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Sound Body, Sound Mind, and Successful Performance:

Exploring Movement and Artistic Expression in Gymnastics, Dance, Martial Arts, Music, and Beyond from an Embodied Cognition Perspective

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Quinn Ceilly
Cognitive Science Capstone Presentation

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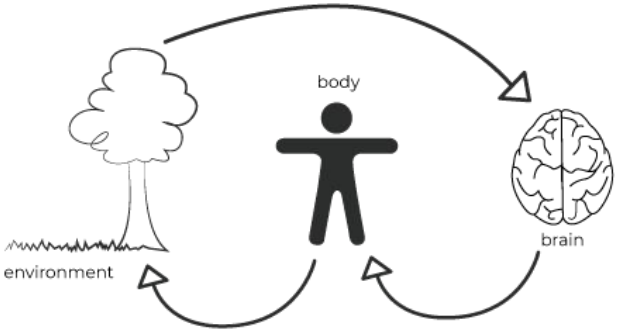
Introduction

- **Embodied cognition approach**: an agent's firsthand recognition of and **interaction** with a somewhat familiar **environment**
- **Relevant questions: What can …**

➢ Voices do?	➢ Sensitive listening do?	➢ Storytelling and role-playing do?
➢ Fingers do?		
➢ Bodily rhythms do?	➢ Unison movement do?	➢ Relaxation and meditation do?

(Spatz, 2017, p. 5).



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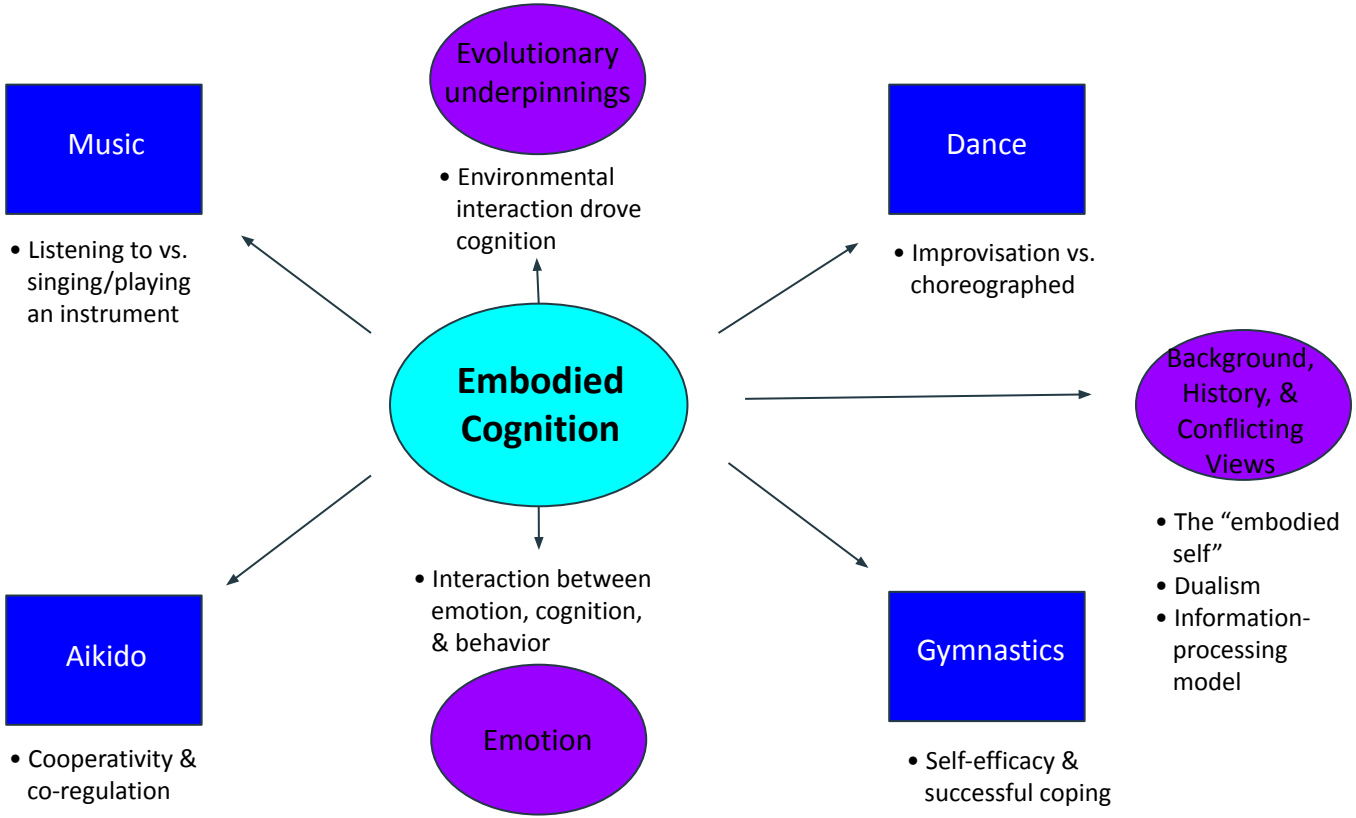
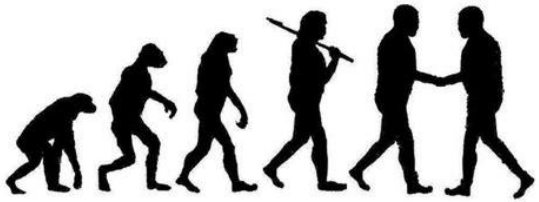
My Research Interest



Embodied Cognition from an Evolutionary Perspective



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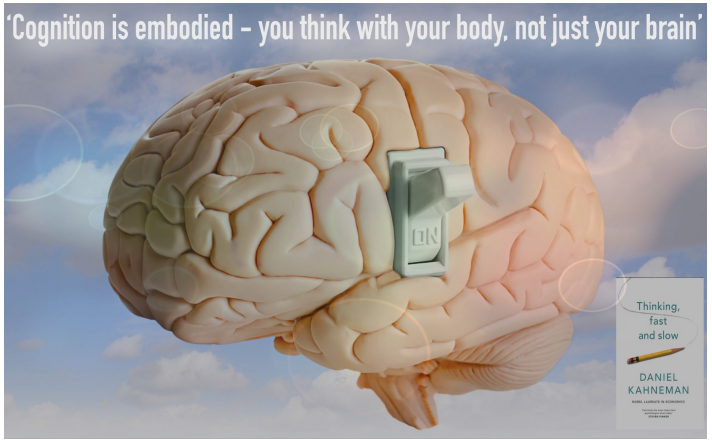
- Human beings developed **cognitive abilities** from **bodily interactions** between the **physical human body** and the **environment** -> **brain** development and **evolution i**n response to the body's actions and existing needs over time
- The mind's ability to produce more **abstract**, **de-contextualized thoughts** resulted from these **sensorimotor abilities** that existed prior (Wilson, 2008).
- Some **animals** other than human beings (scrub jays, bonobos, orangutans, etc.) are able to **plan ahead** and perform **abilities** that equate to **"mental time travel"**
- **"Mental time travel" abilities** differ between humans and non-human animals, primarily in the use of **semantic information**:
    - Some **non-human animals: encode**, **store**, and **retrieve episodic memory** information
    - **Humans: construct**, **reflect** upon, and **critically examine** a variety of scenarios

(Cheng et al., 2016)

Embodied Cognition: Background, History, and Conflicting Views

- **Embodied cognition:** the storage of **multifarious interactions** between the **mental processes** of the agent, the agent's **body**, the external **environment**, and related **contextual information** that allow for more **complex sensorimotor activities**
- **The embodied "self":** influenced by these interactions, fuels opportunities that arise from the initiation of action and behavior (Cappuccio, 2015)
- Embodied cognition vs. classical cognitivist/computational approach (focuses on internal mental processes)
    - Early philosophical considerations of the mind (i.e., Plato and Descartes) -> **Dualist** [Mind | Body] (Illundáin-Agurruza, 2013; Raab & Araújo, 2019)
    - **Information processing model:** compares the mind's functional abilities and processing power to that of a **computer** [rule-oriented, representation-forming, attentive, contemplative, reflective, and aware mind] (Illundáin-Agurruza, 2013)



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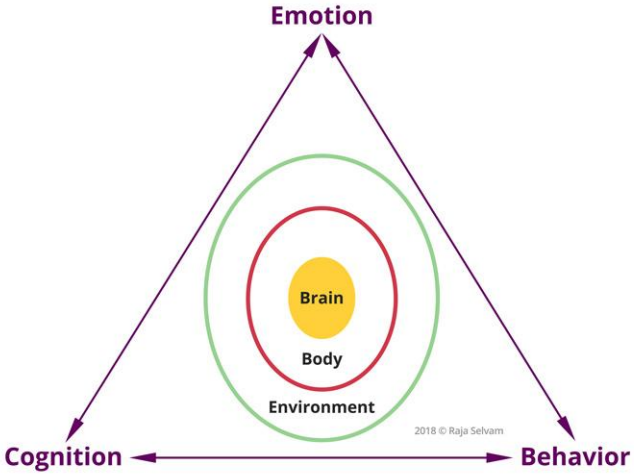
Emotion, Physiology, and Embodiment

- "**Movement** has the capacity to touch us **physically** and **emotionally** at our roots, **provoking the deepest emotions**, from love to fear to joy to abandon[ment]" (Snowber, 2012, p. 56)
    - **Dance**: an activity that allows the engager to cultivate emotional intelligence and **express** the **inner emotions** in a creative, fulfilling manner
- **Emotions:** a **tool** for **interaction** with the **physical** and **social environment**, whether it be with other performers, the audience, judges, referees or other activity moderators, or a combination of these external influences in order to effectively express themselves during performance (Robinson, 2007)
- **Humans:** the **internal** environment (thoughts, opinions, other cognitive processes) and the **external** environment (physical, social, and other extrinsic pressures and influences that exist outside the mind), can motivate the materialization of various **emotional responses** (Robinson, 2007)
    - Ex: a sudden **boost** in mood that a runner experiences after completing a challenging race (the **"runner's high"**)



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Another Example: Emotion and Music

Jenefer Robinson illustrates the powerful impact of **music** on **emotional experiences** regarding the **past**, **present**, and **future**:

"[M]usic can mirror the streams of emotional experience: the many interrelated currents going on simultaneously, perhaps reinforcing one another, perhaps in conflict. **Music can express the way one emotion morphs into another over time, how the stream turns in another direction or returns peaceably to its original channel.** Music can convey changes and modifications in emotion, a sense that things are going from good to bad or from bad to good, a sense that desires are gratified or disappointed, **a sense that memories have engulfed a person or been swept away**. Music can also convey **blends of emotion**, a bittersweetness that is a blend of hope and resignation or sadness and nostalgia." (Robinson, 2007, p. 312)

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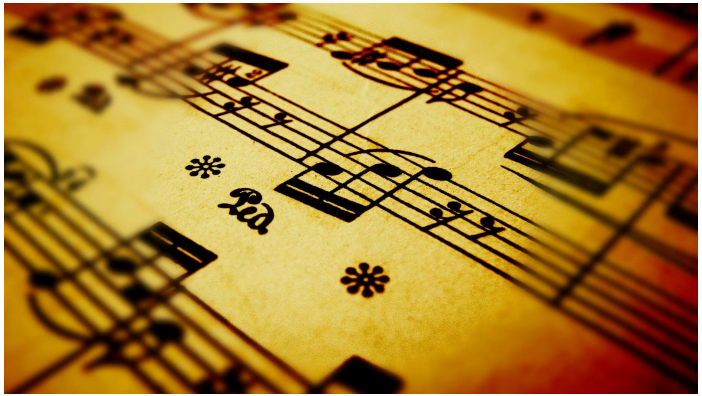
Embodiment in Music



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- **Music cognition:** learning through **imitation** [both musical sounds and the associated **bodily movements** that **produce** these **sounds**] (Cox, 2016)
  - Ex: learning the violin- one observes how a violin is held, how the fingers and bow are positioned
  - A **mind and body** endeavor (Cox, 2016)
- **Musicians engage in musical embodiment:** bodily movements, appropriately plan for sudden key changes, accidentals in the musical composition, and other elements of the piece being performed, and they engage in the act of performing [select group, ensemble rehearsals, stage performances]
- **Listening to music is similar:** speculation about music, recollection of prior musical engagements or performances is also a form of **imitation** (Cox, 2016)

Embodiment in Music Example: Constructing a Choreographed Rhythmic Gymnastics Routine

https://static.themoscowtimes.com/image/1360/d2/690212309dd840809259a8b28300b2b8.jpg

- Athletic skill, music, rhythm, and expression together constitute an embodied performance
- Group performance: gymnasts engage in a movement-driven, embodied language with other performers, judges, and the audience
- Requires direct attention to the skills being executed, the tasks being accomplished with the object used in the routine, (rope, hoop, ball, clubs, ribbon), and the positions of the other performers (Chirazi, 2021)
- Demands a quickness to react to any mistakes made during the performance
- Importance of timing in the choreographed routine with the musical accompaniment, which could easily be impacted by dropped objects, stumbles, or falls

Embodiment in Dance

- **Artistic expressions through dance:** “accesses many kinds of knowledge beyond kinesthetic intelligence, including visual, tactile, mental, cognitive, and emotional intelligence” (Snowber, 2012, p. 57)
- **Improvised dance**: viewing dance as a way to engage in a **form of play** to enhance **introspection**
    - **Imaginative**, **creative,** fosters learning through play
    - The discovery of novel ways of moving, experiencing **“hidden” emotions**, or finding inspiration (Snowber, 2012)
- **Choreographed dance:** the skill development and process of learning is initially a **conscious** process of the body’s movement, the various **sequences** of movements that must be completed in order to successfully perform a skill, and the **complementary movements** that **other dancers** must perform and their positioning in space in the case of choreographed group dance (Chirazi, 2021)
    - **Mastery:** achieved with repetition and practice, conscious movements steadily become **“muscle memory,”** (Barrero González, 2019)

http://koreabizwire.com/wp/wp-content/uploads/2013/07/Korea-National-Contemporary-Dance-Company.jpg

Embodiment in the Martial Arts

- **Aikido:** “the way of harmonizing energy,” places emphasis on **reciprocity**, **non-competitiveness**, and **nonviolence** (Kimmel & Rogler, 2018, p. 198)
- Training: agents rotate between the **attacker** and **defender** roles, **communicate** based on the other agent’s actions and defenses
    - Defender is expected to **harmonize** and **cooperate** with the attacker’s intensity and movements, **“minimal resistance”**
    - Requires a keen **attentiveness** and **sensitivity** to **subtle bodily movements** and expressions
- Necessitates **conscious** engagement during trainings and performances, as they are continuously influencing and influenced by their own movements and the opponent’s movements, other environmental/contextual occurrences
- An **embodied “conversation”** being held between both agents in the enactment of these movements and configurations, which influence the **selection** of, **modification** of, and **extinction** of various **actions** according to these interacting features of the performance

(Kimmel & Rogler, 2018)

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Embodiment in Artistic Gymnastics: Nerves, Self-Efficacy, Coping, and Athletic Performance

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- **John Fitzpatrick (1998):** the most frequent differentiating features between high and low levels of gymnastics performance were **psychological factors**
- **Psychological factors: cognitive** and **behavioral skills** that aid in **overcoming**, **diminishing**, and learning to **withstand stress-inducing** internal and/or external **influences**
    - Important for gymnasts to learn to effectively **manage** such stress when presented with situational difficulties
        - Aspiring elite gymnasts often begin intense training young, experience fairly high stress during competitions and in daily training
        - Elite gymnasts often experience immense levels of anxiety
        - In **young gymnasts:** coach, parent, and teammate **support** is extremely valuable in fostering **successful coping mechanisms** in stressful situations
- Researcher Garifallia Daroglou's research study (2011): both self-efficacy and coping skill development greatly contributed to performance success
    - Gymnasts who engaged in a variety of **coping skills** performed at a **higher level** than those who did not
    - Gymnasts who performed the **most successfully: management of nerves** during stressful situations by relaxing and **competing with enthusiasm and confidence**
    - Prior to competition, **goal-setting** and preparation for competition, **coaching advice**, **confidence** in their **performance abilities**

(Daroglou, 2011)

Conclusion

- In recent years, **embodied cognition** has become more widely accepted as a **holistic approach** to understanding the **complexities** of **cognitive processing**
- The mind is no longer solely considered as completely separate from the body and wholly understood according to internal logical representations and symbolic manipulations
- In this project, embodied cognition was investigated through a variety of perspectives:
    - **Evolutionary perspective:** the structure and interactions made between the physical body of our ancestors and the external world allowed for brain development in response to the body's needs over time, which eventually led to the advancement of human cognitive abilities
    - **Comparison of more traditional cognitive/computational perspectives:** logical processing and symbolic mental representations
    - **Embodiment in the expression of emotions** through music and dance
    - Relationships between **embodiment** in **athletic activities** [dance, martial arts, gymnastics] and **musical activities**
    - **Choreographed** vs. **improvised** movements, particularly in dance, were explored, in addition to the importance of movement as a form of creative expression, a release of tension, and a freeing of bottled-up emotions
    - **Self-efficacy** was discussed in relation to gymnastics
        - Benefits to attaining **high self-efficacy**, along with establishing various **psychological coping strategies**

https://majoreventsgc.com/wp-content/uploads/2020/09/16-1-1024x584.jpg

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