What is the Story Behind the Story?

Two Case Studies of Decision-making under Stress

Anne-Claire MACQUET[a], Héloïse LACOUCHIE[ab],
[a]French Institute of Sports(INSEP), Paris, France
[b]René Descartes University, Paris, France

ABSTRACT

This study aimed to explain how judokas made their decisions under stress. Two female elite judokas participated in the study. An interview was conducted with each athlete separately. Athletes were asked to describe and comment on the decisions made under stress during a recent important match. In reference to the Critical Decision-Making method, interviews were used to enable judokas to describe the decisions made during the match, the processes used to make these decisions and the effect of these decisions on the match. Results showed that judokas used a situation recognition process to make decisions. Results also showed that decisions prioritised the use of judokas' favourite techniques. Situations in which favourite techniques could be used arose in one of two ways: either the situation arose naturally, or judokas decided to manipulate the situation to create the conditions required to implement their favourite technique; then they carried it out.

KEYWORDS

Decision-making; Expertise; Elite sports; Uncertainty management.

INTRODUCTION

In high-level sport, the ability to make efficient decisions under stress is a key factor in performance. Salas, Driskell and Hughes (1996) defined stress as "a process by which certain environmental demands... evoke an appraisal process in which perceived demands exceeds resources and results in undesirable physiological, psychological, behavioral or social outcomes" (p. 6). In dynamic and complex situations such as in sports (e.g., Macquet, 2009) and the military (e.g. Cannon-Bowers & Salas, 1998), characteristics which can be considered as stressors appear in an environment demonstrating: (a) numerous information sources; (b) incomplete and conflicting information; (c) rapid change in the situation; (d) adverse physical conditions; (e) high stakes and performance pressure; (f) intense time pressure; (g) high information load; (h) interference; and (i) threat. In sports, Woodman and Hardy (2001) differentiated between stressors coming from outside the sport organization (e.g., disturbances from friends) and those that are the consequences of the organizational climate (e.g., sport politics). They defined organizational stress as the "stress which is associated primarily and directly with an individual's appraisal of the structure and functioning of the organization within which he/she is operating" (p. 208). Fletcher and Hanton (2003) studied the sources of organizational stress; they identified four categories of stressors: (a) environmental issues; (b) personal issues; (c) leadership issues; and (d) team issues. These sport studies focussed on stressors related to the competitive environment whereas studies about ergonomics and sport cognitive ergonomics focussed on stressors related to the situation. In order to study decision-making under stress, it is important to focus on the stressors related to the situation, such as those presented by Cannon-Bowers and Salas (1998).

Individuals vary in their sensitivity to stressors (e.g., Gaillard, 2008). The ability to remain concentrated under time pressure, fatigue and threat contributes to the determination of stress tolerance. One of the aims of sport training consists of training under such conditions to improve the ability of athletes to make and implement efficient decisions in uncertain environments. From a scientific and practical perspective, one of the challenges is to understand how elite athletes make decisions in these situations of stress and high stakes.

For many years, a field of research has stressed the need to study decision-making in naturalistic environments in order to conduct meaningful research (e.g., Zsambock & Klein, 1997). One of the major theories in Naturalistic-Decision Making (NDM) is the recognition-primed decision (RPD; Klein, 1997; Klein, Calderwood, & Clinton-Cirocco, 1986). According to this theory, experts use their experience to make good decisions without comparing the multiple alternative courses of action. They assess a situation by comparing it with similar previously experienced situations associated with a typical action and stored in the memory. If the current situation is analogous to the typical situation in the memory, then experts implement the corresponding action and adapt it to the current situation. To assess its potential effectiveness, they mentally simulate its. According to

the RPD model, individuals recognize its typicality through salient features that experience has shown to be useful. Recognition has four by-products: (a) expectancies; (b) salient features; (c) plausible goals; and (d) typical action. Results showed that experts determined only a small number of options (Johnson & Raab, 2003; Klein, Wolf, Militello, & Zsambok, 1995; Macquet, 2009), and most often, they determined only one (Yates, 2001).

There are three levels involved in evaluating the situation in a changing context: simple match, diagnose the situation, and evaluate a course of action. In level 1, the situation is rapidly perceived as typical, so the expert can quickly implement a course of action that corresponds to this typical situation. In level 2, the situation is not initially perceived as typical so the expert must clarify it by assessing it to determine its typicality. Then, he/she can carry out a course of action based on the appropriate typical action. In level 3, the expert perceives the situation as typical. Before undertaking a typical action, he/she considers several possible actions and assesses them using mental simulation to determine whether they are likely to work. When he/she considers that one will work, he/she carries it out. However, experts devote more time and energy to assessing what is happening rather than comparing several courses of action.

Previous studies showed the role of practice in decision-making in simulated or standardized situations (e.g., Raab, 2002), and the use of procedural rules to make decisions in competitive situations (e.g., McPherson & Kernodle, 2003). Other studies showed that in a competitive environment athletes reproduced actions that had been practised extensively during training sessions (e.g., Macquet, 2009; Macquet, Eccles, & Barraux, 2012; Macquet & Fleurance, 2007). The NDM and RPD models could provide a theoretical and practical tool for understanding decision-making in competitive situations for several reasons. NDM focuses on real settings involving complex problems, intense time pressure and high stakes, such as sport competitions. The RPD model could provide theoretical and practical insights into athletes' use of their experiences during high-stake competitive situations. It could also provide insights into the number of decisions made by athletes in competitive situations. Furthermore, it could extend knowledge about information perceived during the course of action and reported by athletes.

The present study aimed to explain how judokas made decisions under stress during important competitions. More specifically, it aimed to explain the cognitive experience, knowledge and expertise of judokas from a decision-making perspective.

METHOD

Participants
Two female judokas, aged 20 and 32 years, volunteered to participate in the study. They had been practising judo for seven and 19 years respectively. They were ranked within the top 50 judokas worldwide at the time of the study. The first athlete had been competing at the top level for five years and the second athlete for 14 years. They had won medals at the European and World Championships. The second athlete had also won a World Championship. The athletes were informed of the purpose of the study and assured of anonymity. The study was approved by a local ethics committee. Athletes were given the pseudonyms A1 and A2 to provide some degree of confidentiality.

Data Collection
Two interviews were conducted with the athletes separately, in reference to the critical decision-making method (Crandall, Klein, & Hoffman, 2006). The Critical Decision-Making (CDM) method involves an intensive interview. It consists of asking an individual to comment on an incident he/she experienced and the difficult decisions he/she made. The interviewers invite the interviewee to give information about decision-making and sense-making while recalling a specific incident. Interviewers try to probe progressively deeper on cognitive issues by asking the interviewee to comment on details, background influences and tactics in relation to the decision made. The research team has to understand the story of the specific event and the cognitive demands of the task and setting. Two interviewers are required. The first one conducts the interview, acts as a facilitator and takes notes. The second one takes notes and is responsible for keeping track of the overall interview progression.

The interview comprises four steps: (a) incident identification; (b) time-line verification; (c) deepening, and (d) "What If" queries. The first step consists of selecting an appropriate incident for in-depth examination. This incident needs to contain non-routine and challenging events. It also needs to have happened during the month preceding the interview, in order to enable the participant to remember the difficult situations and decisions easily. Such an incident enables the researcher to cover elements of expertise and related cognitive phenomena. It also enables to learn about the components that characterize skilled performance and expertise. Once the incident has been selected by the interviewee, the interviewer asks the interviewee to give a brief account of the match. This account provides the foundation for the remainder of the interview.

The second step consists of having a clear, defined and verified overview of the incident, by eliciting key events and segments. The interviewee comments on events in greater detail when he/she relives the event in his/her mind. This step is key. Recalled information enables the interviewer to structure the interview and provides information from which to construct a timeline. The timelines of the interviews were used to better understand the decisions made and their effects on the outcome of the contest. Due to text length constraints, they are not presented within the results of the study.

The third step consists of probing. This enables researchers to see "inside the expert's head and look at the world through his or her eyes" (Crandall et al., 2006; p. 77). This step consists of going beyond the facts of the incident to elicit the participant's perceptions, expectations, goals, tactics and the consequences of decisions made. It allows researchers to construct a detailed account of the incident from the interviewee's point of view and to provide the story behind the story, namely the cognitive experience, knowledge and expertise.

The fourth step relates to "What If" queries. "What if" questions allow researchers to see differences between experts and novices and possible vulnerabilities. The interviewee is invited to consider how his/her decisions might have been different if he/she were a novice.

Judokas described a match that lasted 5 min 15 seconds for A1 and 1 min 30 seconds for A2. The interviews lasted 35 and 45 min respectively. Interviews were recorded and transcribed in full.

Data Processing
Data processing consisted of explaining, "What is the story behind the story?" What are the data saying that I do not yet know? Data processing was done using the constant comparative method (Corbin & Strauss, 1990). This method consists of identifying a phenomenon of interest, and a number of local principles or process features of the phenomenon of interest, and categorizing the data based on the initial understanding of the phenomenon. Two researchers analysed the verbal reports separately.

Data processing involved three steps: (a) identification of meaningful units in relation to tough decisions and their effects on the outcome of the contest; (b) construction of the timeline of decisions taken and their effects on the match; and (c) identification of the elements used to make decisions in relation to the RPD model. In the first step, researchers identified the meaningful units in relation to decisions made, and perceptual and cognitive components of decisions in relation to the RPD model. The second step consisted of the construction of the timeline of the match, namely the decisions made and their consequences on the way the situation evolved and the score. It also enabled researchers to differentiate between the tough decisions during the match and their effects on the score, and the decisive decisions that caused the match to end. Finally, it allowed researchers to build up the story of the match. The third step enabled researchers to identify the cognitive components of the decisions made in relation to the by-products of the RPD model (Klein et al., 1986). It also allowed the level of the RPD model to be identified: (a) simple match; (b) diagnosis; or (c) mental simulation.

After each data processing step, data were constantly compared until saturation was reached, which occurred when no further meaningful units and categories were identified from the data. The researchers compared their results and discussed any initial disagreement until consensus was reached. Interview transcripts were divided into 330 meaningful units.

RESULTS

The matches reported by the contestants presented high stakes: A1 was aiming to win the French Championship and A2, third place in the World Championship. A1 had lost against her current opponent in a previous competition. Story building and timelines of the matches allowed the results to be presented in two parts: (a) a succession of ineffective decisions that led to a tight score; and (b) decisive and effective decisions that caused the match to end. In each part of results, decisions were compared with the RPD model.

Succession of Ineffective Decisions that Led to a Tight Score
During elite judo training, judoka learn many judo skills and train to improve these so that they become routine skills that judokas can implement quickly and efficiently. A judoka and his/her coach choose one of these skills, depending on the athlete's physical characteristics and preferences. Judokas practice this one more extensively than the others. This specific skill is called the favourite technique. During a contest, each judoka tries to use his/her favourite technique in order to impose his/her way of competing on the opponent and win the match. Conversely, the opponent tries to prevent the judoka from implementing his/her favourite technique and to use

his/her own favourite technique. In judo, the way athletes stand in front of an opponent and grip their opponent's kimono (i.e., kumikata) largely determines the technique the athletes are going to implement and the probability of achieving a positive outcome. Each judoka has his/her own kumikata depending on whether the judoka is right or left-handed, tall or small and so on.

Results showed that participants and their opponents both tried to implement their favourite technique on occasions without success. For example, A1 said: "During the first part of the contest, my second seois [participant's favourite technique] didn't work, the referee judged it to be a false attack and sanctioned me twice. Seoi is my favourite technique." Results also showed that for both judokas some decisions made were ineffective at winning the match, or led to penalties. This succession of ineffective decisions lasted 5 min (normal time of the contest period) for A1 and 1 min 30 seconds for A2. At the end of these periods, participants reported difficulties in selecting effective decisions. For example, A1 said: "The match was very tight. We both had penalties and the score was equal at the end of regular time."

Categorization of the elements used by the participants to make decisions during the first period of the match was made according to the four by-products of the RPD model: (a) expectancies, (b) relevant cues, (c) plausible goals, and (d) typical action. Results showed that expectancies related to what they thought the opponent would do. They involved anticipation of a specific action that the opponent might carry out in view of an opponent's or participant's abilities and tendencies, level of expertise in a specific situation and experience with this opponent in current or previous contests. For example, A2 said: "She's got a high grip [she catches the kimono by its upper part] and she's aggressive while on the attack". Results indicated that relevant cues related to: the opponent's freshness and involvement, the participant's freshness and involvement, and the score. For example, A1 said: "After three minutes, I noticed that she was tired, she had less strength, her reactions were slower. I was tired too but not as tired as she was." Plausible goals were seen to consist of the number of goals and decisions the participant considered she could implement in the course of the action. For example, A2 said: "I was focussing on this sleeve I had to catch". Participants reported only one goal at a time. Results demonstrated that typical actions referred to the actions that were often undertaken by the opponent or participant in a typical situation, and more specifically, the favourite technique. They referred to an association between a condition and an action to be carried out. The players compared the current situation and event to prior ones. This comparison led them to recognise the situation as typical. They then implemented their favourite technique directly. For example, A2 said: "As she isn't a real right-hander, I prevent her from moving her hand up while gripping my kimono and hold her kimono at the top."

Results also indicated that participants' decision-making in this part of the contest related to the first level of the RPD model: participants recognized the situation rapidly and implemented a course of action.

At the end of this part of the match, athletes commented on the ineffectiveness of the decisions they made and the effectiveness of the opponent's decisions. For example, A1 said: "The match was very tight, no one had an advantage. There was no fall, no real attack." In another example, A2 said: "At this moment of the match, she gripped my kimono first. I was in danger, not enough to be attacked, but I was in danger at the grip level."

Decisive and Effective Decisions that Caused the Match to End

The second part of participants' matches was preceded by a pause to allow the athletes to return to the centre of the contest mat and adjust their kimonos. This pause also allowed them to adapt their initial technique to the unfolding events. For example, A1 said: "She was taller than me and right-handed. I had to control her arm and move her. I had to let her start the action. I told myself to put more pressure on her, she's more tired than I am. I must remain alert, too." In another example, A2 said: "I must move my hand up to dominate more and move her forward."

Participants started the second part of the match and rapidly made decisions that led them winning the match. These decisions were decisive. Results showed that their decisions related to the participants' favourite techniques. However, they were different to participants' earlier decisions involving favourite techniques. This time, participants' decisive decisions involved action-reaction. Participants made a first decision in order to create appropriate conditions for the effective implementation of their favourite techniques (i.e., second decision). In other words, participants did not change their decision to implement their favourite technique. Rather, they changed the situation to make it possible to implement their favourite technique. For example, A1 pretended to implement a routine forwards but instead, implemented this routine backwards. A2 made her opponent free her hold on the kimono to force her to react. Results showed that in order to enable them to undertake their favourite routine, participants made a decision aimed at manipulating the situation to suit the technique they wanted to implement. In other words, instead of changing their decision totally, they decided to change the situation so that they could implement their favourite technique effectively.

Results showed that the decisive decisions that led to the matches ending concerned the four by-products of the RPD model. Participants reported on expectancies while commenting on both opponents' abilities and tendencies and their own abilities and tendencies. For example, A1 said: "She is a very explosive girl during the three first minutes. Then she slows down and is less explosive while attacking". Participants also reported on relevant cues related to opponents' freshness and involvement. For example, A1 said: " She breathed more often, she had difficulty breathing." Results indicated that participants had only one plausible goal at a time and also that participants' typical actions related to their favourite techniques and preceding events. For example, A2 said: "I pulled her forwards as though I was going to implement my favourite routine forwards but I pushed her backwards. I tried to surprise her to make her react backwards, to make her put her weight backwards. I then changed axis and implemented Ippon-Ko" [using a small leg hook and controlling the shoulder]. This decision made me win" (win by ippon).

Finally, judokas reported differences between themselves (i.e., experts) and novices in such situations. Participants commented on their ability to maintain intense concentration and rigor despite fatigue and a tight score for A1, and negative emotions in relation to her failure in the semi-final preceeding her current match for A2 and specific style of A2's opponent. For example, A2 said:
"She has a very specific style. She moves forward all the time, catches the kimono, releases it, catches it, then releases it and so on. A novice is in danger of losing concentration. Instead of concentrating on himself/herself, he/she will be tempted to focus on the opponent. And that's how you lose".
Then A2 said: "I remained concentrated on me on what I had to do to win".

DISCUSSION

The objective of this study was to gain an understanding of the process of decision-making under stress. In order to meet this objective, the researchers used inductive and deductive analysis to understand in detail the difficult decisions made by expert judokas. Results are discussed in two parts: (a) the consistency of the results with the RPD model; and (b) the story behind the story.

Consistency of the Results with the RPD Model
As the RPD model predicts, the results of this study showed that judokas' decision-making was based both on a process of recognition of a typical situation and the use of associations between a typical situation and a typical action. The unfolding situation was compared to a typical situation in the memory. The process of recognition of the situation enables the individual to assess the situation. This process was based on four by-products: (a) relevant cues, (b) expectancies, (c) plausible goals, and (d) typical actions. The judokas perceived relevant cues from visual perception (e.g., focusing on the opponent's sleeve), kinesthesic perception (e.g., feeling a reduction in the strength of her opponent while being gripped by the kimono), and auditory perception (e.g., hearing her opponent's breathing quicken). To our knowledge, previous studies on decision-making in sports (e.g., Macquet, 2009) and other contexts (e.g., Klein et al., 1986) have not reported on relevant cues concerned with the senses. Decision-makers have frequently reported solely on visual data. In some situations, such as in judo, other senses provide important information to assist decision-making. As Macquet et al. (2012) suggested, exploring the role of the different kinds of perception on decision-making would be a worthwile avenue for future research in sports and other contexts.

It can be seen from the results that judokas reported on expectancies based on previous experience with the opponent and knowledge about the opponent's tendencies. These results are consistent with previous research on decision-making in sports based on the RPD model (e.g., Cardin, Bossard, Buche, & Kermarrec, 2013; Macquet 2009).

Results also showed that judokas reported only one goal, meaning that their decision referred to level 1 of the RPD model. This recognition process seemed to depend on their experience of judo situations. Results also suggest that judokas did not have enough time to diagnose the situation and assess the effectiveness of a possible course of action before implementing or changing it. In judo, because contestants are very close to each other and actions are very fast, contestants must assess the situation rapidly in order to implement an effective decision. Exploring the distance between opponents and time available to act would be a worthwile avenue for future research on expert decision-making in sports. From a practical perspective, assessing a situation rapidly and making a timely decision is a determining performance factor in which coaches must train athletes.

Results indicated that typical actions reported by the judokas mainly concerned judokas' favourite techniques This suggests that judokas compared the unfolding situation to typical situations contained in their memories. When the unfolding situation and typical situation were similar, judokas implemented the typical action appropriate to the favourite technique, and adapted it to the current situation. If not, they waited for the situation to occur.

The Story Behind the Story

In the first part of their contest, judokas implemented their favourite techniques,with negative outcomes: penalties for A1 and turnover for A2. In the second part, judokas carried out two successive decisions ruled together. The first one aimed to change the unfolding situation so that it ressembled the situation in the memory associated with the typical action related to their favourite technique. Once the second unfolding situation matched the one they were hoping to achieve, judokas undertook their favourite technique. In other words, when judokas could not undertake their favourite technique directly because the current situation did not allow it, they manipulated the situation until it matched the typical situation associated with favourite technique. Decision-making stopped when the situation matched the typical situation contained in the memory and associated with the favourite technique, and the typical action fitted the unfolding situation.

These results suggest that decisions could be driven by by two temporalities: immediate and anticipated. In the first part of the match, judokas expected that their decisions would enable them to score points. In the second part, they expected their inital decision to enable specific changes in the situation, which would provide the required conditions to implement their favourite technique and score points. In the first case, the decision was a one-off decision; in the second case, it was a two-stage decision. It can be expected that such decisions are made under stress solely by expert judokas. Exploring differences in decision temporalities could be a worthwhile avenue for future research.

These results also suggest the high level of expertise of the judokas. Under intense time pressure, stress and fatigue, judokas were sufficiently alert to assess the situation and make a two-stage decision.

Results showed that the motivation of A1 changed at the end of the first part of the contest. The perception that her opponent's fatigue had increased drove A1 to pursue her strategy. Although the score was tight, A1 was not as tired as her opponent. This difference in perceived fatigue enabled A1 to feel capable of winning the match. This result suggests that A1 had psychological momentum. Psychological momentum means a power that increases in relation to the decrease in the opponent's involvement (e.g., Gernigon, Briki, & Eykens, 2010). This power changes the perception of oneself and the opponent, influences the belief that the result will be success, and improves or maintains involvement in the match. In this study, results indicated that this psychological momentum was positive, meaning it enabled A1 to maintain and improve her performance. It was related to the perception of the opponent's strength when the opponent tried to grip A1's kimono. This momentum enabled A1 to feel that it was possible to win the match, even though the score was tight. It brought A1 closer to victory and made her more involved.

Finally, results showed that differences between experts and novices in such situations related to the ability to maintain concentration and rigor thoroughout the matches, despite fatigue and negative emotions. This suggests a perspective for training: coaches might train athletes under conditions of fatigue and negative emotions to prepare them for stress and fatigue in competitions.

This study presents some limitations. It did not feature other contestants and contests for comparison. The extent to which decision-making under stress in contest sports relates to a recognition process and an action-reaction plan is therefore unknown. There are very few studies on elite athletes, and sport psychology research often involves few participants because only a small number of athletes reach elite level (e.g., Macquet & Kragba, in press).

CONCLUSION

The data tend to support the view that the decisions of expert judokas under stress were based on recognition and experience. Judokas used their favourite technique first. As their decisions proved ineffective, they manipulated situations to make them resemble the typical situations stored in their memories and then implemented the corresponding typical actions, namely their favourite techniques. The continued study of athletes' decision-making under stress will improve our understanding of cognitive processes and performance.

REFERENCES

Cannon-Bowers, J. A., & Salas, E. (1998). Individual and team decision-making under stress: Theoretical underpinnings. In J. A. Cannon-Bowers & E. Salas (Eds.) *Making decisions under stress* (pp. 17-38). Washington, DC: American Psychological Association.

Cardin, Y., Bossard,C., Buche, C., & Kermarrec, G. (2013). Investigate naturalistic decision-making of football players in virtual reality environment: Influence of viewpoints in recognition process. Proceeding of the Eleventh International Naturalistic Decision-Making Conference, Marseille, France

Corbin, J., & Strauss, A. (1990). *Basics of qualitative research: Grounded theory. Procedures and techniques.* Newbury Park, CA: Sage.

Crandall, B., Klein, G., Hoffman, R. R. (2006). Working minds. Cambridge, Ma: MIT Press.

Fletcher, D., & Hanton, S. (2003). Sources of organizational stress in elite sports performers. *The Sport Psychologist, 17*, 175-195.

Gaillard, A. W. K. (2008). Concentration, stress and performance. In P. A. Hancock & J. L. Szalma (Eds.), *Performance under stress*, (pp. 59-75). Adlershot, UK: Ashgate.

Gernigon, C., Briki, W., & Eykens, K. (2010). The dynamics of psychological momentum in sport: The role of ongoing history of performance patterns. *Journal of Sport and Exercise Psychology, 32*(3), 377-400.

Johnson, J. G, & Raab, M. (2003). Take the first: Option-generation and resulting choices. *Organizational Behavior and Human Decision Processes*, *91*, 215-229.

Klein, G. (1997). The Recognition-Primed Decision model: Looking back, looking forward. In C. E. Zsambok, & G. Klein (Eds.), *Naturalistic Decision-Making* (pp. 285- 292)*.* Mahwah: Erlbaum.

Klein G. A. , Calderwood, R., Clinton-Cirocco, A. (1986). Rapid decision-making on the fireground. Proceedings of the Human Factors and Ergonomic Society 30th Annual Meeting, 1, 576-580.

Klein, G., Wolf, S., Militello, L., & Zsambok, C. (1995). Characteristics of skilled option generation in chess. *Organizational Behavior and Human Decision Processes, 6,* 63-69.

Macquet, A. -C., (2009). Recognition within the decision-making process: A case study of expert volleyball players. *Journal of Applied Sport Psychology, 21*,64-79. doi**:** 10.1080/10413200802575759.

Macquet, A. –C., Eccles, D. W., & Barraux, E. (2012) .What makes an orienteer an expert? A case study of a highly elite orienteer's concerns in the course of competition. *Journal of Sport Sciences, 30*, 91-99. doi:10.1080/02640414.2011.617774

Macquet, A. -C., Fleurance, P. (2007). Naturalistic decision-making in expert badminton players. *Ergonomics, 50*(9), 1433-1450. doi: 10.1080./00140130701393452

Macquet, A. -C., & Kragba, K. (in press).What makes basketball players continue with the planned play or change it? A case study of the relationships between sense-making and decision-making. *Cognition, Technology and Work.*

McPherson, S. L., & Kernodle, M. W. (2003). Tactics, the neglected attribute of expertise. In J. L. Starkes, & K. A. Ericsson (Eds.) *Expert Performance in Sports* (pp. 137-168). Champaign, IL: Human Kinetics.

Raab, M. (2002). T-ECHO: Model of decision-making to explain behavior in experiments and simulations under time pressure. *Psychology of Sport and Exercise*, *3*, 151-171.

Salas, E., Driskell, J. E., & Hughes, S. (1996). Introduction: The study of stress and human performance. In J. E. Driskell, & E. Salas (Eds.) *Stress and human performance* (pp. 1-45). Mahwah NJ: Erlbaum.

Von Someren, M. W., Barnard, Y. F., Sandleberg, J. A. C. (1994). *The think aloud method: A practical guide to modelling cognitive processes*. London: Academic Press.

Woodman, T., & Hardy, L. (2001). A case study of organizational stress in elite sports. *Journal of Applied Sport Psychology, 13* 207-238.

Yates, J. F. (2001). "Outsider: Impressions of naturalistic decision-making. In E. Salas, & G. Klein (Eds.), *Linking expertise and Naturalistic Decision-Making* (pp. 9-33). Mahwah, NJ: Erlbaum.

Zsambok, C. E., & Klein, G. (Eds.) (1997). *Naturalistic Decision-Making*. Mahwah, NJ: Erlbaum.