Neuroscience Methods and Organizational Research

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LEADERSHIP...
“Don’t quit your day job”
Presentation Goals

1. Consider the theoretical, methodological, and ethical issues surrounding applications of organizational neuroscience
2. Provide some examples of recent research
3. Conclude with cautionary issues and considerations for “getting into the game”
Popular Books about the Brain
ORGANIZATIONAL NEUROSCIENCE

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LEADERSHIP...
Specific Domain: The Organizational Neuroscience (NEU) interest group is dedicated to using neuroscience knowledge and approaches at different levels in organizations, as well as promoting linkages to management practice.

We encourage knowledge generation through theoretical propositions and/or empirical evidence pertaining to the neural mechanisms associated with behavior in the workplace. Concurrently, the interest group seeks to understand how the environment, culture, and institutions can affect organizational actors’ nervous system functioning. By considering neuroscience at different levels of analysis in organizations, we encourage interdisciplinarity and multi-methods research. Moreover, we stress ethical considerations when using neuroscience technology in workplace research.
Sample Research


What’s going on in this leader’s head that makes him think and behave the way that he does?
LEADERSHIP...
Questions that Inspire Organizational Neuroscience

**With my researcher’s hat on:**

- “How might neuroscience theory and methodologies inform us about individuals, dyads, and teams, beyond our traditional constructs, theories, and assessment methods?”
  - Why must we rely solely on techniques like surveying or observation?
  - How might neuroscience methods help improve “ecological” validity?

**With my practitioner’s hat on:**

- “How can neuroscience help improve individual/team assessment and development efforts?”
  - Can the ROI on such efforts be enhanced through neuroscience?
Why is the Time Right for Organizational Neuroscience?

1. The public (e.g., government, funding foundations, business, etc.) is increasingly seeking new approaches to help answer questions pertaining to management and organizational issues.

2. The issues that managers and organizations face increasingly demand more broad, interdisciplinary research approaches.

3. The technology has increasingly developed to the point of being practical, useful, and cost effective.

4. Our journals are increasingly supportive.
What is neural-assessment in organizational research all about?
Quantitative Electroencephalogrphogram (qEEG)

- Cost-effective
- Non-invasive and no health risk for participants
- Conducive to:
  1. portable assessment in a “natural” setting
  2. producing quantifiable variables that reflect electrical energy at different bandwidths
    - power spectral density
    - coherence (or connectivity)
  3. neuro-feedback for development purposes
Frequencies & Amplitude Bandwidths (or Waveforms)

- **GAMMA**: Active Thought
- **BETA**: Alert, Working
- **ALPHA**: Relaxed, Reflective
- **THETA**: Drowsy, Meditative
- **DELTA**: Sleepy, Dreaming
Vision/ Inspiration
ENVIRONMENTAL ENGINEER
What do We Really Mean when We say that the Brain “lights up”?: Alternative Causal Sequencing

**Causal Sequence**

**Model 1**

- **Stimuli** (relevant to cognition, emotions, and behaviors)

**Model 2**

- **Cognition, emotions, and behaviors**

**Neuro-imaging Assessment**

- Functional (on task)
- Intrinsic (at rest)
Relatively enduring, individual differences in electrical brain activity (or configuration) predict cognition, emotions, and behaviors, such as:

- **leader complexity**

- **ethical leadership**

- **abusive supervisory behavior**
Executive Control

- involved in the inhibition of inappropriate or habitual/automatic responses, such as aggressive outbursts
- emotional regulation to control short-term desires for the purpose of managing long-term, goal-directed behavior
Abusive Supervision Study: Research Methods

- 56 leaders -- 30 military and 26 business (84% males)
- Psychometric ratings attained through internet-based surveys
  - **Self-ratings of:**
    - narcissism (Raskin & Hall, 1979; “I think I am a special person”)
  - **Subordinate/peer ratings of:**
    - political skill (Ferris et al., 2005; “he/she can easily develop good rapport with most people”)
    - abusive supervision (Aryee, Chen, Sun, & Debrah, 2007; “he/she makes negative comments about me to others”)
- *Intrinsic/at rest qEEG assessment of executive control*
GROUP ETHICS CHALLENGE
with EEG

LEADERSHIP...
To better understand how behavior on the part of others (i.e., internal or external stimuli) can induce neural activity and emergent processes in teams

- Wang, D., Waldman, D. A., Stikic, M., Balthazard, P. A., Pless, N., Maak, T., & Berka, C, and Richardson, T. Applying neuroscience to emergent processes in teams. 2nd R&R at one of our major journals.

Possible emergent concepts that could be examined in teams:
- engagement/attention
- emotional contagion/empathy
- shared mental models
Neuroscientists Are Finding That Business Leaders Really May Think Differently

By Presh Tiyarks
And Jaclyn Radal

How do you make a great leader? Pierre Balbuzard starts by wiring electrodes to managers' scalp and recording electrical activity in their brains.

After he completes 500 such scans, the Arizona State University management professor hopes the resulting data will enable him to plot how leading ordinary brains to act like those of leaders.

Mr. Balbuzard says the first 30 scans, of local luminaries, suggest that visionary leaders use their brains differently than others. In the past month, the 45-year-old, who recently retired from the TV network, he's planning to scan 50 West Point cadets.

"We're coming up with the neurons—the brain map—of the leader," says Mr. Balbuzard from his San Luis office, one of 13 licensed with brain diagrams, plastic models and a wind-up toy brain with charting teeth.

Mr. Balbuzard is among a growing number of researchers looking inside the brains for business insights. In the past decade, brain research has fueled more powerful diagnostic tools and an improved understanding of how the brain influences character, personality and behavior.

Researchers have applied neuroscience to areas like economics, finance and marketing. Academics from Stanford University, Carnegie Mellon University and the University of Southern California, for example, used a technique called functional magnetic resonance imaging to identify parts of the brain that influence buying decisions.

Executive coaches and researchers are increasingly turning to neuroscience. Scientists at the University of Pennsylvania and Harvard and Duke universities now teach courses to corporate leaders.

Mr. Balbuzard's work focuses on the left side of the brain, where executive function resides.

"Many of the managers I have been looking at have a predominance of activity in the right hemisphere,"" he says.

Mr. Balbuzard's study involves interviewing managers and studying their electroencephalograms (EEG) while they are making decisions.

"I have a hypothesis that a leader's brain is not just a mass of neurons," he says. "It's a co-ordinated complex of neurological systems, and each has different characteristics."
Can neuroscience help improve the ROI of leader development efforts?
Leader Development via Neuro-feedback: Science Fiction?

- **Neuro-feedback training:**
  1. A neurologically-based norm of effective behavior is established (e.g., Balthazard et al., 2012).
  2. A game or video is displayed on a screen that the trainee can see.
  3. A computer “trainer” (programmed with an algorithm based on the neurological norm of effective behavior) receives information from the trainee’s brain in real-time.
  4. An operant conditioning protocol is then initiated (by the computer trainer) to reinforce the trainee to create new neuro-pathways in line with an established, neurological norm of healthy or effective behavior.

- With neuro-feedback training, the new neuro-pathways become *relatively* permanent.
- Technology has been applied widely in attempts to enhance human behavior, but can it work for leadership behavior *per se*? Is it even ethical for leader development?
Cautionary Issues

Are we engaging in excessive reductionism?

“Socially situated” theory


Takes into account that:
1. neural activity $\rightarrow$ cognition, emotions, and behavior
2. Environment/context $\rightarrow$ neural activity

Are neuroscience applications ethical?

Getting into the Game: Increasing “Approach” and Reducing “Avoidance”

1. **Funding**

2. **Neuroscience expertise**
   - Software, data collection, database management
   - Relevant theory and literature

3. **Sources of expertise**
   - Professional association networking – such as AOM
   - Academic units such as psychology
   - Private firms specializing in neuroscience applications
   - Postdocs
Concluding Thoughts

1. People on the “outside” (e.g., managers, the media, grant agencies, etc.) have shown much interest in organizational neuroscience and its implications.

2. Despite challenges, our mainstream, management, applied psychology, and methods journals have shown interest as well.

3. Neuroscience can be used to help broaden our understanding and assessment of constructs, as well as improve the prediction of important outcomes.

4. Practical implications are on the horizon.
   - Neuro-feedback has the potential to greatly benefit leader development efforts.

5. The time is right for applications beyond a focus on individuals.

6. But with all that said, I have still not quit my “day job”. Instead, I’ve enriched it, and maybe you can too.