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# Multimodal, Long-Term, and Embodied Exercise for a Balanced Body Schema: Linkage of the Psychophysiological HPT Axis Structures

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## Abstract

The purpose of this concept-based paper was to showcase the importance of embodied consciousness (body as a subject and not an object) and how a balanced body schema via regular exercise training can link psychophysiological structures (body and mind unison) which are important for all matters of health. This paper is based on Merleau-Ponty's Phenomenology of Perception and includes two sections. After explaining the notion of the body as a subject and the concepts of embodied consciousness and body schema, an example is provided to show how reshaping body schema via regular, multimodal, and long-term exercise training (e.g., aerobic programs, resistance training, and Yoga) can best modulate the hypothalamic-pituitary-thyroid (HPT) axis, which is key to healthy metabolism and overall health. Recognizing the role of embodied consciousness and especially how body schema contributes to holistic health are significant research areas of study in preventive and complementary medicine, treatment of chronic, clinical conditions, rehabilitation, and healing. The body is not an object, and its functions are not linear and unidirectional (only the mind stimulates the body) but multifaceted, including the attainment of a well-balanced body schema via consistent, embodied, and physically demanding movement programs.

**Keywords:** Merleau-Ponty; Embodied Consciousness; multimodal and long-term exercise training; holistic movement and health; body schema; hypothalamic-pituitary-thyroid (HPT) axis; psychophysiological (for-itself and in-itself) linkage; healthy metabolism; preventive and complementary medicine

## Introduction

Contrary to the Cartesian body vs. mind dualism, the purpose of this concept-based paper is to showcase how a balanced body schema (motor habit or the habitual body) via participation in long-term exercise and physically demanding embodied movement programs can holistically link the psychophysiological structures of the body (i.e., the body's in-itself structures and for-itself essence)

which is vital for all levels of health. By viewing the holistic nature of body and its functions, a better understanding of the maintenance of health and disease prevention is also achieved, which are essential areas of study in preventive and complementary medicine, treatment of different conditions, rehabilitation, recovery and healing [1]. This paper is based on Merleau-Ponty's Phenomenology



of Perception [2] and includes two sections. In the first section, the researcher explains how the body is a subject and not an object in that it has embodied consciousness through which it connects with the mind (body-mind unison). In the second section, it is shown how a balanced body schema (habitual body) via certain forms of exercise can strengthen the hypothalamic-pituitary-thyroid (HPT) axis by linking psychophysiological structures of the body for a healthy metabolism.

### **Body As a Subject and Embodied Consciousness**

Merleau-Ponty criticized the Cartesian body vs. mind dualism, whereby the body is supposed to be inferior to the mind [2]. Based on the Cartesian theorizing, the body is objectified, and its function is determined only by the mind. In contrast, Merleau-Ponty elevated the body from an object to a subject, the Lived Body, that acts by throwing itself into meaningful movement significations like dancing and aerial dancing, climbing, swimming, and functioning within the world [1-8]. The body obtains knowledge via practice, praktognosia, and informs the mind. An expert at aerial dancing does not cogitate about how to perform her piece; the body knows and guides. This does not mean that there is no mindedness. Body and mind work in unison to meet the challenges at task. In the early stages of skill learning, there is increased analytical thinking (e.g., how to tie a knot in the air in aerial silks) which gradually decreases as movement skills are mastered and thus the body takes precedence [1,6,9,10].

The body is not inferior to the mind; it works together with the mind. It is not a statistic that can be thoroughly measured like the dimensions of a table (object in the world). Contrary to a table or other objects in the world, the Lived body is always with us. It never leaves us because it has consciousness – it is a living organism. Consciousness does not derive only from conscious thinking (body as being for-itself) but also from the body (embodied consciousness) [2]. Embodied consciousness can be strengthened via holistic exercise programs like those in performing arts (e.g., aerial silks and physical theater), in which case body and mind unite for improved health, the love of movement, and long-term exercise participation [1,5-8,10-15]. It will be shown below how embodied consciousness can improve via a balanced body schema (motor habit) that can bridge for-itself (psychological – e.g., intentions, perspectives, and breathing regulation) and in-itself (physiological – e.g., activation of the autonomic nervous system) structures of the body.

### **Body Schema Connects the Psychological and Physiological Structures of the Body-Holistic Consciousness and Health**

Based on the Cartesian theorizing, the body is separate from the mind, thus its in-itself (physiological) structures like organs, tissues, blood vessels, and cells are supposed to be separate from its for-itself (psychological) essence like one's memories and intentions. Instead of this fragmented view of the body and its functions, Merleau-Ponty argued that consciousness does not derive only from the mind as a linear and unidirectional stimulus-

response pathway (i.e., only the mind activates the body). Instead, the body also informs the mind via bodily movement within and towards the world (embodied consciousness) [1-5,16]. The body's movement experiences in the world, including exercise training, form the habitual body or body schema as a Gestalt [1-7]. Body schema is not cognitive knowledge or a reflex; it is a pre-reflective unity of the multisensorial system via lived experiences in the world. Instead of separating the body's in-itself structures and for-itself elements, Merleau-Ponty showed that the habitual body (body schema) connects the two types of being (for-itself and in-itself) in different situations like when explaining the phantom limb syndrome [1-5,7].

Expanding upon Merleau-Ponty's philosophy, this (psychophysiological) linkage can be observed within different bodily functions like when reaching metabolic homeostasis via the HPT axis. Specifically, in an euthyroid state, the hypothalamus secretes the thyrotropin-releasing hormone (TRH) which then activates the anterior pituitary to produce the thyroid-stimulating hormone (TSH), which in turn stimulates the thyroid gland to create and release free thyroxine (T4) and triiodothyronine (T3) that play a key role in regulating metabolism, thermogenesis, gastrointestinal function, as well as skeletal and brain development [17,18]. When the optimal thyroid hormone levels are reached, negative feedback loops from T4 and T3 to the hypothalamus and pituitary inhibit further production of TRH and TSH [19]. Although within the in-itself structures of the HPT axis it seems that only a unidirectional stimulus-response process takes place (from the brain to the thyroid gland to the peripheral organs), a balanced body schema via exercise also affects the HPT axis. A recent systematic review and meta-analysis showed that TSH levels decreased while T4 and T3 levels increased among people with hypothyroidism who regularly exercised for 12 weeks – a combination of aerobic exercise and resistance training had the best modulating effects on the HPT axis – compared with non-exercisers [20]. Similarly, achieving a balanced body schema via holistic and embodied movement programs with regulatory breathing techniques like Yoga improves hormonal regulation and thyroid functioning, which is critical for physical health, mental health, and sleep quality [21-23]. Therefore, physiological (in-itself) body structures (e.g., HPT axis neuroendocrine mechanisms) connect with the body's for-itself essence (e.g., exercise intentions, perspectives, and breathing techniques) via a balanced body schema that can be reached through participation in regular, long-term multimodal exercises (aerobic and resistance training) and holistic movement programs. The habitual body can be renewed and reworked and apparently these psychophysiological connections can be optimal with only consistent, embodied, and physically demanding movement experiences that pre-reflectively reshape body schema. The HPT axis is also affected by stress, diet, circadian rhythms, inflammation, and environmental conditions [24], which may also influence and be influenced by one's body schema. Health is holistic and body schema plays a key role in linking the complex elements of body and its functions via movement within and towards the world.

## Summary and Conclusion

The purpose of this concept-based paper was to showcase the importance of embodied consciousness (body as a subject and not an object) and how a balanced body schema via regular exercise training can holistically link psychophysiological structures (e.g., body and mind unison within the HPT axis) which are important for all matters of health. After explaining the notion of the body as a subject and the concepts of embodied consciousness and body schema, an example is provided to show how an improved body schema via regular, multimodal, and long-term exercise training (e.g., aerobic programs, resistance training, and Yoga) can best modulate the HPT axis, which is key to healthy metabolism and overall health. Inspired by Merleau-Ponty's philosophy [2], bodily function in this paper is viewed holistically, in that body schema links the body's in-itself and for-itself structures in a multifaceted way affecting health and lifestyle choices [1,2,4,25]. The central nervous system and the autonomic nervous system are regulated via improved body schema due to regular, long-term, and embodied exercise participation. Changes in the habitual body or body schema (e.g., increased fitness and body awareness via controlled movement sequencies and conscious breathing techniques in Yoga) strengthen the HPT axis holistically (linkage between the body's in-itself and for-itself elements) and not unidirectionally (from only the mind to the body).

The importance of maintaining a well-balanced body schema via embodied and multimodal movement programs in performing arts (e.g., physical theater and aerial arts) is fundamental to improving physical and mental health and the love for long-term exercise participation [1,5-7,10,14]. Recognizing the role of embodied consciousness and especially how body schema contributes to holistic health are significant research areas of study in preventive and complementary medicine, treatment of chronic, clinical conditions, rehabilitation, and healing. The body is not an object, and its functions are not unidirectional (only the mind stimulates the body) but multifaceted, including the attainment of a well-balanced body schema via consistent, embodied, and physically demanding movement programs.

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