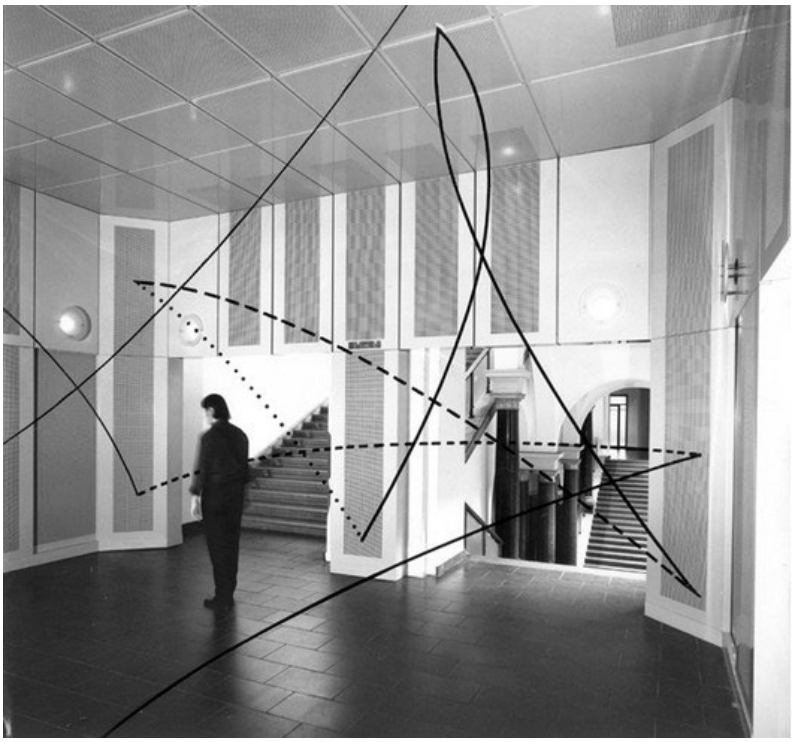

Recognising the Intangible:

How Intangible Materials Enhance Wellbeing within Interior Spaces

Kayla Adamson

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Introduction

As the majority of time in urban environments is spent within interior spaces, these environments play a fundamental role in shaping day-to-day experiences. Interior atmosphere possesses the ability to influence users' comfort, mood and behaviour, with the overall experience of these elements contributing to a sense of wellbeing. To craft these atmospheres, designers employ a range of tools, with materiality as a crucial element. Often physical, visual, tangible materials can be overemphasised, however, spatial experiences extend beyond what is simply tangible, meaning it is vital to also consider the intangible. Understanding the influence of intangible materiality will enable designers to create more holistic spatial designs which cultivate impactful experiences and foster connections between people and spaces, resulting in a stronger sense of wellbeing for users.

Following a thematic approach, this dissertation will begin by defining key terminology to provide clarity of concepts referred to throughout. Chapter two delves into the power of the built environment, and the influence interior spaces can have on wellbeing. This chapter will also discuss the hierarchy of tangible materials and why the intangible should be equally considered, laying out to designers the effect of intangible materiality on wellbeing. Chapter three is concerned with exploring theories within the field of design for wellbeing. This section analyses Neuroaesthetics and Phenomenology, to provide insight into relevant key principles. While many material elements can contribute to establishing atmosphere within interior spaces, chapter four presents light, negative space, sound and temperature as key examples which are explored in depth. The spatial effects of these materials are investigated, with relevant evidence and studies examined, to demonstrate their impact on wellbeing. Exploring and analysing these examples, including understanding their limitations, will provide an appreciation of the importance of intangible materials which designers should consider. The final section, investigates the WELL Certification, discussing its relevance, successes and drawbacks, ensuring designers understand a global system for measuring and certifying the effectiveness of spaces designed for wellbeing. Overall, the objective of this dissertation is to establish the importance of intangible materiality within interior spaces and investigate how this can affect users' wellbeing.

Chapter 1: Defining Key Terms

1.1 Wellbeing

While Hone, Schofield and Jarden (2015, p.98) argues there is no singular correct definition for wellbeing, in its most simplified form, wellbeing is defined by the Cambridge Dictionary (2023) as “the state of feeling happy and healthy” or perhaps even further reduced by the Stanford Encyclopaedia (2013) to mean “how well someone’s life is going for them”. This general sentiment can be expanded to encompass a person’s stress levels, mood, outlook and relationships (American Psychological Association, 2018), leading to a high quality of life. Within the built environment, design for wellbeing is an approach which formulates spaces intended to positively impact the physical, mental and emotional condition of occupants (The American Institute of Architects, n.d.). While definitions are subjective, within this dissertation, wellbeing can be thought of as a positive standard of life in which an individual feels generally content both physically and psychologically. This dissertation will explore how this can be aspired to through the creation of quality spatial design.

1.2 Intangible Materiality

Spatial materiality can capture attention and encourage connection between people and architecture (Di Sarra, 2020), yet its exact definition is open to interpretation. Architectural author, Porter (2004, p.89) argues materiality is the “touchy-feely” elements that make up a space, suggesting a fixed mindset of materials needing to be of touchable solidity. Forty (2004, p.260) diverges from Porter and instead defines materiality not just as physical matter, but to include impalpable tools that could be utilised in the design of spaces. In line with this, many design historians agree that materiality is not only linked to tangible tactility, but also connection to non-solid materials (Löschke, 2013, p.5). This suggests a user’s relationship with materiality within the built environment is not always physical, so materials themselves do not need to be tangible to create impact. When referenced within this dissertation, intangible materials define elements of materiality that lack solid form and cannot be touched, but are employed to contribute to the material atmosphere of a space.

Chapter 2: Importance of Topic

2.1 Influence of Design on Wellbeing

As Architect Le Corbusier stated, “architecture should not only serve us, but also move us” (The United Workplace, 2019). While spaces must meet functional needs, Le Corbusier hints at the necessity for the built environment to emotionally connect with users, and how this can go on to influence behaviour.

A Channel 4 documentary, ‘How Architecture Impacts Our Mental Health’ (2020), reported that amid urban contexts, people spend 90% of their time indoors, and Opinium (2018) found that the average British citizen spends 22 hours per day inside. As the vast majority of time is spent within the built environment, buildings are incredibly influential within users’ day-to-day experiences and ultimately can shape their well-being. Khatoon (2024) asserts that “our environment is an extension of our mind”, which is backed up by Neuroscientist Gage, who confirms that interior architecture possesses the profound ability to “modulate the function of genes and, ultimately the structure of our brain” (The United Workplace, 2019). This is to say that architectural surroundings have the power to convert emotions, adjust behaviour, and as such a significant amount of time is spent indoors, this has a profound influence on occupants’ wellbeing.

2.2 Hierarchy and Impact of the Tangible and Visual

Materiality plays a key role in design, as it can profoundly shape experiences through influencing thoughts, emotions and behaviour (Harrouk, 2020). While there is increasing consideration surrounding the impact of spatial materiality on wellbeing, designers can be prone to overly focusing on the tangible and visual, which in turn can lead to a disconnect between the occupant and the environment. Khatoon (2024), Maladkar (2024, p.1) and Muuto (2025) all list themes relating to light, colour, shape, form, biophilia and texture as essential elements designers should consider when promoting wellbeing. While it cannot be disagreed that these are all impactful and beneficial to wellbeing, the listed materials mostly focus on the tangible and visual. Intangible materials can be just as influential to design for wellbeing and should be further exploited. While it is recognised that some intangible

materials can be visual (such as light and negative space), there is often a visual dominance in the way materials are utilised. In his book, 'The Eyes of the Skin', Pallasmaa (2024), recognises this sensory hierarchy, known as ocularcentrism. In addition, he blames the "inhumanity of contemporary architecture" (Pallasmaa, 2024, p.21) on a fixation with the visual, as there is little consideration of other aspects or even how bodies feel in spaces. Contemporary German Philosopher, Böhme, encompasses this point, "Is seeing really the truest means of perceiving architecture? Do we not feel it even more?" (Löschke, 2013, p.7). This suggests that while sight is important for experiencing the world, it is overemphasised. The visual and non-visual, tangible and intangible are as vital as each other, yet intangible materials are often overlooked, which prevents fully rounded human experiences within the built environment.

2.3 Impact of Intangible Materials

Well-designed spaces utilise intangible materials to evoke emotional connections and have a lasting impact on people's health and wellbeing. Environmental Psychologist, Dr Weiner (Harrouk, 2020) and Clinical and Neuropsychologist, Dr Franks (Khatoon, 2024) agree that elements of materiality which are not tactile, such as light, acoustics and negative space, have an influential power over how occupants feel and behave within a space. Utilising these intangible materials can promote relaxation, focus and creativity. This can lead to an altered state of mind day-to-day, as well as impacting overall mental and physical health in the longer term (Khatoon, 2024). Application of intangible materiality can contribute to spatial atmosphere, which can affect an individual's experience, and, in turn, wellbeing. Furthermore, when controlled by designers, intangible materials possess the ability to affect a user's association with an environment and therefore their emotions. Löschke (2013, p.7) establishes that intangible materiality allows "the possibility to predict, control and influence the consciousness of human beings". This suggests that going beyond purely physical aesthetic appeal, creates a deeper connection between people and spaces, which can manipulate emotions, mood and comfort. In turn, these elements can provide a sense of wellbeing, which asserts intangible materials as vital to influence space.

Chapter 3: Design Theories

While discussing the role intangible materiality plays in promoting wellbeing, it is important to understand the surrounding context, making it relevant to outline theoretical approaches relating to human and health centred design. Therefore, this chapter will provide a further framework for designers to understand some of the theories underpinning the topic.

3.1 Neuroaesthetics

At the crossroads of neuroscience, architecture, art, design, and psychology, Neuroaesthetics is the theory behind how experiences impact brain growth, activity and function and how these are processed by people (Medlink Neurology, 2024). Neuroaesthetics has an unmistakeable focus on the significance of design on people, and bringing in scientific research can create better spatial designs that enhance wellbeing (Muuto, 2025). When within architectural surroundings, environmental triggers send neurotransmitters to the brain with instructions on how to feel or act (Medlink Neurology, 2024). This can be a result of material or design elements, which then determine mood and behaviour, demonstrating the influence of space in manipulating cognitive responses.

Within the name, ‘aesthetic’ primarily suggests the visual, however, in a panel talk, four experts (Muuto, 2024), clarified that Neuroaesthetics also encompasses sensorial experiences and non-physical design elements. Despite this, Neuroaesthetics is a relatively new research area, so the majority of studies do focus on visual and tangible elements (Higuera-Trujillo, Llinares and Macagno, 2021, p.26); however, there is more scope to delve into the effect of intangible materiality on the brain from a Neuroaesthetic perspective.

Neuroaesthetics can back up a designer’s creative decisions (Muuto, 2024) and explain the effect of these choices on people. Senior Neuroaesthetics Lecturer, Chamberlain, establishes that design features, such as claustrophobic spaces or harsh angles, deliver a trigger to the brain suggesting a desire to run (Muuto, 2024, 24:00), demonstrating the body’s natural response to negative spatial design. In comparison, encountering positive art, design and architecture, such as a well-designed interior, can result in an additional 10% of blood flow

to the brain, as well as signalling love (Muuto, n.d., p.6). This establishes that Neuroaesthetic principles can explain how spaces possess the ability to dramatically improve mood and cognitive performance and therefore strengthen a sense of wellbeing.

3.2 Phenomenology

Coined “a philosophy of experience” by Armstrong (2019), Phenomenology is a movement exploring how the world is experienced by individual people. It investigates people's lived perception, compared to objective reality (Hafza, 2024), aiming to understand the emotions that experiences hold for varied people.

Within the context of interior spaces, Phenomenology can encourage atmosphere and emotion for users, striving to stimulate the senses, (Hafza, 2024), which can ultimately affect short and long-term wellbeing. Architect and author, Pallasmaa (2024), encourages designers to cultivate this sensorial interaction to generate more rounded human experiences. This idea forms the basis of the Phenomenology movement, as it aims to foster experiences that are meaningful and impactful. This being said, as the theory establishes that lived realities are individual (Szczepanska, 2011, p.319), varied people and potential perceptions must be contemplated, with designers thoroughly considering their target user. As Phenomenology is encompassed by personal encounters, this means studies in the field generally rely on participants' ability to articulate experiences. Furthermore, unconscious bias sometimes becomes unavoidable as researchers make judgements when analysing emotions, behaviours and perceptions (Ho and Limpaecher, 2022). Due to its subjective nature, this means that ultimately it can be difficult to objectively explore Phenomenology. Despite this, it has been established that the field of Phenomenology explores emotional experiences, which is extremely relevant when concerned with how individuals react to and interact with the built environment, which affects wellbeing.

3.3 Linking Design Theories

There is a significant level of overlap between Neuroaesthetics and Phenomenology as they are both theories that can explain how impactful spaces lead to emotionally positive

experiences. Both these theories are involved with the effect environments have on the human brain, and perceived wellbeing within these spaces (Muuto, 2025). In essence, they establish the importance of design consciously focused around people.

Research surrounding both concepts reinforces the importance of effective design by providing scientific backing that design affects wellbeing. As Scandinavian designers Muuto (2024) affirm, “understanding how we respond to different spaces allows us to better discern the connection between body, mind, and design”. Therefore, Neuroaesthetics and Phenomenology can explain the theories behind why varied atmospheres or feelings are experienced within different spaces, as desired by designers. Ultimately, they serve as a reminder that the human brain, body and experiences should be placed at the centre of spatial design. Additionally, as a part of understanding these theories, intangible materiality can be utilised to elicit positive spatial encounters and improve wellbeing. Neuroaesthetics and Phenomenology do not specifically focus on a singular area of design such as intangible materiality, but they recognise the importance of design that strives to improve wellbeing.

Chapter 4: Key Intangible Materials

As crucial terms and the surrounding theoretical environment have been discussed, this chapter will investigate key intangible materials within the field of design for wellbeing. An understanding of light, negative space, sound and temperature will be provided as examples of the ability of intangible materials to enhance wellbeing within interior spaces. Their influence within this context will be explored, as well as their material limitations, but ultimately, it will be demonstrated why they should be more fully considered by designers.

4.1 Light

4.1.1 Effects of Natural Light

Although light does not have physical substance, as a material, it is vital to both practical and aesthetic interior atmosphere. Light can be deliberately manipulated by designers to provide illumination, visibility, safety, orientation, perception and guidance (Khusnutdinova, Faizrakhmanova and Khusnutdinov, 2020). Furthermore, well-lit environments have been shown to improve general mood, as well as health issues, which can ultimately establish a sense of wellbeing. Khatoon (2024) and Joseph (2006, p.4) both found a significant link between exposure to natural sunlight and reduced effects of Seasonal Affective Disorder and Bipolar Disorder. In addition, Gander (2016) reports that natural light is associated with quicker recovery rates for hospital patients and enhanced academic performance for students. Not only this, but natural light can reduce general agitation, anxiety and stress experienced within day-to-day life (Khatoon, 2024). Therefore, this research substantiates natural light as crucial to positively impacting health and integral to daily quality of life. Beyond this, natural light can determine comfort, engagement and productivity, as a study by Wang, Zhang and Chun (2021) found that within workspaces, levels of performance and wellbeing were lowest in environments with no windows. Consistent with expectations, cognitive function was highest with the most access to natural light (see Figures 1 and 2). This establishes natural light as a fundamental factor capable of contributing to positive mood, stability, performance and an overall improved sense of health.

Figure 1: Windowless Workspace (Fishel, 2014)

Figure 2: Workspace with Natural Light (Baird, 2023)

Although this cannot be disputed, Montjoy (2024) points out that inconsistent sunlight, dependent on time of day or weather conditions, can have negative results on wellbeing. For example, uncontrolled glare from direct sunlight can contribute to excessive heat gain, which could compromise occupants' comfort levels, therefore hindering wellbeing (Global Tint, 2022). Despite this, there are many solutions such as shading devices (shown in Figure 3), treatments, films and heat reflecting glazing for windows (Montjoy, 2024) which can be implemented to control lighting while still maintaining access to natural light and its associated beneficial qualities. On balance, the positive effects of natural lighting surpass its potential challenges, therefore, it can be seen as a vital intangible material that has the potential to determine spatial experiences and improve wellbeing.

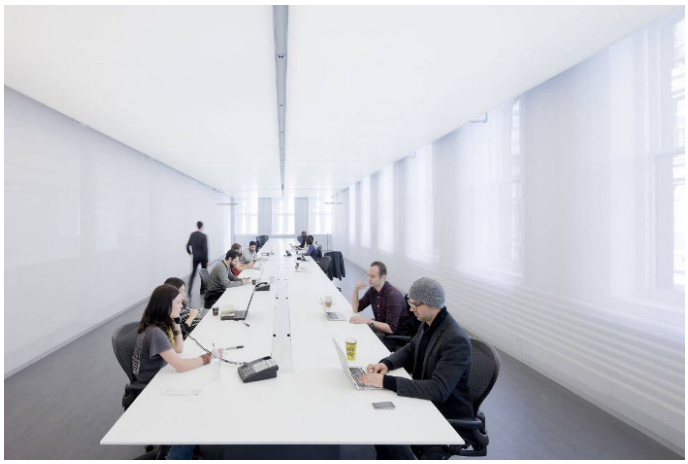

Figure 3: Window Shading (Montjoy, 2024)

4.1.2 Comparing Natural Light and Artificial Light

While natural light's influence has been discussed, artificial light also serves a function in relation to wellbeing. Assorted styles and temperatures of lighting can be utilised by designers to generate varied atmospheres. Muuto (2025) reports that cool toned lighting keeps people on guard, compared to warm toned lighting that promotes rest (refer to Figure 4). Additionally, Muuto (n.d., p.25) and Mostafavi, Xu and Kalantari (2024, pp.2-3) agree that directional light increases efficiency, whereas diffused light fosters relaxation (see Figure 5). Therefore, cool directional lighting could be utilised within workplaces to promote productivity, compared to warmer diffused light, which could be implemented within bedrooms or relaxed areas to create a sense of comfort. This demonstrates the capacity of artificial light as a material which designers can employ to manipulate users' spatial perception, behaviour and emotions.

Figure 4: Cool versus Warm Toned Lighting (Karri, 2025)

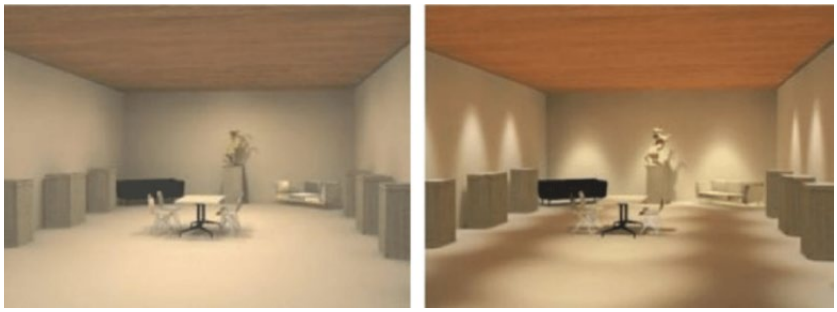

Figure 5: Diffused versus Directional Lighting (The Archspace, 2021)

Light plays a key role in governing the circadian rhythm, which is the body's natural internal clock. As Senior Architecture Lecturer, Dr Lewis explains, light "helps to regulate our body clock, affecting sleep patterns" (Gander, 2016). A study by Lindgren *et al.* (2018, p.2),

demonstrates how artificial light can replicate the varying temperatures and intensities of the natural circadian rhythm (as shown in Figure 6) to enhance “sleep duration, mood and general satisfaction”. Furthermore, Connellan *et al.* (2013, p.136) agrees by suggesting this can result in “reduced depression, decreased length of stay, improved sleep”, and “lessened agitation [and] eased pain” for hospital patients. These studies evidence that artificial light has the ability to synchronise the circadian rhythm, which can significantly improve a state of wellbeing. Despite this positive application, Maladkar (2024, p.1) establishes that poorly implemented artificial light can lead to tiredness, deficient performance and hinder people’s ability to regulate emotions. These consequences can result in disrupted wellbeing for users within a space, indicating the limitations of artificial light as a material. Natural light can be substantiated as a vital material that cannot be replaced, however artificial lighting can work in conjunction with the natural in order to further improve interior spaces in relation to wellbeing.

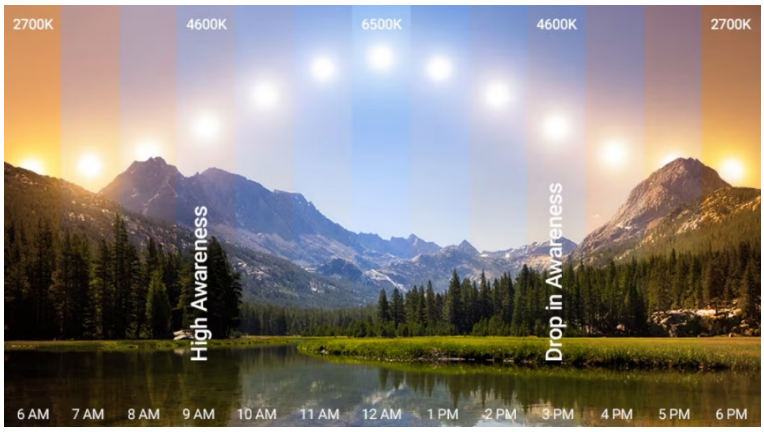

Figure 6: Circadian Lighting (Mauriello, 2023)

4.2 Negative Space

Architectural interiors themselves are not primarily a solid thing, but ultimately a space, therefore exploring space as an intangible material is highly relevant. As it is not tangible or immediately visible, designers tend to overlook negative space, yet its impact on wellbeing can be substantial.

According to Chitra *et al.* (2023, pp.2-3), positive space can be defined as physical architectural elements which suggest stability, assurance and protection. In comparison, negative space can be understood as the voids that exist between or beyond these positive spatial volumes (refer to Figure 7). Chitra *et al.* (2023, pp.2-3) and Stich (1994, pp.213-217) agree that negative space is a material which lacks structural solidity or visible physical form but is essential to impacting spatial composition and atmosphere.

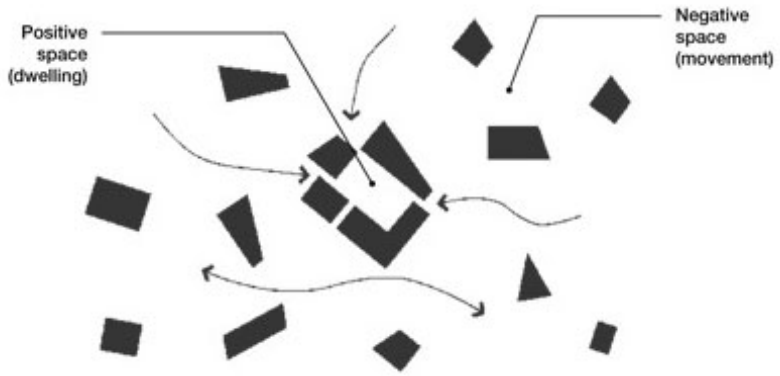

Figure 7: Positive versus Negative Space (AACT Arch&Design, 2013)

Swiss Architect, Zumthor (2005, p.41), asserts that spaces are not designed to be at a standstill, but instead to be used. Spaces must allow people to move and experience them, and therefore, for this to be possible, negative space is fundamental. When effectively implemented, negative space has the ability to indicate visual focus, scale and movement (Chitra *et al.*, 2023, p.1). These impacts can ultimately manipulate a user's perception of a space and their relationship with it. One way in which negative space allows this connection

is the process of physical discovery, as “through movement users can adjust their experience of the space” (Hill, 2006, p.69). Architect, Professor and Author, Hill, substantiates the importance for users to circulate and discover a space through movement (see Figure 8). This encourages curiosity, which is critical to positive spatial encounters. Zumthor (2005, p.43) agrees with Hill that negative space can enable a “voyage of discovery” for the user. However, not only can negative space allow for exploratory movement, but additionally it can manipulate users in a specific direction. Zumthor (2005, pp.41-43) establishes negative space as a material that can be utilised to manage people. If applied correctly, users will be subconsciously drawn to a specific point, predetermined by the designer. This demonstrates the ability of negative space to affect behaviour, determining its power as an influential material that designers should further consider.

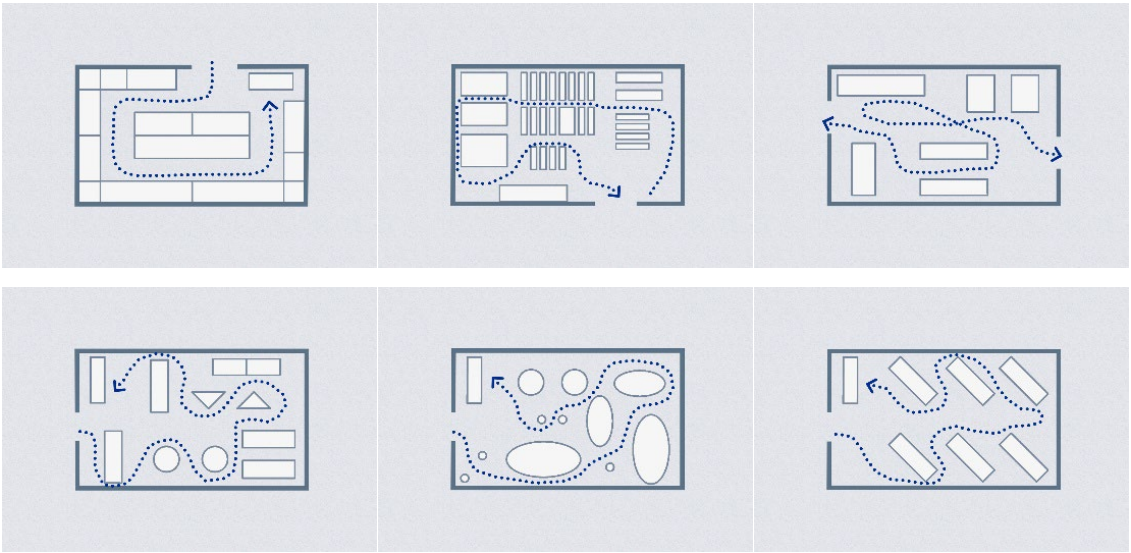

Figure 8: Circulation Plan Diagrams (Iñiguez, 2023)

Even if it cannot be physically entered into, simply the concept of negative space can significantly impact performance and wellbeing. A study conducted by the University of Minnesota found that high ceilings suggest freedom, which promotes creative problem-solving. In contrast, low ceilings create a sense of intensity that can foster concentration (refer to Figure 9) (The United Workplace, 2019). Therefore, analysing the atmospheric effects of this study could be applied to everyday design. For example, collaborative social areas, would benefit from an abundance of negative space to promote innovative thinking, compared to private study zones, where reduced negative space would enhance focus. This

highlights how negative space can shape atmospheres, meaning it has influence over behaviour and therefore wellbeing.

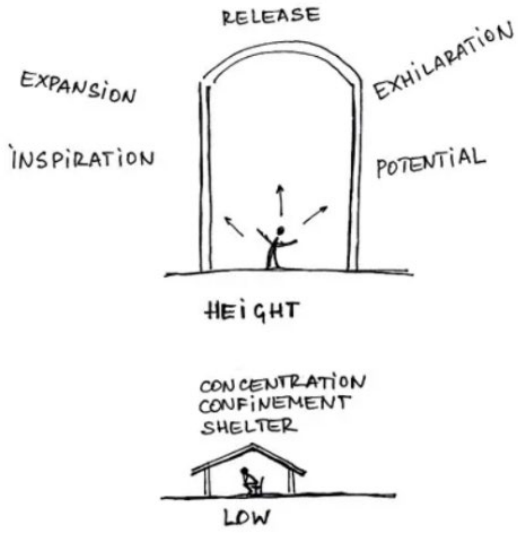

Figure 9: High versus Low Ceilings (Sher, 2014)

Priya (2025) contends that excessive use of negative space can contribute to spatial ambiguity, as environments lack clarity, structure and cohesion. Therefore, this overload due to an abundance of negative space can increase stress levels and consequently contribute to negative wellbeing. Conversely, insufficient negative space can be just as detrimental as Chitra *et al.* (2023, p.3) attributes this to limiting freedom, movement and circulation. This restriction can leave people with a sense of claustrophobia and unease within spaces. However, ultimately positive and negative space must work together to create “harmonious compositions which go beyond plain utility” (Chitra *et al.*, 2023, p.1). This balance can define spatial layouts and facilitate movement in a way which does not become overwhelming, therefore fostering a sense of calm which promotes wellbeing. As discussed, while both positive and negative space are important to design for wellbeing, being intangible, negative space is often under considered, yet it is imperative for designers to give this material further attention.

4.3 Sound

4.3.1 Presence of Sound

Sound is used to communicate, contextualise and understand spaces, therefore placing it as fundamental to environmental perception and experiences. Within his book, 'The Eyes of the Skin', Pallasmaa (2024, p.51) argues sound has a greater degree of immersion than vision. Within a space, all sounds can be encountered simultaneously, resulting in a rounded auditory experience (see Figure 10). On the other hand, in relation to sight, only one direction can be looked towards at any one time, making it harder to take in all surroundings. This is to say that while sound holds equal significance to other sensory materials, in terms of how it impacts day-to-day encounters and can add to interior atmosphere, it is rarely consciously considered within the design process.

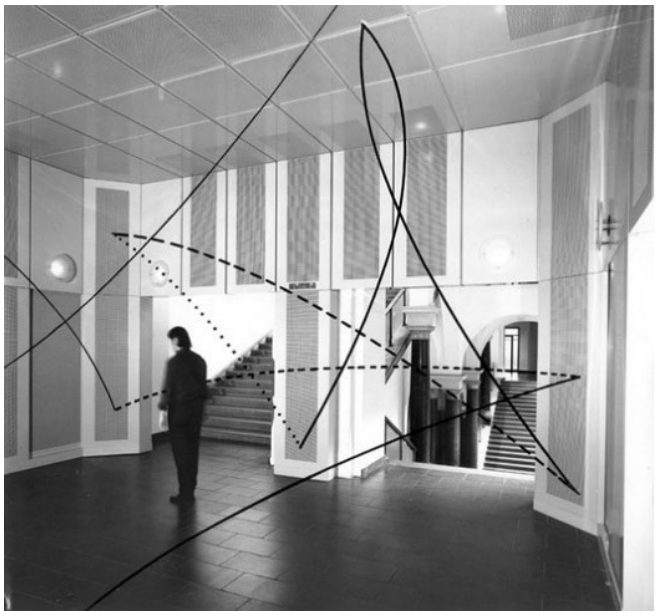

Figure 10: Suggestion of Sound in Space (Lopez, 2011)

Within design, Hill (2006, p.183) and Sandhana (2019), refer to sound as "aural architecture". Acoustic Engineer, Cox, defines this as "how we listen to buildings, the sound within buildings and how we react to them" (Sandhana, 2019). Hill (2006, p.184) agrees with this connection between sound and spatial perception, as he highlights that aural materials can shape contextual awareness and engagement. Furthermore, Sandhana (2019) asserts that sound can directly influence user ease and behaviour. Therefore, it can be established that

sound, as an intangible material, can subconsciously affect interpretation of spaces, in addition to curating emotional responses.

Sound can be deliberately manipulated for specific contexts, in turn affecting users' behaviour. A study by Craven (2020) discovered that varied music tempos can prompt diverse spatial engagement. Slower paced music influenced users to linger, compared to faster paced music, which promoted quick transitions throughout the space. This concept can be applied by designers, for example, by implementing slow music within a gallery or exhibition space, to encourage leisurely engagement. In comparison, faster music could be consciously employed within fast food restaurants to manipulate quick dining and high turnover. This demonstrates the direct impact of aural architecture on emotional and behavioural patterns, both of which contribute to overall wellbeing. Fierro-Newton (2024) reinforces this claim by stating that "sound influences the brain by triggering neural responses that affect emotions, cognition and physiological states". This establishes that sound is not simply a passive background element, but instead actively interacts with the brain, demonstrating its significant influence on how the body reacts to spaces. Despite this, an overabundance of sound, can be significantly harmful to wellbeing. Craven (2020) and Fierro-Newton (2024) both highlight that excessive noise is associated with emotional and physical strain, including elevated stress levels, blood pressure and migraines. Furthermore, Sandhana (2019) highlights a relationship between these heightened sound levels and increased risk of depression and anxiety. On the contrary, noises that the brain recognises as positive can reduce cortisol levels (Fierro-Newton, 2024), leading to stress relief and a sense of calm. By establishing the emotional and physical benefits and consequences of acoustics, this evidence demonstrates the impact of sound on wellbeing and the importance for designers to consider aural architecture.

4.3.2 Silence

When examining sound as an intangible material in relation to design for wellbeing, silence must also be contemplated. Hill (2006, pp.181-182) makes the point that despite the absence of sound, silence still has acoustic impact and the power to affect spatial experiences, therefore making it a powerful material. He maintains that “the depletion of one sense heightens awareness of all the senses and the surrounding environment” (Hill, 2006, p.182). This indicates the ability of silence to encourage recognition of the absence of seemingly insignificant everyday sounds, as well as accentuate other existing sensorial materials. In turn, this can create dramatic interior spaces, leaving users with enhanced experiences. Another spatial effect of silence is its profound ability to evoke a sense of atmosphere, despite an apparent lack of acoustic materiality. Within his book, ‘The Poetics of Space’, Philosopher, Bachelard (2014, p.34), suggests “there is nothing like silence to suggest a sense of unlimited space…absence of sound leaves it quite pure and, in the silence, we are seized with the sensation of something vast and deep and boundless”. This demonstrates how silence can contribute to aural atmosphere, as it evokes a feeling of limitless stillness.

It is worth noting that true silence can have negative effects on wellbeing, leaving people feeling uncomfortable. Microsoft engineers have created a true soundproof room, known as an anechoic chamber (shown in Figure 11), in which people can hear their own heart beating, blood flowing and bones grinding. This results in an experience that “unsettles almost everybody” (Gray, 2017), due to the level of sensory deprivation. In contrast, silence can be perceived, without being full true silence. This silence includes faint noises, such as echoes, reverberations, building services, environmental noise, air flow and people moving (Aural Exchange, 2019). This mediates perceived silence, so unlike the uncomfortable sensory deprivation of true silence, it can evoke a sense of peace and calm, which can draw people in, encouraging engagement and connection with a space.

Figure 11: Anechoic Chamber (Gray, 2017)

Within spaces, perceived silence has been discussed, not only to establish an appreciation for missing acoustics and heighten other senses and materials, but also to curate powerful atmospheres. Both the presence and absence of sound can be thought of as influential, as they possess the capability to immerse users in space. This allows people to be more present in, and connected to environments, which in turn is beneficial to their wellbeing, meaning applications for sound and silence should be considered in more depth by designers.

4.4 Temperature

As another example of intangible materiality, temperature should be implemented by designers to manipulate spatial perception and wellbeing. Research Design Connections (2021) reported that the temperature of an environment can affect users' comfort, dictating mood and in turn influencing sense of wellbeing. A study by Wargocki and Wyon (2016, pp.361-365) discovered that any exaggerated temperature levels considered uncomfortable can result in reduced concentration. As focus is necessary for many tasks and mental thinking, this can affect attention, memory, decision-making and overall cognitive performance.

Designers can utilise temperature control to manipulate users within a space, resulting in altered behaviour. A study by Spence *et al.* (2014, p.8) investigating retail spaces demonstrated that cooler temperatures encouraged more emotional spending, resulting in increased indulgent purchases. In comparison, warmer temperatures resulted in more practical purchases. While this study is within the context of retail spaces, its ability to affect sales evidences temperature's power to influence spatial users' actions and manipulate decision making. This effect of temperature on personal judgements, is also substantiated in a study by Erkan (2021, p.12), which investigated how temperature affects users' "architectural liking of a space". Participants experienced a space at 15°C, 22°C and 30°C, while their cognitive activity was measured. The findings showed that "architectural liking" was lowest at 30°C, slightly higher at 15°C, but significantly highest at 22°C. This establishes that people's reactions to spaces change with temperature, evidencing the claim that temperature can alter users' spatial perception.

As the ability of temperature to influence behaviour and perception has been established, designers need to be aware of ideal spatial temperatures, in order to ensure comfort for users (refer to Figure 12). Wargocki and Wyon (2016, p.361) and Baker and Bernstein (2012, p.12) agree that the ideal interior temperature range is 19-22°C. Both report this as optimal for not only cognitive functioning, but also simply for occupant comfort, which is beneficial to both mental and physical wellbeing. While not disagreeing with the significant effect of temperature, it can be difficult for designers to meet every individual's needs. A report published by the World Health Organisation (Barnard *et al.*, 2018, pp.10-24), suggests that groups such as young children, the elderly and those with illnesses, require warmer temperatures. Additionally, Peterson (2022) reported that women's most comfortable indoor temperature is on average 2.5°C warmer than men's. These variations in ideal temperatures, evidence the challenge for designers to accommodate different comfort needs. Therefore, it could be suggested that designers need to rethink the idea that a single temperature solution works for everyone and instead thoroughly consider the specific spatial occupants for whom they are designing. It must be recognised that it is not simple to accommodate varying needs, however this does not refute the argued importance of thermal comfort and its impact on wellbeing.

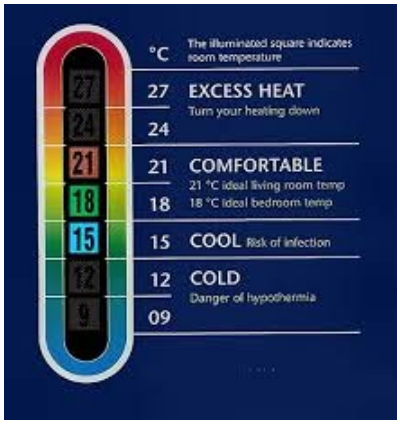

Figure 12: Optimal Interior Temperatures (Crawley, n.d.)

A further limitation of temperature as an intangible material is the financial and environmental costs associated with thermal control. Wargocki and Wyon (2016, p.359) establish that manipulating temperature can use a significant amount of energy, leading to not only increased financial costs but also environmental issues as a result of increased greenhouse gases. In contrast, not deliberately heating or cooling a space, can reduce these costs, however this can result in other implications. As previously evidenced, unfavourable temperatures can lead to unsatisfactory occupant performance and concentration, as well as discomfort, resulting in a decreased level of wellbeing. These implications must be weighed up by designers as they consider whether the energy costs associated with optimal temperature are viable or not, to increase comfort and therefore wellbeing. While there is not necessarily a definitive answer to whether the effects on people or the environment are more justified, the impact of temperature can be solidified as it has been shown to influence users' experiences and wellbeing within spaces.

Chapter 5: WELL Certification

Based on relevant scientific research and industry best practice, the WELL Certification is a ranking system used to review buildings with the goal of improving spatial users' health and wellbeing. Launched in 2014 and now recognised globally (WELL, 2025b), the WELL Certification is a series of objectives, made up of ten concepts, as shown in Figure 13, (air, water, nourishment, light, movement, thermal comfort, sound, materials, mind, community) each of which incorporates more specific goals to form a scoring system, determining if a space receives WELL Certification (WELL, 2025a).

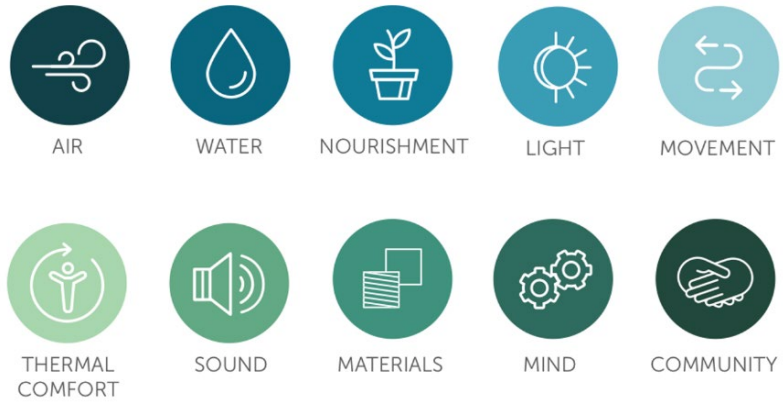

Figure 13: WELL Certification Concepts (WELL, 2025b)

As stated in the WELL manual (WELL, 2025b), the concepts which make up the WELL Certification aim "to deliver more thoughtful and intentional spaces that enhance human health and wellbeing", demonstrating its relevance as a prominent system for measuring the effectiveness of design for wellbeing. Beauman (2025) and Kokatanur *et al*. (2025, p.3) both agree that WELL is the first certification of this type to focus solely on people. BREEAM (Building Research Establishment's Environmental Assessment Method) and LEED (Leadership in Energy and Environmental Design), are also existing building certifications with global reach (Condezo-Solano *et al*., 2025, p.1). Although the BREEAM, LEED and WELL Certifications all aim to enhance how a space operates, BREEAM and LEED prioritise the environmental sustainability of buildings, with less focus on wellbeing, compared to WELL. Of nine categories that make up BREEAM, only one directly relates to wellbeing, and for LEED this is just one of six categories (Condezo-Solano *et al*., 2025, p.1). On the other hand, WELL is exclusively concerned with how the built environment can enhance wellbeing. This being said, many features of WELL can still lead to environmental benefits, and vice versa, with elements of BREEAM and LEED contributing to positive user wellbeing.

As the WELL Certification focuses exclusively on human experiences, this can have negative effects on other areas, for example, a feature of WELL is Circadian Lighting Design, which intends “to provide users with appropriate exposure to light for maintaining circadian health” (WELL, 2025a). Although lighting design can be beneficial to wellbeing, it increases energy consumption (Kokatnur *et al*., 2025, p.15). This contributes to higher levels of greenhouse gases, which can be detrimental to the environment. Additionally, Kokatnur *et al*. (2025, pp.18-19) and Condezo-Solano *et al*. (2025, pp.9-10) both point out the high financial cost associated with the process of gaining certification. These implications could deter some designers from aspiring to attain the WELL certification. Despite this, WELL is a relatively recent system, meaning there is little research surrounding a comprehensive financial analysis of the certification process (Kokatnur *et al*., 2025, p.20). Furthermore, even without striving for certification and incurring the financial costs of this, the concepts of WELL could still be implemented within spaces as a framework to improve wellbeing, including goals to which designers can aspire.

Despite some drawbacks, evidence demonstrates the success of the WELL Certification in actively promoting wellbeing. Studies by Marzban *et al*. (2023, pp.9-10) and Kokatnur *et al*. (2025, p.19) both showed a correlation between WELL Certified spaces and improved productivity, creativity and overall mental health and wellbeing levels for occupants. Additionally, Marzban *et al*. (2023, pp.9-10) revealed that users of WELL Certified spaces were 18% more satisfied with natural sunlight access, 17% with acoustic privacy and 11% with thermal comfort, compared to those in non-WELL certified spaces. This substantiates the fundamental premise of the WELL Certification by evidencing improved comfort, which is crucial to a positive sense of wellbeing. Furthermore, of the ten concepts that underpin WELL (outlined above) many, such as air, light, movement, thermal comfort and sound, can be thought of as intangible materials. This showcases that intangible materials have the potential for significant impact on wellbeing when utilised within spaces.

Conclusion

This dissertation has examined the effect of intangible materiality on the wellbeing of users within interior spaces, as these environments can hugely impact mood, emotions, perception and behaviour (Khatoon, 2024). As asserted by Pallasmaa (2024), there is often an overemphasis on the tangible, which can create a disconnect between people and the spaces they inhabit. This is not to say that tangible elements are unimportant, but the intangible is just as significant, with considerable effects on emotions and behaviour (Harrouk, 2020). As stated by experts in the fields of design, neuroscience and psychology, intangible elements can improve day-to-day experiences, as well as have long-term positive effects on mental and physical wellbeing (Khatoon, 2024).

Neuroaesthetics and Phenomenology were examined, and while both are distinct concepts, collectively they offer insight into how experiences are processed in the brain (Medlink Neurology, 2024). Understanding the theoretical framework behind design for wellbeing, gives explanation to how and why people's behaviour can be altered with varied design decisions.

Key material examples were analysed to substantiate the influence of intangible materiality on wellbeing, encouraging designers to more consciously implement them. Natural light has been found to significantly improve mood and overall mental and physical health issues (Khatoon, 2024). Furthermore, artificial light can synchronise the circadian rhythm (Gander, 2016), as well as be deliberately manipulated, allowing designers to tailor user experiences for specific contexts, with positive wellbeing implications (Muuto, 2025).

As Zumthor (2005, pp.41-43) asserts, negative space is essential for circulation, exploration, layout, composition, scale and direction, for both physical movement and visual focus (Chitra *et al.*, 2023, p.1). This affects users' relationship with the environment and how they feel within it. Both a lack or excess of negative space can lead to confusion and stress (Priya, 2025), meaning it is a designer's responsibility to manipulate negative space as necessary for the spatial context.

Sound is a key source of communication as it can provide context, understanding, comfort, and perception and allow emotional meaning to be derived from experiences (Sandhana, 2019). In contrast, the lack of sound through perceived silence can heighten other elements, creating spatial atmosphere (Hill, 2006, pp.181-182). As exemplified by Craven (2020), sound can alter people's behaviour, therefore it should be deliberately applied to determine how spaces are utilised, aiming to provide a sense of wellbeing.

Temperature as a material was also explored as it can define comfort, concentration, performance and levels of physical health (Wargocki and Wyon, 2016, p.365). Thermal comfort can determine relationships between people and spaces (Erkan, 2021, p.12), therefore designers should utilise temperature to produce desired experiences for users.

While presenting challenges to designers, such as individual's thermal comfort needs (Barnard *et al.*, 2018, pp.10-24), the impact of temperature on comfort and wellbeing cannot be refuted.

As a method for assessing the success of spaces at promoting wellbeing, the WELL Certification was analysed. Its relevance must be recognised as the certification appreciates positive design for wellbeing, while taking into consideration many intangible materials (WELL, 2025b).

Ultimately, intangible materiality has been shown to provide an improved sense of wellbeing for occupants of interior spaces. This establishes that the intangible is not insignificant but is fundamental to design for wellbeing. As such, it is the responsibility of designers to implement intangible materials to create spaces that enhance user experiences and contribute to a positive sense of wellbeing.

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