



THE ONTOLOGICAL

System:

A Neurocentric Systems Approach for
Classifying the Goals and Methods of Cognitive
Warfare

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#2

DR. ROBERT GUTZWILLER

ARE CYBER ATTACKERS

THINKING FAST AND SLOW?

DR. ROBERT GUTZWILLER

#3

EX CIA OFFICER

JAMES LAWLER

SOULCATCHER: RECRUITMENT OPERATIONS

JAMES LAWLER

#5

DR. ARUN VISHWANATH

THE WEAKEST LINK AND BEYOND

UNDERSTANDING, IDENTIFYING, AND PROTECTING USERS FROM SOCIAL ENGINEERING

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OPERATIONAL CYBERPSYCHOLOGY

SUPPORT TO OFFENSIVE CYBERSPACE OPERATIONS

ERICK MIYARES

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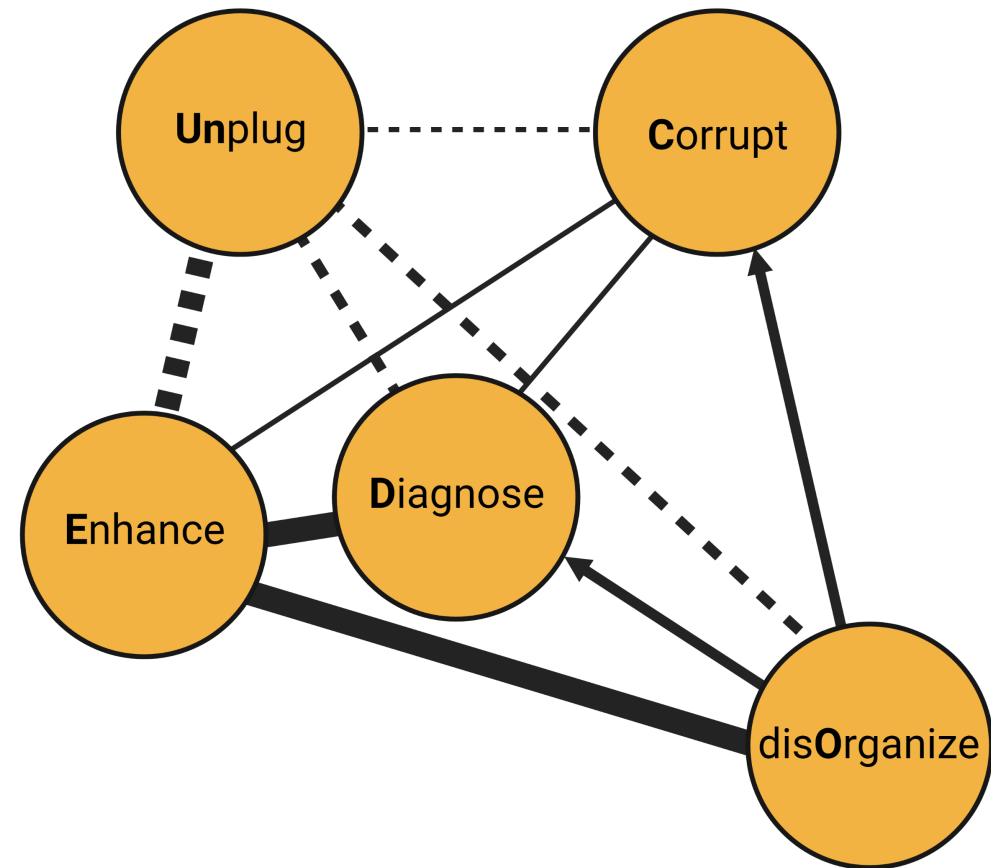


Overview

- Briefly: key characteristics of CogWar
- Neural systems
- The UnCODE system: five classes of goals
- Methods for reaching CogWar goals
- Conclusion

Note:

- Not saying what the current capabilities are;
how to think about CogWar goals and methods



Key Characteristics of CogWar

- System of systems and domain fusion (*Claverie & du Cluzel, 2022; Le Guyader, 2022; Masakowski & Blatny, 2023*)
 - Targets reached through means spanning cyber space and meat space.
 - Several methods can be used to reach the same CogWar goal
- Everyone is a stakeholder (*du Cluzel, 2020*)
- The goal is related to cognition = influencing or monitoring the system where cognition occurs

The Need for a Bottom-Up Approach to CogWar

- Capture underlying principles
- Avoid misconceptions (e.g., mind-body dualism)
- Modular (target, time, and domain agnostic)
 - Include non-human cognition (*Ask & Knox, 2023; Flemisch, 2023*)

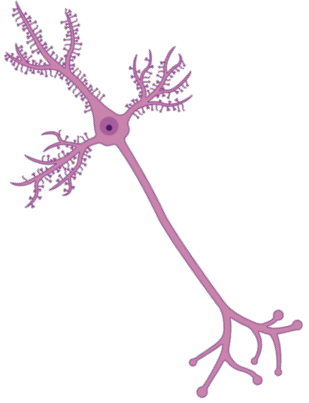
Considerations

- Conducive for common language
- Be actionable to decision-makers

Underlying principles: Neural systems

- A system consisting of neural components: fractal-ish

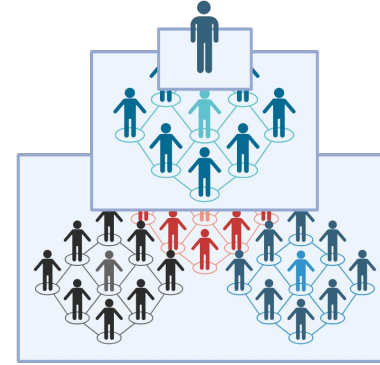
(Sub)cellular



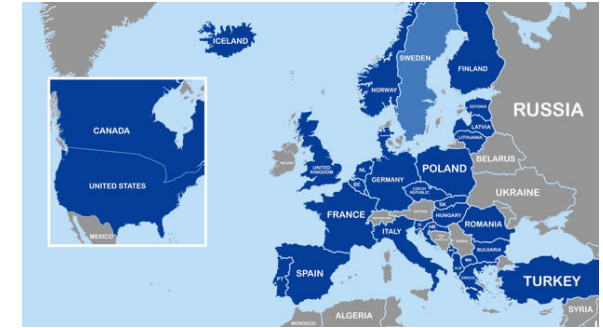
Brain/individual



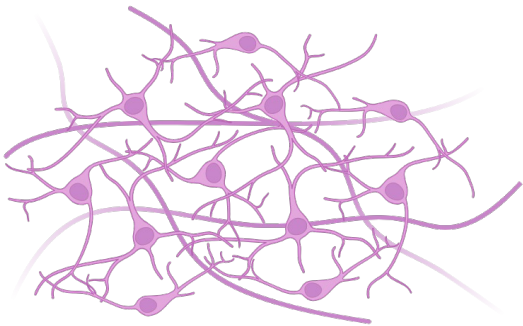
Organizations



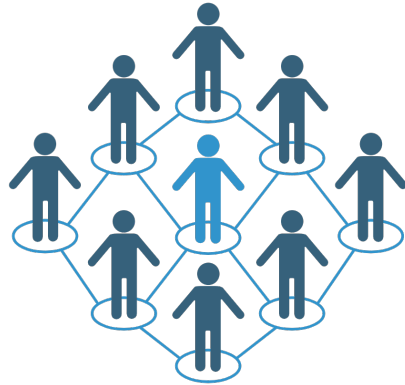
Group of Nations



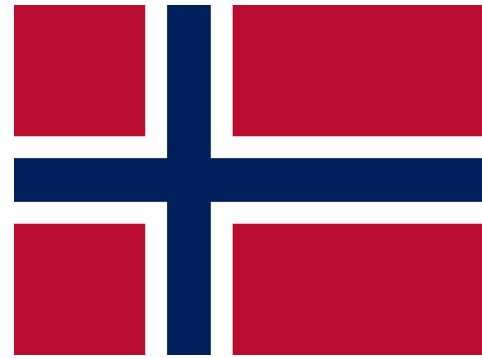
Group of neurons



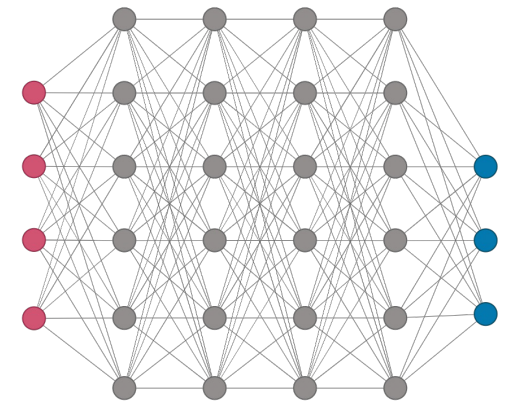
Group of brains



Group of organizations / Nation



Non-human

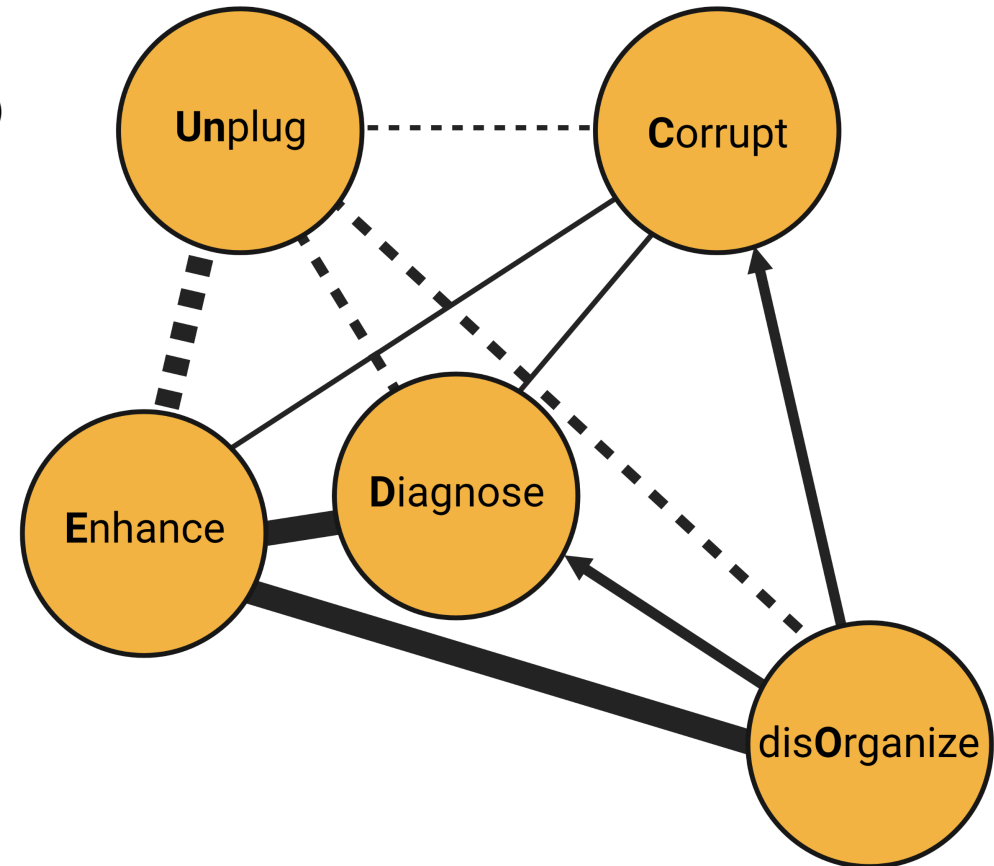


Underlying principles

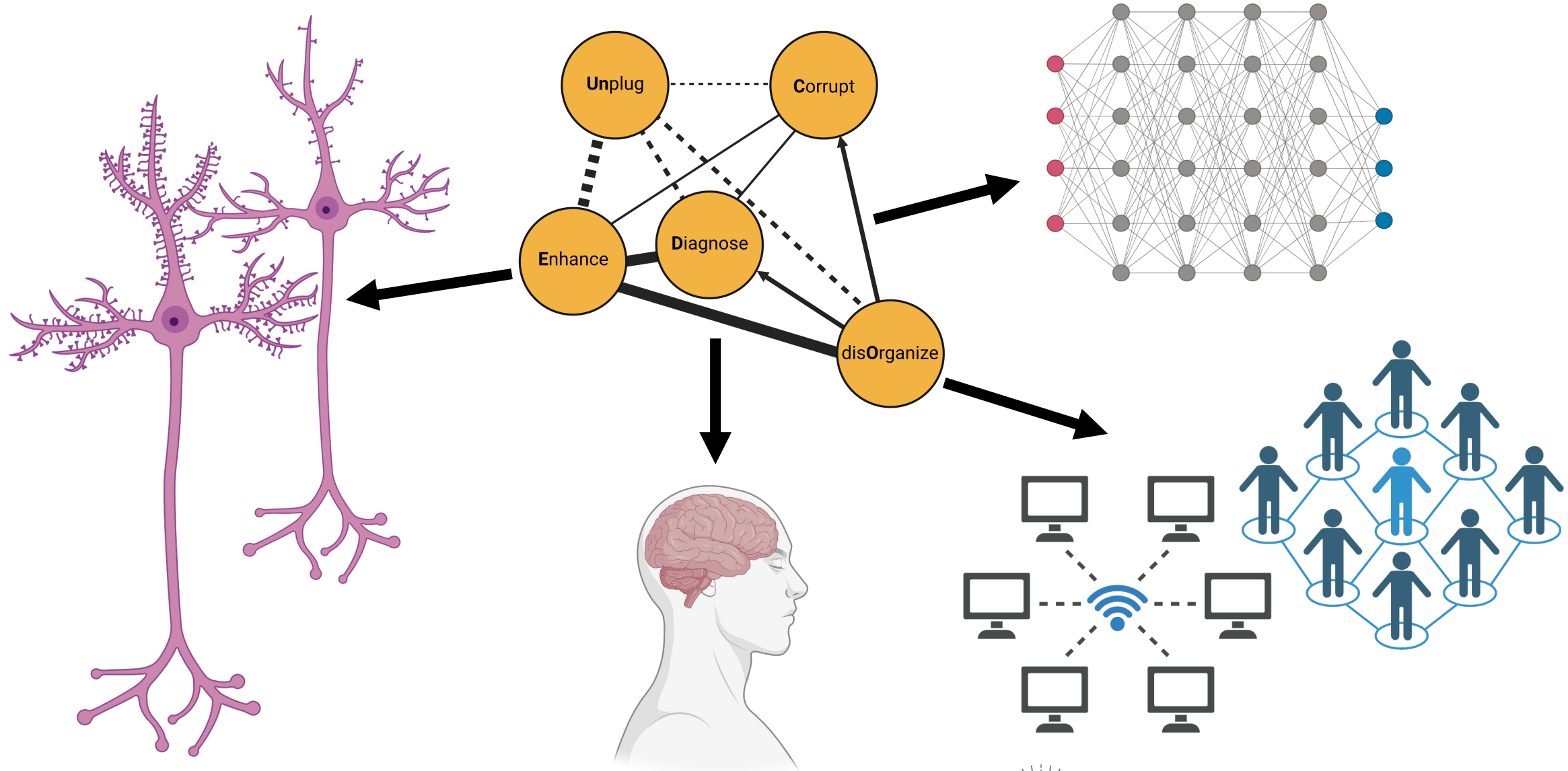
- CogWar goals are based on cognition.
- Cognition occurs in a neural system.
- A neural system is a physical system that processes inputs and produces outputs.
- A neural system changes input-output activity by changing its physical state.
- If a Warfare goal is not concerned with changing the input-output activity (= changing the physical state) of a neural system, it is not a CogWar goal.
- **Note:** Does not distinguish between motor activity, problem solving, perception, decision-making, sleep-wake cycles, etc.

The UnCODE system: Five classes of goals

- 5 goals based on input-output activity
- **Unplug**, **Corrupt**, **disOrganize**, **Diagnose**, **Enhance** (UnCODE)
 1. **Unplug**: eliminate input-output ability
 2. **Corrupt**: degrade input-output
 3. **disOrganize**: bias input-output
 4. **Diagnose**: monitor/understand input-output
 5. **Enhance**: enhance input-output ability



The UnCODE system: Five classes of goals

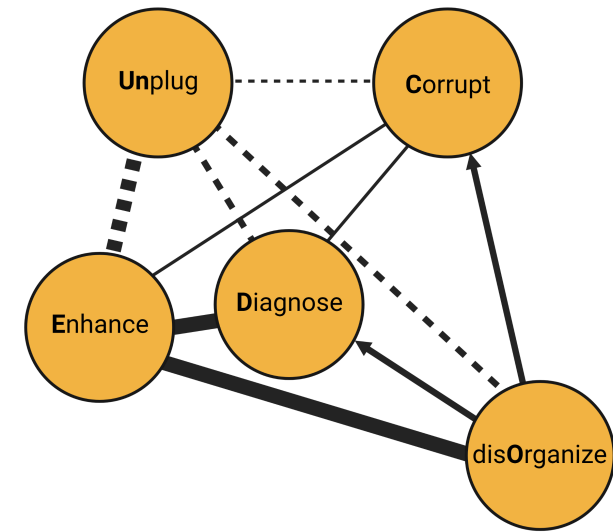
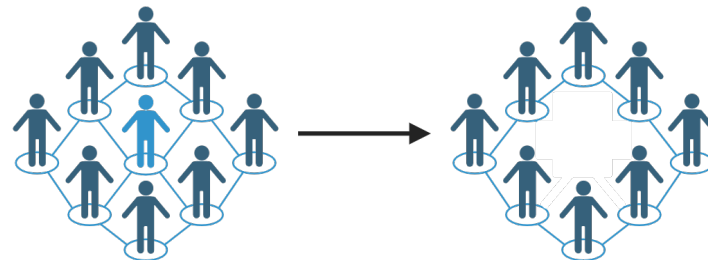


Neural Systems = Cognitive Assets

- Neural systems / Cognitive assets view → Access privilege and intrusion perspective

“The essence of an intrusion is that the aggressor must develop a payload to breach a trusted boundary, establish a presence inside a trusted environment, and from that presence, take actions towards their objectives, be they moving laterally inside the environment or violating the confidentiality, integrity, or availability of a system in the environment.” (Hutchins et al., 2011)

- Information (payload) → change narrative → change perceptions → get military strategist fired (availability)
- disOrganize → Unplug goal.



Methods for reaching CogWar goals

- Influence/monitor neural system → how to get access to the neural system?

Access to neural system

- Direct access or indirect access

Mode of access

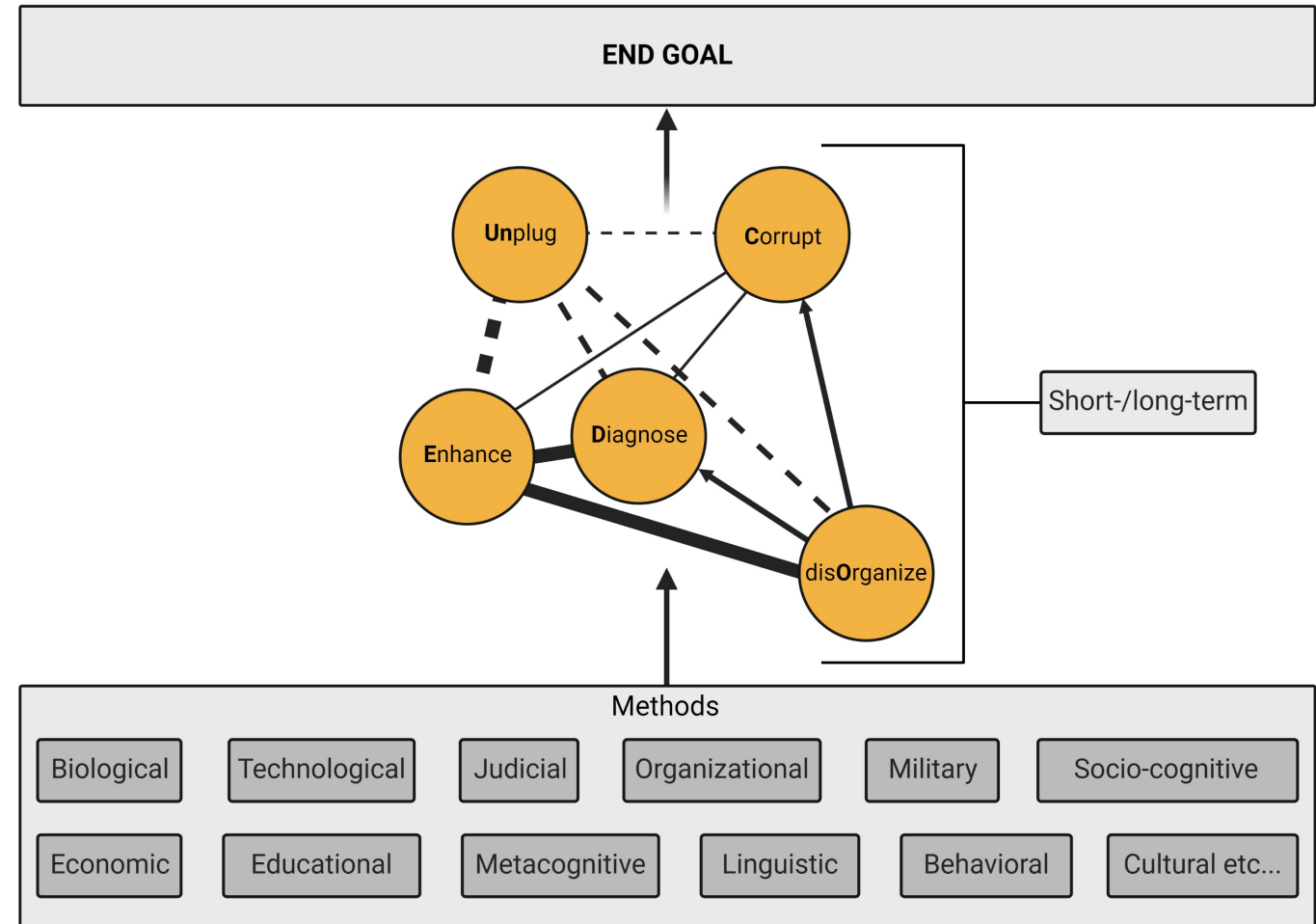
- Direct: privileged or brute force
- Indirect: directed/not directed + neuroergonomic/not neuroergonomic

Methods for reaching CogWar goals

Access to neural system	Mode of access	Description	Example
Direct access	Privileged	Directly interfacing with nervous system, consent from target	<i>Enhance</i> : drugs/virus/brain stimulation to improve performance. <i>Diagnose</i> : electrode implant recordings. Metacognition.
	Brute-force	Directly interfacing with nervous system, without consent from target	<i>Unplug</i> : kinetic force to kill brain. <i>disOrganize</i> : viruses that alter brain function.
Indirect access	Directed and neuroergonomic	Designed for specific target. Based on neural system knowledge	<i>Unplug</i> : Use LLM to identify targets at risk for suicide then convince them to commit suicide
	Not directed, neuroergonomic	Not designed for specific target. Based on neural system knowledge	<i>Corrupt, disOrganize</i> : Addictive apps that hijack dopamine system and bias attention. Increase noise in information space.
	Directed, not neuroergonomic	Designed for specific target. Not based on neural system knowledge	<i>disOrganize</i> : Tailoring a disinformation campaign to a specific group
	Not directed, not neuroergonomic	Not designed for specific target. Not based on neural system knowledge	<i>disOrganize</i> : Propaganda campaign aiming to proliferate a specific narrative

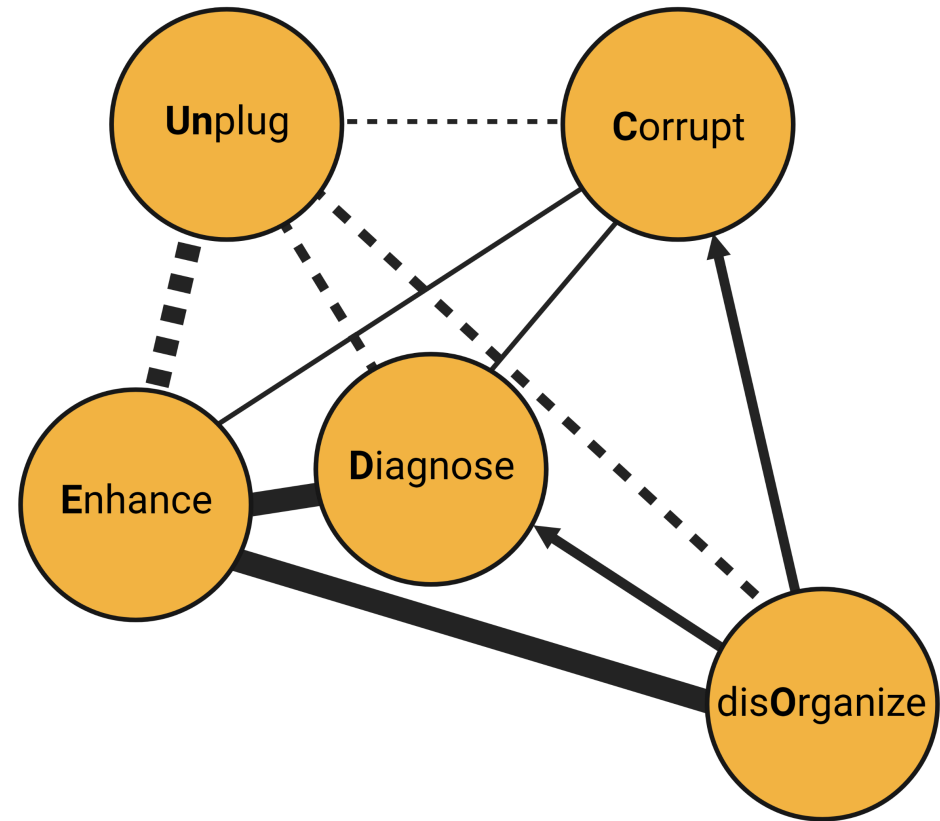
Methods for reaching CogWar goals

- Adversaries may use different methods to reach same goals
- Varying level of sophistication and time scale considered
 - Short time-window → Direct-access, large effect size, short latency
- Hacking neuroprosthetics



Conclusions

- The UnCODE system captures underlying neuroscience principles
- Species, time, and domain agnostic
- Simple and actionable
- Allows for common language



References

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