro-environmental behavior can be better predicted from ethical judgments than from personal confrontation with environmental problems (Kals & Montada, 1994). One study that investigated risk perception in the area of ecological risks (McDaniels, Axelrod & Slovic, 1995) demonstrated that ethical considerations, such as the ethicality of an event, the equitableness of outcomes, and the infringement of rights of non-human species, constitute crucial judgmental dimensions for evaluating such risks. These results demonstrate that environmental risks involve ethical judgments and that ethical considerations promote pro-environmental behavior. Hence, we suggest that focusing on the moral aspects of an environmental decision problem increases the probability that an individual will choose the pro-environmental, or cooperative, option.

Moral judgments, as understood here, are deontological, hence prescriptive in the sense that they tell us what we should do in a certain situation; that is, they refer to categories of actions. Moral judgments are not mere behavioral recommendations, but belong to our most strongly held beliefs, and we feel that they are universal (Baron, 1994), or at least valid within a specific culture. They apply to anyone who is a member of that culture, regardless of whether he or she endorses the moral rule, and regardless of any situation-specific arguments against the application of the moral principle.

Moral judgments are based upon moral values. Values, in turn, are representations of

general objectives relevant for basic questions of human conduct; they serve as criteria for actions and other psychological phenomena, such as attitudes, judgments or attributions (Rokeach, 1973). Values represent standards for oughts and shoulds, or behavioral guidelines. In general, moral values guide interpersonal conduct and function to avoid harm being done to other human beings. With the emerging environmentalism in public debate within western cultures, a discussion began whether environmental concern implies a new value orientation which values nature in its own right, irrespective of its use for humans (Dunlap & van Liere, 1978; the interesting problem of values in cultures other than our western civilization is beyond the scope of this chapter). In the literature on environmental ethics, three classes of valued objects are discussed as grounds for environmental concern: the self, other people, and non-human objects. One of the most prominent psychological distinctions was proposed by Stern, Dietz and Kalof (1993). These authors distinguish three value orientations: (a) an *egoistic* value orientation, or concern for self-interest and personal well-being, (b) a *social-altruistic* orientation, or concern for the welfare of others, and (c) a *biospheric* value orientation, or concern for the ecosystem or the biosphere. Similar tripartite classifications have been proposed by Axelrod (1994) and Merchant (1992). Stern et al. (1993) do not regard these orientations as mutually exclusive, an individual may hold all of them to some extent. Each of these three orientations may lead to pro-environmental attitudes and behavior. For instance, persons holding egoistic values should be pro-environmental if they consider themselves to be threatened personally by environmental changes. The NIMBY- (not-in-my-backyard) phenomenon is an example of egoistically motivated environmental actions. Social-altruistic values should promote pro-environmental behavior if the person believes that the behavior helps other people, for example by protecting children or saving the planet for future generations. Note that both egoistic and social-altruistic value orientations may just as well foster opposition to pro-environmental actions, if these actions are perceived as making one's life much more inconvenient or as threatening other people's interests, respectively. Biospheric value orientation should generally be positively associated with environmentalism. Empirically, it was found that social-altruistic and biospheric values form one cluster (Stern & Dietz, 1994). Public perception does not clearly differentiate between valuing nature in itself and valuing nature for the human benefits that it provides.

The distinction between egoistic values and social-altruistic and biospheric values can help to analyze environmental behavior in environmental dilemma terms. Considered from a value orientation perspective, egoistic value orientation promotes non-cooperative orientations, whereas social-altruistic and biospheric orientations foster cooperative behavior in an environmental dilemma. In social dilemma games, it has been found that individuals with altruistic values are more likely to choose the cooperative option (van Lange, Liebrand, Messick & Wilke, 1992). Thus, inducing a social-altruistic or biospheric value orientation should result in an increased likelihood of pro-environmental behavior. Adopting a social-altruistic or biospheric value orientation -- we call this a moral frame of reference in contrast to an egoistic orientation -- activates new goals, for example, saving the natural environment for future generations, which should then create new, environmentally optimal behavior options (Bazerman, Wade-Benzoni & Benzoni, 1996).

Non-consequentialist decisions and protected values. Moral values are what Baron and Spranca (1997) call "protected values". These authors suggest that protected values arise from deontological rules concerning action; what matters to the decision maker is the implementation of some type of action rather than the consequences that result. The

defining property of protected values is that they are absolute, which expresses itself in resistance to trade-offs with other values. For instance, people are not willing to trade off destruction of natural resources against monetary gains. Such trade-offs are considered taboo (Fiske & Tetlock, 1997), and people can experience intense anger when asked to make such trade-offs (Baron & Spranca, 1997). Another feature is that they are insensitive to the quantity and probability of outcomes. For instance, if natural resources are a protected value for a person, he or she would consider their destruction as morally prohibited, even if the extent of the destruction is small or the probability of harmful consequences is low. This common insensitivity to quantity is also demonstrated in the embedding effect (Kahneman & Knetsch, 1992): People are willing to pay only a slightly larger amount to clean up all the lakes in Ontario than to clean up the lakes in any particular region of Ontario. Willingness to pay for intervention programs to protect environmental goods is insensitive to the scope of the intervention. Thus, it seems that it is the act of contributing rather than the consequences that matter to the individual when contributing to public goods, and that it is the "purchase of moral satisfaction" that motivates these contributions (Kahneman & Knetsch, 1992; Ritov & Kahneman, 1997).

The environmental dilemma structure and the cumulative causation of most environmental risks promote environmentally harmful behavior when only their consequences are evaluated. Hence, a moral focus, which evaluates actions rather than consequences, is desirable when we aim at fostering pro-environmental behavior. With a moral evaluation focus, attention is drawn to those aspects that are neglected when the decision is framed as an environmental dilemma: namely other people and the biosphere. When the decision is made on moral grounds, it does not matter that the individual contribution to the environmental damage is negligible, because the consequences are not evaluated under such a frame. The same argument applies to the unknown probability of others' behavior, which is less relevant to the decision maker under a moral frame. Furthermore, the long time horizon is less important, since a moral commitment may result in less discounting of the future (Hendrickx, van den Berg & Vlek, 1993). Note, however, that with moral values a new kind of dilemma might arise - a genuine *moral dilemma* (Levi, 1986). A moral dilemma exists if two deontological rules, or protected values, apply to a situation simultaneously, but are imcompatible. A notorious example is the person torn between the moral rules "you should not kill" and "you should defend your family" when some aggressor threatens the health of his family.

CREATIVE TRANSFORMATIONS

We will now further elaborate the points of creative intervention introduced in the outline of the environmental decision model in section two. The guidelines for creative transformations of the decision problem towards more pro-environmental preferences counteract the pessimistic view implied by the previous section. However, as prescriptions, they might well increase the probability that a person behaves differently, but they guarantee in no way that the structural constraints of the environmental dilemma can be dissolved.

In order to discuss creative solutions, we need to explicate at the outset our understanding of creativity as it pertains to environmental decisions. Traditional decision theory starts with a given problem structure, where alternatives and information about

possible consequences are given, and the decision process consists of the evaluation of consequences, weighting by probabilities, and selection of the optimal option. From the perspective of the decision maker, an environmental decision is often externally enforced. That is, the decision maker who follows a habitual behavioral pattern when acting in an environmentally harmful way may not even be aware of the environmental implications and has never actively pursued this kind of decision. Hence, the decision will normally be perceived as an adverse and annoying problem to be solved, not as a pleasant activity to be enjoyed (such as, say, choosing from a menu in a restaurant).

The structure of environmental decisions as social dilemmas implies a recommended direction for creative transformations. The options one is confronted with are not "equivalent"; one commonly prefers the non-cooperative (selfish) option such as taking the car, yet, on the other hand, one thinks one ought to prefer the cooperative, pro-environmental option (taking the train). The process of problem transformation can thus be conceived of as a process of preference management: an intentional act of changing one's preferences in a way that one believes one will be better off with (Elster, 1979, 1983; Logue, 1988). To give up smoking, genuinely wanting not to want to smoke any more, is a notorious example. Wanting not to be detrimental to the environment, and wanting not to make people somewhere else (or one's descendants in the future) suffer the consequences of one's immediate selfish decisions - these wants characterize the direction in which creative transformations are aimed.

Furthermore, the pro-environmental decision options usually constitute a departure from the status quo. Driving a car, burning oil, using CFC-substances, which have been for a long time non-problematic actions, all of a sudden become problematic. In terms of social dilemmas, the status quo is mapped to the non-cooperative option, which aggravates the social dilemma, since people have a tendency to stick to the status quo, even if its consequences are worse than if they deviate from the status quo (Samuelson & Zeckhauser, 1988).

Creativity in this context means to transform the representation of the decision problem in a way that frees oneself from being stuck in a social or moral dilemma. The transformation should provide solutions that are, if not optimal, at least satisficing. How this can be achieved builds on a few simple guidelines and strategies. As indicated above, we propose three creative strategies: (1) an intentional and directed search for new options, (2) a critical modification of one's goals and values, and (3) a systematic reframing of the decision representation. These strategies, implemented by an individual decision maker, constitute what Slovic, Lichtenstein and Fischhoff (1988) called self-management of preferences. Of course, these strategies are not exclusive or mutually independent. Furthermore, on a practical level, they can be underpinned with more generic techniques such as brainstorming or morphological combination (Hogarth, 1987). Note, however, that much research has demonstrated that brainstorming in groups often has no effect or is even detrimental (Diehl & Stroebe, 1987). We will analyze each method in turn.

SEARCHING NEW OPTIONS

The most basic method of creative problem transformation is to generate new promising alternatives. Keeney (1992) argues that this is best achieved by a radical change of perspective: from traditional alternative-focused to what he calls *value-focused* thinking. Alternative-focused thinking starts with a given set of alternatives and aims at "choosing

the best" from this set. From the very beginning, the decision space is narrowed down to what is given. As discussed, with environmental decisions there is no unique "best alternative" in a simple sense. Value-focused thinking, on the other hand, starts with one's values, and the guiding question is "what do I want?". Only after one's values are explored and specified, does the decision maker searche for candidates that can achieve these values. This is a kind of backward reasoning process that creates possible solutions with respect to objectives instead of evaluating given alternatives. Values serve as a kind of catalyst for action generation, and thus promote the chance of finding a good solution.

Most people probably never considered their preferred means of transportation as a solution to what they want, but rather as a necessity or habitual behavior enforced by external constraints. Once the dilemma character of an environmental decision is recognized, a person might for the first time explicitly express what Keeney (1992) calls *fundamental objectives*. They define what is essentially important to the decision maker, and they constitute the reasons why she or he is concerned about the decision at all. Fundamental objectives in an environmental decision such as transportation means might be "maximize time for leisure activities" and "minimize health dangers for my children"; "leisure activities" could be further detailed into "time to read" and "time to communicate". Eventually, a comprehensive hierarchy of objectives can be constructed. It is crucial to distinguish this from what Keeney (1992) calls *means-ends objectives*, which are just means to achieve fundamental objectives. It might turn out on closer inspection that what previously has been regarded as objectives were really only means. For example, the objective of saving time by using a car is not an end in itself, but only a means to gain time to, say, read the newspaper. If this is clear, it is easily recognized that one can read the newspaper while travelling on a train. It might even turn out that now the new option, taking the train, seems highly attractive, because it provides sufficient time and comfort to read, although it takes more time from home to work.

Empirically, it has been shown that elaborating one's goals leads to increased creativity in generating options (Jungermann, von Ulardt & Hausmann, 1983); the type of options and the stability and persistence with which these options are pursued depend highly on the type of objectives hierarchy created (Pfister, 1991). Even if no better new options are found, the process of value-focused thinking serves the purpose of destroying the status quo, by stripping it of its cognitive inertia. It may also turn out that the problem actually is a subproblem within a larger decision problem; for example, transportation choice might actually be a career choice, once the transportation problem is subsumed under more general career objectives.

CHANGING ONE'S VALUES

Besides finding new options, it is sometimes necessary to change one's values or fundamental objectives in order to escape a dilemma; especially if the set of available options is fixed. Changing one's objectives is different from clarifying one's objectives by means of value-focused thinking, and it is more effortful. In the strictest sense it means to give up an objective and adopt a new one instead. I could, for example, give up the objective "to acquire the most prestigious car" and instead adopt the objective "to minimize money spent for private transportation", or, on a higher level, "to save money". In a more lenient sense, it means to modify or realign one's preferences; specifically, to change one's

importance weights for relevant attributes and to modify one's utility functions. One might decide that health is more important than a career, and that earning another thousand dollars just doesn't make a difference, intentionally levelling off the utility function for money. All this presupposes some kind of meta-objective or *meta-value*; one needs to know the primary direction of the modification effort. In an environmental context, a public consensus commonly exists about meta-objectives: they are pro-environmental (nobody actually claims that he or she does not care at all about the environment), whereas the to-be-changed objectives are directly or indirectly anti-environmental (non-cooperative or morally despised). Böhm and Pfister (1996), however, have shown that choices between options that varied with respect to their moral acceptability depend on the decision context. If preferences are to be announced in public, participants preferred morally accepted options, whereas in a private context, participants preferred individually useful options.

But how can value changes be achieved? We propose three strategies that everybody has implicitly employed sometime or other. First, we can learn to prefer something previously not preferred by simply doing it and to *habituate* to it. Learning to brush one's teeth is a simple example: after repeated decisions to brush one automatically prefers brushing to not brushing; another example is seat belt use. Several factors contribute to the fact that habits are commonly preferred, for example, self-reinforcement by repeated successful application, the mere exposure effect (Zajonc, 1968), reduction of cognitive dissonance (Festinger, 1964), or the increased salience of reasons supporting the habit compared to reasons for giving up the habit.

Second, we can adopt a new value by *public commitment*, as is illustrated by studies on attitude change via forced compliance (Nel, Helmreich and Aronson, 1969). If we publicly announce not to drive by car anymore, we will actually drive less (at least for some time), and this in turn will influence our values (by discovering new supporting reasons). By committing oneself to one's meta-values, they tend to become regular values we aspire to achieve.

Third, we can try to *become another person* (at least partially) by changing the type of character we presently are (or, more accurately, we think we are). This process of character modification (Elster, 1979, 1983) will most likely cause changes in one's values and objectives. To adopt objectives which conform to our meta-values, one needs to know what types of persons are associated with which kinds of values. Frank (1988) studied how preferences that relate to the type of person one wants to be can support altruistic behavior and solve some choice dilemmas. He gives the example of a traveller in a restaurant in a foreign city, where he will most likely never return. Should he give a tip to the waiter? A compelling reason to give a tip in this situation is the objective that he does not want to be "that kind of character" that gives a tip only for selfish reasons, such as when he knows he will return to this restaurant in the future. Furthermore, the man knows that if he refuses to tip, he will actually run the risk of becoming the kind of character he wishes not to be. This connects the strategy of changing one's character with the strategy of changing one's habits: getting in the habit of doing some action x not only increases the preference for x directly, but at the same time creates a dispostion to do x. And with this newly acquired disposition, we already are a (slightly) different person. This mechanism, however, will not work if the traveller authentically is the kind of person who does not want to tip.

REFRAMING THE DECISION PROBLEM

Here, we conceive of reframing as an intentional process of looking at a problem from a new and different perspective, and, as a result, of mentally representing it differently. This notion of framing is related to but slightly different from its use in decision research (Tversky & Kahneman, 1981). The classical way of framing decision outcomes is by describing them either in terms of *gains* or in terms of *losses* (Kahneman & Tversky, 1984), or, more generally, focusing either on the positive or on the negative side of a two-sided outcome. Since the utility function is commonly steeper for losses than for gains (Kahneman & Tversky, 1979), different preferences might result from different framings, especially under uncertainty. The asymmetry of the utility function around a neutral reference point further implies that moving the reference point itself is a useful reframing strategy. If, for example, I move my reference point for clean air away from the current state of affairs towards a lower (healthier) concentration of toxic emissions, the current state will be judged as a loss, motivating action to overcome that loss.

Especially relevant to environmental decisions is reframing concerning the considered *time-horizon*. As discussed above, one of the major difficulties of environmental decisions arises from the fact that the negative consequences are substantially delayed. Hence, a myopic attitude favors the individually positive short-term, yet non-cooperative, option. A far reaching time-horizon will put more weight on the cooperative long-term option. This is why parents usually care more about the future, extending their self-related concerns to their children's life-time.

On a more general level, the *attitude* taken towards a decision problem is also a type of framing. According to Keeney (1992), the need to make a choice can be seen either as a problem to be solved, or as an opportunity to better achieve one's goals. Extending this view and assuming that problems as well as opportunities come as positively as well as negatively valenced situations, we distinguish four kinds of "decision attitudes" (Beattie, Baron, Hershey & Spranca, 1994) that a decision maker can adopt towards an environmental decision:

(i) as an arduous and troublesome *problem*, better to be avoided;

(ii) as an entertaining "brain teaser" problem, a *challenge* to be accepted;

(iii) as an *opportunity*, providing the chance to achieve one's objectives;

(iv) as a *danger*, jeopardizing one's currently achieved level of satisfaction.

Framings one and two, as a problem or as a challange, refer to the cognitive aspect; one might enjoy applying and developing one's cognitive abilities, or one might rather dislike the effort and pain of cognitive activity. Framings three and four, as an opportunity or as a danger, refer to the motivational or evaluation aspect; one can strive for an even better way to fulfil one's goals, or one may be content with the current level of achievement. Lopes (1987) discussed these differentiations with respect to risk attitudes, distinguishing in a similar fashion between a motive for security and a motive for potential. Representing a decision as a problem emphasizes the security motive and favors the (non-cooperative) status quo option; representing it as a challenge emphasizes the potential-motive, favoring the (cooperative) deviation from the status quo.

DISCUSSION

We proposed a descriptive psychological model of individual decision making in an environmental context, highlighting intervention points for creative transformations of environmentally harmful decisions towards pro-environmental preferences. The construction of a causal mental model, the application of moral values, and the elicitation of relevant emotions constitute the three building blocks of this model. The role of emotions as the main carriers of evaluation was emphasized: prospective emotions such as hope and fear result from anticipating future consequences, and retrospective emotions such as guilt and pity refer to immoral actions or harm done to others. Each model component provides a starting point for a specific type of creative transformation.

In an effort to analyze the specific difficulty of pro-environmental decisions, we then characterized an environmental decision as a choice between a pro-environmental and an environmentally harmful option. This kind of environmental decision problem was categorized as a social dilemma situation. The environmentally harmful decision option (the defective option) results in immediate benefits for the decision maker, but leads to delayed collective costs that often affect other people in distant regions or future generations, but do not necessarily affect the decision maker him- or herself. The pro-environmental option (the cooperative option) results in immediate inconveniences for the decision maker, but, in the long run, everybody will be better off if the pro-environmental option is chosen. This dilemma structure implies that an environmental decision cannot be fully captured by traditional SEU-models.

We claimed that a moral evaluation frame promotes pro-environmental behavior, since such a frame focuses upon actions rather than consequences. If one focusses on actions per se, the salient consequences of the decision that prevent the decision maker from choosing the pro-environmental option - incurring immediate inconveniences and only delayed uncertain benefits - become less relevant. A moral decision, as defined here, evaluates the type of action according to its compatible values, irrespective of its consequences. However, more than one moral principle might apply, and due to the strong resistence of moral values to be weighed against other values, a unique rational resolution of an environmental dilemma is often unlikely.

The dilemma characterization explains why environmental decisions are difficult and often defective. To improve this situation, we then proposed three prescriptive strategies creatively to transform the decision representation in a way that renders the pro-environmental behavior option more preferable: searching for new options, changing one's values, and reframing the decision problem. These strategies, or any of their sub-strategies, may lead to a new construal of the overall representation of the decision, and may consequently bolster the implementation of pro-environmental options.

The emphasis in this paper is on the individual person facing an environmentally relevant choice. However, environmentally relevant decisions are also made on more aggregate levels, such as institutions, nations, and global organizations. Hence, the individual-psychological perspective taken here is just one facet of a multi-facetted societal process of environmental decision making. As Thompson and Rayner (1998) point out in the context of climate change, a multitude of institutions, adhering to conflicting opinions about basic values, causes of climate change, and issues of fairness and equity, constitute the public discourse about environmental decisions. Societal institutions and social conduct as a whole are not just the aggregate of individual choices (the notorious "hidden hand"

leading to a best possible outcome), but institutions "shape politics through the construction and elaboration of meaning" (Thompson & Rayner, 1998, p. 323). The task of societal decision makers, such as politicians, is to make decisions on behalf of others, sometimes in accord with, sometimes against public opinion. Even decisions against the majority vote might sometimes be in the best interest of the majority (Lichtenstein, Gregory, Slovic & Wagenaar, 1990).

We will now discuss whether and how our model may also be applied to aggregate levels. Consider global change phenomena, and climate change in particular, as an example for aggregate decisions. In this case, the decision makers are nations (governments) that decide between policy strategies, such as whether and to what extent CO_2-reduction policies should be implemented. The structure of the decision problem is comparable to the environmental dilemma on an individual level. The decision is between different policy strategies, comparing the costs and benefits of the different strategies on the one hand and the "do nothing" option on the other. The latter option is the one that is associated with immediate nationally egoistic benefits: there are no costs for implementation of reduction strategies or for communicating these strategies to the population arise and potential damage resulting from climate change is not to be expected for several decades, such damage is uncertain, and will most probably not affect the developed industrial nations who cause the trouble. Again, the outcome depends on the actions of other nations; the best outcome would be expected by a free-ride strategy which involves doing nothing while all other nations implement mitigative strategies, so that one takes advantage of the global reduction of emissions without contributing oneself. Implementing reduction strategies, on the other hand, is associated with immediate implementation costs, the benefits are delayed and uncertain, and will be obtained only if most other nations cooperate. Game theory in its multiple variants has been applied to many types of international conflict (Parson & Ward, 1998).

Though the structure is comparable, the preferred option and its implementation may differ. Searching for new options will often be a technical problem, such as developing new technologies that consume less energy or that reduce CO_2-emission while causing fewer implementation costs. New options may also include social intervention programs to change individual behavior, such as implementing special ecological taxes, or the improvement or subsidy of the public transport systems in order to reduce traffic. The cooperative option to implement mitigative policies may seem much more attractive when applying changed values; for example, if the focus is no longer on economic costs and benefits, but on values such as equity between nations, responsibility for future generations, or, more immediate and concrete, peaceful international relations. For instance, the free-ride strategy appears as the best only when considering exclusively economic implementation costs, but it is disastrous with respect to intangibles such as trust and reputation. Even a pioneering strategy, implementing innovative reduction policies as the first and only nation, is desirable when evaluated in terms of international prestige or the advantage of possessing innovative cutting-edge technologies. Especially in resource dilemmas, it seems necessary to enforce cooperation by institutions with legal power; here, hope for a solution on an individual level is futile (Ostrom, 1990). Thus, we would argue that the concrete decision options differ for individuals and nations, while complex issues such as power and interest constellations are beyond the scope of our approach. However, the problem structure is similar, and similar creative strategies may be applied by an individual as well as on more aggregate levels of decision making.

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PART III APPLIED AREAS

A. PERSONAL LIFE

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CHAPTER 6

THE CREATION OF A REALIZABLE OPTION IN THE FACE OF MARITAL DISTRESS: APPLICATION OF A PERSPECTIVE MODEL FOR DECISION MAKING ON DIVORCE

Creativity is usually defined as an innovative idea, leading to a creative product, a piece of art or a scientific discovery. Decision making is strongly connected with action or with preparation for action (Montgomery, 1987). In this chapter I suggest that important decisions in individuals' private lives often depend on the ability to create an eligible alternative to the status quo. Moreover, I will show that this ability depends on the individual's skill and inclination for imagination and/or mental simulation, as well as on his or her executive abilities. Furthermore, I will argue that this decision making process, including the imagery connected with it, is driven by a need for self-development, self-esteem and/or selfenhancement.

Examples from an empirical study of the decision to divorce will be used for illustration.

Many people enter marriage (or marriage-like cohabiting relationships) with high expectations of satisfaction and permanence. The individual has made a public and private commitment to this particular relationship and invested energy, emotions, material goods and such, to its benefit and maintenance. It is well known that these factors work against a change of course (Levinger, 1965; Rusbult, 1980). Furthermore, divorce is likely to go against the individual's values and ethics and his or her perception of cultural norms. The pressures to stay in the relationship are strong. Fear of loss of security, financial as well as emotional, fear of guilt and loneliness, negative reactions from the social network, and negative consequences for the children and the other partner, must be overcome if a separation is to be carried out. Moreover, post-decision processes (in this case the initial decision to marry or live with a particular person) aim to protect the decision maker from regret at having made the wrong decision (Svenson, 1992). So, even if people differ in degree of commitment to a particular relationship (Rosenblatt, 1977) the re-making of an important decision meets many mental and practical barriers.

This paper focuses on the decision to divorce, when everything else to keep the marriage intact has been tried. The participants in this study had severe problems, one of the partners was in most cases very clear about wanting to leave, love was gone, disgust had often come in its place, and children were perceived to suffer. It may sometimes sound like I applaud divorce as a solution for marital distress. However, Gottman (1994) and Vaughan (1986) have clearly stated that there are points of no return, where disgust and contempt are among important indicators of this. Beyond these points it is very difficult to change the course of a relationship. There are researchers and clinicians who claim that any marriage can change for the better. It should be enough if one partner is willing to change and behaves accordingly and the other will, as by a natural law, follow (Reibstein, 1997). I hold this to be a romantic and unrealistic view, even though desirable. However, before this point of no return has occurred, I assume the couples have sometimes tried creative solutions to their marital problems. These acts are beyond the scope of this paper.

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 117-135.

PRIVATE DECISIONS AND DECISION MAKING RESEARCH

Little research interest has been devoted to the study of people's important decisions in their private lives, and even less has been written about how ordinary people may be creative in solving significant dilemmas in their personal lives. Some researchers have nevertheless attempted to include this type of decision in the general decision making field (e.g., Beach, 1993; Kozielecki, 1989; Montgomery, 1997). The contributions of these researchers will be discussed below.

A major life or personal decision has been characterized as having a heavy impact on the decision maker's life, by involvement of significant others, by involvement in the decision, by perceptions of risks and losses and by consequences for self and identity (Karlsson, 1987; Sloan, 1986). Studies on the decision to divorce (Willén, 1999) or having children (Willén, 1994) respectively, showed for instance the extent to which the self was involved in the process. Moreover, earlier research has found that decisions must be consistent with the person's perception of who he or she is today as well as who he or she wants to be in the future (Markus & Nurius, 1987; Schick, 1997; Sloan, 1984). Furthermore, there is a great deal of research showing that people are motivated to protect and enhance their self-esteem, not least through self-deception (for a review see, Baumeister, 1998). Another line of research has focused on the overlapping and merging of selves in close relationships, and shown how the self is expanded through assimilation of partner characteristics (Aron, Aron, Tudor, & Nelson, 1991; Aron, Paris, & Aron, 1995). In a severely troubled relationship it is plausible that the individual will attempt to enhance his self-esteem by withdrawing his investment of self in the other and the relationship.

Traditionally, investigations of human decision making have presented rational, analytic processing as a normative standard for decision making. This research has devoted much interest to decisions under uncertainty, and how people react to prospective gains and losses respectively (Kahneman & Tversky, 1979), but generally ignored the social context and often also the importance of the decision for the decision maker. Quite recently this approach has been challenged by the emergence of the naturalistic decision making research paradigm. In naturalistic approaches techniques are forwarded modeled closer to how decisions are actually made in "real life", employing more automatic, intuitive processing.

Naturalistic decision making researchers have often defined their field in opposition to that of classical decision making (Zsambok, 1997). Orasanu and Connolly (1993) defined eight features characteristic of naturalistic decision making as compared with classical DM. These were: (1) ill-structured problems, (2) uncertain dynamic environments, (3) shifting, ill-defined and competing goals, (4) action/feedback loops, (5) time stress, (6) high stakes, (7) multiple players, and (8) organizational goals and norms. NDM researchers have stressed an interest in the study of expert and not in naive subjects, in organizational as compared to private settings, and in the domain of emergency decision making rather than in people's ongoing lives. However, some researchers working within the NDM paradigm emphasize contextual influences, employment of a broad time perspective, and acceptance of complexity rather than reducing or controlling it (Montgomery, 1997). Beach's Image Theory was developed explicitly as a model for describing mostly personal decisions of more than routine importance by individual, unaided decision makers (Beach & Mitchell, 1987). I will also briefly discuss Kozielecki's (1989) idea of transgressive decisions, which are related to creative decision making. Later, the relation between these theories and

creativity is discussed.

Image theory. According to Beach (1993) the decision maker possesses three decision-related *images.* These images are knowledge structures (schemas) that constrain the decisions that he or she can make. (1) The value image concerns how things should be and how people ought to behave, and could collectively be called principles. This image contains ideas about right or wrong, good and bad, proper and improper and so on. Potential goals and actions that are incompatible with relevant principles are rejected.

(2) The trajectory image concerns the decision maker's goals and (3) the strategic image consists of plans for reaching the goals. Decision making, according to Beach, consists of accepting or rejecting potential goals and plans, and of monitoring the progress of plans as implementation proceeds. Potential goals arise from the need to satisfy principles. Potential plans come from past experience, training or by flashes of creative inspiration.

The decision maker is viewed as making up his or her mind about which goals to pursue, how to pursue them, and, once pursuit has begun, whether progress is being made. This gives an impression of a rational individual, having conscious control over each step in the decision making process.

Transgressive decisions. Kozielecki (1989) introduced the concept of transgressive decisions, which included decisions that played a crucial role in the development of the individual. According to Kozielecki "to transgress" means to go beyond a boundary, or reaching beyond the limits of knowledge and social activity. Clearly, he assumes that one class of transgressive decisions involves creative and innovative action. Among these decisions are attempts at self-development. However, Kozielecki does not elaborate on the particular ways in which transgressive decisions are creative.

The study aimed at testing Montgomery's Search for a Dominance Structure theory (Montgomery, 1993) and its extension; the perspective model for decision making (Montgomery, 1994). Therefore, I will elaborate in some detail on this framework Thereafter, I will discuss how creativity may play a role in personal decision making.

SEARCH FOR A DOMINANCE STRUCTURE THEORY AND A PERSPECTIVE MODEL FOR DECISION MAKING

Search for a Dominance Structure Theory. Montgomery (1993) found empirical support for the notion that individuals strive to control their thinking in order to reach dominance for a preferred alternative and thus be able to choose and stick to that alternative. Dominance is attained when one alternative is seen as better than all other alternatives on at least one dimension and not worse on any dimension. The idea is that the deciding person attempts to justify his or her decision in his or her own eyes as well as in other's.

Montgomery (1993) found that the decision making process proceeds through four phases. First, in the pre-editing phase the deciding individual attempts to simplify the decision problem by sorting out alternatives that are too unattractive to be considered. In the next step the individual finds a promising alternative and a tentative decision is made. The third step, dominance testing, means that the decision maker compares the chosen alternative with the other remaining alternatives more systematically. If it is still considered superior it will be chosen. If not, the decision maker will try and make it superior, through a process of re-structuring. This is done in the fourth phase called dominance structuring.

Montgomery found that decision makers increase the perceived difference between the preferred alternative and its rivals. Strategies to do so are to de-emphasize the significance of whatever deficits the preferred alternative may have. The decision maker may also bolster the advantages of the preferred alternative.

Perspective model. The present study is based on a development of SDS theory (Montgomery, 1994), in which it is assumed that the decision maker's structuring of a decision situation follows from adopting a given perspective and that a re-structuring of the representation of the same situation follows from perspective shifts.

The perspective model concerns the role of perspectives in evaluative judgments. A target may be seen as more or less good or bad depending on the perspective taken (evaluative perspective). For example, a rich man who is restrictive with his money may be seen as greedy from a beggar's perspective, but as thrifty from an heir's perspective. As is true for perceptual perspectives, an evaluative perspective refers to a relationship between a subject and target. A subject perceives a target from a certain mental position, the location of which determines how the target will be perceived. As is also true in perceptual perspectives, it is assumed that the target has different "sides" which may be in the foreground and in the background, respectively, depending on the perspective. More precisely, the model assumes that a given feature of a target (e.g. restraint with money) has a positive side (thrift) and a negative side (greed). This assumption is in line with Peabody and Goldberg's (1989) research, which shows that the large majority of personality terms have positive or negative variants with a common non-evaluative core. In the present study the subject is a marital partner, who may occupy different mental positions in relation to the target, and the target may be the subject him- or herself, the other partner, or a life without the current partner.

There are three factors that determine the position of the subject in relation to the target, namely (a) subject identification (that is, identification with role, person or group of persons which in turn are associated with certain interests) (b) the congruence between interests associated with the subject identification and features of the target, and (c) psychological distance from the target, that is, the extent to which the target is seen as positively or negatively relevant to the interests associated with the current subject identification. The subject identification determines which aspects of the target will be focused, the rule being that the subject will focus on aspects that may help or prevent satisfying the interests associated with the current subject identification. The congruence determines whether the positive or the negative side of the target will come into the foreground, the rule being that when the target is seen as congruent, its positive side will come into the foreground (e.g., thrift) and when it is seen as incongruent, its negative side will come into the foreground (e.g., greed). The distance determines the intensity of the experience (less intensity for longer distances) and also how much the subject will differentiate between foreground and background (less differentiation for longer distances). For example, a person who divorced many years ago (assumed to correspond to a long psychological distance) may experience his or her ex-partner with less intensity and with less differentiation between positive and negative traits than is true for a person who divorced very recently (short psychological distance). As in visual perception, a long distance perspective also implies that a broader area is overlooked (more features and targets are experienced simultaneously) than when the distance is short.

CREATIVITY IN PERSONAL DECISION MAKING

Creativity has been closely related to the concepts of imagination, fantasy, intuition, insight, and re-organization of a mental representation of a problem or situation. Some of these concepts are also found in the literature on decision making. For instance, Lipshitz (1993) claimed that reasoning is guided by mental imagery, and Klein (1989) included in the "rules of thumb" often used in decisions in naturalistic settings, automatic processes like "gut feelings", intuition, and visual imagery. Kahneman and Tversky (1982) introduced the concept of mental simulation, meaning an individual's ability to mentally construct "what might have been". Campbell (1960) believed that creative thinking involves precisely the same principles as trial-and-error learning. That is, a problem presents itself to an individual, who then attempts several "thought trials", until a satisfactory solution is obtained.

One of the more important characteristics of decision problems in real life is their ill-defined nature. In many choice situations alternatives are not given but must be created. There is thus room for the invention of entirely new options as well as continuous collection of new information regarding options already conceived of during the DM process. Sometimes experts face problems for which there is good guidance in standard procedures, manuals or checklists (Orasanu & Fischer, 1997). At others times the standard procedures will not satisfy the demands of the situation. New solutions must be invented. It has been claimed that everyday creativity is psychologically similar to that which underlies great discoveries (Smith, Ward & Finke, 1995). In people's private lives there are also choice situations where the alternatives are not well-defined or not even existing from the start, but where the future has to be projected (Karlsson, 1987) and alternatives be created (Hogarth, 1987). Beach (1987; 1993) did not write explicitly about potential creativity. However, it is possible to imagine decision situations involving conflict between the three images (values, goals and plans), or conflict between values, between goals and between possible paths to the goal. Such conflicts may require creative solutions that allow for personal integrity to be maintained (Schick, 1997). If I have understood Beach correctly, it is in the interaction between the three images that the (new) alternative may emerge, if not given beforehand.

Ward (1995) argued that ideas do not arise in a vacuum. Creative imagination is always structured in predictable ways by the properties of existing categories and concepts. This is true whether the individuals are professionals or everyday people fantasizing about a better world. Kozielecki (1989), in contrast, discussed a certain class of decisions whose main characteristic was that they went beyond the limits of knowledge and social activity. It is unclear, however, whether he suggested that it was only these decisions that were creative. According to Hogarth (1987) imagination and creativity always play key roles in judgment and choice. Moreover, Hogarth argued, to the extent that a person has an expansive imagination, the more rich and varied are his or her choice alternatives. Though imagination is necessary for creative thinking it is not sufficient. There is always a practical and realistic dimension in creativity as compared to daydreaming (Smith, et al., 1995).

Reorganization and insight. Insight is the process by which a problem solver suddenly moves from a state of not knowing how to solve a problem to a state of knowing how to do so (Mayer, 1995). Insight has been conceptualized as (1) completing a schema, (2) reorganizing visual information (3) reformulating a problem, (4) overcoming a mental block, and (5) finding a problem analogue (Mayer, 1995). The notion of insight in problem

solving originates from the Gestalt School (Köhler, 1927). The process of arriving at a new understanding of a problem situation was called restructuring by the Gestalt psychologists. Changing from one representation of a problem to a very different representation is restructuring (Dominowski & Dallob, 1995). In the perspective model shifts between perspectives are assumed (Montgomery, 1994). The perspective shift signifies a shift in global evaluation of a target, from positive to negative or in the opposite direction. Montgomery (1994) argued that the individual in a decision dilemma made more or less controlled attempts at restructuring positive and negative elements of the considered alternatives, as well as in the alternatives' positions in relation to each other. The aim of this testing of different variations of relations is to reach a viewpoint from which it will be possible to make and justify a decision.

Mental blocks. The subjectively expected utility (SEU) theory assumes that decisions should be reached by calculation of the utility of each alternative and the subjective probability of its occurrence. In contrast, Simon (1957) argued that people can successfully adapt to their environment by identifying actions that are merely satisfactory for their goals. So, rather than optimizing, he suggested that people were satisficing. It is obvious, however, that people sometimes neither optimize nor satisfices; they do not choose at all, and at other times they come up with what from the point of view of other's looks like a mistake. In a reply to Kozielecki (1989), Hogarth (1989) argued that it is necessary to explain why decisions sometimes are not made and action avoided, in order to understand how people approach real life dilemmas. This may have some relevance for the ideas presented here, because some couples neither divorce nor improve their marriages but passively hope that life will solve their problem. Some suggestions will be made as to the behavioral and cognitive differences between decisive and indecisive individuals.

Duncker (1926; 1945) discovered early on that people often become "fixed" in their usual way of perceiving an object, thus being hindered in finding a successful solution. This idea might be related to persons being stuck in private decision dilemmas. Duncker addressed the question: What prevents people from inventing creative solutions to problems – that is, from reformulating a given or a goal? This is indeed an important question that I will try to highlight in this chapter on a concrete level. However, let us add the following question: What is the process driving people to leave the world of daydreaming and start to create the imagined world out there?

AN EMPIRICAL STUDY OF THE MARITAL BREAK-UP DECISION

The study I am using as illustration was part of a larger project, aiming at testing the perspective model on a series of real life decisions. This particular study focused on changes in perception and evaluation of partner and self, and on how alternative options to an ongoing troubled relationship was perceived and evaluated. I will show how some of the distressed marital spouses and cohabitees actively shaped a concrete and realizable option for themselves, which included the projecting of a future self (compare to Karlsson, 1987). I will also suggest possible reasons as to why other participants did not resolve their decision dilemmas.

Participants

Twelve couples were contacted through ads in a local daily paper and Family Counseling Centers in Göteborg, Sweden. Ages were 22-65. All but the youngest couple had children. The oldest couple had grown-up children. Both partners of the couples considered themselves to be in a decision situation with regard to the future of the relationship. In most divorces there is one leaver and one who is left. In this paper the focus is on the initiators as they were the more obvious decision makers. However, when relevant for comparison, data from the partners who are left will be reported. The researcher made the decision which partner was driving the process on the basis of (1) the extent to which the participants had reached certain turning points (Vaughan, 1986) or, (2) at which stage in the dissolving process they were (Duck, 1982). Such signs were sometimes obvious, like having made the decision to divorce, having told the partner or even moved out. In other cases, one partner expressed a clear wish to leave, while the other wanted to maintain the relationship. Sometimes one partner did not express a wish to leave as much as extreme discontent and attempts to change the partner, as was found to be one important turning point in the work by Vaughan (1986), or an important characteristic of the dual (second) phase in the divorce process (Duck, 1982).

Procedure

Both partners were interviewed separately and in-depth for one and a half-hours at the department of psychology at Göteborg University by the author, who is also trained as a psychotherapist. The participants were told about the purpose of the study, and it was made clear that the interviewer could not provide advice or counseling. When asked for advice the interviewer referred to Family Counseling Centers. Confidentiality was ensured. Here the participants will be identified by fictitious names. The interview procedure may have influenced the decision process. Some participants made explicit that they had come to think in somewhat different terms than before the interview, and others expressed that they had been helped to make the situation clearer than it was before the interview.

The participants first were asked to express how the relationship with the partner had developed from the first contact to the present situation. Thereafter, interviews focused on (1) how the partner's qualities and behavior was perceived at important periods in the history of the relationship, (2) how the interviewee's self was experienced (3) how interviewees were thinking about breaking up or not, and (4) how the option of living without the partner was perceived. Most attention was given to the present.

Analysis of data

To analyze data a theory-driven interpretative analysis was used (Hayes, 1997; Miles & Huberman, 1994), which in the present case means that the data were categorized according to the perspective model. The analysis went through the following procedure. First, statements were marked and sorted according to focused target (partner, self or a life without the current partner). Secondly, the subject identification was identified, that is, whom he or she is talking about and whose interests are attended to. Thirdly, it was

determined whether the participant was talking about the past, the present or the future. Fourthly, the perspective was coded. Fifthly, strategies to deal with conflict and negative feelings were detected (inter- as well as intra-individual). Finally, perceived control over perspectives and the DM-process was coded.

Comparisons were made (a) on an intra-individual level, that is, how the partner, the self and life without the partner were described for each person, and (b) between individuals. This procedure made it possible to see individual as well as general patterns. On the basis of these comparisons it was possible to group the initiating participants into three groups (non-decision makers, pre-decision makers and decision makers) according to the characteristics of their decision status. Non-decision makers were caught in a decision dilemma. These participants typically perceived threatening and negative features of both a life with and without the partner. They apparently experienced an avoidance-avoidance conflict.

Three pre-decision makers reported having had similar experiences of being caught and vacillating, but had moved on to an active construal process aiming at strengthening the preferred choice. This included the enacting of overt (e.g., physical distancing from the partner) and covert (e.g., imagining a good life without the partner) strategies. Four persons (decision makers) had made the final decision to break up. Two of these had also moved out. Partners who were left were not categorized into different groups.

I will here illustrate with quotations how imagination was utilized at different stages of the decision making process and how decision makers' overt and covert behavior eventually led to a re-structuring and re-interpretation of elements in the decision problem. Finally, I will describe how an insight-like experience cleared the decision dilemma and enabled the individual to act. I will then discuss these results in light of the Perspective model.

RESULTS

The decision to break up from the relationship was preceded by an active mental creation of a realizable, acceptable option. This process led to a re-defining of a life with, as well as without, the partner and was characteristic of pre-decision makers and decision makers.

Non-decision makers appeared unable to move beyond the current situation, and were caught in an avoidance-avoidance conflict. Non-deciding participants were constantly vacillating between a strongly negative view of the partner and an equally negative image of a life without him or her. Partners who were left appeared too preoccupied or overwhelmed with the distressed relationship and with the escaping partner to focus on creative change in any direction. Only when the separation was a fact, a re-orientation was initiated.

Shift from Globally Positive to Globally Negative Evaluation

All participants (left and initiating) reported having had an overall positive picture of the partner in the earlier stages of the relationship. For most participants this picture had, suddenly at some point or more gradually, radically changed into a globally negative

picture. Some showed signs of still being in this process of change. The interviews showed that the participants were generally preoccupied with their partner's misbehavior and the negative aspects of their personal qualities.

Utilizing a variety of strategies, such as blame, self-control and manipulation, a subjectively experienced "hidden" or "lost" partner was urged to re-appear. However, the focus on negative traits decreased the salience of the more positive characteristics. Decision makers and pre-decision makers had attempted to restore the relationship, but ultimately came to believe that these attempts were in vain, and that something new was called for, as in the following extract: Rose-Marie, decision maker: "*.../ it took some time before I understood that I made all the decisions /.../ and /.../ also single-handed had to deal with the consequences. I reached a point when I said to myself, what am I doing? I also understood that I could not change him, only myself, but even so if I changed myself, which I did /.../ nothing changed about him anyway.*"

Non-decision makers wanted to decide in favor of the relationship. They, too, were acutely aware that a change was called for, although what kind of change was unclear, as expressed by Sara:

Sara, non-decision maker: "*We do not have any sexual life at all. For me it is an enormous strain and Stefan feels the same /.../ but I feel like it is not possible to go on like this, we must find some (solution) /.../ or I fear the change so to speak, to walk out on him. Much because of the children, I don't know what I have done (to them).*"

A keyword in these extracts is change; fear of change (Sara) and expected, but not yet experienced change (Rose-Marie).

Insight-Like Experience Leading to Further Distancing from the Partner and Approaching a Single Life

Four participants had decided to leave and two of these had moved out. I will begin with uncovering the decision making process backwards, from the moment the decision was made. For a while we will focus on these four participants only.

Decision makers had experienced at least one clear moment when the pieces fell into place and they knew how to choose. This moment of clarity could take on the features of a sudden insight or of a more gradual, but noticeable clearing of the picture. The first quotation (Erik) is an example of a sudden change:

Erik, decision maker: "*The issue came up again a couple of weeks ago and that made me suddenly make up my mind. I had had enough /.../ (My feelings) for Ellen became more indifferent so to speak.*"

Erik's feelings suddenly changed, leaving him less involved with Ellen. Erik felt that his making up his mind *and* becoming less emotionally close to Ellen happened simultaneously. The second extract is from the interview with Rose-Marie, who realized more gradually that she could not go on to live with her husband:

Rose-Marie, decision maker: "*I made my decision the past fall, but I had been contemplating it for a very long time. I had started to realize that this couldn't go on. I didn't feel ready at the time. But even if I am still scared to death for what may happen to me, it can't be worse (than it is). I gave him telephone numbers to (a family counselor); we have done this and that. But nothing ever happens. After having waited for years, I can now see there was no sense in waiting for the impossible to happen.* "

Erik and Rose-Marie had both been contemplating leaving their partners for a very long time. However, Erik vividly recalled a particular moment when he made up his mind, while Rose-Marie's decision grew more gradually until she just knew that she knew.

The initial shift from globally positive to globally negative evaluation of the partner indicated an increased psychological distance from the partner. The insight experience signaled a further distancing in relation to the partner. Increased distance was indicated by for example perceiving the partner as metaphorically smaller, and in need of the initiator's protection and guidance, or as a feeling that nothing the partner could do had the power to really upset any more.

Erik, decision maker: "*I don't think Ellen understands what is going to happen, how it will affect her life. I try to talk to her about it. I think it will help her to grow a little, having to make her own decisions.* "

Rose-Marie, decision maker: "*It is much much more peaceful and better now, because, if he does something (bad), I can think, oh, it will soon be over. So it doesn't really matter to me. Because I have given up the struggle to make it work, it doesn't hurt me so much any more.* "

In contrast, a life on their own was described in lively and involved terms by both of them:

Erik, decision maker: "*I am looking forward to a life with the children very much. I think I can take on a new responsibility (for the children). I can see in my mind what it will be like. And I can see Ellen starting a job or starting a training program.*"

Rose-Marie, decision maker: "*I am much concerned with where I want to live, how I want to live and how I will arrange my finances and which things I want to take with me, what I think is his and what is mine and I think a lot about that kind of stuff. I have decided which lawyer to engage. I am very ready to get started.*"

Compare the above statements with that of Sara, who most of all wanted to stay in her relationship:

Sara, non-decision maker: "*I have tried to think about a life without him. What it would be like. They are only images, swimming around in my mind. I just don't know.*"

As we can see, the very idea of living without Stefan was very unclear, very vague. Sara could only see a frightening chaos, that is only the threatening features of the idea of a life without her man were highlighted.

Active Creation of an Option

Dynamic interaction between evaluations of life with partner, life without partner and aspects of self. Evaluations of partner, life without the partner and self interacted dynamically to carry the decision making process forward. Thus, changes in evaluation in of any of these instances seemed to cause changes in the other two. Supposedly, a movement can start with fluctuations in perception of self, partner or an alternative life that in turn are triggered by external or internal events. For instance, perceived *increasing* psychological distance from the partner co-varied with *decreasing* psychological distance from a life without the partner. Attempts to maintain distance from the partner led to further exploration and building up of an alternative life. However, the most important result, as I see it, lies in the process through which the self is withdrawn from the current relationship *and* instead connected with features of a new life. In the following section I will show in

more detail and with illustrations how these processes worked.

Chaos and the burning of bridges: Increasing psychological distance from the partner. Carl's relationship with Clara lasted for fifteen years. For about the last seven years he wanted to leave her. At one point he realized that he wanted to leave, found himself unable to do so, without knowing why. Instead he found himself in the situation of expecting unwanted fatherhood. Carl expressed a sense of confusion that mainly had its roots in conflicting motives and values, that is between self-interest and the interests of others, particularly the children. He resolved this conflict mainly by information search (that supported his preferred option) and by attempts to share the burden of guilt. The latter goal was attained by attempts to persuade his wife that he was not the right partner for her. Carl, decision maker, said:

" Clara and I had more or less left each other. But I couldn't control the fact that she removed her (IUD), she told me but yes I was weak there. I understood during the pregnancy that we have never been able to talk to each other about anything. For the first time in my life I realized that I couldn't leave when I wanted to. Either there were barriers, or I didn't want to, or I was afraid or it didn't feel right. I don't know, but I couldn't do it. It was the responsibility for the children, not for Clara. I started to read books about children and divorce and found that, if we do it in a good way they will not become criminals. (Did you take any steps to leave?) *Yes, exactly. I lived by myself. I shut her out. I didn't share feelings. I didn't want to hurt her though. I wanted her to come to this conclusion for herself. I think I have done many things over the years to make her leave me but she never did. Gross insults and the like. Everything that has changed in our lives is due to me, including the divorce."*

In this quotation it becomes obvious that Carl strove to eliminate his own guilt both through sharing of the burden, but also through distancing himself from his wife, Clara. That she still mattered very much to him, although in a highly negative way, contributed to his confusion. This came through in the contradictory statements that he didn't want to hurt her, but obviously did with his rude behavior and in saying that he had no responsibility for her.

Carl's example illustrates one way to construe a decision situation, namely through active distancing from the partner. However, what eventually led Carl to make the final decision was the growing conviction that a life without Clara was the better option from all points of view. How did he arrive at this conclusion?

The building of new bridges: Decreasing psychological distance from a life without the partner. The active destruction of attachment to the partner as described by Carl was paralleled by an active creation of a realizable alternative option. The meaning of the metaphor of burning and building bridges will be illustrated in the following quotations. All four decision makers and three pre-decision makers used some or all of the following strategies, with the aim of creating a realizable option.

The symbolic and real meaning of action: Anders had not yet made up his mind. He was not fully aware that he was not only building a physical space for himself, but also an entirely new life, a complete "room" including friends and interests to move into when the situation became clear to him.

Anders, pre-decision maker: "*Some bad days I think I might leave her, I play the guitar in my own room. I fought for it, I have rebuilt a small chamber to be on my own, with keyboard and synthesizer and guitars, I go in there, after we have quarreled, and sit there playing. I don't need anything. She has to accept it. In my dark moments I dream about a*

single life, I have friends and interests, I will meet other people. I am an outgoing person."

Changing the meaning of what one has always been doing. Rose-Marie, feeling more and more lonely in her marriage, changed the meaning and frequency of behaviors that she had always been carrying out.

Rose-Marie, decision maker: *"I have invested more energy in friends during the last years. But, at the same time, I have always attended courses and worked in the evenings so, really, there is not that much difference, really, I have always had friends. But, maybe I make more of an effort now, I sort of, grasp new friends in an entirely different way, than I used to do. They are much more important to me. "*

Mental exploration of possibilities: All participants engaged to some degree in fantasy or mental exploration of another life. The main difference between those who decided to leave and those who did not, was that non-decision makers lingered at a mere day-dreaming level, while decision makers were much more elaborate in their ideas. Peter had not yet decided, but apparently was on the edge of making a decision. He waited for something decisive to happen. In the meantime he dwelled on thoughts about a way of slipping out without being noticed.

Peter, pre-decision maker: *"I can see two alternatives. Either we learn to live together and then perhaps it will work, or, we don't learn to live together. And in that case we can't live together. But I hope that I will not have to say such a thing, because I don't want to. It is possible that I will get a job somewhere, for instance /.../ abroad /.../ And everything will be resolved. Then I could claim practical reasons practical circumstances. I think I am too afraid to hurt other people. I wish that the problems would just disappear, and everything would be fine. But that will not happen. I will have to do something actively. Solve it. I am imagining a lot of things about everything. So I also imagine what it would be like to live under other circumstances, to live on my own. Yesterday I couldn't sleep because I was imagining what it would be like to start at this job, move away. I started to prepare myself mentally, so to speak."*

Peter's imagination, deliberately or not, brought him farther away from Pia, and closer to a single life. What he imagined he took steps to realize and he had already started to apply for jobs that would make his fantasy come true. One important difference between decision makers and non-decision makers was this tendency to act on fantasy, to make it come true. None of the non-decision makers reported these vivid imaginations.

Creating a world outside of the relationship. A feature of decision makers, related to mental exploration, was the creation of a real world outside the relationship that served the double function of increasing distance from partner and decreasing distance from leading a life as single. Non-decision makers and partners who were left alike, both turned inwards to the relationship, shut others out and did not develop a sense of being an independent agent in relation to the rest of the world. The more blocked they felt, the less activity was reported that might eventually lead to a resolution. Decision makers planned and implemented a life that could be carried out within the relationship, but sometimes was thought of as a life-saving activity. It was emphasized that in acting in a particular way the participant could not control the consequences for the relationship. It was implicit or explicit that the reported actions were carried out against the wishes of the partner.

Anders, pre-decision maker: *"I don't need another woman. I need the music for my personal development. That is why I am going to apply to music school, I can't keep it as a hobby anymore. She has to accept it and she is not willing to do that. Maybe it will increase distance between us, but I can't control it. It exists and it is very important to me. She can*

choose to accept it or not. Just so. Also, I see other people. And I have got many friends (of my own) around the city."

In this quotation Anders reported that he would go through with his plans no matter what. Anders, a pre-decision maker, had already made a choice and taken preliminary steps to realize it. He anticipated that the realization of his dream would make it difficult for him to stay close to Anna. These two goals were seemingly incompatible. However, what he would choose if pressured was clear. *Comparisons with alternative partners*: No participants were currently involved with other partners. However, there had been such affairs or interests in the past. The participants compared these other persons with the current partners, usually to the disadvantage of the partner. The alternative partners seemed to possess everything their partners did not. The comparisons led to validation of the negative view of the partner and helped in keeping distance from him or her.

Anders, pre-decision maker: "*I had an affair. It lasted for some months. She was very kind and sympathetic and very musical and interesting. At that time, it was very interesting. She had everything I missed in Anna. She had a simpler way of being, was not so categorical, not so hard, softer, nicer, and also interested in music. She was an entirely different kind of woman.*"

One of the non-deciding women had had an affair during her marriage. But while Peter and Anders (pre-decision makers) made a decision to breakup on-going affairs to make the best out of their marriages, Bodil never made a decision. Rather, she made the decision to have both men, and eventually was abandoned by her lover. Sara and Ellen still dreamt about pre-marriage passionate lovers, compared with whom their current husbands looked tame, uninteresting and sexually inadequate.

Carl, a decision maker, considered having a love affair with someone, but realized that he could not live in such a situation. He decided that either he would stay in the relationship and be faithful or leave his wife and have a new "real" relationship. The impression was that decision makers, when facing a dilemma, made active and determined attempts to resolve it, decided what they wanted and not wanted, and acted upon their insights, at first in their imagination, trying out the consequences, and then in their real lives. Non-decision makers, on the other hand, had a history of indecisiveness and of becoming fixed in rigid ways of meeting dilemmas, which was among other things indicated by a preoccupation with the past.

Self-perception that facilitated or hindered the creation of a realizable option. The participants were also asked to describe the self. Five aspects were found: (1) self as compared with partner (2) self in relation to partner (3) self as perceived by partner (reflected self-perception), (4) self as perceived by others than partner, and (5) core or independent self.

First, the participants made comparisons between self and partner, as they were perceived presently as well as how they were perceived in the past. The descriptions of partner and self centered around a set of key-characteristics. Early in the relationship the partner was often perceived as better than the self on these key dimensions. At some point this relation between perception of partner and self had changed dramatically. It is unclear if these changes happened simultaneously or, if not, which change came first. However, when the self was now compared with the partner, the self usually appeared good and the partner bad on this same trait dimension. This pattern was stronger for non-decision makers for whom the partner's behavior still mattered a lot. Pre-decision makers and decision makers showed a tendency to change this polarized black and white evaluation to a less

value-laden description of differences, signifying a more distanced perspective on the relationship as a whole and a detachment from the partner. In the initial stages the couples often described their differences as complementary or as contributing to their own personality. Later the same differences were perceived as a nuisance and as a justification for leaving the partner, while their own qualities were bolstered.

Secondly, the initiating participants perceived themselves as generally badly behaved in relationship to the partner, although they sometimes thought they had good reasons for their behavior. "I behave badly but it is his/her fault." With increasing distance there were signs of a helping self in relation to the partner. The initiators seemed to be saying: "I am helping you, I will see to that you don't suffer too much. I have left behind the chaos of indecisiveness and now I am ready to help you through." Thirdly, most actors believed that the partners had a low opinion of them. Initiators tended to see themselves as "bigger" then the partners, and perhaps also superior.

The fourth aspect, statements about how they were viewed by others, varied over individuals, and were less frequent. The fifth aspect is the most interesting for the purpose of this chapter. This category contained statements that concerned a positive self-image independent of the relationship to the partner. The farther the participants had come in the process of breaking up, the more elaborate was this part of the self-image. Building up an independent self went hand in hand with building up an alternative, or to some extent were two sides of the same thing. Compare with Anders' statement above about starting Music School. He said that this was part of his personal development, but it was also part of a life separate from Anna. Non-decision makers did not have a clear sense of self or of what they wanted and did not want from life. Their selves appeared to be buried in the past. Decision makers were more able to hold and express a clear view of who they were what they wanted and where they were going. The decision makers perceived themselves as on the threshold to a new, promising life. I will finally illustrate the difference between the future optimism of a decision maker and the lack of future prospects in a non-decision maker.

Sara (non-decision maker): *"I have no frame of reference with which to make a decision. I feel that I have to take a hold of these questions, the kind of choices I make, why I don't choose, for instance in making demands about contraceptives (for instance). That I can't stand up for myself and why. I have to go on with this therapy thing. I hope I will learn something because I feel so vague. Not to take conflicts and why I don't do that, and how I feel when I make these non-choices."*

Anders, pre-decision maker: *"Suddenly I realized that this (music) is something I am good at. I want to make my own music, go out in the big world with it. It is a large part of me and will continue to be so. I would like to teach. I like people, like to be with people."*

In sum, all participants in this study had radically changed their perception of the partner from a positive to a negative evaluation, and defined their relationships as in need of a reorientation. Some participants had decided or were close to deciding to leave, while others were stuck in a decision dilemma. Some participants (the partners who were left) did not want the divorce. Decision makers and pre-decision makers were characterized by the following points as compared with non-decision makers and partners who were left: (1) They increased psychological distance to the partner by deliberate overt and covert behavior

(2) they engaged in mental exploration and experimentation of alternative possibilities (3) they employed facilitating strategies, such as (a) creating symbols for the new life imagined within the frames of the relationship (b) changing the meaning of ordinary acts

(c) creating an independent world outside of the relationship (d) making active comparisons with alternative partners and (e) deliberately nurturing an independent self at the expense of the relationship self.

DISCUSSION

CREATIVITY IN BREAK-UP DECISION MAKING PROCESSES

I think it is possible to claim that decision making participants in this study showed creativity in their decision making. Hogarth (1987) argued that creativity is always involved in judgement and decision making, and I think these results demonstrate the truth of this claim. Moreover, it appeared that lack of creativity led to being stuck with a difficult personal decision. Another important aspect of creativity was the ability to leap from day-dreaming to a practical and realistic dimension (Smith et al., 1995). Our decision makers demonstrated this leap. Even if insight is a somewhat debated concept (Ohlsson, 1992) it seemed to play an important role for decision making individuals. There was clearly a moment of illumination that simultaneously was functional as a point of no return (Vaughan, 1986). It is interesting that the three pre-decision makers appeared to be "warm" (Davidson, 1995) in the sense that they seemed to "know" that they were approaching a solution and were awaiting its occurrence. They did not appear to feel much in control over this event; rather they exhibited confidence in what might come.

Decision makers and pre-decision makers demonstrated vivid and realistic imagination, thoughtful exploration and evaluation of possible consequences, ability to take the leap from imagination into the real world, and mentally to re-structure their representation of the problem until insight was achieved. In contrast, non-decision makers and partners who were left did nothing of the sort. Duncker (1926; 1946) argued that people sometimes become fixed in their usual way of perceiving an object. I think that the inability to change the situation in any direction was a kind of mental block. If mental exploration of alternatives occurred at all, it was vague and fearful in kind. The "fixedness" lay in perceiving the situation as impossible to change in any radical way and that the solution was to do more of what was already being done, such as attempts to change one's representation of the situation by self-discipline, rather than explore the possibilities of imagined alternatives. The partners who were left naturally felt that they had no control over the situation. This perceived lack of control led to a pre-occupation with the partner's moves and with alternate attempts to go along with his or her demands or resist them. Hogarth seemed to be right in his claim that creativity is necessary for decision making. Moreover, it appears that too many demands on attention (such as threats and negative emotion) blocks the generation of creative solutions and leads to problem fixedness.

USEFULNESS OF THE PERSPECTIVE MODEL IN ACCOUNTING FOR CREATIVITY IN DM

Descriptions of a decision making process based on the perspective model clearly gave insights into the role of imagination and mental exploration of alternatives. The model implies important concepts that have been suggested to signify creativity for many years. These concepts are re-structuring and perspective shift, which were powerful in capturing

the creative and intuitive processes involved in solving personal decision dilemmas.

Search for a Dominance Structure theory (SDS) (Montgomery, 1993), assumes that people in a decision making situation will strive to make one alternative appear dominant and thus be an acceptable option. This is made particularly clear in a situation where there are barriers for making the preferred choice, as in the decision to divorce. The perspective model suggests that people feel their way towards a viewpoint or position in relation to the different possibilities, where the differences between the alternatives will appear optimal (Montgomery, 1994). The model assumes that the individual exerts some degree of control and thus actively chooses between perspectives, as if they were given. However, the results from the present study demonstrated that the possible perspectives were not given, but had to be created actively to allow for something entirely new to emerge. A mental position was taken that could not possibly have appeared in that particular person's mind before this point. Other authors have suggested that people do not make decisions through rational weighing of pros and cons, but rather through automatic processing (e.g., Dunegan, 1993). The participants in this study did not experience any conscious control over the process. Rather, the process appears driven by motivational factors, which influenced the participant to active imagination and mental exploration of new possibilities, and to exert behaviors that supported and validated the imagined world at the expense of the real world, which was a distressed relationship.

During this process the individual may experience mental chaos, including emotional distress. He or she may feel at his or her wit's end. Suddenly there is a change of balance, often caused by a minor event, and a new pattern emerges, with new relations between the involved elements. This experience is typical of what has been called insight in problem solving. The participant feels relieved and is ready to act. Furthermore, a change in psychological distance in relation to the partner appears. For a long time has the decision maker striven to distance him- or herself from the partner by avoiding emotional stress. This striving has been partly successful, but with insight this process is completed and the decision maker experiences that the attachment to the partner is suddenly much weakened.

Enhancement of self. The self is not an entity existing in a vacuum. Taylor and Brown (1988) found that people are generally motivated to see themselves as good, and they may also look to significant others (or their peer group) for information about the self (Mead, 1934). In a close relationship it seems as if there is a perceived overlap between the self and the partner (Aron et al., 1991; 1995). In a detachment process this overlap must cease to exist. Also, motivation to evaluate oneself positively is expected to motivate people to avoid persons and situations that make them think badly about themselves. To choose another option then the status quo the individual had to connect the self with entities that were independent of the partner, that is characteristics of a life without him or her.

GENERALIZABILITY AND IMPLICATIONS

This was a small study and should be generalized with caution. The participants were self-selected and might differ from a "typical" divorcing couple. One question is whether these findings are valid for couples that are not experiencing advanced conflict. For instance, Gottman (1994) found that couples handled issues of conflict in three different ways. Some couples were conflict engaging (and my couples belong to that category), other couples were volatile and a third group were conflict avoiding. It is likely that the latter two

types also would behave differently in a separation.

Decision making regarding individual laypersons' personal futures is a modern phenomenon, and also one that is highly characteristic of our time (Giddens, 1991). People are not only inclined to create themselves and their futures, they also experience pressure to do so. According to Giddens, we have to make decisions about almost every step we take, such as which food to eat or which clothes to wear, because all these behaviors are expressions of the self. Giddens argued that certain kinds of decisions are particularly "fateful". These decisions come when the individual stands at a crossroads in his existence, and are highly consequential and problematic. Fateful moments include the decision to get married, the decision to separate, deciding to opt for an apprenticeship or course of study or when a person decides to collect all of her savings and start a business.

Characteristic of modern times is also the sheer number of possibilities and the combination of different possibilities. This is complicated enough but in the demands to create your own self there are expectations to be what has not been before, that is to create new possibilities and options. There is an obvious risk that the individual will become overwhelmed by existential anxiety and become "fixed" in one familiar way of viewing the problem.

Hogarth (1987) was probably right; modern life requires creativity and imagination to enable the individual to test existing possibilities and create new options in his or her mind. As researchers of decision making we should not forget that decision making and action take place in a social context, in a particular time. In future research we ought to be a little more aware than we have been, how ideology in a certain culture affects individual decision making.

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CHAPTER 7

CONSTRUCTIVE PSYCHOLOGICAL PROCESSES BEFORE AND AFTER A REAL-LIFE DECISION

Creativity seems to be something that many of us think we understand, but understand in different ways. Barron and Harrington (1981) describe how definitions of creativity vary according to different attributes, such as, elegance, beauty of the product, nature of impact, achievement and personal ability. The word 'create' means that something that was not there before is made to appear. The matter used in a creative process can be anything from clay to non-conscious thoughts. In the present chapter we use creativity as a characterization of how a decision maker structures and processes information in a decision problem. The invention of new decision problems, new alternatives, restructuring of alternatives can, to some degree, serve as indicators of creative decision making. The generation of goals or objectives in a given situation, can also reflect a decision maker's creativity (c.f., Keeney, 1992).

Differentiation and Consolidation (Diff Con) theory offers a framework for the study of creative decision making (Svenson, 1992, 1996). In Diff Con as in most other decision theories, a decision problem (such as the choice between job offers) consists of decision alternatives characterized by aspects (e.g., SEK 15 000 per month, Stockholm city). The aspects can be ordered on attributes (e.g., salary, location), and thus creative decision making refers to how each of these components are represented and used in the decision process.

In the following, Diff Con will be presented and processes representing creative decision making will be identified within the Diff Con frame of reference. An empirical example with a real-life decision will be the focus of the chapter and used to illustrate creative decision making. Diff Con research explores ways in which decision problems can be solved and the approach is descriptive even if it could be used for tentative prescriptive generalizations. Therefore, at the end of the chapter some speculations will be offered about how results from Diff Con research could increase creative thinking in human decision

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 137-151.

making.

One and the same objectively defined decision problem can be seen very differently by different decision makers. Some decision makers may have ready made solutions to a decision problem and others may have no such solutions. The need for finding creative solutions varies across different participants even when they make the same objective decision. To illustrate, some decision makers may make a decision according to some simple rule, such as family or cultural norms, while others find the same decision very hard, requiring a great deal of creativity. A young person's decision to enroll in a career program at a university can be a very easy decision made without any hesitation, but it can also be a very difficult task involving, for example, value conflicts that could be solved in creative decision making.

If different individual representations of the same objective decision problem appear when a group of people make the same decision, this has interesting methodological implications. Because, if the theoretical framework for an empirical study assumes that the decision makers who are studied use different representations and decision processes, then a uniform data analysis treating the group as the unit of analysis cannot be recommended. Instead, separate individual analyses should be performed or the decision makers should be grouped together according to how they represent the decision problem. In the latter case individuals who represent a decision problem in the same way are grouped together to form subgroups that can be analyzed as a "homogenous" samples. The results from such analyses of subgroups show how a decision problem *can* be solved (given how it is represented by the decision makers) and not how a majority or the average decision maker would solve the decision problem. Of course, this does not exclude the possibility that the other decision makers could have solved the problem in the same way if they had represented it in the same way as the individuals of one of the homogenous subgroups.

DIFFERENTIATION AND CONSOLIDATION THEORY

Decisions can be either fast and largely automatic or slower evolving from a process in which one alternative is successively differentiated from the other alternatives (Svenson, 1992, 1996). Most often, there is no need for creativity in quick automatic decision processes of which the decision maker is not consciously aware. However, when exploring creative decisions post hoc, one might find that fast automatic processes have produced these decisions. Slower decisions can be followed using process tracing techniques throughout the differentiation processes more easily, and therefore the creativity of these processes can be assessed in a more detailed manner than when quicker decisions are analyzed.

One important assumption in Diff Con theory is that the goal of a decision process is not just to find an alternative which is just superior in comparison to its competitors. Instead, it is necessary to arrive at a situation in which the preferred alternative is sufficiently superior in comparison to the other alternatives (Svenson, 1992). The process of differentiating one alternative from the others can be performed in a straightforward way using the information available as it is, or it can be performed through reshaping the decision problem and applying different decision rules to arrive at a sufficiently superior alternative. Diff Con theory asserts that the latter more creative processes take place when decisions are important and difficult. In this way, some degree of creativity enters Diff Con

theory when the theory is applied to important and difficult decision processes, such as decisions with great possible losses and decisions involving value conflicts. Diff Con identifies four groups of differentiation processes, namely (1) holistic, (2) process, (3) structural and (4) problem restructuring differentiation.

Diff Con theory models quick automatic decisions as *holistic differentiation* processes. These processes are quick, often largely without conscious control and categorize a decision problem as well as the alternatives. In addition, the processes automatically select the preferred alternative. Holistic differentiation often leads to a degree of differentiation which is immediately sufficient for a decision. Holistic differentiation can be seen as a classification activity related to, for example, processes studied in social psychology, such as the use of exemplars in social judgment (Smith, 1992), and share characteristics with perceptual affect holistic type cognitive processes (c.f., Zajonc, 1980). Holistic differentiation is also one way to arrive at a preliminary choice alternative that is later tested in other decision processes following the nomination of the preliminary choice (c.f., Beach, 1990).

Process differentiation can also be used to reach a decision. Here, decision rules, such as the conjunctive and addition of attractiveness rules are applied to differentiate one alternative from the rest in *decision rule differentiation* (Svenson, 1979). According to Diff Con theory (Svenson, 1992), if more than one rule can be used to support an alternative, the support of a second rule will normally increase the degree of differentiation. *Criterion differentiation* is another kind of process differentiation. Here, acceptance criterion levels on different attributes are changed during the decision process. To illustrate the effects of creative decision making, a more creative use of decision rules could lead to a decision with less effort or to a decision that is better differentiated, than a decision reached in a routine process.

Structural differentiation processes change the decision alternatives so that their perceived representation of facts and/or attractiveness are changed to support the preferred alternative. For example, the quality of an expensive but very attractive and beautiful car may be successively upgraded in beauty in *attractiveness restructuring* during a decision to secure a sufficient level of differentiation. Another way of restructuring is *importance restructuring*, that is, to mentally change the importance of an attribute (e.g., price, mechanical quality) so that the preferred or preliminary choice is supported (Svenson, 1992, 1996). *Facts restructuring* changes how we perceive facts. For example, the price of a car that one wants to buy becomes much lower in one's memory than at the auto dealer.
Creative decision making is highly relevant in *decision problem restructuring.* This is particularly relevant in real life decisions (c.f., Abelson & Levi, 1985). The decision maker may not accept a decision problem as it first appears. Instead, the decision maker may find out that the situation requires quite a different decision. To exemplify, in a decision to buy one of two new cars, the decision maker may understand that another decision that was never considered is really more important. This may imply that he or she restructures the problem so that the decision becomes a choice between (1) a used car and a house repair and (2) a new car (whatever make).

Structural differentiation, and in particular, attractiveness and importance restructuring are two powerful ways of achieving sufficient differentiation related to creative decision making. Therefore, they will be in focus in the empirical part of the present chapter. Differentiation through attractiveness restructuring changes the mental representation of a decision so that one or more decision rules achieve stronger support. This is accomplished

by a shift in the way the attractiveness of the aspects are derived from the decision maker's value system. Differentiation through attribute importance restructuring changes the importance of attributes across alternatives. This can be done by increasing the importance of those attributes for which the chosen alternative is perceived as better and decrease the importance of attributes where the non-chosen alternative is superior. Combinations of these two methods are also possible.

Diff Con theory covers both the time before and following a decision. In the post-decision phase a chosen alternative is further differentiated if necessary (Svenson & Benthorn, 1992; Svenson, Ortega Rayo, Sandberg, Svahlin & Andersen, 1994). If the outcome of the decision is poor, or if the values of the decision maker change, *post-decision consolidation* is needed to strengthen the prior decision and avoid regret and change of the decision. Empirically it has been shown that consolidation appears when decisions are important or when they involve value conflicts (Svenson & Hill, 1997; Svenson & Malmsten, 1996). The processes active in consolidation are similar to those appearing in differentiation with exception for some decision rule applications. In fact, the pre- and post-decision phases are sometimes hard to separate because "a point of decision and no return and complete commitment" cannot always be clearly identified. Consolidation in the post-decision phase can be driven by internal psychological processes (for example, changes in a decision maker's goals, a need for a clear cognitive structure) and externally driven events and processes (for example, outcome of a decision, changes of the premises underlying the decision).

EMPIRICAL ILLUSTRATIONS OF CREATIVE DECISION MAKING

Svenson and Hill (1996) found that participants who had a value conflict associated with their choice performed differentiation and consolidation differently than participants who had no value conflict. To specify, if a participant indicated that the non-chosen alternative was better than the chosen on one of the two most important attributes, then differentiation and consolidation was strongest on that attribute. An average disadvantage was not only eliminated but turned into a clear advantage on the same attribute over the pre- and post-decision phases. For participants without a value conflict no corresponding strong effects could be found. The Svenson and Hill study covered pre- and post-decision processes before the implementation of the decision. Svenson and Malmsten (1996) followed participants also after the implementation and outcome of their decisions. Here, participants who did not achieve a successful implementation of the alternative of their choice consolidated less than those who were successful. On average, the latter group eliminated their prior value conflicts and turned prior disadvantages into advantages. Svenson and Shamoun (1997) identified five different ways of handling such value conflicts in structural differentiation and consolidation processes that could illustrate creative decision making. The different strategies are: (1) *Reversing an attractiveness disadvantage into an advantage on conflict attribute*, with no significant changes on other attributes. The preliminary selected alternative is inferior on the conflict attribute in this case. To exemplify, imagine a choice between two cars, one with a less attractive (high) price but very comfortable, and a second car with an attractive (low) price but less comfortable. Solving the conflict by applying the present strategy implies that the buyer of

the cheaper car thinks that, in the end this alternative has become even more comfortable than the more expensive alternative; (2) *Compensating for a disadvantage on an attribute through increasing an advantage on another attribute.* In the example above, according to this strategy the disadvantage of the comfort attribute for the cheaper chosen alternative is accepted and unchanged. But here the disadvantage of the chosen alternative is compensated by upgrading the attractiveness of its price; (3) *Reducing disadvantage on conflict and decreasing advantage on non-conflict attribute.* Here, the decision maker reduces the disadvantage on the conflict attribute while, at the same time, he or she decreases the attractiveness advantage on a non-conflict attribute. The initial disadvantage can be reduced into an advantage in some cases (Svenson & Hill, 1997). Overall ratings of attractiveness of the chosen alternative, as a result of this strategy of conflict reduction may remain largely unchanged, but the attractiveness pattern defending the choice becomes radically different; (4) *Increasing advantage for chosen alternative both on conflict and on other attributes.* This strategy can be exemplified by the car buyer who, after the decision, upgrades all attributes, which makes him believe that the chosen alternative is generally better than the non-chosen alternative; (5) *Downgrading of importance of conflict attribute or elimination of the conflict attribute.* This strategy of conflict reduction implies importance restructuring according to Diff Con theory. This strategy can be performed alone or in conjunction with one of the other patterns above. In our example, the car buyer could, for example, make the comfort attribute so unimportant that it no longer contributes to the overall differentiation. All of the above strategies have the purpose of reducing initial disadvantages on important attributes of the choice alternative. Svenson and Shamoun (1997) conducted analyses of individual decision makers relating their conflict solutions to the five patterns above. Salo (1997) conducted a study that was similar to the one presented by Svenson and Hill (1997) using real-life decisions. The results indicated a significant reduction of the conflict on the conflict attribute just as described by strategy 3, but not the more creative change, turning a prior disadvantage into an advantage.

The above strategies to solve value conflicts can all represent creative decision making in which the decision problem is recreated to allow a decision according to Diff Con theory. The empirical study that follows below was conducted in order to follow up the earlier results indicating creative decision making. More specifically, the restructuring of disadvantages into advantages was chosen as the focus of the study. Decision makers who face a conflict are predicted to differentiate and consolidate to a greater extent than decision makers without conflict. In addition to attractiveness restructuring measures, data on attribute importance restructuring will be analyzed.

METHOD

PARTICIPANTS

A total of 37 students (32 females and 5 males) in the college for staff nurse trainees in Landskrona, Sweden participated in the study. Their ages ranged between 17 and 20 years with a mean of 18.2 years. At the start of the study the participants were going to apply for different educational programs in two months time. The programs were designed for different careers in health care (emergency room treatment, psychiatry, primary care, child

care, treatment of developmentally retarded, and rehabilitation). The two main tasks of the participants in this study were (1) to rate the importance and attractiveness of the two most attractive programs on four attributes selected by each decision maker her-/himself, and (2) select the two best alternatives and to chose the best of these. That program should be the one subsequently applied for by the student.

MATERIALS

The materials consisted of: (1) an instructional decision example, similar to the decision task that was later used in the study; (2) a decision response form asking for the two most attractive career alternatives, and names of the four attributes they considered most important for a choice. Each participant was also asked to rank order and to rate the degree of importance of each of the four attributes he or she had listed. The importance of the decision as a whole was also rated. The participants also rated the two best alternatives with regard to their attractiveness on each of the four listed attributes. The attractiveness of the alternatives as a whole was also rated. The materials also included a page with additional questions not treated here. All judgements were made on 100 mm long lines. The labels of the response scale lines reached from "bad" to "good", or "low" to "high", and the ratings were marked by small vertical bars on the lines.

PROCEDURE

Before the main sessions, all participants were trained using the instructional decision problem in order to become familiar with the procedure. The participants gave their ratings on each of four sessions (T1-T4), two before and two after the application deadline (i.e., the time of the official real decision), with about one month in between each of the sessions. Thus, in all the study covered about three months. The attribute names given by each participant at T1 were printed in advance on each individual participant's own forms for sessions T2-T4. The same procedure was repeated through all sessions. A small gift (a compact-disc voucher, value SEK 80, approximately US$ 10) was given to those who completed all four sessions.

RESULTS

Two participants were excluded from the data analyses because of incomplete answers, leaving 35 participants for the further analyses. The results in the following data analyses are means of ratings, or mean differences between ratings, measured in millimeters on the 100 mm long response scales. According to Diff Con theory and prior research, the most important attributes should contribute more to differentiation and consolidation than less important attributes. Therefore, results from analyses of data for the two most important attributes will be emphasized in the following.

OVERALL ANALYSES

Holistic importance. At the first session, the participants rated the importance of the decision as generally high. From T1 to T3 there was no significant change in mean importance (77.8, 75.1, 78.0), and at T4, a small but only marginally significant decrease appeared (from 78.0 to 73,4 [$t(33)=1.96$, $p<0.06$]).

Attribute labels. The participants generated various attributes as being most important for their decisions. Attribute names relating to the same general content were grouped under one attribute label. A taxonomy for categorization of attributes described by Svenson and Hill (1997) was used. First, single attributes were grouped according to similarity of content. Second, these groups were classified into specific descriptive domains or meta attributes. The participants generated attributes fitting into six of the original eight meta attributes. The other two original meta attributes: *own ability in relation to alternative*, and; *information about alternatives*, was not used by the participants in this study. In addition to the original meta attributes, the participants also generated new attributes that did not fit into the original meta attribute categorization. Table 1 shows the categorized attribute labels generated by the participants for the most and the second most important attributes.

Personal interest seemed to be the major attribute for the participants' career choices. This attribute also generated more conflicts compared to other attributes. Future oriented attractiveness, which, was the second most used attribute, generated only one conflict.

Importance of attributes. From the above it is clear that the decision makers created various attributes as the four most important ones for their decisions. In the analysis of attribute importance during the four sessions, each decision makers' individual rank order of importance at T1 was used to identify the attributes through the remainder of the study. The initial importance ratings (T1) ranged from an average of 88.6 for the most important attribute, to 55.7 for the fourth in importance. The importance of the most and second most important attributes decreased over sessions. Fitting regression lines to each attribute, $Y= -2.77X+88.74$ [$t(138)= -2.60$, $p=0.01$], and $Y= -2.38X+82.44$ [$t(138)= -2.21$, $p<0.05$], where Y signifies importance and X number of session, gave significantly decreasing linear trends for both attributes.

Attractiveness advantage of the chosen alternative. The difference between the attractiveness ratings of the chosen and the non-chosen alternatives (or attractiveness advantage) was calculated as an indicator of differentiation on each of the four attributes. A positive sign indicates an attractiveness differentiation favoring the chosen alternative, and a negative sign a disadvantage for the chosen alternative on the particular attribute. The following analyses focus on the two most important attributes as motivated above.

No significant changes in the attractiveness advantages (ANOVA repeated measures) indicating differentiation or consolidation on the two most important attributes could be observed from T1 to T4.

Holistic attractiveness. The holistic attractiveness advantage for the chosen alternative seemed to be approximately constant from T1 to T4. A repeated measures ANOVA showed no significant changes.

The relative stability of the overall attractiveness evaluations replicated recent findings within the Diff Con framework (Salo, 1997; Svenson & Hill, 1997; Svenson & Shamoun, 1997) in which the overall results were unable to demonstrate attractiveness restructuring.

Table 1. Attributes Generated by Participants Making a Career Choice. First and Second Denote Most Important and Second Most Important Attributes Respectively. The Attributes were Grouped into Meta Attributes According to the Taxonomy in the Svenson and Hill (1997) Study. Attributes that did not fit into this Categorization System were Grouped into new Meta Attributes.

Meta attributes	Attributes grouped according to content	Number of participants using attribute			Conflict attribute	
According to Svenson and Hill (1997)		Tot	First	Second	First	Second
Content quality	Quality of program	2	1	1	-	-
Process quality	Teachers work quality	1	1	-	1	-
Personal interest (now)	Personal interest	19	9	10	2	2
Future oriented attractiveness	What I want to work with	16	8	8	-	1
Instrumental attractiveness in future	Usefulness for future work	2	1	1	-	1
	Usefulness for future in general	9	4	5	-	3
	Possibilities for vocational development	1	-	1	-	-
Social attribute: others' choices	Defendable choice	2	1	1	-	-
Other	Well being	9	7	2	2	1
	Enjoyment	2	2	-	-	-
	Sensation seeking	2	-	2	-	-
	Work mates	3	-	3	-	-
	Earn money	2	1	1	-	-
	Σ	70	35	35	5	8

ANALYSES OF CONFLICT AND NON-CONFLICT DECISION MAKERS

As defined above, a (serious) value conflict decision contains a chosen alternative that is inferior in attractiveness to the non-chosen alternative, on one of the two most important attributes. In all, 13 value conflicts were found at T1 according to this criterion. Five conflicts were found on the most important attribute, and 8 on the second most important attribute. The conflicts were distributed over 11 participants, with two participants having conflicts on both attributes. This means that about one third of the participants made decisions under value conflict. The two participants who had conflicts on both of the most

important attributes were excluded from the following analyses because of the risk of confounding the conflict attribute and the (other) non-conflict attribute in the data analyses.

Holistic importance. The analysis of the decision importance ratings for these nine participants showed that participants with initial value conflicts reduced the importance of the decision over time after the decision had been made (73.75, 71.62, 68.50, 59.50). Comparing this with the participants who had no conflict, no such changes could be found in the non-conflict group (80.40, 77.68, 81.31, 79.45). Figure 1 illustrates this. An analysis of decision importance ratings from T1 to T4 crossed with groups of participants with a value conflict, and participants with no value conflicts showed no main effect of time according to an ANOVA with repeated measures $F(3, 84)=2.33$, $p=0.08$. Tests of between-group effects indicated that the groups differed [$F(1, 28)=4.36$, $p<0.05$]. *t*-tests between the conditions for each T, showed that the main effect of difference between the groups was at T4 [$t(30)= -2.66$, $p<0.05$], as could be expected from Figure 1.

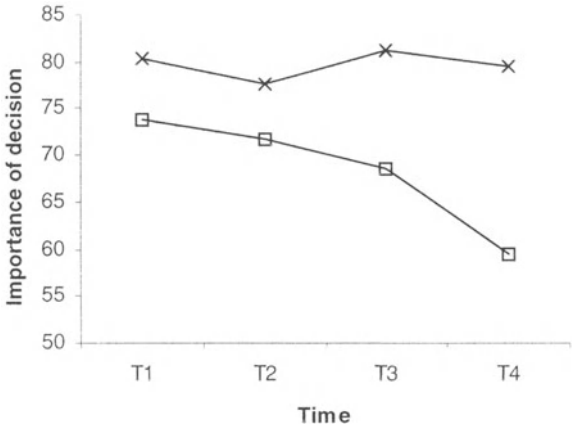

Figure 1. Decision Importance Ratings Given by Participants with an Initial Value Conflict on Either the Most or the Second Most Important Attribute, and Participants with No Conflicts at All. Squares Denote Conflict Group and X's No Conflict Group.

It is interesting to note the interrelation between decision importance and time for the conflict group. Concerning the causal relationship it is only possible to speculate to which extent a value conflict can be alleviated through downgrading the importance of a decision or if the reverse is true.

Importance of attributes. The conflict group rated the importance of both the conflict attribute and the other attribute as very high at T1. The values were reduced over the sessions (*conflict attribute*: 84.11, 77.66, 73.77, 65.55, *other attribute*: 90.66, 78.00, 74.33, 72.33). Figure 2 shows how the importance of the attributes changed over time. By the end of the period the conflict group's conflict attribute had been downgraded most in importance. This contrasts with the non-conflict group's most important attribute that rather seem to gain in importance on the last session.

Simple *t*-tests comparing initial and final importance give significant decreases for the conflict group only, [$t(8)= 4.05$, $p<0.01$] for the conflict attribute, and [$t(8)=4.23$, $p<0.01$] for the non-conflict attribute. Fitting a linear function to the data from the conflict attributes

together gives: Y= -5.95X+90.16 [t(34)= -2.93, p<0.01]. The attribute without conflict in the conflict group was also degraded but less so. No statistically significant changes occurred in the non-conflict group.

The differences in importance between the conflict and non-conflict groups were computed for the two most important attributes to further illustrate the differences between the conflict and non-conflict groups. First, mean importance was computed across the two most important attributes across each session T1-T4 for each group. Second, the difference between the conflict and non-conflict group means was computed for each session. In this way it is possible to show how the importance of the most important attributes in the conflict group decreases in a process de-emphasizing importance, in contrast with the non-conflict decision makers.

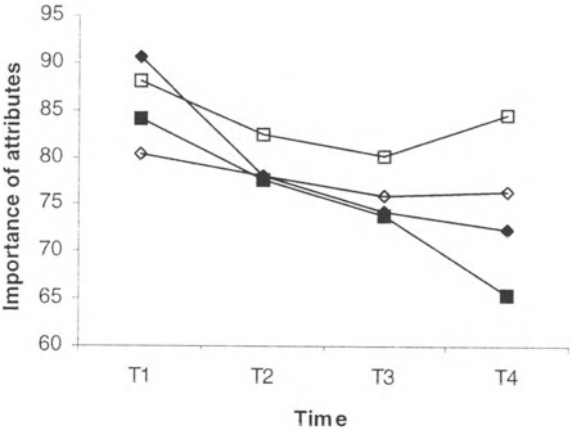

Figure 2. Restructuring of Attribute Importance from T1 to T4. For the Conflict Group, Importance on the *Conflict* Attribute is Denoted by Filled Squares and the Non-conflict Attribute by Filled Diamonds. For the Non-conflict Group the Most Important Attribute is Denoted by Open Squares and the Second Most Important Attribute by Open Diamonds.

Thus, the initially equal importance for the conflict and non-conflict groups was gradually transformed over time (see Figure 3).
This shows how the decrease in importance over sessions was greater in the conflict group. An ANOVA with repeated measures gave significance for the interaction between group and time, [F(3,62)=4.40, p<0.01]. t-tests between the conditions for each T, showed that the main effect of difference between the groups was at T4 [t(55)= -2.35, p<0.05].

To summarize, the results indicate that participants in the conflict group decreased the overall importance of the decision more than the non-conflict participants. In addition, the conflict group also decreased the importance of the conflict attributes to a greater extent than the non-conflict group. These effects can be interpreted as creative decision making in which the importance of a decision and the most important attributes are downgraded more by groups with a decision conflict than by groups with no such conflict. In other words, conflict may trigger creativity.

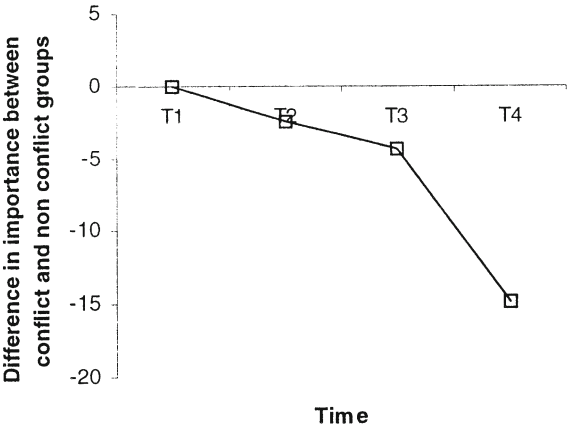

Figure 3. Mean Importance Difference Between the Mean of the Two Attributes in the Conflict Group and the Mean of the Two Most Important Attributes in the Non-Conflict Group.

ATTRACTIVENESS DIFFERENTIATION AND CONSOLIDATION

Attractiveness of attributes. To facilitate the analysis of the impact of value conflicts, a conflict *aggregate* attribute was identified. This aggregate consisted of ratings of attributes on which there was a value conflict regardless of whether the attribute was judged as most or second most important. Correspondingly, the *other*, non-conflict attribute, of the two most important attributes was treated as one attribute across participants. In this way all nine participants could be analysed as one group. To repeat, for each person in the conflict group there was one conflict attribute and the other of the two most important attributes was called the other attribute

Figure 4 shows how the attractiveness difference between the chosen and the non-chosen alternative (i.e., the advantage of the chosen alternative) developed over time. The conflict attribute is denoted by filled squares and exposes a trend from a disadvantage (that is the initial conflict) to an advantage following the decision (-10.00, -4.00, 2.11, 4.11). This trend is significant when fitting a linear function to attractiveness advantage $Y=4.84X - 14.05$ [$t(34)=2.29$, $p<0.05$]. For the other attribute (no conflict) the trend is not significant. However, Figure 4 indicates how the non-conflict attribute seems to be given a more favorable evaluation in the later stages of the process for the conflict group.

To sum up, participants in the conflict group differentiated and consolidated their decisions over the sessions. The effect was strongest on the conflict attribute. No attractiveness differentiation or consolidation could be found for non-conflict participants.

It is interesting to break down the effects shown in Figure 4 into their components. Such an analysis showed how participants with a value conflict on the most and second most important attributes reduced their attractiveness ratings on both the chosen (76.66, 70.55) and the non-chosen alternative (86.66, 74.55) from T1 to T2. At T3 the chosen alternative was upgraded in attractiveness (73.66), crossing over the ratings for the non-chosen alternative that continued its decline (71.55).

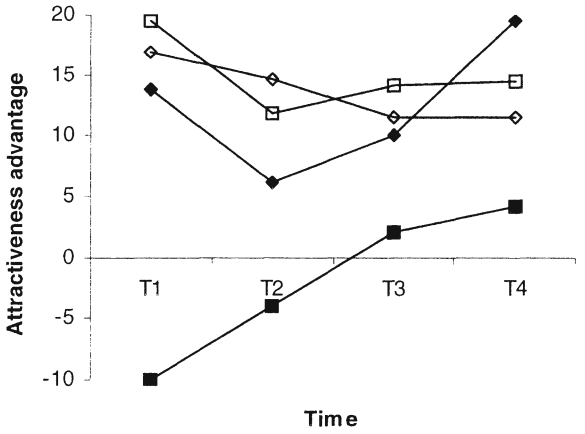

Figure 4. Restructuring of Attractiveness Differences from T1 to T4. For the Conflict Groups, the Mean Values of the Attractiveness Differences on the Two Conflict Attributes were Averaged to Represent the Total Impact of Value Conflict on Attractiveness Restructuring (Filled Squares). The Other Attribute with no Conflict (Filled Diamonds) was also Computed in the Same Way. The Non-conflict Group is here Represented by the Most (Open Squares) and the Second Most Important Attributes (Open Diamonds).

Thereby the conflict was solved mainly through restructuring of the attractiveness of the non-chosen alternative while the chosen alternative did not change significantly (see Figure 5). At T4 the reduction continued for both the chosen (66.77) and the non-chosen alternative (62.66). Fitting a regression line to the data from the conflict group's non-chosen alternative gives a significant linear decrease: Y= -7.50X +92.61 [(t 35) = –3.60, p=0.001].

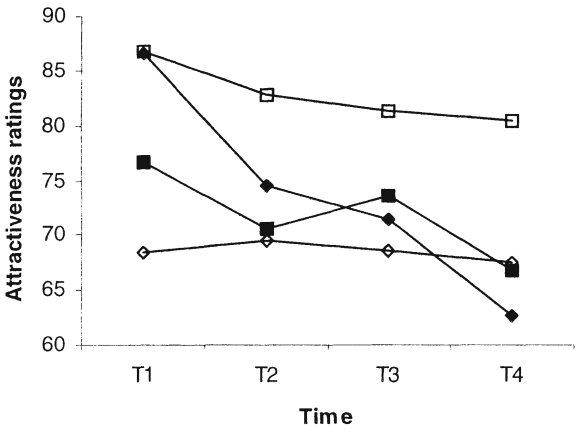

Figure 5. Mean Values of the Participants' Attractiveness Ratings on the Aggregated Most and Second Most Important Attribute. Squares Denote the Chosen Alternative, and Diamonds the Non-chosen Alternative, for Participants with a Value Conflict (Black) and No Value Conflict (Open) Respectively.

CONCLUDING REMARK

The main trends can be related to strategies of value conflict solutions suggested by Svenson and Shamoun (1997). The present results show that participants with a value conflict reversed the attractiveness disadvantage into an advantage on the conflict attribute (strategy 1). The "other" attribute was mainly used for the restructuring. The results of importance restructuring showed that conflict decision makers downgraded the importance of the conflict attribute. This corresponds to strategy 5 in Svenson and Shamoun's classification. Hence, two of the creative strategies suggested by Svenson and Shamoun (1997) were confirmed in the present study.

DISCUSSION

The present results corroborate the results reported by Svenson and Hill (1997) that decision makers under value conflict differentiate and consolidate their decisions in attractiveness restructuring more than non-conflict decision makers. The present study has also shown that decision makers under conflict decrease the importance of the conflict attribute. This kind of differentiation and consolidation could not be revealed by Svenson and Hill (1997), but illustrates attribute importance restructuring predicted by Diff Con theory.

A creative decision is not necessarily a prescriptive or normatively good solution. Creative solutions can be quite poor both for the decision maker her or himself as well as for others. In the following, we will present some thoughts relating creativity to decision goals, formulations of decision problem, decision processes, alternatives and the attributes characterizing the alternatives.

All decisions refer to implicit or explicit goals derived from affective and value systems (see Svenson, 1999 for an elaboration of this within the Diff Con framework). Creative goal elicitations include transformations of goals, for example, change of life style goals and making existing diffuse and unclear goals clear and distinct, for example, creating a principle or structure that fits earlier vague conceptions. New goals can also emerge in creative processes, for example, transformations in which two earlier contradictory goals are merged into one common goal. However, note that it is not necessary that the created goal is prescriptively or normatively satisfactory. It may even be at variance with normative theory and yet the product of a creative process.

Agents, who first structure decision problems and identify alternatives for others, have great power over those making the decisions. This is because those agents have both defined the decision problem (e.g., as an economic problem) and the alternatives (e.g., funding A or B). A great deal of creativity but also integrity is needed by decision makers who can challenge such a pre-structured decision problem and reformulate it creatively (e.g., as a problem of power) with new decision alternatives (e.g., getting rid of person C or D).

According to Diff Con theory all processing of information is performed in relation to a structural goal (to find a sufficiently superior alternative). There may be different ways of reaching that goal and some decision rules may seem more creative than others (e.g., self-deceiving reasoning). Creativity can be inferred from the restructuring of the information about a decision problem in terms of facts and attractiveness. When decision makers with a

value conflict restructure attractiveness so far as some of the students in the present study, this is a creative transformation that is presumably both unexpected and new.

Although creativity does not guarantee better decisions it can help. As just mentioned, a total restructuring of a decision problem is sometimes necessary for improved decision making. Generally speaking, challenging the presentation of a decision problem and the values elicited can lead to creative and improved decision making. Diff Con theory is a descriptive and not a prescriptive theory. Therefore, no definite prescriptive conclusions should be drawn from empirical research based on Diff Con theory. However, it is interesting to note that decision makers seem to solve value conflicts by changing their evaluations of the most important attributes (Svenson & Malmsten, 1996; Svenson & Hill, 1997; this study). Allowing ourselves some more flexibility could enable us to adapt a little better to the decision problems in our daily lives, and encourage us not to prematurely freeze our evaluations on the most important attributes in decision conflicts.

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CHAPTER 8

CONTINGENT DECISION MAKING IN THE SOCIAL WORLD: THE "MENTAL RULER" MODEL

People judge or make decisions in various situations in complex social settings (Fischhoff, 1996; Klein, Orasanu, Calderwood, & Zsambok, 1993). Utility theory is a representative system for explaining various decision making phenomena. It uses mathematical methods and is introduced frequently in consumer activity research in the field of political economy. Although utility theory can explain most decision making phenomena, it cannot completely explain contingent decision making due to problem description (e.g., Tversky & Kahneman, 1981), decision procedure (e.g., Tversky, Slovic, & Kahneman, 1990), and external task factors (e.g., Payne, Bettman, & Johnson, 1993; Selart, 1997). For example, as Tversky and Kahneman (1981) illustrate, even if the completely same alternatives are formed in the same objective situation, the decision made may be different, depending on the way in which a mental representation is created.

This chapter will first explain why utility theory cannot completely explain contingent decision making. Secondly, the decision frame model (Tversky & Kahneman, 1981) as well as the psychological purse model (Kojima, 1959; Kojima, 1994) will be introduced from a critical stand point; and finally, a new model of contingent decision making will be introduced, since utility theories (including such nonlinear utility theories as the rank-dependent utility theory) are often violated as pointed out above.

The mental ruler model assumes that people subjectively construct circumstance in order to create a simple one-dimensional mental ruler, then make decisions using the ruler so created. This one-dimensional mental ruler flexibly created in the decision-making situation may enhance the adaptiveness and effectiveness of problem solving. On the other hand, a mental ruler which is inflexibly applied to the decision-making situation may cause functional fixation and block creative problem solving because of the fixed one-dimensionality. This problem will be discussed later. Not all decisions are one-dimensional; rather, despite the multi-dimensional nature of an object, there is a possibility that one-dimensional decisions are made with considerable frequency in naturalistic situations in order for people to cope with the complexities of the social world. Multi-dimensional judgments and decisions are of course made in some cases as assumed by various conventional decision theories.

**This chapter is based on a revision of an earlier discussion paper entitled "A mental model of creative process in naturalistic decision making: Its qualitative and mathematical representations" (Takemura,1998b). However, mathematical descriptions of the model were eliminated in this chapter for editorial reasons.

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 153-173.

Unlike recent versions of utility theory or prospect theory, the mental ruler model treats utility, value and subjective probability as basically the same evaluation function. Furthermore, unlike other theories, this model forecasts instability of judgment beyond the endpoints of the mental ruler, and also forecasts other characteristics, as described later.

CONTINGENT DECISION MAKING AND THE PROBLEM OF ITS MODELING

CONTINGENT DECISION MAKING

Contingent decision making is regarded as the most typical decision making phenomenon. Contingency (situation-dependency) can be observed very frequently and widely, as seen, for example, in the following phenomena (Takemura, 1995;1998a). The contingency phenomena as mentioned in items (1) to (6) below are not independent of one another, but may occur concurrently. ere, contingency is defined broadly, in order to enable a more general discussion.

(1) Time contingency. A phenomenon in which a different mental process is observed, or a different judgment or decision made, depending on the time at which the judgment or the decision is made. This phenomenon includes effects of time pressure and delay on judgment and decision making.

(2) Contingency of personal relations. A phenomenon in which a different mental process is observed, or a different judgment or decision made, depending on the personal relations involved in the situation where the judgment or the decision is made. The two cases presented here are the case of a different person and that of a person's change in status.

(3) Procedural contingency. A phenomenon of contingency for a judgment or a decision which depends on the procedure by which the judgment or the decision is made. This phenomenon includes the response mode effect, which violates procedure invariance (Tversky, Slovic, & Kahneman, 1990) and causes a different outcome depending on a decision making procedure, such as a matching task or choice task.

(4) Descriptive contingency. A phenomenon of contingency which depends on the descriptive form of the information necessary for making the judgment or the decision. This phenomenon includes the framing effect, which violates description invariance (Tversky & Kahneman, 1986).

(5) External environment contingency. A phenomenon of contingency which depends on the existing external environment when the judgment or the decision is made. This type of contingency includes decisional effects of task factors, such as task complexity (e.g., Payne et al., 1993) and contextual factors (e.g., Selart, 1997).

(6) Internal condition contingency. A phenomenon of contingency which depends on the internal condition of the person when the judgment or the decision is made. This type of contingency includes decisional effects of affective factors (e.g., Forgas, 1995) and personal involvement (Verplanken & Svenson, 1997).

WHY IT IS DIFFICULT TO EXPLAIN CONTINGENT DECISION MAKING USING UTILITY THEORY

In order to answer this question, let us consider a case of descriptive contingency. For example, suppose an answering phone whose standard price is $198.00 sells for $148.50 at an electrical goods store. The effect of the POP (point of purchase) advertisement announcing this decrease may either say, "$49.50 off the standard price" or "25% off the standard price," although both descriptions convey the same discount information. In fact, Kojima (1986) reports that if an article is considered to be a top-level brand by consumers, it sells better when the discount percentage is indicated than when the discount amount is indicated, while an article considered to be a lower-level brand sells better when the discount amount is indicated than when the discount percentage is indicated.

This kind of phenomenon indicates that the same decision problem in mathematical terms may elicit different decisions psychologically that cannot be explained by utility theory, which tacitly assumes mathematical descriptive uniqueness. Most utility theory and mathematical models disregard differences in descriptive forms in order to generalize their explanations (Takemura, 1994, 1996).

Recently, new models have been introduced attempting to explain contingency in decision making under the framework of utility theory (Fishburn, 1988; Takemura, 1994; Tversky & Kahneman, 1992; Tversky, Sattath, & Slovic, 1988; Tversky & Simonson, 1993), but they can explain only part of the contingent decision making (for example, preference reversal of choice and matching, framing effect under risk, context effect by alternative positioning). There is still no theory to date that can explain contingency in decision making from a unified perspective.

EXISTING QUALITATIVE MODELS EXPLAINING CONTINGENCY IN DECISION MAKING

One possible approach to dealing with contingency in decision making, which is so difficult to systematize mathematically, is to capture the complicated phenomena involved by describing them qualitatively or metaphorically. The decision frame and psychological purse models are the two representative methods in this approach (Takemura, 1998a).

The Decision Frame Model

Tversky and Kahneman (1981) propose a psychological framework in which to represent decision making problems. They indicate that the decision making process comprises an editing stage to identify the problem and an evaluating stage to evaluate alternatives according to the representation of the problem; and that a different decision can be made for the same problem depending on how the decision frame is constructed in the former stage. Although they gave little explanation of the nature or the function of the decision frame, they explain contingency by using an intuitively easy term, "frame", and show by experiment that consumers make different purchasing choices if they are given different frames.

The Psychological Purse Model

More than 20 years before the research conducted by Tversky and Kahneman (1981), Kojima (1959) had already indicated that consumers are affected greatly by the contingent representation of a problem when they decide on purchases or regard satisfaction after those purchases. He elucidated contingent representation by a constructive concept called the "psychological purse." According to this model, consumers act as if they have several different purses, and pay from the different purses according to the article, the kind of service provided, or the purchasing situation. Even if they pay the same amount for the same article, if the purse they pay from is different, they will feel a different degree of satisfaction or dissatisfaction arising from the expense (Kojima, 1959; Kojima, 1994). Kojima, Akamatsu, Hama (1983) conducted factor analytical research based on questionnaires and clarified from which kinds of psychological purse various items of merchandise were purchased.

PROBLEMS WITH PREVIOUS MODELS

The qualitative decision frame model takes up a positive frame corresponding to value function in the gain area (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) and a negative frame corresponding to the value function in the loss area. However, more kinds of frames can be assumed to exist in real decision making situations. Although it may be easily understood that all frames can roughly be classified into either positive or negative, there must be other types of classifications of frames. For example, the judgment or the decision on "which alternative is more beautiful," "which is bigger," or "who is more generous," cannot easily be made, and it is unknown whether it can be interpreted by prospect theory corresponding to decision frame. We cannot explain the judgments about "how generous a person is," as shown by Hsee (1998) by positive and negative frames alone.

Whereas the psychological purse model shows what kinds of psychological purses exist by factor analytical research, this model only works at the stage of situation classification. Moreover, it is naturally a model of consumer purchasing behavior and may be applicable to activities other than purchasing, such as corporate or accounting activities. However, it cannot explain other everyday decision-making problems.

In addition, both the decision frame model and the psychological purse model do not completely indicate how the frame and the psychological purse function in the decision making processes. That is to say, while both models deal with the internal structure of decision making problems and indicate that their internal structure has a great effect on decision making, they do not give sufficient explanation to certain issues. For instance, it is unclear how the decision maker psychologically constructs the situation, what kind of nature or function the decision frame or the psychological purse has, or how the judgment or the decision is elicited.

QUALITATIVE DESCRIPTION OF THE MENTAL RULER

BASIC HYPOTHESIS AND BASIC PROPERTIES

The mental ruler model helps to solve the above-mentioned problems, as well as develop the basic ideas contained in the decision frame (Tversky & Kahneman, 1981) and psychological purse models (Kojima, 1959; 1994).

The basic hypothesis of this model is that people make decisions as if they carry around a measuring stick. In everyday life in Japan it is often said metaphorically that everyone uses a ruler with different values to make decisions; and if we consider this more seriously, it may prove to be more useful than we might think for explaining contingency in decision making. Objects subject to the mental ruler can basically be divided into gain and loss areas, just as in the decision frame model, but phenomena which cannot be classified into such areas can also be included, such as judgments based on personal impression, like generosity or calmness, or judgments about probability.

Let us first consider the basic meaning of a "ruler." The reason why people use a physical ruler is to avoid unevenness and distortion when judging length. A physical ruler enables us to judge length with confidence. If there is no physical ruler, what do we do? We probably envision a ruler in that situation, which can be regarded as a creative process in the representation of a decision making problem.

Now let us further consider the properties of the mental ruler in order metaphorically to capture and discuss the characteristics of decision making.

(1) *Basic Property 1: The ruler has gradations.*

I assume that people make decisions based on the gradation of the mental ruler, which can be fine or rough, just as millimeter or centimeter gradations on the physical ruler. For example, let us consider judgments on price. Fine gradations help consumers sense differences by even 1 cent. On the contrary, rough gradations are good for sensing differences of several hundred dollars. Such differences in sensibility concerning prices can be described by the fineness or roughness of the gradations of the mental ruler being used. As will be discussed later, we can imagine changes in the roughness of a ruler's gradations depending on the situation.

(2) *Basic Property 2: The length of the ruler is fixed.*

This property seems quite basic, but the metaphor denotes a great deal. For example, we cannot easily make judgments if the price of an object greatly exceeds the length of the mental ruler in both directions; i.e. when the price is too high or too low. Consumers may join several rulers when one is too short, but the elicited judgment will probably vary widely.

(3) *Basic Property 3: The ruler is one-dimensional.*

A physical ruler measures the one-dimensional property called length. It may be presumed that even though people make judgments founded on multi-dimensional information, it is quite possible that they finalize the judgment one-dimensionally. In Japan, many people think that education based on the standardized test scores is not good, while at the same time they are very sensitive to such test scores in practice. People like to check various kinds of rankings, such as "best sellers". These tendencies seem to indicate that human nature is often characterized by one-dimensional judgments.

FUNCTION OF THE MENTAL RULER

Based on the above basic properties of the mental ruler, here are some theoretical predictions about its functions.

(1) Function 1: People construct an appropriate mental ruler depending on the situation.

People construct mental rulers with appropriate gradations and length depending on the situation. People do this so naturally that they usually do not notice. For example, in Japan, if a person is thinking of purchasing a new car, he/she will no doubt construct a mental ruler with 10,000 yen gradations when negotiating with a car dealer on the price or optional equipment, since a new car usually costs more than 1 million yen. In such a situation, the price area of several hundred yen is treated as insignificant, and is seldom taken into consideration. The same consumer, however, may go to a supermarket after negotiating with the car dealer and may be satisfied to find that the price of a box of 10 eggs is lower than the usual by 20 yen, or disappointed with a price greater than usual by 30 yen Here a ruler gradation of 10 yen units is used to make a judgment or a decision. Therefore, we can assume that people focus on the on-going situation and construct the situation subjectively, constructing a mental rulers for decision making depending upon the situation.

(2) Function 2: The endpoints of the ruler are applied differently, depending on the situation.

This property is similar to a shift of reference point in prospect theory (Kahneman & Tversky, 1979), although prospect theory assumes only one reference point in each situation. The endpoints of the ruler are assumed to change according to the situation, such as in comparing groups of objects. In judging price, for example, the reference point changes according to the object group of brands compared.

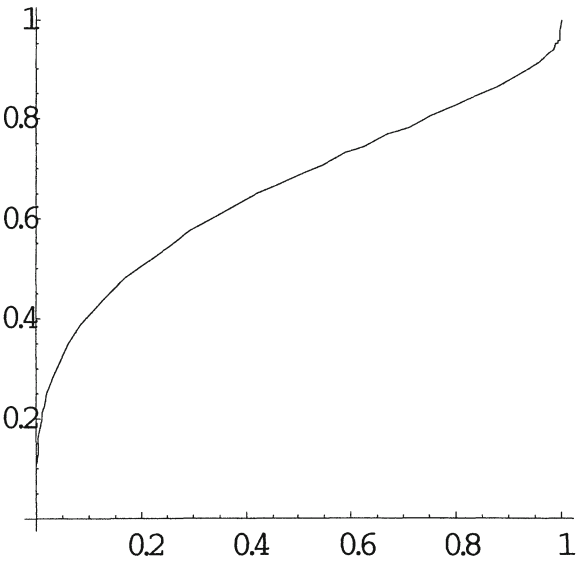

Figure 1. Inverted S-shaped Evaluation Function (Takemura, 1998b)

(3) Function 3: Ruler gradations become finer around the reference point and the endpoints (Inverted S-shaped evaluation function of the ruler).

This is a property which does not apply to a physical ruler. For example, a consumer who is trying to buy an article on a budget of $100 becomes more sensible to a difference between $95 and $100 than to a difference between $50 and $55. If prices being compared exceed the endpoints, it becomes extremely difficult to evaluate. For example, on a budget of $100, the consumer will become insensible to the difference between $150 and $155, and his/her evaluation will become unstable. As shown in Figure 1, the mental ruler is assumed to be an inverted S-shaped evaluation function hold the upper and lower subadditivity (see, Tversky & Fox, 1995; Tversky & Wakker, 1995).

(4) Function 4: More knowledge and/or more involvement creates finer ruler gradations.

If a consumer has a lot of knowledge about an article or is deeply involved in it, the gradation of his/her ruler will become finer, and he/she will become sensitive to smaller differences, which leads to more precise classification of similar articles. Therefore, such a consumer will tend to buy an article at higher prices, even if its quality is only a little better than the others.

(5) Function 5: Even if information is given multi-dimensionally, a one-dimensional judgment will often be elicited by the mental ruler.

This does not only mean that people merely simplify the problem, avoiding data processing overloads, but also means that consumers may construct another ruler to cope with the situation as a kind of creative process in the representation of a decision making problem. For example, by reading fashion magazines or through repeated shopping experience, clothing consumers construct rulers measuring "good taste" based on complicated information when making purchase decisions. However, the mental ruler in this case is also basically one-dimensional.

(6) Function 6: It is difficult to compare different mental rulers.

It should be very difficult for people to compare and evaluate the various mental rulers at the same time, although people construct a mental ruler for each occasion depending on different situations. Contradictory judgments or decisions in situations such as the car or the egg purchases outlined above are usually not perceived by consumers themselves. This is because people usually focus on the situation, view it subjectively, and then construct a mental ruler to deal with it. Therefore it becomes difficult to construct more than two rulers in one situation from the point of view of cognitive load.

COMPATIBILTY TO RESPONSE MODE AS A FACTOR OF MENTAL RULER CONSTRUCTION

Compatibility between the structure of a mental ruler and a response mode structure should play an important role in constructing the mental ruler. The compatibility of the structures denotes similarity between the structural characteristics for the mental ruler and the response mode. If both structural characteristics for the two modes are similar, the efficiency of the information process in a judgment or a decision increases as assumed in the structural compatibility principle for stimulus and response modes (e.g., Selart, 1997). We will assume that a person constructs a mental ruler in a way that will maximize compatibility between its structural characteristics and a given response mode. For

example, the purchase choice situation "to buy or not to buy" has a two-valued response mode and the consumer constructs a two-valued mental ruler, "good or bad." On the other hand, if a consumer is asked to evaluate an article by ranking or by giving it points, he or she constructs a mental ruler of multi-values. If the two structures do not correspond well, a consumer will encounter difficulty in making a judgment. For instance, if a mental ruler has already been constructed, the consumer cannot judge precisely because the ruler has only rough (or fine) gradations.

From the viewpoint of compatibility to the response mode structure, the reason why the mental ruler is one-dimensional may also be explained. When the structure of the environment requires that the judgment or the decision is based on one-dimensional response mode of a judgment or a decision, the mental ruler becomes one-dimensional. In addition, we often use linguistic terms describing dual values, such as "good or not good," to evaluate merchandise and so forth, because decisions are constructed by dual-value response modes, such as to buy or not to buy.

HOW MENTAL RULERS BLOCK CREATIVITY

Creativity plays a vital role in human decision making in the complex social world (e.g., Finke, Ward, & Smith, 1992). We confront an enormous number of complex decision problems that demand creative decision making. We must cope effectively and flexibly with continual changes in our social world. In order to do so, we must redefine decision problems in novel situations and hence reconstruct our mental rulers as representations of the decision situations.

The mental ruler model assumes that people create a one-dimensional mental ruler from given information. The information which is given to the decision maker may be multi-dimensional. Even if the decision maker is supplied with multi-dimensional information, she/he will merely create a new one-dimensional mental ruler to adapt to the situation. As discussed above, a mental ruler is assumed to be constructed in line with the compatibility principle. Compatibility with the response mode often requires one dimensionality of the mental ruler, because most response modes are one-dimensional, such as judgment on desirability of an alternative.

Constructed mental rulers are sometimes novel ones. For example, consumers sometimes make relative judgments concerning the quality of goods from price, design and other multi-attribute information. Such new mental rulers usually enhance the adaptiveness and effectiveness of problem solving, because it is, firstly, contingent on the given situation; secondly, it matches the compatibility principle; and thirdly, the one-dimensional nature of the mental ruler reduces cognitive strain. Therefore, a new mental ruler with such flexibility should enhance creative decision making.

On the other hand, mental rulers may block creative decision making when applied to new situations in inadequate manners. There are two cases of such blockage. The first is the case where a decision maker fails to construct an adequate mental ruler, although the mental ruler is still a newly constructed one. For example, a consumer may make a judgment regarding the quality of goods merely on the basis of this may result in failure to judge in an adequate manner. The second case occurs where a decision maker inflexibly uses a mental ruler which was originally created for a different situation. This type of case is called "functional fixation" in problem solving. An example of this would be the case

where an expert in economics always applies a monetary ruler inflexibly, even when another ruler, say for human-rights, is required in solving a problem.

The creation of a mental ruler is a consciously controlled process in some cases, whereas it is rather an automatic process in others. It is assumed that the first case of creativity blockage frequently occurs in controlled processes, while the second case of blockage frequently occurs in automatic processes.

EXPLANATION OF SOME EXPERIMENTAL FINDINGS

Below, some past experimental results will be qualitatively explained using the mental ruler model.

THE EXPERIMENTAL RESULTS OF TVERSKY AND KAHNEMAN (1981)

The result of the experiment conducted by Tversky and Kahneman (1981) on purchase decision making will be discussed here. The following experiment was conducted in order to confirm that decision frames will change the decisions (Problem 9.10).

181 college students were divided into two groups, and each group was presented with two versions of a question.

Version 1: Imagine that you are about to purchase a jacket for $125, and a calculator for $15. The calculator salesman informs you that the calculator you wish to buy is on sale for $10 at the other branch of the store, located 20 minutes drive away. Would you make the trip to the other store?

Version 2: Imagine that you are about to purchase a jacket for $15, and a calculator for $125. The calculator salesman informs you that the calculator you wish to buy is on sale for $120 at the other branch of the store, located 20 minutes drive away. Would you make the trip to the other store?

The result of the experiment was that 68 percent of the respondents were willing to make an extra trip to save $5 on a $15 calculator; whereas only 29 percent were willing to exert the same effort to save $5 on the price of the $125 calculator. This is obviously contradictory to utility theory, as both versions presented the same choice between a total amount of $140 for a jacket and a calculator at a near-by shop and $135 for the same articles at a more distant shop. According to utility theory, both versions should be indifferent because the total amounts for both versions are identical. This experimental result is contradictory to utility theory under the hypothesis that the choice rate is a monotonic increasing function of the utility.

Tversky and Kahneman (1981) interpret this result using their decision frame concept, explaining that the subjects used different decision frames for each item, not for the total amount. Their interpretation seems basically right, but unfortunately they did not explicate why the different frames for the two articles occurred.

Using the mental ruler model to interpret the process of obtaining the same result, first, the situations for the two versions of this problem, S'_1 and S'_2 can be illustrated as follows:

Version 1: S'_1 = {($125 jacket, $15 calculator, no extra trip), ($125 jacket, $10 calculator, an extra 20 min. trip)}
Version 2: S'_2 = {($15 jacket, $125 calculator, no extra trip), ($15 jacket, $120 calculator, an extra 20 min. trip)}

Next, in the subjectively constructed process of the situations, common information is canceled and deleted, and, especially, the unmentioned information "no extra trip" is not taken into consideration. Therefore, the subjectively constructed situations for the two versions, S_1 and S_2 can be shown as follows:

Version 1: S_1 = {($15 calculator), ($10 calculator, an extra 20 min. trip)}
Version 2: S_2 = {($125 calculator), ($120 calculator, an extra 20 min. trip)}

A comparison can be made here since only the calculator has different prices in either version. The subjects are assumed to construct an evaluation function of the mental ruler, v, and consider the extra trip, in order to evaluate the discount. Here, the evaluation function of the discount amount, F, can be described by the functions of the mental rulers which have different relative endpoints of prices, v_1 for version 1 and v_2 for version 2 Function v_1 is a real-valued function from the interval between two endpoints, $ 0 and $10, and function v_2 is also a real-valued function from the interval between $ 0 and $ 125 .

Version 1: F($5 discounted from $15) = v_1($5)
Version 2: F($5 discounted from $125) = v_2($5)

Nevertheless, if the evaluation function F is applied to evaluation functions, v_1 and v_2, the maximum value of the price becomes $15 for v_1 in Version 1 and $125 for v_2 in Version 2, while a discounted price is $5 for both v_1 and v_2. Based on the relative property of the evaluation function v in the positive area, v_1 ($5) exceeds v_2 ($5). Therefore, the following inequality holds: F ($5 discounted from $15) > F ($5 discounted from $125).

THE EXPERIMENTS BY HSEE (1998)

Hsee (1998) conducted an experiment to confirm the "less is better effect" (Study 1).The subjects were 83 college students separated into two groups, and each group received one of the two versions of the questionnaire below.

Version 1: Imagine that you are about to study abroad and have received a good-bye gift from a friend. It is a wool coat, from a nearby department store. The store carries a variety of wool coats. The worst costs $50 and the best costs $500. The one your friend bought you costs $55.

Version 2: Imagine that you are about to study abroad and have received a good-bye gift from a friend. It is a wool scarf, from a nearby department store. The store carries a variety of wool scarves. The worst costs $5 and the best costs $50. The one your friend bought you costs $45.

In both conditions participants were asked how generous they thought the friend was. Answers were given on a 0-6 point scale where 0 indicated 'not generous at all', and 6 indicated 'extremely generous'. The result was that although the $55 coat was certainly more expensive than the $45 scarf, those receiving the scarf considered their gift giver to be significantly more generous than those receiving the coat (i.e. the mean rating values equal 5.63 and 5.00, respectively).
The both versions of this experiment can be illustrated as follows.

Version 1: {$55 wool coat, worst $50, best $500}
Version 2: {$45 wool coat, worst $5, best $50}

The subjects are assumed to construct a mental ruler using the given information. In Version 1, the ruler is assumed to be constructed on the interval between $50 and $500; in Version 2 between $5 and $50.

Suppose that the subjects take the highest price as a comparative object. The evaluation function F can be illustrated by the following functions of mental rulers, v_1, v_2, which have different relative values of prices.

Version 1: F ($55 wool coat) = v_1 ($55)
Version 2: F ($45 wool scarf) = v_2 ($45)

Nevertheless, the maximum value of the price becomes $55 for v_1 in Version 1 and $45 for v_2 in Version 2, while the price of the target is $500 for v_1 and $50 for v_2. Also, if a psychological reference point is applied to the lowest price and the highest price, the relative deviance from the minimum price becomes $5 for v_1 in Version 1 ($55 - $50), and $40 for v_2 in Version 2 ($45 - $5), while the maximum deviance of the price is $450 for v_1 ($500 - $50), and $45 for v_2 ($50 - $5). This implies that $v_1(\$55) < v_2(\$45)$. Therefore, F ($55 wool coat) < F($45 wool scarf).

Hsee (1998) conducted another experiment asking how much the subjects were willing to pay for a serving of ice cream, presenting two versions: 8 oz. of ice cream in a 10 oz. cup, and 7 oz. of ice cream in a 5 oz. cup (Study 2). The experiment indicated the less-is-better effect in a separate evaluation (the between-subject design). The average price for 8 oz. of ice cream was $1.66, while 7 oz. ice cream cost $2.26. This result implies that if the subjective situation is set very broadly, the decision will be unstable, since the subjective situation is the basis on which people construct the mental ruler to make a decision. In the mental ruler model, the quantity of the ice cream is 8 oz. and the maximum quantity is 10 oz. in the case of a 10 oz cup, while the quantity of the ice cream is 7 oz. and the maximum quantity is 5 oz. in case of a 5 oz. cup. Therefore, it is elicited that the 7 oz. of ice cream in the 5 oz. cup is evaluated as being preferable to the 8 oz. of ice cream in the 10 oz. cup.

Hsee (1998) found that a clear preference reversal occurs in joint evaluation. That is, in within-subject evaluation, the subjects presented a higher price for 8 oz. of ice cream than for 7 oz. of ice cream. This can be interpreted as follows, using the mental ruler model. In joint evaluation, the focus is set on '7 oz. or 8 oz.' to construct the mental ruler in the subjective situation, as both versions are presented at the same time. Therefore, 8 oz. ice cream is preferred to 7 oz. ice cream.

As Hsee (1998) has indicated, this kind of experimental result is difficult to explain by reference to decision making theories of the past, such as those describing contingency. For

example, the decision frame model and prospect theory are not sufficient to expound the phenomenon, since both versions are regarded as gain frames. To apply the decision frame model and prospect theory to the evaluation of generosity shown in Study 1 is also difficult. Moreover, the psychological purse model cannot explain this kind of phenomenon either. These models only give an interpretation of the inconsistency by assuming that there might have existed a different purse or a different frame depending on the situation In addition, as Hsee (1998) indicates, the prominence hypothesis of Tversky et al. (1988) indicating that the conspicuous attribute received weight is not sufficient either.

Hsee (1998) presented an hypothesis that the mutually evaluable attributes, such as cup size and the amount of ice cream, were combined and, as a result, produced an effect on decision making. Hsee presumes that cup size does not have a great effect on decision making in joint evaluation, since comparison of the amount of ice cream is easier than that of cup size. This explanation is not contradictory to the mental ruler explanation offered earlier. Hsee's evaluability hypothesis (1998), however, does not explain how the subjective situation is constructed on how the evaluation based on it is carried out, and how does it explain what kind of judgment or decision emerges; it only states what kind of attributes tend to mutually relate to produce an effect on the decision making, which is meaningful for understanding the structure of the subjective situation in the mental ruler model.

THE EVALUATION EXPERIMENT ON THE VALUE OF SAVED LIVES

I conducted an experiment where 34 evenly divided male and female college students completed the following questionnaire; a slightly modified version of the questionnaire on the Asian disease problem constructed by Tversky and Kahneman (1981):

Question: Imagine that a certain local area in Japan is preparing for the outbreak of an unusual disease, which is expected to kill 100 people. It is considered important that as many people as possible recover from the disease and do not die. State the strength of preference for the following cases according to your subjective value, on a 0-100 point ruler where 0 indicates 'nobody recovers and everyone dies', and 100 indicates 'everyone recovers and nobody dies'.

The subjects evaluated the strength of preference on each case where the number of saved lives is 1, 2, 3, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 95, 97, 98, 99.

Both positive and negative sides of the situation in the sentence were presented as follows, in order to suppress the elements of the framing effect.

(1) One person is saved; Ninety nine persons die. (points),

(2) Two persons are saved; Ninety eight persons die. (points),

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(17) Ninety nine persons are saved; One person dies. (points).

The average evaluation value in each case is shown in Figure 2. As indicated in Figure 2, the result reflects the inverted S-shaped evaluation function, which is predicted by the mental ruler model. In particular, the evaluation function obtained from this result can be approximated to the evaluative function assumed in the mental ruler model by using a nonlinear regression analysis. The result of AIC (Akaike Information Criterion) measure for the nonlinear regression analysis implied that the inverted S-shaped evaluation function

provided a better fit comparing with concave and convex functions.

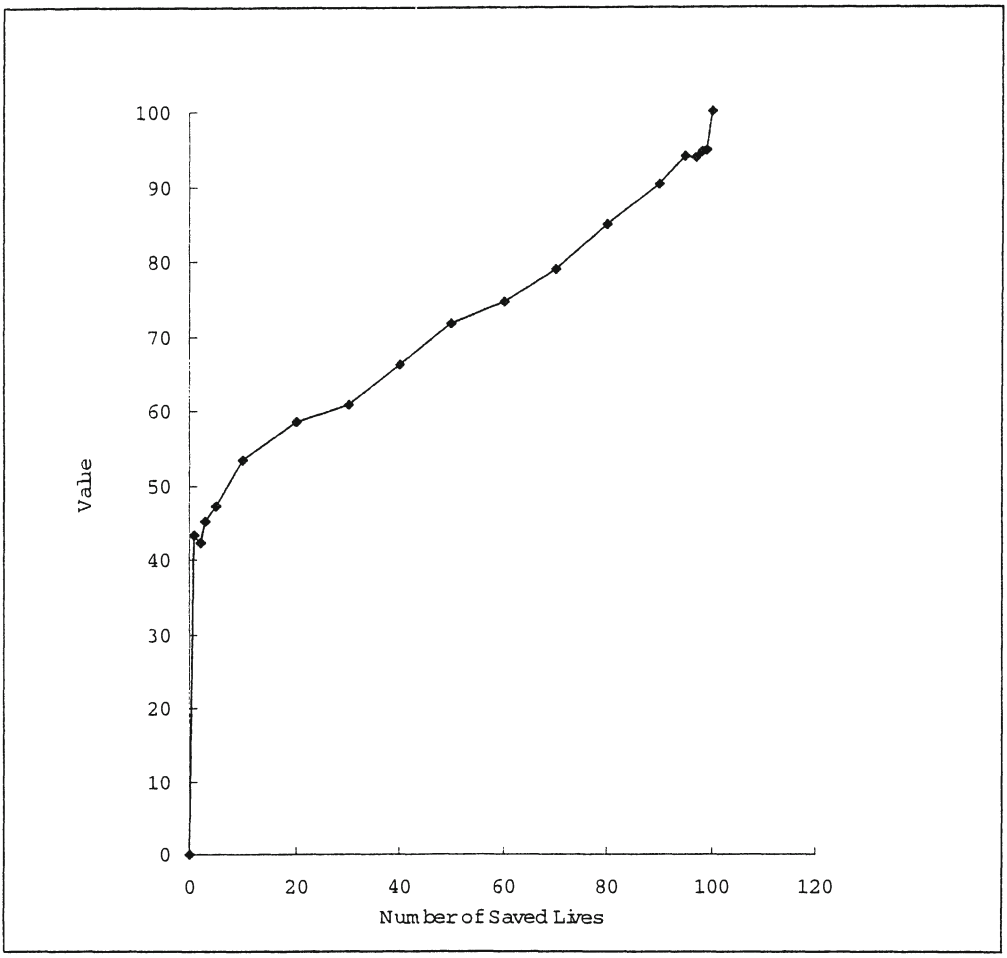


Figure 2. Mean Rating Value for the Number of Saved Lives

RELATIONSHIPS OF THE MODEL TO SOME EMPIRICAL FINDINGS IN THE SOCIAL WORLD

ON THE ONE-DIMENSIONALITY OF MENTAL RULER

The mental ruler model assumes that people frequently make decisions on the basis of a one-dimensional attribute for evaluating an alternative. The one-dimensionality of a mental

ruler may be assumed to have psychological functions to cope with information load caused in complex real world settings and to maintain psychological states such as confidence and satisfaction. However, multi-attribute representation or multi-alternative representation of decision problems would require more information load and would lead to less confidence and to less satisfaction than representation by using a one-dimensional mental ruler on the basis of a single alternative. Therefore, it is assumed that people frequently use a one-dimensional mental ruler constructed from a single alternative.

Fischhoff (1996) investigated personal decisions taken by teenage girls from varied socio-economic backgrounds by interviewing them. He reported the results from 66 younger teens (age:12-14). Interestingly, Fischhoff found that the largest category of the girls' personal decisions (about 45 percent) involved consideration of a single alternative like "eat more healthfully" or "stop blaming others", and that the next most common category (about 20 percent) involved decisions about whether to do something such as "smoke cigarettes". Moreover, he found that about 15 percent of the decisions described two distinct alternatives such as "whether to go to school or hang out with friends", and that only 5 percent of the decisions were involved seeking and designing alternatives such as "how to spend my free time". These results suggested that the teenage girls often construct decision problems on the basis of a single alternative and seldom construct them on the basis of multi-alternatives. Fischhoff (1996) also found that the subjects seldom mentioned uncertainty or positive features of either the chosen alternative or a rejected alternative for their difficult decisions. Although these findings do not always imply that decisions are made on the basis of a one-dimensional attribute on a single alternative, it can be concluded that most representations of decision problems are constructed from simpler attributes for a single alternative in social real world settings compared with traditional laboratory settings.

Huber (1997) studied naturalistic risky decisions for 92 non-students of different age groups, professions, and levels of education, comparing risky decisions in laboratory gambles. He adopted a method of active information search in which each subject is first presented with a minimal description of the decision situation, and then the subject can ask any question in order to obtain more information upon which to base a decision. He found that an average of less than half the subjects asked at least one question about probability. The maximum was 40 percent in a ticks task where the subject acted as a director of a center for allergic children, and the minimum was 6 percent in a post task where the subject acted as a new provisional manager of a post office. The finding of this study suggests that people seldom use probability information in naturalistic risky decisions. Although most of the utility theories and risky decision models assume that utilities and probabilities are integrated or concatenated into a kind of overall value for the alternative, Huber's (1997) finding is different from those traditional theories. His finding implies that people tend to use representations of decision problems with simpler attributes in naturalistic risky decisions in the social world.

Takemura (1994) reported results of a survey for 101 female consumers from varied socio-economic backgrounds by interviewing them. This survey was conducted in a supermarket. The interviewer asked each consumer about her buying or non-buying decision. The result indicated that the largest category of these decisions (about 60 percent) involved focus consideration of a single alternative, and that the next most common category (about 26 percent) involved decisions between two distinct alternatives. Moreover, there was no decision between more than four alternatives. This result suggested that the consumers often construct decisions on the basis of a single alternative and seldom

construct decision problems on the basis of multi-alternatives in their real lives. The result of the same type of survey for 201 male and female consumers also indicated that most of the consumers mentioned only one attribute (about 80 percent), and there was no decision using more than four attributes (Takemura, 1994). The finding of this survey suggests that most consumer decision problems in the supermarket are constructed from a single attribute for a single alternative, as postulated in the mental ruler model. It can be concluded that there are also many social situations where one-dimensional mental rulers are applied.

ON THE INVERTED S-SHAPED EVALUATION FUNCTION

The mental ruler model postulates that people evaluate objects using the inverted S-shaped function, and that this property holds not only for the weighting probability, but also for the values of the results. This property is completely contrary to the property of diminishing marginal utility in utility theory or in prospect theory. In utility theory or prospect theory, a function which is concave downwards is always assumed, whereas the mental ruler model assumes, on the contrary, that there is a function which is convex downwards around the upper bound.

In real buying situations, such as supermarkets and department stores, prices of goods are often reduced or manipulated in order to promote consumer's buying behavior as a price marketing policy. Kojima (1986) investigated contents of advertisements for many supermarkets and department stores in Japan, and reported that most of the prices presented to consumers were odd prices such as 98 yen or 14, 980 yen. Price marketing policies using odd prices also tended to be popular among western countries (Foxall & Goldsmith,1994). According to the mental ruler model, odd prices would be evaluated as being much cheaper by consumers because of sensitiveness of neighborhood on the endpoints of a mental ruler (which implies an inverted S-shaped evaluation function). However, this odd price effect might also be explained by the loss function of prospect theory. In order to determine whether a property of inverted S-shaped evaluation function is observed or not, we should ask consumers to evaluate values from a zero point (which usually means "free") to a maximum point (which usually means a standard price or a maximum price).

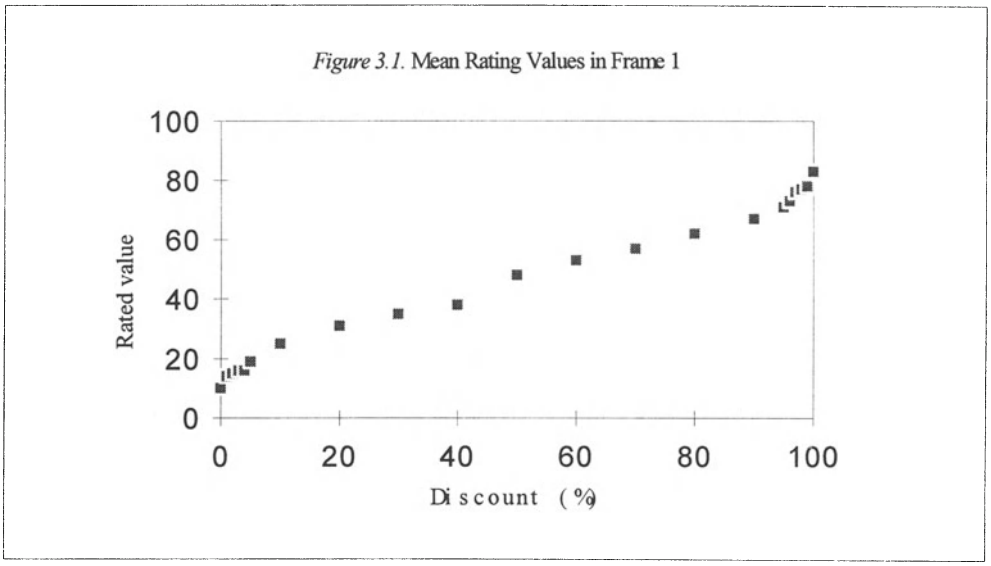
Fortunately, in Japan, mobile phones are sold for free (zero yen) in spite of standard prices because of the mobile phone companies' marketing policies. Therefore, it is natural to ask consumers to evaluate values from zero yen to a certain maximum price. Loi and I conducted a survey in which 203 male and female adults living in Tsukuba answered a questionnaire about discount rates on various consumer goods. The subjects are asked to evaluated the value on each case where the percentage of discount is 0, 1, 2, 3, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 95, 97, 98, 99, 100 (Takemura & Loi, 1999). In order to examine the robustness of the property for the mental ruler over different frames of the same problem description, four types of framing conditions, such as positive vs negative, and percentile vs. absolute value description, were arranged.

Subjects were asked to evaluate their satisfaction level in numeric terms from zero (not satisfied at all) to 100 (absolutely satisfied) concerning various stages of price reductions for a mobile phone, namely from zero percent discount to 100 percent discount. In the questionnaire, a Japanese brand of mobile phone (original price: 8,800 yen) was used as a product.

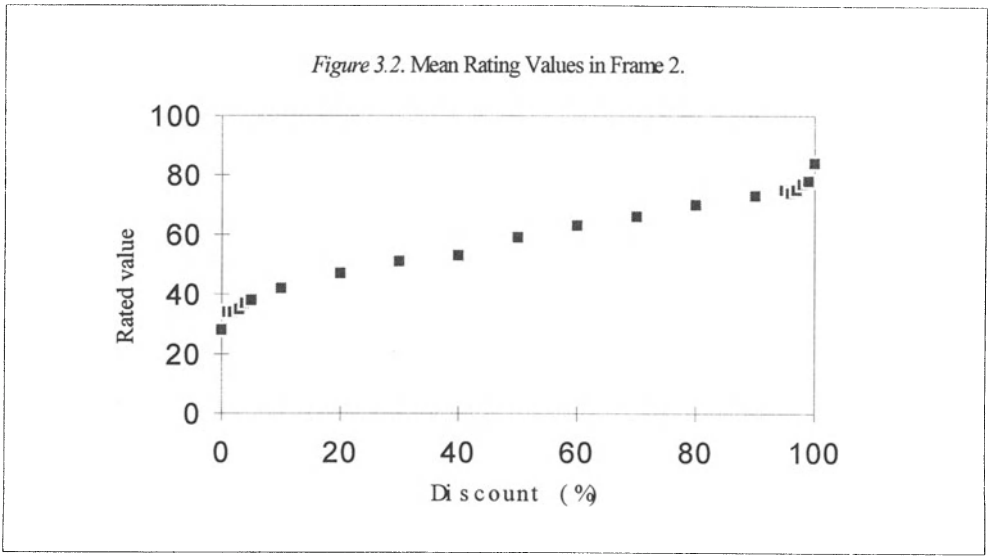
Each subject was assigned to one out of four frame conditions. The linguistic

descriptions of the four frames were, for example, at the level of 10 percent discount:

Frame 1: You may purchase the item at a 10% discount from the original price.
Frame 2: You may purchase the item at a discount of 880 yen from the original price.

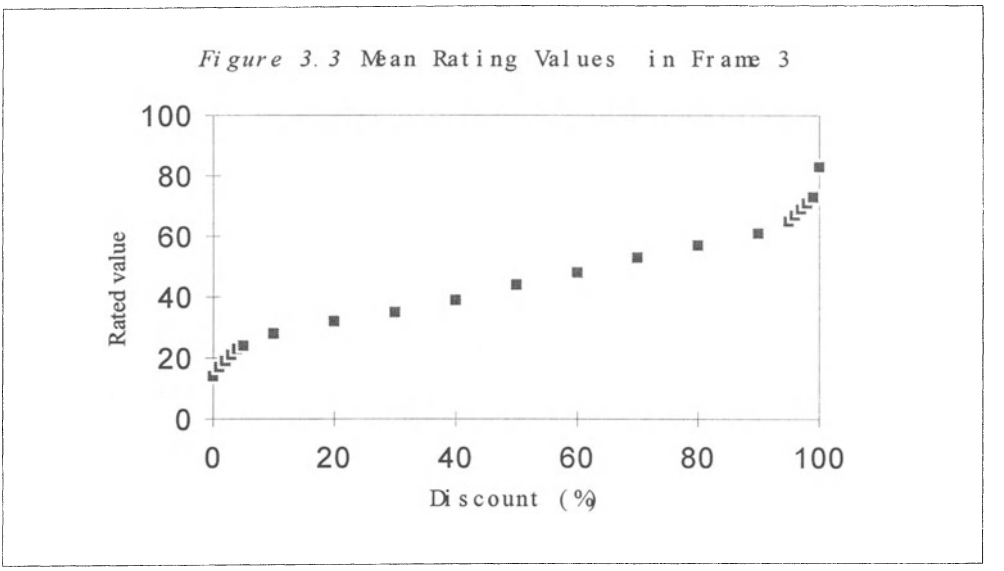


Frame 1: e.g., 10% Discount from Original Price

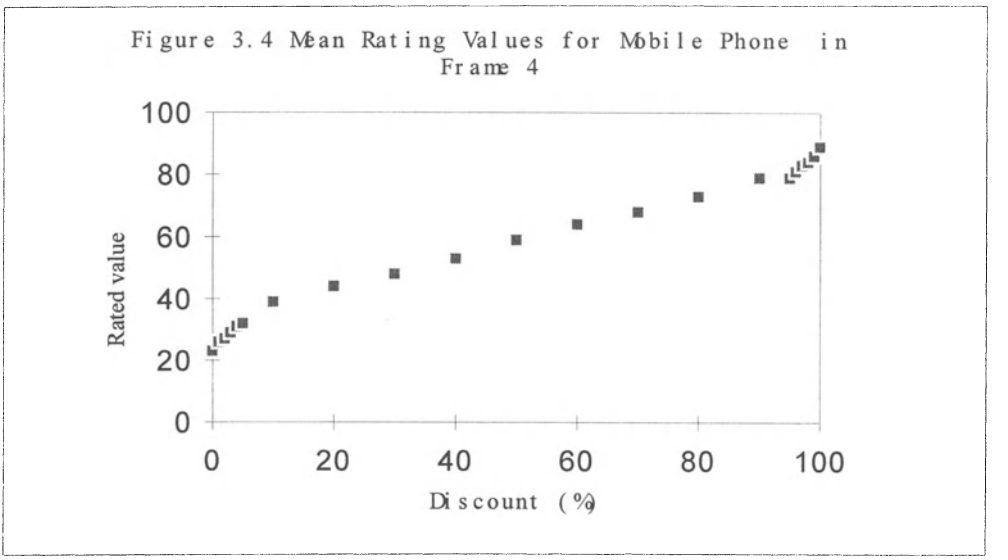


Frame 2: e.g., Discount of 880 Yen from Original Price

Frame 3: You may purchase the item at 90% of the original price.
Frame 4: You may purchase the item at 7,920 yen after the discount.



Frame 3: e.g., You may Purchase the Item at 90 % of the Original Price.



Frame 4: e.g., You may Purchase the Item at 7,920 Yen After the Discount.

Figure 3.1-3.4. Mean Rating Values for a Mobile Phone in 4 Frame Versions of Price Reduction Description

The average evaluation values in each case are shown in Figure 3. The results are, as indicated there, in line with the inverted S-shaped evaluation function in all four frame conditions. It should be noted that the obtained evaluation function was the inverted S-shape regardless of types of framing. This result supports the mental ruler model.

The mental ruler model would be applicable for an explanation of the so-called "zero-risk effect", in which a protective action that leaves no loss is valued more than others that leave some loss even when the amount of loss reduction is exactly the same. A zero-risk effect is observed in many social situations and appears to hold for many areas in which society attempts to reduce risk (Nakayachi,1998a). For example, this effect appears in evaluating the protection policy from radiation, waste disposal, air pollution, and water pollution (Nakayachi, 1998a). The zero-risk effect might be explained by prospect theory. Tversky and Kahneman (1981) termed this effect the "pseudo-certainty effect". Their empirical research indicated that people prefer pseudo-certain alternatives which appear to eliminate risks by framing decision problems. Tversky and Kahneman (1981) also stated that a protective action which reduces the probability of harm from 1 percent to zero percent would be more highly valued than an action that reduces the probability of the same harm from 2 percent to 1 percent. Nakayachi (1998a) also provided an empirical finding of a zero-risk effect concerning the probability reduction in a medical problem of newborn fatalities and a regulation problem of used cars. The zero-risk effect concerning the probability reduction would be explained by prospect theory as well as by the mental ruler model. However, the zero-risk effect concerning results such as numbers of deaths might not be fully explained by prospect theory. According to prospect theory, the zero-risk effect concerning results would be predicted only in the negative framing condition where the decision problems are phrased by negative aspects, but not in the positive framing condition where the decision problems are phrased by positive aspects. On the contrary, the mental ruler model predicts that the zero-risk effect occurs in both frame conditions.

Nakayachi (1998b) conducted a survey to examine the influence of framing on the zero-risk effect in willingness to pay for protective actions concerning a medical problem of newborn fatalities. Undergraduate students were asked to rate their willingness to pay (WTP) for three protective actions that would reduce fatalities to 800, 400 or zero. The result of the survey indicated that the difference of the WTP between actions which reduced fatalities to 400 compared to zero was larger than the difference between actions reducing fatalities to 800 compared to 400. This effect was obtained not only in the negative framing condition, but also in the positive framing condition. The finding in the positive framing condition can not be explained by prospect theory, but it can be explained by the mental ruler model.

CONCLUSION AND FUTURE PERSPECTIVES

In this chapter, I have briefly indicated that theories, such as utility theory, have limited explanatory power regarding contingent decision making at the present time stage. I then discussed the qualitative decision frame model (Tversky & Kahneman, 1981) and the psychological purse model (Kojima, 1959; 1994) of contingent decision making. Finally I introduced the "mental ruler" model to explain the contingent decision making qualitatively. I have considered the hypotheses and functions of the mental ruler, and its structural theory. The basic idea of the model is that people judge or make decisions using a

mental ruler based on a subjective situation which is structured so that a one-dimensional mental ruler can easily be applied to it. The main characteristic of the model is that contrary to prospect theory, it treats utility, value and subjective probability as basically the same evaluation function. I have also mentioned the instability of judgment in the area beyond the length of the mental ruler, a subject not touched upon in previous theories.

I have focused on the one-dimensionality of evaluation in judgment and decision making throughout this chapter. As shown in the research on naturalistic decisions by Fischhoff (1996), Huber (1997) and Takemura (1994), people often use only a few attributes or one attribute of a simple alternative representation even if the decisions are important to them. The findings suggest that judgments and decisions tended to be based on a one dimensional basis as assumed in the mental ruler model. The discussion, however, has some restrictions. There are cases where people evaluate multi-dimensional attributes and view information multi-dimensionally. For example, the case is often observed where people make a judgment or a decision, consciously considering multi-dimensional information as assumed in multi-attribute attitude theory or in multi-attribute decision making theory. Especially, many experimental findings on judgment and decision making suggest that subjects in the laboratories make judgments and decisions in the multi-attribute or the multi-alternative mode. It will be necessary in the future to clarify in what situations one-dimensional evaluation as assumed in the mental ruler model can easily be done, and in what situations the evaluation considering multi-dimensional information is more done often.

The type of information to be utilized in the construction of the mental ruler might depend on the type of information processing applied in the decision making process. When the information processing of constructing the mental ruler is automatic, the multi-dimensional information could be utilized because the automatic processing does not require much working memory. However, when the information processing of constructing the mental ruler is controlled or conscious, the multi-dimensional processing would be difficult for the decision maker because the controlled or conscious processing requires extensive working memory. In a complex real world, the decision maker has to utilize more contextual information and to use more working memory for processing the contextual information than in a laboratory condition. Therefore, in real life settings it is predicted that a decision maker tends to construct the mental ruler from one or few dimensional information if the processing is controlled or conscious. Moreover, it is also predicted that a decision maker tends to construct the mental ruler from information based on more numbers of dimensions if the processing is automatic in real world settings. Further research will be needed to examine which type of information processing facilitates usage of one-dimensional information.

Lastly, the model presented in this chapter is essentially qualitative, and there are still vague points that must be more precisely formulated in the future. Some forecasts or interpretations of the model can also be elicited by experiential testing. There are various possible studies, such as those on perceptual judgment forecast by evaluation function, evaluation function forecast in the area of social judgment or decisions, re-interpretation of possibility weight function, risk evaluation forecasting, and consumer activity forecasting. In the future, we need to work on experiential testing concerning these forecasts to examine the model more accurately.

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B. MANAGEMENT AND WORK ORGANIZATION

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CHAPTER 9
CREATIVITY AND COMPLEX PROBLEM SOLVING IN THE SOCIAL CONTEXT

CREATIVITY AS A PROBLEM SOLVING PROCESS

All over the world, in different contexts, people are concerned with the question of how to promote creativity. The dimensions of creativity seem to be categories which initiate growth and progress of mankind. Nevertheless, in theory and practice, researchers are using very different definitions of creativity. In this chapter we do not want to discuss different viewpoints of creativity (see e.g. Eisentraut & Badke-Schaub, 1995), but it seems necessary to state that the concept of creativity has gone through an interesting change in meaning. Whereas for several decades it was common to discuss and investigate creativity as an individual prerequisite for successful problem solving, a new perspective sees the team as a source of enhancing creativity and thus innovation (Agrell & Gustafson, 1996). We will illustrate why it is reasonable to understand creativity precisely as a problem solving process which is leading to a new product. This process may be an individual activity, but in current practice we often find creativity in a joint problem solving process, as an explicitly collaborative activity. Therefore, the social aspect is an additional requirement which influences the creative process throughout.

COMPLEX PROBLEMS AS CHALLENGES FOR CREATIVITY

Technical development and increasing complexity in different environments impose problems which are not solvable by one-point decisions. Most of the problems we face in working life domains are complex and we have to cope with a lot of data which are nevertheless incomplete and mostly inconclusive (Jansson, 1997). This being so, we have to describe roughly some 'key characteristics' of complex problems (Schaub, 1997). Usually, we speak of complexity whenever we want to imply that there is a network of interrelated elements, so that the consequences of actions cannot necessarily be foreseen. Each single action may affect quite a number of variables and persons so that in addition to the intended consequences, unexpected side-effects and long-term-effects are likely to occur. Complexity is even more difficult in the social context, as processes of division of labour, organisation of tasks, planning of interfaces, as well as linking individual work with group work are always concurrent operations.

Another important feature of complex problems is their dynamics. Problems in real working environments are dynamic if the situation or parts of the situation change without

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 177-196.

intervention. Changes may occur subtly or abruptly, and both rates of change raise different problems in planning and acting. Sudden or unexpected changes may induce the feeling of time-pressure and therefore render a thorough problem analysis impossible. Furthermore, urgent decisions may prevent actors from controlling the actual conditions, so that the real consequences may be quite different from the desired ones. In the social context, poorly organised information distribution, the lack of background information, incomplete or wrong information are often the source of unexpected events during the problem solving process. New ideas and solutions may become inappropriate if the problem context or aspects of the problem itself have changed.

Another important characteristic of complex problems is the frequent absence of clearly defined goals. Although in complex working environments many people strive to reach one common goal, these goal(s) are often only vaguely specified. Different subgoals exist, sometimes they are contradictory, sometimes they are not verbalised, or hidden. A critical challenge for creativity is the step of goal formulation. The definition of the intended goals has to be realised by establishing criteria by which the solution can be judged such as 'novel', 'appropriate', 'efficient', and so forth. In actual practice, goal formulation is determined to a large extent by tradition and routine. Therefore, the generation of new ideas in a group, in an organisation or in society is often a risky undertaking which is not necessarily successful.

If we now focus on creativity, the most important aspect is the novelty of problems. Defining a problem as a task which cannot be solved by routine behaviour leads to the conclusion that each problem has new elements. The degree of novelty of a given problem is dependent on the resolution level of the analysis and thus novelty always relates to the experience and knowledge of the problem solver. In any case, problem solving in a novel situation is a process of action under conditions of uncertainty (Dörner, 1991), which is determined by particular mechanisms and subject to specific dangers and possible errors (see for example, Elster, 1989; Frey & Rosch, 1984; Reason, 1990; Tversky & Kahnemann, 1983). Thus, problem solving is constrained by several internal and external variables. Of course, we all learn in different areas how to implement certain procedures, and soon these procedures are developing into routine behaviour and give us a feeling of confidence. In new situations, which would require changes in routines, routine behaviour still dominates because it seems to be a secure route to success. Creative problem solving, however, is far from established methods and proven practices. This may be an important reason as to why creativity is so highly regarded and yet so poorly understood.

FINDING SOLUTIONS, OR HOW CAN WE GRASP CREATIVITY?

Definitions of creativity focus on four main aspects: product, process, personality characteristics and environmental conditions.

Product: The most common definition of creativity specifies qualitative features of the creative product. The significant features are novelty and utility: a creative solution must be new and it must solve the given problem. For a product to be recognised as 'creative', 'new' and 'relevant' it has to pass through a hierarchy of social evaluations. Under the assumption that the creative product is the result of individual thinking and designing, its evaluation is a hierarchical process, which is determined by, among others, individual 'filters' (self-censorship), group norms (explicit, implicit, imagined), and abstract-social

acceptance mechanisms (such as market). Therefore, the creative process is often a process of violating norms, rules and mainstream ideas.

Process: Complex problems cannot be solved by routine behaviour but require an active solution process which may create a new product or a new solution. A new product or a creative solution may also be attained by chance but not in the sense of a single flash of insight. We assume that there is no particular creative process but a problem solving process as goal-directed activity aiming at the generation of a creative product. Wallas (1926) as well as other authors (Csikszentmihalyi & Getzels, 1973; Johnson-Laird, 1987) emphasise that creative processes need time and a gestation period in order to revise or nurture the ideas.

Personality characteristics: Highly creative individuals like Mozart or Einstein gave rise to the assumption that creativity is a personal trait, a "genius view" (Weisberg, 1986) which is composed by intellectual capacities and extraordinary thought processes. Although studies indicate that creative individuals do not necessarily differ from otherwise relatively non-creative ones in relation to cognitive abilities and knowledge (MacKinnon, 1962), it is nevertheless important to discuss aspects of personality and motivation as important prerequisites for creative activity (see Amabile, 1983; Wallace & Gruber, 1989). Several studies have revealed that creative thinking is linked to different kinds of information processes where performance is dependent on the personal and motivational characteristics (see Walberg, 1969) of the actor.

Environmental conditions: For many years (Rhodes, 1987), 'environment' has been accepted as the fourth component in addition to the above-mentioned three p-s: product, process and person. Organisational consulting services particularly emphasise the necessity of a creative climate in the organisation. For example, the Work Environment Inventory (WEI, Amabile & Gryskiewicz, 1989) has six scales which capture stimulants to creativity and two scales describing environmental obstacles to creativity. Out of the scales measuring stimulating creativity (freedom, challenging work, sufficient resources, supervisory encouragement, work group supports and organisational encouragement) three scales are explicitly related to the social context of the environment and the social support for the employees. At this point we do not want to analyse to which extent and in which sense the social context is important for creativity; we will take up this aspect in more detail below. We only assert that creativity, seen as problem solving, is always part of a socially embedded process.

DESIGNING AS CREATIVE PROBLEM SOLVING IN THE SOCIAL CONTEXT

In general, a problem is characterised by three components, a given situation, a goal situation and a barrier between both situations (Dörner, 1996; Newell & Simon, 1972). Thus, the problem solving process in design is the search and implementation of adequate moves and means from the start to the finishing of the product. The judgement of the product as being creative does not depend on the problem solving process but rather on the evaluation of the results as being new and useful in the particular environment. Creative products are considered to be the result of a problem solving process which involves both the individual and environmental conditions.

In this section we discuss some major requirements of design as a problem solving process in social context and elaborate on particular features of the environment which may

increase or decrease the probability that a creative product will be developed. Designing, regarded as the development of new products, is a process of generating and realising ideas with intermediate stages (Pahl, 1999) where the social context plays an important role. Product innovations thus can be considered paradigmatic for creative problem solving in a social context. What are the specific requirements of design and what does the social context in the design department look like? Usually, each member of a designer group has his or her own field of responsibility with regard to the development of a joint product. Mostly, the work team operating as a project team consists of members with different professional backgrounds such as mechanics, electronics, or planning and sometimes even of other professional groups using different values and goals concerning the specific field (Moritz, & Ito, 1995). These working groups share a common goal, which is structured on several levels. For example, it may be structured on a global level by the assigned instructions of the management, or on the more concrete level by the requirements induced by factors such as technical aspects, safety restrictions, interfaces with colleagues, and needs or wishes from suppliers and customers. Even though there inevitably is a lot of interaction and communication within the particular project group, the individual designer is working in his or her own group only for a minor period of time. To a large extent he or she is working alone but has to coordinate the ideas and the subsequent strategies with the other members of the team (Badke-Schaub & Frankenberger, 1999).

Let us look at some important requirements of designing in detail. All design problems have one common characteristics: the goal is not clearly specified. Even if the design problem consists only of the adjustment of a known solution to new conditions, several elements will not be known in detail, and further material can produce new information and thus new criteria in relation to the goal. A broad and thorough analysis is necessary as creative ideas during this stage may establish a new direction and the chance to depart from conventional views. But new ideas may also discourage other participants engaged in the process, because, during this stage, a lot of clarification between different departments, suppliers and customers is necessary. In addition, goal clarification has a major impact for the future design process because contradictory criteria such as quality, function and price will constrain product development in the following process. The disadvantage of the need to realise a reasonable balance between the different interest groups may be dealt by a comprehensive definition and early structuring of the requirements.

The next step, the generation of solutions, is the one distinctive procedure in design requiring creativity. Empirical investigations illustrate that experienced designers are able to generate a range of new variants and simultaneously restrict the quantity of solutions to a clear proposition of novel principles (Pahl, 1999). Although it is often assumed that the result of this process is always a complete new solution, this is not necessarily true. Creativity can also take the form of recognising similarities in the course of different processes and applying an analogy by transfer of a strategy that worked in another setting than that currently at hand (Klein, 1997). Such strategies, based on domain-specific knowledge, are known to be of major importance to the problem solving performance of individual subjects in design as well as in other fields (Collins, Brown, & Newman, 1989; Christiaans, 1992). Whether such strategies work better in groups than among individuals has not yet been proved in empirical investigations. However, assuming that 'divergent thinking' is one basic requirement for individual creativity (Guilford, 1950; 1977) the group should be a stimulating factor as several individuals together could constitute the heterogeneity which is necessary in order to create divergent thinking.

Once ideas have been created, the evaluation of solutions is the important next step. The group must decide which solutions are best suited to satisfy the requirements of the design specification and thus, which of them should be pursued in the subsequent process. According to empirical findings, solutions in design are usually analysed only in view of a few criteria and the evaluation is often conducted according to subjectively selected criteria which are often rigid and overrated by the individual (Pahl, Badke-Schaub & Frankenberger, 1999; Purcell & Gero, 1996). Experienced as well as inexperienced designers often work with only a rough perception of the specific requirements of unique constellations resulting in typical errors (such as methodism, encapsulation) in different phases of the problem solving process (see Dörner, 1996). What is the reason for this? We assume that individual models of behavioural regulation in problem solving arise from knowledge as well as from motives. Neglecting at this point the well-established influence of knowledge, such as strategic knowledge (Jansson, 1995; Strohschneider, 1999) and experience in problem solving, we want to emphasise the importance of individual motives in perceiving the environment. For example, the (mostly unconscious) decision as to whether a stimulus is perceived as multi-optional with many degrees of freedom or mono-optional (highly constrained) is determined to a great extent by the motives of the actor. Of special importance here is the need for control which is a basic human motivation (Bischof, 1985; Flammer, 1990), affecting the individual tolerance for ambiguous information (Dörner, 1999). Human beings strive for control of their environment because the feeling of control reinforces the feeling of competence which constitutes an important general precondition for dealing with problems. The use of behavioural routines is purposeful in light of the reduction of uncertainty but at the same time prevents creativity. Even experienced problem solvers frequently rely upon well known solutions and strategies which have proved to be successful in other problem contexts. They know which questions to ask and what actions to take and thus they run into the situation of solving the problems they know how to solve but not the problems which need to be solved (Dörner, 1996). Although routine behaviour prevents creative solutions, it may be advisable in situations with high time-pressure.

A related problem is that of success. Successful behavioural routines which have been used in the past have a higher probability to be implemented in the future because human beings feel competent in doing things along well established lines. Therefore, obviously, creativity cannot be restricted to cognitive phenomena. Creative thought- and decision-making processes are embedded within emotional-motivational processes. In this respect, the social context may serve as a positive catalyst for the development of individual creative processes, but it may also inhibit such processes. If we consider, for example, a group with a distinct hierarchical structure which may be characterised by low questioning rates and restricted feedback, each group member has little opportunity to reduce uncertainty by communication with his colleagues. As a consequence he could try to keep his solutions strictly to the rules in order to minimise problems of later maladjustment. Accordingly, groups playing with different roles (such as advocatus diaboli) may produce more flexible communication structures and thus allow a broader scope for development of new or even strange ideas.

THE DESIGN PROCESS AS A CREATIVE VERSION OF A PROBLEM SOLVING PROCESS

We do not endorse a trait approach, assuming that creativity is a personal trait, but rather emphasise the idea of a process approach including the person, the process and the social environment. In the following section, we report some results of an interdisciplinary study which was intended to investigate group design processes in industry. Our research questions are guided by our interest in the collaborative design-thinking and -acting processes which can be considered as problem solving processes driven by the increasing demands of the customers and the market.

By investigating engineering design activities, we are basically involved in observing the creation of new products in the social context. As pointed out earlier, the generation of one or even more solutions is the most important step during the whole design process because the creation of (new) ideas is the essential precondition before any decision can be made. Therefore, the design process can be described as a comprehensive problem solving process during which solution search and decision making constitute important phases, as Pahl and Beitz (1995) have suggested.

Taking a closer look at design processes, the focus should not be limited on the product but must be extended to include also the task, the individual prerequisites of the designers,

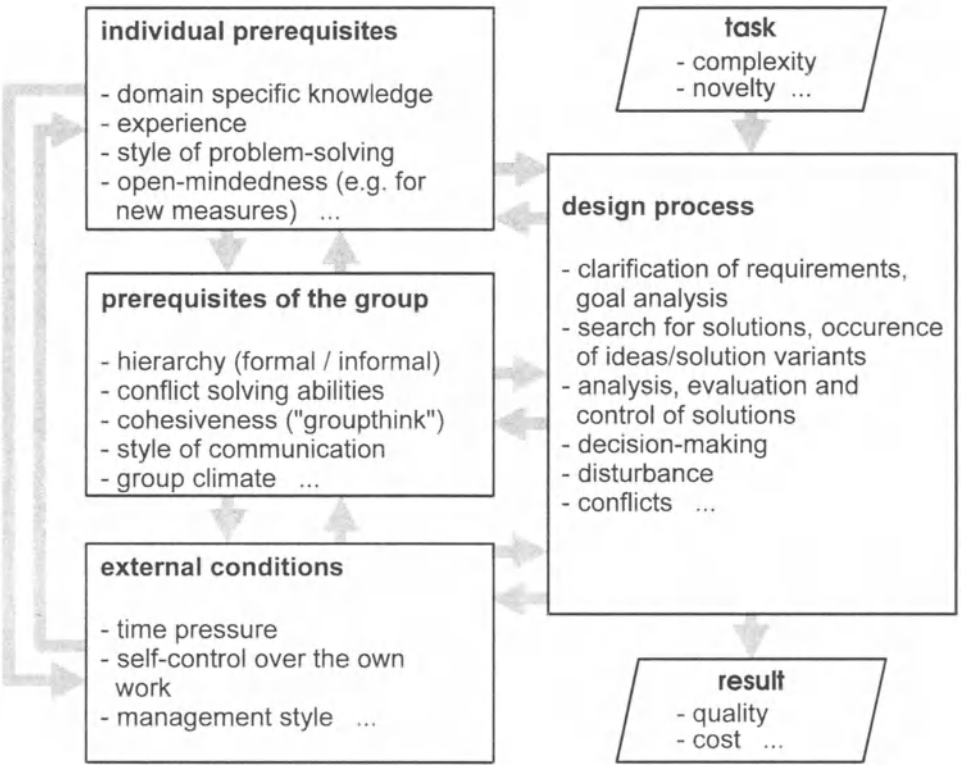

Figure 1. Prerequisites of Problem Solving Influencing the Design Process and the Result

the prerequisites of the groups and the external and organisational conditions under which the designers perform.

THE IMPLEMENTATION OF THE STUDY

In a joint research project engineers and psychologists were investigating design processes in industry by preparing detailed records of the design process as well as collecting data on the individuals, the group and the external conditions (see for example, Frankenberger & Badke-Schaub, 1998). In order to analyse the course of the design work in detail, an investigation has to be centered around very detailed observations of single cases over an extended period of time. The research team observed, documented, and analysed four design processes in two companies for a total of 28 weeks without participating in the work. In order to guarantee valid conclusions about the relevant factors and their impact on the design work, a broad variety of investigative methods were used.

The design process was registered by on-line protocols and by video-recordings. In addition, questionnaires were used and the documents and drawings the designers created were accepted as a basis for interviews in order to understand the development of the solution. Furthermore, biographical data (e.g., education and career, experience, qualification) and external conditions (e.g., company, working environment) were compiled by questionnaires and interviews. Additionally, we used computer simulated problems in order to analyse very different aspects of individual and group problem solving aspects (Badke-Schaub & Tisdale, 1995; Brehmer & Dörner, 1993; Dörner, 1996). The designers dealt with these problems either individually or in groups. Thus, individual problem-solving styles and abilities, such as the ability for detailed analysis or quick action with only a rough resolution level can be observed. As a group, the designers may reveal their ability to organise themselves according to the situation as well as proving their ability to solve conflicts and to communicate adequately.

Thus, we managed to have a very detailed documentation of the whole design process and we gathered various data on different factors concerning the individual, the group, the task and also various external conditions. The next step consisted of linking the different data in order to explain the more or less successful creative course of design work.

CRITICAL SITUATIONS AS DETERMINANTS OF THE DESIGN PROCESS

When we take a closer look at design work, we observe the designers elaborating goals, searching for information, generating solutions, analysing solutions and making decisions – most of the time on different levels of realisation. As the engineering design process is a process stretching from task clarification to detail design (see Pahl & Beitz, 1995), different requirements and different degrees of 'importance' have to be distinguished. Usually, the engineering design process starts with the definition of the task and the generation of a checklist of all participants to specify their demands and wishes, thus providing the criteria for selecting and evaluating design concepts in the latter phase. In the conceptual phase, the design-determining decisions are made. For example, essential problems are identified, functional structures and principles are established, solution principles are generated and evaluated. The result of this phase should be the one design concept which satisfies most of the demands and criteria of the list of requirements. The next step, the embodiment design, is "that part of the design process in which, starting from the concept of a technical product,

the design is developed, in accordance with technical and economic criteria and in the light of further information, to the point where subsequent detail design can lead directly to production." (Pahl & Beitz, 1984, p. 166). In the last part of the design process, which is labeled the detail design, the focus is on defining the layout, but also detailing the drawings and documenting the solution. During this phase not every particular decision is important for the development of solutions. Mostly, decisions in detail design is routine work for the designer.

Consequently, if we take a more abstract view on the design process, we can identify phases of routine work on the one hand, and critical situations on the other hand, in which the design process takes a new direction on a conceptual or embodiment design level. Trying to explain the course of the design work by considering influential factors and their interrelations, critical situations are of specific interest. Influences on the design process are especially significant in these 'turning points' (see Figure 2).

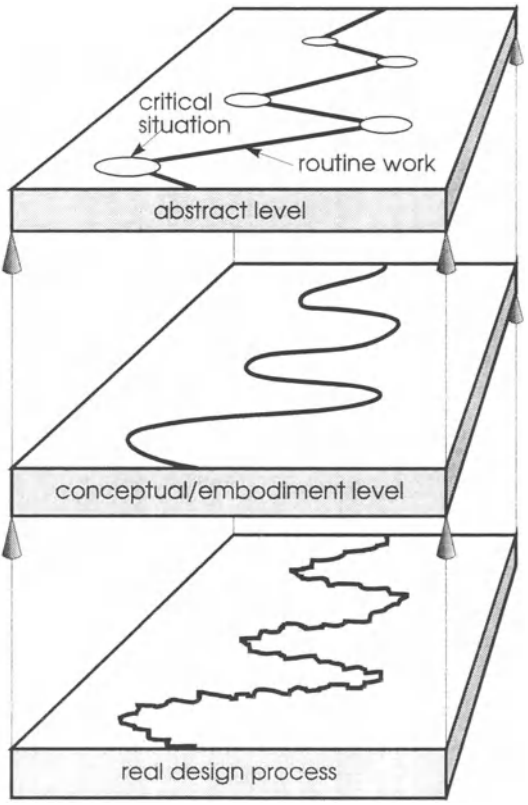

Figure 2. Routine Work and Critical Situations on an Abstract Level of the Design Process

We thus distinguish between different types of critical situations, depending on the requirements of the design process mentioned earlier. The identification of the specific type of critical situation in the design process follows predefined rules, which fit the requirements of the phases of the design process according to Pahl and Beitz (1984; 1995)

and Ehrlenspiel (1995) (see Figure 3). This is done on the basis of the on-line protocols which are made during the observation of the whole process.

First of all, two different kinds of critical situations are relevant: on the one hand there is the design context and the requirements caused by the design problem, and on the other hand there is the social context of the design process. Overall we distinguish between five types of different critical situations: 1) goal analysis and goal decision, 2) information- and solution-search 3) analysis of solutions and decision making 4) disturbance-management and 5) conflict-management (see also Figure 3).

Regarding the simplified model in Figure 3, the design problem context is divided into three subsequent types of critical situation concerning goals, solutions, and decisions. These types picture a possible division of the design process and are very similar to other guidelines for problem solving. It is necessary to state that these situations can be integrated into one another and not necessarily followed in a sequential order by the problem solver.

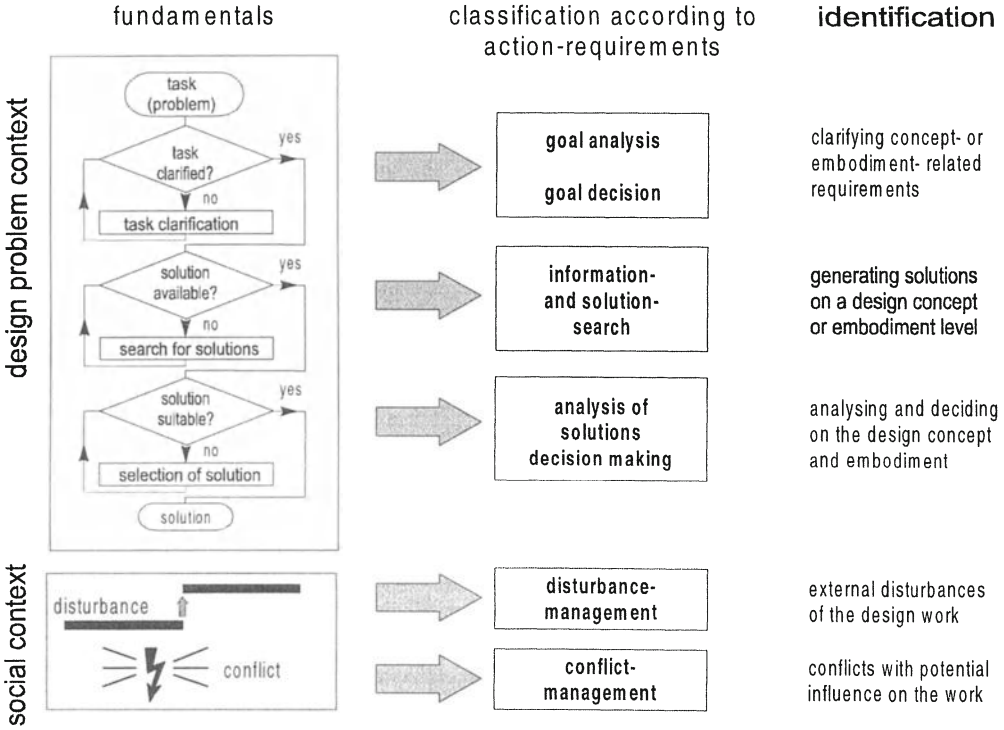

Figure 3. Different types of 'Critical Situations'

During the four observed design processes in the two companies we identified a total of *265* different critical situations and explained the route taken by more than *2200* single interrelations between *34* influential factors, process characteristics, and result characteristics. Each critical situation can be seen as a small story illustrated in a model which is explained by different mechanisms between influential factors working in this single situation.

The key to the interpretation of the single critical situations is the assumption that the *frequency of occurrence* of factors and relations represents their *importance* in the design projects. This assumption is useful because it is not possible to find another revisable, reliable and objective measure which indicates the importance of one factor or relation (between two factors) in comparison to another. Thus, by summing up the single models of one type of critical situation (for example for all successful or unsuccessful solution search situations), we can identify the main mechanisms responsible for positive or negative outcomes of this type of critical situation. On the basis of this analysis we are able to answer questions such as, 'which are the main factors responsible for a deficient conflict management?' or 'which are the mechanisms leading to a successful solution search?' Of course, the frequency of the different types of critical situations is very much dependent on the particular project.

During the four design projects observed we identified a total of 9 per cent situations of information- and solution- search (n=36), from which nearly 78 per cent were successful (n=28).

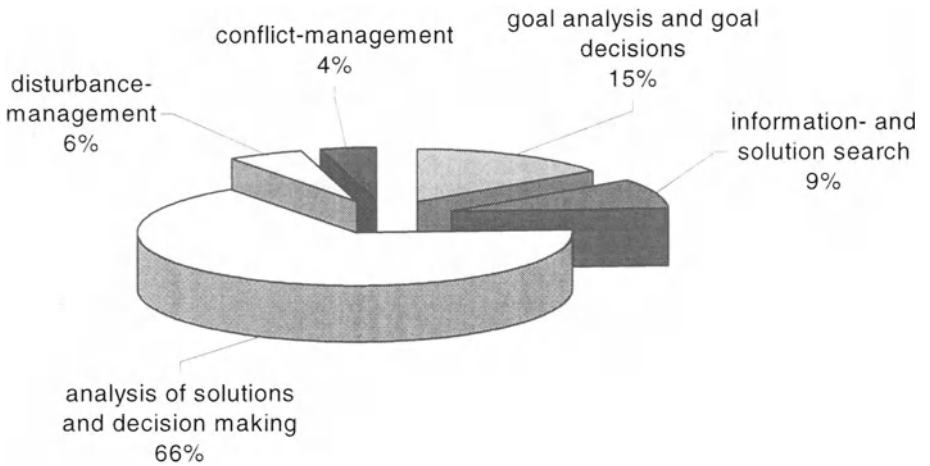

Figure 4. Frequency of the Different Types of Critical Situations as a Percentage

In the following, we explain some important mechanisms for a successful solution search. This type of critical situation is the most creative part of the design process as it is strongly connected with the production of new ideas.

SOLUTION SEARCH AS THE PROTOTYPICAL EXAMPLE FOR CREATIVE PROCESSES

Let us give an excerpt of a short design episode: Designer B is searching for a fleece surface control system concept for a height-adjustable equalising-device. He thinks about a swivelling strip of plate and asks his colleague C beside him to generate a good idea for the

strip support: "...I thought I would support this near the centre of gravity, and a very little force will swivel the strip..." Together the two designers develop two alternative solutions in an engaged discussion: a swivel support by an edge and by a pivot pin. Designer B: "...we need a very easy going axis, this means the smaller the diameter the better. I'll take a little DU-sleeve, 6 mm ..." And designer C warns: "... don't make it too small...".

During this successful solution search, designer B is chatting with his colleague at the next desk, with whom he has a good relationship. Designer B is not only asking for new ideas but is also interested in an evaluation of this particular problem by his colleague. Both designers exchange extended information and ideas, and consequently various aspects are taken into account. Driven by extensive experience and a good group climate they are able to produce two different solutions of high quality.

Speaking about all 28 different critical situations of successful solution search, we could detect some typical mechanisms (Figure 5) which could be identified by analysing the mechanism regulating these situations in detail. As the diagram is not self-explanatory, some comments are necessary in order to understand the boxes and arrows:

The *thickness of the boxes* depicts the frequency (in percent) of the factors identified in all critical situations of successful solution search. Thus, the label '75%' in the box entailing 'group climate' implies that 75 per cent of all successful solution search situations were characterised by the fact that a good group climate was the reason for talking to a colleague about further ideas on a particular problem. The *thickness of the arrows* represents the frequency (in percent) of the relations occurring in this type of critical situation. Thus, the arrow from the box 'experience' to the box 'availability of information'

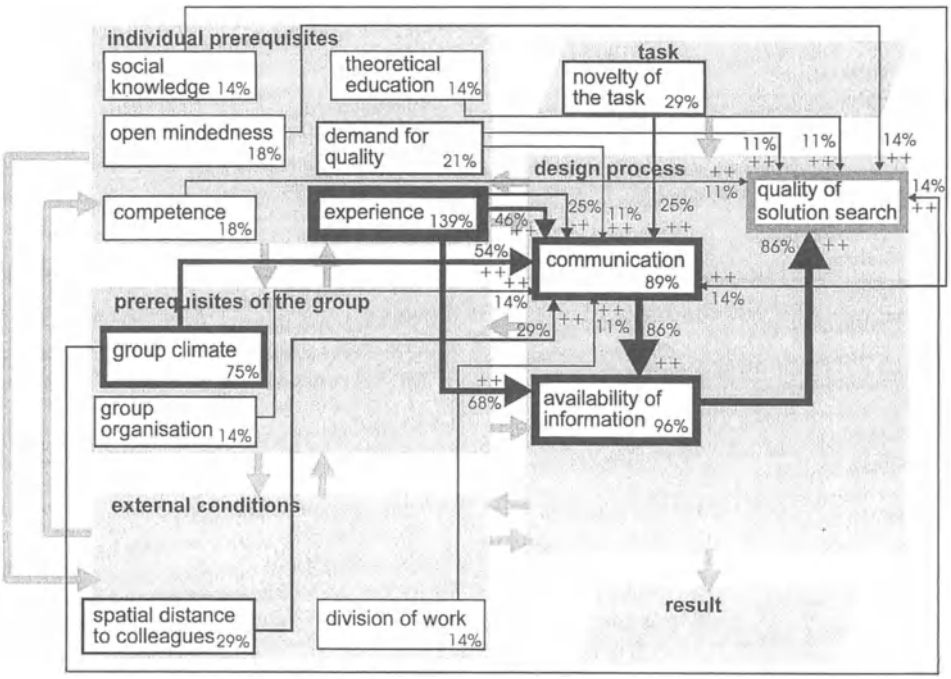

Figure 5. Mechanism Leading to Successful Solution Search (in 28 situations)

implies that in 68 per cent of all successful solution search situations, the experience of one designer contributed new information in this situation. The positive sign (+) indicates a positive peculiarity on the side of the input variables and the process variables, whereas the negative sign (–) suggests a negative property. According to this convention the arrow from the box 'experience' to 'communication' 25% -+ suggests that in 25 per cent of all successful solution search situations low experience led to an initiation of communication. The figure 139% in the box 'experience' indicates the fact that high experience in one critical situation may serve both as a source for communication as well as a cause for availability of information, so that we have to take 'experience' into account twice in one critical situation. Thus, a percentage of over 100 per cent can only result if one factor occurs very often and is related to more than one other factor.Obviously, the different fields and variables in the network depicted in Figure 5 are highly interrelated. In the following section, some of the important results are discussed:

The quality of solution search was rated to be high if the generated solution was a new one which was suitable for implementation (useful) and if it was generated by discussing other alternatives. These principles follow the two well-known criteria of a creative problem solution: it must be new and it must solve the problem. Additionally, we applied the postulate of design methodology that more than one idea should be generated by each solution search. The reason is that this generative type of solution search offers a greater chance of introducing new and unconventional ideas, considering various principles, thus gaining a broader field of solutions.

Nevertheless, it has to be stated that in engineering design not every successful solution can be realised in the design process, because many constraints (such as time of delivery, restrictions out of the patent infringements, and so on) have to be dealt with in detail (a process that is mostly part of solution analysis). The results of the observed 28 successful solution search situations reveal that the generation of ideas depends largely on the *availability of information* concerning the requirements and the knowledge of possible solution principles. Information transfer is thus mostly based on the experience of the designers.

Moreover, the open-mindedness of the individual designer for new ideas and a high demand for quality leads to an intensive search for solutions. A systematic search with the use of design methods such as a morphological matrix or classification schemes occurred very rarely, but in the few cases observed, theoretical education in systematic design was an important support. Furthermore, the competence of a designer was directly connected with a high quality of solution search, as competent designers were better able to adjust their strategies to the requirements of the particular situation.

These results are confirmed by other studies (Perkins, 1988; Sternberg, 1988) which have shown that domain specific knowledge is not sufficient for successful problem solving because the adaptation and re-structuring of knowledge is also related to personality characteristics such as open-mindedness or tolerance of ambiguity.

With respect to the prerequisites of the group, a good group climate supports the open exchange of ideas between the designers. Actually, most of the successful instances of solution search took place in collaboration with colleagues: communication was the main prerequisite for a satisfactory availability of information and information itself was the prerequisite of a successful solution search (as is shown in Figure 5). Apparently, the results reveal that a creative solution search (which we equate with a successful solution search, as mentioned earlier) is much more likely to be based on a positive group climate

(75 per cent of all successful solution search situations) than on good group organisation (14 per cent). The communication is also facilitated if the members of the team can easily be contacted and if the spatial distance between the workplaces is short. Figure 6 summarises the important (larger font) and less important (smaller font) variables of the different areas connected with creative solutions in the observed design processes:

The opposite result, an *unsuccessful solution search*, usually comes to a halt with no new solution idea(s) or with an inadequate solution idea. The important differences in comparison to a successful solution search are related to the following five aspects:
Firstly, the experience of the designers is an interesting aspect: in unsuccessful solution search situations experienced designers are less often able to offer new information than in successful situations. Secondly, the open-mindedness of the designers is very low in some

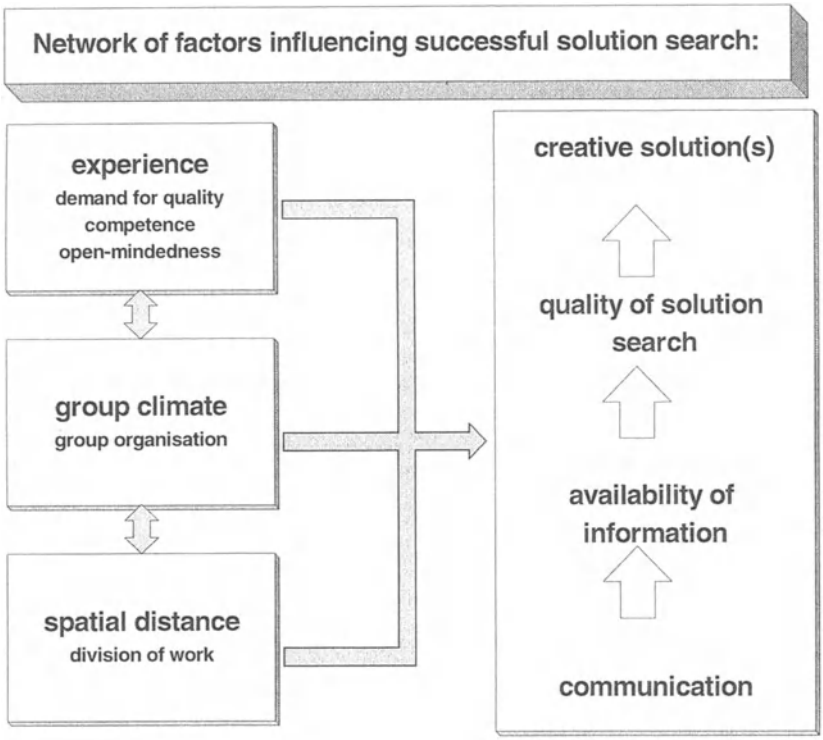

Figure 6. Important Factors Contributing to Successful Solution Search

of these instances, with the consequence of new solutions not being accepted. Thirdly, in situations of successful solution search the group climate and not necessarily the problem itself is often the instigator for communication in the group. Another important difference relates to the preceded phase of goal clarification: if an inadequate goal analysis has left too much vagueness, necessary information is lacking and the existing information is not sufficient to produce further ideas. And finally, the feeling of responsibility with regard to

information transfer is an important aspect. Especially in design departments we find a high division of labour according to the different professional backgrounds of those, involved in the project. Therefore, it is necessary to coordinate the duties between the project participants precisely. If this requirement is handled poorly, if it is not generally known which department is responsible for which information, the designers don't get the information they need. This could also be a severe obstacle for thinking creatively about new solution ideas.

This pattern of results was confirmed recently by further studies in two additional organisations, including 46 successful and 23 unsuccessful solution search situations (Badke-Schaub, Birkhofer, Dörner, Stempfle & Wallmeier, 1999) and also by an analysis of communication patterns in different types of critical situations (see Badke-Schaub & Frankenberger, 1999).

CONCLUSION: ENHANCING CREATIVITY IN THE SOCIAL CONTEXT

According to the results discussed in the preceding section, we want to emphasise the following three aspects regulating creativity in the social context of groups:

1. Problem solutions in an organisation mostly require several types of expertise, different types of specialised knowledge and a broad group basis in favour of the particular solution - therefore work in and with the group is a requirement in many situations. The use of the group can be seen as an effective tool for generating and exchanging ideas under the condition that there is experience in the group and that the group members are open-minded and highly motivated to produce a high quality solution. The process of social interaction is a challenge to develop new ideas by combining the resources of the group members. But as our study has illustrated, group climate is an essential pre-condition for an open exchange of ideas. It is difficult, however, to influence the climate of an organisation. Of course, there are possibilities for changing micro-climate features with respect to time pressure, management style and group composition (Rickards, 1990). In order to enhance individual motivation and creative solutions, one important approach is, for example, to give the individual freedom about how to perform the task (Amabile & Gryskiewicz, 1989). The perception of self-control over one's own work is a factor which results in higher levels of creativity.

Furthermore, the social environment may produce extrinsic motivation: The leader should send messages which reward efforts to generate new ideas. At the same time, he or she should be able to develop procedures and practices which enable the group members to work together in a more affirmative climate, including all the members of the group.
An organisation that disciplines every mistake very dramatically will encourage its members to avoid risks, to resist changes, and to be too critical of new ideas. Here, the role of the leader becomes very important; he or she should prefer a questioning attitude over a judgmental attitude. Questioning old and even successful solutions may enable people to become sensitive to new problems and new solutions.

2. Teams construct the social context in many different ways because the structures, aims and tasks of teams may vary strongly. The investigation of small design groups with innovative tasks reveals that it is important to use the group as an emotional background for the creative process of the designers. A positive group climate is one important factor

which allows the designer to think freely without severe limitations by group norms, thus the individual tolerance for ambiguity is expected to be higher.
However, groups show deficiencies in different ways almost like individuals. First of all, group pressure is a predominant factor which may prevent creative solutions in the group. Creativity in the group may be enhanced if the group members can be taught to resist group pressure towards conformity. Case studies of major fiascos as a consequence of poor decisions show that a very cohesive group climate will lead to restricted communication in the group and to the various phenomena referred to Janis (1972; 1982) as 'group-think'. A group-think dominated situation often generates a suppression of divergent thoughts because each member pays more attention to group consensus than to new or outstanding problem solutions. In a situation of low cohesiveness, on the other hand, the group members will only fight for their own point of view and for their own success. Therefore, the creation of a balance between cohesive group climate and individualistic group members seems to be a very important part of the group structure.

As many authors claim, Janis' elaboration of the connection between cohesion and group-think is rather imprecise (see e.g. Aldag & Fuller, 1993; Lüthgens, 1997), and it seems necessary to distinguish between different types of cohesion. Whereas Janis uses the term cohesion implicitly in connection with the socio-emotional context, cohesion may be related to the particular task and thus may be another source of group-think. Summarising such objections we would maintain that group composition is an important prerequisite for creativity in the social context. The aspect of group composition refers to the following question: how diverse should a group be and with regard to what type of diversity (Moreland, Levin & Wingert, 1996)? In general, the statement holds that the more complex the task the better a diverse (working) group would perform because diversity provides flexibility and promotes innovation. On the other hand, high diversity can produce conflict and thus lead to difficulties within the group with the consequence of labour turnover of group members. However, conflicts can be helpful as well as harmful, depending on the type of conflict. Whereas emotional conflicts always increase tensions between the group members, content conflicts which focus on the task as well as administrative conflicts which focus on the group structure may be helpful (Kirchmeyer & Cohen, 1992). Ancona and Caldwell (1992) illustrate the difficulty of keeping a balance between homogeneity and heterogeneity in an investigation of product development teams recruited from different hi-tech corporations. They report a negative overall effect of diversity on performance but at the same time they find positive effects on the development of innovative products. These results are confirmed by the studies of information flow in different R&D teams by Dewhirst, Arvey & Brown (1978) and Tushman (1977; 1979). These authors argue that the optimal organisation of a group is highly task dependent. In complex tasks which induce more pressure to produce creative ideas, a decentralised structure (that is, no strict responsibilities for external communication and a high degree of intra-team interaction) goes along with group efficiency. In less complex tasks the group should be structured to a higher degree. In this case, a strong hierarchy in the group as well as high external constraints will diminish divergent communication in the group and thus give potential for creative ideas which would be without much use in routine tasks.

3. People almost always work in groups, or at least have to make the results of their individual work compatible with that of others. Therefore, each social context interacts directly or indirectly with thinking and reasoning processes in complex working environments. This functions via, for instance, verbal communication (options, goals), non-

verbal communication (affects, facial expression), and internal organisational procedures. From the individual viewpoint organisations and teams represent complex systems, whose regularities are often not completely understood. This means that the social environment is often experienced as an opaque landscape with its own demands.

Being aware of some important mechanisms which are supportive for creativity in groups, the following important question arises: how can we provide specific guidance to reduce uncertainty and enhance creativity in the social context? There are a variety of different methods for the enhancement of creativity in groups (Holt, 1992). The most well-known and commonly used technique seems to be the brainstorming technique (Geschka, 1993), originally developed by Osborn (1953), in order to facilitate the generation of ideas by minimising the internal censorship caused by the possibility of being evaluated. This assumption was not supported by the results of controlled experiments. Instead of being superior it was found that with respect to quality and quantity of ideas, working in groups is less effective than working alone (Diehl & Stroebe1987; Dunnette, Campbell & Jastaad, 1963). Groups produced fewer solutions to a given problem and the solutions were rated lower with respect to creativity than individual responses randomly combined into groups, the so-called nominal groups. There seems to be at least one critical reason for this result. Groups, producing an idea, pursued the same train of thought longer than individuals did (compare also Kaplan & Wilke, this volume). This means that the supposed advantage of the group to enable its members to use the ideas of one another does not carry the problem solving process farther along but may inhibit individuals in the group. Accordingly, the wide-spread assumption that the group is the best tool for production of ideas is not necessarily true. However, the validity of this result is restricted because the tasks given in these studies were quite limited in their complexity. Additionally, these groups are usually composed in such a way that the knowledge and experience of the group members is highly similar because most of the participants in these studies are simply students of psychology.

The question remains whether brainstorming is a helpful problem solving technique on the individual level or not. On the basis of the results of several studies over the last years, Weisberg (1986) concludes that brainstorming is not an effective method to increase creative thinking, especially not in terms of quality as a critical aspect of effectiveness. All sorts of instructions which put the individual in the situation of knowing more about the criteria for a solution or emphasising initial criteria and judgmental attitudes were more effective than brainstorming instructions. Therefore, the essence of creative thinking is not to withhold judgement but may be to evaluate critically with respect to the problem content. Hence, as it was stated earlier, besides the fact that the development of solutions is founded on an intensive occupation with the specific work area (Poincaré, 1973; Rubinstein, 1973), the creative problem solving process includes not only the generation of ideas but also their evaluation. In both phases the social context may serve as the setting for the interplay of convergent and divergent thinking, based on different individual knowledge and background. Group members should learn to evaluate their own work as well as the work of other group members, since this evaluation is the basis for effective problem solutions. Supporting the group as one selective measure is no sufficient qualification in order to improve the entire problem solving process – however, it is necessary that the individual designer (at any time) is able to (re)-evaluate the different solutions thoroughly in order to converge the search for solution strategies. Thus, the shift between group work and individual work and between formal and informal communication seems to be a necessary precondition in the complex field of the generation, development and realisation of new

problem solutions.

If we are able to flesh out the important influences on creative design processes, it may allow us to prepare individuals and groups to become aware of their own problem solving strategies and the relevant conditions under which they are performed. There are studies confirming that the reflection of important parameters and mechanisms in different types of critical situations enables the designer to improve his or her thinking (Badke-Schaub, in press). The analysis and discussion of critical situations in the group enables the participants to detect and use supporting mechanisms as well as to prevent hindering mechanisms such as overlapping work or reduced information flow from disturbing a creative climate.

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CHAPTER 10

ON PRACTITIONERS' USAGE OF CREATIVITY HEURISTICS IN THE DECISION PROCESS

Some scientific quarters have long regarded habits as barriers to creativity together with certain perceptions and emotions (Khare, 1996). For instance, it has often been argued that although everyday thinking can be useful when we need to solve problems similar to those that we have been confronted with before, they nevertheless often misguide us when we are facing new problems (Khare, 1996). This is due to a lack of appropriateness. The metaphor that everyday thinking may be looked upon as an algorithm, always working in the same way leading to the same conclusion[1], is often used to describe this circumstance. Supporters of this perspective frequently hold the view that everyday thinking has to be removed in order for people to become more creative and make better decisions (Khare, 1996). The perspectives that will be presented in this chapter reveal that this picture has to be modified. It will be pointed out that although the creative thinking process is different from "ordinary" day-to-day thinking and involves a leap that cannot be formulated, analyzed, or reconstructed (Koestler, 1964; Wallas, 1926), creative products are also observed to be the outcome of ordinary thinking (Perkins, 1981; Weisberg, 1992). This approach may be regarded as reductionistic (Goldenberg, Mazursky, & Solomon, 1999) if one does not take into account the fact that there are qualitative differences in everyday thinking.

For instance, recent research suggests that the concept of habit is broad and covers both responses guided by automatic processing and conscious reasoning processes (Oulette & Wood, 1998). This qualification necessitates a more complex discussion of how habit relates to creative behavior. On the one hand, the literature suggests that many habits are automatic in the sense that repetition and practice of a skill may lead to cognitive control of the skill becoming mechanical. In such a case the behavior can be performed quickly in parallel with other activities, and requires minimal focal attention. For these responses, frequency of past behavior reflects habit strength and may serve to predict future performance (Posner & Snyder, 1975; Schneider & Shifrin, 1977; Shiffrin & Schneider, 1977). On the other hand, when behaviors are not well learned or occur in unstable contexts, intentions may direct behavior consciously through controlled reasoning processes. Such processes are often subject to an extensive, thoughtful, and systematic analysis (Eagly & Chaiken, 1993). We believe that it cannot be ruled out that these types of processes, occurring in everyday life, are important for the production of creative decision alternatives.

We suggest that an important feature of creative decision making is to what extent

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people create decision alternatives with high quality. This production of high quality alternatives is assumed to primarily occur consciously through controlled reasoning processes. Thus, an important feature of creative decision making may be studied in generative terms (i.e., focusing on the generation of decision alternatives) since the generation of high quality alternatives is assumed to be essential for making subsequent creative decisions. Another feature of creative decision making may be studied by investigating the nature of the process, in terms of how conscious it is perceived to be. A way of measuring this is to ask decision makers how involved they are in the process.

In this chapter, it is argued that both intention and motivation play crucial parts in creative decision making in everyday life. It is thus suggested that although creative decision making may be considered less habitual than automatic repetition of past acts, it still cannot be ruled out that this type of behavior may occur in everyday life at a conscious and controlled level. This suggestion makes it vital to focus on everyday aspects in the study of organizational life (March & Simon, 1958). Two perspectives of the habitual nature of creative decision making will be presented in the chapter. The first perspective is descriptive, and takes into account the suggestion that motivation is the key for many people in everyday life to define their involvement when they are engaged in creative decision making. The second perspective is decision-aiding in nature, emphasizing how creative decision making should be driven by motivation and value-focused thinking in order for people to be able to create as many good alternatives as possible to reach a solution. The chapter continues with a description of an empirical investigation of how the prescriptive thinking for creating alternatives in fact is used habitually by managers in their everyday lives. It concludes with a discussion of the main findings.

WHAT COGNITIVE SCIENCE HAS TAUGTH US ABOUT THE SOCIAL CREATION OF HABITS

The failure to improve creative outcomes by methods like brainstorming, synectics, and random stimulation has been explained by the unstructured nature of the task connected to the use of these methods. Also, many problems that lack a structuring framework are ill-defined in that the representations of one or more of their basic components are seriously incomplete, and the search space is exceedingly large (Reitman, 1964). Many ill-defined problems thus seem difficult, not because we are swamped by the enormous number of alternative possibilities, but because we have trouble thinking even of one idea worth pursuing (Goldenberg et al. 1999). Managers are therefore believed to quite often utilize classification schemes to impose structure on environmental cues (Bayster & Ford, 1997; see also Giddens, 1990; Gergen, 1991).

It seems evident that these new trends in management science in many respects build on the insights developed by Herbert Simon and his associates (see for instance March & Simon, 1958). For instance, in line with previous results (Simon, 1945) proponents of these new approaches claim that habit is not to be regarded by and large as something passive in behavior. Rather it should be looked upon as a means of directing attention to certain aspects of a situation on behalf of other aspects. Hereby, the decision is actively guided in a specific direction. Furthermore, the importance of premises in structuring the activities and perceptions of organizational participants (Simon, 1945) is also today emphasized by many management scientists. Action is regarded as the key for organization members to discover

their motives. This position may be exemplified by how professionals develop action-based work-related cases (Argyris, 1994). First, they describe the problem as they see it. They then report on how they would go about solving the problem if they had access to the people and systems they believe are relevant. Third, they indicate thoughts and feelings that they have, but do not normally communicate. Action-based cases like these may be used to develop quantitative and qualitative data about the frames, the espoused theories, the theories-in-use, and the self-censoring mechanisms of the professionals (Argyris, 1994). Furthermore, action-based cases will most probably also provide insights into how problems and solutions often are decoupled, and how both oversight and different attempted solutions of problems often influence decisions (March & Olsen, 1976; March & Weissinger-Baylon, 1986).

In this section it has been argued that there are many reasons that make it vital to focus on everyday thinking in the study of organizational life (March & Simon, 1958). It is only through the study of everyday thinking that researchers are able to understand many of the most important features of, for instance, organizational learning and creative decision making. Habit is not to be regarded by and large as something passive in behavior. Rather it should be looked upon as a means of directing attention to certain aspects of a situation on behalf of other aspects.

THE EVERYDAY THINKING NATURE OF CREATIVE DECISION MAKING – A DESCRIPTIVE PERSPECTIVE

ATTITUDE FORMATION AND CREATIVE DECISION MAKING

Decision alternatives often involve an emphasis on values. It has therefore been suggested by Verplanken and Svenson (1997) that both motivation and involvement play crucial parts in the creation of decision alternatives. They argue that the research that has focused on how these psychological states influence the decision process has been limited[3]. Furthermore, they state that the identification of the decision problem is useful for the understanding of the role of involvement with a bearing on the creative decision making process. It is suggested that involvement is vital at the very beginning of the decision process, when the problem is identified. In order to achieve this, the decision maker is scanning for attributes and alternatives that are relevant to this goal. Each type of involvement is believed to be connected to a particular such goal. According to Verplanken and Svenson (1997), value-relevant involvement is connected to the goal of making decisions that are in line with the activated values. In this way, the values are assumed to guide the search for relevant attributes and alternatives. A drawback with this type of processing is that alternatives which are not value-relevant simply do not appear on the table. However, it is assumed that decision makers who are driven by different motives, that is, either by high outcome-relevant involvement or high impression-relevant involvement, will be more eager to search for a larger number of attributes and alternatives. It may therefore be argued that these forms of involvement may be considered as more beneficial for the creation of decision alternatives.

It has been argued that the habitual nature of creative decision making is influenced by scripts as well as by goals and plans. This fully engaged thinking therefore involves a choice of cognitive strategy which is highly influenced by different forms of goals, motives,

and needs. Considered as a habit, creative decision making has furthermore been suggested to be conscious and controlled, as well as extensive, thoughtful, and systematic. Thus, it is seldom automatic in everyday life.

THE HABITUAL NATURE OF CREATIVE DECISION MAKING – A DECISION AIDING PERSPECTIVE

In the previous section, it was outlined that we are guided, to a large extent, by different forms of involvement when we make our decisions. In fact, it has been pointed out that human involvement may serve as a key for understanding a broad range of decision behaviors that are influenced by habit, emotion, and moral values (Showers & Cantor, 1985; Zey, 1992). Such a suggested wide range and complexity of human decision making unavoidably makes a threat to rational choice theories. This is because emotions in everyday life have been shown to make decision makers depart from the stated axioms of rational decision theory in many situations. Some decision theorists therefore suggest that the application of rational thinking to decision making must be context dependent and case-based. The role of a decision analysis is thus to provide prescriptive advice to a presumptive decision maker (it could be an individual or an organization). In order to do so, apart from suggesting general solutions, the decision maker's individual values and objectives must be taken into account. Although decision analyses generally are performed by experts, people in general may also themselves use simplifications of the prescribed routines in order to avoid serious problems and to improve the quality of their everyday decision making habits.

THE IMPORTANCE OF VALUE-FOCUSED THINKING AS A PATH TO CREATIVE DECISION MAKING

In his recently published book, Ralph Keeney (1992) has informed us about how we may create better alternatives for most of our decision situations. The secret is that we should focus more on decision opportunities rather than on problems. We are also recommended to use fundamental values to guide our decision making. In the book, Keeney has stated that people generally are too keen to identify only a few alternatives for a given decision situation. He has also pointed out that much problem solving is characterized by a quick move away from the ill-defined to the well-defined. Thus, people are often apt to move from constraint-free thinking to constrained thinking. According to Keeney, the underlying reason for such a move is the need to feel progress towards reaching a solution. In order to feel progress, a couple of promising alternatives are often rapidly classified. Subsequently, they are evaluated without any efforts of searching for additional alternatives. Nevertheless, should there be such a search, it is often the case that the few alternatives that are on the table (or perhaps only one, such as the status quo) serve to anchor the thinking about others.

As an alternative way to proceed, Keeney has suggested that values should guide the decisions. In so doing, creativity and productivity may be present in the search for new alternatives, since values may be reformulated into objectives which are assumed to stimulate goal-directed motivation. An advantage with using value-focused thinking in this

respect is that it will remove the anchor on the already defined alternatives and allow clear progress toward a more optimal form of problem solving. It is also argued that value-focused thinking makes it much easier to identify co-ordinated alternatives than alternative-based thinking (see also León, 1999). For example, if you are planning to take a business trip for a certain purpose, you may add alternatives by asking yourself if other aspirations could also be addressed on the trip. It is also noted that many constraints that are involved in a decision situation are unnecessary and may be removed in order to create more alternatives. Such constraints may consist of prior arranged rewards/incentives, deadline-induced pressures, expected evaluations or monitoring (Amabile, 1983). In this type of process, attention to different subsets of an attribute may sometimes also result in the creation of options (see Jungermann, von Ulardt, & Hausmann, 1983; Keller & Ho, 1988; Pitz, Sachs, & Heerboth, 1980; von Winterfeldt, 1980 for illustrations). This is because our associative memory permits small cues or attributes to stimulate the retrieval of complex associations. These may in turn have a bearing on the option-generating process. Another way of creating options is to apply creativity heuristics to the decision situation in order to release the constraint-free thinking. Recently Amabile (1996) presented a list of the most cited creativity heuristics in the literature[4].

However, it is important to note that generating numerous alternatives does not necessarily in itself imply that such alternatives will be creative (see also Fischhoff, 1983; Gettys, Pliske, Manning, & Casey, 1987; Isenberg, 1986; Keller & Ho, 1988; Pitz, Sachs, & Heerboth, 1980). Concentrating too hard on a clear precise objective may also be harmful in the sense that if you always know where you are going, you may never end up anywhere else, and it is always possible that some other place would have been preferable, but you just did not know. Creative decision making should thus be a process for discovering goals as well as for achieving them. In other words, you should be goal-guided and not goal-governed (Gelatt, 1991). Also, the creation of options may sometimes be informed by non-conscious cognitive processes that operate in the absence of relevant stimulation, as for example in images (Neisser, 1967).

The introduction of values has many important consequences for the decision making process, requiring that the goal remains in focus. One may begin by considering which consequences should ideally be achieved, and create alternatives that will allow their achievement. De Bono (1993) recently pointed to the fact that in practical life, a problem such as how to deal with a shortage of water may lead to the immediate test of an idea (e.g., raise the charge for water use). If the idea turns out to be difficult to implement it may serve as a basis for generating concepts (e.g., increased efficiency of use, less wastage, discourage use, education). These concepts may in turn lead to new ideas or to even broader concepts, or directions, which will lead us to the objective (e.g., reduce consumption, increase supply, do without). Hence, we go from an idea to a concept, which becomes a fixed point for other ideas. But there is also a movement from the concept itself to the "broader concept", which then becomes the fixed point for alternative concepts. In this way, two layers of concepts are used in order to build a cascade of alternative ideas.

An important goal is to try to find a win-win situation for all parties (Keeney, 1992), that is, one should attempt to improve all parties' situations. In order to accomplish this, the values of others must also be taken into account as well as your own. For instance, imagine that a state is constructing a dam with the aim to increase agricultural productivity. This may nevertheless result in the farmers remaining at the same productivity level but instead choosing to raise their leisure time (Ackoff, 1978). Retrospectively, better alternatives

might have been considered in order to increase agricultural productivity. From the other point of view, better alternatives might also have been created in order to increase the leisure time for the farmers compared with the dam alternative.

In this section it was suggested that we may create better alternatives for most of our decision situations, by stressing the importance of decision opportunities rather than problems, and by using fundamental values to guide decision making (Keeney, 1992). In so doing, creativity and productivity may be present in the search for new alternatives, since values may be reformulated into objectives which are assumed to stimulate goal-directed motivation. Thus, creative decision making may be studied in generative terms (i.e., focusing on the generation of decision alternatives) since the generation of high quality alternatives is assumed to be essential for making subsequent creative decisions.

VALUE-FOCUSED THINKING IN EVERYDAY LIFE – AN EMPIRICAL STUDY OF THE HABITUAL ASPECTS OF MANAGERIAL REASONING

Taking into account that value-focused thinking has been prescribed to facilitate the creation of decision alternatives (Keeney, 1992), we decided to investigate to what degree decision makers actually use this form of thinking habitually in everyday life. We also wondered if value-focused thinking could be regarded as a pre-decisional habit which interacts with different classification schemes (Bayster & Ford, 1997). The question is based on the fact that it has been suggested that scripts have the ability of providing readily available value-related labels, which make quick categorizations easy (Fiske & Taylor, 1991).

To be able to answer these questions we developed an electronic questionnaire which was distributed to managers of information technology companies in Sweden. In the questionnaire two classification schemes of relevant decision situations were presented. These schemes have been suggested to be fundamental to managers in their everyday decision making (Bayster & Ford, 1997). The first scheme involves decisions that rely on well understood and accepted rules, for instance net present value, rate of return and tax schedules. These decisions are often process-based and technical in nature. The second scheme involves decisions that include reorganizations, for instance the rating and ranking of employees, or the hiring, promoting or termination of the same. These decisions are often subjective in nature and open to interpretation. The two schemes are presented in Table 1.

With regard to each classification scheme, seven aspects of value-focused thinking were presented to the managers (see Table 2). Four of these aspects concerned situations for which the outcomes of the decision situations were of interest mainly to *individual decision makers* (aspects # 1, 5, 6, 7). The other three aspects dealt with situations for which the outcomes of the decision situations were relevant to *multiple decision makers* (aspects # 2, 3, 4). For each aspect, the managers were instructed to make a judgment on a rating scale and thereby state how often they were involved in each aspect of the thinking. The managers were first instructed to relate the seven aspects of value-focused thinking to Classification scheme I, entailing procedural issues of financial routines. Subsequently, they were instructed to do the same with Classification scheme II, entailing the personnel decisions. The judgmental instructions read as follows (aspect # 1): "How often do you

Table 1. The Classification Schemes of Decision Situations Presented to Managers (from Bayster & Ford, 1997)

Classification Scheme I
Goals: Organizationally focused, congruent across decision makers *Problem definition*: Global, stable view of problem among decision makers *Decision importance*: Determines willingness to expend resources to search for decision relevant information. *Availability of analytic methodology*: Available and accepted by all decision makers. Relied upon to make the decision. *Nature of information*: Complete, accurate, relevant, unbiased, and available. Used to make optimal decision. *Description:* Very common in for instance economic or "money-based" issues. The decision making process relies on well understood and accepted rules, for instance net present value, rate of return and tax schedules. The decisions are often process-based and technical in nature.
Classification Scheme II
Goals: Reflect self-interests of decision makers as individuals or coalitions. *Problem definition*: Negotiated. Decision makers define problem to their advantage. *Decision importance*: Determines willingness to expend political "capital" to influence the decision *Availability of analytic methodology:* Not available and/or not accepted by all decision makers. Control over analytic process represents a source of power. *Nature of information*: Incomplete, inconclusive, irrelevant, distorted, or not available. Manipulated to support positions. *Description:* Very usual in for instance personnel issues such as organization, labor and staffing. Issues include reorganizations, rating and ranking of employees, hiring, promoting or terminating employees.

consider explicitly what you would like to achieve, and create alternatives that will allow you to achieve them in your everyday decision making? Please make a rating on a scale ranging from -6 to +6 where (-6) stands for very seldom, (-3) for rather seldom, (0) for neither seldom nor often, (+3) for rather often and (+ 6) for very often".

The managers were subsequently instructed to indicate on another scale how involved they generally perceived themselves to be when dealing with each kind of aspect. In this case, the judgmental instruction differed slightly. For all aspects, it read as follows: "On average, how involved are you when performing this activity? Please make a rating on a scale ranging from -6 to +6 where (-6) stands for very little involved, (-3) for not very involved, (0) for neither little nor much involved, (+3) for rather involved and (+ 6) for very much involved".

Several predictions were made about the results. First, we assumed that the managers overall would indicate that they, at least according to their own standards, perceived themselves to be quite engaged in the different aspects of value-focused thinking. The reason for this assumption was that we believed that taking values into account in everyday reasoning must be normal in managerial decision making. Second, a high degree of

Table 2. Questions Asked to the Managers

1. How often do you consider explicitly what valued consequences you would like to achieve, and create alternatives that will allow you to achieve them in Classification scheme I/Classification scheme II decision making? *
2. How often do you try to create an alternative that gets you what you want and at the same time makes others better off when you are engaged in Classification scheme I/Classification scheme II decision making?
3. How often are you thinking of others values at the same time as you think of your own when you are making Classification scheme I/Classification scheme II decisions?
4. How often do you try to create a win-win situation for yourself and for the others, when you are making Classification scheme I/Classification scheme II decisions?
5. How often do you begin with the fundamental objectives that indicate what you really care about in the problem when you are making Classification scheme I/Classification scheme II decisions?
6. How often do you use simple logical reasoning processes to identify the mechanisms by which your objectives may be achieved when you are making Classification scheme I/Classification scheme II decisions ?
7. How often do you create alternatives or classes of alternatives by asking what control you have over that mechanism when you make Classification scheme I/Classifications scheme II decisions ?

*Subsequent question after answering each of the questions above (1-7): On average, how involved are you when performing this activity?

reported involvement in connection to each aspect of the value-focused thinking was also expected. The basis for this assumption was that creative decision making was considered to be a highly conscious and controlled habit, and thus, as such, should require a large degree of involvement. Third, different effects of the classification schemes were also predicted. With regard to perceived frequency, no clear effects were expected. But concerning involvement, we assumed that managers would be more involved in decisions related to personnel issues than to procedural issues of financial routines, since the former decisions were schematically considered as less rule-based. Fourth, it was also assumed that an interaction between classification scheme and aspect category should be found. It was thus predicted that the scheme entailing procedural issues of financial routines should lead to a higher perceived frequency of the *individual decision making aspects* than of the *multiple decision making aspects* by the managers. However, the reverse was predicted for the classification scheme involving the scheme entailing personnel decisions.

RESULTS

Our results were based on the responses collected from 22 managers (about 150 were approached), of which 17 were male and 5 were female. A majority of the managers had completed a university degree (19 out of 22). They all held leading positions at information technology companies in Sweden, which on average engaged 25 employees. Normally, the managers had been serving for 5 years in their companies. The results revealed that the managers generally perceived themselves to be quite often engaged in the different aspects of value-focused thinking, as a basis for their everyday decision making, (see Table 3; the

mean values M = 3.95 and 3.51 reliably differed from zero, $p<.01$). This measure is subjective because it has limited abilities to estimate the actual frequency of the behavior. Still, it indicates that creativity directed towards decision making was perceived to be used habitually by the managers, according to their own standards.

Table 3. Mean Values of Managers' Judgments Concerning their Perceived Frequency of and Involvement in Several Aspects of Everyday Value-focused Thinking (N=22)

	Classification Scheme I				*Classification Scheme II*			
	Perceived frequency of		Perceived involvement in		Perceived frequency of		Perceived involvement in	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
All aspects (#1-7)	3.95	1.63	3.88	2.06	3.51	1.96	3.33	2.19
Aspects mainly concerning individual DMs (#1, 5, 6, 7)	3.54	1.72	3.76	2.15	3.18	1.93	3.19	2.30
Aspects mainly concerning multiple DMs (#2, 3, 4)	4.48	1.67	4.05	2.07	3.95	2.10	3.52	2.19

Frequency was measured on a scale ranging from -6 to +6 where (-6) stands for very seldom, (-3) for rather seldom, (0) for neither seldom nor often, (+3) for rather often and (+ 6) for very often. Involvement was measured on a scale ranging from -6 to +6 where (-6) stands for very little involved, (-3) for not very involved, (0) for neither little nor much involved, (+3) for rather involved and (+ 6) for very much involved".

Another interesting feature of the results was that the managers reliably perceived themselves to be involved to a high degree in the different aspects of value-focused thinking (the mean values M = 3.88 and 3.33 reliably differed from zero, $p<.01$). This finding underlines the fact that considered as a habit, creative decision making could very well be regarded as a conscious and controlled process which is extensive, thoughtful, and systematic in character. Hence, both these general results support our general predictions stating that creative decision making is to be viewed as one among several everyday behaviors that are performed habitually in the management of organizations. Therefore, our results challenge assumptions of the kind that "all habits have to be removed" in order for people to become more creative and to make better decisions.

EFFECTS OF CLASSIFICATION SCHEME ON MANAGERIAL JUDGMENT

In line with our predictions, there were no effects of the classification schemes on the perceived frequency of the different aspects of value-focused thinking. However, much to our surprise, it was revealed that the managers perceived a higher degree of involvement

when dealing with the classification scheme entailing procedural issues of financial routines than when concerned with the scheme entailing personnel decisions, $t_{(21)} = 2.32$, $p<.05$. There are several explanations for this. One is that although the former scheme is to be considered more rule-based than the latter, procedural issues of financial routines still may be regarded as something which is not automatic by nature. These issues may require involved supervision on a daily basis from the managers. The managers may also have been influenced by some form of social desirability norm, stipulating that all issues involving financial matters - no matter how trivial - should be treated both frequently and with great involvement.

Another explanation is that issues related to the conversion of the organizational structure in smaller companies may follow prescribed routines and thus be more rule-based and deserving less involvement than in larger companies. If this is the case, a possible reason could be that the political importance of these issues is not as high in smaller companies as in the larger ones.

When looking at the effects of classification scheme on the judged frequency of the different aspects of value-focused thinking (aspects related to decisions implying single vs. multiple decision makers), there were also some interesting findings. When applying the classification scheme entailing procedural issues of financial routines, the managers reported a higher judged frequency of the social aspects than of the individual ones, $t_{(21)} = 4.50$, $p<.01$. This finding was contrary to what we had expected. Similarly, when applying the classification scheme entailing personnel decisions, the managers also reported a higher judged frequency of the social aspects than of the individual ones $t_{(21)} = 4.24$, $p<.01$. This result was in line with our predictions. Taken together, our results indicate that the application of different classification schemes in managerial decision making may not lead to that different aspects of value-focused thinking being highlighted in the decision making process.

In this section it was revealed that decision makers taking part in our investigation perceived themselves to be regularly engaged in different aspects of value-focused thinking. It was also found that they perceived themselves to be quite involved when engaged in those different aspects. A third finding was that the managers perceived a higher degree of involvement when dealing with the classification scheme entailing procedural issues of financial routines than when concerned with the scheme entailing personnel decisions.

CONCLUSION

The basic idea of this chapter has been to provide arguments in favor of the view that creative decision making may be looked upon as a conscious and controlled habit which appears in everyday life. From this perspective, it has been argued that the behavior may be influenced by scripts as well as by goals and plans. Considered as a habit, creative decision making has furthermore been suggested to be conscious and controlled in its nature as well as extensive, thoughtful, and systematic.

Propositions were also provided in order to improve decision making routines. From this point of view, it was suggested that value-focused thinking is an important method for improving creative decision making (Keeney, 1992). The essence of value-focused thinking is that decision makers should focus on the decision objectives in favor of decision

alternatives in order to be able to enlarge the set of decision alternatives. Accordingly, if we learn how to apply this kind of thinking to our everyday decision problems we may also improve our decision making habits over time.

Taking into account that value-focused thinking has been prescribed to facilitate the creation of decision alternatives, we investigated the degree to which decision makers report that they actually use this form of thinking habitually in everyday life. We also questioned whether value-focused thinking could be regarded as a pre-decisional habit which interacts with different classification schemes (Bayster and Ford, 1997). The results revealed that decision makers perceived themselves to be quite regularly engaged in different aspects of value-focused thinking in their everyday decision making. The results also indicated that the decision makers perceived themselves to be highly involved in the different aspects of value-focused thinking. Hence, both these general results supported our claim stating that creative decision making is to be regarded as one among several everyday, habitual behaviors. Furthermore, it was revealed that the managers perceived a higher degree of involvement when dealing with the classification scheme entailing procedural issues of financial routines than when concerned with the scheme entailing personnel decisions. However, it was also established that the application of different classification schemes in everyday decision making may not lead to different aspects of value-focused thinking being highlighted in the decision making process.

To conclude, we believe that researchers interested in the area of creative decision making would prospectively benefit from treating this phenomenon as a habit. This is for several reasons. First, recent research suggests that the concept of habit is broad and covers responses guided by automatic processing as well as by conscious reasoning processes (Oulette & Wood, 1998). One advantage that researchers will have if treating creative decision making as a (consciously controlled) habit is that it will inevitably provide them with increased opportunities for collecting data from a working life environment. Second, treating creative decision making as a habit will allow researchers to use several new methods that will help them to establish the structures of, for instance, conceptual models. Finally, treating creative decision making as a habit will also make it easier for researchers to benefit from research conducted in important areas of psychological science which have a strong bearing on organizational and working life issues.

NOTES

[1]For instance, according to Max Weber, there exists an inner psychological disposition in the human mind, which is labeled *Eingestelltheit.* This implies a continuation along the path regularly favored, and contains in itself tangible inhibition against innovation (Weber, 1922; see also Camic, 1992, for a review).

[2]Essentially, a script may be regarded as a sequence of related behavioral events that help us organize our knowledge of the world so that we may understand events and situations (Schank and Abelson, 1977; Abelson, 1981). It comprises a set of action rules which have a direct reference to the situation for which it applies. A script specifies which actions will take place (in a general sense) and in what order. It also leaves open slots to be filled in at the time when the specific action will take place. For instance, a script does not specify what a manager will say at a meeting. This is something that varies from one occasion to another. Hereby, a script becomes a kind of knowledge structure that we use as a form of guidance in the social world.

[3]Verplanken and Svenson (1997) make a distinction between three types of involvement that are of special relevance to the decision process (see also Johnson and Eagly, 1989, for a review). The first type is labeled value-relevant involvement and relates to the fact that many decision makers are psychologically influenced by their values and attitudes in their acceptance or rejection of different states of affairs. For instance, it has been shown that people generally are more keen to reject ideas when they have high ego involvement compared to when they have low involvement. The second type of involvement is defined as impression-relevant and refers to situations in which a person perceives that expressing an attitude has direct consequences on others' impressions of herself/himself. The third type is labeled outcome-relevant involvement and denotes situations that are unfamiliar and which are unlikely to be linked to important values or to the prospect of being socially evaluated. Instead, this form of involvement is supposed to lead to message-relevant thinking by a strict focus on presented arguments. Ekvall (1983) stated that definitions of creativity in a social context may focus on the creative process, the creative product, the creative person, or the creative environment. From this perspective, it seems reasonable to argue that value-relevant involvement may be more important for attitudes towards the creative process whereas impression-relevant involvement may be more fundamental for attitudes toward a creative person or a creative environment. Similarly, outcome-relevant involvement seems to be very important for attitudes toward the creative product.

[4]1. Play with ideas (Wickelgren, 1979).
2. Try to generate hypotheses by analyzing case studies, using analogies, accounting for exceptions and investigating paradoxical incidents (McGuire, 1973; see also 1997).
3. Make the familiar strange and the strange familiar (Gordon, 1961).
4. Try something counter-intuitive (Newell et al. 1962).
5. Use concentrated work sessions rather than scattered, distributed work sessions; start by playing with the same idea in a number of different ways before entering the idea-generating sessions; don't rely too much on over-learning of response algorithms (Mednick, 1962).
6. Try to rearrange the elements of a problem; take a break; start to consider a solution involving the most important elements before elaborating a solution in detail; try to consider classes of elements on behalf of particular elements; given that the way to reach a goal from your position seems too far, it may help to look for shorter ways (Anderson, 1980).
7. Apply "intermediate impossibles"; determine the value of an idea by its potential to set off further ideas rather than on its validity (de Bono, 1971).

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CHAPTER 11

MANAGERIAL BEHAVIOR AND DECISION MAKING; PERSONAL AND SITUATIONAL FACTORS

Organizations need managers who are able to contribute significantly to the attainment of organizational goals. It is therefore necessary for organizations to select, train, develop and promote people who will be able to make such a contribution. The question "what makes a manager effective" remains largely unanswered, despite numerous studies of managerial behavior, management styles and managerial effectiveness. Such studies have shown us *what* managers do and *how* they do things, but the effectiveness of these actions is still elusive. Important conclusions from these studies are firstly that situational factors are generally considered important in determining effectiveness. Secondly, effective managers have a broad repertoire of behaviors at their disposal. Finally, effective managers use situational factors to determine which behavior is appropriate in a particular setting. These conclusions, however, do not give an insight into the covert processes *behind* effective managerial behavior. In other words, we are interested in the creative decision making process leading to a behavioral choice. In order to learn what makes a manager effective, we would like to know *why* managers do things the way they do. An analysis of this type of managerial decision making will lead to enhanced insight into the effectiveness of managerial behavior and to recommendations for researchers and practitioners regarding the selection and development of managers.

First, it is necessary to define and distinguish between several key concepts used in this study. Effectiveness is generally defined as attaining goals or goal achievement. Managerial effectiveness is often explained as "getting things done", and denotes the extent to which what managers *actually* do matches what they are *supposed* to do (Hales, 1986). Basadur (1999, see the chapter in this volume) describes how effectiveness in today's organizations depends on both efficiency and adaptability or creativity. Efficiency means optimizing current methods and routines to achieve goals at the lowest possible cost; creativity means deliberately changing current methods to attain new goal levels. Until recently, organizations could rely on efficiency alone to be effective. Efficiency is described in this chapter as one of the reasons *why* managers do the things they do. These days, however, creativity is required to enable organizations to succeed (Basadur, 1999). Creativity, according to Amabile and Conti (1997), is a function of skills in the task domain, skills in creative thinking, and intrinsic motivation. Sternberg and Lubart (1995) describe creativity as actively pursuing ideas that are unknown or

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 211-238.

out of favor but have potential ("buying low"). When an idea becomes valued and yields a significant return, a creative person moves on to new project ("selling high"). Creativity, however, can be reduced by risk aversion (Sternberg & Lubart, 1995). Vroom and Yetton (1973), in their model of managerial decision making, state that the most efficient option is often chosen when there are few risks involved in decision making. Creative decision making may require a less efficient route, depending on the diagnosis of the situation and the risks involved. In this chapter we will focus on this kind of managerial decision making, namely how managers decide to react to particular situations. We feel this type of decision making requires creative thinking. Managers, who are creative in choosing a reaction to a particular problem, rather than sticking rigidly to routines, will be more effective in contributing to their organization's goal achievement.

This chapter discusses the creative decision making of managers within the context of a study on managerial behavior and effectiveness. The main research question addressed in this chapter is *why* managers do things the way they do. To answer this question we have studied how managers decide to react to situations in their daily work. More specifically, we have looked at reasons managers give for their behavior. An example of a reason is 'urgency'. If a manager feels that a specific problem urgently requires a solution, he or she may act differently compared to his or her reaction to a less urgent problem. The relative importance and significance of these reasons in managerial decision making may be influenced by both personal and situational factors (Vroom & Yetton, 1973).

In the first part of the chapter a literature review is given of relevant management theory, regarding both managerial behavior (*what* managers actually do) and management styles (*how* managers do the things they do). There are a large number of studies on managerial behavior, management styles and effectiveness with different and sometimes contradictory outcomes. Most authors agree that the effectiveness of managerial behavior is largely determined by the situation. Managers need to be creative and flexible in choosing a reaction to a particular problem, rather than sticking rigidly to one type of behavior or style. The ability to read the situation and to choose an appropriate action may however be influenced to a larger extent by personal rather than by situational factors. We are interested in the creative decision making processes *behind* overt managerial behavior. *Why* do managers do things the way they do? How do managers decide to respond to particular problems? To what extent do situational and personal factors influence managerial decision making? Based on the literature review, several research questions are posed. A number of hypotheses were postulated concerning the effect of both personal and situational factors on the perceived importance of different *reasons* for choosing a particular action.

The second part of this chapter describes an empirical study of managerial behavior and effectiveness, which was conducted with a sample of 139 senior managers from Dutch organizations. Short scenarios describing managerial problems were developed using a combination of management theory and interviews. Managers were asked to indicate *how* they would react to the situation and to indicate reasons *why* they would react this way. By studying these reasons for choosing a particular behavior, insight was gained into the creative decision making processes behind overt managerial behavior.

In the final part of the chapter, the results from the study are discussed in the light of the theoretical issues raised in the first part of the chapter. Managerial effectiveness is of obvious importance to organizations. Effectiveness, as we will show, requires creativity in decision making. How can organizations make sure they select and train managers to use these skills?

THEORETICAL BACKGROUND

MANAGERIAL BEHAVIOR

The first section of this chapter deals with the actual content of managerial work, both according to classical management theory and more recent empirical findings (*what* managers actually do). Traditionally, management has been described as consisting of the so-called POC_3-functions (Fayol, 1949); that is, Planning, Organizing, Controlling, Coordinating, and Commanding. This list has been changed and supplemented by various authors (for reviews see Carroll & Gillen, 1987; Hales, 1986). Mintzberg (1973; 1975) seriously challenged this classical view of management. He argued that Fayol's description of managerial work should be called folklore, when compared to his own observations of the daily activities of top managers. Brevity, variety and discontinuity are all characteristics of managers' activities; they spend most of their time in verbal communication and they prefer action to reflection. The classical management functions are viewed (at most) as vague objectives of managerial work. Based on his research, Mintzberg described ten managerial roles that seem to capture the essential content of all managers' jobs. He distinguished between three interpersonal roles, three informational roles, and four decisional roles. Other authors such as Drucker (1982) and Kotter (1982a; 1982b) came to similar conclusions regarding managerial behavior. Kotter stated (1982b) that the actual behavior of the managers looks less systematic, reflective, and less organized than one would expect from management theory, and it looks more informal, reactive and frivolous.

Several authors have discussed the fact that a lot of observed managerial behavior does not seem to fit into the traditional categories. In an article titled "Are the classical management functions useful in describing managerial work?" Hales (1986) discussed the question whether recent empirical studies of managerial work disprove the classical theories of management. He found that recent studies rarely address the non-observable functions behind apparent managerial behavior. By asking managers *why* they perform these behaviors, it might therefore be possible to explain or even reduce the difference between traditional management theory and empirical findings. Carroll and Gillen (1987) also tried to fit together the traditional approach and newer conceptualizations of the manager's job.

One possible explanation for the discrepancy between classical management theory and more recent observational studies is that the former refers to what managers *should* do (prescription) and the latter is proof of what managers *actually* do (description) (Hales, 1986; Lipshitz & Nevo, 1992; Stewart & Stewart, 1976). Another explanation is that the different theories reflect the diversity of the phenomenon itself; that is, the wide variations in jobs designated as managerial (Hales, 1996). Carroll and Gillen (1987) and Noordegraaf (1994) suggested a final explanation. One should look at the difference between actual observed managerial behavior and the classical management functions in terms of a continuum. This continuum leads from behaviors to activities to tasks to functions. The continuum can be explained using an example as given in Textbox 1. These explanations help to clarify and perhaps resolve the apparent controversy between classical management theory and empirical research findings.

There are a number of studies that are based on empirical data on managerial behavior and that attempt to classify this behavior into comprehensive categories or functions. Vinkenburg (1997) provided an overview of such managerial behavior taxonomies; examples are studies by Quinn, Morse and Wagner, Luthans and Yukl (Luthans, Hodgetts & Rosenkrantz, 1988;

Textbox 1 Continuum (based on Carroll and Gillen (1987) and Noordegraaf (1994))

Continuum	*Explanation*	*Example to illustrate the continuum*
Behavior	Without context or intent	Holding a phone in your hand and talking into the mouthpiece
Activity	Related to context	Talking on the phone to a subordinate about a current project
Task	Goals of activities	Making sure the work on a project is carried out according to schedule
Function	Contributions of tasks to the organization	Planning and organizing

Luthans & Lockwood, 1984; Morse & Wagner, 1978; Quinn, 1988; Yukl, Wall & Lepsinger, 1990). Luthans *et al.* (1984; 1985) devised a method to observe and categorize managerial behavior. This resulted in four main clusters of managerial activities subdivided into twelve categories and their behavioral descriptions. The main clusters of managerial activities are, according to Luthans *et al.* (1984; 1985): traditional management, communication, networking and human resources management. These activities, established through empirical research, show distinct resemblance to Yukl's Managerial Practices (Yukl *et al.*, 1990; as argued by Lipshitz & Nevo, 1992). Both Mintzberg's interpersonal roles (1975), Kotter's networking activities (1982a) and the classical managerial functions are represented in the clusters of activities.

It is important to note that different managerial activities are part of the management job, *regardless* of the person of the manager. As Mintzberg stated: "Individual personality may affect *how* a role is performed, but not *that* it is performed" (1973, p. 54). How does a manager perform these managerial activities? How does he or she plan the unit's business, motivate a subordinate, communicate with a customer? There seems to be an added value to asking managers *how* they would behave in specific work situations and *why* they would behave this way. This may provide more insight into management than either pure observation or asking for a general job description would.

Management styles

The question of *how* managers perform different activities or behaviors is the topic of a somewhat different area of theory development and research, concerning management styles. Den Hartog, Koopman and van Muijen (1997) gave an overview of the style-approach. The

most common distinction among different management styles is a task-oriented versus a relationship-oriented style, sometimes described as initiating structure versus consideration (Bass, 1990; Blake & Mouton, 1985; Yukl, 1994). Other researchers distinguished between delegation or participation and direction or autocratic leadership (Gibson, 1995; Reddin, 1970). Participation as a specific management style has received considerable attention (Koopman & Wierdsma, 1998). Participation refers to the degree to which a manager consults and lets his or her subordinates take part in decision making on issues relevant for the organizational unit (Vroom & Yetton, 1973); directive or autocratic leaders do not leave room for such participation. A final distinction among management styles is between transactional leadership (Bass, Avolio & Atwater, 1996) and transformational leadership (House & Howell, 1992; Koopman, 1991). Transformational leaders show individualized consideration, provide intellectual stimulation and have charisma; transactional leaders perform "management-by-exception" and provide contingent rewards to their subordinates.

A manager's style has traditionally been seen as more determined by personality than by situational factors. The early style-approach was soon criticized for its lack of attention to the context or situation in which the managerial behavior takes place (Den Hartog *et al.*, 1997). The theorists adhering to the contingency or the situational leadership-approach claimed that situational factors largely determine which management style is most effective (Hersey & Blanchard, 1993). Vroom and his colleagues (Vroom & Jago, 1988; Vroom & Yetton, 1973) have developed a model of managerial decision making (a decision tree) in which seven rules specify which of five possible processes is considered feasible. These processes vary from autocratic to participative decision making. The decision rules illustrate a combination of characteristics of the situation and a manager's educated guess at the importance of these characteristics. The decision rules are given in Textbox 2. The use of the Vroom and Yetton decision tree provides practical guidelines for managerial behavior.

Textbox 2 Decision rules (Vroom & Jago, 1988; Vroom & Yetton, 1973)

1. Is quality required (e.g., is only a specific solution acceptable rather than a number of options)?
2. Is sufficient information available to make a quality decision?
3. Is the problem structured in terms of what information is needed?
4. Is acceptability of the decision to subordinates critical to decision implementation?
5. Is it certain that subordinates would accept the decision if the leader made it on his/her own?
6. Do subordinates have the same goals as the organization in terms of the benefits to be obtained in solving the problem?
7. Is it likely that there would be conflict among subordinates about which is the preferred solution?

Vroom and Yetton (1973) adhere to the contingency approach, implying that the situation largely determines how a manager should react to a particular situation, in order to be considered effective. Their model is much more strongly supported by empirical results than any other theory of leadership and unsurpassed in terms of validity (Yukl, 1994). Therefore, this theory will be used as a framework in this study of managerial decision making, with regards to *how* and *why* managers choose to react in a certain way to a particular situation.

Managerial effectiveness

The question whether managerial behavior or management styles are indeed effective is of great interest to both researchers and practitioners. However, there are relatively few studies concerning the relationship between managerial behavior or styles and effectiveness. In a review titled "What we know about leadership; effectiveness and personality", Hogan, Curphy and Hogan (1994) wrote:

"There is little published research concerning what effective leaders actually do. [...] Indices of effectiveness are often hard to specify and frequently affected by factors beyond a leader's control. Nevertheless, effectiveness is the standard by which leaders should be judged; focusing on typical behaviors and ignoring effectiveness is an overarching problem in leadership research" (o.c., p. 494).

The little research that has been done is limited to showing positive correlations between frequencies of managerial behavior or style and various measures of effectiveness. Results from these studies are diverse and often contradictory. The relationship between management styles and subordinate performance, satisfaction and stress has been studied extensively. Most theories on management styles assume and even postulate normative ideas about how the use of one particular style (in a specific situation) will also lead to greater effectiveness. It is indeed strange therefore that the relationship, between management styles and criteria for managerial effectiveness, has received relatively little attention. Vroom and Yetton (1973) did show that decisions made according to the styles prescribed by their model tend to be more effective than those that are not.

We have argued that "*how* managers do the things they do" seems to be a more relevant question than "*what* managers do" when trying to figure out what makes a manager effective (Shipper, 1991). It is useful to study not only the frequency of managerial activities, but also the competence or level of mastery of managers in carrying out these activities. However, it has been shown above that the *how* question can not be answered by one particular management style, as the link between style scores and criteria for managerial effectiveness is not often clear. Simply trying to find a relationship between frequencies of managerial behavior or style and criteria for effective managerial performance may not lead to clear and consistent results nor to insight into the decision making process behind overt managerial behavior.

Hales (1986) argued that the diverse and contradictory evidence from studies of managerial effectiveness is due to the *research method* or *instrument* used. Another cause for contradictory evidence on managerial effectiveness is the variety of *criteria* used (Bormann, 1991; James, 1973; Sokol & Oresick, 1986). Researchers use very different criteria or dependent measures for effectiveness. These can vary from soft data (perceived effectiveness, subordinate satisfaction) to hard facts, such as profit. Campbell, Dunnette, Lawler and Weick (1970) referred to this diversity of criteria and the difficulty of finding a reliable measure as

"the criterion problem". Stewart and Stewart (1976) advised researchers to find out what the criteria for effectiveness are in the *particular* organization one is looking at, as only these are relevant and right. Examples of such organizational criteria are salary, salary growth, hierarchical growth, potential ratings, and performance appraisals (Ansari, Baumgartel & Sullivan, 1982; Goffin, Rothstein & Johnston, 1996; Orpen, 1996). Other authors suggested some kind of measure of discrepancy between individual managerial behavior and an organizational norm of effective behavior (Hales, 1986; Roskin & Margerison, 1983; Tsui & Ashford, 1994). More successful managerial behavior is expected to deviate less from this norm.

Despite contradictory results, most studies have concluded that what is required of a manager and his or her behavior in order to be labeled effective, depends mostly upon the *situation*. This context includes a number of different factors such as type of organization, managerial level, functional area, unit size, geographical location and so on. (Morse & Wagner, 1978; Stewart & Stewart, 1976; Yukl *et al.*, 1990). These are all macro level contextual factors. There is of course also an effect of the more micro level characteristics of the specific situation on what is considered effective behavior. Examples of micro level situational factors are task structure, task complexity, manager-subordinate relationships, subordinates' motivation and subordinates' ability (Hersey & Blanchard, 1993). In terms of the activities suggested by Luthans *et al.* (1984; 1985), various types of management situations are distinguished that may require different types of behaviors such as human resources management situations versus traditional management situations.

Results indicate that effective managers have a broad repertoire of behaviors at their disposal as well as the ability to vary their actions depending on the situation (Blake & Mouton, 1985; Denison, Hooijberg & Quinn, 1995; Hooijberg, 1996; Kotter, 1982a; Luthans, 1988; Mintzberg, 1973; Morse & Wagner, 1978; Quinn, 1988; Whitley, 1989). Although contextual factors determine what kind of behavior is effective in a given situation, an effective manager is able to analyze the situation and make a choice of an appropriate course of action. Hooijberg (1996, p. 919) described this ability as follows:

"Managers need more than the ability to perform multiple leadership functions (behavioral repertoire, authors' note); they also need to be able to perform these leadership functions when the situation calls for them and to not perform them when the situation does not call for them (behavioral differentiation, authors' note)".

The situation, not the manager determines what kind of behavior is effective. However, the manager must be able to foresee this and to select a fitting behavior according to situational requirements. This paradox seems to be at the core of what *determines* managerial effectiveness. Shipper (1991) stated that part of the mastery of managerial skills is the ability to know when different skills are most appropriate. He called for an integrated study of managerial behavior based on a contingency model of leadership effectiveness, since such a study may provide some insight into when various behaviors are most effective.

Person versus situation

The notions described above touch upon an ongoing discussion in psychology in general and organizational behavior in particular; the person-situation debate. This debate is not new in the literature on management and leadership. Researchers tend to agree on an interactionist point of view, that is, behavior is regarded as a function of both individual and situational

factors (O'Reilly & Chatman, 1994). However, *which* of the two factors explains the most variance in behavior, and should therefore receive the most attention, is still the topic of heated polemics (Davis-Blake & Pfeffer, 1989; House, Shane & Herold, 1996).

Recent support for the importance of *personal factors* can be found in Yukl and Tracey (1992) who found that specific influence tactics used by managers were effective across situations and organizations. The recent coverage of best practices in human resource management (Becker & Gerhart, 1996; Delaney & Huselid, 1996; Pfeffer, 1996) implies that there are indeed practices that are consistently related to improved performance at the individual subordinate level and at the organizational level. Especially in situations such as discussing bad news with a subordinate, there may be only one (best) way to do so, regardless of the nature of the task or the level of maturity or stress. Personal factors such as personality, age, experience and gender are generally supposed to have a strong impact on managerial decision making, behavior and effectiveness. Gronhaug and Falkenberg (1998), who studied managers' success attributions, discussed how experience may lead to acquired schemata and thus stable attributions of organizational success. Some researchers regard a manager's ability to deal with the demands of the situation as a personality characteristic. Adamiec and Kozusznik (1995) referred to the managerial ability to flexibly use one's own characteristics as a *meta-trait*. We feel that there is a lot of creativity and flexibility involved in the way managers decide how to react to the demands of the situation. Referring to the definition of creativity by Amabile and Conti (1997), skills in the task domain can be equated with behavioral repertoire as described above. Furthermore, skills in creative thinking are comparable to the use of different perspectives, sensitivity to situational cues and the ability to choose an appropriate action. Pratch (1996) stated that effective leaders possess personality structures with the capacity to respond and adapt in resourceful ways to complex and changing circumstances. However, effectiveness in itself is *not* a personal quality a manager brings to a situation (Reddin, 1970).

Other research supports the importance of *situational* factors. Hersey and Blanchard (1993, p. 158) stated that "different leadership situations require different leader styles. In summary, the evidence is clear that there is no single all-purpose leadership behavioral style that is effective in all situations". The poor support discussed above for a link between management styles and managerial effectiveness, even when measured within a specific situation, is further evidence for a situational or contingency approach. Bass (1990, p. 444) claimed, when discussing management styles, that both the contingency and the noncontingency theorists may be right. Frequency of direction may be mainly a matter of personality; frequency of participation may hinge mainly on contingent factors. Unckless (1996) suggested examining complex conceptualizations of personality such as "person-in-situation models" and "circumplex models" to help solve the dispute over the determinants of organizational behavior (Mischel & Shoda, 1995; Wiggins, 1980). These models emphasize the importance of the individual's construal of the situation. In situations with similar psychological features individuals show consistent patterns of behavior (for example crying in frightening situations), rather than showing consistent behavior across all situations (for example crying all the time). The consistency is based on intrapersonal criteria. Varying behavior given a specific situational context reflects stable and meaningful patterns rather than inconsequential deviations from normality.

This literature review has provided one main conclusion: managers who are able to analyze a situation and its demand characteristics, and to select a fitting way to deal with the situation from their behavioral repertoire, are likely to be considered more effective than others. This

implies flexibility and creativity rather than rigidity in managerial decision making. The above review cannot establish whether it is the person, the situation or the person-in-situation that ultimately determines managerial behavior and its effectiveness. The effect of situational and personal factors on managerial decision making remains an interesting object for further investigation.

Research issues and hypotheses development

The literature review above has raised a number of questions and issues. We have problematized *what* managers do and *how* they do things. We have also found that the results from studies that look for the relationship between managerial behavior or management styles and effectiveness are inconsistent. The question "what makes a manager effective" was not answered, but there is one important lead for further exploration. This is the notion that effective managers use situational factors to determine which behavior is appropriate in a particular setting. *Why* managers do things is thus dependent upon the situation. Their perception of a situation and their sensitivity to situational cues is of vital importance (Robertson & Callinan, 1998). It is obvious that the effectiveness of managerial behavior is largely determined by the situation. The ability to read the situation and to choose an appropriate action may however be a matter of personality. We wish to study the processes *behind* effective managerial behavior, that is, the creative decision making process leading to a behavioral choice. The main research question addressed in this chapter is why managers do things the way they do. To be able to answer this question we will focus on how managers decide to react to situations in their daily work. Following Vroom and Yetton (1973), we will look at reasons that managers give for their behavior. Personal and situational factors are expected to influence these reasons' importance and significance in managerial decision making.

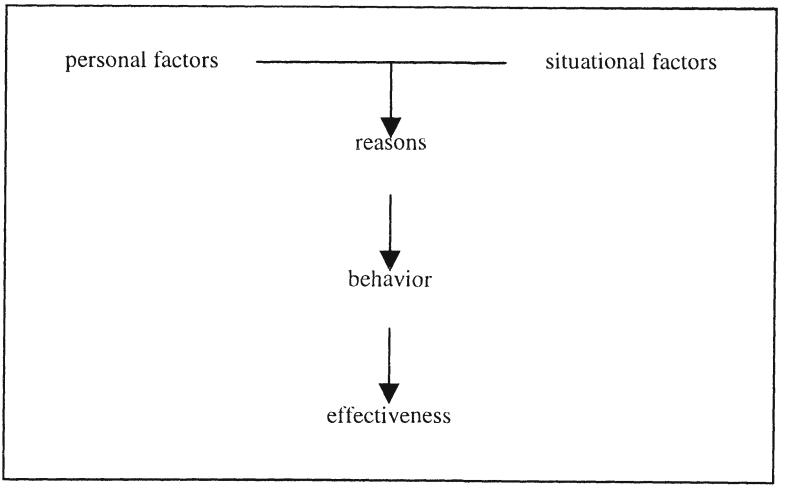

Figure 1. Link between Concepts in the Study

In the following parts of this chapter, an effort will be made to address the issues and questions raised by the literature review, using results from an empirical study on the determinants of managerial behavior and effectiveness. The study was conducted by Vinkenburg and is fully described in her doctoral thesis (1997). In Figure 1, the concepts introduced above (personal and situational factors, reasons for behavior, managerial behavior and effectiveness) and its proposed interrelationships are illustrated.

As described above, what reasons a manager considers important in a particular situation may have a large impact on managerial decision making and, consequently, behavior. As also described above, the importance of different reasons is expected to vary across situations. For instance, if a manager feels that quality or acceptance is important, he or she may behave differently from a situation where urgency or efficiency is perceived to be important. Which reasons does a manager perceive as most important in deciding how to react to a particular situation? The literature review and the analysis above has led to a number of research questions that need to be answered:

- What different reasons in managerial decision making can be distinguished?
- What is the relative perceived importance of those reasons in managerial decision making?
- Does the perceived importance of different reasons vary across different types of situations?
- Which specific situational and personal factors influence the perceived importance of different reasons?

A final question raised by the literature review is whether there is a relationship between the perceived importance of different reasons in a particular situation and self-reported managerial behavior in that situation. This question, however interesting, cannot be answered conclusively from the study presented in this chapter. Therefore, we have decided not to include this question in our list of research questions. Because we feel it does deserve some attention in this chapter, we will explore the interrelationships between the perceived importance of reasons and chosen behavior in only *one* particular situation, to show an example of managerial decision making.

To answer the first research question, a set of different reasons relevant to managerial decision making was selected building on the literature review and interviews with managers. Vroom and Yetton (1973) have studied the determinants of the degree of participation in decision making, looking at reasons such as quality, acceptance, and information (Vroom & Jago, 1988). The authors conclude that the degree of importance of these reasons determines the degree of participation used. Yukl and Fu (1996) describe reasons for managerial use of delegation, such as developing subordinates and empowerment. For example: is acceptance by employees considered important, or is the problem so urgent that full acceptance cannot be achieved within these time limits? Next to some of the reasons mentioned above (acceptance, quality, and urgency), we will also look at maintaining a positive atmosphere, efficiency, and flexibility. These reasons were mentioned as relevant to managerial decision making by managers interviewed in two pilot studies (as described below, in the paragraph titled "*instrument development*").

The other research questions were addressed in the study described below. There were no hypotheses formulated concerning the second question. This question refers to the relative importance of different reasons in managerial decision making. As there were few studies found that explicitly addressed this issue, it was studied in an exploratory manner. The third and fourth research questions concern the influence of both personal and situational factors on managerial decision making. Answers to these questions can be found by looking at the

relationship between such factors and the perceived importance of specific reasons for managerial behavior. Four hypotheses are formulated below regarding such relationships. We expect that the perceived importance of different reasons vary across different types of situations. We also expect an effect of specific situational and personal factors on the perceived importance of different reasons. First, the influence of situational factors is discussed. In this chapter, a distinction will be made between contextual and situational factors. The context refers to characteristics of the total organization and the unit of the manager; the situation refers to characteristics of the specific work situation or problem a manager is presented with.

To operationalize situational factors, we decided to use the taxonomy of managerial activities suggested by Luthans *et al.* (1984; 1985). As mentioned before, they distinguished between four main clusters of managerial activities; traditional management, communication, networking and human resources management (Luthans *et al.*, 1984; 1985). These clusters of activities can be equated to different types of situations, and were used in developing the instrument used in this study. The four types of situations are treated as independent variables. Every specific situation fits into one of the four categories. In reaction to a given situation, individual managerial behavior can vary. Specific reasons may be considered more important in one type of situation compared to other types of situations. In particular, this holds true for people-oriented reasons in human resource management situations. One hypothesis was formulated concerning the effect of this type of situation on the perceived importance of managers' reasons. Other effects will be examined in an exploratory manner.

Hypothesis A: People-oriented reasons such as acceptance and maintaining a positive atmosphere will be considered more important in human resources management types of situations.

Next, contextual factors are discussed. Differences between managers from different organizations will be assessed using 'type of organization' as an independent factor. Various authors have looked for differences in management across different types of organizations. The main distinctions include: (1) public versus private sector; (2) profit versus non-profit organizations; (3) military versus civilian organizations; and (4) services versus industry (Lipshitz & Nevo, 1992; Noordegraaf, 1994). In some studies, there is a particular focus on health care institutions as a special kind of organization (Scherer, Canty, Peterson & Cooper, 1995). Generally speaking, managers from non-profit and health care organizations are often presented as more people-oriented and less competitive compared to managers from profit organizations, especially within industrial organizations (Chusmir & Hood, 1988). A hypothesis was thus formulated concerning such differences in terms of the perceived importance of reasons.

Hypothesis B: Managers from non-profit (especially health care) organizations will consider people-oriented reasons such as acceptance and maintaining a positive atmosphere more important than would managers from profit organizations.

There are a number of contextual factors related to the type of organizational unit that have an effect on management, such as management level, functional area, nature of the task, span of control and unit demographics. Yukl (1994) describes results from several studies in which the manager's *position* or level in the organizational hierarchy influences the importance of

skills needed to fulfil role requirements. In a study looking at the perceived importance of different management tasks at different management levels and functions, it was reported that first-line supervisors find supervising individuals important. Middle managers indicate the importance of linking groups. Finally, executives feel that monitoring the environment is most important (Kraut, Redigo, McKenna & Dunnette, 1989). The size of the unit or *span of control* (i.e., the number of subordinates) influences the complexity of the situation. Large numbers of subordinates will increase authoritative and directive behavior. They will require more traditional management and group maintenance activities (Yukl, 1994).

Hypothesis C: People-oriented reasons such as acceptance and maintaining a positive atmosphere will be considered more important at lower management positions; flexibility and efficiency will be considered important by managers with larger spans of control.

Finally, the effect of personal factors is discussed. A large number of personal factors are expected to have an influence on managerial decision making with respect to behavior in a specific situation. However, an in-depth analysis of the effects of the manager's personality falls outside the scope of this chapter. Here the following question is addressed: do gender, age, and experience have an influence on the reasons managers consider important in decision making? Managerial qualities such as relation-orientation are highly valued these days and may be more prevalent in women (Fondas, 1997). We also expect that the degree to which managers find the relationship with their subordinates important increases with age and experience (Bass, 1990). Therefore, both female managers and more experienced, older managers are expected to find reasons such as acceptance and good working relationships more important than men and/or younger managers.

Hypothesis D: People-oriented reasons such as acceptance and maintaining a positive atmosphere will be considered more important by female managers and by older and more experienced managers.

The research questions and hypotheses formulated above will be addressed in the following section.

EMPIRICAL STUDY

INSTRUMENT DEVELOPMENT

In order to measure managerial behavior in particular situations, an instrument was developed using the theoretical framework of managerial activities from Luthans *et al.* (1984; 1985) as a source for situation descriptions. This instrument measures managerial behavior through self-reported reactions to situation descriptions or scenarios. The situations consisted of short written vignettes presenting a managerial problem in three to five sentences. A large number of different ways to deal with the described situations was generated through two pilot studies, by interviewing 33 managers in both the USA and the Netherlands. On the basis of the interviews it was decided that out of the original 50 descriptions, 36 showed clear face validity, as they were highly recognizable and relevant to the managers interviewed.

In the interviews conducted in the pilot studies, managers were asked to read the situation descriptions one by one. After reading a situation description, the respondents were asked to indicate *how* they would react to the situation and *why* they would react this way. This method is illustrated in Table 1.

Table 1. Illustration of the Method Used to Study Managerial Behavior

Situation given:	Example:
What (activities)	Setting up a project
Questions asked:	
How (actions, behaviors)	Asking subordinates for input
Why (reasons)	Acceptance is important

Three experts independently read the qualitative interview data from the pilot studies in order to come up with a clear and comprehensive way to code the data into categories for the further development of the instrument. The framework used while doing this exercise was based on managerial decision making literature (McCall & Kaplan, 1985; Vroom & Yetton, 1973) (see the section on managerial styles). The experts' main conclusion was that in almost each of the respondents' reactions to the situations, three topics were addressed. Respondents often mentioned (a) issues regarding their behavioral reactions to the problems described, that

Table 2. Topics and Issues from the Qualitative Data

BEHAVIORAL REACTIONS	REASONS	PROBLEM DEFINITION
Need for information	Quality	Need for information
Direct versus indirect	Urgency	Complexity
Formal versus informal	Acceptance	Conflict of power
"By the book" versus personal	Flexibility	Conflict of interests
Easy versus elaborate	Efficiency	Experience / familiarity
Simple versus complex	Atmosphere	
Self versus delegate		
Alone versus cooperative		

is, the way they would choose to behave or deal with the situation; (b) reasons considered important in this particular situation when choosing a behavioral reaction; and (c) the way they defined the problem. The order and frequency of discussing these topics varied between respondents. The main topics and the issues raised while discussing the topics are shown in Table 2.

Textbox 3 Example of a page from the MSA instrument.

Situation 15. While trying very hard to make a deadline, you foresee that your unit will not be able to deliver or finish the job on time because of a computer failure and other circumstances. Your immediate supervisor calls to ask how you are doing.

How likely is it that you would choose to react to the situation in the following manner?

1 = very unlikely 5 = very likely

Reaction 1.	You would honestly tell your supervisor what is going on, what caused it and what you have tried to do about it. Together you try to find alternatives.	1 2 3 4 5
Reaction 2.	You would honestly tell your supervisor what is going on, what caused it and what you have tried to do about it. You make an estimate of the extra time you need.	1 2 3 4 5
Reaction 3.	You would not say "We are not going to make it", but "Things are not going very well": as you do not know for sure whether you will make it until the deadline has passed.	1 2 3 4 5

How important are the following reasons in deciding how to react to the situation?

1 = not at all 5 = very much so

Acceptance	1 2 3 4 5
Efficiency	1 2 3 4 5
Flexibility	1 2 3 4 5
Atmosphere	1 2 3 4 5
Quality	1 2 3 4 5
Urgency	1 2 3 4 5

The final instrument, titled Management Situation Analysis (MSA), comprising 36 situation descriptions and precoded answer possibilities based on the interviews was used in an empirical study with a sample of 139 managers from three different organizations. An example of a page from the instrument including a situation description is given here in Textbox 3, using a situation from the communication cluster.

The technique used in this study to measure managerial behavior depends fully on self-reported data. There are disadvantages to using self-reported data, including social desirability effects and other biases. An alternative would be to use observation to collect data. In the light of our main research question, an important limitation of observation is that it is difficult to measure anything beyond frequencies of behaviors. In contrast, using self-reported subjective perceptions may facilitate a greater insight into the processes *behind* overt managerial behaviors and into the causes of what makes some managers more effective than others. By letting managers indicate which reasons they feel are important in deciding on a particular behavior, such an insight is further enhanced. Especially the open-ended questions used in the interviews resulted in more detailed information on the *how's* and the *why's* of managerial behavior, rather than just the *what's* (as illustrated in Table 1).

In addition to the MSA instrument measuring self-reported managerial behavior, the questionnaire included several personality measures, and covered biographic and job-related information. For every manager, data on several criteria for managerial effectiveness were collected. These data included salary, salary growth, hierarchical growth, potential ratings and performance appraisals. Apart from the variables relevant to this chapter, the other data and analyses will not be discussed. For a full description of the complete study including all measures and procedures we refer to Vinkenburg (1997).

SAMPLE AND MEASURES

The final sample for the study consisted of 139 managers, 114 men and 25 women. The managers' mean age was 43.4, ranging from 29 to 63. The level of education was fairly high; 56.0% of the managers had a university degree (masters' level or higher). Most managers in the study had a full time contract (129 or 92.8%); the average number of hours worked per week was 52.3. Average tenure at the organization was 10.0 years; the tenure on the job was 3.0 years. The managers had an average of 10.5 years of management experience. Eighty percent (80.0%) of the managers were in a top- or higher middle management position. The size of the managers' organizational unit in terms of span of control was an average of 10.6 subordinates, ranging from 1 to 75.

In the instruction on the first page of the questionnaire managers were given an example of a situation plus questions in order to explain the way to fill out the instrument. A page from the instrument is given in Textbox 3. Per situation, the respondents were first asked to read the situation description. They were next asked how likely it was that they would choose to react to the situation as described in the different precoded answer possibilities. Finally, the respondents were asked to rate the importance of six different reasons in deciding how to react to the situation. These reasons were based on the literature review and the answers from the interviewees in the pilot-studies as described above, in Table 2. Six reasons were given for every situation. The list of definitions of the reasons, as described in Textbox 4, was given once, in the instruction on the first page of the questionnaire. The degree to which each reason was perceived as important was measured on a five-point scale (ranging from 1 = not at all to 5

Textbox 4	Explanation of reasons
Acceptance	- subordinates, customers, other stakeholders must accept the result or outcome
Efficiency	- obtaining the same results with less effort, means, time or money
Flexibility	- supple, quick reaction, high adaptability
Atmosphere	- for the sake of maintaining a positive atmosphere/climate/mood within the unit
Quality	- ensuring a good product and/or service, quality of work
Urgency	- something has to be done as soon as possible

= very much so).

In order to measure the influence of situational factors, we distinguished between four main clusters of managerial activities, or types of situations, suggested by Luthans *et al.* (1984; 1985). These clusters were used in developing the Management Situation Analysis, and served as a means of categorizing the 36 situations. It is important to note that this categorization refers to a theoretical clustering of types of management situations, *not* of managerial behavior.

In order to measure the influence of contextual factors, and more specifically of the type of organization, we distinguished three different groups of managers in the sample. One group of managers worked for a large profit organization in communication services (n=68); one group of managers took a higher-level management course (n=21); and one group worked for non-profit health care organizations (n=50).

RESULTS

The first step in the analyses was to look at the respondents' scores on the perceived importance of reasons in the 36 situations of the MSA instrument, in order to find out what managers find important in dealing with situations. Respondents were asked to rate the importance of six different reasons influencing a certain action (acceptance, efficiency, flexibility, atmosphere, quality, and urgency). As there are over 200 different mean scores on the reasons-per-situation variables, not all frequencies will be shown. The number of different reasons considered very important or relevant (i.e., a mean score greater than 4) in deciding how to react to a situation was looked at. The reasons most likely to be considered *most* important were quality, acceptance and efficiency (17, 9 and 4 times respectively).

Next, a total score was calculated for each reason across all 36 situations, by averaging the separate scores. Frequencies for these total scores can be found in Table 3. These total scores can be used to illustrate what managers generally regard as important when dealing with

situations. The six total scores are highly intercorrelated (correlation coefficients range between .50 for acceptance and urgency and .68 for efficiency and flexibility, in all cases, $p<.001$) indicating that there are relatively stable patterns of relationships between the perceived importance of various reasons across different situations.

To answer our research question concerning the relative importance of different reasons, a nonparametric Friedman test was performed. This test showed that the mean total scores for each reason were significantly different from each other ($chi^2=296.01$, $p<.001$). Paired t-tests with the Bonferroni correction were performed to check which mean scores in fact were different. All mean total scores were significantly different from each other; mostly at the $p<.001$ level (acceptance versus efficiency $t=3.02$, $p<.005$) except for flexibility versus atmosphere (t=-2.16, n.s.). Therefore, the total scores on the reasons are significantly interrelated, but the absolute difference between the perceived importance of the reasons remains constant. It is possible to conclude that within this set of reasons, quality is considered the most important reason, and flexibility is considered the least important reason in all kinds of management situations. This is an answer to our second research question, concerning the relative importance of different reasons.

Table 3. Frequencies of Reasons - Total Scores (n=138); Sorted by Descending Means

Reasons	mean	Sd	range
Quality	4.05	.56	2.47-5.00
Acceptance	3.78	.56	1.75-5.00
Efficiency	3.63	.68	1.63-5.00
Urgency	3.27	.74	1.31-5.00
Atmosphere	3.21	.68	1.50-5.00
Flexibility	3.08	.78	1.00-4.78

To see whether different reasons are considered more or less important in different types of situations and to test Hypothesis A, subtotal scores were calculated for each reason within each type of situation according to the four Luthans clusters of managerial activities (as previously described in the chapter). This resulted in 24 different scores (six reasons times four situation types). It was checked whether the four mean subtotal scores for each reason were significantly different from each other using a nonparametric Friedman test. Next, paired t-tests using the Bonferroni correction were performed to determine which means differed from each other. The results of these analyses are presented in Table 4. The intercorrelations between the different reasons within each type of situation were also looked at. Only in networking behavior situations some non-significant correlations were found (atmosphere and efficiency; r = .08). All other correlations were highly significant. A similar nonparametric Friedman test

Table 4. Reasons - Subtotal Scores per Situation Type; Nonparametric Friedman Test

Reasons [1]		mean	chi-square	significance	t-tests
Quality	- trad	4.18	111.24	****	all ****
	- comm	4.09			
	- netw	3.57			
	- hrm	3.97			
Acceptance	- trad	3.52	190.64	****	all ****
	- comm	4.27			
	- netw	3.22			
	- hrm	3.93			
Efficiency	- trad	3.86	142.66	****	all **** except
	- comm	3.34			comm:hrm t=-1.89 p=.060
	- netw	4.00			
	- hrm	3.41			
Urgency	- trad	3.39	98.33	****	all ****
	- comm	3.20			
	- netw	3.64			
	- hrm	3.00			
Atmosphere	- trad	2.87	169.08	****	all **** except
	- comm	3.49			trad:netw t=-1.06 n.s.
	- netw	2.94			comm:hrm t=-0.82 n.s.
	- hrm	3.52			
Flexibility	- trad	3.21	53.78	****	all *** except
	- comm	3.10			trad:netw t=2.15 p=.033
	- netw	3.10			comm:netw t=0.04 n.s.
	- hrm	2.89			
**** p < .001 *** p < .01					

1 - trad = traditional management; comm = communication;
netw = networking; hrm = human resources management

within each type of situation of scores for the different reasons showed that although quality was considered most important in human resources management situations, acceptance and atmosphere were considered as second and third most important, respectively.

The third research question was answered positively, as it is clear from these analyses that the perceived importance of different reasons that managers use to decide how to react to situations, varies across different types of situations. Efficiency is especially important in networking situations; acceptance is important in communication situations (like informing your subordinates of a decision made "upstairs"); and quality is important in traditional management situations (like planning). However, Hypothesis A, which concerns the expected prevalent importance of acceptance and atmosphere in human resources management situations, was not confirmed.

It can also be concluded from the mean scores presented in Table 4, that generally all mean subtotal scores on flexibility are relatively low and close to each other. In contrast, the mean subtotal scores for acceptance show more variance in different types of situations. Subtotal scores of reasons in human resources management and communication situations were always close to each other and different from scores in traditional management and networking situations. A graphic representation of the mean subtotal scores for all six reasons is presented in Figure 2. The results show that different reasons are considered important in different types of situations. This is likely to have an impact on what kind of reaction to a situation a manager decides to choose. As expected from the literature review, there indeed exists an effect of the type of situation on decision making regarding managerial behavior. This is a positive answer to the third research question, even if Hypothesis A concerning the importance of people-oriented reasons in human resources management situations was not confirmed.

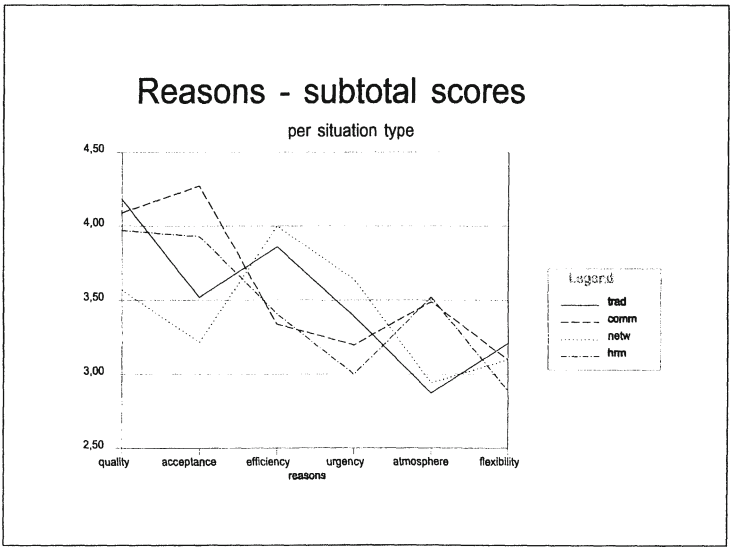

Figure 2. Reasons-Mean Subtotal Score by Situation Type

To answer our fourth research question and to test the hypotheses concerning the effect of personal and contextual factors on the perceived importance of different reasons, both the scores on the perceived importance of the various reasons per situation description and the total score for each reason were looked at. First, 36 multivariate analyses of variance were performed on the separate reason scores explained earlier in the chapter (acceptance, atmosphere, efficiency, flexibility, quality and urgency) within each situation with gender and organization as factors. In only 3 out of 36 situations a significant multivariate effect of gender was found. Therefore gender is not considered to be an important factor. Type of organization had a far larger impact on the perceived importance of the reasons. A significant organization effect was found in 23 situations. There were no interaction effects on the reason scores between gender and organization in any situation.

Second, gender and organizational differences in the *total* scores for each reason were tested using a multivariate analysis of variance. Age, management experience, span of control and management level were entered as covariates but did not have a significant effect. There was however a significant effect of organization ($F=2.26$, $p<.01$); which was univariately significant for all reasons except acceptance. The mean scores and univariate results from this analysis are presented in Table 5. Gender did not have a significant effect ($F=1.55$, n.s.), nor was there a significant interaction between gender and organization. The managers from the health care group found all six reasons (including acceptance (n.s.) and atmosphere) more important for their behavior than the other managers. This confirms Hypothesis B. However, the fact that care-managers would find *all* reasons more important was not quite expected.

Table 5. Mean Total Scores Reasons by Organization[1], with MANOVA Results

Reasons	A	B	C	univariate F, sign
Quality	3.9	4.3	3.8	4.98 ***
Acceptance	3.7	4.0	3.7	2.23 n.s.
Efficiency	3.5	3.9	3.4	5.64 ***
Urgency	3.1	3.6	3.1	4.24 **
Atmosphere	3.0	3.5	3.1	8.50 ****
Flexibility	3.0	3.4	2.7	3.00 **

[1]= The Three Different Organizations Represented in the Sample are:
A – Communication Services
B – Health Care
C – Management Course

As the earlier analyses had shown that the total scores for each reason, although highly intercorrelated, were significantly different from each other (see Table 3), the univariate F-tests of the gender effect were looked at. This showed that there was a significant effect of gender on the perceived importance of quality ($F=5.79$, $p<.05$; $t=-4.28$, $p<.001$). Women found quality more important (m=4.39) than men did (m=4.00). For a further check, the separate MANOVAs for each situation were looked at again. The gender difference in the perceived importance of quality occurred in 26 out of 36 situations, in terms of univariate tests. As there were no gender differences in the perceived importance of acceptance or atmosphere, Hypothesis D concerning this expected gender difference must be rejected.

The hypotheses concerning the influence of span of control and management level (Hypothesis C) and, in addition to gender, the influence of age and experience (Hypothesis D) must be rejected on the basis of the non-significant effect of the covariates in the MANOVA. As there were some univariate effects, the significant correlations are mentioned here. As expected, age was positively correlated with finding acceptance important ($r=.21$, $p<.01$). Span of control was unexpectedly positively correlated with atmosphere ($r=.17$, $p<.05$) and flexibility ($r=.20$, $p<.05$), in conformity with Hypothesis C. There were no other significant correlations.

Example of a situation

It is possible to look at the intercorrelations between the scores of importance of different reasons and the scores of likelihood of different reactions within each of the separate 36 situations, in order to explore the final research question raised by the literature review. This question deals with the relationship between the perceived importance of different reasons and self-reported managerial behavior. Rather than showing all 36 analyses, an example of correlational patterns is given here. For the example we will use the same situation from the communication cluster that was presented above in Textbox 3. Causal patterns are expected to exist, as the perceived importance of reasons may have important consequences for behavior. Examples of reasons considered and behavior chosen in particular situations may hold clues about how behavior is shaped by situational characteristics.

A canonical correlation analysis was performed to test the relationships between the perceived importance of reasons and the likelihood of reactions, such as behavior. Results from this analysis are presented in Table 6. The results indicate that one canonical variate was found, which, looking at the standardized canonical coefficients in the table, can be interpreted as a function of preferring reaction 3 over reaction 1; that is, *not* telling your supervisor you will not be able to make a deadline. The mean scores show that most managers would rather tell their supervisor the truth. This analysis serves as an example of showing the causal relationships between reasons and behavior; that is, managers who find it important to maintain a positive atmosphere, and do not find acceptance important in this situation, are more likely not to tell their supervisor the truth.

As this analysis is purely used as an example, further relationships with personal or contextual factors will be described briefly. When gender, age, management experience, management level and span of control were introduced into the canonical correlation analysis, the model improved in terms of explained variance (canonical correlation = .5675). The effect of finding acceptance important disappeared in favor of a gender and span of control effect; women and managers with a larger span of control were less likely to tell

their supervisor the truth. The effect of maintaining a positive atmosphere remained the same.

Table 6. Means and Canonical Correlation Coefficients between the Canonical Variate and Situation 15, Behaviors and Reasons (see Textboxes 2 and 3 for Content).

Variables	mean (n=138)	coefficients
Behavior items		
Reaction 1	4.04	-.70
Reaction 2	4.34	-.18
Reaction 3	1.64	.59
Reasons items		
Acceptance	4.04	-.55
Efficiency	4.49	-.20
Flexibility	3.45	-.13
Atmosphere	3.13	.91
Quality	4.11	.05
Urgency	3.89	-.06
Canonical correlation		.4087
Canonical R-squared		.1670
df (hypothesized; error)		21; 325.03
F statistic, significance		1.5683, p=.055

CONCLUSIONS

To enhance our insight into managerial effectiveness, the main research question addressed in this chapter was *why* managers do things the way they do. To answer this question we have studied how managers decide to react to situations in their daily work, focusing on reasons managers give for their behavioral choices. From the main research question, four questions were deduced that were mostly answered positively based on the results of the empirical study. Based on the literature review and interviews, it was possible to select a set of six different reasons relevant to managerial decision making. Managers were asked to indicate *how* they would react to the situation and to indicate the relative importance of reasons *why* they would react this way. In terms of relative importance, quality was perceived as most important and flexibility as least important in choosing a reaction to a situation. It was found, as expected, that the importance of particular reasons varied across different types of situations. Efficiency was considered important in networking situations; whereas acceptance was perceived as important in communication situations. In traditional management situations managers found quality important. We were wrong, however, in expecting that acceptance and atmosphere were perceived as most important in human resources management situations. These reasons, however, were perceived as second and third most important, compared to quality. Acceptance showed the most variance across different types of situations, and flexibility the least. The relatively low scores and variance observed between types of situations for flexibility may be explained by a weak operationalization of flexibility or by the fact that the managers indeed perceived flexibility as less relevant in making a behavioral choice.

Next, we looked at how specific situational and personal factors influence on the perceived importance of different reasons for deciding on a particular action. Generally, few significant effects of personal and situational factors were found. The expected effects of personal factors (such as gender, age and experience), and contextual factors (such as management level and span of control), on the perceived importance of different reasons were not confirmed. Older managers attached more importance to acceptance than younger managers, as expected. Female managers did indicate that they find *quality* an important reason for deciding among different behavioral reactions to management situations, to a higher extent than male managers. Overall, there seemed to be a larger difference between managers from different organizations in this sample than between men and women, taking the relevant variables into account. For example: managers from health care organizations found *all* reasons for responding to management situations more important than managers from other types of organizations. It was expected that they would find acceptance and atmosphere important. Any other differences were not expected. The result can be explained by a response bias but also by an enhanced awareness and responsiveness of health care managers to situational factors. As expected, managers with a large span of control perceived flexibility as important. Unexpectedly, they also attached more importance to maintaining a positive atmosphere. For these managers, the ability to create and maintain a positive atmosphere and a sense of wellbeing among subordinates contributes significantly to managerial effectiveness.

Most of the hypotheses postulated above were not confirmed. Some interesting, if not hypothesized, effects of personal factors on the reasons managers consider important in choosing behavioral reactions were found. These effects could be addressed in further research. The data showed that women find quality more important than men in deciding how to react to management situations. This finding may imply increased opportunities for women

in organizations, due to the combined effect of the importance of quality for today's organizations and the growing emphasis on feminine characteristics in management.

The final research question raised by the literature review concerning the relationship between the perceived importance of reasons and, consequently, self-reported managerial behavior in a particular situation, could not be answered conclusively on the basis of the data collected in this study. This relationship was explored using only one exemplary item from the instrument. The outcome of the exploratory analysis, however, holds considerable promise for further examination. We do therefore, from this example, expect a significant relationship between the perceived importance of different reasons and self-reported actions in other situations. Secondly, the analysis also supports our expectation that situational factors are relatively more important in determining decision making processes behind managerial behavior than personal factors. Focusing on the mental processes and individual decision making behind overt managerial behavior, further research of this kind may provide more insight into what makes a manager effective.

It may be generally concluded that situational factors have a larger impact on the behavioral choices of managers than personal factors. This is illustrated both by the acceptance of the hypothesis concerning the effect of type of organization and by the finding that the perceived importance of different reasons varies across different types of situations. These results support the contingency approach, implying that the situation largely determines how a manager should react to a particular situation, in order to be considered effective (Vroom & Yetton, 1973). The managers in this study appear to be sensitive to situational cues. Managerial effectiveness was equated above to the ability to read the situation *and* to choose an appropriate action from a behavioral repertoire. Because of their focus on the situation in deciding how to react, the managers in the study are able to be creative and flexible in choosing a reaction to a particular problem, rather than sticking rigidly to one type of behavior or a personal style regardless of the situation. Based on these findings, it is possible to conclude that it is best to enlarge and strengthen both individual managers' ability to discern relevant characteristics of situations and their behavioral repertoire, that is, the use of different management styles. This conclusion differs significantly from commonly held ideas in organizations of *one* optimum management style (such as coaching) that should be used in every situation and under all circumstances. Organizations need to learn how to stimulate the degree to which managers are able to read complex situations and to react both effectively and creatively rather than rigidly, predictably and in conformity with tradition. As described above, individual creativity is a function of three components, according to Amabile and Conti (1997). Next to skills in the task domain and skills in creative thinking, an important component of creativity is intrinsic motivation. Extrinsic motivation is in fact detrimental to creativity and innovation in organizations, according to these authors. Therefore, offering managers more pay or other rewards is not the best way to reinforce creativity. Amabile and Conti (1997) suggest other ways for organizations to enhance a creative and innovative environment, such as a basic orientation towards innovation, including encouragement and acceptance of risk taking, resources in the task domain, and skills in innovation management. As organizations are constantly trying to find and keep effective managers, these suggestions can help organizations in their effort to find and keep effective managers in order to reach present and future goals.

Next to addressing *what* managers do and *how* they do the things they do, we have studied *why* managers do things. We have thus looked at the perceived importance of different reasons for reacting to particular situations. In order to learn what makes a manager effective, we have

given some insight in this chapter into the creative decision making processes *behind* overt managerial behavior. We have also provided a method with which to measure self-reported managerial behavior and the decision making processes behind this behavior. Both the theoretical insights and the method used can be helpful in developing assessment center exercises, management development programs, organizational change processes and such. A 360-degree version of the instrument, which includes the views of relevant others on the behavior of the manager, might be helpful for organizations who want to evaluate and improve their managers' performance by providing feedback in concrete rather than abstract terms.

By analyzing how managers read situations, and why they decide to react to those situations in certain ways, we may have been able to help researchers and practitioners in organizations in their efforts to select, train, develop and promote more effective and creative managers. Sensitivity to situational cues and flexibility and creativity in both managerial decision making and behavior makes managers more effective. Such managers will be needed and valued more and more at a time when the environment of organizations is increasingly turbulent and organizations are subject to ongoing changes.

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CHAPTER 12

DISCIPLINE AND CREATIVE WORK – DESIGNING NEXT YEAR'S CAR MODEL

This chapter deals with the management of creative design work in large organisations. The focus of the chapter is on the complexity, for the individual, of navigating proposals through the creative process. A minor incident in a multi-million dollar, three-year project charged to bring out another year model of an existing car is chosen to illustrate how organisational embeddedness generates complexity.

A common view of management may be that it is the antithesis of creativity since it imposes the discipline of economy on the creative process. Economy in terms of time (keeping the design of a product ready in all its components so that the suppliers can deliver on time for mass production start); in terms of money (getting the design within the target cost so that the product will sell at a profitable price in the intended market niche), and in terms of hierarchy (complying with plans and requirements determined at other organisational levels). There are also disciplines of space. Those who work on one component must adapt their solution to those provided by people who work on other components, as there is a limited amount of space in, for example, the engine bay of a car. This introduces two kinds of space restrictions; on the design of the component (Have you noticed the shape of the "washer fluid" container of your car?), but also a need to have meetings to co-ordinate work.

But this contradictory position of management and creativity may be misconceived in the first place. The Creators (Boorstin 1992) have always worked under the yoke of inadequate resources. Furthermore, the creative leap must be followed by the discipline of management in order to be moulded into innovation. Csikszentmihalyi (1990), the father of the flow-concept, claims that at the start of his research on "flow" 25 years ago he believed that creativity was done by creative people, but now he includes that the creative idea must be judged valuable to society and be realised before the creative process is complete. In this process functional knowledge (expertise) is applied to turn the original design idea into something useful for "the customer".

The location of such functional and component specialist knowledge is currently a hot topic among car manufacturers. Should functional specialists sit together or should teams of different specialists gather around specific tasks (Calabrese 1998). A further spatial complication in car design is that it is now common practice to build the car design on a basic platform with common solutions for a whole family of models. A platform lives for 5 - 8 years and the year models are built on this basis. Common parts provide for economy of scale and unique parts have to be justified with reference to customer value, functionality or cost. There is pressure from Headquarters to reduce the number of articles (component parts) to gain economy of scale. This might be accomplished by persuading suppliers to do

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 239-257.

sub-assembly work inside the plant of the host company or before delivery. This calls for negotiation already at the design stage regarding the degree of supplier involvement in development work. Solutions differ: The one new component may be developed together with a supplier on a contractual basis, while another is developed "in house" and then ordered in the framwork of an ordinary supplier-customer relation.

Finally, there might be an equity-based alliance where two car companies have set up a jointly owned production company to produce competing cars on a joint platform. A third owner in the joint venture might be the state with an interest to promote employment in the area. Such an alliance is justified by the economies of scale gained by commonality and by volume (both alliance partners undertake to occupy half the capacity of the production plant, with complicated rules regulating how deviations from the planned volumes will be treated).

In spite of the complexity of these kind of arrangements there is a strong trend (Gomes-Casseres 1996) in many industries, to use alliances as instruments for gaining access to complementary technical competence, to markets, and to speed up the development process for new products (Hagedoorn 1993). However, there is limited evidence of the effectiveness of co-operation. Gomes-Casseres (1996) claims that alliances with unity of control have better technical performance while more diffuse alliances have better market performance.

An interesting aspect from a management point of view is that alliances usually do not have the unity of control that the top of a hierarchy provides. The partners will form a managing committee to deal with situations not foreseen in the incomplete contract constituting the alliance. Negotiation will be prevalent not only at the top, but also at lower levels of the alliance, because the first reaction when problems are brought to higher levels for decision will be to return the issue to the lower level for settlement.

The factors sketched above serve to illustrate the complexity of design work in terms of negotiated arrangements with many agents with differing priorities. This multilevel negotiation goes on continuously and it is to be expected that it interferes with the creative aspects of designing new products.

The concrete case on which this chapter is built has all these factors present and more. The location is the joint venture establishment set up by the Mitsubishi-Volvo alliance in Born in southern Holland. In this fairly new alliance, where three national cultures meet to integrate Japanese lean production philosophy with Swedish customer-value-through-safety thinking, Volvo has decided to conduct the development of new models based on the joint platform in site. This means that specialised design engineers, used to a certain way of working, are taken out of their usual environment and located in a different, and more sensitive situation, where they work in the English language and are supposed to seek commonality in solutions with the Japanese partner, who carries out the development work in Japan. The fact that the joint venture is a separate, jointly owned unit means that the effects of design solutions on costs and timing in the production process have to be negotiated. Close co-operation with suppliers all over the world is required.

Co-ordination of the project does not only mean negotiating agreements with suppliers, but also attending a large number of meetings where commitments of different kinds are made (e.g., Business Area, Executive Committee New Projects, Design Review Meetings, Cost Review Meetings, Action groups, Engine department, alliance committees of many kinds). The project leader of one of the projects drew a picture of all meetings, outside the regular project management meeting, that he participates in and which restrict his freedom

of action through such commitments. The map contained more than 30 meetings (counting "Suppliers" as one, even though the number is large). The most binding agreements are those negotiated with the alliance partner, and with representatives of the joint venture, but also the line departments of the home organisation may have very strong commitments to a certain solution due to the family concept of the cars sold under the same brand name. Complexity takes the form of contradictory claims based in incompatible logics, as well as compromises, and a sense of lack of freedom of choice, in combination with responsibility. Individual engineers, who participate in more than one project as part of the efforts to improve learning from experience between projects, have the added problem of adapting to the differences generated by differing project leadership styles.

The context sketched above will restrict the creative work involved in designing next year's car model. Institutional structures ("ways of working") as well as procedures based in contract will generate dynamics of their own. In general we can safely assume that the creative process is more open in early phases and more closed or focused in later phases. This will effect the work of engineers, causing frustration as discipline is applied when the project approaches realisation.

We have chosen to present the treatment of one decision issue among the thousands of issues brought up during a project on its path towards the start of production. The issue is creative in the sense that it includes the application of a good solution from one area to another area. It is also simple to understand for non-specialists. It is chosen because it illustrates how the disciplining dynamics frustrate an engineer with a good idea. The incident happened about 40 weeks into the development of the 1999 year model. The proposal by the engineer in focus is to apply a solution (a fire wall insulation solution) developed by the Quality department in a separate project to reduce noise in a diesel engine version of the car also in petrol engine versions. This introduced a solution better than what was specified in the original project content, and at a low cost (noise reduction is a customer value). The only thing to do was to get the solution accepted and an authorisation to spend the money to have the supplier do the CATIA-work (to document the solution in the computer specification of the car). The responsible engineer immediately saw the benefits of the idea when a subordinate suggested it, and the idea seemed so obvious that it was consideredto be a mere formality to get the authorisation. To his surprise, the engineer was denied the decision and had to come back two weeks later with a better prepared proposal.

We will proceed as follows; first a more detailed description of the context is given, then the occasion when the actual decision was taken is presented (to show how simple it can be on the surface), then the sequence where the engineer loses control over the idea is described and the various interpretations by the participants of what went on. Finally the theoretical and practical implications of the findings are discussed starting from the results presented by Schroder et al. (1967).

CONTEXT

A most striking thing when registering communication in a project management team meeting is the amount of information on context needed to be able to attribute meaning to what is said. The importance of context is indicated by the fact that different participants quite often interpret the same event differently. Different knowledge speacialities (engine,

electronics, production) orient attention to different cues in a complex setting.

In order to appreciate the sense of the exchange to be analysed an overview of the structure in which the project is situated is necessary:

The project to develop next year's model of a car is a strictly controlled one. The first step is a pilot study under the jurisdiction of the business area (BA 400, small platform). The study will focus on a target market niche for the product and deduce the properties that the new product must have to satisfy the prospective customer. There is a proposed time plan and a detailed budget for the large number of improvements (more than 1,000) requested in relation to the current year model. When the pilot study is ready (properties, budget, time plan) the board of directors signs a contract with the project leader (who was usually in charge of the pilot study) to deliver a solution which satisfies the requirements inside a cost and time plan. Still the project content is frequently changed through added solutions that have been worked out in other parts of the organisation. During the project period the progress of the project is monitored closely through frequent cost review meetings and quality "gates" (if the project meets the requirements specified for that stage of the project the "gate" is opened and funds for the next stage released). There is a large number of other committees, work groups, departments, and partners that have direct influence, not to say veto power over the project.

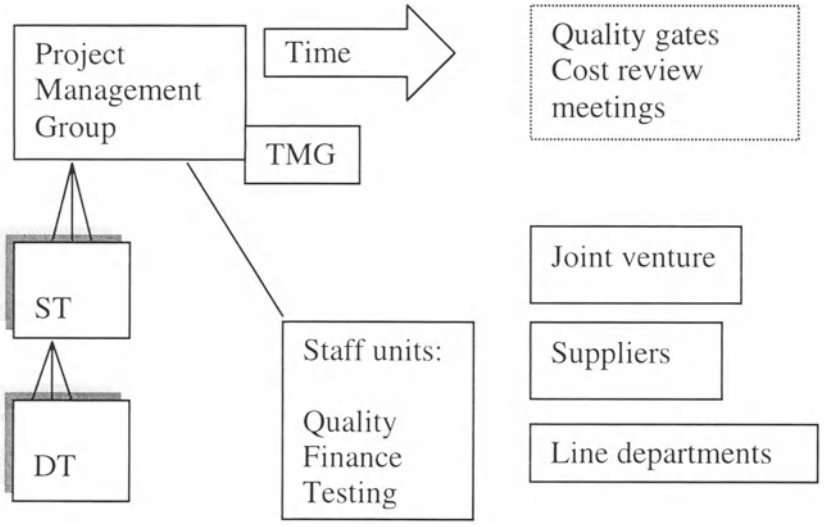

Figure 1. Some of the Units Constituting the Immediate Context of a Project

The project itself has a hierarchical organisation in the sense that it is broken down into about 10 functional areas (e.g., Engine, Electricity, Exterior) called "System tasks" (ST) with a responsible ST manager. Subordinated to the ST there are "Design tasks" (DT), (e.g., brake system), with a responsible design engineer. The budget and the master time plan are broken down correspondingly, so that costs, quality and so on are monitored on an ST/DT basis. The project is managed and co-ordinated through decisions in a meeting called the PMG (Project Management Group) which is held every second week. In this meeting the ST managers, project staff (Controller, Quality, Project Secretary), and representatives of

the relevant departments (Production, Purchasing, Quality, Logistics) of the joint venture participate. The meeting is a decision-making meeting in the sense that identified problems are declared solved here, deviations from budget are dealt with, action plans set up, and emergencies reported. However, the most prominent function seems to be to keep everybody informed about the status of the other parts of the project, since deviations from plans tend to effect how others can realise their plans. Every meeting has a point on the agenda for each ST manager to report the current status of his part of the project. These presentations serve to expose the competence of the actor and to preserve the harmony of the project. Delays, or failures to find solutions to current problems, visibly disturb colleagues. Personal prestige is at stake.

In order to keep the PMG meeting strictly to its decision-making function a parallel meeting, the TMG (Technical Management Group), is held to discuss technical substance. If you have an idea for a better solution the proper thing to do is to raise the issue in the TMG, get a go-ahead to work out a "desk study", and if the results are promising, then get a budget allocation for a complete study in the PMG meeting. Such studies will invariably involve the departments of the joint venture, since they must provide estimates of the cost and other effects in the production process of the contemplated product change. This might include informal chats with the appropriate engineer in the joint venture, but when the change approaches the formal decision stage the project must request, formally, a study of these production process effects. There is a procedure for this. The problem is that the ST manager is responsible for all cost effects of the design he proposes (including those in the production process which is managed by the joint venture entity), and at the same time the joint venture (a separate organisation) is under strict budget control from its board of directors where the alliance partners share responsibility. This means that a proposed change in design will have to be studied in its process effects and a cost estimate made by the joint venture staff, then the responsible ST manager has to consider the total costs and benefits from the contemplated change. Then he will propose the change in the PMG, which, if it approves the change, will request a formal estimate from the joint venture, which will have to get top management approval of the consequent budget change and then report back to the project, which will issue the engineering change documents. There are many opportunities for breaks in the flow.

The meeting itself has a standardised agenda with early general information, follow up on "action points" (decisions in earlier meetings requiring solutions to be reported against a deadline), status reports on each ST, and so on. The deputy project leader usually tries to impose a time schedule on the agenda in order that those who cannot attend the whole meeting should be able to see when their presence is required. However, discussion usually wins over discipline. Meetings go on for 3 - 4 hours, with few breaks if any, and with large volumes of concentrated information on complicated problems. Members must be alert to keep abreast of project events and be clear and to the point in their own presentations. The project secretary keeps the minutes of the numerous decisions, often not very clearly formulated.

The project leader is the prime actor and has the final say, but his style also sets the tone. The professional speciality of the project leader is usually matched to the main thrust of the project (new engines requires an engine man etc.), which means that he has a special authority in some area. The environment is stressful and since almost all participants are required to speak a foreign language (English) the use of words is not always the most elegant and lack of words may be compensated to some extent by body language. The

general impression from the meetings is that the atmosphere is "democratic" but demanding in the sense that tolerance for unprofessional behaviour is low, even if newcomers are expected to make procedural mistakes in the "exotic" joint venture environment. From an efficiency point of view our first impression was that there are too many people in the meeting, the agenda is too large, and the meeting is too long. Still, the project team worked constantly with meeting efficiency and some changes in membership were made during the second project we studied (the 1999 year model).

DATA COLLECTION

Most PMG members were interviewed at the beginning of the observation period which started a few months after the project was initiated, regarding earlier experience and current views on how the group works and which members have prominent roles in the team. Then, continuously over the two year period of the project, interviews were made with managers at corporate level and with representatives of the alliance partner as well as with top managers of the joint venture company. The topics were mainly strategy and management issues relating to cultural differences.

A questionnaire measuring work climate (Ekvall 1988, Ekvall & Arvonen 1994) was administered early in the project, i.e., 1.5 years before production start, and again about a month before the car went into production. The average scores for 10 dimensions coincided closely with the norm scores for creative organisations on the first occasion provided by Ekvall, except for the dimensions referred to as, Conflicts and Debate/Diversity, where our team scored considerably higher, and Risktaking and Playfulness where the score was lower than the norm for a creative organisation. A year later, the scores were closer to the norm, with a considerable reduction in Conflicts.

The bulk of the data collection was carried out through direct observation of PMG meetings, many of which were video filmed. From these videos a number of sequences have been selected, which provide relevant illustrations of communication problems. Two of the authors have selected about 20 sequences each and then discussed the list narrowing it down to 6 sequences which were edited onto a videotape to be used in "self-confrontation" interviews. In these interviews each one of the sequences was played for each participant individually and for each interview the respondent was asked "What is going on here?" and the answers and follow-up questions were tape recorded and transcribed.

ANALYSIS

We have studied two year model projects (the 1998 and 1999 Volvo S/V 40). The focus of the studies was on communication and joint problem solving in multicultural management (project) teams. The ethnographic field work soon revealed that there seemed to be a relation between the complexity of the situation and the work climate measures which indicated higher than expected measures for debate and personal conflicts (Ekvall 1988). Usually "debate" is considered supportive of creativity, while "personal conflict" is detrimental. In the interviews, differences in the "ways of working" were often pointed out as sources of complexity. It seemed like two logical regimes were at play at the same time

(the "lean production" view of one partner, and the "customer value" view of the other). What looked like an innovation in one view was an undesirable deviation in the other. Arguments (articulated in a foreign language) that were perfectly rational in the context of one "way of working" were beside the point in the other. Schroder et al (1967) show how the amount of "integrated information" as a function of environmental complexity describes an inverted U-shaped form. Decision-makers are able to make sense of a complex information up to an optimal level. When complexity increases above that level the capacity to deal with complexity is reduced, and, e.g., stereotypes come into play. The maximum is reached at a relatively lower level of complexity in the presence of "noxity" (threat of conflict with representatives of other views with consequent delays) than in the presence of "eucity" (positive reward if project successful, commitment to work). Both conditions were present at different times or even at the same time.

Furthermore, the differences in "ways of working", which may be seen as labels for the differences in the structures brought to bear in judging degree of professionalism as well as in concrete routines, indicate differences in ends as well as means between the alliance partners. In such situations decision making by "inspiration" has been forecast (Thompson & Tuden 1959, Thompson 1967, Hedberg & Jönsson 1978). Good leadership will bring the group to agreement in judgement in a manner described in Moscovici's studies of "group polarisation" (Moscovici & Doise 1994). This concept means that a group charged with reaching consensus on a complex judgement task will tend to take a radical position, such that individual members of the group are persuaded to move in the direction of an extreme opinion. This can be compared to Stoner's (1968) "risky shifts" in group judgement. However, if the group is deliberating under restrictions, such as a time limit or set agenda, it will tend to make decisions by compromise, which also means that the individual members will return to their original opinions after the decision. The strict regime of the project, with its target costs, time limits and contracted content, will tend to provide for the latter type of condition, at least when the project approaches production start. Finally, it should be remembered that the product development team is a temporary organisation with members pursuing individual careers.

All this illustrates that misunderstandings are to be expected as members work out the implications of what is said in meetings (see Grice (1989), "implicature"), from their different frames of reference .

In view of these conditions our approach to the empirical material has been to elicit the help of participants in analysing communication processes. This is necessary in order to get to grips with member interpretation of meeting content. The method has been "self-confrontation" interviews where participants have, individually, commented on video sequences (selected as described above) from PMG meetings prompted by the question "What is going on here?".

THE FIREWALL INSULATION DECISION

Consider the following excerpt from a decision where everything is normal and the actors well prepared:

Sequence 1 PMG meeting 1997-10-29, 9.58 - 9.59 am:
The project leader (Adam) is working his way through the early part of the agenda where

outstanding decision points are dealt with. He, as usual, stands up at the head of the table with the agenda on overhead film on the projector on his right. The responsible ST manager (Bill) responds, sitting down at the far end of the table:

"*Adam*: Fire wall insulation!
Bill: Yes, we would like to have a decision... You already know about the content .., it is about X million SEK, approx.!
Adam: Yes?
Bill: ... and we would like to go on with the study for firewall ... insulation
Adam: Designing it!?
Bill: Designing it .... only the CATIA -work! And we would like to have acceptance to start up the supplier ....
Adam: You have it .... you have it!"

This appears to be a simple and straightforward decision to go ahead with a design job to be done by a supplier. The issue here is that the project includes a diesel engine variant and tests have made the Quality department start activities to reduce noise from that engine in that variant. One of the solutions was to improve the insulation of the (fire) wall between the engine bay and the coupe. The creative leap here is to apply that solution also to the variants with petrol engines. The cost will be minimal and the benefits in terms of customer value is assured. The project leader is very pleased to improve the project beyond contract specification. The only thing required is to work out the computer specification ("CATIA-work") of the insulation for the petrol engine variants. Bill asks for a budget allocation to order this job to be done and gets it. The point on the agenda is a formality since the project leader is already well informed about the proposal. There is no need to present the arguments. Everybody knows what this is about. One reason for this is that the issue was tabled in the last meeting when the discussion was livelier:

Sequence 2. PMG meeting 1997-10-15, 13.09 – 13.12
Legend:
F9QT is the code word for the diesel engine version. 903 is a code word for week 3 in 1999 (820, consequently, means week 20 in 1998).
<....> denote inserted descriptions of non-verbal behaviour
Bill: ... and we have decided to fit the F9QT.(.insulation(?))... to all cars. So it can improve all cars. And the costs... for mainly ...
Caesar (project secretary): <breaking in> This is a first request?
Bill: A first request, yes... and the costs here <pointing to the overhead picture> are related to CATIA work, to make the construction of it. So we need this information to carry on, eh we need the yes on this money to carry on.
Dick (controller): This is not the final cost of the solution?
Bill: This is just to start up the supplier...(name of supplier)..
Dick: Who is going to pay for it?
Bill: Eeeeh, I asked John <the DT engineer> about this and I think it is Eric.<turning to Eric> Are you requesting this from product planning?
<Fred moves forward while trying to read what is on the overhead picture, squinting>
Eric (marketing): No, ... but personally I think we need to do a lot regarding noise on the

F9QT
Greg (deputy project leader chairing the meeting): <talking in a low voice to Eric who is sitting two seats away from him> (....) of course .... financing it <pointing to the overhead picture> .....
<silence 4 sec>
Fred (Production Control): <pointing towards the picture on the screen> I think we get very many of these study requests ... <talking in a low voice. He is standing behind those seated at the table, behind Eric, two seats away from Greg>(...) should be very careful.
<Several people start to talk to each other in pairs, some turning away from the front end of the table>
<Silence/general mumbling 6 sec>
Bill <at a slightly louder voice>: If we get an early answer we might meet the project.. eeeh recommendation. If we wait with the decision it is a risk that we won't get it in time for 903. As it looks now, if we take a decision this week first shot sample can be delivered somewhere 820 - 830 <hand gesture to mark uncertainty> as a rough estimation
Somebody: Who is paying for the F9QT..
Fred: <breaking in>That is ... that is now the situation eeh?
Bill: Yah!
Fred: If we are forced with the back to the wall, now to say yes, I don't accept anything <expressive body language>
Bill: Okay <subdued>
Fred: <starting to walk back towards his seat, hand in pocket, then turning and pointing (downward movement) towards Bill> First you have a proper study of this item then come in <turning towards his seat again>
<Silence 4 sec. Several people smiling awkwardly? and looking at each other for cues about how to react?>
Bill: This is the... to accept this money... who is the budget owner... who can finance this?
<Silence 3 sec.>
Dick: Who is the customer? <Short pause> Who wants it?..... Who asked for it?
Greg:...Quality asked for it <body language>(....) thought you asked for it Eric, as the Market....
Somebody: This is a part of the F9QT....
Dick: No it is.(...).. total sum forecasted(?)
Somebody: This is for the F9QT... but this is necessary to get.....
<Greg stands up to take away the overhead slide from the projector>
<The meeting breaks down into several conversations (23 sec.)>
<After this moment of confusion Caesar stands up and walks over to Greg (advising him, whispering in his ear, to stop the item?)>
Greg: Bill, I don't think we can...
Bill: You are not ready for a decision...<bending forward to pick up his papers>
Greg... I hope you understand...
- End of sequence -

What is going on?

Bill wanted a decision to go ahead with an order to a supplier to computer design a fire wall insulation solution for all cars (not just the F9QT diesel) and he did not get it. The contrast with the treatment of the same issue two weeks later (sequence 1) is striking! Bill

was not properly prepared and his presentation generated uncertainty as soon as questions began. The deputy project leader (Greg) was not informed, the controller (Dick) was not informed, Product Planning (Eric) was not informed, Production Control (Fred) was not informed, and Quality that had initiated the study was not present! It is very easy to point out a number of mistakes and unfortunate circumstances that derailed this item. Sequence 1 is an example of a decision on a creative solution that works and sequence 2 illustrates how it may not work.

Obviously Bill had not prepared the ground for this item properly since he did not get any response from anybody in support of his proposal. The only sign of support was Eric's statement that it is a good thing to reduce noise. (But Eric could not commit his department to pick up the bill for this project without consultation.) Greg was taken by surprise when it turned out that the job was not requested by Product Planning (Eric). This was the first time Greg chaired a meeting. He had got the job as deputy project leader recently. The project leader should have briefed him on the agenda before leaving for an important meeting at headquarters. Caesar breaks Bill's rhythm by starting up the questioning. Dick, the Controller, sharpens the situation by asking who is going to pay (which is a natural thing to do for a controller).

When everybody is preoccupied with the financing issue Fred (Production Control) intervenes ("too many studies!" "We should be careful") to stop yet another change in project content. Bill tries to push for a decision now by pointing out that time will be lost if the decision is not taken now. Fred intervenes again and points out that Bill is trying to force a decision. He should come back when he has proper material to present. Bill then desperately asks for support. Will the department who ordered this please step forward! Confusion spreads and the meeting is visibly breaking up into small meetings between people sitting next to each other. The project secretary sees that this is not leading anywhere and walks over to whisper in Greg's ear that he should stop this, which Greg does. Bill gathers his papers to return to his seat saying "You are not ready for a decision".

In the sequence the length of pauses has been noted. There are four pauses (3 - 6 sec.) which must be seen as indicators of embarrassment or frustration, and one long pause (23 sec.) towards the end when the item is derailed and nobody seems to see any way to save the situation.

Participants comment on sequence 2

First the comments of the four speakers in this sequence (Fred did not comment) are presented, then a summary of the comments of 10 non-speakers is given and finally three types of attributions are given:

Bill is a bright young engineer, who is new in the managerial position (Interior). He was promoted a couple of months before the meeting, but he had worked in the project from the start. His first comment was that this was a very unpleasant situation for him. He was not well enough briefed about the fire wall insulation project - to know who is carrying the cost is basic! But he knew that a decision was needed now. Key people who knew about the proposal were not present at the meeting (Quality and Project Leader). It was also a stressful situation; Bill was the last person to present. It was past lunchtime and everybody was tired. If I had only cleared this with Quality beforehand, he sighed. Bill had an uneasy feeling of uncertainty before the meeting, but he was expected to bring home the decision and was under the impression that this was only a formality. As the questions started to come he was stressed, but tried to control body language so as not to show his uncertainty.

Next Bill focused his comments on Fred (the NedCar representative); this was a golden opportunity for Fred. If he sees a weak spot he strikes like a shark. " I felt like a piece of meat dangling in front of the shark". (Fred does not want additions to the project because it would mean a lot of extra work for his people in estimating consequences and re-planning. They were already overworked due to personnel reductions – lean production).

Searching for an answer to the controller's question he knew that it was either the Product Planning (Eric) or Quality who would pay. Eric was there and Bill thought it was he (it wasn't). "But, OK. I learned something from this" - to anchor your decisions (a Swedish expression for the need to see to it that members of the meeting are informed and positively inclined when they come to the meeting, in other words, not to surprise the meeting), to take the time, to have discipline. "But you know sometimes you get information just before the meeting and if I bring it up now and get the decision there will be more time to work out the solution...." In this case it was critical to start work on the tools because now Interior had to meet the Phase 1 deadline instead of Phase 2 (reference to the new time schedule - the diesel version is in Phase 2 but since this new solution goes into all cars it would have to be ready for Phase 1). That means that lead time has to be shortened by 13 weeks! Bill had a good ex-post justification for the need to take the decision at that meeting.

The frustrating thing about this was that Bill had more or less promised John (the subordinate in charge of this task) that he could start up the supplier on this. Bill and John checked after the meeting with Bill's predecessor, and he told them that it was Quality who was funding. He then went ahead outside the PMG and got an informal decision that was later confirmed in the PMG (shown in the sequence 1 above).

When asked about whether Fred intervened here because he was also surprised by Bill's proposal, Bill claimed that a (formal) Design Concept Sheet on this issue had been sent to Fred so he should have known. Maybe there were so many changes that he could not keep track of them all. (Had Bill been better informed he could have counter attacked on this basis, but...). Fred has a competitive style in these meetings (and this was a victory for him).

Greg, who was chairing the meeting, was new in the job also. He did not have prior information on this fire wall proposal. He did not see that there was much he could have done differently and points out that due to fatigue (the meeting had already gone on for about 4 hours) the discussion got stuck on the issue of who was paying. The problem was that Eric (Product Planning) was surprised by the request for a couple of million without being briefed beforehand. Normally this kind of issue would have been brought up in the TMG meeting, but that week the TMG meeting was cancelled because most of the people were summoned to a strategic meeting about the next platform. Regarding Fred's intervention the comment was that, formally, it is not Fred's business to have opinions about studies until they are presented to NedCar through the proper channel. It would have been nice if he could have helped, but... well, Greg felt that he could have been more alert and cut off the discussion earlier.. but he was not informed. Dick, the Controller, pointed out that this is an ill-prepared presentation.

When asked whether this could have been handled entirely in a TMG meeting Dick said that this was definitely a PMG decision which should be protocolled in PMG to be valid. The only thing to do here was that Bill should talk to Erik about the money beforehand, but it turned out that it was Quality who paid in the end. Dick's final comment was that Bill was inexperienced. Sometimes it is necessary to learn the hard way.

Eric (Product Planning) pointed out that this was a new detail with a rather high cost which was presented for the first time to at least 80-90 % of the participants at a PMG meeting. It was not entirely clear what kind of improvement in noise (in terms of decibel) this will deliver and how it would contribute to the whole solution. The meeting was not prepared for this. The second mistake was that it was not clear who was to finance the job.

Everybody jumped to the conclusion that it was Product Planning who wanted this and of course all our customers want low noise, but this was not the way to bring this up. Bill felt well prepared with the information on the overhead picture; delivery time, cost and he knew that properties would improve. He thought that he had a good proposition and then he was treated like this. It could have been avoided if he had talked to the right people and brought it up in the TMG first. Eric claimed that the incident was caused by Bill's inexperience.

Those were comments from 4 of the speakers in the sequence. Due to space limitations the account for the comments made by the remaining participants will be brief.

The project leader, Adam, informed that it was Quality that ordered the job, and gave reasons why it was rational for the project to take it over. He explained Fred's premature reaction by giving his opinion about what it is like to work with the logistics of changes to project content (steering new material flows into the planned production process).

The testing engineer provided the information that Bill's predecessor as ST manager for Interior had engaged the Supplier to assist in this job and now there was more or less a package solution that Bill stumbled onto. There was little choice but to go ahead.

When Fred intervened Testing rememberd saying to his neighbour "Fred is back!" because they had not seen him in the PMG meetings for some time, but now he was back with his standard reaction - issuing warnings about new studies. In a sense it is not a bad thing that he did this because a study (of a new solution) can have bad effects on the course of a project because you tend to become too optimistic about time schedules and, as a consequence, new things are brought in too late.

One member pointed out that the power balance between production and design was different in the joint venture than in the main Volvo plant where design was leading the way and Production participates in meetings in a supportive way. He also pointed out that because Mitsubishi and Volvo did not communicate well enough the joint venture managers can sometimes play one against the other. In a sense that was what Fred was doing in this sequence. The break down of the meeting in several conversations was explained by the fact that everybody realised early on that this would not end in a decision. Greg should have cut this earlier. Had he been better informed he could have saved the situation by asking Bill the right questions. These situations could be avoided if people who come to work in this project were better informed about the way to work here.

The manager of Quality for the project described the situation as arising from the fact that the rules of the game were not clear enough. Bill was not well enough trained to present a decision point and Fred interpreted the situation as Volvo forcing NedCar, back against the wall. Bill's frustrating situation was partly due to the fact that he was in a time squeeze due to the new time schedule for the project (Bill mentioned that this proposed solution meant that they must be ready 13 weeks earlier because the solution applied to all cars).

Three ST managers used the break of procedural rules as the main explanation to the event. This issue should have been brought up through the proper channels, and John, the DT engineer behind this, should have known better and briefed Bill.

There is a set of rules, and there is work going on to improve rules for how issues should be brought up in the PMG. A new manual is being prepared. There were also comments pointing out that a "fix-it" mentality had developed in this joint venture, one just gets going without proper consultation with line departments, and situations like this one arise.

SUMMARY OF COMMENTS FROM PARTICIPANTS

Comments usually start with a diagnostic statement (Confusion! Typical! This is an example of...!) followed by attribution of causes to the problem. There are three main types of causes; inexperience, unclear rules of the game, or the rules of the game were not followed (briefing the right people in advance, using proper channels). One should note that nobody said "Bad luck!" (Except maybe the engine man who said 'these things sometimes happen'). There were a number of unfortunate circumstances that contributed to the complexity of the situation.

INEXPERIENCE

When respondents use this attribution it relates to lacking knowledge of how things are done around here. Nobody suggested that anybody was incompetent in his job. Some statements can be understood as meaning that it is stupid to make a proposal without knowing who is going to pay the bill, and it is unwise to surprise a meeting, but there was no explicit comment on engineering competence. When inexperience was used as an explanation it was often implied that learning "the hard way" is what we all go through. The more seasoned hands can point to the young ones with a paternal nod - They will learn, this is part of growing up! This line of reasoning implies that what is lacking is skill in applying the (local) rules of the game - or circumventing them, which is a higher form of skill. There is a local context that one has to learn to navigate and most of that learning is done by doing. There is a cavalier attitude in these comments.

There was one exception; one commentator expressed embarrassment about the fact that nobody tried to help Bill out of the situation. The team should not leave a member alone in such a situation.

UNCLEAR RULES OF THE GAME

The respondents who referred to unclear rules of the game stated that the projects that are conducted inside the alliance setting in Holland have not yet found the proper procedures. From the start there has been improvised solutions, largely due to the fact that the line organisation (Engine department, Transmission etc.) are not readily available for consultation here and now since they are located in Sweden. And even if they were it is difficult to explain the special circumstances to them which makes it impossible to follow standard procedures and get results on time (since NedCar and Mitsubishi are separate organisations with their own standard procedures). In such situations one uses informal channels and ad hoc agreements which are later confirmed formally. As practices settle

they are formalised into procedures, forms, committees, window persons, and the like. In such a dynamic situation, manuals on procedures, if they exist, tend to get outdated by creative problem solving, and there is little sense in trying to impose rules that have become obsolete. Still the local operations management sees it as an important task to try to formalise procedures as they develop, usually in co-operation with the alliance parties. This, in turn, introduces another source of complexity since compromises between the parties will blurr the logic behind the proposed procedure for both.

The demand for rules of the game also changes over the lifetime of the project. At first the project members are new to each other and the project is in its "Sturm und Drang" phase, and the need for rules is not explicit. Later, as deadlines and budget limits become more encroaching, the differences in interest and the need for discipline become more visible, the demand for rules to refer to in the settlement of disputes increases.

It seems obvious that unclear rules of the game generate a need to settle things by argumentation. The problem is that the arguments that seem convincing to one person are irrelevant to another. Part of the problem is to adapt arguments to the needs of those who are supposed to be persuaded. It is in this connection that respondents refer to "ways of working". Our arguments are not persuading them because they have other "ways of working".

PROPER PROCEDURES NOT FOLLOWED

The claim at the centre of this attribution is that if only people followed proper procedure and the principles of good engineering work, such incidents as this would not happen. Implied is that there are rules (and there is common sense) to fall back on. If you are inexperienced you can always get ahead by following the rules. They contain our accumulated wisdom. This argument is usually emphasised by giving an example of how the rules should have been applied in this case. (Suppose that Business Area told me that they want golden handles! The first thing to do then would be to ...). You show that the rules work by constructing a "concrete/realistic" case, which even an outsider can understand, and thereby the gist of the system of rules is exposed. In a sense this view is akin to a design engineer's dogma. You design something on the basis of well-founded assumptions about the world and if the designed object (be it rules or a product) is used according to intentions it will work. (The problem is the "ceteris paribus"). The world changes in accordance with other rules than those assumed by the designer.

RECONSTRUCTION OF A NARRATIVE

It seems like the comments from the participants are based on some underlying narrative (slightly different for different respondents). From the accounts given it seems possible to construct a common implied story of this item on the PMG agenda:

Bill's predecessor, who probably had gone quite far in agreements with the supplier, started the job. The job was initiated by the Quality department as a package of actions to counteract the higher noise level of the diesel engine that was being introduced (but the project leader claimed that the initiative originally was to improve the "looks" of the fire wall). This specific part (Fire wall insulation) is steered into the project for implementation

through the regular project work and the DT engineer has probably talked to somebody and the project leader has agreed that it is a good idea to apply this solution to all cars (since Quality is paying). Bill was not informed about the full background when he took over a couple of months ago. Now he is under pressure to get a decision to release the money for the CATIA-work and he has been provided with a reasonably good overhead picture with the necessary data on cost and time. He also knows that this is just a formality. The deputy project leader was not informed, the controller was not informed and Bill finds himself in a situation where he trusted that the ground was prepared for the decision when it in fact was not, and he was not equipped with arguments to repair the situation.

When the ground is prepared, two weeks later, the item sailed through without any problem (sequence 1).

DISCUSSION

The problem for Bill was that he thought that he was going to play another game. He had a good proposal and needed the formal decision to go ahead. When he realised the mistake he was paralysed because he could not avoid contemplating the repercussions; first those following from his demonstration that he was not in control of his own part of the project, second the loss he might cause in the team's power struggle with Production on who adapts to whom (see Bacharach & Lawler, 1980, p. 35, trade-off between bases of power). Bill knew that because of this "problem" he would have more difficulties with his proposed solutions in the future. In a complex project like this the division of the project into sub-projects and "jobs" is dependent upon constant confirmation that everybody is on schedule in terms of time, cost, and quality. 'I must do my job because the others are doing their part on the assumption that I will be ready on time.' When the project members get signals that the others are on schedule and they are themselves in control an exhilarant atmosphere ("flow") may emerge in the project and great things can be accomplished. If on the other hand surprises appear (which is quite usual because new problems and solutions come up all the time) one has to devote attention to needs and procedures of rescheduling or consequent changes. A competent member will minimise the effects on others, but colleagues get nervous when they see chaos in neighbouring "jobs". Creativity in one part of the project may generate frustration in another. Therefore, the situation is emotionally loaded. It is not the decision in itself but the demonstration of incompetence (lack of care in anchoring, not having core information) which disturbs. The questions indicate the concern for contextual anchorage (Who is the customer? Who is going to pay for it? Who asked for it?).

Bill also described the situation as an opportunity for Fred (Production). He tends to attack when he sees a weak spot. Bill realised that he had provided a weak spot and thus was a poor representative of the team. (Again. it should be noted that there was no critique against the substance of the proposition. It is a good and creative idea to apply the diesel solution to all cars.) Disturbances in communication with, for instance, Production, would lead to new institutional structures (this is not working, we must set up a procedure, or a new form or a co-ordinating committee). This would make it difficult to use established informal channels in the future. This was embarrassing, not only for Bill. Fred stood for formal procedures and it was likely that this incident would provide arguments for more bureaucracy. The more experienced colleagues saw their (informal) networks threatened.

The creative process "works" in sequence 1, but is frustrated in sequence 2. It works when there is a clear "figure" (the fire wall solution) against a reasonably clear "ground" (secured improvement of product, financing from Quality, and trust in the presenter). In sequence 1 the "decision" was a formality to confirm that the necessary funds were released. The fire wall job was already under way through an informal decision by the project leader. We have observed on many occasions that action comes before decision or that action is other than what was decided. The point is that the formal structures of the project can be used to discipline actors who do not do the proper informal groundwork.

The choice in the PMG is usually between "yes" and "no", not between alternative solutions. (During our two years of observation of the PMGs of two year-model projects we have difficulties remembering any occasion where alternative solutions have been weighed against each other in the PMG.) This is done in other meetings, and when it is done the background is that the final decision will be taken in the PMG (unless the PMG is overruled by a higher authority). This shows that the disciplining power of the final "yes" or "no" stretches far into the more creative discourse of functional engineering work.

The situation arose because of a number of unfortunate circumstances. Everybody was tired after a long meeting. The project leader was not present, Quality was not represented, and there was no TMG meeting that week (where the issue could have been sorted out), and several other contextual circumstances. There is a procedure (set of rules) for "steering in" additions to projects. These procedures cannot be very detailed when the alliance is new (5 years old at the time of the observations), and a culture of "fix it" through informal channels had developed. This meant that new members would have to learn how to be effective from experience. The situation was perceived as complex by the newcomers accustomed to other ways of working, and learning may be frustrated by the fact that differences are not very great. A knowledgeable project leader and senior colleagues may help to stabilise a situation like the one that emerged here. If they are not present to do that, the individual actor may retreat to a use of stereotypes to "cope".

Bill used the metaphor (Lakoff & Johnson 1980) of a shark to describe Fred's intervention. The metaphor serves to show that Fred is an outsider to the team, an aggressive threat, and that that kind of behaviour on his part is typical. It introduced or represented a bias (restricting conditions) when Bill worked out the implication (Grice 1989, Chapter 2) of what Fred was saying. Grice draws on his Co-operative Principle ("Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged" (p. 26)) when discussing "implicature". We may need a broader spectrum of conceptualisations of the context in which communication takes place in order to trace relations between creative proposals, arguments, and judgement of value or appropriateness. A more constructive intermediating tool in sensemaking seems to be "ways of working" which was often used in interviews when respondents attribute causes of communication problems in the PMG and between work groups. This also is a generalising, although descriptive term, related to "work groups" (Bacharach & Lawler, 1980; Dahrendorf, 1959) which in Dahrendorf's definition are based in difference; departmental differences, differences in work activity or hierarchical position.

Bill's interpretation of Fred as a seeker of weak spots to attack like a shark should not to be seen as based in differences in ways of working between two work groups, but as a political image in a context of struggle for control over rule making. The classical struggle between production and design was visible, but this time the multicultural and alliance

setting added the emotional load. The issue at hand, and the signalling, is not "cultural" or "alliance". Rather the cultural and alliance dimensions seem to have added to the complexity of the interpretative task. This in turn is coped with through restricted search in the interpretative repertoire (Potter & Wetherell 1987) using stereotypes. Thus the interpretation, the working out of the implication, was not an open-ended analysis of the text itself as Grice's reasoning presupposes. A Grice analysis would see the statement by Fred "We get very many of these studies" as a breech of the Relation maxim of the Co-operative Principle (such a comment is not a relevant one and Fred had implied something). But Bill took a step further and came to see this exchange (as if through a tunnel) as a two-person dialogue because of the aggressiveness he saw in the statements by Fred (which was amplified later in the meeting when Fred referred to the sequence 2 incident in the discussion of another matter). This limited the scope of working out the implication to something in the area of personal conflict. The shark metaphor fits this situation after it has been delimited by the conflict perspective.

We have found that personal conflicts are more frequent in this alliance environment than is usual in creative engineering environments (Ekvall 1988). It seems, almost by definition, like a two person focus will elicit stereotypes of personal conflict and "political" categories. In discussions involving several people the exchange seems to be disciplined by a need to use "rational arguments". We thus see generalised stereotypes like using "ways of working" as bases for explanation of "technical" matters. Neither of these topics of discussion is clean in the sense that the issue is either technical or a political, rule making issue. The discussion involves several logics and assumes a path towards a main interpretation; the decision situation is constructed in the interaction. This adds complexity to the process. Participants have to be alert.

A remarkable phenomenon in this sequence is the way the meeting fell apart into general confusion in a very short time. This is probably due to the fact that participants soon realised that this was not going to lead anywhere. However, one colleague expressed embarrassment over not helping Bill in his predicament when reviewing the sequence 2.

CONCLUSION

We have shown that the sequence 2 was interpreted differently by different participants. We claim that the related risk of misunderstanding stems from the complexity of the situation which is described in terms of differences in "ways of working" by the majority of the participants, but as threatening (use of the shark metaphor) by the centre stage person. Both stereotypes are used as tools to cope. Both tend to restrict the scope of interpretation. This narrowing down of the range of information considered as relevant is what goes on when the disciplining effects of institutions are amplified by the approach of production start. Simon (1960) provides a decision model with the stages "Intelligence", "Design", "Choice". The two first stages in a case like the fire wall solution, will, in an organisational setting, serve to restrict the number of permissible alternatives. Narayan and Fahey (1982) identified a number of phases in coalition formation (Activation, mobilisation, coalition formation, confrontation, decision) and found that much power was exerted in the three middle phases. The decisions we have studied in the PMG meeting were usually the "final" choice between "yes" and "no" (with the option to postpone decision and come back better prepared next time) and as such they tend to discipline the earlier phases. Over the life of a

project this disciplining will be more pronounced in the latter part of the project, closer to production start.

Schroder et al (1967) discuss the effect on integrated information (or level of information processing) in varying Environmental Complexity of "noxity" (the amount of frustration or threat in the environment) and of "eucity" (the amount of promise or reward in the environment). They find support in their experiments (admittedly simplified situations) for the conclusion that the level of information processing (indicating the capacity to integrate information) peaks at considerably higher levels in "eucity" than in "noxity". They conclude (p. 161) that it is "highly important to obtain structural as well as content information in order to better understand interpersonal and intergroup interaction". The method used in this study tends to focus on content.

There is a balance between these two conditions (the "disciplining" structure and the "creative" content) that may be expected to influence the capability of teams to cope with the complexity of creative product development in alliance settings. Possibly the view proposed by Bruner (1990), who distinguishes between paradigmatic and narrative modes of cognition, is the best basis for research concerning these issues. But since we deal with collective decisions communication must be the centre of focus.

Managing in such a complex context as that described above requires its own kind of creative work. Admiration goes to the engineer who is able to "steer in" his (more seldom her) proposal towards the decision making arena. If the path is blocked he finds a way around the blockage and on the way towards decision the proposal is given impetus by briefing the right gatekeepers and gaining their support. Goodwill is built which can be accumulated and used on other occasions, new paths are discovered which may be turned into highways by frequent use.

The formal organisation deals with these "underground" activities by localising areas of friction between units and devising local solutions to whatever seems not to function properly. In this way the dynamics of organising in the project setting is fragmented into many local solutions which are continuously added to the existing portfolio of routines. We call this interface management. Now and then projects to review procedure are initiated. The set of rules is updated and an overall grip on the creative development of practices is attempted. For a while there is a "fit" between the ways of working and the formal procedures, but soon participants invent better ways of steering their proposal "in" towards the disciplining project management meetings and the process goes on - - and most new ideas are not very good anyway, are they?

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CHAPTER 13

MANAGERS' STRATEGIC DECISION PROCESSES IN LARGE ORGANIZATIONS

This chapter presents a longitudinal field study of real-world managerial decision processes among top executive managers in large organizations. We were interested in how people make strategical decisions in complex, dynamic, and real-time environments in different decision domains. The research was conducted in business, industrial, and health care organizations.

We define a decision process as the sum of the activities executed in order to prepare for the product of the process, i.e. the decision. This is in contrast to Nutt (1984) who defined the decision process as "the set of activities that begins with the identification of an issue and ends with an action" (*p.* 415). In agreement with Nutt, it should be noted that the decision is usually not a goal in itself, but can, for example, be a means to see to it that certain desired activities are executed. On a more general level, it seems reasonable that an important function of decisions is to regulate action. The requirement that certain types of decisions are taken formally ensures that certain types of actions are only executed after the agreement of those persons responsible, such as the company executives or the company board etc. Moreover, the fact that a certain action has been formally decided on may increase its chances of being implemented. However, obviously the formal taking of decisions can also have other functions. For example, a decision may be formally taken in order to show that the organization follows the law or in order to reassure a particular faction in the organization.

We will take the perspective that organizational decision making is deeply integrated into the activities going on within and outside the organization. Our informants were asked to report ongoing decision processes and we suggest that it is profitable to see these decision processes in the context of a larger project or enterprise. The project requiring the decision might then be seen as a 'task' in itself. For example, an opportunity might have been seen (by the manager or some other person or group), and the task in this case is to exploit the opportunity in some way. Alternatively, a problem may have been spotted and a solution is now sought for or a goal has been formulated and must somehow be achieved. Thus the decision may be viewed as playing a role in a larger task. The managers we interviewed (in this chapter called decision makers) were usually 'in charge' of the tasks.

[1] The order of the authors is arbitrary, equal responsibility is taken.

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 259-280.

In this sense they were driving the decision processes reported on. The decision maker's concern is usually not only to see to it that the desired decision is formally taken by the organization but also to see to it that the decision, if taken, is implemented. Nutt (1986) analyzed the different kinds of actions managers take at various times in the decision process in order to increase the chances that the decision is implemented.

ORGANIZATIONAL AND NATURALISTIC DECISION MAKING

In the last decade a substantive critique has emerged directed against the classical research paradigm in behavioral decision making. This classical approach has been heavily influenced by concepts and approaches from economics (March 1994; 1997). Many researchers, mainly under the banner of so-called 'Naturalistic Decision Making' (NDM, Klein, 1998; Klein, Orasanu, Calderwood, & Zsambok, 1993; Orasanu & Connolly, 1993; Zsambok & Klein, 1997), have argued persuasively that classical decision research has not described important aspects of decision processes in real life contexts. One type of critique has pointed out that individual decision makers face serious limitations in attention, memory, comprehension, and communication (March, 1997; Payne, 1997) not given much attention in the classical approach. Other examples of important aspects of decision making in real life contexts which are usually neglected (mostly taken from Orasanu and Connolly, 1995 and Klein 1997a; b; 1998) are time pressure, importance of uncertain and/or inadequate information (information that is missing, ambiguous, or erroneous), ill-defined and varying and/or rival goals, higher-level goals, changing conditions, lack of feed-back of steps and measures taken, the impossibility of foreseeing consequences, types of decision, multi-actor influence on decisions and the importance of organizational culture.

Decision making in organizations is not completely typical of the phenomena studied in the Naturalistic Decision Making approach. A similarity between NDM and organizational decision making at high managerial levels is that the study of experts is a central part of both approaches. Although research on decision tasks characterized by time pressure is typical of NDM, the results from the NDM approach are argued to also hold when there is no time pressure (Klein 1997a; b; 1998). A difference between the NDM approach and research on organizational decision making is that in NDM the typical cases studied concern individual decision making in a social context over fairly short time periods. Compared to the typically more instantaneous decision processes studied in NDM, such as those executed by fireground commanders, chess players, nurses, and flight crews, the time pressure that may exist in organizational decision making is usually present over a longer time period. In top level organizational decision making the decision processes usually take place over longer time periods and the decision maker is typically even more dependent on other actors. Furthermore, each actor is usually striving to attain many different goals and he or she is constrained by institutional regulations (for example concerning the form of the decision processes and the content of the decision), previous decisions, and currently on-going parallel decision processes (March, 1994; 1997).

An important conclusion from the research presented by Klein (1998) is that in many situations *only one decision alternative* is considered. According to the RPD-model (Recognition Primed Decision, Klein, 1997a; b), this alternative is usually to a large extent constructed on the basis of a similar situation retrieved from memory. In these cases, the

decision as such concerns whether to adopt the alternative (possibly in a modified form) or not. In organizations the routines laid down for many types of decisions will also influence the construction of the decision alternative/s. Furthermore, in organizational decision making the construction of the alternatives also involves communication and negotiation with other persons and social groups. In order to learn more about the nature of organizational decision making we in the present study analyze the number of decision alternatives considered in the decision processes reported on.

STRUCTURE AND CREATIVITY IN THE DECISION PROCESS

Mintzberg (1975) carried out research on how managers spend their time at work. On a general level the results showed that managers tend to spend very short time with each issue they handle, "Brevity, fragmentation and verbal communication characterize his work" (1975, *p.* 54). Three overarching roles were identified for the managers: interpersonal, informational and decisional roles. Mintzberg characterized these roles as "inseparable". Mintzberg also concluded "the manager plays the major role in his unit's decision making system." (*p.* 56). Four decisional roles were identified. These were labeled: entrepreneur, disturbance handler, resource handler and negotiator. It is not obvious exactly how the handling of strategical decisions, i.e., non-routine decisions usually with long-term consequences, map onto these roles.

Smith (1997) launched a radical critique of the possibility of doing research on decision making in organizations that is somewhat compatible with the picture of managers' work provided by Mintzberg. Smith argued that, due to the great complexity and variability of managerial decision processes, it is not possible to formulate stable models of the decision process. In line with the literature on situated cognition (for example Rogoff & Lave, 1984) and on NDM he argued for the existence of two types of methods, weak and strong. Weak methods are generally useful but not very effective, whereas strong methods are tailored to the situation and therefore effective but do not generalize well to other situations. Smith's argument was that managerial decision making to a large extent, at least when executed by experienced decision makers, is characterized by use of strong methods. This makes it hard to draw conclusions from studies of managerial decision making that will generalize to other contexts. Although we to some extent sympathize with Smith's argument, we are not as pessimistic as Smith is about the possibilities of finding features of managerial decision making that can generalize.

The decision makers in organizations are usually well aware of the fact that a decision process lies ahead of them. Moreover, they often have more or less concrete ideas about the different events that are likely to occur in the process, including different steps and measures that they will initiate themselves. Due to the fact that the decision process occurs in a complex environment where things change independently of the decision maker (dynamic decision making), the decision maker will still have to adjust her initiatives in the decision process on-line. Thus, even though the decision process in organizations may be to a large extent structurally pre-organized, dealing with the decision process on-line will still often involve departing from routines and allowing some measure of creativity. Even when routines are followed, the decision process may include inventing new measures with respect to the construction of the details of the decision alternative worked on. Such on-line

handling will also occur if the decision maker is not under pressure of time.

ORGANIZATIONAL DECISION PROCESSES AS LEARNING AND AS COMMITMENT TO ACTION

Learning and efforts to create commitment to the favored decision alternative are two intertwined aspects of the decision process in organizations. Learning will occur as an effect of the decision maker attempting to develop a better understanding of the decision situation and the decision alternative/s. At the same time the acceptance and commitment of the different parts of the organization to the alternative/s will depend on the recognized properties of the decision alternative/s. Thus, the decision maker's job includes identifying relevant properties of the alternative/s, identifying the parts of the organization from which it is relevant to get acceptance of the alternative and to diagnose the chances of getting it accepted.

SELLING-IN

In the process of selling-in a decision alternative, new properties of the alternative will be discovered. This may for example happen when the people addressed in the selling-in process contribute new perspectives or other information on the alternative that the decision maker was not aware of. At the same time the degree of success in selling-in the alternative to different parts of the organization is also, in itself, an important part of the alternative's properties and the selling-in process may lead to a change in this as well as in other properties of the alternative. Examples of relevant parties for selling-in activities can be found at various levels, both internal (owners, board members, more senior executives, coworkers, union leaders, lower level staff) and external (customers and deliverers). Other types of external selling-in include a confirmation of parliament, government and other authorities.

Selling-in may thus help both to ensure that the decision is formally taken and that it is successfully implemented. When preparing to have the decision formally taken, the selling-in efforts also help the decision maker to *assess* the situation with respect to the preferences of the persons involved in the formal decision (if such occur) and thus to assess the likelihood that the suggested alternative will be formally accepted when the decision is made. Likewise, the experiences from the attempts to sell in the alternative can help to *assess* the chances that the alternative will be implemented. If it appears impossible to sell in the decision among the personnel this may be seen as an important argument against the decision. Furthermore, with successful selling-in more people feel responsible for the outcome of the implementation of the decision. This also means that selling-in involves spreading the responsibility if the decision turns out to be a bad one.

In brief, selling-in processes can be used to accommodate the decision alternative/s to the properties of the organization and the world outside. Seen from this perspective, efforts to sell in the decision can be understood as an important part of much decision work in organizational settings. In the present study we analyzed the extent to which the decision makers reported that they planned and carried out activities involving information gathering not relating to selling-in and the extent to which they reported activities relating

to selling-in.

It is not entirely obvious how to best name the phenomenon we attempt to describe with the label 'selling-in'. The term 'selling-in' does not appear to be very common in the literature on organizational decision making although many somewhat related concepts are used. The Swedish term used by our informants in this context is 'förankring', which in direct English translation is 'anchoring'. We have avoided this term since it, in the biases and heuristics tradition of Tversky and Kahneman, is used to refer to the anchoring and adjustment effect. In fact, outside of usages implying anchoring and adjustment, we have only come across the terms 'anchoring' once in the organizational decision literature. Kotter (1995) writes about the dangers of not anchoring changes in the corporation's culture. Here anchoring appears to mean, approximately, to integrate deeply. Examples of similar concepts and ideas are 'getting on board', 'mobilizing', 'building support', 'getting people on the horse', 'enlisting', 'creating commitment', 'aligning' and 'contracting'. However, none of these notions are used in connection with analyses of decision processes. For example, they do not appear to capture the notions of getting people committed to *a decision alternative* and being prepared to learn from the people addressed. As an illustration, Kotter (1990) discussed aligning, and what is involved is "communicating the new direction to those who can create coalitions that understand the vision and are committed to its achievement" (*p.* 104). Thus, in the context of alignment (and 'creating commitment', etc) the vision is already established and the task is to get people to follow it.

Finally, our notion of selling-in should not be confused with the concept of "selling" previously introduced by Tannenbaum and Schmidt (1958). Tannenbaum and Schmidt developed their "selling" concept in a context concerned with describing different forms of leadership. "Selling" concerns a decision already taken by the manager. It has to do with the type of manger leadership where he or she "rather than simply announcing [the decision] takes the additional step of persuading his subordinates to accept it" (*p.* 97).

Some aspects of the decision process are more difficult to carry out than others. The creativeness of the decision maker is presumably most highly challenged with respect to the difficult parts. In this study we analyzed which aspects of the decision process were found to create the greatest difficulties.

TAKING THE DECISION

Most decision processes are expected to end with a decision being made. However, some decision processes do not end in this way. Instead they are, for various reasons, prematurely aborted or simply dwindle and lose their identity. This may be because the process was wrongly designed from the beginning, that the decision was badly timed (too early, too late etc.) or that the surrounding world changed in ways not foreseeable at the start of the decision process.

In those cases where a formal decision is taken it can concern different aspects of the decision process. Apart from accepting the decision (ending the decision process), the board can also, for example, give frameworks (limitations) for a continued process, confirmation of the process and/or content (e. g, of a first draft of a contract), or give directives for changes to the process, such as its content or timing. In this study we investigated why some decision processes never produce a decision, and how common this is. Furthermore, in those cases where a decision was taken we analyze its content.

In brief, in our study we were interested in describing characteristic features of manager's strategic decision processes in large organizations. For this purpose we analyzed the number of decision alternatives considered, the extent to which a decision was taken and if so what its content were, the extent to which the managers reported that they planned and carried out activities involving information gathering and activities relating to selling-in, what the managers reported as most difficult in the decision process and which changes in the conditions they imagined might have facilitated the decision process.

METHOD

SELECTION OF INFORMANTS

The present study was a part of a project studying the relation between information needs, decision making and use of information technology in large organizations (see also Allwood & Hedelin, 1996). Because of this we were interested in organizations big enough to require advanced information technology. In a catalogue listing the type of organizations that were relevant for the study we found 48 organizations with more than a couple of hundred persons employed. We stopped recruiting when 14 such organizations had agreed to participate in the study.

We turned first to the top executive manager in the respective organization and asked if they themselves and/or anyone else in their top management group would be interested in participating in the study. In total, 65 experienced decision makers in leading positions in the 14 organizations were asked to participate in three semi-structured interviews.

PARTICIPANTS

In spite of the fact that we turned to very busy individuals and that participation in the study required the devotion of many hours to the investigation, we achieved a very good participation rate. Only 15 of the 65 participants declined to participate before interview 1. The acceptance rate for participation in the three interviews was thus 76.9% (50 of 65). The stated reasons for not wanting to participate were: no time to participate in the study (6), no current involvement in strategic decisions (4), intention to quit the organization (1) and new job (1). In three cases no reason was given. Eleven organizations remained in the study, 6 private and 5 public.

However, five persons did not participate in any of the three interviews. These persons only filled out a questionnaire that was also part of the project. One participant, who only participated in one interview, was excluded from the analyses. Furthermore, one participant quitted his job before the third interview and because of this he was also excluded. Finally, two persons were lost for analysis due to problems with the tape-recording.

Thus, 41 participants, each providing data for three interviews remained, 36 males and 5 females. The average age for the males was 46.6 years; range 35–64 years, and for the females 47.0 years; range 36–55 years. Of the 41 participants, 3 (7.3%) were top executive managers, and 6 (14.6%) were top executive vice managers. The remaining 32 participants (78%) were either head of a department and/or members of the board of their organization.

Many of the participants were highly experienced professionals in decision making.

However, only about half of them stated that they had good or relatively good personal experience in strategic decision making similar to that reported in the interviews. Seven participants (17.9% of the 39 participants who provided information in this context) stated that they had good experience, 13 participants (33.3%) had relatively good experience, 5 participants (12.8%) had some experience, 6 participants (15.4%) had little experience, and 8 participants (20.5%) lacked experience of similar strategic decision making.

Twenty participants (18 men, 2 women) came from the private sector and 21 (18 men, 3 women) from the public sector. Within the private sector, 4 participants came from the chemical manufacturing industry, 6 from energy organizations, 8 from chemical and food industry organizations, and 2 from transportation industry. Within the public sector, 3 participants came from a health care organization, 4 from the national social insurance office, 3 from the Swedish post office, 6 from the civil aviation office and 5 from the Swedish alcohol retailing organization.

The average number of employees in the participating private organizations was 2,858 employees (range 251 to 10,108) in 1994. In 1994 the net profits for the private organizations ranged from 364 million Swedish crowns (MSEK) to 25,119 MSEK (mean net profit = 6,024 MSEK). This data only concerned the Swedish part of the organizations. We lack data on the accounts of the public organizations.

INTERVIEW FORM

Here we will only describe the questions reported in this chapter[2]. From interview 1 answers to the following questions will be reported.

Describe a strategic decision you are going to work with.

Describe the coming decision process. What steps and measures have been planned to be taken and which have been taken?

From interview 2 we report answers to the following question.

Can you summarize the state of the decision process as it is now?

Answers to the following questions are reported from interview 3.

Can you describe the state of the decision process?

What was the greatest difficulty in the decision process?

What, if anything, would have simplified the decision process if it had been different?

The other questions mainly concerned various aspects of how information technology had been, or could be, of use in the decision making process. The same was the case for the content of the questions in a questionnaire also completed by the participants (not reported here).

PROCEDURE

All interviews were conducted in Swedish and were tape-recorded with the participants' consent.

Interview 1 took about 2 hours, and was conducted face to face. Before the interview the participants were asked to select two forthcoming strategic decisions[3].

[2] The full interview forms can be ordered from the first listed author.

The participants were instructed that the decision should be strategic in character, but that it could vary in content. Furthermore, the participants were instructed that it should be likely that the decision would be formally taken within three months from the point in time when the interview was held. In practice it turned out that many of the decisions reported on were not taken within this time limit. We therefore decided not to constrain the interview period to three months. In fact, the time range for the last interview with each participant was 28 to 369 days. In interview 1 we asked the participants to estimate a point in time that might mark the middle of the decision process. At that point in time we telephoned them and agreed on a time for interview 2, given that it was to be executed when the decision process had reached halfway.

Interview 2 took about 30 to 60 minutes, and was conducted by telephone at an average of 9.4 weeks after the first interview (SD = 2.4 weeks: range 12 to 160 days).

Interview 3 took about two hours, and was conducted face-to-face. The time between interviews 1 to 3 was on average 29.6 weeks (SD = 19.4 weeks; range 28 to 369 days).

TRANSCRIPTION AND CODING

Five trained assistants transcribed all interviews. Where the tape-recording was inaudible, a note ('on-identified part') was included in the transcription. A written manual, to be used when coding the interviews, was constructed. This manual was accepted after two revisions.

In order to improve the quality of the coding, the two authors initially coded 13 of the 41 transcripts independently. Any discrepancies in the coding results were then resolved in a discussion between the authors. The first listed author coded the remaining transcripts.

RESULTS

In the first part of the Results section we report some structural properties of the decision processes and the decision. Here we describe the domains of the decisions, number of decision alternatives considered in the decision process and whether the decision was taken or not. In the next part of the Results section we report more process-oriented aspects of the decision processes. Here we consider the extent to which the participants described plans that were reported to have been carried out in later interviews. This analysis was carried out separately for a search for information concerned with aspects other than selling-in a decision alternative and for activities concerned with selling-in a decision alternative. Furthermore, we report those aspects of the decision process the participants experienced as difficult and what they thought might facilitate similar future decision processes.

TYPES OF DECISIONS

The decisions reported on by the decision makers were classified into seven decision domains.

[3]In this chapter we only report on the decision first mentioned by each informant. Thus, henceforth we will only discuss one decision for each informant.

After the name of each domain, the number of participants coded into this type of decision is indicated followed by a description and/or one, or more, examples of the decision type in question. This will be the format for many of the analyses reported below.

Investment (12). An informant said, "... to build a plant for 20-30 million crowns [SEK] to be able to increase the capacity and to use a new technology".

Personnel issue (10). A decision involving recruitment, discharge or relocation of employees, and competence development issues.

Organizational change (8). An informant said, "... how should we structure the region's top management of 12 persons who have worked together for 4 years. Which are the functions and responsibility areas here? One reason for this reorganization is a saving of 15 million crowns".

Market policy (4). "We have to decide whether or not to extend the market. Shall we establish outside our ordinary area or not?"

Merge decision (3). A decision about a merge of two companies.

Economy (3). A decision involving the determination of the result of a budget follow-up.

IT policy (1). "Should we buy new data communication equipment or not?".

In brief, the most common decision domains were issues relating to investment, personnel and organizational change.

NUMBER OF DECISION ALTERNATIVES CONSIDERED IN THE DECISION PROCESS

An analysis was made of the number of decision alternatives considered in the decision process. The coding was based on answers to all questions over all three interviews and took into account the number of alternatives considered and whether the alternative was later replaced. The categories used in the analysis are described below. In order to convey an impression of the complexity involved some of the examples given are rather extended.

One alternative (19). Here the informants reported that only one and the same alternative was considered during the decision process. Two examples are: "We want to hire a lawyer [a candidate was already identified]" and "We have to show that it is a profitable project [two old water-power stations were to be substituted with a new one]".

One alternative replaced by another (3). These informants reported that they rejected the original alternative in favor of a new alternative appearing later in the decision process. An example is an informant who said, "This is a very large project that deals with very substantial investments. Such a [...] project needs an initial investment of maybe about 50 to 70 millions and this is not that easy to receive. The new plan will lead to the revision of some of our steps and measures. We need to be on a more conservative level of investment than we had first thought". Another example is "First we pushed for one alternative, which was postponed for various reasons. Then we pushed for a new alternative. [...] This time we have decided to be more 'rebellious' you might say, and somewhat more concrete and not so unclear in our information".

Pushed for one alternative among many (2). These informants mentioned that they pushed for one alternative but they did not explicitly mention how many alternatives were being considered. Furthermore, other interest parties were pushing for other alternatives. One of the two informants said in the first interview "One possibility is that we instead tell

the entrepreneur that we should pay for these four [individuals]. Another possibility is that we employ two [of the four]. If we are lucky and have a good discussion with the union, they will realize that we will employ all four individuals directly [and not, for example, employ two of them first]. The personnel organizations can act so that we do not get the persons we want". At the second interview he reported that the union wanted the job to be advertised externally, "Furthermore, they want the number of work tasks in the job description to be extended, which I am against".

The other informant said in the first interview "The intuitive decision [about a new proposal of how goods were to be sent] has already been made". However, the consequences must be evaluated. "What are the consequences for our information system? For our way of working? What are the consequences for investment? Do we need automatic sorting plants? How might this affect our method of dealing with the hauliers about prices? We have to see what the consequences will be before we evaluate this issue". In interviews 2 and 3, the informant worried about whether the hauliers would accept the decision. In interview 3 the informant said, "We have increased the push on the hauliers that we must have this, and they accepted it".

Choice between two alternatives (5). Examples of this category are: buying a company or not, making an external or internal recruitment and trying to expand the market or not.

Several alternatives considered (12). The informants stated explicitly or implicitly that several alternatives were considered in the decision process. It was also clear that the number of alternatives were reduced during the decision process. For example, in one case the decision concerned IT policy. The decision process started due to the management's desire for better functionality of the IT system. In interview 1 the informant said "After the collection of information an evaluation of a number of different technical methods of communication must be carried out. [...] There will be an evaluation of the costs of the various alternatives. We will also conduct an analysis of the security of the alternatives". In interview 2 the informant said, "The decision was already partly made, which ruled out one alternative".

In the next example the decision concerned some form of partnership between two companies. In interview 2 the informant described three alternatives: (a) "We ought to search for a new possibility to establish a firm owned by both of us, in fact a joint venture firm", (b) "Not to be a third hand owner but, we just want some observation and a certain share making it possible to feel a greater solidarity and also have an insight into the business" and (c) "help them to establish business in Sweden inasmuch as we, without being owners, can still act as somebody to talk to and to consult concerning employment of staff, since we probably know the individuals who are most suitable for this firm". The decision in the next example concerned an investment in a power station. The decision process was prolonged with various alternatives proposed "Certain parts of the project will be prolonged over two years. We are conducting comparison analyses of economic calculations for various alternatives."

In the last example from this category the decision concerned the construction of a model for price setting. In the first interview the informant said, "Our top management will make a decision in favor of some of the alternatives. Thereafter we will describe consequences for the alternative they [the politicians] have decided to support. How does this influence single products or product groups? What happens to the sale of different products or product groups? Will there be any political effects? We will try to identify what problems might appear. We will try to consider all the consequences. We must

produce issue-related information showing the consequences. We need to create two main alternatives".

A Mann-Whitney U-test showed that there was a significant difference between public and private companies with respect to the number of decision alternatives considered. Private companies considered more alternatives than the public ones did ($z = -2.88$, $p < .004$). Five of the 20 informants in the private companies considered one alternative, 1 preferred to replace one alternative with another, 1 pushed for one alternative among many, 4 reported a choice among two alternatives, and 9 informants considered several alternatives. In contrast, in the public organizations 14 informants out of 21 considered one alternative, 2 one alternative replaced by another, 1 pushed for one alternative among many, 1 reported a choice among two alternatives and 3 informants considered several alternatives.

TAKING THE DECISION

We next consider the outcome of the decision processes reported within the time span of our study (369 days). In this context it should be remembered that the informants were instructed to select decisions that were to be completed within three months from the first interview.

Decision formally taken (33). Ten of the 33 participants reported this in interview 2, and 23 participants in interview 3. For two of the 33 participants the decision content changed into something very different.

Two examples of the decision taken already in interview 2 are, first, a decision concerned with re-deployment of staff. At the second interview, conducted 8.6 weeks after the first interview, the informant said, "We could not wait any longer since it [the decision] concerns staff and we made the decision to let her move to another office". In the second example the decision concerned an investment in a computerized salary system. At the second interview, 7.8 weeks after the first interview, the informant said, "We have presented the decision recommendation, which allowed us to negotiate. Negotiations were conducted about prices, some bargaining and further buying of products. The negotiations were completed, the decision was taken and an agreement was signed to introduce the salary system to all stores owned by the organization".

Next, we present two examples of decisions reported by the informants in interview 3 as taken. The first example concerns a decision about how to save money in the organization. At the third interview, the informant said "I started the saving process by asking how much the clinics could save. I only received suggestions corresponding to half the sum we needed to save, 50 million, and some of them said they could not save anything. The manager who had the most extensive budget and said he could not save at all, is no longer manager". The decision in the next example concerned how to structure the organizations' new management. At interview 3, the informant said "Then my board made the decision at an ordinary quarterly board meeting [...]. At this time we made both the organizational decision and the decision about elections concerning staff".

No decision (6). Six informants reported in the third interview that no decision had yet been taken. The first example concerns a decision to retrieve staff from an entrepreneur. In the third interview the informant said "We will wait for a salary revision, an extensive salary negotiation, starting in April. I have asked for a negotiation, but they [the union]

have not answered. I have not had any contact with the union so I do not know the reason why we have not entered into negotiations".

In the next example the decision concerned a new way of making investments. In interview 2 the informant said "It is unclear whether or not it [the decision] will be taken during the spring or maybe not before the end of the year, or during the autumn. I have no idea about this just now. Something has happened in our organization implying that we need to re-consider the alternatives. This is related to the information I need and how the search for information has been conducted. We have to wait for the solution of the larger issue [a large reorganization]. Therefore this decision will be somewhat delayed". A further example of a postponed decision concerned the purchase of energy. In interview 3, the decision maker stated that no information was missing and that the persons concerned in the organization were fully informed about the situation. However, the positions of the two parties involved in the purchase had not changed. The informant also stated that the organization did not see any reason to change their position. So, the decision was postponed until the parties could agree. A final example of a delayed decision concerned the creation of a new model for the price setting of goods. Here the decision was postponed due to unforeseen consequences of structural changes on the market.

Part of decision taken (1). This case concerns the development of a policy for IT-data communication. During the decision process one dysfunctional alternative was ruled out and only two alternatives remained.

Stalled decision process (1). One decision process was stalled. The topic of the decision concerned the sponsoring of a sport event. Because the decision maker was unable to contact the office responsible for the sport event, he could not make a decision about how much support would be given.

In the remaining part of the Results section we will report different analyses concerned with the process and content of the decision process. We will first deal with the extent to which the informants reported that they engaged themselves with two aspects of the decision process, a search for information and efforts to sell in the decision. In both of these connections we report the relationship between actions planned and actions executed in the decision process. Finally, we report some indicators of what the informants experienced as difficult in the decision process.

SEARCH FOR INFORMATION CONCERNING ASPECTS OTHER THAN SELLING-IN A DECISION ALTERNATIVE

In the next two sections we analyze the extent to which the respondents reported that they planned and carried out activities concerned either with a search for information concerning aspects other than selling-in a decision alternative or with activities concerned with selling-in a decision alternative. This analysis was conducted in order to get an idea of how the respondents were occupied during the decision process.

In this section we deal with search for information concerning aspects other than selling-in. This can be seen as an attempt to improve the quality of the decision. First, we analyzed the extent to which the informants in interviews 1 and 2 mentioned plans and in interviews 2 and 3 mentioned activities having to do with finding relevant information. Here we simply analyzed the number of times, in the three interviews, that the informants mentioned search for information of the described type, including attempts to analyze

information for further clarification (henceforth called 'finding' or 'searching for' information). When a statement could be coded as having to do with selling-in a decision alternative (see below) it was not coded as a search for information.

In total, 40 informants out of 41 mentioned at least once that they *planned* (analyzed in interviews 1 and 2) *or carried out* (analyzed in interviews 2 and 3) a search for information (M = 9.39, SD = 4.29, N = 41, range 0–19 plans and actions). These 40 informants in interviews 1 and 2 mentioned *plans* to search for information at least once (M = 6.44, SD = 4.15, N = 41, range 0–19 plans), and 36 of them in interviews 2 and 3 mentioned a search for information as having been *carried out* at least once (M = 2.95, SD = 2.68, N = 41, range 0–12 actions). (Here and in all similar analyses reported below, we used 41 as the denominator).

Some examples of informants from interview 1 who mentioned that they had *plans* to search for information are "This suggestion needs to be based on facts so that they will not be able to say 'Yes, now he does not know what he is talking about'". Another informant said, "We try to get information, which is as accurate as possible, and information, which is as long term as possible".

The following statement is an example from interview 2 of an informant who talked about actions related to a search for information, which he had *carried out* "We had some difficulty finding the right location. We wanted to rent the location, since we did not want to invest in one of our own. Finally, we found one that was almost perfect, with one exception there were very limited possibilities for growth". Examples from interview 2 of informants who talked about *plans* for actions concerned with finding information are "We will conduct an investigation about how to divide the company into different smaller companies", and "Distinct issue-related information of organizational structure will be required, that is which tasks are central for the organization, and which are local".

Finally, two examples of informants from interview 3 who reported that they had *carried out actions* concerned with a search for information are "This lawyer informed us that he is willing to work for us, and we have got information from him about the costs" and "We have certain overall figures, partly the list [...] with average revenues per product, what we earn for each arrival etc".

The relationship between actions planned and actions executed concerning a search for information in the decision process.

In total, across the three interviews, there were more instances of planned actions concerning search for information that were not carried out than of actions concerning search for information that were actually executed. The number of planned actions that were not reported as carried out was on average 4.45 (SD = 5.19, N = 41, range 0–25) and the number of planned actions that were reported as executed was on average 1.99 (SD = 1.32, N = 41, range 0–5). On the other hand, actions were also reported as executed that were not reported as having been planned. This happened on average .96 times (SD = 1.92, N = 41, range 0–8). Further details are shown in Table 1.

SELLING-IN

In the introduction selling-in was discussed as an important, but insufficiently researched, aspect of the decision making process. We suggested that the managers we have been

Table 1. Average Number of Information Search Activities in Interviews 1-3 Reported as Planned and Carried Out

	Planned	Carried Out		Not Carried Out	
		Planned	Not Planned	Planned	
Interview 1	4.82	-[a]	-[a]	-[a]	
Interview 2	1.62	1.02[b]	0.08	2.26[b]	
Interview 3	-[a]	0.46[b] 0.51[c]	0.88	1.08[b]	1.11[c]

[a] Not analyzed. [b] Planned in interview 1. [c] Planned in interview 2.

studying were the drivers of the decision process. In this sense they to some extent acted as champions in the organization trying to accomplish something or at least seeing to it that something got done. In the next analysis we looked at the extent to which the decision makers reported that they had planned for or had actually executed selling-in efforts in the decision process. For this purpose, we scored the number of plans or actions concerned with selling-in mentioned by each informant in response to the interview questions analyzed. In this section we give many examples. The purpose is to convey a clearer picture of what we mean by efforts to sell in by showing the forms such efforts can take. For example, many of the examples illustrate the champion character of the informant's activities.

In total, 33 informants out of 41 mentioned once or more that they *planned* (analyzed in interviews 1 and 2) *or carried out* (analyzed in interviews 2 and 3) attempts to sell in the decision idea with one or more persons within or outside the organization ($M = 1.49$, $SD = 1.07$, $N = 41$, range 0–3 actions). In interviews 1 and 2, 28 informants reported *plans* for selling-in activities at least once ($M = .94$, $SD = .83$, $N = 41$, range 0–3) and in interviews 2 and 3 twenty informants reported having *carried out* selling-in activities ($M = .55$, $SD = .63$, $N = 41$, range 0–2).

Some examples from interview 1 of informants who mentioned *plans* for selling-in activities[4] are "I have to find out what opinion the person himself has [about changing work]", "Both the union and the management group need to be involved", "I will discuss it [the purchase of a machine] with the manager. He signs the invoice for this. I will also discuss it with the future users of the machine".

Further examples of *plans for efforts to sell in*, all stated in interview 1 and some of them showing the learning aspect of the work involved in selling-in, are "In practice this [reorganization] will very much depend on information. We will give them [the employees] the issue-related information, let them think themselves, and give them time to forward their own suggestions. I have asked them to come to me with their opinions about how this [reorganization] could be implemented" and "It is possible that we also have to go to the 'Popular movement council for rural development in Sweden'[5] and some other external authorities to get a broader view of the issue".

[4]When the word "anchoring" is used in the quotations below it is the Swedish word "förankring" that has been used by the informants.
[5]The Swedish name is Folkrörelserådet Hela Sverige.

Some examples from interview 2 of informants who mentioned selling-in activities carried out are: "The decision is anchored with my boss who is a member of the board. He is informed about the content and the consequences of the decision" and "The decision is anchored with the coming manager to give him initial information about our needs. We have discussed the strategies with the politicians".

The following are examples of informants from interview 2 who mentioned plans for selling-in activities: "We will have a more concrete presentation about the suggestion to the carriers on the 26th of January. At that time we will have the information and will be mentally prepared to talk to them. We need to sell it in downwards though the organization. We have a kick-off on the 7th of February where we will present the suggested decision to the organization. In principle the suggestion will be valid from that date", "I will inform the political presidium next week", and "We have a number of alternatives, which we need to reason about together [The decision concerns the region's overarching organization.]. How shall we structure the management group of the region? What functions and what responsibilities will they have?"

Two examples of selling-in activities reported as carried out in interview 3 are the following: "We have used this decision process to reach acceptance and we have got it now. So this has been an issue back and forth". Another informant stated "I will quit this job and I am leaving in two months. Therefore I intend to leave this as a testimony to my successor – whoever that might be – so I have contacted some people and anchored the issues so that this man or woman can go on with this [project]".

The relationship between actions planned and actions executed concerning selling-in in the decision process.

In total, across the three interviews, there were more instances of planned actions concerning selling-in that were not carried out than of planned actions concerning selling-in that were actually executed. The number of planned actions that were not reported as executed was on average .58 (SD = .63, N = 41, range 0–2) and the number of planned actions that were reported as executed was on average .36 (SD = .54, N = 41, range 0–2). On the other hand, actions were also reported as carried out that were not reported as having been planned. This happened on average .19 times (SD = .40, N = 41, range 0–1). Further details are shown in Table 2.

Table 2. Average Number of Reported Planned and Carried Out Selling-In Activities in Interviews 1-3

	Planned	Carried Out		Not Carried Out	
		Planned	Not Planned	Planned	
Interview 1	0.78	-[a]	-[a]	-[a]	
Interview 2	0.16	0.15[b]	0.07	0.51[b]	
Interview 3	-[a]	0.12[b]	0.09[c] 0.12	0.00[b]	0.07[c]

[a] Not analyzed. [b] Planned in interview 1. [c] Planned in interview 2.

DIFFICULTIES IN THE DECISION PROCESS

When everything runs as expected in the decision process the need for creativity may not be very obvious, although creativity may also have a role in keeping the process running smoothly. However, when there are difficulties, there may be more need for creativity. Next, we present an analysis of the difficulties in the decision process reported on by our informants. We first present the informants' answers to the question *'What was the greatest difficulty in the decision process?'* posed near the end of interview 3. As in previous analyses the informants' answers were coded into categories.

Selling-in (14). The stated difficulties coded into this category mostly concerned difficulties achieving a consensus around a proposal for the decision that the informant was driving. In one case the difficulty concerned selling-in with concerned personnel. She stated "The difficulty was that I didn't know how I should handle it internally, that is 'upwards' in the organization". She didn't know if she would be able to achieve the desired decision or not, that is she felt uncertain whether she had been able to sell in her decision sufficiently. However, the decision had been made and implemented during the interview period.

In the next example, the informant reported that it had been difficult to make the decision. He felt he would have needed more 'number-arguments' in order to sell in the decision with the relevant persons. Another informant said that it had been difficult to produce a sound economic basis, "that would be convincing for everyone, including the 'non-believers'".

Five other informants felt that they had not sold in the proposal in the right way. For example, they had "sent out papers instead of talking to people", had failed "to get everyone to be part of this" [in the sense of getting people to accept mentally the suggested decision], "to get the users to accept the suggestion for IT-policy", "to coordinate and get a grip on a large number of viewpoints", and "to agree on what is good and how it works". Finally, one informant reported that the greatest difficulty had been "to know the consequences of variables [external interest parties such as the 'EU'-commission and state-authorities] that you do not control yourself" [this relates to difficulties in finding support for the proposed decision from these instances: external selling-in].

Selling-in – peripheral aspects (2). These difficulties are more peripherally related to selling-in concerns and are thus not as clearly relevant to selling-in as the previous category. One informant mentioned different types of communication difficulties and the other "to know that you find the right level in the communications you send. That it is not too weak or too tough. To create an understanding for our activity".

Difficult to interact with other [opposing] party (2). Difficulties in relating to the other party in negotiations can be seen as having to do with preconditions for selling-in decisions that involve negotiations with opposing parties. In one case, the other party kept asking for advice from a lawyer. This prolonged the negotiations and, according to the informant, led to a poorer business agreement. In the other case the difficulty was in interacting with the union. The difficulty was diagnosed by the informant as being due to poor organization on the employers' side.

Both selling-in and difficulty finding information (1). One informant mentioned that it was difficult to agree about whether the organization could live up to the quality demands of another organization. This appears to involve both difficulties of selling-in and difficulties of finding information.

Difficulty finding information (5). In this category the informants expressed in a number of ways that the greatest difficulty had been related to finding information. For example, one informant said that it had been difficult to get information about what the real needs were. Another informant stated the difficulty as being to interpret correctly information about sales, market development and the competition. The three other informants mentioned the difficulty of finding information, for example, due to poor archiving routines, unsuitable information banks, and the presence of "a lot of soft data".

Difficulty predicting the development of events (2). The difficulty of predicting the development of events can be seen to involve difficulties in finding information. One of the informants mentioned that it was hard to predict the development of events over longer time intervals and the other informant said that the greatest difficulty was in judging 'life lengths' technically and economically.

Management of time (2). Two informants stated that the greatest difficulty had been in living up to the time plan and correctly predicting how much time would be needed.

Difficulty choosing the right alternative (9). Nine informants stated that the greatest difficulty was in choosing the right alternative or choosing how to present the decision alternative. Some reports were "to know that the right outcome was achieved", "to know that it is worthwhile investing a lot of money in a specific purchase alternative", "to find the correct size on the staff management". Other informants stated that it was difficult to "know how much of the resources it is reasonable to spend on different alternatives", "choose the right person", "find the correct location", or "to start up the new management". Finally, two informants mentioned "the difficulty of finding the right balance between favoring old or new [staff]" and "knowing that decisions that concern people turn out to be correct".

Miscellaneous (4). Four informants were placed in the miscellaneous category. These difficulties concerned "realizing that we were actually on the wrong track", "getting the other party to react as I wish", "working with an imprecise goal", and "deciding whether the change should occur at once or gradually".

IMPROVEMENTS CONCERNING THE DECISION PROCESS

At the end of interview 3, the informants were asked '*Was there anything that could have simplified the decision process if it had been different?*'. Four informants (10%) answered "no" to this question, and three informants answered "don't know". This question gave rise to similar answers as the last reported question.

Selling-in (12). Only three informants provided answers not coded as selling-in on the previous question ("the greatest difficulty"). One of these three informants asked for "better routines for reporting the needs from the offices". Another of them wanted information to "be better able to understand the board's intentions". The final informant of the three said, "Maybe the whole thing would have been simplified if one had achieved a better understanding of the other party". Two of the answers coded into this category were also coded as *Difficulty finding information.* One of these persons said "If we had had well-structured databases then it would have been simple, but right now everyone has opinions about everything".

Selling-in – peripheral aspects (4). One of the answers coded into this category had been coded into the same category on the previously reported question and two of the

answers had on this occasion been coded as *Selling-in*. The informants stated that the decision process would have been simplified if "I had had better insight into how the unions really think", "one could have taken the decisions oneself", "the persons involved were less emotionally engaged" and if "there had not been so many parties involved".

Difficulty finding information (12). Only one of these 12 informants had stated a similar answer to the last reported question. One informant stated that he would have liked to follow up the development month for month, maybe several years back in time. However, since the two companies involved had merged this would have had to be done manually. One informant mentioned "handling issues like this is so unusual that we have no real culture for this [to develop new X] and the preparedness for giving support [such as information support] for this special issue is lacking". The possible improvements that were identified with respect to an information search as reported by the other nine informants are listed in Table 3. One of the informants coded into this category was also included in the category *Miscellaneous,* below.

Table 3. *Information Related Improvements That Might Have Simplified the Decision Process*

* Availability of a database for airplane traffic.
* The purchase system available in a more advanced stage than at present. Possibility to get information quicker about "how it really looks".
* Availability of data on developments that occurred a longer time back.
* Greater degree of access to information from the organization in charge of [X].
* Easier access to information.
* A higher level of computerization.
* Clearer goals for the project.
* Functioning data communication between main office and the stores.
* Access to information that the informant considered it would be unrealistic to have access to.

Miscellaneous (6). Finally, six informants gave answers coded as miscellaneous. Two of these restated previous answers. One of the other informants wanted to have people involved in the decision who were formally competent in making such decisions and that these people should have the right to say "yes" or "no". The informant also stated "that my boss would give clearer directions and not give the impression that he might change them. That the organization could give better support when these kinds of questions are handled". Of the remaining three, two wanted more help from outside consultants, and the last one asked for "greater possibilities to change things than we had".

DISCUSSION

In this study we have investigated how managers make strategical decisions in complex, dynamic, and real-time environments and in different decision domains. The chapter has illustrated that decision making in organizations is something that is deeply integrated into the other activities going on within and outside the organization. The decision processes reported on by our participants were part of a smaller or larger task, project or enterprise and the managers we interviewed were usually 'in charge' of the tasks.

In most of the decision processes reported there was only one alternative that was being considered. What appeared to be happening in the decision process was that this alternative (or occasionally the various alternatives) was being constructed in the sense that the details were being specified. Thus, this study provides further evidence to indicate that the notion from the NDM research literature (Klein, 1998) that most of the time only one decision alternative is considered in the decision process may also hold for strategic decision making processes in large organizations.

Our results illustrate that the informants communicated with other persons, within and outside the organization, about the decision alternative/s. These communications can be seen as ways of learning more about the alternatives under consideration. At the same time the communications can usually, but to a greater or lesser extent, be seen as involving negotiations with the other person (or group) about the properties of the decision alternative being considered. One function of these negotiations was to inform the other persons and to elicit their reactions. These reactions in turn gave rise to further communications including clarification of misunderstandings and possible changes to the proposed decision alternative. An aim of the communications was usually to achieve consensus in the understanding, that is, a shared understanding of the alternative. In this way the alternative was also constructed through communication with other persons. By getting a chance to influence the alternative a likely effect recognized by our informants was that the other persons would become more committed to, and also feel morally responsible for, the decision. All of these functions are part of what we above have called the selling-in of the decision alternative.

Many approaches to decision making have stressed that information seeking and information interpretation are important parts of the decision making process. Our results complement this picture by showing that selling-in activities also take up a large part of the informants' time and engagement in the decision process. Furthermore, our results showed that both of these two types of activities were part of our informants' initial understanding of which activities would be carried out in the decision process. Thus, already in the first interview our informants had plans both for information seeking and selling-in activities in the decision process. The analyses showed that *plans* and *activities* associated with a search for information concerning aspects other than selling-in were reported by more informants (40 and 36 informants, respectively), compared with plans and activities associated directly with selling-in (28 and 20 informants, respectively).

Our results show that most of the decision processes (33, or 80%) were completed with a formal decision, but most of these decisions were not completed within the time span predicted by the informants at the time of the first interview. A few of the decisions were taken earlier than predicted; 10 decisions were reported as taken already in interview 2, but most of them were taken later than predicted. Furthermore, it is of interest to note that the deviation between the planned time for the interview (according to the researchers' initial instructions to the informants) and the actual time when the interview was carried out was smaller for interview 2 compared with interview 3. Interview 2 on average took place after about 9 weeks, instead of the planned 6 weeks, and interview 3 on average took place after about 29 weeks, instead of the planned 12 weeks. One possible explanation for this difference is the presence of an anchoring effect (in the sense of the heuristics and biases tradition). When suggesting the date for interview 2, the informants may have been too anchored in their earlier views of how long the decision process would take. An alternative explanation for the observed deviation is that more unplanned things happened between

interviews 2 and 3, compared to between interviews 1 and 2. However, it is not clear why this should have been the case.

These results show that the informants only partly had control over the development of the decision process. The same conclusion was reached in our analysis of the proportion of planned activities that were later followed up in the sense that the activities were later reported to have been carried out. External events acted to complicate the unfolding of the process and often presented threats to its conclusion within reasonable time. Skill in on-line handling of the unexpected can be seen as an important type of creativity in organizational decision making. It is presumably important in most cases to avoid any stalling of the decision process. To a large extent the onus is on the manager to see to it that the tasks he or she is in charge of are driven to a successful outcome. One sign of a successful manager is that he or she "gets things done".

In a sense, selling-in can be seen to be about the coordination of wills, intentions and desires within and outside the organization. In contrast to, for example, alignment discussed by Kotter (1990), where the task appears to be getting people to be inspired, loyal and committed to a vision or a decision, selling-in efforts are here seen as carried out by champions (our informants) who want to achieve a successful completion of the tasks for which they are responsible.

It seems reasonable to expect that there are cultural differences with respect to the extent to which selling-in of decision alternatives is carried out in organizations. One indicator of this is that the concept of 'förankring' was developed in the Scandinavian cultural context (and possibly in other cultures) rather than in the U.S. Furthermore, the degree to which selling-in is carried out may be greater in Sweden or Scandinavia than for example in the U.S., where managers have more a reputation for their action-oriented attitude. However, the selling-in process concerns more than only the implementation aspect of the decision. For example, it is also relevant for the development of a qualitatively positive decision alternative in general (that is, seeing to it that the decision, if implemented, will have good consequences for the organization). For this, communication with experts and others is needed irrespective of country. Accordingly, we suggest that, although there may be cultural variations, the selling-in aspect of the decision process can be expected to be of importance in strategical decision making in large organizations in general.

We also asked our informants about what had been difficult in the decision process. The parts of the decision process experienced as difficult by managers might be those deserving most immediate facilitation. Most efforts at facilitation so far have been concerned with helping the decision maker to structure the decision situation or with finding information or analyzing retrieved information. Indeed, our results showed that some of the difficulties that our informants reported related to finding relevant information (reported by less than 15% of the informants). However, our results also showed that more than a quarter of our informants thought that selling-in was the most difficult part of the decision process. Still more informants mentioned aspects that were related to the selling-in of a decision alternative in one or another way. These results were especially surprising considering that planning and carrying out activities relating to a search for information concerned with aspects other than selling-in were more commonly reported than plans and activities concerning selling-in as such.

From these results, conclusions may be drawn with respect to what types of support for organizational decision making should be developed. Our results suggest that in addition to

support for collecting and analyzing information concerning, for example, markets or sales development it may also be appropriate to attempt to develop support for the decision process aimed at improving communication. This latter type of support might be given in the form of practical courses in communication that, for example, include how to prepare thoroughly the rhetorical aspects of a communication situation. In order to be more open and receptive in the communication situation, training managers may also provide them with more room for creativity in the way they construct decision alternatives and in the way they communicate with different parties in the decision process. Other forms of assistance might, for example, help the decision maker to structure the communication situation by providing means for helping him or her to analyze the present state of a negotiation situation. Such an analysis could include identifying the (possibly different) understandings held by the different parties involved and clarifying suitable measures to be taken in order to develop the situation in a desired direction.

The results of this study suggest that it is of interest for future research to attempt to improve our understanding of different forms and functions of selling-in efforts in decision making processes in organizations. Furthermore, research efforts should be directed towards the development of productive forms for support of selling-in activities in organizational decision processes.

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CHAPTER 14

MAKING EXPANSIVE DECISIONS: AN ACTIVITY-THEORETICAL STUDY OF PRACTITIONERS BUILDING COLLABORATIVE MEDICAL CARE FOR CHILDREN

Cultural-historical activity theory (Cole & Engeström, 1993; Engeström, Miettinen & Punamäki, 1999; Leont'ev, 1978) places decision making in the context of object-oriented, collective and artifact-mediated activity systems constantly undergoing developmental transformations. Decisions are not made alone, they are indirectly or directly influenced by other participants of the activity. Decisions are typically steps in a temporally distributed chain of interconnected events. Decisions are not purely technical, they have moral and ideological underpinnings with regard to responsibility and power. And the content of decisions is not restricted to the ostensible problem or task at hand; they always also shape the future of the broader activity system within which they are made.

This implies four dimensions of potential expansion of decision making: the social-spatial ('who else should be included?'), the anticipatory-temporal ('what previous and forthcoming steps should be considered?'), the moral-ideological ('who is responsible and who decides?'), and the systemic-developmental ('how does this shape the future of our activity?'). While largely hidden in times of business-as-usual, these dimensions of expansion become salient in problem situations and periods of intense change.

In an ongoing longitudinal intervention study of the multi-organizational field of children's health care in the Helsinki area in Finland, my research group has followed and documented how doctors and nurses in the local Children's Hospital and in the primary care health centers of the Helsinki area deliberately attempt to expand their decisions along these four dimensions. In this area, patients with chronic diseases and multiple diagnoses are typically treated by several caregiver organizations which are not well coordinated with each other, causing various kinds of disruptions and overlaps in the child's care. In a series of workshop sessions called 'Boundary Crossing Laboratory', practitioners from the different caregiver organizations analyzed discoordinations and gaps in communication between primary care health centers and hospitals in concrete patient cases. On the basis of these analyses, the practitioners and management of the organizations designed a framework for collaborative case management aimed at gradually building a new type of collaborative care from the ground up, through collaborative decisions made by practitioners. We call this new type of care practice *knotworking* (Engeström, Engeström & Vähäaho, 1999).

The key tool for this new type of practice is called 'care agreement'. It requires that at the beginning of a potentially prolonged care relationship with the hospital, the practitioners responsible for the patient in the Children's Hospital submit their written preliminary plan for the care to be scrutinized by the patient's family, the practitioners responsible for the patient in the primary care health center, and to possible other parties involved in the medical care of the child. The plan is thus turned into a joint agreement, signed at the minimum by the physician responsible for the child in the Children's Hospital, the parents, and the general practitioner (GP) responsible for the child in the primary care

C. M Allwood & M. Selart (Eds.), Decision Making: Social and Creative Dimensions, pp. 281-301.

health center. The agreement explicates the division of labor between the parties and provides contact information needed to facilitate communication between them. The agreement also includes the name of the designated coordinator of the patient's care trajectory; this is normally the patient's personal general practitioner at the health center.

The framework of collaborative case management and the care agreement have been implemented since the spring of 1998. My research group has been following and documenting patient cases, focusing on the decision making of practitioners. In each case, all parties (including the patient's family) are interviewed, documents are collected, and actual consultations are videotaped. This dense and multi-faceted qualitative data allows us to analyze to what extent and in what ways the four dimensions of expansion are realized as the practitioners attempt to build a new collaborative type of care through their daily decisions and interactions.

In the following, I will first discuss the changing theoretical landscape of decision making in organizations and the potential contribution activity theory can make to it. I will then present a patient case that demonstrates the challenges of expanding decision making along the four dimensions mentioned above. I will conclude by discussing how decision making in multi-organizational fields might be conceptualized in the light of activity theory and the analysis of our case data.

DECISION MAKING IN TRANSITION

In recent years, a number of scholars, most prominently James March, have repeatedly shown that decision making in organizations is not reducible to straightforward models of rational choice (March, 1988; see also Klein & al., 1993; Klein, 1998). Rather than making calculated choices between alternatives, organizational actors often make decisions based on fulfilling their identities and on following rules and routines that they themselves may not be aware of. These observations prompted Weick (1993) to suggest that the very idea of decision making should be replaced with the idea of sensemaking in organizational research.

"One way to shift the focus from decision making to meaning is to look more closely at sensemaking in organizations. The basic idea of sensemaking is that reality is an ongoing accomplishment that emerges from the efforts to create order and make retrospective sense of what occurs." (Weick, 1993, p. 635)

March (1999) in turn argues that decision making and sense making are best seen as complementary processes. Sense making is both input to and output of decision making. Decisions shape meanings and are shaped by them. March agrees with Weick's point on the largely retrospective nature of decisions.

"Actions come first, and premises are made consistent with them. Individuals and organizations discover their wants by making choices and experiencing the reactions of others as well as of themselves." (March, 1999, p. 27)

While this shift toward meaning and interpretation in our understanding of organizational decision making is important, another shift may be even more crucial for future research. March characterizes this second shift as the emergence of an 'ecological' vision of decision making. He points out that traditional views that locate decision making in the heads of individuals at a given point of time in a particular place underestimate the systemic character of decision making in organizations.

"They tend to ignore the significance of the interactive conflict, confusion, and

complexity surrounding actual decision making. ...Many things are happening at once, and they affect each other. Actions in one part of an organization are not coherently coupled to actions in other parts, but they shape each other. Many of the features of decision making are due less to the intentions or identities of individual actors than to the systemic properties of their interactions.

Decision making is embedded in a social context that is itself simultaneously shaped by decision making in other organizations. Premises and actions in one organization coevolve with those in other organizations. This interactive character of decision making extends over time so that the development of beliefs, rules, and expectations in one organization is intertwined with their development in others." (March, 1999, p. 29)

This idea of decision making as distributed in social space and over time poses tremendous challenges to empirical research. An early example of how such distributed decision making may be approached is Mehan's (1984) study of decision making concerning referrals to special education in a school system. Mehan points out that the committee meeting where the placement decision is formally made is only a culmination of a lengthy process.

"The construction of an educationally handicapped student's career or educational biography starts when the teacher makes the initial referral. Often, the teacher has only a general notion that the student 'is in trouble' or 'needs help.' This initial, rather general attribution becomes refined as more and more institutional machinery (e.g., tests, committee meetings, home visits) is applied to the case, until finally, by the placement meeting, only a parent's refusal to sign the documents during the placement meeting would be likely to change the assumed placement." (Mehan, 1984, p. 60)

An important insight of Mehan's study is that instead of a momentary, singular, isolated decision, the proper unit of empirical analysis in this type of organizational decision making is the entire *career path* of a student through the referral system. This idea is closely related to concept of *trajectory* coined by Anselm Strauss. In a major study of distributed actions in a hospital, Strauss and his colleagues used a patient's entire illness trajectory as the empirical unit of analysis (Strauss & al., 1985; see also Strauss, 1993).

Such units of analysis are needed because decision making is distributed across participants and through time. The variables or information are not under the control of any one person, and they are not exhaustively presented at any given point of time.

"In this respect, the decision-making action of the committee is submerged in the other practical activities confronting the committee members during the course of their daily, institutional lives. What appears to be the project from the point of view of rational action (making decisions) turns out to be a component part of more inclusive practical projects. ...

...The placement of a student in a special education program is not so much a decision made as it is an enactment of routines." (Mehan, 1984, p. 66)

The distributed features are obviously accentuated in decision making in multi-organizational or interorganizational fields (DiMaggio & Powell, 1983; Friend, 1993; Leblebici & al., 1991), such as an entire health care system instead of a single hospital or department. They are further highlighted in periods of intense change. Leblebici et al. (1991) found that transformations of interorganizational fields (in their case, the US radio broadcasting industry) proceed cyclically through phases of intensifying competition for resources.

"...intensified competition encourages dominant players to adopt those practices that are successful at the periphery and thus legitimizes these radical experiments. ...Finally,

new conventions, based on different premises relevant for the fringe players who introduced them, transform the pattern of transactions among participants and thus alter definitions of success and its critical resources." (Leblebici et al., 1991, p. 359)

The adoption of such radical experiments and emerging new conventions typically entails formation of new partnerships and alliances, and thus *deliberate* expansion of decision making in socio-spatial and temporal dimensions. In Mehan study the temporally and socially distributed decision making was largely based on routines. In periods of radical organizational change, routines are called into question and new procedures are articulated.

THE CONTRIBUTION OF ACTIVITY THEORY

Activity-theory may be included as a distinctive strand in the broader category of naturalistic decision making. As Klein (1998, p. 4) points out, typical features of naturalistic decision making include time pressure, high stakes, experienced decision makers, inadequate information, ill-defined goals, poorly defined procedures, context with higher-level goals, dynamically changing conditions, and need for coordination between multiple actors.

These features differ radically from the conditions of conventional studies of decision making, including clinical decision making. The conventional approach begins with precisely defining the problem or decision to be made, including the alternative strategies being considered and the criterion by which the choice among the alternatives is to be made. This is commonly achieved by constructing a decision tree which displays the available decision options or strategies, as well as the possible consequences of each (Doubilet & McNeil, 1988, p. 256). Proponents of naturalistic decision making research point out that the conventional procedure does not work in studies of naturalistic decision making.

"...the focus in the decision event is more front-loaded, so that decision makers are more concerned about sizing up the situation and refreshing their situation awareness through feedback, rather than developing multiple options to compare to one another. In contrast, most traditional decision research has involved inexperienced people who are engaged in laboratory tasks where contextual or situational factors play a limited role. The traditional paradigm emphasizes understanding the back end of the decision event – choosing among options." (Zsambok, 1997, p. 4)

In activity theory, cognition and decision making are seen as embedded in object-oriented collective activity. The first contribution of activity theory to the changing field of decision making is the *modeling of the systemic conditions of decision making* in terms of collective activity systems mediated by cultural tools (both material and conceptual), rules, and division of labor (Engeström, 1987). Activities are systemic formations of relatively long-lasting or durable collective behavior that often take the shape of an institution. Activity systems evolve historically and reproduce themselves constantly. An activity system produces large numbers of actions, many of which are repeated with little variation and over time become automatic operations, routines that are taken for granted.

An action is a relatively discrete segment of behavior oriented toward a goal. This does not mean that goals give rise to or predetermine actions. To the contrary, both activity theory and theories of situated cognition agree with Weick (1993;1995) in that goals and plans take shape and are used as resources *in* action, often being articulated only

retrospectively. Actions have relatively clear points of beginning and termination. An individual actor is seldom clearly aware of the relationship between his or her action and the complex activity system that gives rise to it. Yet, no action can be fully understood and accounted for without analyzing it in the context of the entire activity system, against the background of its temporal evolution and its spatio-social organization. This becomes particularly evident when one tries to explain seemingly irrational actions and interactions, such as errors, disturbances and failures. Their systemic origination is much more interesting than trying to pinpoint the specific individual at fault.

Each step in the trajectory of an object – an illness, for example – through an institutionalized activity system may be seen as a situated action. But each action is shaped by, and in turn gives shape to, the historically evolving structure of the entire activity system, including the not immediately visible factors of community, institutional rules, and division of labor. A general model of an activity system is presented in Figure 1.

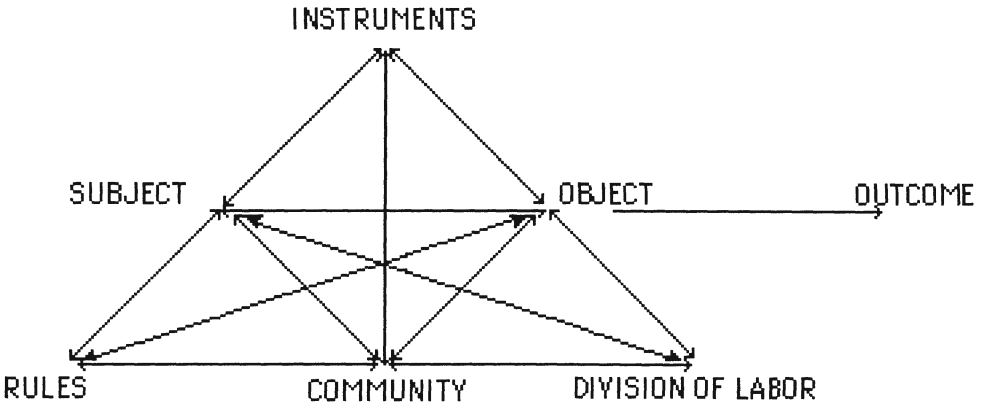

Figure 1. General model of an activity system (Engeström, 1987, p. 78)

From the viewpoint of activity theory, cognitivist and situated approaches to reasoning and decision making share a common weakness. In both, the focus of analysis is restricted to actions, whether couched in 'tasks' or in 'situations'. Both have difficulties to account for what makes people act and form goals in the first place, what creates the horizon for possible actions, what makes people strive for something beyond the immediately obvious goal or situation. What is excluded is objects and thus motives of activity - the long-term *'why?'* of actions.

Leont'ev (1978, p. 52) pointed out that the concept of object is already implicitly contained in the very concept of activity; there is no such thing as objectless activity. An object is both something given and something projected or anticipated. An entity of the outside world becomes an object of activity as it meets a human need. This meeting is "an extraordinary act" (Leont'ev, 1978, p. 54). The subject constructs the object, "singles out those properties that prove to be essential for developing social practice," using mediating cognitive artifacts that function as "forms of expression of cognitive norms, standards, and object-hypothesis existing outside the given individual" (Lektorsky, 1984, p. 137).

In this constructed, need-related capacity, the object gains motivating force that gives shape and direction to activity. The object determines the horizon of possible individual

actions within the collective activity. Without examining the cultural-historical content and evolution of objects, our understanding of activity and cognition remains formal and superficial. But the relatively durable object of collective activity is practically reconstructed and molded through situated, short-lived individual actions.

From the point of view of cultural-historical activity theory, decision making is essentially reconstruction and redefinition of the object of activity in and through specific situated actions. Each decision-making action concerning, for instance, an individual patient and his/her specific illness has consequences not only on that particular patient but also reproduces and modifies the general, durable object of health and illness. The general aspect of decision-making actions is mostly realized without conscious reflection, in the form of 'unintended consequences' (Giddens, 1984). Expansive decision making occurs when actors more or less deliberately attempt to shape the general object and general conditions of their activity through their decision-making actions.

All activities are saturated with decision-making actions. In many activities such actions are relatively invisible and involve little conscious articulation. In certain institutionalized activities, such as legal work in courts or medical care, decision-making actions are typically articulated and documented in official records. It is important to point out here that even most of the articulated and documented decision-making actions are probably mundane and seemingly rather inconsequential. Yet such 'small decisions' may contain the crucial developmental tensions and potentials for change that are of decisive importance for the future of the entire activity system.

The social foundation of an activity system is a community of practice consisting of members who share the same general object. The members of the activity system have different positions and histories and thus different angles or perspectives on their shared general object. This multi-voicedness of activity systems in accentuated and multiplied in multi-organizational fields where several activity systems interact.

Actions do not take place in a stable, perfectly balanced context. An activity system is in constant imbalance and development. Actions shape the development and are shaped by it. Development takes place as emergence and resolution of internal contradictions in the activity system. The influence of such systemic contradictions on reasoning and decision making has largely been neglected by traditional cognitivist approaches, and the newer wave of situated cognition has barely touched upon them.

As organizational activity systems and their fields undergo transformations, they typically redefine and expand their objects. The second key contribution of activity theory to a reconceptualization of decision making can consist of the articulation of crucial *dimensions of expansion* of the object. In previous studies (Engeström, 1999; Engeström, Engeström & Vähäaho, 1999), we have identified four such dimensions of expansion: the social-spatial, the temporal, the moral-ideological, and the systemic-developmental.

In health care, expansion of the object along the social-spatial dimension typically means that instead of being regarded as an isolated disease, the patient and her illness are constructed in their social network, including the network of other caregivers involved with the patient. Temporal expansion means that instead of being seen as a discrete visit or complaint, the patient and her illness are constructed as a long-term trajectory of illness and care. Moral-ideological expansion means that instead of each individual practitioner being responsible just for the care she or he is giving to the patient, all practitioners involved take responsibility for the overall care trajectory. This implies also a reconsideration of power relations: it is not anymore automatically given that the highest

ranking specialist alone has absolute power to determine the course of the care. Finally, systemic-developmental expansion means that instead of being seen only as influencing the given patient, actions taken in the practice of care are also seen as shaping the collective work practice and organization of care over a long haul.

A third important contribution of activity theory to the changing conceptual landscape of decision making is an emphasis on *developmentally significant contradictions* within and between activity systems (e.g., Engeström, 1995; 996). In decision making, such contradictions manifest themselves as disturbances, discoordinations and dilemmas (Engeström, 1992). These concepts come close to the way March characterizes the fundamental role of ambiguity in decision making.

"Individuals commonly find it possible to express both a preference for something and a recognition that the preference is repugnant. They are often aware of the extent to which some of their preferences conflict with others, yet they do little to resolve those inconsistencies." (March, 1999, p. 17)

On the other hand, people are not just passive victims of such dilemmas.

"They seem to recognize the extent to which preferences are constructed, or developed, through a confrontation between preferences and actions that are inconsistent with them and among conflicting preferences. Though they seek some consistency, they appear to see inconsistency as a normal and necessary aspect of the development and clarification of preferences." (March, 1999, p. 18)

It is unlikely that the implementation of a new collaborative tool such as the care agreement will yield quick results in terms of dramatic or straightforward expansion of the object in the decision making of the practitioners. It is more likely that the changes proceed in piecemeal and contradictory ways.

In the following sections, I will put these three contributions of activity theory – and the four dimensions of expansion in particular - into use as a framework for an analysis of the case of a diabetic patient named Tina. In Finland, public health care services are principally funded by taxation and the patient typically pays a nominal fee for a visit. A critical structural issue in the Helsinki area is the excessive use of expensive hospital services, historically caused by a concentration of hospitals and in this area. In children's medical care, the high end of medicine is represented by the Children's Hospital which has a reputation of monopolizing its patients and not actively encouraging them to use primary care health center services. Due to rising costs, there is now much political pressure to change this division of labor in favor of increased use of primary care services.

THE CASE OF TINA: WHERE SHOULD THE CARE OF A DIABETIC CHILD BE LOCATED?

Tina was a three-year old girl who was diagnosed with diabetes when she was one year old. Tina's diabetes was stabilized and in 1998 she made a control visit to the Children's Hospital every three months. After a control visit on July 2, 1998, the diabetes specialist responsible for Tina's care at the Children's Hospital wrote a care agreement proposal for Tina and included it in Tina's medical record. The contents of this proposal, inserted in the standard format as a box in the patient record chart, are shown in Figure 2. Text printed in italics was written by the specialist diabetes physician.

On September 23, *1998*, Tina visited her personal GP at the primary care health center

Care agreement

Continuation care (for chronic and acute diseases):
At the Children's Hospital, diabetes clinic

Specialist physician: *A. K.* phone: *123456* fax: *123567*
Nurse: *T. S.* phone: *123457* fax:

Personal health center GP:
Health center nurse:

Coordinator (personal health center GP if not agreed otherwise):

Figure 2. The Contents of Tina's First Care Agreement Proposal

because of an acute respiratory infection – in other words, a cold. The GP noticed the care agreement proposal in Tina's hospital record which had been sent to the health center to be scrutinized and signed by the GP and the health center nurse responsible for Tina. She noticed that the proposal explicitly said that all Tina's continuation care, including acute illnesses, will be handled at the Children's Hospital. This was in conflict with the actual behavior of Tina's parents who had just brought Tina to the primary care health center for an acute cold. This prompted the GP to respond to the care agreement proposal. Thus, a week later she sent the care agreement proposal back to the diabetes specialist at Children's Hospital. The GP had added the names and phone/fax numbers of herself and Tina's health center nurse on the appropriate lines in the care agreement box. She had not written anything on the line reserved for the name of the coordinator. Immediately below the care agreement box, she had handwritten the following sentence:

They have visited the health center of K. for acute respiratory infections and the like, this is probably the idea, too.

On October 8, 1998, Tina made another control visit to the Children's Hospital. After that visit, the diabetes specialist responsible for Tina's hospital care wrote a new care agreement text which was again included in the medical record chart as a box. The contents of this new care agreement differed from the previous one in that the first line – 'Continuation care (for chronic and acute diseases):' – was filled as follows:

Care for diabetes at the Children's Hospital, other health and medical care in the primary care health center.

In addition, the name of the responsible hospital nurse was changed from T.S. to K.L. The lines deserved for the identification of responsible persons at the primary care health

center were left open by the diabetes specialist.

The central issue for decision making in this case is *where should Tina's care take place* – in the hospital or at the primary care health center. This looks like a simple decision to make. As the following analysis will demonstrate, it was not so simple.

THE SOCIAL-SPATIAL DIMENSION

In November and December 1998, we interviewed Tina's personal GP, Tina's parents, and the diabetes specialist responsible for Tina's care at the Children's Hospital. The interview with the diabetes specialist is particularly instructive for an understanding of the challenges of expansion along the social-spatial dimension of decision making. First, we asked him about the other parties involved in Tina's care.

Interviewer: Has she been receiving care in other hospitals, at the health center, or other organizations?

Diabetes physician: I cannot say for sure. There are notes in here (refers to Tina's hospital record in front of him) about something, that after having diabetes for half a year she visited the health center for an acute infection. (...) This does not show other times, if she has visited the health center. (...)

Interviewer: Has some information been sent from here to the health center?

Diabetes physician: I believe the first hospital report has been sent, and then this referral for the delivery of free care supplies. But not necessarily any information about these routine visits, if they haven't specifically asked for it. Until the care agreement was made, then that information was sent, at least.

From the health center records, we learned that in 1998 Tina actually visited the health center four times: twice for acute infections, once for diabetes care supplies, and once for a vaccination. From Tina's GP we learned that prior to the care agreement proposal, she had received no continuous documentation from the Children's Hospital concerning Tina's diabetes care. The discrepancy between the two sets of records, together with a mutual failure to send documents, perpetuated mutual ignorance of care given to the patient in the other institution.

Next we asked the diabetes specialist about the making of the care agreement proposal for Tina.

Interviewer: Could you tell me about Tina's care agreement, what kind of an agreement was sent (to the health center) and when?

Diabetes physician: I seem to have written it here (in the medical record chart) twice, it seems. The first time was the second of July, 1998 and it didn't contain any more text than this standard care agreement stamp inserted by the typing center. It has the names and phone numbers of the responsible hospital nurse T.S. and myself. And then a new care agreement has been made on October 10, even though I usually make them only once. One change has occurred, since T.S. is no more involved in diabetes care, the responsible nurse is now K.L. It says here that diabetes care will be at the Children's Hospital and other health and medical care at the health center.

Interviewer: Yes, have you received feedback on this from the health center?

Diabetes physician: Yes. From the health center of K, we have a response that names the personal GP and the health center nurse and gives their contact information. And then it says here that they have visited the K health center for acute respiratory infections and the

like, and this is probably the idea, too. This is one of the few feedbacks I've received.
Interviewer: Did you take a stand on the division of labor in the first version (of the care agreement)?
Diabetes physician: In the first one nothing was said.
Interviewer: Aha.
Diabetes physician: There is nothing else in there except continuation care in the Children's Hospital. Usually I've tried to dictate in them the text which was now in this second care agreement. Especially in the early ones they probably don't have it.
Interviewer: Can you say why you wrote the reformulated, second care agreement, what caused it to be remade?
Diabetes physician: I think it's because I didn't notice that I had already once dictated it there.
Interviewer: Aha. I was thinking whether it was because the personal GP wrote something there, or because the hospital nurse was changed.
Diabetes physician: No. It could be one possibility that the nurse was changed, but I think it was above all because I did not notice it.

There are several interesting issues in this exchange. First, the physician claimed that the first version of the care agreement contained nothing but the standard stamp – ignoring his crucial formulation according to which the entire care would be located in the hospital. Secondly, when asked about feedback from the health center for the second version of the care agreement, the physician interpreted the question to pertain to the first version and responded affirmatively. Then he explicitly – and erroneously - denied having taken a position on the division of labor in the first care agreement. Next, he qualified that statement. Finally, the physician maintained that the GP's note had no impact on his rewriting of the care agreement – he only rewrote it because he forgot that he had already done it once.

After this sequence, we asked the diabetes specialist about the distribution of responsibility for Tina's care.

Interviewer: This is probably an easy question, but who has the responsibility for Tina's care?
Diabetes physician: For the care of diabetes, I have the responsibility. And it's not really an easy question, for diabetes care, if we take it from one moment to another, the responsibility lies equally with the child's parents, just as for other care of the child. But I and our diabetes clinic are responsible for giving the family the skills to care for diabetes at home. (...)
Interviewer: There are no other specialists involved in Tina's care?
Diabetes physician: At least I don't remember there being any. (...)
Interviewer: Has she had any acute visits?
Diabetes physician: For diabetes there have been a couple. (...)
Interviewer: What has been planned for the future for Tina?
Diabetes physician: In what sense? Her care continues here. Her balance is good and they master her care well at home. (...)
Interviewer: Did this care agreement have any impact on Tina's overall situation?
Diabetes physician: As a whole, I don't think so. But it has done something, since we got feedback from there...
Interviewer: If one thinks about the collaboration with the health center?
Diabetes physician: I think that the ground rules are pretty well known, so it doesn't

change very much, but at least it's now on paper..
Interviewer: What about the family, then?
Diabetes physician: I think it hasn't changed anything for the family. I have never asked them, though. (...)
Interestingly enough, the diabetes specialist did not even mention the health center and the patient's personal GP as having responsibility for the patient's care. Yet the standard care agreement explicitly states that the personal GP is the coordinator of the child's entire care (especially responsible for coordinating primary care and hospital care) if not otherwise agreed.

The diabetes physician stated that the care agreement had little effect on care and collaboration. He may be right, especially since he himself produced the care agreement texts without engaging in any direct collaboration with the parents or the nurse responsible for the patient.
Interviewer: Did this care agreement go to the parents themselves?
Diabetes physician: In principle we have agreed that it should be sent to them, to their home, but I have never checked, and I don't recall anyone mentioning that they have received it.
Interviewer: How was the situation where you made the care agreement, were the parents and the nurse involved in it?
Diabetes physician: No. They have not been involved in these care agreements, I have pretty much made the care agreement between the typist and myself. (...)

When we interviewed the GP we learned that the new, October version of the care agreement had not reached her, although the diabetes specialist included it in Tina's hospital chart nearly two months earlier. From Tina's parents, we learned that neither one of the care agreement proposals had been shown or sent to them, or explicitly discussed with them by the diabetes physician.

Assessed along the social-spatial dimension of expansion, this case is internally contradictory. On the positive side, (1) the hospital specialist did send a care agreement proposal to the health center, (2) the health center GP responded to the proposal, and (3) the GP's suggestion was indeed included in the revised version of the agreement. These three actions, no matter how unremarkable and mundane for the subjects at the time, represent the beginnings of a new type of distributed and collaboratively negotiated decision making which has been lacking in the field of children's medical care in Helsinki.

On the negative side, the hospital specialist (1) did not include the parents and the responsible nurse in the drafting of the care agreement proposals, (2) did not send the care agreement texts to the parents, and (3) did not send the revised version of the agreement to the health center GP.

From an activity-theoretical point of view, the three failures or inactions on the negative side can be interpreted as manifestations of the power of the *rules* of traditional professional conduct among hospital specialists. Eliot Freidson (1989, p. 126) describes these rules of non-communicative solo conduct among physicians as follows.

"They do not expect others to be checking up on them and they themselves try to avoid giving the impression of checking up on their colleagues. There is even a feeling of embarrassment when one accidentally observes a colleague's apparent peccadillo, and sometimes an attempt is made to turn the eyes away, to act as if the observation was not made. ... One can easily see how this avoidance of 'snooping' reduces the amount of information available to the company of equals and thus increases the difficulty of

corroborating and evaluating whatever few observations happen to come to hand."

March (1999, p. 22) characterizes such rule following in decision making at a more general level.

"Such identity fulfillment and rule following are not willful in the normal sense. They do not stem from the pursuit of interests and the calculation of future consequences of current choices. Rather, they come from matching a changing (and often ambiguous) set of contingent rules and identities to a changing (and often ambiguous) set of situations. The terminology is one of duties and roles rather than anticipatory, consequential choice. (...) Actions reflect images of proper behavior, and human decision makers routinely ignore their own fully conscious preferences. They act not on the basis of subjective consequences and preferences but on the basis of rules, routines, procedures, practices, identities, and roles."

When we add to this the fact that "individuals may have a difficult time resolving conflicts among contending imperatives of appropriateness" (March, 1999, p. 24), we can begin to understand the confused and contradictory nature of the account given by the diabetes specialist in the interview. The systemic conditions for the diabetes specialist's decision-making may be summarized with the help of Figure 3, depicting the inner contradictions of the activity system of the diabetes physician using the new care agreement instrument.

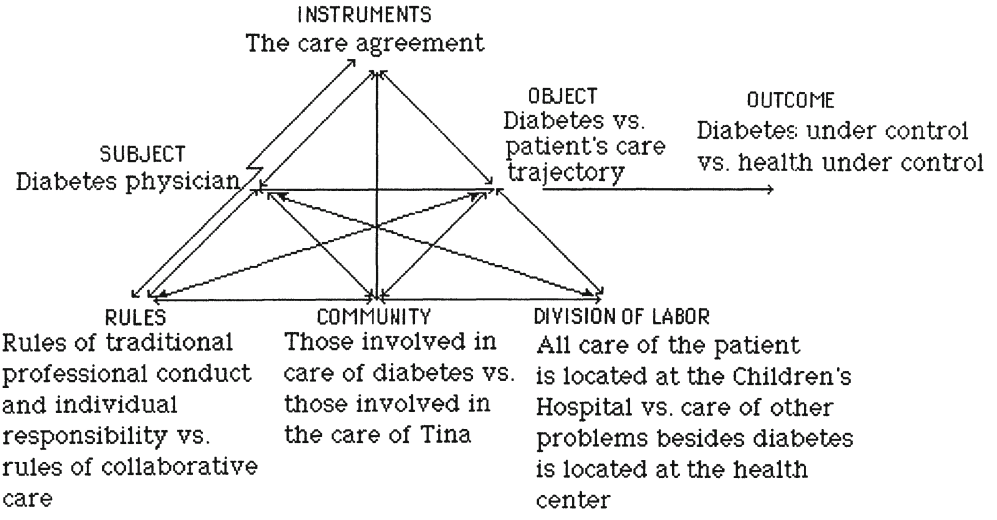

Figure 3. Systemic Conditions of Decision-making for the Diabetes Specialist

When the diabetes specialist formulated the first care agreement proposal, he used a new collaborative tool but acted largely on the basis of the tacit rules of traditional professional conduct and individual responsibility. The lightning-shaped two-headed arrow between the instruments and the rules in Figure 3 indicates this crucial contradiction. The second version of the care agreement acknowledged the role of the primary care health center in the division of labor and its place in the community of caregivers responsible for

Tina's health – but simultaneously the specialist's failure to send the new agreement to the GP and to the parents all but eliminated the impact of this expansive acknowledgment.

THE TEMPORAL DIMENSION

The temporal dimension of expansion in Tina's case is best illuminated in the interview of Tina's primary care GP. We asked her what information she had received from the Children's Hospital concerning Tina before the care agreement proposal.

Interviewer: And when have you received information from the Children's Hospital. (...) Have they sent you anything in 1997?

GP: (going through her papers) This was probably the first visit, the only one I have here, and that one is the ear doctor's business ... that one is the same, just in a different file... No, there is nothing here after that. This is some urgent care visit, this is from the Children's Hospital, but it's an urgent care visit from April 10, 1998.

Next we asked whether the care agreement served any useful purpose for her.

Interviewer: Does it contain information that's useful for you, or does the document somehow serve you?

GP: Sure, sure it does, I see in here that her diabetes care seems to be going well and is in good balance. Surely the parents can tell that, too, but here I see it black on white as the hospital physician's assessment.

Interviewer: Aha, yes. What do you see, what things are there?

GP: Well, every three months she seems to visit A.K. at the diabetes clinic of the Children's Hospital, and it says here that "care has progressed very well," "care has continued to progress well." (...)

These initial responses of the GP indicate that the care agreement has potential to compensate for the fragmented, visit-based nature of care in the primary care health center and for the lack of continuous information from the Children's Hospital. The care agreement, being embedded in the cumulative medical record chart, seems to give the GP a sense of longer-term monitoring of the patient's progress, indicated by the expression "every three months" and the quotes from the medical chart ("care has continued to progress well").

The GP took up again the issue of temporal expansion at the end of the interview as she commented on the official instructions concerning the care agreement.

GP: Well, in any case, in the last instructions it says that, even when the patient visits us, we shall send, and also on these intermediate visits, when the patient visits the Children's Hospital they should automatically send (reports) to us. But it seems that this does not at the moment happen completely systematically, because it seems that Tina has visited (the Children's Hospital) the last time in October, if this, yes, control every three months its says here (in the care agreement), so no report of that visit has come to us here...

Interviewer: What do you think about this yourself, how often would you like to receive information?

GP: Well, it's true that if everything is going well and every three months they send me a document, the paperwork does accumulate. But at least if the care regime is changed or there is some problem, so there's something to inform about, at least then. But one could think that in Tina's case perhaps once a year or once every half a year I'd receive information, receive an update. But in the end, I for instance have so few diabetic children

that even reports every three months would not cause too much work. But perhaps it would for the hospital physician, to remember to send always.

The GP's response indicates that an ability to follow and monitor the care trajectory on a continuous and long-term basis was an important concern for her. When asked about the desirable frequency of reports from the hospital, she worked through a the dilemma of *much paperwork vs. continuous monitoring,* producing a string of four sentences each starting with a 'but' – a common sign of dilemmatic discourse in the Finnish language. The end result of this work was that she was willing to have hospital reports on Tina every three months.

For the hospital specialist responsible for the care of a chronic disease such as diabetes, a long-term view and continuity of care within the particular disease are somewhat self-evident features of the practice. The potentially more troublesome issue for him is other parallel illnesses, diagnoses, cares, and caregivers – the social-spatial dimension. For the primary care general practitioner, the situation is reversed. She is used to multiple parallel problems and lines of care. The troublesome issue for her is fragmentation and inability to follow the illness and care longitudinally – the temporal dimension. Systemic conditions of the GP's decision-making are summarized with the help of Figure 4. Note that the activity system is here depicted as facing the object from the opposite side as compared to the activity system of the diabetes physician depicted in Figure 3. This indicates that the meeting of these two perspectives is a crucial issue, a point to be elaborated later (see Figure 7).

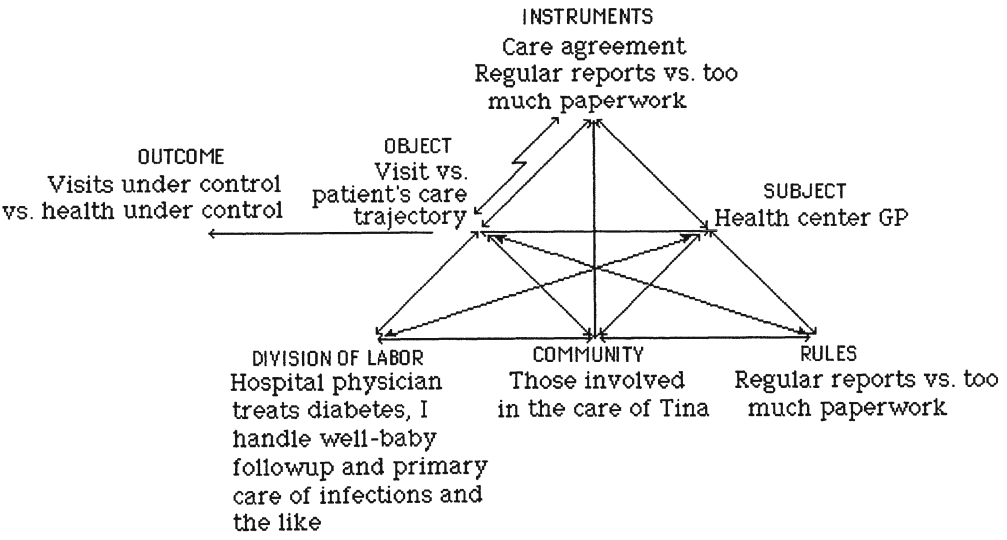

Figure 4. Systemic Conditions of Decision-making for the Primary Care General Practitioner

As Figure 4 indicates, issues of community and division of labor did not seem to be problematic to the GP. When we asked her who is responsible for Tina's care, she responded without hesitation.

Interviewer: If I ask you who is responsible for Tina's care, what do you answer?

GP: Me and the physician at the Children's Hospital together. This is kind of a shared responsibility, he is responsible for the care of diabetes and I am (responsible) for the well-baby followup and for primary care of infections and the like.
Interviewer: Yes, and you can also name the persons in the hospital end?
GP: Well, they are written here (in the care agreement), "specialist physician A.K." and "nurse T.S."

The GP's interview implies that she was willing to begin to expand the object of her work from discrete visits to continuous care trajectories. The central contradiction (again represented with the help of a lightning-shaped two-headed arrow in Figure 4) for the GP arose from the problematic nature of the new tool, that is, the care agreement and the regular reports on the patient's care it was supposed to bring with it. Part of the dilemma was the tension between enhanced longitudinal monitoring on the one hand and increased paperwork on the other hand – shown both in the instruments and in the rules in Figure 4. As I demonstrated above, the GP worked through this dilemma and opted for regular reports. What remained troublesome was that those reports were not actually coming ("it seems that this does not at the moment happen completely systematically"). The new instruments were not working as they were supposed to, thus the emerging new object of long-term care trajectory was nullified.

THE MORAL-IDEOLOGICAL DIMENSION

The moral-ideological dimension of expansion is best captured by comparing the different parties' responses to the question 'who is responsible for Tina's care?'
Diabetes physician: For the care of diabetes, I have the responsibility. And it's not really an easy question, for diabetes care, if we take it from one moment to another, the responsibility lies equally with the child's parents, just as for other care of the child. But I and our diabetes clinic are responsible for giving the family the skills to care for diabetes at home.
GP: Me and the physician at the Children's Hospital together. This is kind of a shared responsibility, he is responsible for the care of diabetes and I am (responsible) for the well-baby followup and for primary care of infections and the like.
Tina's father: We are responsible for it in my opinion. It cannot be anyone else but us. The doctor only gives advise. But if there is a panic situation and we must take her to the hospital, then the hospital is responsible, since they decide then how she's treated at that moment, but at home we are responsible...
Tina's mother: Yes, the main responsibility lies with us. (...)

Each one of the three parties went beyond the traditional notion of delegating the responsibility for care of chronic disease solely to the hospital specialist. However, interestingly enough, none of the three parties named all three of them as being responsible together. The attributions of responsibility between the three are summarized in Figure 5. The sizes of the circles represent the relative importance put on the responsibility carried by different parties.

Being based on interview responses that may be change from one situation to another, Figure 5 should be cautiously regarded as an interpretation of one passing moment in the discursive construction of responsibility among the parties. As such, it does indicate that something like a collaborative triangle was potentially taking shape in the discourse of the

participants. However, its links were still weak and incomplete.

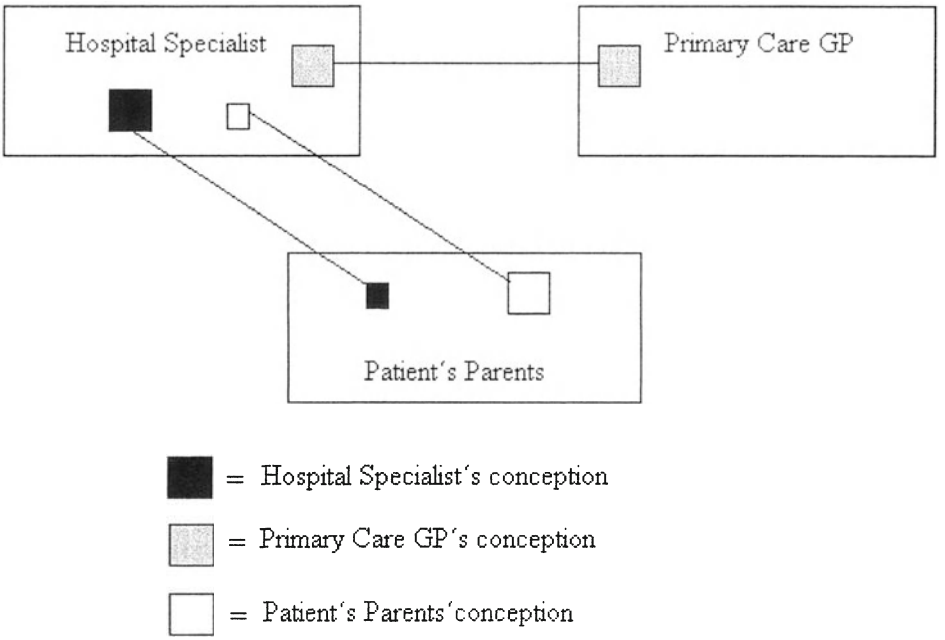

Figure 5. Attributions of Responsibility between Key Participants in Tina's Care

Tina's parents had adopted a very clear rule emphasizing their own central responsibility for Tina's care. This rule was in obvious conflict with the fact that they were not involved in the formulation of either one of the care agreement versions, indeed had not even received either version.

Interviewer: Have you heard about such as thing as a care agreement?

Tina's mother: I have at least heard the name somewhere.

(The interviewer gives Tina's mother and father the official instructions for the use of care agreements; the parents read the instruction sheet.)

Interviewer: How does it sound?

Tina's mother: Not bad in my opinion.

Interviewer: Do you know if such a care agreement has been made for Tina?

Tina's mother: Would we have been supposed to sign it ourselves if such a document were done?

(The interviewer gives Tina's parents a copy of the two care agreements.)

Interviewer: I'd still like to ask, would these papers, would you have wanted these to be sent home to you, or did this come as a surprise to you, that I showed these?

Tina's mother: Well, I guess I would have liked to get those agreement papers, but not necessarily the medical record chart, which A.K. and T.S. have dictated, not that necessarily. But that lower part there (points at the care agreement box in the chart), that I could well have taken, because I didn't know about it...

Systemic conditions for the decision-making of Tina's parents are summarized in Figure 6. A contradiction is located between their rules that required taking central responsibility

for Tina's care on the one hand and the new instrument for collaborative care which had not been made available to them. This is a tension between the patient-centered and empowerment-oriented ideology represented by the parents and also to some extent espoused by the diabetes specialist – and the consequences of actual actions of the specialist.

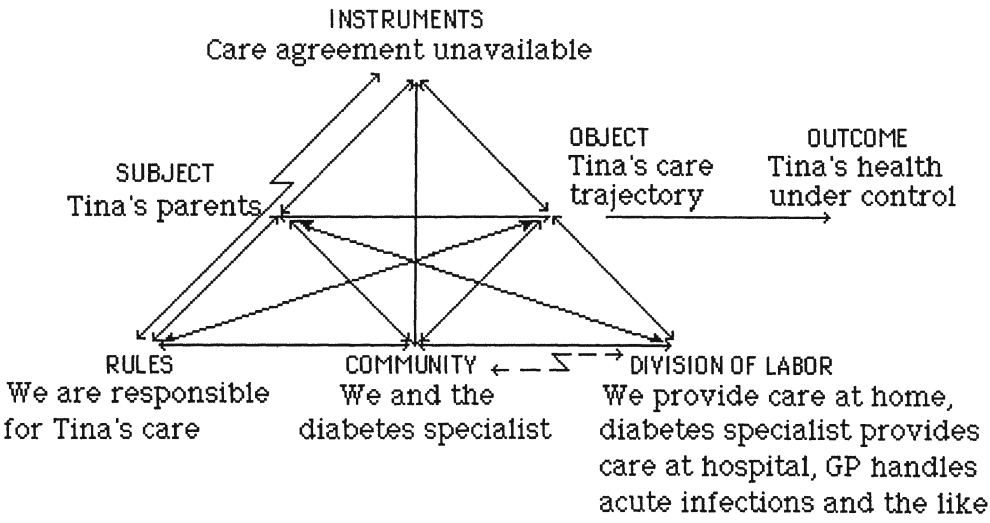

Figure 6. Systemic Conditions of Decision-making for Tina's Parents

There is also another, less salient tension in Figure 6, namely that between the parents' notion of community of care (which includes the parents themselves and the diabetes specialist) and their notion of division of labor in Tina's care (which includes also the primary care general practitioner). This mismatch may well reflect a dilemma between a focus on Tina's chronic illness and a broader focus on Tina's overall health. However, this tension was not nearly so prevalent and pervasive as in the interview of the diabetes physician.

THE SYSTEMIC-DEVELOPMENTAL DIMENSION

The interviews of both the diabetes specialist and the general practitioner contain passages that reveal an awareness of a transformation going on in their work activities, toward a systematic use of the care agreement procedure.

Diabetes physician: (...) Usually I've tried to dictate in them the text which was now in the second care agreement. Especially in the early ones they probably don't have it.

GP: Well, in any case, in the last instructions it says that, even when the patient visits us, we shall send, and also on these intermediate visits, when the patient visits the Children's Hospital they should automatically send (reports) to us. But it seems that this does not at the moment happen completely systematically (...).

From the point of view of expansion along the systemic-developmental dimension, the most interesting question is: To what extent might these practitioners be aware of possibilities of influencing and shaping the transformation of their field through their daily decision-making actions?

We were fortunate to capture data that illuminates this elusive dimension. As Tina's GP did not get a response from the Children's Hospital concerning her suggestion to change the text of Tina's care agreement, she took it up with the head physician of her health center. In November, 1998, the head physician sent the following e-mail inquiry to the director of the Children's Hospital.

Initially the care agreement proposal stated that also acute situations would be treated in the Children's Hospital. However, the patient came here with an acute situation = with a cold. The care agreement was returned to the Children's Hospital with the suggestion that in acute situations the colds and such problems are to be treated here at the health center. After that, we have heard nothing from the Children's Hospital. We have discussed the matter with the patient's mother.

The new instructions for the care agreement procedure do not explicate how to proceed when the health center suggests a change in the agreement. Will the Children's Hospital respond to the suggestion? Are we to consider that the Children's Hospital accepts the changed agreement if there is no response?

Some days later, the director of the Children's Hospital responded informing us that he had drafted a new version of instructions for the care agreement practice in which the Children's Hospital was explicitly required to respond without delay to change suggestions from the health center. This requirement, along with numerous other new points, was actually included in the next version of the instructions. At the same time (in December 1998 and January 1999), the very format of the care agreement was revised. The new format gives a whole page to the care agreement. The page is structured so that it includes three significant new features: (1) separate fields for the explication of the parts played in the patient's care by (a) the hospital, (b) the health center, and (c) possible other caregivers; (2) a separate field for the signature of the patient's parent or custodian; and (3) a separate field for possible changes to the agreement suggested by the health center.

It is certainly possible that the same changes would have been introduced even without the interventions of Tina's GP and her head physician, perhaps prompted by other feedback from the field. This does not reduce the significance of their actions: if nobody acts, nothing will change. In this sense, the incident provides evidence that during a period of transformation, expansive actions of individual practitioners can and do influence the shaping of the future systemic conditions of their daily work and decision making.

CONCLUSION: DECISION MAKING AS NEGOTIATION

As March (1999) argues, organizational decision making takes place in systemic conditions which exert tremendous influence on individual actions. In a multi-organizational field such as medical care for children, these conditions are excessively complex. The relatively detailed modeling of each key activity system and its contradictions presented above makes it possible to construct a simplified overview of their interrelations (Figure 7).

Figure 7 shows the hospital specialist, the health center GP, and the patient's parents all

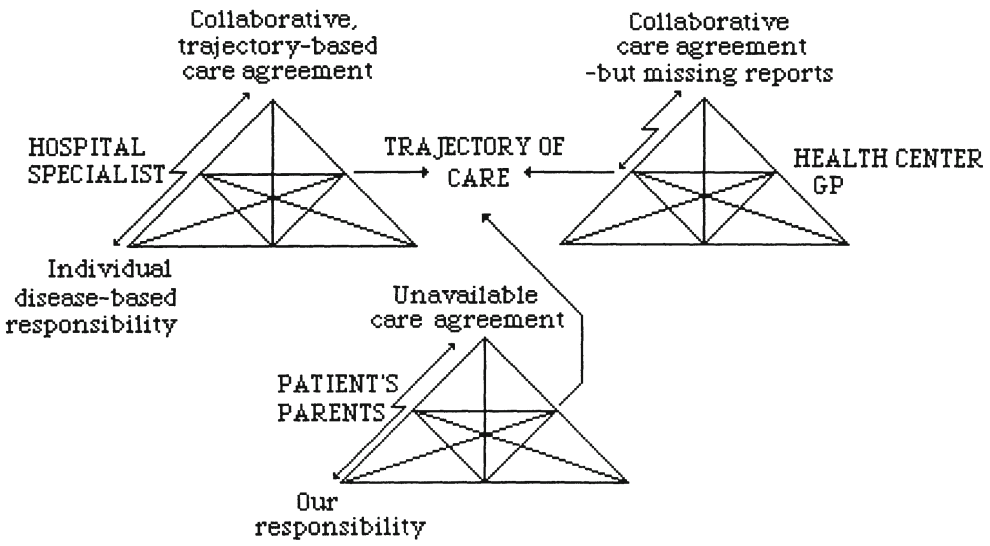

Figure 7. The field of Activity Systems Responsible for Making Decisions on Tina´s Care

working on a newly emerging object – the patient's care trajectory. In Tina's case, this trajectory is relatively simple and predictable. In many other chronic patients' cases, the trajectory is very complicated and unpredictable, due to multiple parallel or poorly bounded and hard-to-diagnose medical problems. As we have seen in the preceding sections, even in Tina's case, fully functioning collaborative care practice and case management will be very demanding achievements of expansion. Each one of the three activity systems is riddled with its own contradiction, generating disturbances and dilemmas in the everyday flow of actions.

Each one of the three activity systems also has its own unique perspective and irreplacable contribution to the building of a collaboratively monitored care trajectory. Paradoxically, expansion of decision making along the four dimensions analyzed in this paper can only be achieved in everyday actions of decision making. Tina's case demonstrates that no matter how incomplete and contradictory, these actions are beginning to invoke novel forms of dialogue. This calls for analyses of decision making as *negotiation* between multiple perspectives on an emerging, potentially shared object.

Negotiation is more than an instrumental search for a singular, isolated compromise decision. It is basically a construction of a *negotiated order* (Strauss, 1978) in which the participants can pursue their intersecting activities. As Firth (1995, p. 7) put it, "in quite implicit ways, negotiation activity implicates the discourse process itself, revolving around such things as acceptability of categories used to describe objects or concepts, and the veridicality of facts, reasons or assessments." Putnam (1994, p. 339-340) takes a step further and points out that successful negotiations tend to transform the dispute, not just reach an instrumental end.

"By transforming a dispute, I refer to the extent that a conflict has experienced fundamental changes as a result of the negotiation. Fundamental changes might entail

transforming the way individuals conceive of the other person, their relationship, the conflict dilemma, or the social-political situation. ...In the transformative approach, conflicts are no longer problems to be resolved; rather, they are opportunities to create a new social reality, a new negotiated order, a different definition of a relationship, or a transformed situation."

In Tina's case, we can observe two steps of transformative negotiation, albeit carried out in very rudimentary and partial form. The first step occurred when the GP responded to the diabetes specialist's initial care agreement proposal by pointing out that the patient's care should be meaningfully distributed between the hospital and the primary care health center. Even though the diabetes specialist in his interview denied having been influenced by the GP's feedback, he did after it rewrite the care agreement so as to include the primary care in the division of care responsibility. This exchange transformed the object of decision making, expanding it from the specific visit, medical problem, and care procedures of this particular patient to the general issue of how to divide and coordinate the care between two institutions in terms of a longer-term trajectory. This new negotiated order was a fragile and probably short-lived achievement – but it does illuminate the developmental potential of the activities involved.

The second step of transformative negotiation occurred when the general practitioner alerted her head physician and the head physician sent a message to the director of the Children's Hospital, asking for clarification to the general issue of getting a response from the hospital when a GP suggests changes to the care agreement. Again, we do not have a direct response from the Children's Hospital. Instead, the hospital responded by producing a new form for the care agreement which explicitly requires the response asked for by the GP and her head physician. This negotiation, though curiously non-reciprocal in its form, expanded the object of decision making to include the general rules of interaction in the making of care agreements. Again, a momentary expansion, but probably not without some lasting effects.

Both steps of negotiation were achieved without following a proven procedure or script. They were initiated as if small experiments on the part of the GP and her head physician. This is to be expected.

Especially when the construction of an expanded object is its early stages, decision-making actions require ad hoc experimentation and negotiation takes the form of *improvisation* and *bricolage*, i.e., constructing solutions by means of combinative tinkering with available imperfect resources and tools. Organizational researchers have recently rediscovered the importance of improvisation (Weick, 1998; Barrett, 1998). Using jazz bands as a point of reference, Barrett (1998, p. 613) describes improvisation as follows.

"Improvisers enter a flow of ongoing invention, a combination of accents, cymbal crashes, changing harmonic patterns, that interweave throughout the structure of the song. They are engaged with continual streams of activity: interpreting others' playing, anticipating based on harmonic patterns and rhythmic conventions, while simultaneously attempting to shape their own creations and relate them to what they have heard."

The two steps of negotiation observed in Tina's case did not reach the level of interplay and reciprocity described by Barrett. They remained mere openings. However, when made explicit and visible, such small steps can be used as building blocks. Improvisation does not emerge out of a vacuum. It is based on rehearsing, and it can definitely be learned.

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