Workshop: Intersections Between Resilience and Risk

Loughborough University

Water supply, Energy supply, Food supply, Natural resources, Transport and Critical Infrastructures
(Naoki Masuda; network science)

What does Resilience mean to you?:

1. Relatively large “basin of attraction” in dynamics (network or non-network)

2. Functionality of a system (e.g. connectivity of infrastructure network) maintained after some damage to the system (e.g. node removal)

Key Resilience Research Challenges:

1. Judge the resilience or loss thereof from time series data (some work in stat phys / biology though)

2. Implication / application of Barabasi’s framework of resilience (a Science paper) in engineering domains?

Your Current Research Focus:

1. Energy landscape analysis of data

2. (temporal) networks. E.g., targeted attack on networks

What would good look like?

1. Diagnosis of infrastructure (and other) networks. How resilient?

2. Design of resilient networks and their implimentations?

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Perceived Barriers?:

1. Collaboration between theory and applications
2. Collaboration/cross-talk between different applications (chemical systems, ecosystems, engineering like this, financial systems etc.)

What are the consequences - Risks?:

1. Paucity of data?
2. If implementations turn out to be difficult?

Envisaged Breakthroughs Required:

1. Dynamical system approach (Barabasi et al.) applied to engineering problems.
2. Centralised vs distributed systems. Which are more resilient? Trade-offs?
3. Temporal / multilayer networks?

Who needs to do what?:

1. Different teams (e.g. a water team and an theory team) write a joint paper for mutual understanding and bigger proposals.
2. Write a joint review paper (there are already some though). Also find existing notions and methods related to resilience.

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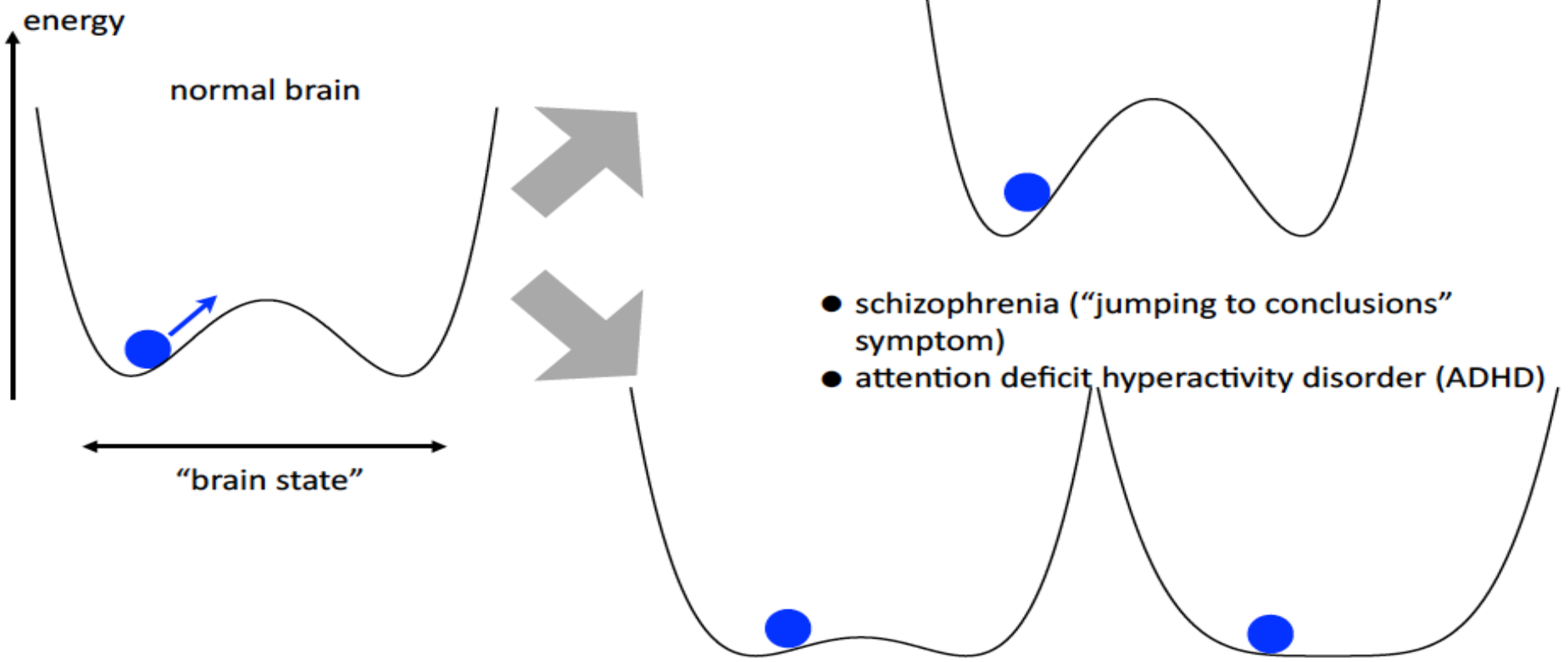

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