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Kinaesthetic Perception and Architecture

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Abstract

This article highlights the review of the kinaesthetic perception derived from Greek *kinein* (to move), and *aesthesis* which is defined as the perception of movement in architecture. Kinaesthetic perception is defined as “a sense mediated by end organs located in muscles, tendons, and joints and stimulated by bodily movement and tensions,” and “sensory experience derived from this sense”. Since the 1960s, kinaesthetic perception, known as a term in neurology, psychology, orthopedics, and medicine, has been explored for creativity, especially in architecture, art, dance, particle animation, hypermedia, and game theories. This perception has been studied in Merleau-Ponty’s phenomenology in architectural theory and education and in terms of the oblique idea of Paul Virilio and Claude Parent, which have emerged as one of the important and triggering terms of kinaesthetic perception in architecture today. With the advent of technology, re-introducing this perception through technology or traditional means can help us remember the multi-dimensional interaction of our senses. Therefore, this article examines an interdisciplinary relationship among kinaesthetic perception, architecture, movement, and the body or soma and asks what kinaesthetic perception can provide new experiences in architecture.

Keywords: Kinaesthetic perception, perception in architecture, neuroarchitecture, kinaesthetic empathy



Percepción de Kinaesthetic y Arquitectura

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Resumen

Este artículo destaca la revisión de la percepción kinaesthetic sacada del griego de palabras kinein (para moverse), y aesthesis es definido como la percepción de movimiento en la arquitectura. La percepción de Kinaesthetic es definida como “un sentido mediado por órganos de final localizados en músculos, tendones, y uniones y estimuló por movimiento corporal y relaciones tensas,” “y la experiencia sensorial se derivó de este sentido”. Desde los años 1960, kinaesthetic percepción, conocida como un término en neurología, psicología, la ortopedia, y la medicina, ha sido explorada para la creatividad, sobre todo en arquitectura, arte, baile, animación de partícula, hipermedios, y teorías animo-sas. Esta percepción ha sido estudiada en la fenomenología Merleau-Ponty’s en teoría arquitectónica y educación y en términos de idea oblicua de Paul Virilio y Claude Parent, que han surgido como uno de los términos importantes y provocadores de la percepción kinaesthetic en la arquitectura hoy. Con el advenimiento de tecnología, introduciendo de nuevo esta percepción por tecnología o medios tradicionales puede ayudarnos a recordar la interacción multidimensional de nuestros sentidos. Por lo tanto, este artículo examina una relación interdisciplinaria entre percepción kinaesthetic, arquitectura, y movimiento, y el cuerpo o soma y pregunta a lo que percepción kinaesthetic puede proporcionar nuevas experiencias en la arquitectura.

Palabras clave: Percepción de kinaesthetic, percepción en arquitectura, neuroarquitectura, kinaesthetic empatía

Located in the intersection of different disciplines such as philosophy, medicine, anatomy, physical science, physiology, psychology, and other sensory areas (Pfaffmann, (n.d.), *kinaesthesia* or *kinaesthesia* (sometimes referred to as the sixth sense), is one of the crucial senses of all the senses and is defined as a muscular sense or sense of movement. As Hildegard et al. defined, kinaesthesia gives “feedback from the environment” because it provides “controlling voluntary movements such as reaching, grasping, and manipulating” (Hilgard et al., 1975, p. 126). In this way, it becomes important to human beings as it enables basic movements such as standing up, walking, speaking, and doing any coordinated movement (Whittaker, 1976, p. 358).

Kinaesthetic perception is “mediated by receptors in muscles, tendons, joints, and skin”. This perception is related to the motor system, coordination, and skin senses (Atkinson et al., 1985, p. 176). It is also about perceiving parts of the human body in relation to each other through the relation between our joints, enabling the sense of “joint movement, joint position, sensations related to muscle force, such as effort, tension, and heaviness, the timing of muscle contractions, and the size and shape of the body and its parts” (Taylor, 2013, p. 932).

Aristoteles defined our five senses, such as sight (visual), auditory sense (hearing), smell, taste, and touch (skin sense) (Morgan, 1977, p. 267). Of these senses, the “sense of touch”, also called the fifth sense, was not regarded as a unitary sense organ such as four other visible organs, such as “the eye, ear, nose, or mouth” (Gibson, 1966, p. 98). However, psychologists later discovered that touch includes four senses, and there may be up to 10 senses. In the 1960s, scientists identified different sensory channels for touch, coldness, warmth, and pain. These new senses, apart from the known senses, were named “other senses” or “the lower senses” (Morgan, 1977, p. 267). Chemical senses, such as taste and smell, were categorized as chemical because they were stimulated by chemical substances (Morgan, 1977, p. 268), and four different skin senses, such as touch or pressure, cold, warmth (the sense of heat and cold: thermoception) and pain (nociception) (Morgan, 1977, p. 252-272).

In addition, the proprioceptive senses, which are the kinaesthetic senses consisting of the receptors in the muscles, tendons, and joints provide information about the movement, and the vestibular sense, which is a key sense for keeping balance, and receipts in the inner ear and provides information about head movement and orientation of the head (Morgan, 1977,

p. 252-272). However, according to some researchers in the late 1970s, the sense of touch can be divided into at least two senses, which translates into a total of 15-20 senses (Whittaker, 1976, p. 357).

The kinaesthetic sense deeply affects our perception of reality by synthesizing different senses in the fields of architecture and urban design. Since the 1960s, research on kinaesthetic perception, which has mostly been investigated in neuroscience, neurology, physiotherapy, orthopedics, psychology, and philosophy, shifted to creativity-related areas such as computer science, regarding particle animation, motion analysis, hypermedia, (video-game theories), performance arts such as dance, art, choreography, theater and pantomime sports and music, involved in human body and psychology. Their disciplines rely on the motion and act of the body or soma. Since the 2000s, studies on space experience in the context of kinaesthetic perception have been explored, especially in the context of interactive space design, hyperbodies, machine learning, augmented reality, augmented ecologies and material studies.

The growing interest in this perception has been associated with the close relationship between kinaesthetic thinking and “kinaesthetic empathy” which integrates emotion and movement and is grounded in theories developed by Robert Vischer and used by many art historians and philosophers such as Friedrich Theodor Lipps, Heinrich Wölfflin, Wilhelm Worringer, and Alois Riegl in the early 1900s.

However, architecture and its relationship with education—among these disciplines have been the most disregarded. Today, the emergence and discovery of diversity in kinaesthetic perception of touch have become more important in terms of interdisciplinary openings in the field of psychology, philosophy, neuropsychiatry, neuroscience, and neuroarchitecture.

The main focus of research groups, such as the Academy of Neuroscience for Architecture (ANFA), is on interdisciplinary interaction such as architecture, neuroscience, and philosophy, to understand human responses to the built environment. Based on architecture-related disciplines as a creative human activity, such studies aimed to bring up the interdimensional perceptions of places and environments that architects and designers have long forgotten and ignored. All these studies focus on understanding the brain landscape, reveal the relationship between neuroscience and creativity, its relationship with the environment, and the perception of things, whether architecture, art, or design (ANFA, 2020).

Therefore, this article is a vantage point in the understanding of kinaesthetic perception from an architectural perspective. Based on the

theories related to kinaesthetic perception, what can kinaesthetic perception provide in the ignored fields of architecture and architectural education?

The History of Kinaesthesia in Medicine, Neurology, and Psychology

Kinaesthesia (or kinesthesia) is the sense of movement derived from the Greek words *kinein*, *kinesis* (to move, movement), *aesthesis*, and *aisthesis* (aesthetics, perception). It is rooted in medicine such as anatomy, neurology, orthopaedia, psychology, and philosophy. According to Deidre Sklar, kinaesthesia is “a sense mediated by end organs, located in muscles, tendons, and joints and stimulated by bodily movement and tensions” and includes “sensory experience derived from this sense” (Sklar, 1994, p. 15).

It is known that two Italian scholars made the first written reference to kinaesthetic perception; physician Julius Caesar Scaliger (Giulio Cesare della Scala) as “the sense of locomotion” in 1557 and philosophical physician Caesalpinus of Arezzo in 1569 (Bastian, 1869, p. 9). The British anatomist Sir Charles Bell (1774-1842) and the German scientist and philosopher Hermann von Helmholtz (1821-1894) are key figures who defined kinaesthesia, which was also known as proprioception. Anatomist, physiologist, neurologist, artist, and philosophical theologian Sir Charles Bell’s “Idea of a New Anatomy of the Brain” (1811) was called the “magna carta of neurology” (The Editors of *Encyclopaedia Britannica*, 2018). In 1826, Bell defined kinaesthesia as the “muscular sense” (Boring, 1942, p. 8).

Von Helmholtz studied medicine but later switched to physiology, mathematics, and physics, contributing widely to the experimentation of optics, and sound sensation. He investigated how “the sense of vision created the idea of space”. According to him, space is “a learned, not an inherent concept. He demonstrated in non-Euclidean space that “these could be conceived and worked with as easily as the geometry of three dimensions” (Williams, 2018).

In 1880, British physiologist and neurologist Henry Charlton Bastian proposed that kinaesthesia is the scientific term for muscle senses as “it included sensations from the tendons” (López-Ibor et al., 2011, p. 37). He described it as a sense of awareness of the position and movement of our limbs and as a “complex of sensations” in relation to the movement (Taylor, 2013, p. 932). In fact, in 1889, Goldscheider proposed three types of kinaesthesia as the result of experiments on muscular anesthesia: muscular, tendinous, and articular (López-Ibor et al., 2011, p. 37).

In 1906, neurophysiologist Charles Sherrington introduced the term “proprioception”, derived from proprius (one’s own). According to him, the receptors that are proprioceptors were found in the muscles, tendons, and joints, and in the vestibular organs that act as “information about one’s own body” and “exteroceptors” that provide “information about things external to the body, and interoceptors, which signal information about the viscera” (Taylor, 2013, p. 932). In the following years, in addition to these identified receptors, skin receptors have been known for their close relationship with “sensations of joint movement and position” (Taylor, 2013, p. 932).

In the 1920s and 1930s, it was thought that the sense of movement was provided by the receptors located in the body parts, such as eyes, ears, and the skin, which signaled the body’s movements for the sense of seeing, hearing, and touching (Gibson, 1966, p. 33). According to the ecological psychologist, James Gibson, and his ecological approach to perception (1966), “somaesthesia” was created by Boring for the expression of the “feelings of the body” with such possible sensations such as “hunger, thirst, nausea, and the other visceral experiences” and pain, but they did not conclude. Therefore, Boring regarded sensations as the “sole basis of perception or knowledge” (Gibson, 1966, p. 98).

The History of Kinaesthesia in Philosophy and Art

In addition to its discovery and importance in the physical body and senses, the kinaesthetic perception drew attention to philosophy and art after the 1880s. In 1886, Swiss art historian, Heinrich Wölfflin, mentioned this perception in his doctoral dissertation *Prolegomena to a Psychology of Architecture* (*Prolegomena zu einer Psychologie der Architektur*) in relation to the term ‘Einfühlung’ (“in-feeling”, “feeling-into,” and also translated as empathy) invented by Robert Vischer (in his doctoral dissertation *On the Optical Sense of Form*, 1873) and used by Friedrich Theodor Lipps in *Asthetik: Psychologie des Schönen und der Kunst* (1906) to define aesthetic experience (Reynolds & Reason 2012a, p. 17-19).

Einfühlung means “the unconscious projection of our “own bodily form– and with this” the soul–into the form of the object” (Mallgrave, 2010, p. 77). The human body has an “empathic relationship with an object” which is naturally ““*physiognomic* or emotional”” (Mallgrave, 2010, p. 78). German art historian Wilhelm Worringer developed “the idea of empathy” concerning aesthetics in a 1908 book, “Abstraction and Empathy: A Contribution to the Psychology of Style *Abstraktion und Einfühlung: Ein Beitrag zur*

Stilpsychologie, derived from theories of Theodor Lipps and Alois Riegl. Movement or kinaesthesia meant “shifting, pulsating, writhing, dancing, [and] expressive action of bodies in space over time” for Worringer (Jones, 2012, p. 11-12). “In Vischer’s and Lipps’ writings on aesthetics, the kinaesthetic sensation was considered an intrinsic part of empathy” (Reynolds & Reason, 2012a, p. 19).

Wölfflin asked how architectural forms can “express an emotion or a mood” (Mallgrave, 2010, p. 77, 80) and mentioned that “physical forms possess a character” as “human beings possess a body”. The form of a building affects our “corporeal balance” intuitively regarding its composition through our physical sensation of it. This affection occurs due to “a direct impression of the unbalanced condition on our muscles, or in our involuntary vestibular effort to interpret other forms through our bodily organization”—rather than a mere—“active imagination” (Mallgrave, 2010, p. 80).

Following these theories, the French philosopher Henri Bergson evaluated kinaesthesia and kinaesthetic empathy as the “durational dimension of human experience, the embodied mind’s capacity to give meaning to each present instant by [recourseing] to [the] past embodied memories”. This duration enabled us “to make sense of things” and the world (Jones, 2012, p. 12). According to Bergson, motion exists in perception, and is a “mental synthesis”, a process in his book, *Time and Free Will: An Essay on the Immediate Data of Consciousness* (1889) (Bergson, 1910, p. 111).

Another noteworthy finding on kinaesthesia and perception is that of Edmund Husserl, who mentioned “Thing and Space, Lectures of 1907”, including his lectures in the University of Gottingen. In this book, Husserl argued things as “the things of the thing of everyday experience (Husserl, 1997, p. xii) from a phenomenological point of the constitution of the appearance of a thing (*res extensa*) and space (Husserl, 1997, p. xiii). For Husserl, “the perceiving Ego, or its body”, “the eye, the head, or the whole body” and “the relations between the thing and the body” are the three things that move and change the “the appearance of the things” (Husserl, 1997, p. 125).

Some other important figures in kinaesthetic perception are Merleau-Ponty’s *Phenomenology of Perception* (1962) and the embodied mind and body, in which he mentioned that “kinaesthetic sensation” was the originality of the movements which I perform with my body...” (Merleau-Ponty, 2005, p. 107). For Merleau-Ponty, “our own body is in the world as the heart is in the organism: it keeps the visible spectacle constantly alive, it breathes life into it and sustains it inwardly”, and forms a system with it, and space is

perceived through one's movement in space (Merleau-Ponty, 2005, p. 235). In "The Visible and the Invisible", he mentions "The body is made of the same flesh as the world". It is "shared by the world", in which it is "in a relation of transgression" with the world. Therefore, the body is the "measurant" "of all, *Nullpunkt* (zero point) of all the dimensions of the world" (Merleau-Ponty, 1968, p. 248-9).

The Importance of Kinaesthetic Perception

As Lawson mentions, "perception is an active process through which we make sense of the world around us. To do this we rely upon sensation, but we normally integrate the experience of all our senses without conscious analysis" (Lawson, 2001, p. 42). The tactile-kinaesthetic sensations play a role in the perception of the distance of objects and the differentiation of one's own body from the environment (Korkala et al., 2017).

Kinaesthetic perception and kinaesthetic intelligence, also called bodily kinaesthetic intelligence, are stated in Howard Gardner's "Frames of Mind: The Theory of Multiple Intelligences" (1983). Gardner mentions a harmony and balance between mind and body observed in the Classical Era in Greece, where the mind is "trained to use the body properly", and the body is "trained to respond to the expressive powers of the mind" (Gardner, 2011, p. 219). This ability allows the whole body to be used. The act of grasping objects with precise control with fingers is an example of this (Gardner, 2011, p. 221). Bodily intelligence can also be observed in dancers, performers, and mimetic ability in actors, who use their specific limbs and interact physically with the environment (Gardner, 2011, p. 239, 243, 245). With the advent of new technologies, this perception differs in a wide range of disciplines such as "dramatic (dance, drama, mime, theatre, [and] musicals), industrial (sculpting, auto repair, design, electronics, building, metal or woodworking), or recreational (recess, classroom games, physical education, sports, [and] active health programs)" (Jensen, 2001, p. 71).

According to Sklar, "movement is a corporeal way of knowing". Like verbal media, it is as loaded with significance, with who people take themselves to be" (Sklar, 1994, p. 11). To develop a capacity of kinaesthetic experience—"kinaesthetic empathy" is involved in "bodily memory and bodily intelligence" and "gives a sampling of the proprioceptive, or "felt" dimensions of events" (Sklar, 1994, p. 14-15). This empathy can enable closer interaction with architecture and the world and enhance a better design process, and increase awareness in cross-cultural interactions such as art

practice (Reynolds & Reason, 2012b, p. 319-320). Amelia Jones summarizes this as follows: “We are never whole and final as subjects but always porous, through kin[a]esthetic empathy perhaps, to the impact and impression of other subjective expressions around us” (Jones, 2012, p.13).

The vision includes “physical distance from the perceived object”. However, “kinaesthetic experience tends to involve direct contact with the object of our perception” and “reciprocal interaction” (Yiannoudes, 2006, p. 253). Movement is an important part of understanding the world around us, whether it is any static object or architecture or other things and people in motion.

Kinaesthetic Perception in Architecture and Architectural Education

Architecture is perceived with all senses, and it is multi-sensory. “Kinaesthetic perception of architecture refers to the capacity of architectural space to stimulate our kinaesthetic sense” (Yiannoudes, 2006, p. 253). As Sama points out, the kinaesthetic experience of architecture is manifested in our ability to move and comprehend three-dimensionally (Sama, 2011, p. 2).

The foundations of kinaesthetic perception and their reflections on art and architecture became more visible during the Bauhaus period. Key figures of Bauhaus education and practice, such as Oskar Schlemmer and László Moholy-Nagy worked on the reflections and perception of body movement in space. One of the important figures addressing kinaesthetic perception in design and costume design is the leading practitioner, German sculptor, artist, designer, and choreographer, Oskar Schlemmer, who worked with the Bauhaus school. The transformation of the human body was possible by changing metamorphosis, costume, and disguise (Schlemmer, 1961, p. 25). In his work “Triadic Ballet”, Schlemmer established a relationship between the body with and other bodies around it. Schlemmer commented on the space and his drawing of Man as Dancer—from “Man and Art Figure” (1921) experienced space with all senses and the body with the dancer and actor’s “sense of touch”. The human figure was observed and translated into abstract geometries mechanically (Gropius, 1961, p. 8). Gropius observed a similar relationship between the moving human body, mechanics and geometry in space. For ballet and theater, he performed rather than perceived through vision and physicality (Gropius, 1961, p. 8).

In architecture, kinaesthetic perception approaches can be related to the corporeal studies that began in the early 1930s with the choreographer and architect Rudolf van Laban, who documented the body’s movements and

physical movements into notations and diagrams. He recorded these movements in space for others to perform. These spatial exercises can be extended to the physiology of modern dance by being extended to the notation of Rudolf von Laban's body movements and their relationship with the three-dimensional space (Laban, 1975).

In Bauhaus' methodology, many of the architectural education and basic design principles were based on the preliminary course of Vorkurs and the form lessons theory (Formlehre), which focused on the relationship between "physical stimulus" and "psychological sensation" in the Bauhaus school in the 1930s (Çelik Alexander, 2017, p. 174). Moholy-Nagy claimed that any person could become a "musician, painter, sculptor, or architect" when he/she is "able to participate in all the pleasures of sensory experience" (Moholy-Nagy, 1947, p. 17). Moholy-Nagy suggested that the first year in the Bauhaus was directed toward gaining "sensory experiences" (Moholy-Nagy, 1947, p. 19) derived from tactile exercises (Moholy-Nagy, 1947, p. 21). This course was one of the most innovative programs in pedagogy in the Bauhaus (Çelik Alexander, 2017, p. 176). The basic workshop or courses provided students with information about "structure, texture and surface treatment" by examining and experimenting with different materials such as wood, plastic, metal, glass, textile, etc. (Moholy-Nagy, 1947, p. 21). Moholy-Nagy published the book *Von Material zu Architektur* in 1929, where he developed kinetic structures and tactile boards (Moholy-Nagy, 1929). One of these tactile boards was made by Willy Zierath in 1927, a tactile scale made of different materials such as cardboard, wood, plastic, etc., and a piece of a graph showing tactile values in charts on a grid paper below (Çelik Alexander, 2017, p. 173).

After the 1960s, the idea of the "oblique" function that emerged in the "Architecture Principe" (1963) by Paul Virilio—Merleau-Ponty's student and architect and medical doctor, Claude Parent, focused on the perception that started with a distinctive approach to direct kinaesthetic perception after the Second World War. Virilio was an admirer of Gestalt perception. The oblique function provides an orthogonal approach and a critique of Euclidean geometry and architectural harmony with topology. As the idea of the ramp, oblique means habitable circulation, related to the body's experience in space. In this context, Virilio and Parent question the concept of curves of different scales by kinaesthetic and experimental reading through urbanism (Layzell, 2010). This idea later affected the practices in corporeal studies in the coming periods.

The idea behind the oblique function was how a body physically perceives and excludes a space. In this experience, the wall became an inclined plane by tilting the floor to revive the old paradigm of the vertical wall, so that it could be “experienceable” as much as “cities imagined”. The slope refers to the effort to climb up and the speed downward. In this way, the body cannot isolate itself from space and feel the degrees of inclination. Parent and Virilio associated this research with the refuge archeology in the design of the Sainte Bernadette Church (1963-1968, France) in Nevers (Lambert, 2015). The oblique provided an “escape” from “the rationality of modern space” (Tommasini, 2010). This idea was later observed in the adoption of the oblique function by Rem Koolhaas in the book Ramp for the Venice Biennale.

Depending on Merleau-Ponty’s phenomenology with its “focus on the outward-reaching abilities of the organism and in accordance with a theory of direct perception of environmental ‘affordances’”, Fingerhut gives this example as “offerings of the surroundings” and “a tree being perceived as “climb-able” by a squirrel” (Fingerhut, 2011, p. 12). When it is applied to the perception of architecture, how can it be readable? What can different types of architecture trigger in our brain? Is it the inhabitable property of an enclosed space, or the idea of oblique, climb a ramp? Regarding this example, what does architecture trigger in mind and perception? Or is it how neurophysiologist Berthoz mentions: The “three basic elements-regularity, chance, and movement-are what make nature appear as it does. They are also the elements that constitute perception” (Berthoz, 2002, p. 256).

A remarkable approach to kinaesthetic perception and body is that of Shusterman, who coined the term “somaesthetics”, which states that “tactile and somaesthetic senses are important for “architecture’s experienced atmosphere”. For Shusterman architecture is perceived through soma, and he uses the word soma rather than the body since it is a “living, perceptive, sentient, dynamic, and intelligent corporeality that involves intentionality, mind and the spirit rather than being a brute material counterpart from which mind and spirit must be distinguished and opposed” (Shusterman, 2012, p. 227). The architectural form and design are mainly based on improving the somatic experience, since we perceive soma, its proportions, and soma from Vitruvius (Shusterman, 2012, p. 225, 226). He mentions that “somaesthetic senses are crucial to architecture’s experienced atmosphere”. It is presumed that these dimensions of the atmosphere are mainly “too elusive for the exercise of criticality” (Shusterman, 2012, p. 235). “Proprioception and particularly kinaesthesia seem important for the appreciation of architecture as [the] environment through which we move and orient our bodies,

maintaining a dynamic equilibrium as we navigate entrances, corridors, and staircases” (Shusterman, 2012, p. 226) and “soma provides the most basic tool for all spatial articulation by constituting the point from which space can be experienced and articulated” (Shusterman, 2012, p. 224).

Kinaesthetic Perception Today

After the 2000s, sensory movement and corporeal movement have been associated with the evolution and transformation of space and building form. Understanding the space with kinaesthetic perception not only allows architects and designers to grasp the built environment and body of objects around us, but also transforms them with the help of digital sensors. Motion analysis is explored in particle animation or laboratories, or wearable architecture.

“Somasthetic and haptic perceptions are gained through corporeal activity and physical work. They allow us to know places in intimate, unself-conscious ways...” (O’Neil, 2001, p. 4). As Shusterman mentions, our environment is perceived through all senses and “the tactile and muscular sensations of walking through space, feel[ing] of the surface material beneath our feet; the rhythm of our footsteps, the kinaesthetic feel, proprioceptive balance, and muscular effort of traversing a courtyard or ascending or descending a staircase or adjusting one’s gait and posture to negotiate a narrow corridor or low door” (Shusterman, 2012, p. 235).

Contemporary approaches that draw attention to kinaesthetic perception are related to the approach of Alain Berthoz (2000), Alva Noë (2004), and Brian Massumi (2002), philosopher and social theorist (Reynolds & Reason, 2012a, p.18-19). In his book “The Brain’s Sense of Movement” (2002), what Berthoz expresses about architects is a realistic and bold statement: Architects have ignored the pleasure of movement and motion since the last 20 years apart from engineers and couturiers, who build artificial objects such as planes or clothes that are closely related to the body and human movement. In contrast, the fact that architects “have built and continue to build is a tragedy for our brain, its emotions, and the pleasure it takes in movement”. Architects investigated the prisons of lines deeply with modernism and especially the theories of the Bauhaus, which have been brought within the degradation of architecture, clothing, and objects as “combinations of three prototypic forms: circle, square, and triangle” (Berthoz, 2002, p. 255-257).

However, “perception is inseparable from action. It predicts the future. It was organized [throughout] evolution according to the natural properties of

the physical world and biological mechanisms” (Berthoz, 2002, p. 255). These Buildings “deny our senses the pleasure of shape and movement that curves and mass would provide” (Berthoz, 2002, p. 256). “Architects are responsible for constructing an environment that meets our brains’ expectations...” (Berthoz, 2002, p. 255).

In *Action in Perception*, Noë develops an enactive approach to perception, which is a kind of thoughtful activity. He suggests touch as a model for our perception since “perception is not a process in the brain, but a kind of skillful activity of the body” (Noë, 2004). The importance of touch was also mentioned by Gibson, who argued that in architecture, active touch could be enhanced in the sense of “exploratory instead of performatory” (Gibson, 1962, p. 477).

Discussion: Towards Awareness on Kinaesthetic Perception

Kinaesthetic perception, and kinaesthetic empathy can raise awareness of using and discovering the body in architectural education to create interactive experiences among body, mind, and the environment: constructive culture. Kinaesthetic spatial perception and multiple intelligence theory used in design education and training can provide a holistic perspective to the experience of the space. The kinaesthetic perception of space means the capacity of the architectural space to stimulate the kinaesthetic feeling. In this context, kinaesthetic perception plays a significant role in understanding the environment and communication.

Tactile perception has been regarded as an important feature in architectural education and has extended to wider experimentation involving corporeal studies that measured years and openings in architectural education. Kinaesthetic awareness can provide a deeper understanding of the formation of geometry, pattern, models, shapes/forms, and internal properties of a structure. This perception does not necessarily evoke movement, but it can be a meaningful application and perception for the creative and critical evaluation of the possibilities of the environment. Therefore, awareness of kinaesthetic perception can provide a more context-based understanding of the world.

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