Movement Disorders: Workbook

Cognitive Neurocircuitry from Sensation to Selection of Movement and Feedback Loops

Dr. Christopher Montoya

Cover and Original Artwork by Jaylie Holmes

Editor Kristiana Green

Movement Disorders Psychology 3710
Fall 2024

Preface

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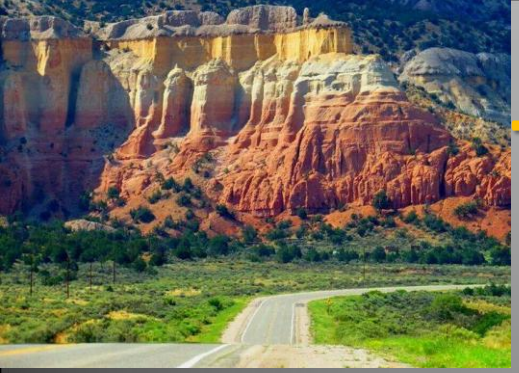
Several different **cognitive tools** will be used in delivering and more easily understanding material for this workbook. The first tool in our toolbox is Meta-Theoretical Convergent Validity.

1. Metatheoretical Convergent Validity is a point of view that all theories and hypotheses of being are only partially true (**probabilistic**) however, when added together their sum will eventually begin to converge on **truth**.

Cognitive Tools for Exploring Science

2. Openness is essential to embrace the concept of Meta-Theoretical Convergent Validity. This **Openness** that is needed is one of the **Big Five Personality Factors** described by **Costa and McCrae** in their model of personality traits. **Openness,** according to Costa and McCrae relates directly to intelligence and degrees of freedom in flexibility of thought. **Openness** is central to every aspect and facet of who psychologists are and should be. One technique that psychologists use to measure overall health, and higher levels of intelligence is by assessing ease of cognitive movement (Jean Piaget, 1952) or the lack thereof termed "dis-ease" of cognitive movement that positively correlates with thought and physical movement disorders.

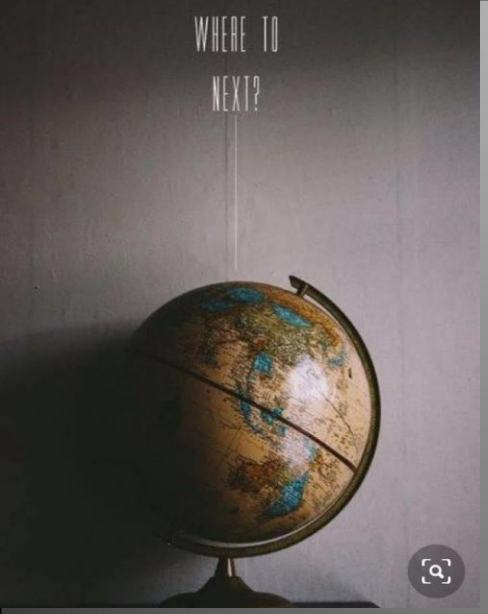


Thinking Critically & Creatively

3. Critical Thinking

- The ability and willingness to assess claims and make objective judgments based on well-supported reasons and evidence, rather than emotion or anecdote.

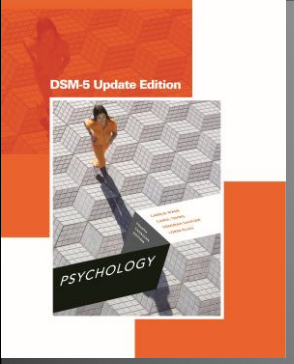
Critical thinking as a concept has expanded over the past three millennium. The term "critical thinking" has evolved into many overlapping definitions which together form a substantive and trans-disciplinary or sans-disciplinary conception.



CRITICAL THINKING

"Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence. Critical Thinkers are open mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences…" (Elder 2007).

Some critical thinkers even put it into point form. Let's review a modification from Myers, Dewall and Gruber 2021 Psychology Text



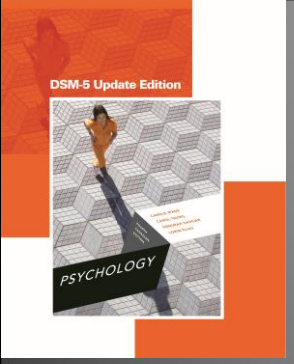
9 Critical Thinking Guidelines Modified from Myers, DeWall & Gruber 2021

- 1. Ask questions; be willing to wonder (Do You See Me Now)
- 2. Define your terms (Earth Centre of the Universe, Hawking)
- 3. Examine the evidence (Earth Flat, Michael Talbot)
- 4. Analyze assumptions and biases (Bombing of Hiroshima)
- 5. Avoid emotional reasoning (Why We Should Love Donald Trump)
- 6. Don’t oversimplify (What Temperature Does Water Boil At?)
- 7. Consider other interpretations (Is Light a Particle or Wave)
- 8. Tolerate uncertainty (Was Darwin a Creationist?)
- 9. Think about your thinking (Design or Chaos? S. I. N.) Metacognition is thinking about thinking.

Indigenizing Critical Thinking (AI)

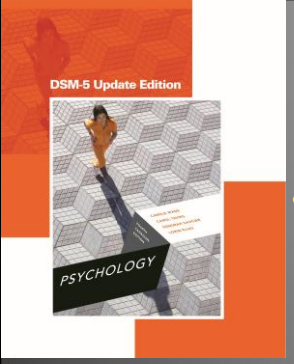
1. **Ask questions**; be willing to wonder: A First Nation story tells of a young brave who was always curious and eager to explore the world around him. He often **asked questions**, even when the answers were not obvious. He was never afraid to take risks and delve into the unknown.

The Iroquois have a story called "The Great Peacemaker and the Five Nations." This story tells of how the Peacemaker brought five warring nations together to form the Iroquois Confederacy. Through his teachings of peace and unity, the nations were able to come together and create a strong and lasting alliance. This story is still told today and serves as a reminder of the importance of working together and respecting one another. **Bridge:** we see further because we stand on the shoulders of giants. (Sir Issac Newton, 1642 - 1727). Those who asked similar questions of why not?



Indigenized Critical Thinking (AI)

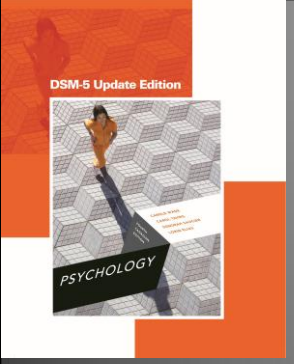
- 2. Define your terms: In the traditions of some First Nations, the word "truth" is not defined as a fact or an absolute, but rather as something that is ever-changing and unique to everyone. It is something that can be molded and shaped by personal experiences. In this respect it is very much like science. Bridge: Science does not deal in truth science deals in probability and levels of certainty and perspective.
- 3a. Examine the evidence: A First Nation story tells of a wise elder who was always examining the evidence and looking for clues to make the best decisions. (The point is to evaluate the arguments of others and then create or synthesise your own arguments). He believed in relying on facts and evidence, rather than simply trusting what people said. Bridge: In a similar fashion evidence-based science is empirical that is… measuring things you can touch, see, and measure. The more we communicate and measure the more we can theorize.



Indigenized Critical Thinking (AI)

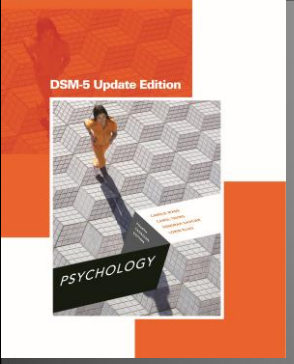
- 3b. Another First Nation story that **examines the evidence** is the Haida story of Raven and the Box of Daylight. In this story, Raven, a trickster god, was sent to retrieve the box of daylight from its hiding place. Upon arriving, Raven found a large house with many doors, each one guarded by a creature that could only be convinced to help by evidence and logical reasoning. After providing evidence to each creature, Raven was eventually able to convince them to move and retrieve the box of daylight. This story is a reminder to examine the evidence and use logic before making a decision. **Bridge:** Psychology is the marriage of Philosophy (logical reasoning) and Physiology (evidence based) biology.

- 4. **Analyze assumptions and biases:** A First Nation story tells of a brave warrior who was highly aware of his own biases and assumptions. He was always careful to examine his thoughts and beliefs before making any decisions. He believed that the truth was something that should be sought out, rather than assumed. **Bridge:** Indeed, it is difficult to talk with a psychologist before hearing the words, "if we assume…." To make sense of things scientists commonly make assumptions that help them structure their paradigms. However, when conducting a scientific investigation with humans "without bias," you would need to select a **random sample** and set up proper protocols. The questions need to be constructed, conducted, and recorded in the same manner for every person interviewed.



Indigenized Critical Thinking (AI)

4b. Another First Nation story that speaks to **analyzing assumptions and biases** is the Anishinaabe story of the Two Wolves. In this story, an elderly grandfather is teaching his grandson about the battle between two wolves that lives inside every person - one wolf is full of anger and hatred, and the other is full of love and compassion. The grandson asks his grandfather which wolf will win, and the grandfather replies, "whichever one the person feeds will win." This story speaks to the importance of understanding our own assumptions and biases and being mindful of which ones we choose to nurture and feed. **Bridge**: the story also speaks to competitive neural plasticity in the brain (use it or lose it). If you feed hatred your brain will be wired to detect hateful things. If you feed love, then your brain will be wired to detect loving things.



Indigenized Critical Thinking (AI)

- 5. **Avoid emotional reasoning**: In the stories of the Ojibwe people, a young warrior named Anishinaabe became angry when his hunting spear failed to find its mark. He was so upset he threw the spear into a nearby lake. An elder in the tribe told him to take a moment to calm himself and to be mindful of the consequences of his emotions. Anishinaabe learned to take a step back and think before he acted, and to be aware of the impact of his emotions. **Bridge**: if we look at the frontal lobes of the brain as being the brake and the more primitive limbic areas of the brain as the gas pedal then…. "Step back and think," translates directly into use your frontal lobes and think before acting. Do not rely on the primitive limbic areas that are more for survival and reproduction when dealing with mundane frustrations.

Poetic Critical Thinking

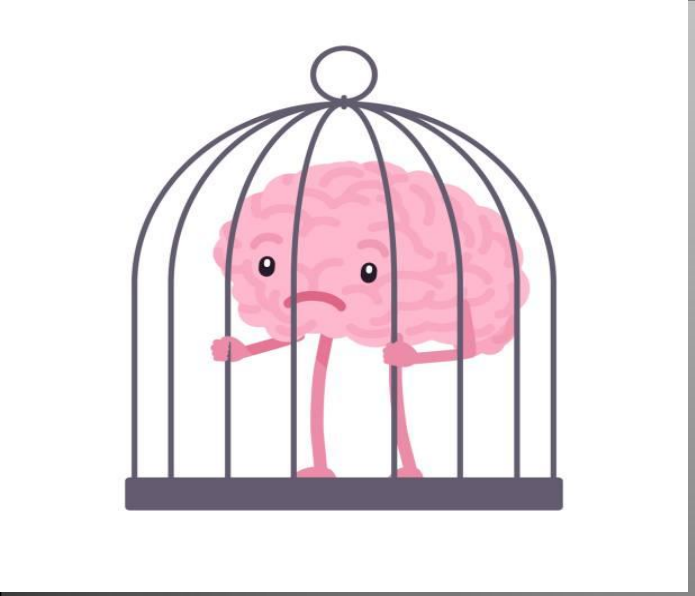
- **Critical thinking** can also be expressed via **Openness** through **poetry** or other art forms.
- *To Althea, from Prison by Richard Lovelace*
- When Love with unconfinéd wings
- Hovers within my gates,
- And my divine Althea brings
- To whisper at the grates;
- When I lie tangled in her hair
- And fettered to her eye,
- The birds that wanton in the air
- Know no such liberty.

Poetic Critical Thinking

- When flowing cups run swiftly round,
- With no allaying Thames,
- Our careless heads with roses bound,
- Our hearts with loyal flames;
- When thirsty grief in wine we steep,
- When healths and draughts go free,
- Fishes, that tipple in the deep,
- Know no such liberty.

Poetic Critical Thinking

- When, like committed linnets, I
- With shriller throat shall sing
- The sweetness, mercy, majesty,
- And glories of my King;
- When I shall voice aloud how good
- He is, how great should be,
- Enlargéd winds, that curl the flood,
- Know no such liberty.



Poetic Critical Thinking

- **Stone walls do not a prison make,**
- **Nor iron bars a cage.**
- Minds innocent and quiet take
- That for a hermitage.
- **If I have freedom in my love,**
- **And in my soul am free,**
- **Angels alone, that soar above,**
- **Enjoy such liberty.**
- In the motion picture "**The Matrix**" Morpheus states, "**Most people are trapped in a prison that they cannot taste feel or see.**"

Post Formal Thought

4. **Post Formal Thought** occurs after Piaget's Formal-Abstract thought and epitomizes the highest level of fractionization of cortical function and hence flexibility of cognition. A Post Formal Thinker (less than 1% of the adult population) can recognize and synthesize opposing ideas or feelings into a more complete understanding or the **Gestalt** (**the big picture**) where the whole is indeed greater than the sum of its parts (Indigenous Holistic) .

Bridging Principles

Indigenous content brings with it the concept of a **Creator** and the construct of **Intelligent Design**. The idea of introducing **Creationism** into science, in the past, has been problematic. Therefore, we introduce **diagrammatic intersections** and **bridging principles** that are necessary to connect intelligent design to the **evolutionary nomological net.** It is hoped that considering **Intelligent Design** might afford scientists with a different parallax which may help unravel some of the mysteries of the human brain.

Creating the Intersection:

In **On the Origin of Species** Darwin wrote:

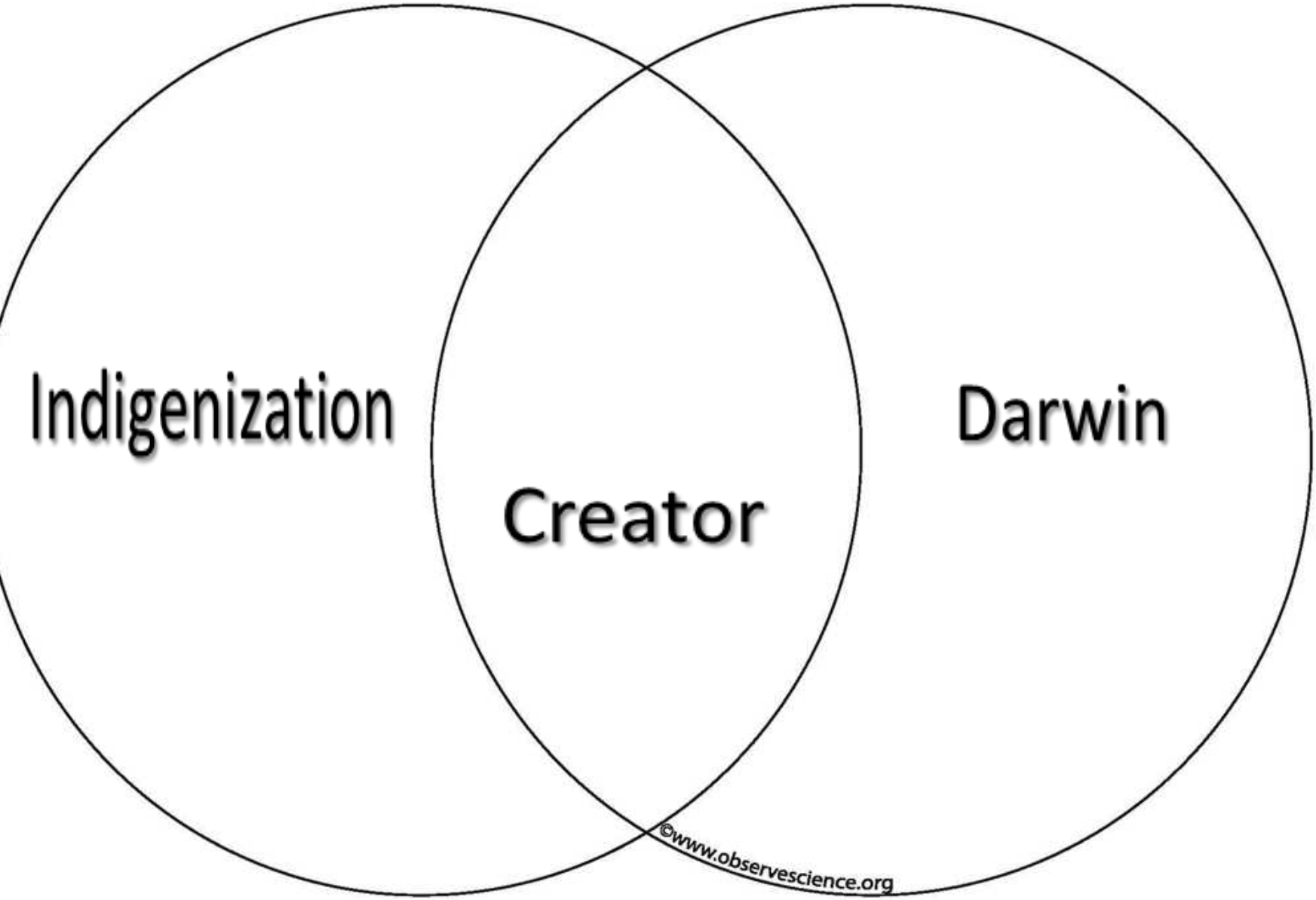
'In the distant future I see open fields for more important research. **Psychology** will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation. **Light will be Thrown on the origin of man and his history'**

In the chapter titled recapitulation and conclusion, Darwin clearly writes, therefore I would infer from analogy that probably all organic beings which have ever lived on this earth have descended from one primordial form, into which life was first breathed into by the **Creator**... To my mind it accords better with what we know of the laws impressed on matter by the **Creator**, that the production and extinction of past and present inhabitants of the world should have been due to secondary causes."

Darwin concluded in the last paragraph of origin the species, "there is grandeur in this view of life with its several powers having been originally breathed by the **Creator** into a few forms or into one..." Darwin further writes in his difficulties in theory chapter, "have we any right to assume that the **Creator** works by intellectual powers like those of man**?**"

Darwin was a Deist Creationist at the writing of his theory of evolution. Before his death in his last work the dissent of man he wrote, the idea of a **creator and ruler** of the universe has been answered in the affirmative." Montoya, Montoya & MacKay (2007).

Indigenization vs. _____



EDUCATIONAL SURPRIZES

Half-way through the semester Students were placed in talking circles of 4 to 5 students each and asked ….

1. In your opinion after looking at the evidence was it evolution or creation?
2. In your opinion after looking at the evidence was it free will or predestination?

3. Their answers were?

Both

AS AN INSTRUCTOR I HAD SEAMLESSLY BLENDED THE CONCEPT OF CREATOR INTO EVOLUTIONARY SCIENCE IN ONE SEMESTER… USING INDIGENIZED METHODS….

What worked: Indigenization of science brought new insights into the intelligent design of the evolution of consciousness, and free will.

Sticking to being evidence informed while decolonizing curriculum.

AI sped up the process of referencing, HTML editing, and fleshing out story lines.

Indigenous practices seemed to have value in and of themselves not just because they aligned with and mimiced western values.

What did not work/what hurt

Process Brought up painful questions:

Are our Schools used as institutions of assimilation?

Creating safe spaces is more difficult than anticipated and requires vulnerability and openness on my part.

THANK YOU … QUESTIONS?