

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

Abstract

Embodied cognition is a more recent approach to understanding how human beings think, in which the relationships between cognition and action are emphasized. A key assumption of embodied cognition concerns that our physical/bodily interactions with the environment allow us to more advantageously perceive, remember, contemplate, and act on complex information that is presented to us. This paper specifically explores embodied cognition in the context of athletic preparation for competition and achievement during competition. Athletic activities such as gymnastics, dance, and the martial arts (for example, Aikido) will be investigated, and similar performative characteristics and influences in music will also be explored. The historical underpinnings and evolutionary elements of embodied cognition, the fundamental attributes to embodiment, comparisons between more traditional cognitivist and computational approaches to cognition, and the application of embodied cognition to athletic performance will be discussed. Further, coping skills utilized by athletes in preparation for competition and the potential applications of embodied cognition to therapies and treatments for a variety of psychopathological conditions will be explored.

Introduction

The embodied cognition approach to understanding human thought is characterized by an agent's firsthand recognition of and interaction with an environment that is somewhat familiar to the agent. This recognition and the subsequent information that the agent takes away from the engagement with the environment is considered to occur without cognitive or advanced perceptual processing, in which acquired heuristics, propositional contents, and encoded algorithms that have been stored in the mind are not utilized (Cappuccio, 2015, p. 214). This approach contrasts with the more traditional cognitive perspectives, which assume that, in order for intelligent operations to be carried out, logical processing must occur in some form, particularly via various forms of rudimentary symbolic manipulation that extract amodal information from the external environment without contextual influence (Cappuccio, 2015, p. 214). A variety of theorists have supported the embodied cognition perspective, relating it to numerous contexts that describe how the mind works. For instance, Paul M. Fitts and Michael I. Posner's

cognitive-computational approach (1967) emphasizes how more than just “intellectual” skills that exist via internal mental processes are required in order for the body to effectively perceive, remember, think, and act; such activity is only fully made possible with the body’s interaction with the external environment (Cappuccio, 2015, p. 214). Further, James Gibson’s cognitive-ecological approach (1979) describes how the body aids in much of the information-processing phenomena that many have associated with internal activity of the mind in classical approaches to understanding cognition (Cappuccio, 2015, p. 214). Gibson also developed a theory of affordances, in which he defines affordances as “the offers, consistent in opportunities of interaction, that the objects present in the environment possess in relation to the sensorimotor capacities of different animals: ‘The *affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill’ ([*The Ecological Approach to Visual Perception*,] p. 127)” (Garbarini & Adenzato, 2004, p. 100). As such, objects that are present in the external environment provide a variety of affordances for human beings and other animals, depending on their current needs, although these affordances are an intrinsic feature of the object, and not formulated by the needs or intentions of the viewer (Garbarini & Adenzato, 2004, p. 100).

This paper seeks to explore embodied cognition as it relates to preparation prior to competition and achievement during competition in the contexts of athletics, such as artistic gymnastics, dance, and the martial arts (specifically, Aikido) and in music. The history of the development of embodied cognition as an approach to understanding human cognitive abilities (Garbarini & Adenzato, 2004; Illundáin-Agurruza, 2013; Raab & Araújo, 2019; Robinson, 2007; Spatz, 2017) and its evolutionary support will be investigated (Wilson, 2008), comparisons between more traditional cognitivist and computational approaches to cognition, and the application of embodied cognition to athletic (Barrero González, 2019; Bradshaw, 2010; Kimmel & Rogler, 2018; Snowber, 2012) and musical (Schiavio, Gesbert, Reybrouck, Hauw, & Parncutt, 2019) performance will be discussed. Finally, coping skills utilized by athletes in preparation for competition and the potential applications of embodied cognition to therapies and treatments for a variety of psychopathological conditions will be examined.

Embodied Cognition from an Evolutionary Perspective

- ¶ Describe evolutionary aspects in the development of embodied cognition as an area of investigation (Wilson, 2008).
- ¶ Discuss how human beings evolved from animals- our ancestors and the development of our cognitive abilities (Wilson, 2008, p. 376).
- ¶ Discuss how and why human social cognition arose, its significance to our cognitive development (Wilson, 2008, p. 377).
- ¶ Discuss planning and “mental time travel” abilities that humans and some animals can accomplish (bonobos, orangutans, scrub jays) (Wilson, 2008, p. 378).

☞ Discuss numerosity and proto-mathematical abilities that some non-human primates are able to accomplish (Wilson, 2008, p. 378).

☞ Discuss causal reasoning, imitation, tool use abilities in non-human animals (Wilson, 2008, p. 378-379).

☞ Discuss how voluntary control, analogy, and imitation abilities suggest an evolutionary influence through an embodied cognition perspective (Wilson, 2008, p. 380-387).

Embodied Cognition: Background, History, and Conflicting Views

☞ Describe the development of embodied cognition as an approach to understanding human cognition: (Aizawa, 2015; Allen-Collinson, 2009; Garbarini & Adenzato, 2004; Illundáin-Agurruza, 2013; Raab & Araújo, 2019; Robinson, 2007; Spatz, 2017).

☞ Outline the fundamental elements of the cognitivist/computational approach (Cappuccio, 2015, p. 214; Raab & Araújo, 2019).

☞ Provide a definition of existential phenomenology and the influential figures involved in its development (Allen-Collinson, 2009, p. 8).

☞ Describe Rosch's principles of categorization, the mind's hierarchical organization of information into various categories (horizontal and vertical levels) (Garbarini & Adenzato, 2004, p. 104).

☞ Discuss Powers (1978) goal-directed action and its influence on an agent's perceptions of the fluidity of the external environment (Cappuccio, 2015, p. 217).

☞ Explain Maurice Merleau-Ponty's (1945) "tacit knowledge" and "knowledge in the hands" as influenced by context and experience (Cappuccio, 2015, p. 213-214).

☞ Describe Lakoff and Johnson's (1999) concept of the disembodied mind vs. the embodied mind, embodied realism (Garbarini & Adenzato, 2004, p. 101).

Emotion, Physiology, and Embodiment

☞ Describe the fundamentals of emotional expression as a means of environmental interaction (Robinson, 2007).

☞ Describe the physiological manifestations associated with emotion (Robinson, 2007).

☞ Provide a background of embodied cognition and music, particularly as it relates to our emotions (Robinson, 2007; Schiavio et al., 2019).

☞ Provide a background of embodied cognition and athletics, particularly as it relates to our emotions (Illundáin-Agurruza, 2013; Raab & Araújo, 2019).

☞ Discuss emotions, judgments, and beliefs (Robinson, 2007).

☞ Provide a background of judgment theory (Robinson, 2007).

Embodiment in Music

- ¶ Provide a background of embodied cognition in music learning and performance (Robinson, 2007; Chirazi, 2021; Cox, 2016; Schiavio et al., 2019).
- ¶ Discuss the occurrence of coordinated behavior in music, environmental influence during ensemble performances (Schiavio et al., 2019, p. 6).
- ¶ Discuss the flexibility in behavior based on the perception and interpretation of environmental occurrences and subsequent action during musical practices and performances (Schiavio et al., 2019, p. 7).
- ¶ Discuss improvisation in music-making (Schiavio et al., 2019, p. 9).
- ¶ Describe “preferential behaviors” that form over time in musicians based on prior performance successes (a dynamic process, moving away from autonomic/“mindless” responses and actions during music practice and performance) (Schiavio et al., 2019, p. 9).
- ¶ Explain the concept of bodily memory and its role in guiding decision-making (Schiavio et al., 2019, p. 9).
- ¶ Describe the interrelationships between music, rhythm, and expression through choreography (Chirazi, 2021, p. 57).

Embodiment in Athletics: An Overview

- ¶ Provide a background of embodied cognition in an athletic context, with a focus on gymnastics, dance, and the martial arts (Aikido) (Cappuccio, 2015; Chirazi, 2021; Illundáin-Agurruza, 2013; Raab & Araújo, 2019; Schiavio et al., 2019).
- ¶ Describe how Thomas Carr and Sian Beilock contributed to the field of embodied cognition as it relates to athletics (skill development and performance) through experimental investigation (Cappuccio, 2015, p. 214-215).
- ¶ Discuss Dreyfus’ phenomenological doctrine of skillful action and absorbed coping (Cappuccio, 2015, p. 218).
- ¶ Describe the development and occurrence of athletic skill, situated intelligence, self-monitoring, and the potential for distractibility during competition, based on both internal and external influences (Cappuccio, 2015, p. 216).

Embodiment in Dance

- ¶ Background of embodied cognition, artistic expression in dance (Barrero González, 2019; Chirazi, 2021; Snowber, 2012).
- ¶ Describe improvised dance (Barrero González, 2019; Snowber, 2012).
- ¶ Describe the characteristics associated with choreographed, intentional dance (Barrero González, 2019; Chirazi, 2021; Snowber, 2012).
- ¶ Describe the characteristics associated with individual dance performance.
- ¶ Describe the characteristics associated with group dance performance.

Embodiment in the Martial Arts

- ¶ Provide a background of embodied cognition, artistic expression in the martial arts (main focus- Aikido) (Kimmel & Rogler, 2018).
- ¶ Explain how Aikido is dependent on the actions of two people (Kimmel & Rogler, 2018, p. 196).
- ¶ Explain the training involved in Aikido and the mental and physical components to this (Kimmel & Rogler, 2018).
- ¶ Discuss J. J. Gibson and behavioral dynamics in Aikido (Kimmel & Rogler, 2018, p. 195-196).
- ¶ Describe the perception-action dynamic in Aikido (Kimmel & Rogler, 2018, p. 196).

Embodiment in Gymnastics: Nerves and Athletic Performance

- ¶ Provide a background of embodied cognition, artistic expression in gymnastics (Bradshaw, 2010; Chirazi, 2021; Daroglou, 2011; Gautier et al., 2008; Luis del Campo & Espada Gracia, 2018; Marsh et al., 2006; Pizzera, 2012)
- ¶ Describe how nervousness can impact athletic performance if effective coping strategies are not employed (Cappuccio, 2015).
- ¶ Describe the phenomenon, “choking under pressure” (Cappuccio, 2015, p. 215, p. 217, etc.).
- ¶ Outline the fundamentals of the self-focus theory of choking (Cappuccio, 2015, p. 216-217).
- ¶ Define the “constrained action hypothesis” and explain why it seems to account for the “choking effect” that occurs in many well-trained athletes in competition (Cappuccio, 2015, p. 217-218).
- ¶ Describe choking as a disruption of automaticity, and why this seems to be a reasonable explanation (Cappuccio, 2015, p. 218).

Coping Mechanisms and Performance in Gymnastics Competitions

- ¶ Provide an overview of and the importance of coping mechanisms with gymnastics performance during competition (Daroglou, 2011; Luis del Campo & Espada Gracia, 2018; Pizzera, 2012).
- ¶ Describe the influence of psychological factors on gymnastics performance, based on empirical study findings (Daroglou, 2011).
- ¶ Explain the influence of coach and teammate support on coping with stress (Daroglou, 2011).
- ¶ Describe the study findings (Daroglou, 2011).
- ¶ Explain what applications these results have in gymnastics, and how coaching can improve (Daroglou, 2011).

Self-Belief, Self-Concept, and Performance in Gymnastics Competitions

- ¶ Describe self-belief and physical self-concept and their influence on gymnastics performance during competition (Marsh et al., 2006).

- ¶ Discuss the role of self-efficacy in gymnastics performance success; describe study findings and their significance (Daroglou, 2011).
- ¶ Describe how the perspective of the self-concept is multidimensional (Marsh et al., 2006).
- ¶ Explain the reciprocal effects model that describes the causal ordering of gymnastics self-concept and gymnastics skills involved in performance (Marsh et al., 2006).
- ¶ Discuss study findings and significance (Marsh et al., 2006).

Treatments and Therapies Utilizing Embodied Cognition

- ¶ Discuss how we can utilize embodied cognition elements in treatments and therapies (De Fano et al., 2019)
- ¶ Describe specific applications of dance therapy in treatment methods (Barrero González, 2019)
- ¶ Discuss how the awareness of bodily states and bodily movements can heighten one's awareness in space (a form of mindfulness) (Barrero González, 2019, p. 92).
- ¶ Explain the relationships between habit, our body's "comprehension" of the world, and motor intentionality (Barrero González, 2019, p. 93).
- ¶ Apply Merleau-Ponty's ideas concerning embodied cognition, bodily awareness, habit, etc. to the usefulness of dance therapy.

Conclusion

- ¶ Restate thesis, key terms used
- ¶ Review embodied cognition key features, key theorists
- ¶ Review historical elements, relationships between athletic activities, music, and the arts.
- ¶ Review therapies, benefits to coping mechanisms and a healthy self-concept
- ¶ Review salient experimental findings, conclusions drawn from findings

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