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Perspective-taking:
Bridging the Gap between Intuitive and Rational Decision Making

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Abstract

Military doctrine prescribes a rational approach to decision making. By contrast, academics point at the intuitive approach that commanders *actually* apply. Experienced decision makers are able to quickly seize up a situation, and they can, based on their intuition, reach an appropriate decision. However, intuitive decision making can also lead to suboptimal decisions as compared to decisions based on rational models. The drawback of rational decision making is that is a time-consuming and cumbersome process. This paper presents an explorative study that investigated if the quality of intuitive decision making can be improved by a newly developed technique of perspective-taking. The question is whether this form of intuitive decision making can reach effectiveness levels of rational decision making, but with a considerable time reduction. Military officers, in one of three conditions (rational, intuitive, intuitive and perspective-taking), were asked to make two complex, division level decisions. The results suggest that intuitive decisions are sub-optimal compared to rational decisions, but intuitive decisions followed by perspective-taking have similar quality to rational decisions, and are realised in a much shorter time.

1. Introduction

When growing up most of us are told that, when facing a difficult decision, we should write down the pros and cons of all options, assess their consequences, weigh them accordingly, and then decide upon the best option. Today's complex world, however, does not always seem to allow for such conscious and time-consuming thought. Moreover, due to the complexity we are facing, we are often not even able to oversee all the available options and their consequences.

Civil society is not the only domain that has been affected by a growing complexity, the military domain has also changed over the last few decades and is still changing. In 1997, General Krulak, then Commandant of the U.S. Marine Corps, already noted and predicted:

> "It will be an asymmetrical battlefield…our enemies will not allow us to fight the Son of Desert Storm, but will try to draw us into the stepchild of Chechnya. In one moment in time, our service members will be feeding and clothing displaced refugees, providing humanitarian assistance. In the next moment, they will be holding warring tribes apart- conducting peacekeeping operations- and finally, they will be fighting a highly lethal mid-intensity battle- all on the same day…all within three city blocks."

While Krulak may have focused on military operations that take place in urban areas, he essentially points out that military service members engage in different roles. Military stability operations in, for example, fragile states, have indeed expanded to include not only combat operations, but often the military is also engaging in non-combat operations, such as providing humanitarian aid and offering support to a civil government. The expansion of the role of the military, moreover, has made decision making more complex

by adding more factors to the decision making process that need to be taken into account. We now speak of the 'Dutch approach', the '3D approach' or the 'comprehensive approach' as an all-embracing approach in which military, political, economic, and social measures are combined to result in a desired end state (Gooren, 2006; Van der Kloet, 2006). Furthermore, military actions and the outcomes of military leaders' decisions are scrutinized by the media (e.g. by embedded journalists), and seemingly small decisions may have large political effects.

To realize effective decision making, military doctrine prescribes an analytical approach, the Military Decision Making Process (MDMP). The MDMP can be characterized as a rational model, because it affirms the major premises of rational decision making; (1) it is a systematic and stepwise process, (2) multiple options should be evaluated and the best one should be selected, and (3) the evaluation of the alternatives should be performed through an exhaustive factor-by-factor comparison. The MDMP is to serve as an aid in the decision making process for diverse operations, ranging from stability, support, offensive, and defensive operations. By following the steps of the MDMP, a commander and his staff are supposed to reduce uncertainties and take into account various factors thoroughly, thus enabling them to systematically plan an operation. It is a linear approach to warfare which can be defined by breaking down a system in component parts, thereby making it easier to grasp the relationships between the different parts and simplifying the problem.

However, the elaborate process of the MDMP does not seem adjusted to the fast pace and the dynamics of contemporary military operations and is also not attuned to the wide range of factors that are involved in the 3D approach. As a consequence commanders frequently express their dissatisfaction with the MDMP (Groenink, 2009). Commanders point out that they try hard to make rational decision models work in the field, but the process keeps failing them. Military commanders try to abbreviate the prescribed processes, but there is little guidance on how to achieve this abbreviation (Ross et. al, 2004). The ever present time pressure also does not always allow commanders to fully go through the MDMP. In a previous study, in which we interviewed commanders, the MDMP was, in general, described as too elaborate to follow, because it is too prescriptive and too time-consuming (Groenink, 2009). Commanders in our interviews further pointed out that they frequently use their intuition, instead of solely relying on a rational approach, by applying mental shortcuts and only working out a single option. As Simon already noted in 1979: decision makers are likely to 'satisfice';

they will have some aspiration as to how good a solution should be and they stop searching for another one, once they have arrived at an option that is 'good enough'.

A discrepancy thus arises, a rational and systematic approach to military decision making that takes all relevant factors into account with weighting what option is best to achieve the desired effects, seems appealing. However, the environment the military is presently operating in, as well as the problems they are facing, may be too complex to dissect and break down in smaller parts. These parts may, in turn, have complex interdependencies that are very difficult to understand and predict. Instead, it seems that commanders rely on fast analysis towards a single option: they rely on their intuition. Intuitive decision making can be characterized as a fast and a non-sequential process involving the non-conscious, holistic integration of elements that results in a direct knowing (Sinclair & Ashkanasy, 2005). The advantage of intuitive decision making is certainly the speed; an intuitive response often points a commander in the right direction, enabling him to retain or gain the initiative. There are, however, also drawbacks to intuitive decision making. In an intuitive decision making process usually only one option is considered and commanders may be jumping to conclusions, thereby overlooking important details. Over-application of rules of thumb and other forms of mental shortcuts may result in only considering one, often familiar, perspective in a decision making process.

In the complex and fast-paced military domain commanders strive to quickly and effectively reach a decision. In the before mentioned interviews we conducted, the commanders pointed out that intuition almost always guides them in their decision making process. The goal of this research project is to find ways to avoid the pitfalls and biases of intuition and to bring about more effective decision making, while retaining the speed associated with intuitive decision making. Debiasing techniques are tested to complement intuitive decision making and by doing so we are trying to close the gap between intuitive and rational decision making. The goal of the present study is to test whether a perspective-taking technique can bridge this gap between intuitive and rational decision making.

This qualitative and explorative study compared the campaign plans of commanders in three conditions that differed in decision making strategy. A rational condition, an intuitive decision making condition, and an intuitive condition complemented with a perspective-taking technique (Kahneman & Lovallo, 1993) were compared. In this study military officers were presented a scenario and they were asked

to go through two complex, division level decision making processes. We hypothesized that by first intuitively working out a course of action (COA) and then taking a moment to look at the COA from different perspectives would provide as effective a plan as a rational decision making process would, but with a considerable time reduction.

The paper is organized as follows. Section 2 describes the theoretical background of intuitive decision making and the perspective-taking technique and the research questions will be presented. Section 3 lays out the design of the study and describes the materials that were used. Section 4 presents the qualitative results of the study. In section 5 and 6 we discuss our tentative conclusions and provide a discussion of the study.

2. Theoretical background

2.1 Intuitive decision making

Traditionally, decision making research has centered around the use of rational or analytic decision making models as a means of attaining the best plan or solution to a problem. Rational models prescribe how decisions should be made, but they do not necessarily describe how decisions are actually made. In 1979, Simon argued that the existing models of rationality could not satisfactorily account for human behavior. In a similar vein, Klein (1993) argued that rational models do not describe how decision makers operate in their natural context. Klein asserted that classical decision making research pays little attention to real world problems, which are usually quite unstructured and cannot be solved by simply applying formal rules. He and other researchers started to study decision making in its natural context (called Naturalistic Decision Making, NDM). Zsambok and Klein (1997) described that experienced decision makers are more concerned about assessing the situation and keeping their situational awareness through feedback up to date, rather than developing multiple options and comparing them systematically to one another. These researchers stressed that intuition is largely based on experience. Through experience expert decision makers are able to quickly recognize a situation by pattern recognition and match it with an appropriate course of action (Recognition Primed Decision Making Model, Klein, 1993).

Researchers from various disciplines (e.g. economics, military, and psychology) have studied intuition quite extensively and the attention for intuitive decision making is still increasing. Nonetheless, a clear and agreed upon definition of the construct is still

lacking and various definitions and views on intuition circulate. In a recent article, Dane and Pratt (2007) reviewed existing literature on intuition and they offered, in our opinion, a comprehensive definition of the construct intuition. They stated that …"intuition has tended to converge on four characteristics that make up the core of the construct: intuition is a (1) non-conscious process (2) involving holistic associations (3) that are produced rapidly, which (4) result in affectively charged judgments" (Dane & Pratt, 2007, p. 36). Although this definition does not explicitly state previous experiences as the basis of intuition, it is implied by the process of holistic associations, meaning either a quick recognition of patterns or a synthesis of past professional experiences. Intuition can thus be viewed not only as simple pattern recognition, but also as the synthesis of different associations resulting into novel creations.

Although the NDM researchers usually stress the positive sides of intuitive decision making, some important errors and biases are also associated with the use of intuition. Usually intuition is accompanied by a feeling of certainty and a chosen COA may not be further assessed by decision maker, because he is just not inclined to check the appropriateness of his response. A particular situation or parts of the situation may moreover be recognized incorrectly and the then chosen COA will not fit into the situation. As mentioned earlier, in an intuitive decision making process, factors may also be overlooked and rules of thumb and mental shortcuts may be applied too much and incorrectly. To encourage decision makers to critically look at their intuitive responses, we developed the perspective-taking technique.

2.2 Perspective-taking

As mentioned earlier, classical decision making research focused mainly on how decision making could be optimized. Rational decision making models were expected to be able to predict how we operate in our environment. Throughout the years, though, Kahneman and Tversky (2003) and others have shown that decision makers are not so rational after all and they are prone to be biased in their decision making, resulting in suboptimal solutions. Biased judgments may not only lead to suboptimal solutions, but they also cause serious errors in decision making.

Milkman, Chugh, and Bazerman (2008) also stressed that errors are costly. Unfortunately though, more than 25 years of research has shown that errors and biases in general are difficult to avoid. Training to avoid biases with debiasing techniques, such as showing the direction of a bias or providing detailed feedback, as proposed by

Fischhoff (1982), have yielded very little success. Milkman et. al (2008) argued that most errors are made, because decision makers are relying upon their intuition, instead of applying rational approaches. These authors referred to the dual process model of Kahneman and Tversky (2003), which distinguishes between two modes of cognitive processing.

Table 1 Kahneman & Tversky's (2003) dual process model

System 1	System 2
Fast	Slow
Parallel	Serial
Automatic	Controlled
Effortless	Effortful
Associative	Rule-governed
Slow-Learning	Flexible
Emotional	Neutral

On the one hand there is System 1 thinking, associated with intuitive, automatic and mostly unconscious thought. On the other hand, there is System 2 thinking, associated with deliberate, analytical and conscious thought (see table 1). Kahneman and Tversky (2003) proposed that cognitive processing can follow the path of Sytem 1 or System 2. Using this model, Milkman et. al (2008) proposed that to avoid errors and biases in decision making, we should rely more upon System 2 thinking and move away from relying on System 1 thinking.

This line of reasoning, training decision makers to use System 2 thinking instead of System 1 thinking, has indeed prevailed for decades. Imposing the use of formal rational models, such as the MDMP, is one of these strategies. Nevertheless, as research into military decision making has shown, commanders have trouble applying these formal models. In our opinion, research should not focus on trying to replace intuitive thought; instead the biases and errors that unavoidably will occur, should be controlled by complementing intuitive thought with debiasing techniques. We believe intuitive responses are inevitable; previous experiences and associations cannot be turned off or ignored by decision makers. For this reason, we chose to develop the perspective-taking technique as a means of attaining the effectiveness of rational decision making with the speed of intuitive decision making.

We have used the ideas of Kahneman and Lovallo (1993) and they have inspired us to create the current perspective-taking technique. We have interpreted the concepts of narrow and broad framing and the inside and outside view in a somewhat different way than as originally intended by Kahneman and Lovallo. In our study narrow and

broad framing of a problem were defined as follows. Framing the problem narrowly and using the inside view are defined as only looking at the problem at hand from one perspective, mainly the military perspective, and only taking into account the information concerning military intervention. Framing the problem broadly and using the outside view, on the other hand, are defined as looking at the problem from multiple perspectives, by for example applying a more 'comprehensive approach', and looking beyond the military aspects of a situation.

But what is the difference between incorporating all factors in the MDMP and taking multiple perspectives? In a rational decision making process, all different and available factors are to be analyzed and they are to be synthesized in such a way that an optimal course of action arises. This is of course how the MDMP is meant to work, but as commanders have experienced in the field, they have trouble working through the process and bringing together all these different perspectives into one product. The proposed perspective taking technique approaches the situation in a reversed manner. First, the commander analyzes the situation and guided by his intuition he will choose a certain course of action. This course of action can be worked out and then looked at from different perspectives. After this review, the plan can still be adapted to better suit one or more of the different perspectives.

2.3 Research questions

In this study the following research questions are addressed:

- *How do the three strategies, rational decision making, intuitive decision making, and intuitive decision making complemented by the perspective-taking technique, differ from one another?*
- *Can the perspective-taking technique enhance intuitive decision making up to the effectiveness levels of rational decision making, with a considerable time reduction?*

Because of the explorative and qualitative nature of this study we were not able to perform analyses to present statistically significant results, we therefore only formulated expectations. First, we expect that the rational decision making will show the highest levels of effectiveness. Second, we expect that the intuitive decision making condition will show the lowest levels of effectiveness. Third, we expect that by using the perspective-taking technique, the effectiveness levels of this condition will be raised. Fourth, we expect that the perspective-taking technique will have a positive effect on the

outcome of an intuitive decision making process, comparable to the outcome of a rational decision making process, but in a shorter amount of time.

3. Study design

3.1 Sample

The study was performed in June 2009. For this study, 13 military commanders went through two decision making processes. The participants were Army officers (active duty majors) that were enrolled in an Advanced Staff Course for an Executive Master of Security and Defence. The mean number of years of active duty was 19.5 years (M = 19.53, SD = 2.63) and the average age was 38 (M = 38.6, SD = 2.33). All of the participants had deployment experience (at least one deployment), had been previously trained in military planning, and had operational experience at the battalion and/or brigade level.

3.2 Scenario

For this study a scenario was developed in consultation with the Dutch Operations Training Center. The scenario incorporated the different aspects that can be found in stabilization and reconstruction (S&R) operations. These aspects can be defined as measures concerning security, justice and reconciliation, humanitarian assistance and social well-being, participatory governance, and economic stabilization and infrastructure.

The scenario was based on a fragile state such as can be found in Africa. Matters such as a failing regime, a large flow of refugees, and ethnic tensions were described in the scenario and background and historical information concerning these matters was also offered. Various maps (e.g. country and neighboring countries, ethnic make-up of the country), terrain and weather information, and demographics were provided.

The participants first read the historical information concerning the country and they were offered a general overview of the country and the neighboring country. Information about important political figures, police and security forces, and the economic and humanitarian situation of the country were also offered. The scenario then focused upon the Southern Region of the country, where the mission was to take place. For this Southern Region, the buildup of the ethnic problems was described and the

scenario outlined the effects of the Civil War upon that region (i.e. refugee problem). The last section of the scenario concerned the current situation of the country and the Southern Region. The country was now on the verge of a second Civil War, and the country's own government had requested help from NATO. For the first part of the study, the participants were to plan a stabilization operation that was to last for one year. The participants were asked to plan the operation keeping the following end state in mind:

> "The self-sustaining government of the country remains in place and is able to exercise sovereign authority on their territory supported by the local population, enable Internally Displaced Persons (IDPs) to return in a controlled way, the military wings of the rebel parties neutralized and the economic situation stabilized to prevent civil unrest in order to create a stable and secure environment in the West-African region."

For the second part of the study, the participants were told that they had been deployed for six months and they were again offered an overview of the current situation. The participants were asked to plan an operation that mainly focused on the security and refugee issues of the Southern Region. The NATO mission for this part of the study was to support the country's own government in ensuring safe returns and repatriation of refugees, in order to continue the achievements already made and to exploit the successful return of the IDPs and refugees.

3.3 Experimental conditions and procedure

The officers were presented a written scenario containing all the information necessary for the development of a campaign plan. Three conditions were distinguished and participants were randomly assigned to one of these conditions. The conditions were offered the same scenario, but they were instructed to plan their operation in three different ways. To make sure that the participants used the different decision making strategies (rational or intuitive) time limits were set on the intuitive conditions. Intuitive decision making is often induced by high time pressure (Zsambok & Klein, 1997), therefore the intuitive condition was seriously restricted in time. All of the participants were told that they should be able to present their plan to the other participants and they were asked to include their ideas and decisions into a PowerPoint presentation. They were furthermore encouraged to write down their ideas, thoughts and initial plans in a Word document. The three conditions were placed in separate rooms and in each room an experimenter was present. The experimenters handed out the scenarios, the tasks,

and the questionnaires. The participants did not talk to each other and worked out their decisions individually.

The first group of participants (5 majors), the rational condition, was asked to use the NATO Operational Planning Process as a guide to develop their campaign plan. These participants were asked to provide an Operational Design and they were able to work out their plan in 135 minutes. For the second part of the scenario, the participants received a new operation order (as described above), and they were again asked to work in a rational manner. The time needed for this second planning process was expected to be shorter than the time needed for the first planning process, and subsequently the participants were offered 75 minutes to complete their task.

The second group of participants (4 majors), the intuitive condition, was also asked to provide a campaign plan, but they were asked to work as quickly as possible. These participants were notified that they should provide their plan in 75 minutes and they were instructed to use spontaneous insights. For the second part of the study, the participants were offered the operational order as described above and for the intuitive condition the time to complete the task was limited to 30 minutes. It is important to note that the majors were not explicitly told to use their intuition, but they were limited in their time in such a way that we would expect them to work intuitively.

The last group of participants was placed in the perspective-taking technique condition (4 majors). This group was given the same instruction as the intuitive condition and they were also instructed to work quickly and use their spontaneous insights. These participants were also not explicitly told to use their intuition as a guide in their decision making process, but rather they were seriously limited in their available time. For working out their initial plan, these participants were offered 75 minutes. After 75 minutes, these participants were asked to use the perspective-taking technique. They were instructed to take a step back and distance themselves from their plan. Five generic perspectives were presented (Population, Government, Security & Public Safety, Economy, and Interdepartmental Cooperation), and participants were asked to critically look at their plan from these different perspectives. They were instructed to: “Take some distance from your initial plan and now try to look at your plan from the following perspectives to see if your plan can be improved.” They were asked to take these outsiders’ perspectives and to examine if their initial plan was viable. The participants were then given an extra 15 minutes in which they were offered the possibility to adjust their initial plan. The participants of this last condition were therefore able to work on their plans for

90 minutes in total. For the second part of the study, these participants were offered the second task and they started working on their initial plan for 30 minutes. After 30 minutes, the participants were again instructed to use the perspective-taking technique. The perspective-taking technique was used as it was in the first part of the study and the participants were encouraged to look at their plan from the different perspectives. They were again offered 15 minutes to examine their plan and change it, if they felt the necessity. The participants were for this task able to work on their plans for 45 minutes in total.

At the end of the first task and at the end of the second task, the participants were asked to fill in a questionnaire. The participants were asked several questions about the scenario and the task, and they were asked to rate their decision making processes.

3.4 Instruments and variables

In this study we measured the effectiveness of the plans of the two tasks and we collected data from the questionnaire. The effectiveness of the decisions made by the participants of this study was defined by the number of factors that were taken into account during their decision making processes. Making sound decisions requires the integration of large amounts of information into impressions and it requires the comparison between these impressions to arrive at a decision. To accomplish this, two things are needed. One needs enough processing capacity to deal with large amounts of information, and one needs skills sophisticated enough to integrate information in a meaningful and accurate way. As mentioned earlier, the scenario contained different elements that are common in countries where Stabilization and Reconstruction operations are taking place. For the analysis of the plans of the participants, a set of criteria was thus set up in advance. These criteria were factors that had been mentioned in the scenario and could therefore have been taken into account in the different decision making processes (see Appendix A & B). The factors were clustered around the themes: Politics/Government, Refugees/Development, Military, and Economy (based on the comprehensive or so called Dutch Approach). The plans of the participants were scored on the presence of these factors.

After each task, the participants were also asked to fill in a questionnaire. First we will discuss the questions about the scenario and then we will turn to the questions

about the decision making processes. Five questions were asked concerning the scenario:

(1) Was the scenario recognizable to you?

No recognition	1	2	3	4	5	6	7	*High recognition*

(2) Were elements of the scenario recognizable to you?

No recognition	1	2	3	4	5	6	7	*High recognition*

(3) Were you able to use previous experience?

No use of experience	1	2	3	4	5	6	7	*Much use of experience*

(4) Did you experience time-pressure?

No time-pressure	1	2	3	4	5	6	7	*High time-pressure*

(5) Did you think the scenario was realistic?

Not a realistic scenario	1	2	3	4	5	6	7	*Realistic scenario*

As can be seen, these questions were scored on a 7-point scale and participants could see what constituted a low or a high rating. Besides the rating on the 7-point scale, participants were able to write down their reasons for their ratings.

Next, the participants were asked questions about their decision making processes. The following four questions were asked concerning the decision making processes:

(1) How many factors did you take into account in your decision making process?

Very few factors	1	2	3	4	5	6	7	*Many factors*

(2) Was there a dominant factor in your decision making process?

No dominant factor	***1***	***2***	***3***	***4***	***5***	***6***	***7***	*One dominant factor*

(3) Did you use a decision making model during your process?

A model was used	***1***	***2***	***3***	***4***	***5***	***6***	***7***	*No model was used*

(4) What kind of analysis/strategy did you use?

Rational strategy	***1***	***2***	***3***	***4***	***5***	***6***	***7***	*Intuitive strategy*

These questions were again scored on a 7-point scale and participants were able to write down their reasons for their ratings.

At last, demographic information, such as age and years of active duty, was collected.

3.5 Analysis

The individual plans, consisting of the PowerPoint presentations and Word documents, were scored on the criteria that made up the effectiveness scale constructed for this study (Appendix A & B). The plans were scored on the inclusion or absence of each factor by two independent raters. When it was clear that a certain factor was incorporated into the final plan of the participant, the factor was scored as 1. When it was clear that a certain factor could not be found in the final plan of the participant, the factor was scored as 0. All the factors that were taken into account in the decision making process were summed and this sum represented the effectiveness of the plan.

To test the agreement between the two judges, the intraclass correlation was computed. The agreement was not tested at item-level, but the scores per category (Politics/Government, Refugees/Development, Military, and Economy) were compared. The agreement of the judges for the first task was 0.75 and for the second task 0.89. Since there was a good agreement between the two judges, the scores of the judges were averaged and for each participant a final score was computed.

The questionnaires that participants were asked to fill in were analyzed both quantitatively and qualitatively. The quantitative data of the 7-point scale was processed

in SPSS. The text that participants were able to add, in order to more completely answer the questions, was worked out using protocol analysis.

4. Results

In the present study we collected both qualitative and quantitative data. Due to the exploratory nature of this study, we did not include a large number of participants and we are therefore restricted in performing statistical tests. First, the results of the plans of the three conditions will be discussed. Second, the results of the questionnaire will be discussed.

For each participant an average final effectiveness score was computed based upon the ratings of two judges. The average scores per condition were then calculated and these are shown in table 2. As can be seen, the average scores of the rational condition are the highest on both tasks.

Table 2 Mean effectiveness scores

	Task 1	Task 2
Condition	Mean (Sd)	Mean (Sd)
Rational (*n* = 5)	14 (5.8)	14.3 (3.5)
Intuitive (*n* = 4)	10.6 (3.8)	10.1 (3.4)
Perspective-taking (*n* = 4)	13.9 (4.4)	14.1 (2.7)

The average scores of the perspective-taking technique condition are very close to those of the rational condition. The intuitive condition, at last, clearly scored lower than both the rational condition and the perspective-taking technique condition. The rational and perspective-taking technique conditions have almost equal scores on both tasks, with the important difference that the perspective-taking technique condition finished their plans in two-thirds of the time that was available to the rational condition. The expectation that the intuitive condition would have the lowest scores has been met. The effectiveness scores of the intuitive condition were clearly lower than the effectiveness scores of the rational and perspective-taking technique conditions. The expectation that the rational condition would outperform both the intuitive and the perspective-taking technique condition has not been met. The difference between the rational condition and the perspective-taking condition is very small and we can state that these scores are almost the same.

To check whether the effectiveness level of the perspective-taking condition was actually raised after the use of the perspective-taking technique, we compared the plans

handed in by the participants *before* the use of the technique to the plans handed in by the participants *after* the use of the technique. The mean difference was calculated and can be found in table 3.

Table 3 Mean differences before/after perspective-taking

	Task 1	Task 2
Condition	Mean D	Mean D
Perspective-taking (n = 4)	4	3.8

The comparison showed that for the first task the participants received on average 4 extra points after they had used the perspective-taking technique. For the second task the participants received on average 3.8 extra points after they had used the perspective-taking technique. This means that by using the perspective-taking technique the participants took on average four more factors into account in their decision making process. The expectation that the perspective-taking technique would raise the effectiveness level of intuitive decision making has been confirmed. Before the participants of the perspective-taking technique condition used the technique, they took as many factors into account in their decision making process as the participants of the intuitive condition. They were then instructed to use the perspective-taking technique, thereby raising their effectiveness score to the level of the rational condition. Working out an initial plan intuitively and then taking different perspectives into one's mind raised the level of effectiveness. Furthermore, the total amount of time taken by the participants was two-thirds of the total amount of time taken by the participants of the rational condition. The participants of the perspective-taking technique condition were thus able to perform at the same effectiveness level of the rational condition, but with a considerable time reduction. The last expectation has consequently been confirmed.

The questionnaire that the participants were asked to fill in contained questions about the scenario and about their decision making process. We will first discuss the questions concerning the scenario and then we will turn to the questions concerning the decision making processes.

The average scores on the questions reveal that the scenario for both tasks was deemed realistic and that the scenario and elements of the scenario were recognizable (see table 4). Also, most participants were able to use their experience from previous deployments and training in working out their decisions. Some officers commented, for example, that the scenario resembled the decision making processes that they had

faced when deployed in Afghanistan. Other officers explained that the problems described in the scenario, resembled cases they had worked out when they had received training in military planning. Recognition of the scenario and elements of it, were especially rated highly in the intuitive and perspective-taking technique condition and they were also more likely to report that they had used previous experiences in working out these tasks. Using previous experience and pattern-recognition indeed fits with a more intuitive approach to decision making.

Time-pressure was over the three conditions rated as being 'average'. Although, the officers commented that they had little time available to go through their decision making process, they did not report experiencing time-pressure.

Table 4 Mean ratings scenario

	Task 1	Task 2
Question (*n* = 13)	Mean (Sd)	Mean (Sd)
Recognition scenario	5.8 (1.5)	4.6 (1.8)
Recognition elements scenario	6.5 (0.5)	5.2 (1.4)
Use of Experience	5.9 (1.5)	4.7 (1.7)
Time-pressure	3.7 (1.5)	4.0 (2.2)
Realism scenario	6.5 (0.7)	5.8 (1.4)

The second part of the questionnaire consisted of questions about the actual decision making processes the participants had gone through. Table 5 shows the average ratings of the participants on the 7- points scale. The officers rated the number of factors that they had taken into account in their decision making processes as 'average'. Most officers commented that they had taken approximately five factors into account. For example, some officers noted that they had thought about the refugee problem, the country's own government, or the conflicting parties. In the intuitive and rational conditions, officers often noted military factors that they had taken into account, such as the intentions of the rebel parties, terrain or the available own assets. In the perspective-taking technique condition, on the other hand, officers commented that they had thought about the refugees, humanitarian aid, and a hearts and minds campaign. On the next question the officers indicated whether one of the factors they had taken into account had been dominant. The high average score on this question shows that most participants had a dominant factor they took into account during their decision making process. For the intuitive and the rational condition, a military factor was often noted as being most dominant in the decision making process. Officers in the perspective-taking

technique condition, in contrast, considered 'good governance' or the population the most dominant factor in their decision making process.

Table 5 Mean ratings decision making process

	Task 1	Task 2
Question (*n* = 13)	Mean (Sd)	Mean (Sd)
Factors	3.4 (1.3)	4.4 (1.1)
Dominant factor	4.9 (1.7)	5.7 (1.4)
Model used	5.0 (2.0)	5.6 (1.3)
Strategy used	4.7 (1.8)	5.3 (1.4)

The high average score on the question whether a decision making model was used, shows that most participants were not able to apply a decision making model during their decision making process. Most officers pointed out that they were not able to fully apply a decision making model due to the restrictions of time. They indicated that they were not able to fully base their decision making upon a rational model, because of the time restrictions that were set in this study. The participants in the rational condition did, however, note that they tried to follow the steps of the imposed rational process as closely as possible.

The high average score on the question about whether a rational or intuitive strategy was applied, denotes that the participants rated their decision making strategy as largely non-conscious, based on experience, pattern-recognition and intuition. Especially in the intuitive and perspective-taking technique conditions, most majors noted that they used intuition or their experience to guide them in their decision making process. The manipulation of limiting the amount of available time and not asking participants to use a certain decision model was successful in inducing intuitive decision making.

5. Conclusion and discussion

This study has shown that the perspective-taking technique that we proposed, can improve and complement intuitive decision making by raising the level of effectiveness of the decision making process to levels comparable to that of a rational decision making process. The effect was found in two different tasks. Even though the tasks differed substantially, the participants were able to improve the effectiveness of both their plans by looking at their plans from five generic perspectives.

The results of this study may have a positive effect on military decision making. First, the technique can be a valuable addition to the decision making processes performed by the military by achieving an acceptable level of effectiveness with a considerable time-reduction. The time-reduction that the perspective-taking technique enables, can prove to be of great importance in the current fast paced military operations.

Second, the current stabilization and reconstruction (S&R) operations, make it necessary to take into account many different perspectives and factors when planning an operation. By using the perspective-taking technique, decision makers look at their plans from different perspectives, once an initial plan has been made and they are able to adjust their plans to accommodate the perspectives of others. It is very likely that it is easier for decision makers to adjust an initial, intuitive and holistic plan, to accommodate different perspectives, than it is to consciously integrate these perspectives at the start of a planning process.

Third, as already mentioned in the introduction, decision makers are very likely to use their intuition in a decision making process and they have trouble applying rational models. Instead of trying to enforce the use of rational models or accept intuitive decision making with potential suboptimal solutions, the perspective-taking technique may provide relatively low-cost, but effective solutions by fostering commanders' intuition. For these reasons, this study was an essential and valuable step in the development of this perspective-taking technique.

It must be noted here how easily the participants seemed to switch from using rational models to using intuition in their decision making, even with their considerable experience at staff level and training in the use of rational models. When explicitly asked to use a rational model, participants still point out that their intuition guides them in their decision making processes. One officer stated, for example, that he applied a rational model 'fed by intuitive associations'.

A major limitation of this study is the number of participants. Because of the exploratory nature and the small number of participants of this study, we are not able to show statistical significance and make hard claims about the results we found. It may furthermore be difficult to generalize the results to other domains. Nevertheless, we found that the participants of the perspective-taking technique condition were able to perform at the level of the participants of the rational condition, with a considerable time reduction. In addition, we found that this effect was found on both tasks; for two different

cases we observed the same pattern. A replication of the study with a larger number of participants is off course still desirable.

Another limitation is the use of the outcome effectiveness scores as a way to classify the quality of a decision making process. In decision making research, it is very difficult to assess the quality of a decision. The final outcome and the effects of a decision may not be revealed straight away and can sometimes only be assessed months after the decision has been implemented. External factors may moreover affect the decision outcome and a 'good' decision may turn out to have little result. In a similar vein, a 'bad' decision may turn out to be have the desired result, because external factors have influenced the implementation of the decision in a positive manner. We chose to define quality as the amount of factors that were taken into account in a decision making process, because we believe that the integration of a large amount of information is an indicator of the quality of a decision making process. Further development of quality indicators of complex decision making is needed to confirm that the use of the perspective-taking technique is effective.

Further research is also necessary to check the applicability of the perspective-taking technique in the field. The experimental setting of this study may have caused participants not to work in the same way as they would when working at a general staff. The perspective-taking technique should be tested with active, deployed staffs to check the effectiveness and feasibility of the technique in the field.

Also, further research is needed to see whether the technique is applicable and effective in other domains, such as the political realm. We expect that the perspective-taking technique can improve decision making processes in other domains. It is important though to determine which perspectives should be taken into account. The perspectives used in this study are, for example, not applicable to the decision making processes faced by an international law firm. It is important to note, that in this study, in the perspective-taking technique condition the same five generic perspectives were used for two different tasks. Even though the tasks differed substantially, the participants of this condition were able to improve the effectiveness of both their plans by looking at their plans from these five generic perspectives.

To our knowledge, this study is unique in using a complex scenario that incorporated many of the different factors and uncertainties seen in today's operations. We aimed to capture today's complexity and judging from the ratings provided by the participants about the realism and the recognizability of the scenario, we conclude that

we succeeded at introducing a complex and realistic scenario. Research into this kind of complex decision making is rare since it is difficult to capture this complexity in purely experimental settings. We think that decision making in these complex situations is qualitatively different from that in most decision making studies. Therefore, more research effort should be spend in deep understanding of the decision making in these kinds of complex operational conditions.

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Appendix A Scoring Effectiveness Task 1

GOVERNMENT/POLITICS

Support to the government:

• Prevention of fraude (elections)	0	1
• Prevention of corruption and self-enrichment	0	1
• Various interests served (also ethnic groups)	0	1
• Good governance	0	1
• Supported by the population (Hearts & Minds)	0	1

Capabilities to enforce measures:

• Army, RSLAF	0	1
• Police	0	1

Cooperation

• Foreign Affairs, Political advisors	0	1
• Building better relations with neighboring country	0	1

REFUGEES/DEVELOPMENT

Short term:

• Support refugeecamps (food, shelter)	0	1
• Safety, secure routes	0	1
• Prevention of ethnic conflicts	0	1

Long term:

• Support safe return	0	1
• Housing, work	0	1
• Mediation between current residents and returnees	0	1

Cooperation:

• NGOs	0	1
• Authorities of neighboring country	0	1

MILITARY

OMF:

• Protection of population	0	1
• Eliminate OMF	0	1
• Eliminate political influence of rebels	0	1

Population:

• Distinction between population/OMF	0	1
• Recognize Two-party system, Tumno (RUF) and Mundo (pro- Sierros Leoniesean Government)	0	1

ECONOMY

Stimulate economy

- Prevent mismanagement, corruption, smuggle

0	1

- Natural resources, diamants

0	1

- Trade and agriculture

0	1

- Export, harbor of Freetown

0	1

- Toerism

0	1

Cooperation

- Humanitarian aid
- Local authorities

0	1
0	1

ADDITION

Measures not already mentioned.

0	1

0	1

0	1

Appendix B Scoring Effectiveness Task 2

GOVERNEMENT/POLITICS

Support to the government:

• Support interest of all different parties (also ethnic groups)	0	1
• Housing	0	1
• Infrastructure	0	1
• Supported by the population (Hearts & Minds)	0	1

Capabilities to enforce measures:

• Army	0	1
• Police	0	1

Cooperation:

• Foreign Affairs, Political advisors	0	1
• Agreements with neighboring country to hand over war criminals	0	1
• Working together with neigboring country to eliminate OMF	0	1

REFUGEES/DEVELOPMENT

Short term:

• Support refugeecamps (food, shelter)	0	1
• Safety, secure routes	0	1
• Coordination of refugeestream	0	1
• Prevention of ethnic conflicts	0	1
• Prevent incidents, pillaging	0	1
• Take rain season into account	0	1

Long term:

• Secure place of return	0	1
• Housing, work	0	1
• Mediation between current residents and returnees	0	1

Cooperation:

• NGOs	0	1
• Authorities of neigboring country	0	1

MILITARY

OMF:

• Protection of population	0	1
• Eliminate OMF	0	1

Population:

• Distinction between population/OMF	0	1

ECONOMY

Stimulate economy

- Prevent mismanagement, corruption, smuggle | 0 | 1 |
- Creation of employment for returnees | 0 | 1 |

Cooperation:

- Humanitarian aid | 0 | 1 |
- Local authorities | 0 | 1 |

ADDITIONS

Measures not already mentioned.

0	1

0	1

0	1