

Rhythm, Sound, and Memory: Cinematic Principles Shaping Experiential Architecture in Cultural Buildings

Riyam Mushtaq  *, Hoda A. S. Al-Alwan  

Department of Architecture Engineering, College of Engineering, University of Baghdad, Baghdad, Iraq

ABSTRACT

The relationship between cinema and architecture has witnessed an increasing presence in contemporary studies, as both converge at a common point: shaping human experience within a specific temporal and spatial space. Cinema uses the principles of rhythm, sound, and memory to shape visual and auditory narratives, while architecture seeks to embody these principles in tangible spaces that organize human movement and influence sensory and emotional perception. This relationship demonstrates that cinematic expression tools can enrich architectural experience. However, the challenge lies in the limited theoretical frameworks that explain how to translate these principles into design strategies, particularly in cultural architecture. Based on this gap, this research aims to explore the principles of rhythm, sound, and memory as tools capable of reshaping the architectural experience and enhancing the user's perception of space. To achieve this, the research relied on a qualitative analysis of international case studies that included the Jewish Museum in Berlin, the Paris Philharmonic Hall, and the Teshima Art Museum, tracing the roles of the three principles: rhythm in organizing movement, sound in shaping spatial atmosphere, and memory in building emotional connections within architectural narratives. The results reveal that integrating these principles contributes to enriching sensory perception and deepening emotional responses. They also demonstrate that aligning cinematic logic with architectural design provides a multidisciplinary framework for rethinking the narrative of space. Thus, the research presents an innovative approach to employing cinematic tools in cultural architecture, creating immersive spaces that stimulate the senses, evoke memory, and enhance human presence.

Keywords: Architectural experience, Cinematic principles, Cultural buildings, Sensory perception, Spatial Narrative.

1. INTRODUCTION

In light of the rapid development witnessed worldwide in the fields of art and technology, knowledge-based disciplines have begun to open up to one another, producing hybrid

*Corresponding author

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patterns of thought and practice **(Troiani and Kahn, 2016)**. Among these interactions, the relationship between cinema and architecture has emerged as a field rich with possibilities, where concepts of time, movement, perception, and memory intersect **(Frunza, 2007; Pallasmaa, 2012)**. Cinema is more than just a medium for storytelling; it is a sensory practice that transports the viewer within spaces composed of image, sound, and rhythm **(Bruno, 2002; Ye, 2016)**. This can be transformed into effective design tools within the architectural field, particularly when dealing with cultural buildings **(Troiani and Kahn, 2016)**. This research is based on three main cinematic principles: rhythm, sound, and memory. Rhythm in cinema is not viewed merely as a temporal sequence, but rather as a tool for organizing movement and interaction within space **(Ye, 2016)**. Sound, on the other hand, transcends its aural nature to create spatial atmospheres that influence the user's feelings and emotions **(Kooshesh and Karami, 2024)**. Memory, meanwhile, serves as a carrier of meaning, linking the past to the present and imbuing space with a profound emotional and historical dimension **(Bruno, 2002; Andjelković, 2015)**. Hence, the research seeks to deconstruct these principles and reconstruct them within a design system that serves the architectural experience **(Frunza, 2007)**.

The research follows an analytical methodology that is applied to three international case studies: the Jewish Museum in Berlin, the Philharmonie de Paris, and the Teshima Art Museum. These projects are selected for their design approaches that engage with time, sensory perception, and emotional dimensions, which are elements that also constitute the essence of cinema **(Bruno, 2002; Pallasmaa, 2005)**. By analyzing these models, the research seeks to highlight how cinematic logic can be employed to formulate experimental architecture that engages the senses and stimulates collective and individual memory.

Based on this theoretical background, the research poses the main question: How can the principles of rhythm, sound, and cinematic memory be employed to formulate a sensory architectural experience that enhances emotional and functional interaction within cultural buildings? The research aims to build a conceptual and applied framework that translates cinematic principles into architectural design tools that reshape the relationship between the user and space by activating the senses and evoking collective and individual memory. The research's scope lies in its focus on cultural projects that have undergone functional reuse, adopting a qualitative analysis of interior spaces as the primary carrier of the cinematic-architectural experience.

The study is conducted in an analytical and comparative manner on existing architectural projects, and through this, it develops a framework and a viable methodology that transforms cinematic principles into analytical indicators that can be subsequently used in design applications or site studies on rehabilitation or reuse.

The importance of this research stems from the need to develop new design tools that take into account the human dimension in cultural buildings. The intentional use of temporal and sensory elements in design has the ability to trigger memory and reshape the visitor's perception of space **(Ghanim and Shukur, 2010)**. Cinematic principles enable the production of spaces with an emotional and narrative character, departing from rigid models and embracing a vibrant architecture that engages the user as both an active and interactive actor. Visual attraction plays a key role in this engagement; it is a selective activity that characterizes mental life, and represents what we can perceive of things through their positive qualities that make us attracted to them and result in excitement, pleasure, enrichment, love of staying and attachment to the place **(Hussien and Albazzaz, 2017a)**, as well as creating a harmonious interplay that evokes empathic responses **(Mahmood and Al-**



Alwan, 2023). Integrating cinematic principles into architectural practice is not merely an aesthetic experiment; it is a step toward building a design language that enriches the relationship between people and place through sensory, temporal, and cultural strategies.

2. THEORETICAL BACKGROUND

Architecture and cinema are regularly juxtaposed, due to their shared connection to the physical and visual worlds. Through their psychological representations, they both enlarge the surface, frame, light, and depth of the actual world (**Mohamed, 2023**). Amongst all the arts, architecture has a significantly specific and sophisticated relationship with cinema (**Vidler, 1993**). Bruno, acknowledged that while several disciplines may affect each other to a particular range, the correlation between architecture and cinema could be proven to be considered among the most substantial (**Bruno, 2002**).

Literature reviews have addressed a number of attempts to frame this relationship. (**Frunza, 2007**) proposed a perspective that transcends the traditional function of architecture by exploiting the tools of cinema to formulate sensory and narrative spaces, while (**Pallasmaa, 2005**) focused on the cognitive and existential dimension that cinema confers when translated into architecture. Subsequent research, such as (**Ye, 2016; Kooshesh and Karami, 2024**), demonstrated that the principles of time, memory, and rhythm can be transformed into analytical tools for understanding spatial experience. Despite these contributions, most have remained within the confines of theoretical propositions or addressed the relationship through general philosophical approaches, without delving deeply into how these principles can be activated within specific architectural examples. Hence, the contribution of this research emerges, seeking to link theory with practical application by analyzing contemporary architectural projects that reveal the manifestations of the principles of rhythm, sound, and memory in the architectural experience.

It's crucial to take into account that architecture and cinema have influenced each other in a reciprocal way. Architects employed cinema to advocate modern architecture during the 1920s and 1930s. Cinema, consequently, has utilized architecture and the urban environment to depict the overall spirit and atmosphere that a film aims to reflect (**Mohamed, 2023**). Architecture and cinema only reveal their productive force when we delve into our personal and collective memories, they make use of physical tools, experiences, and assemblage to demonstrate their mythopoetic inspiration. Moreover, cinematic considerations about successful representations of space have a substantial impact in audio-visual decision-making processes including post-production, editing, mise-en-scene, and sound while filming (**Mohamed, 2023**).

The three principles; rhythm, sound, and memory, are essential pillars in shaping the cinematic experience, contributing to building a sense of time, guiding perception, and consolidating emotional impact. When approached within the context of architecture, they provide effective tools for producing sensory and narrative spaces that enable the user to deeply interact with the space. Perception, or the act of perceiving, is the process by which we learn about our surroundings through the sensory organs, which are thought of as active systems that take in sensory data as signals, organize, and interpret them in light of the knowledge that is already stored in our brains as mental images. Perception is considered a creative process; it is not merely the passive reception of signals but rather a complex act constructed from sensory data and influenced by the recipient's expectations, memory, and learning, among other factors (**Hussien and Albazzaz, 2017b; Al-Alwan et al., 2022**).



Below, each principle will be addressed separately, with the aim of analyzing its theoretical dimensions and tracing its practical manifestations in architectural design.

Despite the abundance of theoretical discussions on the intersections of architecture and cinema, there remains a need to link these propositions to measurable analytical procedures applicable to specific architectural examples. This research aims to fill part of this gap by constructing a conceptual and methodological framework that transforms the principles of rhythm, sound, and memory into analytical indicators applicable to documented architectural cases.

2.1 Rhythm

Rhythm is one of the fundamental principles of cinema, used to organize time and movement within a film, whether at the level of cutting, editing, or camera and actor movement. Rhythm is not limited to the chronological sequence of scenes; it encompasses the emotional relationship the film builds with the viewer through repetition, variation, and visual or auditory escalation. Cinematic rhythm can be fast or slow, harmonious or tense, and each pattern contributes to directing attention and creating specific temporal and sensory impressions **(Bordwell and Thompson, 2019)**.

When the concept of rhythm is translated into architecture, it becomes evident that rhythm is a way to achieve the highest levels of creativity in architecture, particularly in modern architectural movements, and is regarded as one of the creative principles in recent architectural philosophy **(Maan et al., 2013)**. It becomes a means of organizing the user's experience within space. This is embodied through the repetition of architectural elements, the gradation of masses, the change of lighting, or the succession of spaces and passages. As the user moves through space, they experience a spatial sequence that can be likened to a cinematic montage, where the architectural scene is gradually constructed through movement. Thus, rhythm becomes an interactive design tool, enhancing the user's perception of time and space and creating a dynamic architectural experience **(Bordwell and Thompson, 2019)**. **Table 1** summarizes precisely the implementation of Rhythm in both cinema and architecture.

Table 1. Rhythm in cinema and architecture and its implementations.

Principle Implementation	Rhythm
In Cinema	It emerges from the temporal organization of shots and scenes. Rhythm is not the metrical sequence of pieces; what makes it is the time-thrust within the frames (Tarkovsky, 1986) .
<i>'In the Mood for Love'</i> (2000) Wong Kar-wai	Rhythm conjures up a meditative sensory experience; Wong Kar-wai uses slowness and repetitive shots of corridors and staircases to generate a sense of non-linear, circular time. (Lim, 2005) . The repetition of the musical piece " <i>Yumeji's Theme</i> " also contributes to this slow rhythm, which makes the scene resemble an emotional state more than a narrative (Teo, 2005) . Researchers such as David Bordwell have pointed out that this rhythm not only completes the story but also creates a temporal space in which the viewer lives between memory and desire (Bordwell and Thompson, 2019) . Fig. 1 illustrates the concept of rhythm that is embodied through the visual repetition of the same characters in more than one scene. In these

	shots, rhythm is not merely a chronological arrangement; it becomes a physical experience.
In Architecture	It can be described through musical structures such as syncopation, polyrhythm, and oscillation. Architectural elements, columns, windows, and voids, act like musical notes organized into beats and phrases. These patterns create a compositional logic that defines spatial anticipation and pause, echoing musical scores in their capacity to guide experience (Önertürk, 2020).
'Institut du Monde Arabe – (Paris)' (1987) Jean Nouvel	Nouvel relies on a dynamic façade composed of a metal mesh with mechanical elements resembling moving geometric screens (moucharabieh). The openings operate according to an electronic system that controls the degrees of light and shade throughout the day. This regular movement creates a continuous visual rhythm that varies according to time and climatic conditions, creating a kind of reciprocal relationship between the interior space and the surrounding city (Pallasmaa, 2012).

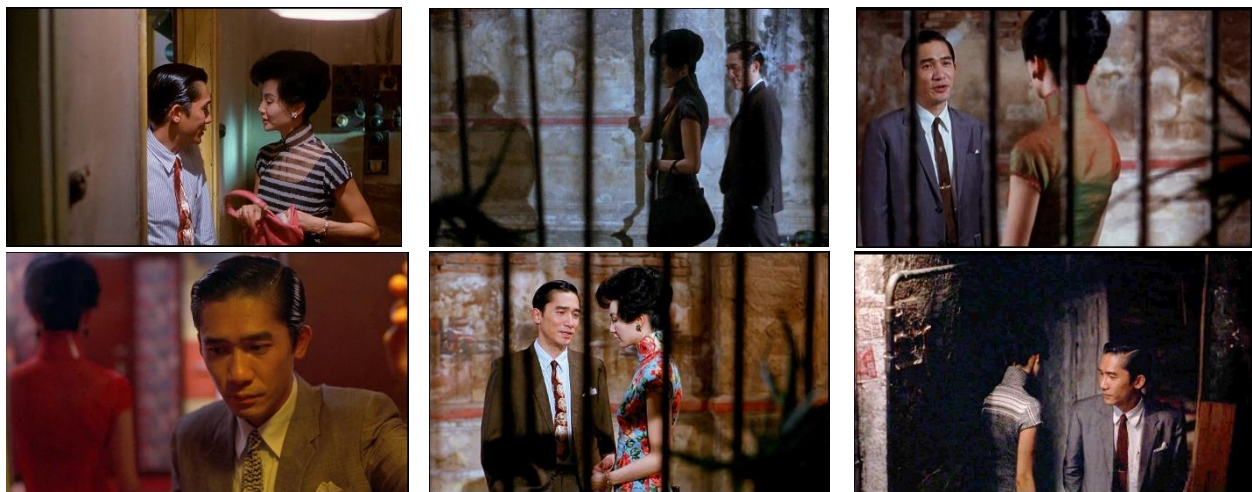


Figure 1. The rhythm of repetition of the scene reflects the idea of revolving around desire and silence, as the relationship between the two characters remains suspended and incomplete (Screenshot by the author from 'In the Mood for Love').

2.2 Sound

Sound is an essential element in building the cinematic experience. Its role is not limited to accompanying the image or enhancing the action, but rather extends to becoming a tool for shaping the sense of place and time (**Chion, 1994**). In cinema, sound is used to regulate rhythm, create tension, build atmosphere, or guide sensory perception. Sound can be direct and clear, or mysterious and invisible in its source, giving it an abstract character that deepens the sense of mystery or immersion. Silence itself is an effective acoustic component, employed to create anticipation or highlight specific visual details (**Altman, 1992**).

When the concept of sound is brought to mind within architecture, it becomes a means of enriching the sensory experience of space. Sound refers not only to what is heard, but also to how sound vibrations are received within the space, and the effect of architectural materials and configurations on absorption, reflection, or reverberation. The sonic experience varies from one space to another depending on height, size, texture, and materials, making sound a subtle yet influential design tool. Architecture can also evoke a

symbolic or memorable sound, such as the sound of footsteps in a stone corridor, or the echo of a voice in a high dome, linking the auditory sensation with memory. **Table 2** illustrates the concept of sound in both cinema and architecture in addition to its implementations.

Table 2. Sound in cinema and architecture and its implementations.

Principle Implementation	Sound
In Cinema	It is not merely an accessory but a structural and emotive force that defines space, time, and presence. Unlike visual elements, which can be isolated or directed, sound envelops the listener, rendering the spatial experience immersive and continuous (Pallasmaa, 2005). It acts as a temporal guide, creating rhythm and continuity between frames, or alternatively introducing disjunction through asynchrony (Ye, 2016).
<i>'Ivan the Terrible Part II: The Boyars' Plot'</i> (1958) Sergei Eisenstein	Sergei Eisenstein used sound within a polyphonic structure, transforming the music from a celebratory connotation into a symbolic function that conveys the psychological transformation of the character. In the coronation scene shown in Fig. 2 , the melody begins with a celebratory musical tone, then gradually transforms into a tone that conveys a sense of threat and tension, creating a state of emotional synchronicity between the image and the sound (Ye, 2016).
In Architecture	It functions not merely as an environmental element but as a spatial and perceptual tool that shapes experience. Sound creates a temporal and affective layer that interacts with space and user movement (Pallasmaa, 2005). It produces a 'non-visual architecture' that connects people across spaces. Sound is not illustrative but compositional, where it constructs mood, sequence, and even social relations through a temporal-spatial experience (Pallasmaa, 2005).
<i>'Casa da Música'</i> (2005) Rem Koolhaas	It embodies the principle of sound as a fundamental design tool, where the auditory experience is an essential part of the composition of the space. The main hall is designed with asymmetrical geometric shapes to create a balanced sound distribution, as well as the large glass windows that allow for interaction between indoor and outdoor sounds, creating a complex sensory experience that combines music and surroundings of the city (Dias, 2023).



Figure 2. A shot from the coronation scene in *'Ivan the Terrible, Part II'* showing the emotional synchronicity between the celebratory melody and the gradual shift towards visual and auditory tension and threat (Screenshot by the author from *'Ivan the Terrible, Part II'*).



2.3 Memory

In cinema, memory is one of the most profound and complex narrative tools, used to connect the present to the past and reconstruct events in a non-linear manner. Memory is not merely a recollection of the past; rather, it integrates with visual and auditory experience to create an internal temporal reality in which story, time, and emotion intertwine **(Deleuze, 1986)**. Flashbacks, repetition of scenes, and the manipulation of narrative time are often used as means of embodying memory in film. This use is not only intended to clarify events, but also to deepen the emotional connection between the viewer and the film by evoking the human experience of time, nostalgia, and forgetting **(Murch, 1992)**.

According to **(Pallasmaa, 2005)**, memory in architecture becomes an essential element in shaping the relationship between people and place. Spaces can carry layers of time through the reuse of buildings or the use of design elements that represent historical or cultural references. The use of materials, colors, lighting, and symbols can also evoke a personal or collective memory in the user. In this sense, memory in architecture is not merely a recollection of the past, but rather a tool for building a continuous dialogue between time and place, between experience and identity, and between the individual and society **(Pallasmaa, 2005)**. Thus, architecture becomes a means of evoking, reinterpreting, and reviving memories within the present. In this context, **Table 3** provides a comparative illustration of the representations of memory in cinema and architecture.

Table 3. Memory in Cinema and Architecture and its Implementations

Principle Implementation	Memory
Cinema	Memory emerges not as a static reference to the past but as a phenomenological illusion an ephemeral optical condition shaped by movement, perception, and reflection (Cairns, 2012) .
<i>'Nostalgia'</i> (1983) Andrei Tarkovsky	Memory is transformed into a living cinematic space. It's not just a flashback, but a sensory existential state evoked through sound, light, nostalgia, and the reflections of places. Viewers live within the place as they live in time, with moments of the present and the past intertwined without a clear separation. The characters don't just move within a visual scene, but rather experience an emotional landscape composed of memory, space, and time (Mostowifard et al., 2023) . In scenes illustrated in Fig. 3 , Tarkovsky shows how space transforms between the present and the past. The scene begins with an area altered by time and losing its original features, then the image flows into a childhood scene that recalls intimate details of memory. This interplay illustrates how memory becomes a vivid visual experience that transcends the boundaries of time and reshapes perception of space.
Architecture	Memory is not merely a recollection of the past but a constructed spatial phenomenon. It involves the layering of time, perception, and narrative in a way that renders space as a vessel of lived experience (Pallasmaa, 2012) .
<i>'The Cartier Foundation for Contemporary Art'</i> (1984) Jean Nouvel	It embodies the concept of memory through its fluid and unstable visual surface. Its glass facades reflect the natural surroundings, light, and sky in a constantly changing manner, creating a cinematic temporality that transforms perception into a retrospective medium that links the present moment to a moving visual memory (Cairns, 2012) .



Figure 3. Scenes of the return to his hometown in 'Nostalgia, the left shot shows the present situation of the area and the right one recalls the past scene of that area (Screenshot by the author from 'Nostalgia').

3. METHODOLOGY

This research adopts a qualitative analytical methodology in a comparative format because the subject matter requires a deep understanding of sensory and cognitive contexts that cannot be extracted by quantitative measurements alone. The qualitative approach provides flexibility to deconstruct sensory and symbolic experiences within architectural spaces through a critical reading of published materials (plans, images, design texts) and a careful visual and architectural analysis that links concept to design manifestation. The research also employs the comparative design of case studies because comparing multiple locations reveals recurring design patterns and different ways of employing cinematic principles, enhancing theoretical induction and identifying research gaps **(Al-Sadkhan and Karim, 2006)**.

The case studies were selected according to clear methodological criteria: first, the design embodiment of cinematic principles (rhythm, sound, memory) so that they appear in the spatial and temporal compositions of the buildings under study; second, the programmatic diversity that covers a spectrum of cultural spaces (museum, performance hall, experimental museum) to enable systematic comparison across different usage contexts; third, the mnemonic and semantic significance of these buildings as carriers of meaning and collective memory, making them ideally suited to studying the mechanisms of memory evocation through design; and fourth, the availability of reliable documentation (plans, photographs, design texts, and reports) that allows the application of structural, visual, and qualitative analytical tools to reliable materials without relying exclusively on field measurements. Based on these criteria, samples provide a valid methodological basis for extracting transferable design indicators that support the analytical purpose of the research.

Three international architectural case studies representing contemporary cultural buildings were studied: the Jewish Museum in Berlin, the Philharmonic Hall in Paris, and the Teshima Art Museum. These examples were selected based on their distinctive use of cinematic principles within their spatial and experiential composition. Each case study demonstrates a high level of engagement with time, the senses, and symbolism. Culture, understood as a set of values, beliefs, knowledge, attitudes, and abilities that identify a specific group of people in a location and are transmitted to future generations, has a major influence on how these architectural expressions are shaped and how they use cinematic techniques to convey a message **(Fakhrulddin et al., 2023)**.

In its broadest definition, culture is the entire collection of unique spiritual, material, intellectual, and emotional traits that distinguish a community or social group. It

encompasses not just literature and the arts but also lifestyles, human rights, value systems, customs, and beliefs (**Fadhil and Slik, 2022; Al-Ani and Al Slik, 2023**). It is often explained as overlapping with all the details of the daily life of communities and people, and linked to the values of society (**Al-Shami et al., 2023; Al-Shami et al., 2024**).

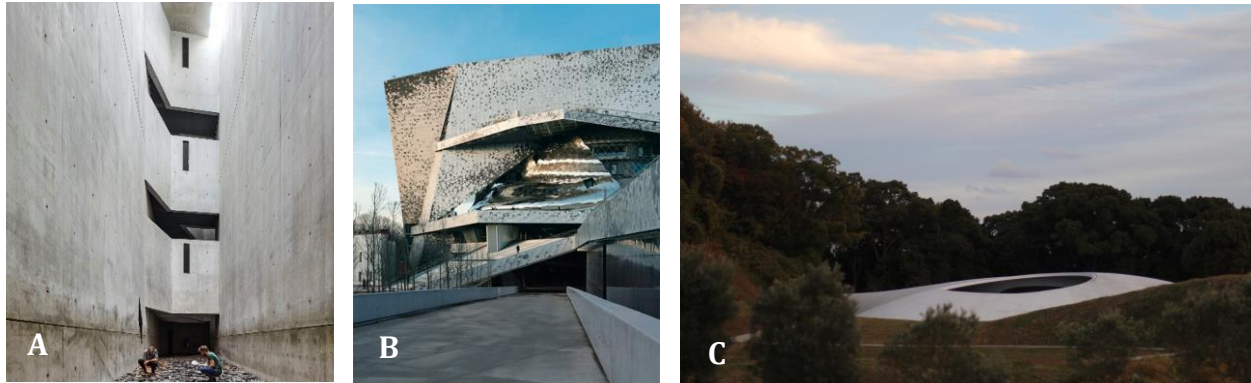


Figure 4. The three case studies (A) *The Jewish Museum*; shows that the void contains an artwork made from 10,000 iron faces (**Kim, 2022**). (B) *Philharmonie de Paris*; the exterior facade, clad in matte gray aluminum panels, appears as a mass shrouded in silence (**Beaucardet, 2018**). (C) An Aerial photograph of 'Teshima Art Museum' shows how it appears as a soft, organic, breathing organism within its natural environment (**Ignacio, 2018**).

These three contemporary architectural projects are among the most prominent examples of addressing issues of rhythm, sound, and memory in design. The first project is the Jewish Museum in Berlin, which embodies a tragic history and relies on emptiness and silence as a form of architectural narrative. The second project, the Philharmonie de Paris, a concert hall in a European capital, is distinguished by its use of rhythm and light to create an immersive spatial experience. The third project, the Teshima Art Museum, relies on the relationship between nature and interior space, creating a sensitive cognitive connection with visitors. Through these models, research seeks to reveal how cinematic principles can be employed as design tools capable of producing meaning and an architectural experience that transcends traditional functionalism. By deconstructing the architectural experience in each of the three projects according to three sensory analytical principles, it becomes possible to trace the impact of these principles on the user's perception and connection to space.

Perception was approached operationally within a qualitative-comparative measurement framework in two steps: (1) a descriptive/interpretive reading focusing on perceptual arousal cues in documentary sources (design texts, image scenes, plans), where indicators related to sensory attention (transitions of vision and light, motor stops, sound arousal elements) were recorded; and (2) coding and comparison, which transformed these observations into operational indicators related to perception (visual attention, auditory responses, mnemonic/emotional recall).

3.1 Measurement Method

The measurement method used in this study is based on a qualitative-comparative analytical methodology, where each case study is analyzed according to the three principles (rhythm, sound, and memory) based on available documentary materials (diagrams, images, and



design texts). A close visual and architectural reading is conducted to extract descriptive observations related to scene sequences, sound composition, and elements of mnemonic presence. These observations are systematically coded using the coding steps (introductory → axial → selective). When necessary, and for the purposes of systematic comparison, some descriptive observations are converted into ordered scores (low/medium/high) according to rules described in the working codebook. Documentary evidence (images, diagrams, and textual quotations) is preserved as a supporting reference and not a substitute for qualitative reading. Available structural or predictive evidence (such as vision maps or attention maps on still images) is used only as complementary evidence to strengthen conclusions. The study's limitations, such as the lack of acoustic field measurements or actual movement tracking, are explicitly noted.

3.1.1 Jewish Museum Berlin

This project, designed by Daniel Libeskind in 2001, represents one of the most prominent architectural examples that relies on memory as a design and narrative tool. Designed to express the history of Jews in Germany, the building addresses concepts of absence, loss, and discontinuity, not through a direct presentation of content, but rather by evoking a sense of emptiness, discontinuity, and silence within the space itself **(Tseng, 2015)**.

From the moment a visitor approaches the slanted facade of the Jewish Museum in Berlin, a sense of instability begins, as if the architecture itself is suffering from a shock **(Tseng, 2015)**. The broken lines, irregular windows, and sharp angles not only convey design information but also suggest a narrative rupture, an irreparable temporal break. Entrance to the museum is not through a direct gate, but rather through another historic building connected to the museum via an underground passageway, as if the visitor is forced to traverse through collective memory before arriving at the museum's "new body" **(Tseng, 2015)**. This movement, which takes the visitor from shadow to light, from silence to soft sound, creates a rhythmic sensory experience, where movement within the space becomes a kind of "spatial montage".

The slanted corridors and sudden interruptions in the path, through their spatial composition, embody the fractures of memory and the distortions of history. Here, the broken architectural form - Deconstructivist form - transforms into a silent narrative statement, conveying meaning through composition rather than words **(Tseng, 2015)**.

This architectural language is employed as a medium to evoke collective pain and threatened identity, clearly evident in the corridors that end in silent walls or closed spaces. Some of these spaces, such as the "Holocaust Tower" and the "Memory Void", do not contain exhibits or panels, but rather function through a purely sensory experience, forcing the user to engage directly with the space as a form of intense presence **(Zhang et al., 2024)**.

The museum does not display history but rather embodies it. It does not explain the Holocaust but rather leaves the user feeling a disconnection of meaning. With this configuration, the building transforms into a spatial cinematic experience, where time becomes palpable, emptiness speaks, and silence is charged, leaving the user with an emotional charge that is difficult to forget **(Zhang et al., 2024)**.

3.1.2 The Philharmonie de Paris

The Philharmonie de Paris, designed by Jean Nouvel in 2015, is one of Europe's most prominent modern cultural institutions, blending musical performance with sensory architecture **(Day et al., 2016)**. To constitute a distinctive architectural and cultural



addition to La Villette Park in northeastern Paris, it was designed to be more than just a theater; rather, it was a living space that interacts with sound, movement, and memory in a sensory and communal way **(Kahle et al., 2024)**.

From the moment the building's massive gray mass appears on the horizon, a sense of aural anticipation overwhelms the visitor. The building lacks the usual features of a classical music hall: no classical columns, no grand, formal facade. Rather, it appears as a silent metallic wave waiting to be deconstructed by sound frequencies **(Day et al., 2016)**.

The entrance does not lead directly into the hall, but rather takes the visitor on an upward, winding journey through curved staircases and corridors where the lighting gradually changes, creating a subdued kinetic rhythm. The movement here is not a transition from one place to another, but rather an auditory setting; It's as if the body practices listening before reaching the point where the real sound begins **(Day et al., 2016)**.

Inside the main hall, the sound doesn't project from the front as in traditional theaters, but is distributed in every direction, due to the spiral configuration of the audience seats that wrap around the stage. Here, the sound is not only received but embraced. It's as if the space itself is playing with the musicians. The use of curved surfaces and low-absorbing materials, such as treated wood and fabric, creates a dynamic interaction between sound and space **(Kahle et al., 2024)**.

The experience isn't limited to the performance itself; it extends to how the sound is extinguished and gradually absorbed into the architectural fabric. Between each musical movement, silence is temporary but palpable. This silence is what gives the sound its meaning and restores a meditative dimension to the space, much like what cinematic scenes achieve when sound is used as a dramatic force **(Troiani and Kahn, 2016)**.

On the level of memory, the building does not evoke a historical event, but rather a collective sense of musical experience as part of contemporary French culture. The architecture does not impose prior reading but rather allows each user to burden the space with their own memory, whether it be music they heard in childhood or a concert they experienced there for the first time. Ultimately, as the visitor exits the building, they realize that this hall is not just a theater, but an architectural sound machine, reshaping the relationship between body and sound, between space and memory, and giving sound an unforgettable architectural presence **(Day et al., 2016)**.

With this configuration, the Philharmonie de Paris is transformed into more than just a performance space; it is a living structure that breathes sound, moves with rhythm, and evokes a shared auditory memory without uttering a word. Rhythm is manifested in the gradual transition between tracks, and sound becomes the primary material through which the experience is shaped, while memory is left open for each user to fill in at their own pace, without guidance or explanation **(Kahle et al., 2024)**. In this way, architecture approaches cinematic practice; where time is not only presented, but constructed and reshaped within space, and the senses become the deepest mediator between man and place.

3.1.3 Teshima Art Museum

The Teshima Museum of Art, designed by Ryue Nishizawa in 2010, opened on the Japanese island of Teshima. This museum is distinguished by its lack of traditional exhibits, presenting the space itself as a work of art and an integrated sensory experience, in which architecture interacts with water, light, time, and human presence **(Ignacio, 2018)**.

From the outside, the museum appears like a giant drop of water resting on the ground. The white, semi-oval concrete structure blends precisely with the island's topography, with no



sharp lines or angles disrupting its harmony with nature. There are no internal columns, only a delicate dome open to the sky through two circular openings that allow light, rain, and air to enter **(Suwa, 2019)**.

Entering the museum is like immersing yourself in a meditative experience. There are no directions or information panels. Just a soft, silent, and humid void. Movement within space requires an innate slowness, as if the space itself imposes an internal rhythm on the body. The visitor does not walk as he pleases, but as the space allows him; even the steps of a single foot make a difference in perception **(Ignacio, 2018)**.

Small drops of water spread across the floor, emerging from tiny holes in the concrete and moving very slowly, merging or separating, in a scene resembling the movement of time itself **(Suwa, 2019)**. This silent visual flow represents a kind of “liquid time” that cannot be measured by a clock, but only by sensation. Rhythm here is not an artistic sequence, but a biological experience experienced by the body every second. There is no music, but everything whispers: the movement of the air, the evaporation of the water, and the sound of footsteps all form a soft, soundless sound **(Ignacio, 2018)**.

This place does not evoke historical memory but rather implants in the user an immediate sensory memory. Leaving the museum does not mean forgetting the experience but rather taking it with you as a sensation that is difficult to explain yet always affecting. It is as if the museum does not tell you anything, but rather allows you to feel what you were previously unable to express **(Ignacio, 2018)**.

After reviewing each case, studying independently and providing detailed descriptive readings of each, the analytical observations related to rhythm, sound, and memory were compiled into an organized framework. **Table 4** presents the operational indicators and ordinal scores derived from these readings, enabling a systematic comparison between the three cases. This transitional link provides a clear bridge between the textual description of the cases and their evidence-based comparative analysis.

Table 4. Measurement Framework for Sensory Semantics: Rhythm, Sound, Memory.

Variables	Rhythm	Sound	Memory
Architectural Implementation	Movement axes and sequencing of stations; shifts of view/light; repetition or variation of architectural elements that create a visual/temporal montage.	Spatial volumes and materials that produce silence/echo; distribution of sound in space; architectural strategies that make sound an active material.	Presence of memorial elements, deliberate use of absence/void, use of historical materials or narrative sequencing to invoke collective/individual memory.
Materials Used	Floor plans, sequential interior photos, visitor-path descriptions, design texts that describe entry sequence (shadow → light), corridor geometry.	Material specifications, design notes on acoustics, interior photos, seating/plan geometry (e.g., spiral seating), published acoustic descriptions.	Exhibition catalogues, historical texts, design statements, floor plans showing “memory voids” or memorial spaces, published analyses.



Operational Indicators		Clarity of main axis; presence of ordered stations/scenes along a path; frequency of view/light changes; repetition of elements (openings, columns, frames).	Presence of designed sound-distribution (diffuse/omni-directional); materials that absorb/reflect; existence of intended silent/echo zones; textual/technical evidence of acoustic intent.	Existence of memorial/void spaces; clarity of imposed narrative or sequence intended to recall history; use of materials/architectural gestures as mnemonic devices.
Comparison Metric		Ordinal: High = clear continuous axis across ≥ 3 stations + explicit textual support; Medium = partial/fragmented axis or suggestive textual hint; Low = no coherent axis or sequence.	Ordinal: High = explicit acoustic design + clear volumetric/ material evidence; Medium = strong material/volume indicators but no technical data; Low = no evidence of acoustic intention.	Ordinal: High = explicit memorial architecture (voids, towers, memorial galleries) + textual intent; Medium = symbolic/material hints without explicit memorial program; Low = absence of memory-related features.
	Jewish Museum	High Medium Low	High Medium Low	High Medium Low
		Inclined passages, sudden breaks, and an entry through a historic tunnel create a clear sequence and spatial montage.	Raw materials (bare concrete, metal floor) + silent gaps/towers of silence create an intentional soundscape.	The presence of explicit memorial elements (Holocaust Tower, Memory Void) and an explicit spatial narrative aimed at evoking collective memory.
	Philharmonie de Paris	High Medium Low	High Medium Low	High Medium Low
		Stepped ascents/ curved stairs and lighting changes create a consistent kinetic rhythm before reaching the hall.	The spiral seating arrangement, curved surfaces and treated materials indicate a clear and distributed acoustic design in the space.	There is no explicit historical memory, but the visitor is left to fill in the musical memory; a mental/collective presence but not an explicit memorial.
	Teshima Museum	High Medium Low	High Medium Low	High Medium Low
		There is no clear linear axis, but a slow physical rhythm is imposed on the visitor, "liquid time." The rhythm here is more sensory than axial.	There are no technical acoustic clues, but the space, water, and air movement produce a sensory sonic geography that supports a silent/subtle experience.	There is no explicit historical memory; the museum creates an immediate sensory memory based on personal experience rather than a clear historical narrative.

4. RESULTS AND DISCUSSION

4.1 Analysis

After reviewing each case study independently and providing detailed descriptive readings, **Table 5** is presented as a brief analytical summary that brings together the basic indicators of rhythm, sound, and memory. It offers a comparative analysis that highlights the conceptual and aesthetic dimensions of memory, sound, and rhythm as shared principles



between cinema and architecture. It not only demonstrates the expressive potential and essential characteristics of these principles in cinema and architecture but also illustrates how these elements transform from mere sensory tools into structural components that reshape perceptual experience and meaning in both fields. Through the following analysis, it becomes possible to discern the hidden connections that make memory a transforming time, sound an expressive medium, and rhythm a framework that establishes the relationship between body, space, and image.

Table 5. Comparative analysis between the three case studies according to cinematic principles

Cinematic Principles	Case Studies		
	Jewish Museum, Berlin	Philharmonie de Paris	Teshima Museum - Japan
Rhythm	Interrupted movement within sloping corridors and sharp angles generates a jerky rhythm that mimics historical discontinuity (Tseng, 2015) .	A smooth, ascending transition in the tracks creates a preparatory rhythm before entering the performance hall (Day et al., 2016) .	A slow physical rhythm imposed by the wet ground and the open ocean – a tangible experience of time (Ignacio, 2018) .
Sound	The echo of footsteps within concrete spaces – a silent sound charged with emotional content (Tseng, 2015) .	A comprehensive sonic balance across the spiral formation; the space embraces and intelligently distributes the sound (Kahle et al., 2024) .	There is no technical sound, but rather the natural sensory presence of water, air, and silence (Ignacio, 2018) .
Memory	Embodying the collective memory of Jews through "emptiness," silence, and symbolic interruption in the composition (Zhang et al., 2024) .	Evoking a contemporary musical memory through a design that doesn't impose a narrative but rather allows for free immersion (Kahle et al., 2024) .	Cultivating a sensory, momentary memory through direct interaction with nature and time within a silent space (Ignacio, 2018) .

The results of the comparative analysis of the case studies reveal a multiplicity and strategy in the use of the principles of rhythm, sound, and memory as organizing elements of the architectural experience. These principles were not only exploited as decorative elements, but also as structural frameworks that reshape movement paths, define the characteristics of auditory presence, and create semantic layers that enable the space to carry individual or collective memory. Cross-readings reflect that rhythm acts as a mediator between the body and space by regulating the flow of movement and changing visions and light, while sound, depending on spatial configuration and materials, is transformed into a material with expressive power that influences the user's sensory awareness. Memory, however, remains a mechanism for symbolic employment and semantic immanence, where space, absence, and materials are used to establish a temporal presence and produce a post-narrative experience for the visitor.

This research reinforces the idea that integrating cinematic principles does not follow a single recipe but rather requires a careful contextual reading of the program, cultural identity, site potential, and building materials. It also shows that transforming qualitative observations into comparable operational indicators, see **Table 4**, facilitates the extraction



of scalable and measurable design patterns without requiring quantitative measurements unavailable within the scope of the study. The systematic reading also reveals that the effectiveness of these principles is maximized when employed in an integrated manner (e.g., combining movement sequences with thoughtful sound engineering and spatial narrative memory), resulting in deeper and more memorable sensory experiences.

Finally, the findings indicate that employing these principles offers practical possibilities for the rehabilitation of cultural spaces: not only as restoration or functional projects, but as catalysts for crafting sensory spatial experiences that reconnect audiences with time, memory, and identity. The discussion highlights that practical application requires a systematic design sensibility, careful documentation of evidence, and the potential for subsequent field measurements to deepen the findings.

5. CONCLUSIONS

Through a systematic comparative analysis, this study demonstrates the feasibility of transforming cinematic concepts into architectural design tools that contribute to reshaping the spatial and temporal user experience. The study developed a useful methodological framework for transforming qualitative observations into actionable operational indicators, providing a descriptive and methodological basis for practitioners and researchers. The research's contributions include a theoretical connection between film logic and design practices, a methodological contribution through replicable measurement tools, and applicability to cultural space design policies.

The study's contributions stem from three main axes: (1) a theoretical contribution linking film logic and architectural design practices as sensory-temporal intersections; (2) a methodological contribution through the presentation of operational indicators and a classification codebook that can be applied in future analyses; and (3) a practical contribution through the provision of guidelines for the design or rehabilitation of cultural spaces with the aim of deepening the sensory and memory response of users. The study acknowledges certain methodological limitations, notably the lack of field acoustic measurements or visitor movement tracking and suggests that these measurements should be the subject of future complementary studies (acoustic measurements, visitor field experiences, questionnaires, and behavioral surveys). Ultimately, the study hopes that this framework will inspire designers and cultural policymakers to adopt a more sensory and humanistic approach to engaging with cultural spaces, where the architectural experience becomes a cognitive medium for engaging with time, memory, and identity.

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Credit Authorship Contribution Statement

Riyam Mushtaq: Writing – original draft, Literature collection, Data organization, Methodology. Hoda A.S. Al-Alwan: Supervision, Review & editing, Validation, Methodology.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.



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الإيقاع والصوت والذاكرة: مبادئ سينمائية تشكل التجربة المعمارية في الابنية الثقافية

ريام مشتاق شاكر*، هدى عبد الصاحب العلوان

قسم هندسة العمارة، كلية الهندسة، جامعة بغداد، بغداد، العراق

الخلاصة

شهدت العلاقة بين السينما والعمارة حضوراً متزايداً في الدراسات المعاصرة، إذ يلتقيان في نقطة مشتركة: تشكيل التجربة الإنسانية ضمن فضاء زمني ومكاني محدد. تستخدم السينما مبادئ الإيقاع والصوت والذاكرة لتشكيل السرديات البصرية والسمعية، بينما تسعى العمارة إلى تجسيد هذه المبادئ في مساحات ملموسة تُنظّم حركة الإنسان وتؤثر على الإدراك الحسي والعاطفي. تُبين هذه العلاقة أن أدوات التعبير السينمائي تُثري التجربة المعمارية. إلا أن التحدي يكمن في محدودية الأطر النظرية التي تُفسّر كيفية ترجمة هذه المبادئ إلى استراتيجيات تصميمية، لا سيما في العمارة الثقافية. بناءً على هذه الفجوة، يهدف هذا البحث إلى استكشاف مبادئ الإيقاع والصوت والذاكرة كأدوات قادرة على إعادة تشكيل التجربة المعمارية وتعزيز إدراك المستخدم للمساحة. ولتحقيق ذلك، اعتمد البحث على تحليل نوعي لدراسات حالة دولية شملت المتحف اليهودي في برلين، وقاعة الأوركسترا الفيلهارمونية في باريس، ومتحف تيشيما للفنون، متتبعاً أدوار المبادئ الثلاثة: الإيقاع في تنظيم الحركة، والصوت في تشكيل الجو المكاني، والذاكرة في بناء الروابط العاطفية ضمن السرديات المعمارية. وتكشف النتائج أن دمج هذه المبادئ يُسهم في إثراء الإدراك الحسي وتعميق الاستجابات العاطفية. كما تُثبت أن مواءمة المنطق السينمائي مع التصميم المعماري يُوفر إطاراً متعدد التخصصات لإعادة التفكير في سردية الفضاء. وبالتالي، يُقدم البحث نهجاً مبتكراً لتوظيف الأدوات السينمائية في العمارة الثقافية، وخلق مساحات غامرة تُحفز الحواس، وتُثير الذاكرة، وتُعزز الوجود الإنساني.

الكلمات المفتاحية: التجربة المعمارية، المبادئ السينمائية، المباني الثقافية، الإدراك الحسي، السرد المكاني.