

Extending Hypothesis Testing of Edge Organizations Using Functional Magnetic Resonance Imaging (fMRI) During ELICIT

15th Annual ICCRTS Conference

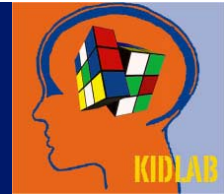
Layne Kalbfleisch, M.Ed., Ph.D. – 2E & KIDLAB GMU

Mark E. Nissen, Ph.D. - Center for Edge Power - US Naval
Postgraduate School

June 24, 2010/ Paper #123



ELICIT Research



ELICIT: multiplayer online game

- ◇ Counterterrorism intelligence domain
- ◇ Like game Clue: ID fictitious terrorist plots

Used for C2 experimentation

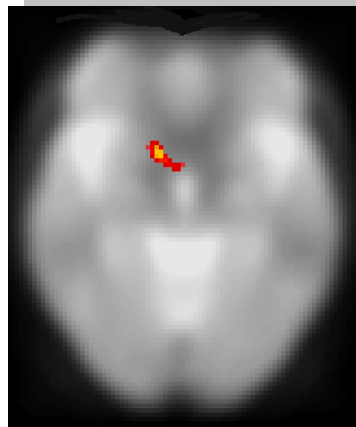
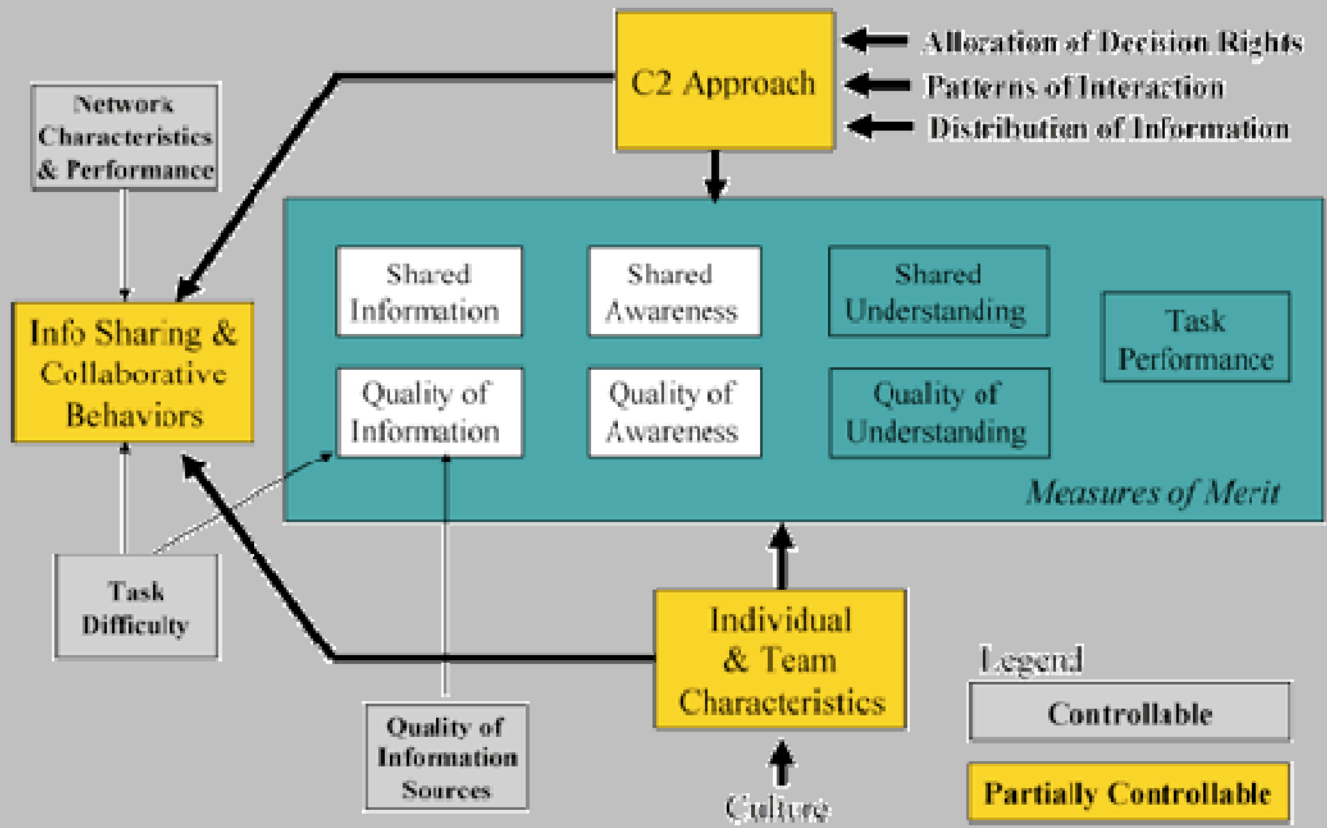
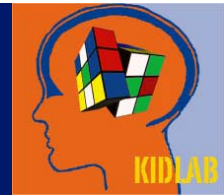
- ◇ Examine organization forms, learning, trust, culture, media richness, virtual environments, others

Open questions

- ◇ Individual differences & team performance
- ◇ Neurophysiological roots

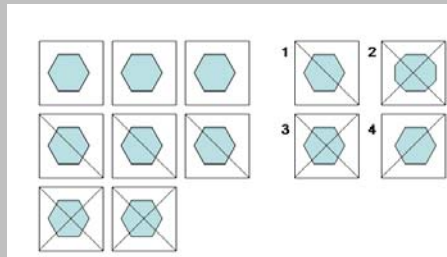
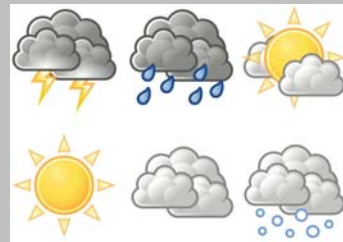
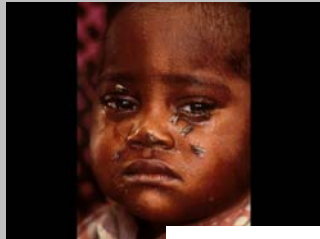
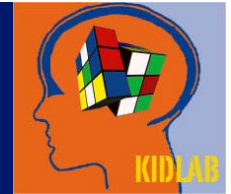
Interested in understanding linkages

Key ELICIT Variables



Neural measure of **uncertainty** during a fluid reasoning task where no direct feedback is given (orbital frontal cortex, BA25). *Kalbfleisch et al., 2007*

The 'Fix Cycle' Systems of Reasoning



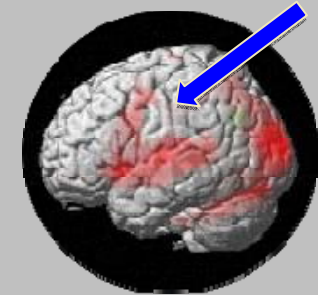
(Kalbfleisch, 2008, 2010)



(Lange et al., 2008)

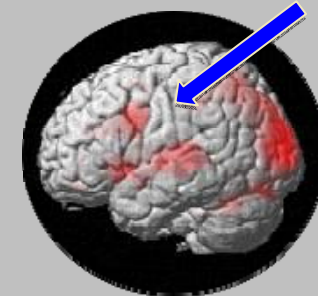
Varying Conditions and Contexts

- Deadline Pressure
- Difficulty Level
- Uncertainty
- Emotional State
- Individual Strategy



Visual Context and Complexity

(Stoneham et al., *SFN*, 2008,
Debettencourt et al., *OHBM*, 2009,
Halavi et al., submitted)

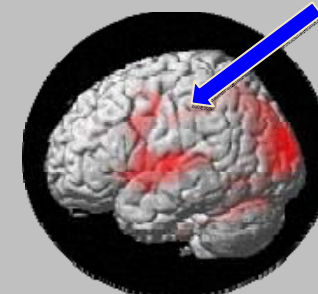


Hard to Control for but Still Matters:

Motivation (limited models)

State v. Process

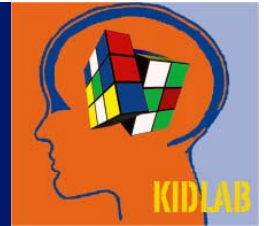
(Kalbfleisch et al., *Cognitive
Neurodynamics*, 2006, 2007;
Kalbfleisch, 2009, Roberts et al., 2009)



Behavior Paradox in Autism

(Brar, Kalbfleisch et al., *OHBM*, 2009)

Trust isn't a new commodity:
noun, verb, adjective

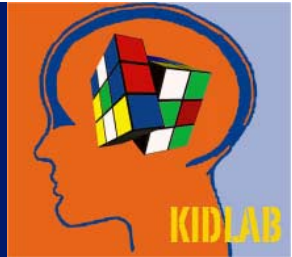


Using performance data from **ELICIT** (Alberts & Hayes, 2003) to guide an articulation of reciprocal influences of the environment on the nervous system and consequential **EDGE** (Leweling & Nissen, 2007) performance & behavior.

Physical - Social - Perceived - Implicit



Tools to Help Match Our Inherent Characteristics as Individuals to our Behavior in Groups



Methods for stimulating/priming/matching receptivity to specific types of information

fMRI-EEG Modalities



Neuroimaging – *where* are these systems, *how* do they connect and communicate, how do they characterize **what** someone can do? how are they **changed by experience**?

Knowledge at that level can **re-calibrate** how to **instruct/support/assess/enrich** learning and performance, making someone their most flexible, responsive and agile during individual and team performance.

Further infusion of CONTEXT into experimental design (Kalbfleisch, 2008, 2009)

***Awareness/Affect/ELICIT* (Kalbfleisch & Nissen, 2010)**

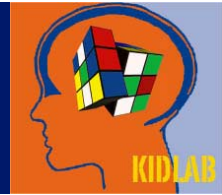


Kappametrics, Chantilly, VA





To continue the conversation



Layne Kalbfleisch, M.Ed., Ph.D.

Associate Professor

KIDLAB GMU (<http://krasnow.gmu.edu/kidlab>)

2E (Layne.2E@gmail.com)

Mark Nissen, Ph.D.

Director, Center for Edge Power

Naval Postgraduate School

<http://www.nps.edu/Academics/Centers/CEP/index.html>

MNissen@nps.edu