

Methods (Pt.3): Manipulating And Measuring



PSYCH 1101

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DAY 4

www.cornellpsych.net

*no food or drink in Bailey Hall
please silence devices

So Far...

- Psychology—the scientific method applied to the study of the human mind (thoughts, feelings, behaviors, etc.)
- We make informed guesses, then collect data (which we use to build better guesses, predict behavior, construct theories).
- Observation and experimentation

Limits To Experimentation

- Not everything can be manipulated through random assignment
 - convenience
 - ethical considerations
- Even if possible, experiments can contain confounds
- Experimentation requires an intentionally constrained, controlled, often artificial environment.
 - may limit prediction in other environments, because the real world is much more complex

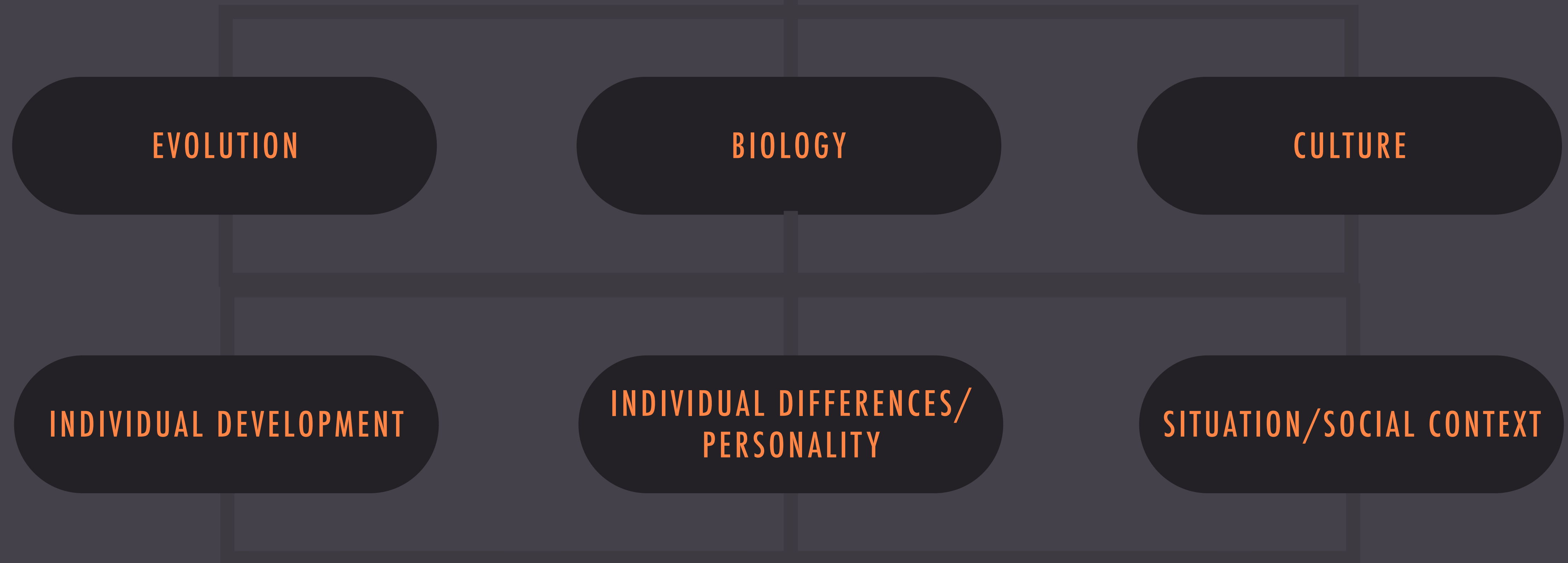


Source: <https://youtu.be/E43-CfukEgs?t=2m45s>

Replication And "Open Science"

What If You Had To Answer This
Question:
What Makes People Violent?

Which Level Of Analysis?



A sample of some methods used by
psychologists

Measuring Emotion

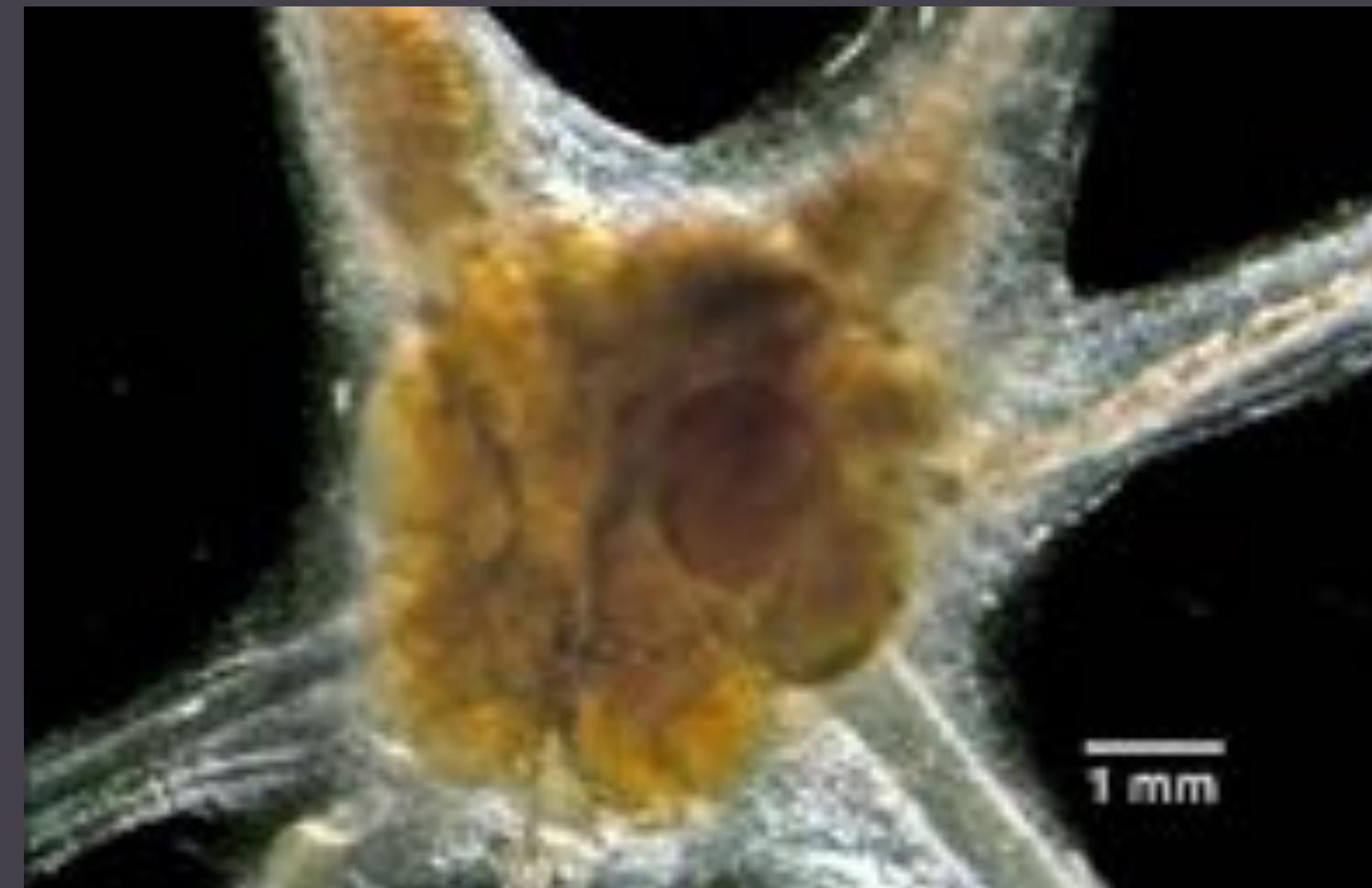


FACIAL ACTION CODING SYSTEM (FACS)



SKIN CONDUCTANCE (AND OTHER PHYSIOLOGICAL AROUSAL MEASURES)

Methods Involving Animals



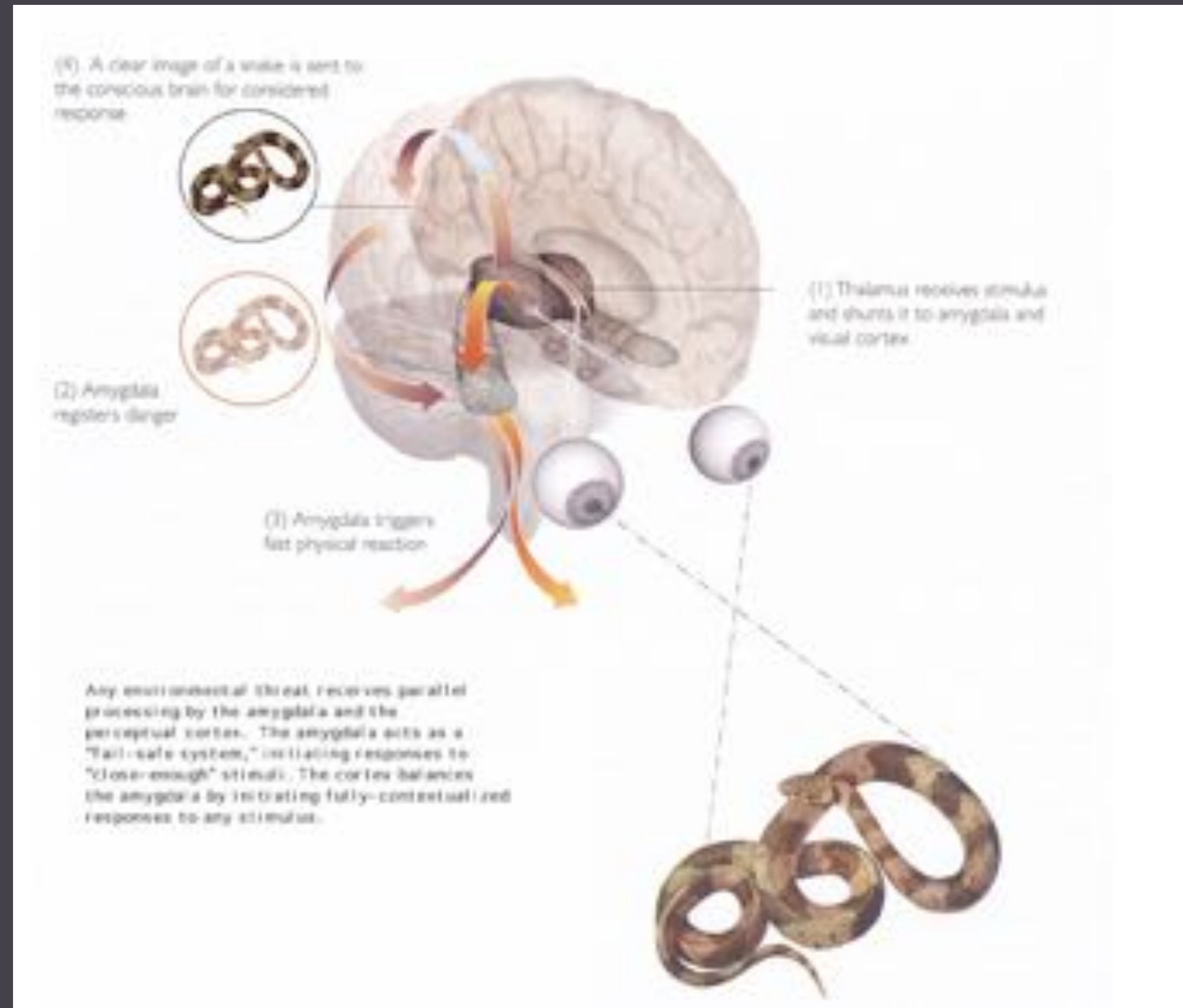
* *Aplysia californica*



**Mus musculus*

*example: fear conditioning

- Consistent pairing of an auditory tone with the delivery of a shock
- Tone by itself causes fear response
- Easily measured in mice (e.g, freezing behavior)





The origins of our mistakes?

Possibility #1

Our environment is designed badly.

Possibility #2

Our minds are designed badly.

from watching the ways that social scientists have learned about human errors.



Methods Involving (Human) Brains

- Measuring brain activity associated with thoughts/behaviors (correlation)
- Naturally-occurring lesions from accidents or disease (quasi-experiment)
- Direct brain stimulation (experimental manipulation)

Example: Electroencephalography (EEG)

- measures electrical activity in the brain
- good temporal resolution (milliseconds)
- poor spatial resolution
- (fairly) non-intrusive



Example: Functional Magnetic Resonance Imaging (fMRI)

- measure of blood flow to areas of brain (oxygenation)
- correlational (but can be paired with experimental task)
- decent spatial resolution
- poor temporal resolution (signal lags)
- expensive, can be uncomfortable



Example: Transcranial Magnetic Stimulation (TMS)

- Electromagnetic induction over scalp
- Disrupts neuronal activity in targeted region
- (For now) penetration is limited to 5-6 cm deep
- minor side-effects (headaches, scalp discomfort, rare chance of seizure)

