Police officers work in risky environments, and regularly apply threat identification and management strategies to a variety of situations. These strategies include identifying the source and imminence of threats, and potential consequences, within short timeframes. Whether, and when, to use force is calculated against the need and implications of doing so, in order to protect police officers and the community. In these circumstances, police organisations have traditionally relied upon a rational choice decision-making model to assess and manage risk, and the correlated use of force.

This Briefing Paper examines the challenges in applying a rational choice model by police officers who have to manage stressful situations that may require the use of force. These challenges include the sequential assessment of an ideal response from a range of potential responses, while incorporating flexibility and timeliness into the decision-making process. This paper outlines an alternative model by which police officers may undertake risk identification and management processes, being naturalistic decision-making. Although the naturalistic decision-making model has been implemented in other risky occupations (for example, the military) its application to the work of police officers has received little attention. This Briefing Paper details why the naturalistic decision-making model is highly applicable to risk identification and responses, and the use of force, by police officers. The paper concludes by outlining a research proposal which incorporates a scenario-based assessment tool.

This Briefing Paper highlights the work of CEPS researchers in the Use of Force project, one element in the wider Frontline program of research.

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Frontline Police Officer Assessments of Risks and Decision Making During Encounters with Offenders

Professor Geoff Alpert and Assistant Professor Jeff Rojek

Overview

In general, 'risk assessment' and 'management' are simple concepts, with the objectives being to identify hazards that may contribute to harm or injury, and then to implement procedures that reduce hazard exposure (Head and Horn, 1991; National Research Council, 1993). In order to achieve those objectives, a deliberate and rational decision-making effort is required. This exercise involves an analysis of the probability that loss or harm will occur from a particular event, and the seriousness or extent of loss or harm among alternative courses of action. In theory this is an easy exercise, but in practice the process can be more difficult. It requires finding a balance between actions with a high probability of occurrence but low loss, versus actions with high loss potential but a lower probability of occurrence. This risk management decision-making process is often aided by complex statistical procedures for estimating probability and outcome (National Research Council, 1993; Stern & Fineburg, 1996).

While rational decision-making efforts are important to the operation of police organisations, they must be supplemented with risk assessment and management tools for the individual officers who assess risks and threats, and respond to them in a real-world, fast-paced environment. In other words, while the organisational decision-making model is appropriate for static and stable environments it lacks the flexibility required by police officers who have to make 'split-second decisions'. It is well known that, while policies provide procedural guidance, they do not necessarily cover all contingencies in the real world, and may not correspond to live-action sequences. Decision making in police-citizen encounters often requires officers to assess threats and risks, and respond accordingly, to control an offender in circumstances that are tense, uncertain, and rapidly evolving (see Alpert and Dunham, 2004). Therefore, officers need to be prepared to assess threats and risks, and know how to respond to protect themselves, the public and their agency.

The purpose of this essay is to offer a model for explaining the risk management decision-making processes of police officers during potentially dangerous encounters with citizens. Although naturalistic decision-making (NDM) is an accepted part of military doctrine, its use represents a paradigm shift for the police who have relied on traditional rational decision-making based models of risk management. We will introduce and discuss briefly the core concepts of naturalistic decision-making in the context of how officers assess and respond to threats and risks in citizen encounters, and propose a research project using scenario-based training evaluations to improve officers' abilities to understand and manage these situations in real-world environments.

A Naturalistic Decision-Making Model of Risk Management

The naturalist decision-making approach is designed specifically to focus on how individuals make decisions in dynamic, uncertain and quickly developing situations. One of the best examples of this research comes from Klein's (1997) work with commanders in fire-fighter crews. Klein (1997) found that commanders rarely engaged in a comparative evaluation of alternatives, as would be expected under the rational decision-making model. Instead, they would typically engage in a process of assessing the situation by searching for, and understanding, the available cues in order to form an interpretation of the situation – that is, to "size up" the situation[1] - and then choose a course of action. If the situation was recognised as familiar or typical, the manager would then apply commonly used goals and responses for resolving the situation, while remaining cognisant of the potential for unanticipated contingencies that may require an adjustment in interpretations and responses. When situations were more complex or ambiguous, the managers would search for more information to develop a better understanding of what he or she was facing. Commanders will draw on their experience to reach the most plausible solution to resolve the situation from the interpretations they have formed. In an ideal world, they would be trained to engage in a process of mental simulation and visualisation to determine if the chosen solution would work, according to their understanding of contingencies in the current event. If they did not believe that a solution would work, they would mentally simulate the next most plausible solution, and continue to engage in this process until a solution was reached that they felt would work.

In other words, Klein's (1997) fire commanders did not engage in a rational process of comparing multiple alternatives of action at once, but instead would act on the first alternative

they determined to be a solution to the problem. They would assess a given situation, and select a response based on their interpretation, knowledge and experience. If that response failed to resolve the threat or problem, they would move to another action. While the rational choice model assumes that decision-makers evaluate multiple alternatives and choose the best one as a course of action, Klein (1997) found that decision-makers in the dynamic situations he studied retrieved singular responses based on experience and then, through mental simulation, decided on the next best response until a situation was resolved. This sequential process differs significantly from the multiple comparative or rational processes, and provides the ability to assess and manage risk more efficiently in dynamic and time-compressed conditions. Klein (1997) additionally notes that experience is key to effectively identifying and responding to hazards in this decision-making process. He asserts that fire commanders who have been involved in the greatest variety of situations have the best knowledge base and repertoire of situational interpretations, and therefore their responses are more successful (Kahneman and Klein, 2009; Lipshitz, Klein, Orasanu, & Salas, 2001).

Another way to consider risk assessment and management comes from Douglass (1986) who studied the influence of social groups and social environments on decision-making. Douglass (1986:83) stated that "The social environment in which the decision-maker finds himself determines what consequences he will anticipate [and] which ones he will ignore." In other words, it is a person's general experiences, as well as the specific social interaction, that helps define the perceived level of risk, and how it is interpreted and answered (Zinn, 2008). Risk assessments are a dynamic process, a social way of thinking, and ways in which people enter into interactions with people and places (see Emirbayer, 1997). Based on the assessment of risk in a given situation, officers will make informed decisions about how to behave and what tactical actions to take (or not take) and against whom (Dror, 1992). Individuals develop

schema to organise their perceptions of people, objects and places.[2] These allow for pattern recognition and are often stored in "hidden memory" (Patrick, 1992). In dynamic situations, where there is ambiguous, conflicting or missing information, decisions are made on information learned by the officers as the encounter develops, and it is in this context that the officers use prior experiences to form a response (Smith and Alpert. 2007; Schraagen, Chipman, & Shalin, 2000; Dror, 2007; Goodwill et al. 2010).

Monk (1998) adds to this decision-making perspective by creating a more discrete version of the standard feedback model. Monk (1998) reports that decisions in these environments are often based on how individuals observe or perceive the situation, what they recognise as familiar, and how they respond or act. Other research findings support the naturalist decision-making theory and describe how individuals use different decision-making strategies depending on the nature of the situation, time available and perceived risk. For example, Helsen and Starkes (1999) explain that the way information is looked at and interpreted is just as important as the nature of the information that is observed. The goal in making proper interpretations and decisions is to create an adaptive capability that facilitates quick decision-making processes to resolve any encounter in which an individual has become involved (Flin and Arbuthnot, 2002; Chichton and Flin, 2001; Endsley, 1997: Cannon-Bowers, Burns, Salas, & Pruitt, 1998; Kaempf et al., 1996).

Taken together, the naturalist decision-making model and influence of the social environment provide comprehensive insights into risk assessment and decision-making strategies taken by police officers in routine and potentially dangerous situations. Experienced decision-makers use situational awareness to assess risk

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1 This process of identifying situational cues and forming interpretations is similar to Weick's (1979; 1995) articulation of sensemaking.

2 It is also important to recognize that such schemas may form general biases as well, which can result in the application of incorrect interpretations to specific events, and the ecological fallacy (e.g. Good & Brophy, 1990; Grant & Holmes, 1981; Noseworthy and Lott, 1984; Sherman, Judd & Park, 1989; Robinson, 1950). For an application of this illusory correlation in policing see Smith and Alpert (2007).

and to implement courses of action. These decision-makers do not appear to compare their possible options or alternatives, but assess and interpret the situation and act on what they think is the best option (Klein, 1989, Crichton & Finn, 2002; Endsley and Garland, 2000). Situational awareness is a multi-dimensional concept that includes the 'knowing and understanding of what is going on around you,' and consists of three general steps: perception of cues and environment; comprehension, which includes the interpretation, storage and retention of information; and projection, which is timely decision making for action.

The Application of Naturalistic Decision Making to Policing

The naturalistic decision-making model has been applied to risk management scenarios in fire-fighting, small army units, nuclear power plants, and nursing (Klein, 2008), but has surprisingly garnered little attention in policing circles. Consistent with the naturalistic decision-making premise, policing scholars have recognised that officers often work in uncertain, unpredictable and time compressed environments, including situations where they face threats to themselves or citizens (e.g. Crank, 1998; Manning, 1997; McNulty, 1994). In one of the few empirical efforts to recognise this link, Rojek (2005) framed the collective risk-management practices of a police tactical unit as naturalistic decision-making, in conjunction with Weick's (1979; 1995) Model of Organisational Sensemaking and High Reliability Theory (e.g. Laporte, 1988; Roberts, 1990; Weick, 1987; Weick & Roberts, 1993; Weick, Sutcliffe, & Obstfeld, 1999).

Rolfe (2005) also makes an important contribution to the discussion of police officer risk assessment and decision-making, arguing that at least three types of knowledge and information are necessary to solve complex tasks. First, declarative or factual knowledge is necessary to determine **what** to do (Gott, 1989). Second, procedural knowledge or a cognitive basis for skilled performance is necessary to figure out **how** to do it (Patrick, 1992), and third, conditional knowledge or adjusting cognitive

strategies is necessary to determine **when** to act (Biggs, 1992). Rolfe (2005) investigated the different ways novice and expert Police Forward Commanders (PFCs) made decisions in high-risk situations. Experts were identified as having more overall experience, specific training and previous command of high-risk incidents, and received greater peer recognition than the novice commander (Rolfe 2005). Rolfe (2005:185) also exposed gaps in knowledge and skills between expert and novice officers in the command of dynamic situations, reporting that "The expert PFCs (officers) proactively sought specific information; they knew what information or cues were salient, recognised and assessed the situation and commanded goal directed courses of action. At all times their decision-making was framed by an understanding (schemata) of the situation and they approached their tasks with confidence. The(se) decision models are similar to those described by Klein (1999, 2003)."

Rolfe (2005) found that the experienced officers made more effective and efficient decisions (including timely decisions) than the novice officers. The novice officers were not able to assess the cues or manage information as well. Compared to the expert officers, the novice officers did not have the reservoir of knowledge or understanding necessary to draw on for accurate decision-making. As Rolfe (2005:189) informs us, novice officers "generally waste time and effort examining as much information as possible when much of that information is relatively unimportant…" Thus, consistent with the NDM approach, expertise is central to the capacity of officers to make quick and effective decisions in dynamic, uncertain and time compressed conditions.

Real-World Scenario Training as a Research Tool

It is our contention that the tenets of NDM may also be a useful tool for understanding the behaviour of frontline officers in citizen encounters, particularly situations that hold a possibility for the use of force. Our knowledge of police use of force is informed by Reiss (1980) and Scharf and Binder (1983) who suggest

that police-citizen encounters involve multiple frames. At each frame or stage, the probability of moving to the next is likely influenced by preceding decisions. The four-stage process suggested by Scharf and Binder (1983) includes: (1) anticipation, where the officer becomes involved in an encounter; (2) entry into the situation and determination of the inherent threat; (3) information exchange, which may be short or drawn out; and (4) the final frame, where the final decision is made on whether or not to use physical force.

We suggest that real-world scenario training be used to provide a research setting where recruits and officers, who go through a series of planned encounters based on real-world events, are evaluated by their trainers and then interviewed and de-briefed to determine what stages they go through when assessing threats and risks. Specifically, they should be asked what cues they see and how they use them, what parts of the environment are important, how they store and retrieve information on which their decisions are based, and why they selected particular responses. All officers' records concerning assignments, specialised training, and previous use of force incidents should be compared so we can learn if those differences explain variance in assessment strategies and actions among officers.

Important information about the formation and retrieval of information, aspects of mental modelling, and varying methods of linear and sequential decision making, can be explored during an evaluation of these exercises. As a springboard, we use Rolfe's (2005) research which studied police commanders and incorporate critical questions (see Klein, 1997) which are important to the study of frontline officer decision-making (see Appendix A). The categories of questions cover cues, uncertainty, analogies, goals, basis of choices, standard scenarios, and situation assessment (Klein 1997; Rolfe 2005). While there are a variety of options concerning the design and ways to conduct the research, our purpose in this paper is to suggest a research platform and concepts, with specific measures and procedures to be outlined in a subsequent proposal.

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Appendix A
(Rolfe, 2005:79, based on Klien, 1997)

Table 3.4 Basic Probe Types and Example Questions

Probe Type	Example question
Cues	What were you paying attention to, specifically what were you trying to see/hear at this point in time?
Uncertainty	What do you do if you are uncertain in your thinking or with actions you are directing?
Analogues	Were you reminded of previous experiences?...did you think of one instance or combine similar experiences?
Goals	What were your specific goals at that point in time?
Basis of choice	What course of action did you decide on during this segment of video?...what did you think about in choosing that course of action?
Standard scenarios	Did this case fit a standard or typical scenario?
Situation assessment	What was your understanding of the situation at this point in time?

About the Authors

Geoffrey Alpert has been conducting research on high-risk police activities for more than 25 years, and has published more than 100 journal articles and 15 books. His book is Understanding Police Use of Force: Officers, Suspects, and Reciprocity (with R. Dunham) and was published in 2005 by Cambridge University press. Professor Alpert recently completed a major study on police officer decision making funded by the National Institute of Justice, and an investigation of racial profiling for the Miami-Dade County, Florida Police Department. He is working on a use of force study that focuses on less-lethal technology and the effectiveness of their applications. Dr. Alpert routinely provides commentary for the national networks' evening news programs and morning talk shows.

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