FEATURE ARTICLE

Naturalistic Decision Making + Macrocognition

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We hear many opinions about whether our community should retain its title of *Naturalistic Decision Making*, or should shift to *Macrocognition*, or should consider some other description altogether. After many discussions, we want to recommend a compromise – actually, more than a compromise. A blending of these viewpoints.

For over a quarter of a century we have used the label *Naturalistic Decision Making* (NDM) to name our community and title our conferences (12 conferences, to date, with the 13th planned for June 2017 in Bath, England). By now, the NDM brand has become somewhat familiar.

What is central to NDM is our curiosity about messy contextual features which are difficult to quantify and impossible to control, but which are essential to understanding how people actually make decisions. These features include vague goals, organizational constraints, uncertainty, team coordination, and especially experience, often decades of experience.

But during those 25 years, we have expanded our interests and perspective. We are now interested in more than decision making. We also study sensemaking, and problem detection, and planning with wicked problems.

Sensemaking, coordinating, managing uncertainty, and other cognitive functions that allow people to cope with complexity are covered by the term *Macrocognition*. The distinction with *micro*cognition has been elaborated in a number of journal publications and book chapters. It originated in the writings of a number of researchers, who were working independently. The distinction has a history in the literature on the philosophy of cognitive psychology and applied cognitive psychology. Many of the *macro*cognitive processes do not appear in classic textbooks on *micro*cognition, but these processes, illustrated below, are very important to the professionals that

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(continued) we serve. And our study of macrocognition embraces the same messy contextual factors that originally sparked NDM research.

So we have an opportunity to take advantage of both terms, Naturalistic Decision Making and Macrocognition. NDM is a community of practice, and we think it makes sense to continue to be known as the NDM community. We are NDM researchers.

By retaining the NDM term, we are reflecting our origins — our initial discovery that we could study decision making in natural settings and make unique and important contributions. And now we are broadening that naturalistic inquiry to include so many other phenomena.

Many of the people we interact with, such as clients, sponsors, students, and collaborators, appreciate the importance of decision making and the need to explore ways to improve decision making. In contrast, a term like *macrocognition* is not immediately understandable: The term *cognition* can come off as jargon, and adding *macro* doesn't help, although it seems that the European wing of the NDM movement is more comfortable with the *macrocognition* label than the U.S. wing. To further add to the confusion, the term *Naturalistic Decision Making* is sometimes interpreted as a cognitive process or model rather than a community of researchers.

It is unlikely that we can ever eliminate all confusion, but at least we can try to be more clear among ourselves. We want to reflect the broader macrocognitive framework we have evolved into. Our intent is to understand these processes more fully and find ways to help people carry them out more successfully. We have made important discoveries about sensemaking, uncertainty management, team coordination, problem detection, and the development of expertise, as well as decision making.

Therefore, we assert that **the NDM community studies macrocognitive processes**. This formulation blends both traditions. We welcome your comments — please send them to any or all of us: gary@macrocognition.com, rhoffman@ihmc.us, lmilitello@applieddecisionscience.com.
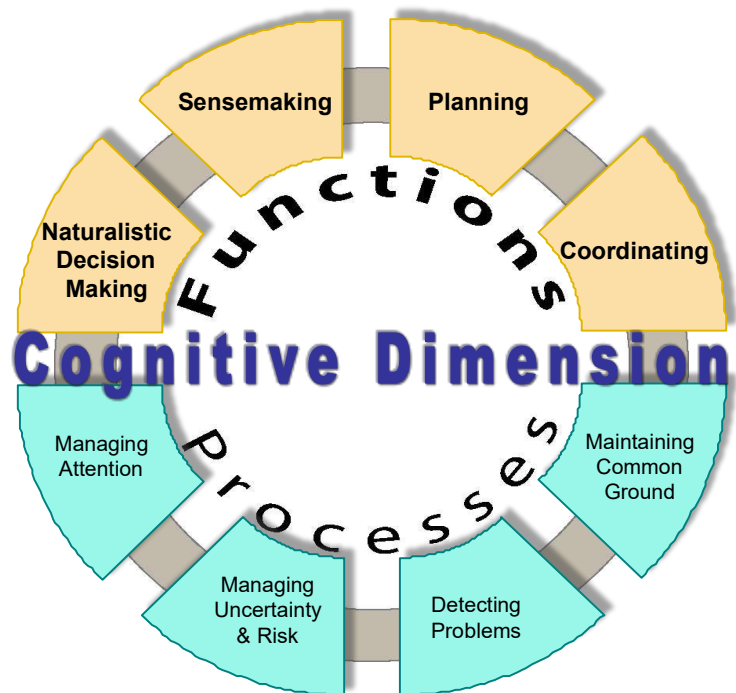
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Gary Klein, is Senior Scientist at MacroCognition LLC. He received his Ph.D. from the University of Pittsburgh in Experimental Psychology. He taught at Oakland University and served as a Research Psychologist at Wright-Patterson AFB. In 1978 he started Klein Associates, which he sold in 2005. He formed a new company, ShadowBox LLC, in 2014. He has written five books, including Sources of Power: How people make decisions, and Seeing What Others Don't: The remarkable ways we gain insights. He formulated the Recognition-Primed Decision (RPD) model and helped to found the Naturalistic Decision Making movement in 1989, and the Cognitive Engineering and Decision Making Technical Group of HFES in 1995.

Robert Hoffman is a world leader in cognitive systems engineering and Human-Centered Computing. He is a Fellow of the Association for Psychological Science, Fellow of the Human Factors and Ergonomics Society, Senior Member of the Association for the Advancement of Artificial Intelligence, and a Fulbright Scholar. His Ph.D. is in experimental psychology from the University of Cincinnati. His Postdoctoral Associateship was at the Center for Research on Human Learning at the University of Minnesota. Hoffman has been recognized internationally in psychology, remote sensing, human factors engineering, intelligence analysis, weather forecasting, and artificial intelligence—for his research on the psychology of expertise, the methodology of cognitive task analysis, HCC issues for intelligent systems technology, and the design of macrocognitive work systems.
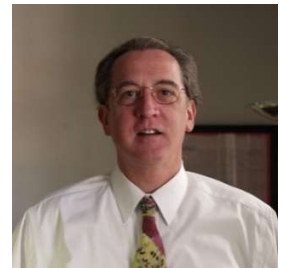
Laura G. Militello, M.S. is co-founder and senior scientist at Applied Decision Science, LLC. She has been a member of the Naturalistic Decision Making community since 1991; has attended nine of the twelve previous NDM meetings; and has contributed to five edited volumes on NDM and two special issues. Her research interests include studying decision making in complex settings, and strategies for supporting expertise via technology design and training.

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