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Material Atmospheres in Cultural Architecture: A Phenomenological and Empirical Study of the Royal Danish Playhouse

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ABSTRACT

Materiality in architecture has long been theorized as a central mediator of human perception, emotion, and memory. This study aims to find out how architectural materials influence emotional and sensory experience in cultural spaces, and in what ways phenomenological theories of materiality can be empirically observed in lived spatial perception. The study bridges phenomenological theory and lived perception by evaluating how material choices affect feelings of warmth, calmness, openness, and comfort, as well as broader atmospheric reception. A mixed-method approach was employed, combining theoretical analysis with an empirical sensory-emotional survey conducted in the Royal Danish Playhouse. Eighty-five participants evaluated their spatial experience across dimensions including emotional tone, sensory engagement, material harmony, and perceived atmosphere. Responses were documented using structured Likert scales and open reflection prompts. Findings indicate that materials play a measurable role in shaping emotional and atmospheric response. Light and texture emerged as key mediators, confirming that materiality shapes emotional and spatial perception and validating phenomenological understandings of architectural atmosphere.

Keywords: Cultural Architecture, Emotions, Metamorphism, Transcendental, Poetics

INTRODUCTION

The materials that surround us are not calm and passive, but they live and resonate with us, especially in places like cultural spaces, museums and galleries (Rasmussen, 1959; Bloomer & Moore, 1977). The way they resonate or talk back to us is through their texture when seeing and touching, temperature, scent and sound. In art and cultural architecture, where perception and emotion are central to the spatial experience, such atmospheric cues become particularly potent. While architectural theory has long acknowledged the sensory and emotional impact of materials, there remains a lack of focused inquiry into how specific materials influence atmosphere. Juhani Pallasmaa (2012), Peter Zumthor (2006), and Gernot Böhme (2013) consider architecture as a multiple sensory place where materials show various moods and memories. However, few studies isolate the affective properties of particular materials, such as oak and concrete, in real-world contexts. Even fewer go beyond abstract theorization to examine how these materials operate within the lived, spatial realities of contemporary cultural buildings. This paper addresses that gap through a design-based theoretical analysis of the Royal Danish Playhouse in Copenhagen, designed by *Lundgaard & Tranberg Arkitekter* (2008), a public theatre that exemplifies the deliberate use of contrasting materials. The oak and concrete are the dominant materials in the Royal Danish Playhouse, this study shows how they influence the perception of the space with warmth and intimacy, with their sensory characteristics. The research inspects materials' tactile, visual, acoustic and thermal dimensions with focus on phenomenology,

Metamorphism and semiotics. In doing so, the paper places materials as collaborators of emotional experience and not just as structural components. Ultimately, this study reframes the role of materials in cultural architecture, as not only functional or symbolic, but as sensory interfaces that mediate space, memory, and mood.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The emotional resonance of architectural materials is becoming widely accepted as a central concern within architectural theory and practice. Scholars and practitioners argue that materials are not neutral building components but active elements that shape atmosphere, memory, and identity. Thinkers such as Pallasmaa (2005), Zumthor and Böhme (2006) frame materials as multisensory and atmospheric agents, while Moravánszky and Bardt extend this understanding toward temporality and embodied experience (Moravánszky, 2017; Bardt, 2019). However, despite rich theoretical discourse, limited empirical research demonstrates how specific materials shape emotional responses in real architectural settings (Mallgrave, 2010).

From a phenomenological perspective, Juhani Pallasmaa (2005) challenges the dominance of vision in architectural experience, highlighting instead the multisensory qualities of materiality. His concept of *hapticity* emphasizes the direct and embodied interaction with materials, where wood, stone, or steel evoke emotional responses that transcend visual form. Peter Zumthor (2006) further develops this line of thought by identifying atmosphere as the affective quality emerging from the interplay of materials, light, scale, and sound. For Zumthor (2006), architectural design can't be separated from the sensory signals transmitted by materials, which evoke memory, intimacy, and presence. The temporal and transformative dimension of materials has been explored by Ákos Moravánszky (2017), who frames architecture as a living process through his theory of *Stoffwechsel* (metamorphosis). Materials, in his account, carry memory and ecological histories, linking the built environment to cycles of transformation. This perspective resonates with Sarah Robinson's (2016) emphasis on material memory and identity, where she argues that materials form part of the "sensory-self," shaping how individuals remember, identify with, and react to spaces. The intertwining of materiality and identity reveals that architecture is not only technical but psychological and existential. Alongside phenomenology, semiotics provides another important framework for understanding material resonance. Roland Barthes (1967) interprets materials as signs that operate within cultural systems of meaning. The coldness of steel can signify industrial modernity, while the warmth of timber can embody domesticity and tradition. Similarly, Gaston Bachelard (1964), in *The Poetics of Space*, describes how materials and spatial forms such as staircases or wooden textures become vessels of imagination and intimacy, evoking dreams and symbolic associations. These interpretations demonstrate that the resonance of materials arises not only from direct sensory experience but also from their cultural and symbolic dimensions. Gernot Böhme (1993) has framed the aesthetic dimension of atmosphere, conceiving it as a "quasi-objective" phenomenon arising in the interplay between space and perceiver. Materials, in this sense, are tuning devices that modulate spatial moods through texture, color, and acoustic qualities. Marc Schoonderbeek's (2013) *Sfeer Bouwen / Building Atmosphere* extends Böhme's theoretical framework into practical design strategies. By focusing on sensory layering, sequencing, and dramaturgy, Schoonderbeek illustrates how atmosphere can be actively constructed through the intentional use of materials in design practice.

The architectural discussions have further been shaped by contextual interpretations of materiality. Christian Norberg-Schulz (1980), for instance, introduces the concept of *genius loci* or the spirit of place, emphasizing that architectural materials should harmonize with the cultural and environmental identity of their surroundings. According to this view, materials drawn from local sources—such as stone, clay, or timber—express the continuity between the natural environment, cultural heritage, and architectural form. This connection between material and place situates architectural design within a broader dialogue between human experience and landscape. Recent scholarship has further deepened the relationship between materials, cognition, and embodiment. Christopher Bardt (2019) explores how materials engage both the senses and the mind through embodied cognition, showing that material perception is not limited to surface impressions but involves analytical and experiential processes. This complements Robinson's (2016) arguments on material memory by revealing the cognitive depth of material engagement. Together, these perspectives highlight the agency of materials in shaping the affective, symbolic, and psychological dimensions of space. Taken together, these bodies of work suggest a shift away from the abstraction and visual formalism that has dominated much of twentieth-century architecture. Instead, scholars such as Pallasmaa (2005), Zumthor (2006), Bachelard (1964), and Böhme (1993) advocate for a material practice that is multisensory, symbolic, and atmospheric. The resonance of architectural materials lies not only in their technical properties but in their capacity to evoke memory, stimulate imagination, shape identity, and generate emotional responses. This synthesis positions materials as co-authors of architectural experience, underscoring their role in the creation of atmospheres that are at once poetic, psychological, and deeply human.

These frameworks conclude that architecture is not something dead and cold without life; on the contrary, it is alive and lived. With a combination of various materials through their texture, shape, color, sound, and smell, materials create emotion, and put in motion human senses that trigger memories and feelings. The human being and the materials themselves would not have meaning without each other, materials without an observatory meaning the human and the human without materials. The given concepts and theoreticians' ideas are elaborated below.

Architectural materials are not passive finishes but active mediators of perception, affect, and meaning. Phenomenological accounts emphasize multisensory engagement: Pallasmaa critiques ocularcentrism and foregrounds hapticity, while Zumthor frames "atmosphere" as the felt outcome of how material, light, scale, and sound co-operate (Pallasmaa, 2005; Zumthor, 2006). Semiotic perspectives explain why materials also read as cultural signs: Barthes clarifies how denotation and connotation let timber feel "warm" or steel "cold" beyond their physics (Barthes, 1967, 1972). Böhme positions atmosphere as a quasi-objective relation between space and perceiver, with materials acting as tuning devices of mood (Böhme, 1993). Moravánszky adds temporality—*Stoffwechsel*—showing materials as processes that weather, patinate, and thus carry memory (Moravánszky, 2017). Bardt's material cognition and Robinson's "sensory-self" connect these cues to embodied memory and identity (Bardt, 2019; Robinson, 2016). Practice-oriented work (Schoonderbeek/OASE 91) demonstrates how sensory layering and material dramaturgy operationalize these ideas in design (Havik et al., 2013). Building on this synthesis, we interrogate how dominant surface materials modulate affective appraisals (e.g., warmth, calm, privacy, openness) when controlling for light, acoustics, and temperature. Our contribution is to translate phenomenological and semiotic claims into reproducible measures and testable hypotheses about material effects in lived interior settings.

THEORETICAL PERSPECTIVES ON MATERIAL ATMOSPHERE

Metamorphism and the Dynamic Nature of Materials

Metamorphism treats materials as fixed bodies throughout history, and is dynamic, according to Moravánszky, a concept that later emerged. With time, changes in weather and seasons, erosion, carbonation, and so on, the change in materials supports the concept of metamorphism by Moravánszky, as they are not seen as passive but rather as active materials. Shortly, he refers to them as being in an ongoing *Stoffwechsel,* material metabolism.

Material Temporality and the Making of Atmosphere

Metamorphism redefines materials as part of an ongoing process. With being exposed to open weather and no shelter, different copper structures, such as statues with exposed copper roofs, are initially red-brownish. Over time, after the oxidation process, a light green layer develops, acting as a shield to the structure and known as *Patina*[11]. Very few would have believed that the Statue of Liberty's primary state was red-brownish; this change is not decay, but a story that continues to be told. The interaction between humans and materials leaves traces through time. For instance, stairs made out of stone get worn out, and we can embrace the smooth traces with the passing of time. This perspective aligns with phenomenological thinkers like Pallasmaa (2005), who highlight the temporal aspect of material experience. A building is unfinished at handover; it continues to evolve atmospheres as materials interact with climate, light, and occupants. The tactile softness of a well-worn wooden floor or the darkened Patina of a brass handrail tells of a life lived.

When it comes to the phenomenon of making of atmosphere; Schoonderbeek (2013)'s *'Sfeer Bouwen'* amplifies this thinking through the idea of temporal Atmosphere. It encourages designers to consider how Atmosphere evolves, how a space at dawn differs from dusk, how seasons shift the character of materials, how use patterns transform acoustics and scent. The passage of time is inscribed in matter, and architecture gains meaning by accommodating and expressing these changes.

Cultural and Ecological Metamorphosis of Materials

Depending on their background and their cultural heritage, materials can be interpreted in many ways. Seen as a brutalist and cold material, the concrete often points out an elegant minimalist design when built in a correct way. Clay bricks were considered cheap and simple, but now they can be interpreted as a sustainable material with a rich cultural heritage. According to Barthes, materials constantly change and evolve based on their history. Architecture plays a role in this change. For instance, Herzog & de Meuron use aged brick in modern galleries, while Tadao Ando uses cast-in-place concrete in spiritual spaces. These choices show how materials can take on new meanings through different properties. When it comes to Ecological Metabolism of materials; Moravánszky (2017)'s analyses a sustainable point of view by highlighting the materials lifecycle. The meaning of this is that when materials get created or crafted into a space, after a specific time, when a space changes or gets demolished,

the materials can go back to the environment without polluting it. View, as mentioned, requires a careful selection of materials. Tim Ingold further comments that rather than being static materials are dynamic entities in motion crafted by humans. He values materials that go through change and that get embedded with light and weather. In these terms, the modernist concept of longevity is called into question by metamorphism. It promotes architecture to engage with the rhythm of life rather than maintaining a structure in a state of inactivity. The architect turns into an overseer of material transformation instead of an expert in design. Curiosity, humility, and a poetic awareness of the language of matter are all necessary for this. Metamorphism opens a conceptual and practical pathway toward more emotionally resonant, temporally sensitive, and ecologically grounded design. It calls for architecture that lives, breathes, and changes, and for materials chosen for what they are and what they will become.

Semiotics of Materials: A Barthesian Analysis

In architecture, materials serve purposes beyond only forming shapes or supporting buildings. They also share stories and meanings that are deeply embedded in perception, memory, and society. The study of symbols and signs, also known as semiotics, becomes particularly important in this situation. One of the most significant semioticians of the 20th century, Roland Barthes (1967), showed that everyday items and pictures are rich in cultural meaning in addition to being useful and beautiful.

Meaning and Myth in Material Expression

Barthes (1967) distinguishes between *denotation*[12], the basic, literal meaning of something, and *connotation*[13], the layers of cultural and emotional associations that accompany it. In architecture, concrete might be denoted as strong and durable. However, its connotations vary widely: depending on the context, it might signal brutalist authority, working-class housing, minimalist purity, or institutional coldness. Similarly, wood is not just wood. It can evoke rustic tradition, environmental awareness, warmth, or artisanal authenticity. Glass, too, fluctuates between transparency and fragility, openness and exposure. Steel may represent strength and technology or sterility and detachment. These meanings are not fixed. They change over time and across cultures. What matters for architects is that people interpret materials not only with their eyes and hands but also through their cultural imagination. Every texture, color, and junction becomes a point of interpretation. Furtherly; Barthes (1967)' concept of myth is important here. He argues that myth is a way for society to make artificial ideas seem obvious or natural, therefore giving them a universal feel. In addition to being expensive, a polished marble foyer "feels" rich.

The Architect as a Storyteller

When the architect realizes this, they become more than just designers or problem solvers. They transform into a sort of an author, organizing materials for narrative effect in addition to efficiency or structure. This concept is referred to in Schoonderbeek (2013)'s *'Sfeer Bouwen'* as "material dramaturgy," which is the intentional staging of objects that generate cultural and emotional resonance. Imagine entering a structure with a floor that changes between rough stone, smooth concrete, and soft carpet. Every transition creates an atmosphere in addition to being tactile. From public to private, from outside to inside it indicates a shift. Materials thus take on the role of characters in a drama, each with its own narrative.

Reading and Composing Materials Across Cultures

Semiotics are seen as abstract, but humans still use them in real life. Lighting in a space plays an important role in how we see and read a material. When a material is exposed to a strong light, it can make the material more significant and fancy, whereas in a softer light, the material can appear more cozy and acceptable to the eye. *Juxtaposition*[14] also plays a role: glass next to wood evokes modern meets natural; glass next to steel suggests transparency meets control. 'Sfeer Bouwen' gives examples of materials that are not just chosen but composed like notes in a musical score. One material frames another. One speaks through contrast. When it comes to cultural contexts of materials it is to emphasize that meanings do vary from one place to another. In some cultures, clay walls might signify poverty; in others, they symbolize heritage, sustainability, and craftsmanship. A good architect considers this, choosing materials not only for their technical qualities or appearance but also for how they will be perceived by those who use the space. This attentiveness demands empathy. It also requires awareness of how architecture functions within larger systems of meaning. Buildings are like words that we can read, says Barthes (1967). Materials are the language of a building that helps us read and understand it.

Phenomenology and Emotional Atmosphere

We feel it before interpreting, analyzing, or even naming a space. This preconscious sensation, often hard to describe, is what phenomenology in architecture seeks to capture. It is not about style or theory; it is about the

lived, embodied experience of being in a space. At the center of that experience is atmosphere, which is how a room makes us feel before we understand why.

Phenomenology and the Senses / Composing Sensory Atmosphere: From Zumthor to Schoonderbeek

Juhani Pallasmaa (2005), a leading contributor in architectural phenomenology, discusses that the human eye has dominated shaping modern architecture through *ocularcentrism*[15]. This concept values the sight of a space or building rather than how it is felt when seeing or entering it. In 'The Eyes of the Skin,' he calls for reawakening the haptic, auditory, *olfactory*[16], and *kinesthetic*[17] senses in design. For Pallasmaa (2005), touch is not just something that happens with our fingertips; it happens with our feet on a floor, our skin in a sunbeam, our ears in a reverberant corridor. Consider the difference between walking on cold terrace and worn timber. One is sleek, perhaps corporate, warm, domestic, and lived-in. Phenomenology focuses on these subtle differences and how they shape our sense of belonging. Peter Zumthor (2006) takes this thinking further by treating Atmosphere not as an effect, but as a material. In 'Atmospheres,' he writes about the emotional charge that spaces can carry. The smell of wood smoke, the muffled acoustics of heavy drapes, and the way light filters through linen matter deeply. They are not decorative; they are essential. Zumthor's own projects embody this. Zumthor' (2006)'s '*Therme Vals'*, for example, is less about water or stone than the relationship between the two. The echo of footsteps on wet *quartzite*[18], the coolness of stone against skin, the darkness between lit pools, all these sensory cues create a mood of quiet immersion. You don't just visit the baths; you feel them. On the other hand; Schoonderbeek (2013)'s 'Sfeer Bouwen' translates these insights into practice. The book emphasizes 'sensory layering' using combinations of light, sound, temperature, texture, and scent to create immersive environments. It is not enough to specify beautiful materials; one must choreograph their encounters. Examples from the book show how a change in floor texture can signal a shift in function, how acoustics shape privacy or openness, how diffused light can slow movement and sharpen perception. This isn't just theory it's a toolkit for building emotion into space. In cultural spaces, this might mean using floor texture to signal transitions between public and private zones, or adjusting acoustic absorption to affect social dynamics. Soft, diffused lighting can slow movement and deepen perception. Even scent plays a role think of the smell of timber in an art library or leather in an auditorium.

The Material Mind and the Cognitive Body according to Bardt and Phenomenology in Everyday Architecture

In '*Material and Mind*', Christopher Bardt (2019) connects cognitive and awareness of sensation. He believes that our bodies also play a role in how we think. Acts that show comprehension include the back leaning against a sun-warmed wall, the foot sensing the elevation of a stair, and the hand smoothing clay. This concept reinterprets architectural design as a material-influenced cognitive process. In addition to facilitating movement, a polished railing fosters confidence, rhythm, and memory. According to Bardt (2019), the 'material mind' is a type of intellect that is neither purely utilitarian nor abstract. He believes that our bodies also play a role in how we think (see also Merleau-Ponty, 1962; Gallagher, 2005) Remembering that phenomenology is not exclusive to sacred or expensive construction is crucial (Pallasmaa, 2012). Its ideas are applicable everywhere. A clean atrium may not feel as cozy as a public library with a smell of old books and comfy sunlight from shaded skylights (*Böhme, 1993*). Compared to a floor plan, a kitchen with warm tiles beneath and an aged timber table can feel more significant. The Atmosphere is democratic. It arises from care, not cost (*Zumthor, 2006).*. What phenomenology asks of architects is simple: Pay attention. Attend to how things feel, not just how they look. Design for the whole body, not just the camera. And remember that emotion is not a luxury in architecture, it is the very point. Thus, one could claim that phenomenology shows how building materials shape us rather than only creating a space. They form our daily habits, memories, and emotions (Pallasmaa, 2012). Working with the grain of human perception, phenomenological design develops spaces that are seen and felt.

Inter-material Relationships and Visual Harmony

Architecture is never the story of one material alone. Just as in music, a single note cannot form a melody, in architecture, the interplay between materials, their textures, colors, weights, and emotional associations give rise to harmony, contrast, and rhythm. How materials relate to one another in space directly impacts how that space is felt, navigated, and remembered (Pallasmaa, 2012).

Material Conversations: From Texture to Detail

Intermaterial[19] relationships are not simply about matching finishes or coordinating colors. They are conversations, sometimes gentle, sometimes tense, between elements that come from different origins and have different sensory qualities. A timber beam resting on a rough concrete wall, a translucent glass screen beside a dense brick mass, a velvet curtain grazing a stone floor, these are not just material juxtapositions. They are sensory moments loaded with meaning (Böhme, 2017). When materials interact, they lend each other context. A smooth

surface feels smoother beside something rough. A dark material deepens the presence of something light. A fabric-covered panel's softness can temper the surrounding steel frame's hardness. In this way, materials do not exist in isolation; they together create each other's presence. When it comes to detailing and crafting; how materials meet how they are joined, layered, separated, or overlapped is critical to how their relationship is perceived. Is the edge clean or exposed? Is one material tucked into another, or do they meet flush? These details are where Atmosphere is either built or lost (Frampton, 1995). Zumthor (2007)'s work is exemplary in this regard. The charred timber interior is revealed through a layered concrete shell in his '*Bruder Klaus Field Chapel*' (Zumthor, 2007).

Referential Materiality and Emotional Resonance

Christopher Bardt (2019) writes about how materials evoke each other even when one is absent. A concrete surface with timber formwork imprints carries the traces of wood. This *referential materiality*[20] points to the memory and presence of another material, subtly layering emotional and historical dimensions into the experience. This phenomenon speaks to architecture's poetic potential: a material can tell a story of itself and the process, memory, and absence that shaped it. Such traces enrich a space's tactile and emotional palette (Pallasmaa, 2012). On the other hand; visual harmony is often misunderstood as uniformity or minimalism. However, true harmony is more like a well-composed piece of music; it relies on variation, tension, and release. In *'Sfeer Bouwen'*, Schoonderbeek (2013) emphasizes calibrated rhythm as materials arranged to build up expectation and resolution, to draw the body through space. For instance, dark basalt stone at an entry gives way to warm oak in a living room, followed by soft textiles and low light in a private *alcove*[21]. Each transition is not only visual but emotional (Böhme, 1993). The sequence of materiality can parallel the sequence of human intimacy: from public to personal, from formal to relaxed. Harmony is found not in similarity but in complementarity. Rough concrete can anchor light timber. A mirror can amplify a matte surface. Materials with opposing tactile qualities can create richness, just as a symphony needs bass and treble.

Materiality, Memory, and the Sensing Body: Eperiencing Atmosphere in the Royal Danish Playhouse

Architecture together with being spatial and structural, it is also emotional. With this every material that is used in a space is a vessel for identity and memory. Materials elicit the underlying depths of the human mind through touch, scent, acoustics and heat (Pallasmaa, 2012). These levels produce what Sfeer Bouwen calls the "anchoring" effect of architecture (Böhme, 1993). Playhouse demonstrates the process, not theoretically, but as a fully sensory presence.

Memory and the Sensing Body

Our bodies remember space before our minds interpret it (Merleau-Ponty, 1962). The worn oak underfoot, the red velour seat fabric, the scent of seawater drifting through the glass wall, each of these sensations at the Playhouse creates a lasting imprint. They are not simply finishes but they are triggers of experience. Inside the main auditorium, the rough Kolumba brick does not just absorb sound, it absorbs time. Its hand-laid texture recalls older, grounded spaces, cathedrals, fortresses, yet here, it is reimagined into a modern chamber of listening. The smoked oak floors echo the public promenade, extending a memory of the outside world inward. In this way, the Playhouse constructs memory while it hosts it. This is reflected in the survey results, where 84.7% of participants reported a moderate to high sense of calmness and 85.9% perceived the environment as warm—indicating that material surfaces such as oak, velour, and brick effectively support emotional grounding and spatial memory. In terms of discussing the phenomenon of identity through material choice, it is important to emphasize the fact that we do not just pass through spaces, we internalize them (Mallgrave, 2010). The Royal Danish Playhouse demonstrates how material choice can affirm, soothe, and even elevate personal and collective identity *(Lundgaard & Tranberg Arkitekter, 2008; Jensen, 2009).*

- **Red velour seats** evoke not only theatrical tradition but also bodily comfort, warmth, softness, gravity.
- **Maple wood balconies** with soft perforations feel human-scaled and tactile. Locals affectionately call it "the pumpkin," a nickname born not from formal drawings but lived encounters.
- **Glass facades** open the Playhouse to its environment. They include the public in the spectacle, not just as viewers, but as participants. These impressions align with the survey findings, where 67.1% of participants identified light and shadow as the dominant atmospheric factor, confirming the powerful role of the Playhouse's glass façades in shaping emotional and perceptual experience.

The materials that are mentioned above welcome our bodies and our presence rather than resisting or declining us. The essence of architecture is not just about the abstraction that we see, but also the deeper feeling felt through the warmth of a space. Sarah Robinson adds further that our senses are not created or shaped by emptiness, but by the warmth of a material and its texture that resonates to us (Robinson, 2015).

Cultural Memory and Material Atmosphere

Material memory is not just individual, it is cultural. In Nordic architecture, the way timber, brick, and light interact is the direct intention to collective meaning. The Royal Danish Playhouse speaks directly to that tradition *(Lundgaard & Tranberg Arkitekter, 2008)*:

- **The oak flooring** recalls the Scandinavian forest and domestic warmth.
- **The copper cladding** patinates with time, aligning with maritime tradition.
- **The dark brickwork** references local masonry techniques while inviting reinterpretation.

The three points that are mentioned above do not reflect just the aesthetics of the materials, but at the same time the heritage. The concept of Atmosphere gets more meaning when the materials reflect and relate to the context. This contextual resonance was also perceived by visitors: 64.7% described the material palette as harmonious, and 91.8% reported heightened material awareness after experiencing the space, suggesting that cultural material cues are not merely symbolic but viscerally registered through perception.

Designing with Material Memory

The Royal Danish Playhouse was not built as a singular icon; it was built as an urban memory bank. Its materials engage the city, the sea, and the visitor over time:

- **Material continuity**: The oak boardwalk extends through the foyer, dissolving the boundary between city and stage.
- **Trigger textures**: From Jura Gelb limestone in smaller foyers to the velour in seating, each surface is designed to prompt feeling.
- **Visible wear**: Patina on copper, footprints on timber, the building honors traces of use, not erasure.

Bardt (2019) reminds us that memory lives not just in objects but in the way we interact with them, how our body leans, touches, moves. The Playhouse is filled with these invitations. It does not dictate how to feel, but gives material cues that evoke belonging.

Poetic Echoes: Bachelard in the Brick

Bachelard speaks of spaces that reverberate, not in sound, but in feeling. The Playhouse is one such space. It does not shout but it echoes within. It creates a slow architecture, where time thickens. In the hush of the auditorium, one feels the acoustics not only with the ears but in the chest (Pallasmaa, 2005). The way footsteps are absorbed by smoked oak or returned by limestone becomes part of the building's dialogue with the body. A glance through the glass facade toward the fog over the harbor, a hand grazing the maple rail, these are moments of poetic awareness. Sfeer Bouwen would call this emotional anchoring, Bachelard would call it reverie (Bachelard, 1964). Both of them are right. Memory is not a cold or passive backdrop but it is rather an active material and component in the Playhouse (Pérez-Gómez, 2016). The building builds and shapes us in the meantime where we create our relationship with the building. This is achieved through the textures and tones.

Embodied Methodologies of Atmospheric Design

Atmospheric design is often misunderstood as something purely instinctive, an elusive talent possessed by only a few intuitive architects. However, this perception has gradually shifted through the contributions of phenomenologists, architects, and researchers who have revealed that Atmosphere is not an accident (Zumthor, 2006). It is something that can be studied, tested, rehearsed, and refined (Mallgrave, 2013). This chapter introduces embodied methodologies that help architects move from intuition to application, from feeling to form, by treating the body as both a designer's tool and the end-user's medium (Pallasmaa, 2009). The Royal Danish Playhouse, with its multisensory palette, spatial choreography, and emotive materiality, stands as a compelling example of these methods in practice *(Lundgaard & Tranberg Arkitekter, 2008; Jensen, 2009)*. Peter Zumthor famously insists on 1:1 prototypes, not as luxuries but as necessities. To understand how a hand meets a wall, or how footsteps sound in a corridor, one must build, and dwell. Emotion is not abstract data, it is felt. At the Royal Danish Playhouse, this principle is alive in every detail. From the smoked oak floors extending from the promenade to the velour seats in the auditorium, the space was prototyped through full-scale mock-ups to ensure experiential integrity. The acoustics of the Kolumba brick walls, for instance, were not theorized, they were built and tested. In this way, the Playhouse exemplifies architecture as a tactile rehearsal.

Multisensory Mapping

Atmosphere is not formed through visuals alone (Pallasmaa, 2012). It is assembled through the convergence of touch, sound, scent, light, and temperature. Consider how the glass facade of the Playhouse mediates visual transparency, while simultaneously channeling harbor breezes. Or how the maple wood balconies are not just

warm to the eye, but softly resonant to sound. Through multisensory mapping, the building moves from being an object to being a host, welcoming the visitor through layered perception (Böhme, 2017).
Designers can map:

- **Tactility**: rough Kolumba brick vs. smooth smoked oak
- **Acoustics**: dense brick vs. absorbent textiles
- **Thermal feel**: copper's coolness vs. velour's warmth
- **Olfactory triggers**: scent of the sea, timber, or stone after rain

These overlaps are not coincidental, they are composed.

Mapping the Multisensory Field

Pallasmaa (2012) says that design grows from lived memory. Architects are not outside observers, they feel space just like everyone else. Writing down how we react to a place can help us understand it better (Pérez-Gómez, 2016). Simple thoughts like *how did I feel in that corner? What changed when I sat down?* Can open a deeper sense of empathy. In the Playhouse, such notes might say: *My body relaxed in the foyer when I heard the sound of the water outside. Touching the brick felt steady and calm, almost like being in a quiet chapel.* These small moments tell more about space than any drawing ever could. The Playhouse integrates its harbor site not just visually, but emotionally. Its oak promenade rests over water, its angled columns mimic Venetian piles. The building responds to sun angles, tidal reflection, and wind exposure. This is not symbolic, it's sensory immersion. Designers must visit, pause, and listen to the site. Good material decisions begin with site intimacy (Holl, 2011).

Material Culture and Temporal Belonging

Dark custom made bricks, and oak boards that recall old ship decks, make these choices nothing like accident. They are quiet gestures of continuity, drawing from Copenhagen's maritime past and architectural tradition (Frampton, 1983). As *Sfeer Bouwen* reminds us, materiality is never only about how something looks or feels; it is also about belonging. Architects are asked to think: what does this material mean here? What story does it keep alive? In the Royal Danish Playhouse, every surface becomes a translator between past and present, between the city's memory and its modern life. Atmosphere changes. Morning light differs from dusk. Rain reveals new sounds. Copper patinates. Stone absorbs warmth (Böhme, 2017). Survey responses further support this temporal sensitivity, with participants describing the space as open (67.1%) yet emotionally calm (84.7%), a combination often produced through the interplay of light, material aging, and atmospheric change
The Playhouse anticipates this:

- **Seawater cooling and natural ventilation** change interior temperatures subtly throughout the day.
- **Materials like oak and copper** age with grace, gaining tactile and visual richness.

To design atmospheres is to design for time, embracing patina, seasonal rhythms, and material aging as part of the architecture's story. Schoonderbeek (2013)' *'Sfeer Bouwen'* emphasizes this as space's 'living' aspect. A well-designed atmosphere doesn't fade; it deepens.

Collaborative and Ethical Embodiment

Architecture is rarely experienced by architects. Inviting users into the process, through sensory workshops, mock-up walks, or material testing, builds richer atmospheres.
Imagine:

- A theater director selecting the seat fabric for acoustic warmth.
- A community member reacting to a timber sample that smells like childhood.
- A stage technician walking through the foyer to test lighting contrast.

These insights matter. They close the empathy gap.

Designing for Atmosphere is not just aesthetic. It is ethical.
The Playhouse demonstrates this by offering:

- **Visual openness**: transparency for orientation and inclusion
- **Tactile comfort**: seating, flooring, and transitions designed for diverse bodies
- **Acoustic softness**: spaces that avoid sensory overload

On the other hand; as Gernot Böhme reminds us, Atmosphere is shared. It is collective. And thus, it must be just. Designers bear responsibility: to include not just the average user, but the elderly, the child, the differently-abled (Pallasmaa, 2012). Embodied methods prioritize these experiences. They humanize architecture. This humanizing effect is evident empirically: 41.2% of participants felt a sense of connection to the space, while only 15.3% reported feelings of isolation—indicating that the Playhouse fosters inclusion and emotional presence

through its atmospheric design. Atmospheric design is not magic. It is a practice, deliberate, learned, and compassionate (Mallgrave, 2013). Through methods like full-scale testing, sensory mapping, journaling, and cultural research, architects can move beyond intuition and toward intention. The Royal Danish Playhouse stands as a living case. It does not merely showcase good materials; it choreographs them. It senses, adapts, and listens. It is a building where emotion is embedded in brick, where every step across oak tells you: this place was made to feel. Designing Atmosphere is not optional. It is the very purpose of architecture. For in the end, we do not just inhabit space, we remember it, feel it, and carry it within us (Robinson, 2015). The survey's reflective responses echo this: participants frequently described vivid sensory memories—such as the sound of footsteps on oak and the scent of the harbor—demonstrating that the Playhouse's materials imprint themselves on embodied recollection.

METHOD

In the study, a mixed-method research design was adopted in the Royal Danish Playhouse, a project known for its poetic handling of wood, brick, copper, and glass (Lundgaard & Tranberg Arkitekter, 2008; Jensen, 2009). To complement the theoretical analysis, an empirical survey was conducted to capture lived emotional and sensory responses to the material atmosphere of the Royal Danish Playhouse. The objective was to investigate how dominant materials—primarily oak, concrete, brick, and glass—shape affective experience, perceived warmth, spatial openness, and material awareness.

A total of **85 participants** experienced the interior of the Playhouse and completed a structured questionnaire. The survey consisted of five sections:

1. Emotional response to the space
2. Sensory perception (light, texture, material presence)
3. Spatial and social perception (openness, intimacy, inclusion)
4. Material harmony and contrast
5. Reflective interpretation

Measures used included five-point Likert scales, semantic descriptors (e.g., "warm–cold," "open–enclosed"), and open reflective prompts. This approach aimed to translate phenomenological qualities—typically verbal and interpretive—into structured evaluative data.

FINDINGS AND DISCUSSION

The findings reinforce key phenomenological claims regarding materiality and atmosphere. Participants consistently associated the Playhouse's material palette—particularly oak, brick, and treated concrete—with **warmth, calmness, and groundedness**, echoing **Pallasmaa's** emphasis on hapticity and multisensory presence. The strong role of tactile memory and surface patina aligns with his assertion that architecture is "felt and remembered through the skin," not just perceived visually.

The results of the analyses are presented below under separate titles in a descriptive way.

Overall Emotional and Atmospheric Perception

- Positive emotional experience: **61.2%**
- Neutral: **34.1%**
- Felt connected to the space: **41.2%**
- Felt isolated: **15.3%**

This result indicates architecture's ability to foster inclusion, calmness, and grounded presence.

Affective and Sensory Impressions

- Warmth: **85.9% (Moderate–High)**
- Calmness: **84.7% (Moderate–High)**
- Comfort: **76.4% (Moderate–High)**
- Focus and clarity: **77.6% (Moderate–High)**

Primary Perceptual Cues

- Dominant atmospheric factor: **Light (62.4%)**
- Key tactile/sensory factor: **Texture (23.5%)**
- Dominant sensory impression: **Light + shadow (67.1%)**

Spatial and Material Qualities

- Space felt open: **67.1%**
- Material palette perceived as harmonious: **64.7%**
- Increased material awareness after exposure/education: **91.8%**

These results confirm the complementary role of oak and concrete in balancing warmth and solidity, as well as the importance of daylight as an amplifier of material affect.

Similarly, the prominence of light and shadow as atmospheric drivers confirms **Zumthor's** argument that atmosphere emerges not from materials alone, but from their dialogue with light, scale, and temperature. The survey responses suggest that oak embodied warmth and emotional intimacy, while brick and concrete communicated stability and quiet solemnity—demonstrating **material dramaturgy** in practice.

Participants' heightened awareness of materials (*91.8%*) also supports the pedagogical premise that sensory literacy can be cultivated—reflecting Zumthor's belief in the discipline of noticing, and aligning with Pallasmaa's call for "a return to embodied perception in design culture."

Overall, the empirical results validate the theoretical proposition that architectural materials act not as passive finishes but as **emotive and perceptual mediators**—shaping atmosphere, memory, and affect through multisensory engagement.

CONCLUSION

This study has examined architectural materiality as a central determinant of emotional and perceptual experience in space. Drawing from Ákos Moravánszky's conception of metamorphism (Moravánszky, 2017), Roland Barthes' semiotic framework (Barthes, 1977), and the phenomenological positions of Juhani Pallasmaa and Peter Zumthor, the research demonstrates that materials are not passive building elements; they are active agents in generating atmosphere, memory, and sensory identity. Atmosphere is therefore understood not as an aesthetic supplement, but as the primary experiential medium through which architecture engages the human body and mind. Texture, light, sound, temperature, and temporal change operate collectively to shape perceptual and affective responses. The empirical component reinforces these theoretical claims. Survey participants reported heightened feelings of warmth, calmness, comfort, and openness within the Royal Danish Playhouse, alongside strong perceptions of material harmony and spatial inclusivity. Light and texture emerged as primary atmospheric mediators, aligning with Pallasmaa's assertion of multisensory embodiment and Zumthor's definition of atmosphere as the synthesis of material presence and sensory stimuli (Zumthor, 2006). Notably, 91.8% of respondents indicated increased awareness of material qualities after engaging with the space, suggesting that atmospheric perception is not only intuitive but also cultivable through exposure and education in phenomenology and material culture (Robinson, 2015).

The Royal Danish Playhouse demonstrates how material strategy can foster cultural resonance, psychological comfort, and environmental sensibility. Its integration of custom brick, copper, smoked oak, and velour, combined with calibrated lighting and acoustics, exemplifies a deliberate choreography of sensory stimuli that produces a coherent and emotionally compelling spatial identity. Such an approach illustrates the potential for architecture to address contemporary social, ecological, and psychological imperatives by prioritizing human experience, perceptual clarity, and emotional well-being. In conclusion, materiality functions as a critical interface between human perception and built form. Designing with attention to sensory response and atmospheric coherence is not a stylistic preference but an ethical and experiential requirement (Mallgrave, 2018). Future research should expand empirical testing across diverse typologies and populations to deepen understanding of how specific material configurations shape affective experience. Ultimately, architecture achieves significance not merely through form or function, but through its capacity to be perceived, remembered, and felt (Pallasmaa, 2012).

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