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The Interior Experience of Architecture: An Emotional Connection between Space and the Body

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Abstract: This paper provides a phenomenological understanding of interior space to explore the emotional connection between space and experience. It focuses on the significant aspects of interior space, considering how people experience interior space and which aspects improve the quality of spatial and emotional experience. I have argued that the interior experience offers effective ways of stimulating emotional experience to create spatial perception as a way of understanding architecture. Interior experience can be developed through: (a) stimulating a lived body; (b) emphasizing materiality; and (c) generating emotional connection. This allows people to develop an awareness of the sensual aspects of the interior space and improve the quality of their emotional experiences. I have drawn upon representative case studies about spatial experience to explore how they use materiality to stimulate sensory effects and how the multi-sensory space connects with emotional experience, which is one of the fundamental aspects of this paper. I found that an integrated body and materiality are fundamental elements that are needed to enrich the spatial experience, even in an abstract dimension of the work without architectural form. Thus, this paper contributes to the understanding and knowledge of the relationship between interior space and experience with respect to improving the quality of the emotional experience in order to develop spatial experience and considering how experience intervenes in interior space to create a multi-sensory space.

Keywords: interior experience; multi-sensory experience; movement; sensory body; emotion; materiality

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1. Introduction

This paper provides a phenomenological understanding of interior space to explore the emotional connection between space and experience. It emphasizes the importance of interior experience as a way of understanding architecture. It considers how people experience interior space, what elements, forms, and techniques can be used to improve the quality of spatial experience in architecture, and which aspects of interior space stimulate multiple senses, which help to create a better experience through emotional connection in the realm of architecture.

Over the last century, the field of architecture has focused on the functional and morphological aspects rather than on its relationship to people and its environment of interior space [1–4]. In addition, the visual-oriented representation of architecture has led to the predominance of the visual experience over other sensory effects [5].

In recent decades, however, there has been much discussion on the phenomenological understanding of architectural space, as it has become more critical to focus on how people experience the space rather than on the current visual-oriented architectural form; this has been raised as a fundamental issue in both an academic and practical context [4,6–10]. Although there are already many studies on the phenomenological understanding of architecture, these rarely discuss the importance of the interior experience of architecture and its connection to the emotional aspects that enrich the quality of architecture. An interior experience that emphasizes the body and environmental stimuli represents an immersive experience, affecting emotion [11]. The body here means bodily movements and senses

as a subject to interact with interior space, while environmental stimuli are understood as interior environments that directly respond to the body. In this sense, this paper argues that the interactive connections between the body and environmental stimuli are substantial elements for generating the emotional experience that improves the quality of interior experience, understood as "the origins of architecture" [12]. Thus, it is worth looking at the interior experience of architecture for an emotional connection between space and experience, engaging the body and various aspects of interior environments.

An architectural experience cannot be perceived merely through the visual sense. Instead, as has been emphasized by many theorists and architects, such as Juhani Pallasmaa, Peter Zumthor, Kengo Kuma, and Yi-Fu Tuan, it is understood through the eyes and experienced through the entire range of bodily senses and the physical movements of the body "as one moves through it and actively interacts with it" [13] (p. 168). This idea was initially developed by philosophers such as Kant and Hegel and later by Martin Heidegger, Gaston Bachelard, and Maurice Merleau-Ponty. These phenomena and how we experience space through our body are emphasized [14] (p. 6). In this sense, Finnish architect Juhani Pallasmaa (2005) states that "[e]xperiencing architecture is multi-sensory; qualities of space, matter and scale are measured together by the eye, ear, nose, skin, tongue, skeleton and muscle. Architecture strengthens one's sense of being in the world, and this is basically an enforced experience of self. Instead of mere vision, or the five classical senses, architecture involves several realms of sensory experience which interact and fuse into each other" [10] (p. 41).

In this respect, some contemporary architects, designers, and artists highlight the importance of spatial experience in their projects by engaging with several issues, such as materiality, the body, senses, emotion, and environments. Their projects are presented using various methods, including architectural space, pavilion, and installation. For example, Peter Zumthor's Thermal Vals provides a phenomenological experience in which various sensory elements are transmitted to the body; it allows people to touch water and stones, see the light and darkness, hear the sounds of flowing water, and smell the mist of the water [7,15]. The Blur Building by Diller + Scofidio concentrated on the awareness of bodily experiences and sensations to generate an emotional connection. This pavilion provided an immersive experience that stimulated all of the senses due to the sight being blocked by mist [16] (pp. 48–49). Responding to Peter Zumthor's architecture, Olafur Eliasson's the Mediated Motion provided sequential spaces filled with natural materials, including water, steam, fog, earth, wood, fungus, and duckweed [17]. Eliasson allowed visitors to be a part of the exhibition, engaging "their senses, memory, and reflections to make his projects more profound" [18]. Some works create a physical architectural space, stimulating spatial experience through bodily movements and senses, while some other projects present abstract space using ephemeral yet experiential material, engaging emotional experience or feelings. They have the power to provide a spatial experience through bodily engagement and to stimulate users' emotions. While visual-oriented spatial experience focuses on the physical forms of architecture, interior experiences that are felt through engaging the body and environmental stimuli provide multi-sensory space and generate various types of emotional experience [13] (p. 169). These projects trigger me to consider: (a) the meaning of experience in the realm of architecture; (b) how people can obtain a sensory experience from interior space; and (c) which aspects of interior space can improve the quality of spatial and emotional experiences. This paper investigates various elements to find a way of improving the emotional experience and therefore developing the interior space, rather than measuring the emotional levels numerically. Thus, the hypothesis of this paper relies on the qualitative-analytical and bibliographical research methods. To explore these research questions, I formulated two hypotheses.

1. An interactive connection between the body and various elements of interior space improves the interior experience, providing a personal connection to culture and emotion.

2. Sensory effects that enhance the emotional connection with the interior space can potentially enrich the spatial experience and improve its quality to greater effect than functional or form-oriented factors.

This is an opportunity to develop the idea of the body and interior space, which may lead to theoretical and practical aspects with contemporary significance. Methodologically, this paper demonstrates the value of the phenomenological understanding of the interior experience for emotional connection. For this, I investigate:

1. The meaning and essential aspects of interior space;
2. The meaning of the body and experience in architectural space;
3. Case studies, through analyzing the selected architectural space; and
4. Various effective ways of improving the qualities of interior experience and its emotional connection, which I then go on to discuss.

Thus, this paper attempts to analyze various characteristics of the environmental stimuli of interior space as a way of showing how experiencing space can create a connection with personal emotion. This is done through the use of selected case studies of architectural representation that are presented in various ways. This paper presents ways in which the interior experience can contribute to a phenomenological understanding of the architectural realm, engaging several key issues, such as the body, senses, emotional experience, and culture, which solidify spatial perception.

2. Interior Experience as the Origin of Architecture

2.1. Interior Space

This section investigates the meanings and essential aspects of interior space in understanding architecture. It focuses on the body and materiality, understood as a subject and object, respectively, considering how interior space engages the body and provides a sensual experience.

Many architects and researchers focus on the primacy of interior space in architectural experience because "the inside is always more important than the outside" [19] (p. 274). This is because most people spend more than 90 percent of their lives indoors [20] (p. 4). In this sense, Bart Verschaffel states that the significant aspect of architecture is "the creation of an interior, [which] separates a circumscribed space from its environment and turns it into an inside" [21]. In addition, interior space can impact the people who occupy and use those spaces; it is strongly related to our body and is understood as a communicative form. In this sense, Frank Lloyd Wright states, "[t]he space within becomes the reality of the building" [22] (p. 217), because interior space allows people to dwell, live, move, and enact the rituals of their everyday life. It demonstrates that the "reality of the building does not consist in the four walls and the roof but in the space within to be lived in" [22] (p. 80). Concerning this, John Dewey defines architecture as "the formation of interior space", as it provides "opportunity for movement and action" [23]. These ideas emphasize the important connection between interior space and the body. The interior space, engaging the body, provides spatial experience, which generates an emotional connection. Many architects, such as Louis Kahn, Wright, and Zumthor, agree that the most important function of architecture is "to enrich experience and enhance the life that takes place within it" [12] (p. 9). Paul Goldberger also highlights the importance of interior experience, "by staying in one place and taking it all in" [24], in order to feel the space. This emphasizes that interior experience is emotional and communicative because it engages the body.

People continuously interact with various elements of interior space. The environment of interior space provides material worlds. Material worlds here not only means physical aspects, such as wood, brick, and concrete, but also substances, including proportion, form, texture, light, shapes, color, temperature, smell, and even sound. This is understood as environmental stimuli. It can be divided into two aspects: the morphological factor, which is a visual composition of architectural space, and the sensual factor, which relates to arousal of people's sensory perceptions [25]. For example, people primarily experience the

various features of environmental materials within an interior space. Beyond the immediate visual qualities of a space, the sensual factor can be felt through our body; for example, people can smell various odors, touch the texture of surfaces, and reflect sound while walking inside. This means that interior space can be "defined not only by occupation but also by materiality" [26] (p. 1). The materiality of the interior space can reflect the spatial usages, revealing traces made by our body, as Walter Benjamin states [27]. This shows that materiality, as an environmental stimulus, can enhance the spatial experience by engaging the body. In relation to this, Peter Zumthor states that "[t]he material presence of things in a piece of architecture, its frame. That kind of things has a sensual effect on me" [28] (p. 23). This shows that materials provide interior environments and directly stimulate sensory experience. In other words, materiality can be understood as a medium to connect with the body and the interior space. It shows how people relate to the interior space and engage with materiality; a method of communication between the body and the space. The environmental stimuli can also evoke our memory and cause us to "feel" [14]. Moreover, social and cultural environments are also a substantial factor affecting what people experience, because the built environment is an integral part of the social and cultural order [29] (p. 457). In relation to this, Kahn refers to the interior space as "a society of space", which generates social and cultural relations [12].

The interior space becomes the manifestation of what people perceive, experience, and feel. It also reflects how people use, occupy, transform, and adapt to space. This spatial experience can transform the space into place, emphasizing the sense of insideness within the dwelling [30] (p. 20). It shows that the interior space is strongly related to a lived body [31] within the material world, reflecting spatial identity and culture. The interior space contains various elements, comprising physical factors, space, and the body. In other words, the interior space can be defined by the body and becomes the reflection of the identity, subjective experience, and personal responses [26] (p. 2). Thus, interior spaces can be understood and explained not only by architectural forms, but also by their relation to the body, environmental stimuli, and culture, which forms the meaning of space through experience. This idea provides a framework for exploring how the multi-sensory atmosphere of interior space can be formed and how this stimulates spatial experience and emotional connection. Table 1 shows the key aspects of interior space.

Table 1. Characteristics of interior space. Source: author's drawing.

		Contents
Environmental Stimuli	Morphological Factor (Form and pattern)	volume, scale, rhythm, order, proportion, contrast
	Sensual Factor (Material connection)	texture, light, shadow, color, temperature, sound, smell
	Influential Factor	cultural symbolism, local/social issue
Container	• Interior space is a container where various elements, such as the body, objects, and materials, are involved. • Interior space engages the body as a form to interact with. • Interior space can be transformed into a place through bodily experience.	

2.2. The Body and Experience

The body is significant in the understanding of architecture and its history. Historically, architecture has mainly been experienced through the visual sense. The body can be understood as an element of nature and ingredient of form, and in the past it was described as the most fundamental measurement of self [16]. It has long been the medium through which Western culture and society has represented the architectural environment [7]. Although the body was a fundamental representation of architecture and has been used as a system of proportion throughout history, the experiential and emotional roles played

by the body in the subject's thinking were ignored entirely, a situation that lasted until the 20th century [6,16]. This shows that the physical representation of the body emphasizes the visual aspects rather than the spatial experiences. However, contemporary theorists and architects, such as Maurice Merleau-Ponty, Juhani Pallasmaa, and Peter Zumthor, highlight the significant aspects of the bodily experience for emotional connection within the interior space of architecture. They consider how a lived body can "effectively create a more emotionally charged space and consequently [cause] an emotional connection within architecture" [16] (p. 12). The physical body and its emotional connection can stimulate the sensory experience of architecture.

The body can be a form that is used to interact with space, allowing us to experience the interior environment that generates spatial perception. The bodily experience in architectural space can be interpreted through phenomenological understanding. Phenomenology is the most effective and applicable approach to architecture in response to the body, emphasizing experience through continuous interaction with various elements [32] (p. 565). For example, people experience space through the body as soon as they enter an inside area. In this sense, Merleau-Ponty concentrates on perception, body, and the sensible dimension of human experience, providing "an important perspective on more practical, applied architectural issues" [5] (p. 13). Pallasmaa is indebted to Merleau-Ponty, particularly to themes such as the lived body, perception, and mobility. In this regard, Steen Eiler Rasmussen underlines the experience of architectural space, stating that "it is not enough to see architecture; you must experience it" [33]. In this sense, Zumthor uses emotion as a measuring tool for experience [28]. This means that architecture is not just experienced visually, but through the entire body, such as through movements and the senses, stimulating spatial experience [34]. In other words, the phenomenological approach is used to explore the relationship between space and the body through experiences. This idea can be seen as parallel to the Asian philosophy of traditional architecture, which emphasizes the interrelationships between body, mind, environment, and cultural identity in order to understand architectural space [35–39]. However, these ideas have rarely been discussed in the realm of architecture, either in Asia or in the West [38,40]. Furthermore, bodily movement is also an important method of experiencing space. Bodily movement can be divided into two aspects: physical movement and visual movement. It provides dynamic experiences through changes that occur due to spatial sequences [41,42]. It shows that bodily senses and movements provide constant dialogue with interior space due to spatial experience.

Spatial experience can be physical, sensory, and mental. The term "experience" itself emphasizes the body as a medium for interacting with objects and space, generating emotional aspects. According to the *Cambridge Dictionary* (2022), experience means "something that happens to you that affects how you feel" [43]. This shows that the word includes both physical and emotional qualities through doing and feeling. In this sense, to experience space is to interact with space through the body and mind; people can recognize, act on, and perceive the space through their entire body. This means that the physical, sensory, and emotional aspects of the body cannot be separated. For example, people can perceive the surface of the concrete with their eyes, feel the surface by touching it with their skin, smell the air of an interior space, and listen to the sound of footsteps while walking inside. Therefore, an entire body can be viewed as a sensing apparatus that gauges a space, other people, and surrounding objects in order to produce a spatial experience [44]. This method of sensory experience can generate an emotional experience; it is specific to place, time, and materials. In this respect, Yi-Fu Tuan states that "place is a center of meaning constructed by experience [. . .] through not only the eyes and mind but also through the more passive and direct modes of experience" [45], which evokes feelings. This shows that place can be understood as a space where a particular spatial experience and its emotional connection are embedded. John Dewey defines experience as the whole process of human adaptation to the environment through interaction with the environment. He also emphasizes that human activities are incorporated from rational and emotional thoughts and acts [46] (p. 41).

People perceive the world through a lens generated by the emotions they experience [12,47]. Emotions are an expression of our feelings that appear according to certain situations and experiences. Emotions are related to both personal experiences of interior space and social experiences, affecting spatial perception and definition. This can be embedded within the body as memories, which form a spatial identity. For example, each person has different spatial memories, as they have experienced space differently [48]. This shows that interior space can evoke a socially memorized spatial experience that affects one's emotions. In other words, we can all experience space differently, even if we are in the same space. In this sense, Pallasmaa states that "all experience implies the acts of recollecting, remembering and comparing" [10] (p. 72). This allows us to experience interior space in various ways, stimulated by overlapping our present experiences and the memories formed by past experiences [46] (p. 38) within the culture.

Thus, to experience space is to understand space phenomenologically, engaging the body, environmental stimuli, and culture to provide an emotional connection (see Figure 1). This provides some of the varying approaches for understanding the distinct ways of conceptualizing how interior space is experienced through the meanings of the body, which could provide theoretical and practical approaches to exploring the cultural context. Experiencing space in this way has been described in phenomenology as "multi-sensory", a way of interacting with space through a sensing apparatus of the body. In relation to this, Tuan (1977) explores the relationship between people and space, examining the sensory and affective experience. Tuan writes, "[t]he given cannot be known in itself, what can be known is a reality that is a construct of experience, a creation of feeling and thought" [49] (p. 9). Tuan's idea addresses how people feel and think about space and how they form a sense of attachment to space, based upon memories or intimate experiences.

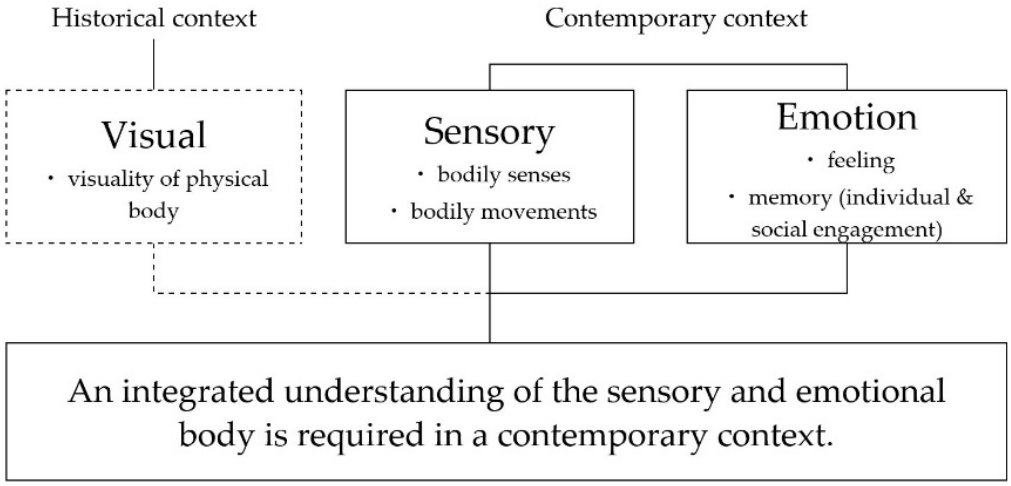


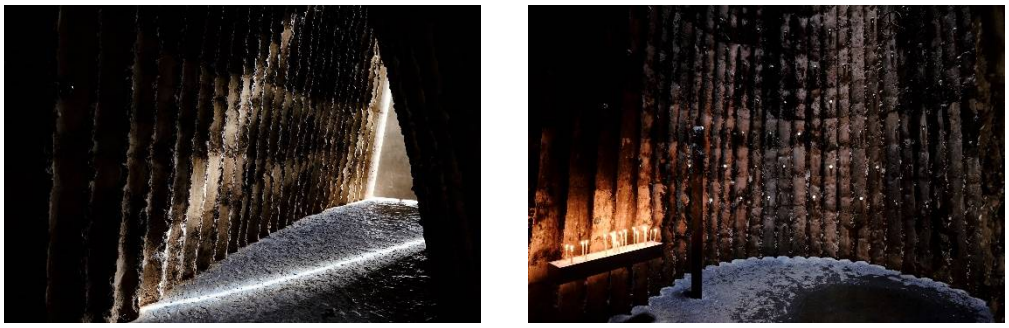
Figure 1. Phenomenological understanding of the body. Source: author's drawing.

3. Multi-Sensory Experience and Emotional Connection: A Review

The interior experience is likely to be significant in the phenomenological understanding of architecture, but discussions regarding the issues concerning the emotional connection are still at an early stage. Therefore, due to the limited amount of research regarding the connection between interior experience and emotion, it is worth looking at several architectural projects. The review of these projects not only covers existing architecture, but also pavilions and conceptual installations. This is because such projects provide both the symbolic meaning of architectural space and various ways of understanding spatial experience. For the case study, I have therefore selected two prominent phenomenological architects, Peter Zumthor and Kengo Kuma, and analyzed how they created architectural space in order to improve the quality of interior experiences and emotional connections.

3.1. Bruder Klaus Field Chapel, Peter Zumthor

In 2007, the Bruder Klaus Field Chapel was built by Peter Zumthor in Mechernich in Germany (see Figure 2). The most significant aspects of the Chapel are found in the construction methods [50,51]. Twenty-four layers of concrete were poured into a wooden frame surrounding the tree trunks, which were stacked in a curved conical form. Once the concrete had set, the wooden frame was set on fire. When the blaze subsided, only the concrete was left, containing a blackened void where the logs' shape and bark were imprinted, and emitting a particular smell. After removing the frame, many small holes were left behind in the walls and crystal shafts were inserted into the holes, which created an effect reminiscent of the night sky [50–53]. These refracted lights from the crystal shafts contrasted to the rough, blackened concrete surfaces surrounding them [51,52]. These elements were used to create a structure, but the effects are far more evident in the interior space; "the process of construction is integrated with the experience of space" [53] (p. 290).



(**a**) (**b**)

Figure 2. Peter Zumthor, Bruder Klaus Field Chapel, 2007. (**a**) entrance area (**b**) interior space (Photos: August Fischer).

The environments of the interior space are a stark contrast to the smooth, angular façade. During the short journey from entering the structure to the inner space, "the horizontal movement through space is slowly shifted to a vertical movement with the eyes" [53] (p. 290). "[The] gaze is pulled up by obvious directionality to the point where the roof is open to the sky and the night stars" [50]. Sunlight, air, and rain all penetrate the opening and create a particular environment and experience based on the time of day and the season.

3.2. Serpentine Pavilion, Peter Zumthor

The Serpentine Pavilion 2011 was created by Peter Zumthor for meditation that evoked a spiritual experience (see Figure 3). At the center of the pavilion was an inner garden, which was conceived by Dutch designer Piet Oudolf [54]. Zumthor highlighted the role of the senses and emotions in our architectural experience. The pavilion provided a hallway with multiple paths and staggered doorways for visitors, which gently guided them to a central, hidden inner garden. The covered pathways and seating areas surrounding the central space created a calm and meditative environment from which visitors looked out onto the richly planted sunlit garden, which was the center of the pavilion [55].

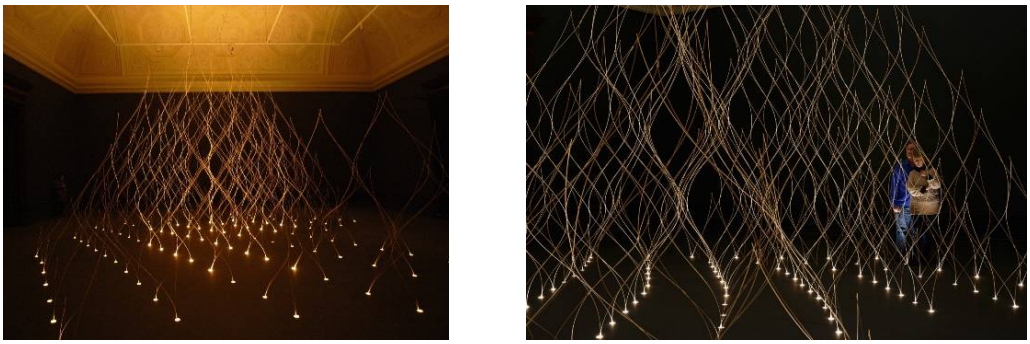
While traveling through a dark hallway with intermittent natural light streams, visitors were directed "away from the bustling city and toward the secluded, intimate interior" [56]. Through blackness and shadow, "visitors entered the pavilion from the lawn and began the transition into the central garden, a place abstracted from the world of noise, traffic, and the smells of London—an interior space that allowed people to sit, to walk, and to observe the flowers" [54] for meditation. The carefully chosen flora produced various colors, fragrances, and textures that stimulated the individuals' bodily senses [56].

(**a**) Sitting areas (**b**) A floral garden (**c**) Corridor

Figure 3. Peter Zumthor, Serpentine Pavilion, 2011. (Photos (**a**,**b**): author. Photo (**c**): John Offenbach).

3.3. Sensing Space, Kengo Kuma (2014)

The Sensing Space was a new type of architecture exhibition presented at the Royal Academy in 2014, emphasizing the experiential aspects rather than the functional aspects of architecture. Seven prominent architects were invited to focus on the sensory qualities of architecture [57]. The exhibition encouraged visitors to consider how architecture makes people feel. As a part of the Sensing Space exhibition, Kuma introduced certain scents into two darkened rooms to provoke memories of a particular space: the smell associated with architectural aspects of Japanese culture (see Figure 4). He interpreted the aroma of architecture as a full bodily sensation "inspired by a *Ko-Do*, Japanese smell ceremony, which has similarities to a *chado*, the traditional Japanese tea ceremony" [58].



(**a**) (**b**)

Figure 4. Kengo Kuma, Sensing Space, 2014. (**a**) Kuma's installation (**b**) Kuma's installation (Photos: James Harris).

In these darkened rooms, he created the woven bamboo structures as a traditional Japanese architectural material, with spotlights infused with the aroma of *tatami* mats and *hinoki*. Kuma referred to darkness as being "very important in traditional Japanese architecture [...] Darkness also emphasizes the distinctive scent in each installation" [59]. A review in the *New Statesman* stated that this particular scent evoked the childhood home that comforted him and sent him "to the sleep of the innocents" [59]. This is a personal experience shared not only with visitors who have similar memories, but also those who are not familiar with the smell.

3.4. GC Prostho Museum Research Center, Kengo Kuma (2010)

Designed by Kengo Kuma, the wooden structure of the GC Prostho Museum Research Center was built in Aichi Prefecture, Japan, in 2010 (see Figure 5). The GC Prostho was inspired by a traditional Japanese toy called a Chidori. Chidori is a three-dimensional puzzle composed of interlocking timber sticks that feature joints that can be assembled by twisting the sticks without the aid of fittings, such as nails [60–62]. The Chidori system

provides a flexible structure and anti-object where space is delineated by light, structure, and materiality. People first encounter the wooden structure and experience glimpses of the interior space according to light conditions [60]. When entering inside, people experience "a cave-like space carved out of the lattice that is concurrently experienced as connected to the exterior while distanced from it due to the viewing angle densities of the Chidori system" [60]. The quality of spatial experience is provided by integrating light and shadow from the east-facing structure; "sunlight filters through the lattice structure, creating an ever-changing pattern of shadows" [53]. Kuma refers to these patterns created by light and shadow as "a forest of deciduous trees, where you can enjoy sunshine filtering through" [62]. This filtering of light through lattice provides constantly changing patterns and volumes throughout the day and allows people to experience the spiritual nature of the space in various ways.

(**a**) (**b**) (**c**)

Figure 5. Kengo Kuma, GC Prostho Museum Research Center, 2010. (**a**) Façade (**b**) The lattice structure (**c**) Interior space (Photos: Daici Ano).

4. Analysis and Discussion

The case studies discussed above present the important connection between the sensory body and materiality (environmental stimuli) and show that the interior experience affects the emotional experience. Three key aspects have been raised as significant in order to improve the qualities of interior experiences, which are: (a) the stimulation of the body through movements and senses; (b) the use of materiality, which allows people to develop an awareness of the sensual aspects of interior space; and (c) emotional connection, which can be shaped both individually and socially. However, throughout the research, I found that: (a) these three aspects cannot be separated, but rather an integrated understanding is required, providing multi-sensory experience; (b) a particular factor provides cultural experience by stimulating socially shared memory; and (c) an abstract dimension of a work without architectural form also provides spatial experience through stimulating bodily senses and evoking personal memory. It allows people to smell, hear, and touch the materials of the interior space while walking inside, which evokes a particular memory of one's past experiences through emotional connection. This means that interior experience is physical, sensory, cultural, and mental. The characteristics of the architectural projects found through analyzing the case studies are as follows (see Tables 2 and 3).

As shown above, the case studies concentrate on particular environmental materials and stimulate bodily senses in order to provide a spatial experience and its emotional connection. For example, Bruder Klaus Field Chapel and Serpentine Pavilion focus on the integrated ways of using various environmental elements, providing a multi-sensory space. On the other hand, Kuma's Sensing Space and Prostho Museum concentrate on a particular element, stimulating a socially shared memory. The materials help people to experience, feel, and perceive the space in a particular way. In this sense, Zumthor states that "materials react with one another and have their radiance, so that the material composition gives rise to something unique" [28] (p. 24). The materiality stimulates bodily senses, which are not

independent, but interactive with each other, to provide a multi-sensory experience of a place in time.

Table 2. Characteristics of architectural projects. Source: author's drawing.

	Peter Zumthor's Bruder Klaus Chapel	**Peter Zumthor's Serpentine Pavilion**	**Kengo Kuma's Sensing Space**	**Kengo Kuma's GC Prostho Museum**
Type	Chapel	Pavilion	Installation	Museum
Location	Mechernich, Germany	Hyde Park, UK	Royal Academy, UK	Aichi, Japan
The Body	• Movements • Senses: smell, tactility	• Movements • Senses: smell, hearing, tactility	• Senses: smell	• Movements • Senses: tactility
Materiality	Light, water, concrete, woods, and fire.	Plants, flowers, black wall, light	Aromas, wood strips	Light, shadow, woods, glass
Emotion	• Spiritual inspiration • Meditation	• Meditation • Relaxation	• Socially shared memory	• Sense of space • Cultural connection
Spatial Experience	To emphasize material experience, particularly smell and tactility, through multi-sensory space for spiritual experience. To use native materials for a strong connection to a particular place in Germany.	To emphasize visitors' sensory experiences and provide space for meditation. To provide various emotional experiences through the interaction of gardens, light, and darkness.	To provide a culturally specific spatial experience, providing a socially shared smell of a Japanese home. To emphasize materiality and senses rather than architectural form.	To provide a sense of space with formlessness, providing a cultural idea of a lattice structure. To use light and shadow for various spatial experiences in changing spatial atmospheres.
	↓ Various aspects, such as the physical and sensory body, materiality, and emotional connection, were combined to improve the quality of the interior experience.			

Table 3. Analysis of various aspects of spatial experience for emotional connection. Source: author's drawing.

	Morphological Factor							**Sensual Factor**					**Influential Factor**		**The Body**	
	Volume	**Scale**	**Rhythm**	**Order**	**Proportion**	**Contrast**	**Texture**	**Light**	**Shadow**	**Color**	**Temperature**	**Sound**	**Smell**	**Culture**	**Local**	**Senses**	**Movements**
BKC	○	○				○	○	○	○		○	○	○		○	○	○
SP	○	○			○	○		○	○	○	○	○				○	○
SS			○	○	○				○				○	○		○	
PM	○	○	○	○	○		○							○		○	○

BKC: Bruder Klaus Chapel, SP: Serpentine Pavilion, SS: Sensing Space, PM: Prostho Museum.

An integrated understanding of environmental stimuli and the body can improve the multi-sensory experience. Thus, experiencing architecture provides a multi-sensory space; "qualities of space, matter and scale are measured together by the eye, ear, nose, skin, tongue, skeleton and muscle" [10] (p. 41) within the material worlds. This means that interior space provides a sensory experience that combines all of the senses. The interior space reinforces one's sense of identity and enriches the experience. For example, when visiting an architectural space, what most strikes people is not the physical function for which it was created, but the feelings it transmits through materials, stimulating their bodily senses. In this sense, the case studies demonstrate that the stimulation of bodily senses and their connection to environmental stimuli can improve the quality of spatial experiences, generating emotion.

Peter Zumthor focused on the tactile sense in order to provide spatial experiences when engaging with materiality in the Chapel. In particular, he focused on the sense of touch, which is directly related to the use of materials, and deals with several key issues, such as the body, surroundings, and spatial continuity in time [63]; it connects with particular aspects, such as environments and the culture of a specific place. In relation to this, many architects and theorists concentrate on significant aspects of tactility as a source of a visual sense that exceeds "two-dimensional surface texture" [64]. This introduces a sense of how "touch performances propose qualities of feeling that impact powerfully and ideologically" [65] (p. 167). This means that differentiated sensory organs in the skin can understand space by "touching", which is related to the sense of touch. Jennifer Fisher, Assistant Professor of Contemporary Art and Curatorial Studies at York University, highlights that "tactilism is strikingly performative" [65] (p. 166). It means that tactilism stimulates one's entire body, engaging various elements within space. The tactile experience that integrates space and one's own experience is perceived through the skin. The skin is a sensory organ and acts as a canvas for tactile sensation within the cultural context. In this regard, the tactile sense provides two key attributes: texture and temperature [20,66,67]. For example, our skin can measure the temperature of the surroundings in an interior space and can experience the texture of an interior space through the tactile experience of stroking the surface. Moreover, the sense of touch can be considered the visual unconscious. In relation to this, Merleau-Ponty focuses on the significance of "visual tactilism". He argues that people can see the depth, smoothness, softness, and hardness of matter with their eyes [68]. This shows that the visual-tactile sense observes both materials that are far away and things that are close with the same intensity, combining them into a coherent and intimate experience. Zumthor also writes about material, stating that "people interact with objects. As an architect, that is what I deal with all the time" [28] (p. 17). He argues that touch is a synergetic sensory link that amplifies our bodily experience of the architectural form [69]. For this, he concentrates on the interrelationship between space, time, sounds, smell, light, and shadow, emphasizing the importance of materiality. Sense of smell is also an important idea that enables both the Chapel (smoke smell) and Serpentine Pavilion (floral scent) to improve the quality of the interior experience in relation to materiality. For example, a particular smell, which was left behind in Bruder Klaus Field Chapel, can directly link that place with something that was burned in the past. Moreover, the sense of sound is also a significant aspect of environmental stimuli in the Chapel; it is never absent, and relates strongly to materials in the interior space. According to Pallasmaa, the sense of sound creates an experience of interiority, compared to the sense of sight, which implies exteriority [10]. Hearing allows one to perceive the environment in cooperation with sight and imagination. Sound measures space and its scale. The sound is provided depending on the pattern and scale of the space and materials [10] (p. 75). These sensory experiences are again integrated through the body and constantly interact with materials and the surrounding environment. Spatial experience through the sensory body resonates in our consciousness and highlights material experience in interior architecture.

Culture is also a significant aspect of interior experience. A particular environmental element evokes personal memory, which then connects to spatial experience within a culture. In particular, the sense of smell is strongly linked to cultural aspects, evoking a particular memory. In this respect, it is worth looking at Kuma's Sensing Space, as it underlines materiality rather than architectural form. Kuma's abstract wooden structure containing a particular smell evoked a socially shared memory of a Japanese home for those visitors who had experience of living there and gave information about the cultural smell of the architecture to others who do not have this shared memory. These culturally specific sensory experiences and memories stimulate our emotions and feelings in particular situations related to the cultural space. Kuma's installation also highlighted the experiential rather than the functional aspects of architecture. It simply provided a sense of smell in a dark room without an architectural form, but stimulated spatial experiences and emotional connections. It demonstrated a significant aspect, which is that spatial experience can be

developed not only in an architectural form, but also in material worlds with regard to the cultural context. Thus, the spatial experience can be developed not through the reality of architectural representation, but rather through "the awakening of the imagination" [17], based on the predominant experience. Kuma's Sensing Space also emphasized darkness in order to provide the aesthetic value of Japanese architecture. Shadow and darkness are considered to be a silent space in Japanese culture. The Japanese are familiar with living in darkness and discover beauty in shadows. According to Jun'ichirō Tanizaki, this is because the Japanese spend much of their daily lives in the heavy darkness that hangs beneath the eaves [70]. Thus, the darkened room in Sensing Space provided a familiar sensation of Japanese home culture. In relation to this, light and shadow, as environmental elements, provide various ways of experiencing space. Light and shadow are significant and enable us to experience and feel a particular spatial environment [14,71]. Together, they enrich the quality of materiality, providing volume, smoothness, temperature, and patterns; they provide a particular atmosphere of interior space [14,71]. This can also be found in other case studies. The Prostho Museum, for example, emphasized the integration of light and shadow, engaging the wooden lattice structure. It provided various ways of experiencing space through observing the changes in spatial volume and atmosphere created by the changing levels of light and shadow throughout the day. This aspect can also be linked to the Japanese cultural context by engaging particular elements, such as shadow, lattice structure, and timber. In the Chapel, however, light and shadow were used for spirituality as they have a mystifying quality. In ancient Greece, the light was respected for its spirituality and was considered to create a sacred place for holding ceremonies, creating an ecstatic mood and an atmosphere of divinity [14,72]. Light also provides a comfortable environment. As I mentioned in the previous section, the Serpentine Pavilion provided both dark corridors and a garden filled with light, allowing people to experience different ways of meditation, both through walking and through remaining separated from the world of noise and the smells of London. This shows that an interior experience of architecture can be transformed into an emotional level of experience of architecture.

Through this interior experience combining the body and materiality, a particular emotion, such as spiritual, meditative, cultural, or enjoyable, can be evoked. This means that the body, materiality, and emotional connection offer a fundamental idea for enriching the interior experience. Emotions generated through sensory experience within space also recall memories of past space, which embodies interior experiences. Thus, people can experience, perceive, and feel the space, which creates spatial imagination; this can be developed both individually and socially. Thus, interior experience represents several key issues, such as the body, materiality, culture, emotion, and memory (see Figure 6).

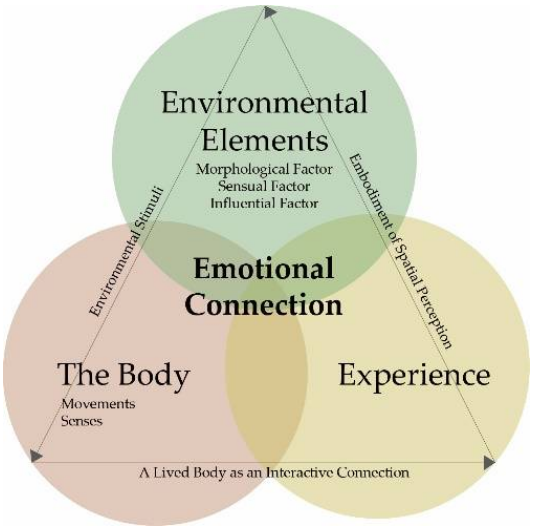


Figure 6. Embodiment of spatial experience for emotional connection. Source: author's drawing.

5. Conclusions

This paper provides a phenomenological understanding of interior space in order to explore the emotional connection between space and experience. This paper incorporates a literature review and gathers together theoretical research based on issues of interior space, experience, and emotion. I have explored the important role of the interior experience within the field of architecture, engaging the bodily sense, materials, culture, and identity. The interior space here refers not only to physical aspects, such as materiality, but also to a container where bodily activity and movements are embedded within the culture. In this paper, I have argued that interior space offers effective ways of developing spatial and emotional experiences. Throughout this research paper, I found that the body and materiality are essential in order to improve the quality of experiences in the realm of interior space, which is understood as the origins of architecture. The spatial experience of architecture is developed by: (a) the body, which includes bodily movements and senses; (b) materiality, which represents the interior environment, stimulating the body; and (c) emotional connection, which evokes both individual and socially shared memories.

Although a phenomenological understanding of architecture is becoming a more important social issue in contemporary society, it seldom considers interior experience but instead focuses on a visual sense of architectural representation. In this paper, I try to trace what effect the spatial experience has on improving the quality of interior design through examining the body and materiality in a contemporary architectural context, considering the roles of interior space and the effects of experience. This paper also concentrates on phenomenological and emotional experience in understanding architecture, which affects the users' perceptions and experiences through phenomenological engagement. Interior space provides a personal connection to communication to offer an individual experience and social engagement through predominant memories. The important aspects of interior space are to provide bodily participation and emotional experience in engaging the body, and allowing them to interact, communicate with, and recognize previous experience to embody spatial perception. Thus, interior space can be transformed into a place where the body is involved, allowing people to discover the interior environment that stimulates users' emotions and improves interior design to give users a better experience. In this paper, I have drawn upon the representative case studies regarding the interior experience to explore how they provide sensory effects and materials and engage people, providing an emotional experience to improve the quality of the interior space, which is one of the fundamental aspects of this paper. I found three significant aspects: (a) an integrated understanding of the body, materiality (environmental stimuli), and how emotion plays a substantial role in improving the quality of the interior experience; (b) a particular factor provides cultural experience by stimulating socially shared memory; and (c) material worlds that engage the body can enrich both spatial and emotional experience, even in an abstract structure. This highlights the idea that spatial experience is not only a functional but also a sensory and material experience. From this perspective, the emotional experience can substantially improve the quality of interior space to enable a better understanding of architecture. It is difficult to generalize the findings of this paper with regard to the architectural environments as only four case studies were explored. Moreover, the data were interpreted and analyzed by reflecting the researcher's perspectives, which could provide a subjective view in some respects. Nevertheless, this approach is still substantial and widely used in the qualitative analysis of spatial experience. More discussions will be necessary to develop ideas on how sensory stimulation and materiality affect emotional experience and to look at what qualities need to be developed to allow the interior experience to become more powerful, which could be examined in future studies.

A phenomenological understanding of interior space can bring about the stimulation of emotional feelings and memories, leading to new ways of thinking about architecture, which helps us to develop interior or architectural design. Therefore, I expect that this paper will contribute to the understanding and knowledge of the relationship between

interior space, the body, environmental stimuli, and materiality, considering how experience interacts with architecture to create a multi-sensory space.

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