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Suite 740
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Phone: 202-861-0791
Fax: 202-861-0790
www.international-economy.com

The Cognitive Domain of War

BY JAMES BLACKWELL

The role of science in approaching the enemy?

Why do terrorists and insurgents do the things they do? What will they try next?

In the bad old days of the Cold War, we could anticipate what our opponents were thinking because we figured out the logic behind their strategy. We assumed the Russians were rational actors and constructed an elaborate theory—systems theory—to understand and explain their rationality. That theory allowed us to construct a strategy around the concepts of containment and deterrence. It even enabled complicated calculations of how many warheads we needed and what enemy targets we should aim to hit with them.

But today's bad guys don't think that way. They seem possessed of a very different logic, a rationality based more on faith than reason. So we have difficulty anticipating where the next Improvised Explosive Device will be planted or which oncoming car is driven by a homicide bomber. And soldiers die.

This new war in which we are engaged around the globe will not be won in the physical or information domains. In fact, we will lose if we fight primarily by killing people and breaking things. We can only win this Long

James Blackwell is Vice President of Defense at DeticaDFI, Inc.

We invested vast resources in the second half of the twentieth century to developing systems theory and applying it to the fundamental questions of war and peace in that day. It is now time to embark on investment of a similar magnitude of time, money, and brainpower to discovering the underlying mechanisms of the cognitive domain of war.

War in the Cognitive Domain—the place where we perceive, feel, think, and decide. Yet we understand far too little of this place. We have no maps, little theory, few implements, and no doctrine. We should build on our experience and reputation for winning wars the classic way by deepening our expertise into the Cognitive Domain.

Science is revealing much about what happens in the cognitive domain of human behavior. Chess master Gary Kasparov once remarked that intuition enabled him to beat IBM computers in chess. Furthermore, Kasparov believed that intuition assisted and empowered the game's superior players to win competitions despite defying analysts' best post-match examinations. Some of this kind of work has been popularized by such literature as *Blink: The Power of Thinking Without Thinking* by Malcolm Gladwell. There is much more to this in the empirical research—an emerging understanding of how intuition works and perhaps how it can be harnessed to think more effectively during military campaigns and make better wartime decisions.

The 2002 Nobel Prize in Economics went to a Princeton psychologist, Daniel Kahneman, who suggested that most human decisions are based on intuitive judgments, not rational thinking. He points out, however, that the biases that skew our thinking are nevertheless generally successful in leading us to behaviors that work. Gary Klein has developed a model of such thinking, "The Recognition Primed Decision Model," that he uses to help his clients develop training routines and procedures to maximize the potential for success in complex challenges confronting teams and groups. Harvard's Steven Rosen presents evidence to prove that much of our war-like thinking and actions are driven by chemistry—hormones and proteins.

Ethologists study how animals behave, emote, and perhaps think. They have learned much about animal behavior that should be considered in our understanding of war. Animals seem to reveal observable indicators of internal cognitive processes. For example, research shows that a rabbit judges whether a bird flying overhead is a threat by discerning whether the bird flaps its wings or soars. If it soars, it is a predator and the rabbit adjusts its behavior accordingly by hiding or standing still. Are our enemies sending us behavioral cues revealing what they are planning next? If so, how can we sharpen our senses to read these cues and gain the advantage?

The Max Planck Institute in Berlin is the pioneering force behind the empirical research on a form of intuition known as "Fast and Frugal Heuristics." Their intriguing experiments included demonstrations that inexperienced people off the street, using simple rules of thumb, can do just as well or better at making money than experienced stock market analysts who use sophisticated trading software. These experiments potentially provide tan-

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talizing insight into the nature of the Cognitive Domain of War.

Experienced basketball players have discovered their own fast frugal heuristic known as "Feed the Hot Hand." They believe that they should give the ball to a player more often if that player has hit a number of shots in a row. One set of experimenters, Gilovich, Vallone, and Tversky, show that successive shots are in fact independent events and view the Hot Hand as a heuristic bias. But other experimenters, such as Bruce Burns, conducted simulations showing that streaks are predictive of a player's shooting percentage and belief in the hot hand is a fast frugal heuristic for deciding how to allocate shots among team members, that is, "Who gets the next shot?" Could insurgents be applying a similar kind of logic in deciding who gets to be the next suicide bomber?

Sometimes our intuitions, especially those based on experience, can be just as effective, and sometimes more efficient, at producing good decisions in battle as the systems theory approach. There is a complicated and data-intensive approach to decision-making in battle, taught by the military's staff colleges, known as the Military Decision Making Process. But Klein has found that today's battle captains are quick to assume great risk in the absence of adequate situational awareness and leap to conclusions about what to do based on tacit knowledge derived from their professional military education, realistic training in virtual combat environments, and an innate confidence in themselves and their soldiers' moral and physical makeup. German psychologist Gerd Gigerenzer's theory of fast and frugal heuristics can be applied to understanding decision making for war fighting.

There is math to go along with understanding the cognitive domain of war. The relationship between a population of predators and a population of prey in a given habitat can be modeled by paired differential equations first enumerated by two scientists working separately on the problem of keeping the number of varmints in check. These are the "Lotka-Volterra" equations. What the Lotka-Volterra equations can reveal, for example, is the complex, deterministic relationship between the numbers of foxes and rabbits in a particular habitat. Can we develop analogous theorems and models to simulate or predict what will happen in a counterinsurgency campaign?

It turns out that there are physiological, psychological, and sociological indicators of cognitive processes. We should do more basic and applied research in these areas, but in the meantime there are a number of potential military capabilities that ought to be pursued. At the tactical level, we might be able to give soldiers at checkpoints protocols for recognizing threats such as suicide bombers and distinguishing them from innocent civilians. There may be technologies that can rapidly perform the sensing and rapidly cue soldier responses—for example, shoot versus don't shoot. At the operational level, we should be able to build cognitive assessment centers where behavioral scientists could anticipate the enemy's next moves—for example, where is the next array of improvised explosive devices likely to be emplaced—then guide countermeasures and operations. And at the strategic level, why don't we try to gain insight into the cognitive processes that govern the campaign planning and warfighting of Iran, North Korea, or China in order to develop our own strategies?

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Non-Linear Predator-Prey Models

R(t) = the number of rabbits and *F(t)* = the number of foxes alive at time *t* then the Lotka-Volterra model is:

$$dR/dt = a*R - b*R*F$$
$$dF/dt = e*b*R*F - c*F$$

where the parameters are defined by:
a is the natural growth of rabbits in the absence of predation;
c is the natural death rate of foxes in the absence of food (rabbits);
b is the death rate per encounter of rabbits due to predation; and
e is the efficiency of turning predated rabbits into foxes.

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