

**ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL OF SCIENCE**  
**ENGINEERING AND TECHNOLOGY**

**AN INTERMODAL RESONANCE APPROACH  
TO ARCHITECTURAL AESTHETICS**

**M.Sc. THESIS**

**Tuğçe DARCAN**

**Department of Informatics**

**Architectural Design Computing Programme**

**JANUARY 2014**





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**JANUARY 2014**



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*To lovers of art, architecture and design,*



## **FOREWORD**

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## **ABBREVIATIONS**

**MNS** : Mirror Neuron System  
**FLMP** : Fuzzy Logical Model of Perception



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# **AN INTERMODAL RESONANCE APPROACH TO ARCHITECTURAL AESTHETICS**

## **SUMMARY**

The thesis aims to propose a comprehensive approach to the question of architectural aesthetics. Apart from the key terms adopted from the field of neuroaesthetics, knowledge from other fields such as neuropsychology, behavioural psychology, evolutionary aesthetics, design theories involving architectural computation theory and philosophy are benefited in order to grasp an interdisciplinary perspective to the controversial issue of architectonic contemplation. Based on the cumulative knowledge, the argument of intermodal resonance is introduced, referring to the aesthetic value of cross-modal stimulation among multiple sense modalities. Structured by three basic concepts; micro-consciousness, empathy and ambiguity, intermodal resonance is regarded as the core of architectonic contemplation. Then, the components of intermodal resonance are elaborated under three captions as follows: perceiver of design, perceptual mode of perceiver and perceptual aim of designer. Initially, beholder's bodily engagement in space is handled through a phenomenological perspective. Then, the desired perceptual mode is defined as both dispersed and focused so that the beholder can easily penetrate into resonant ambience. Lastly, synesthetic resonance is elaborated as the peak point of intermodal resonance and the ultimate goal of architectural design.

Subsequently, qualitative aspects that elicit intermodal resonance are discussed along with a broad collection of sample projects. First, specific samples of functional and spatial solutions are exemplified as subtle initiators of intermodal resonance. Second, articulation of spatial elements is handled in parallel to the resulting cross-modal sensations. Third, environmental elements are considered as nature-based design elements of architectonic space and modifiers of intermodal stimulations. Finally, environmental adaptation is elucidated as another factor that paves the way for resonant perception.

Overall, architectural aesthetics is tackled as a matter of sensual impressions rather than the sum of quantitative attractions. A resonant and fragile, that is to say, sensible and adaptive architectonic approach is favoured as the key for an aesthetic spatial atmosphere, which is capable of triggering intermodal sensations.



## MİMARİ ESTETİĞE DUYULAR ARASI REZONANS YAKLAŞIMI

### ÖZET

Hazırlanan tez çalışmasında, mimari estetiğin geniş kapsamlı bir yaklaşım çerçevesinde ele alınması hedeflenmektedir. Mimari düşüncenin tartışmalı bir noktasına temas eden mekansal estetik kavramını gereğince değerlendirebilmek için, farklı disiplinlerden beslenen bütüncül bir bakış açısına ihtiyaç olduğu öngörülmüştür. Bu doğrultuda, felsefe, sayısal tasarım teorilerini de içeren mimarlık teorileri ve çeşitli bilim dallarının bilgisiyle, mimari estetik kavramına çok katmanlı bir çerçeveden bakılması amaçlanmıştır. Temel olarak, nörobilimin [neuroscience] bir alt dalı olan nöroestetik [neuroaesthetics] alanı ve nöropsikoloji, davranış psikolojisi ile evrimsel estetik alanlarının da içinde olduğu farklı disiplinlerin bilgisine başvurulmuştur. Nöroestetik biliminin terminolojisi içinde yer alan mikro bilinçlilik [micro-consciousness], muğlaklık [ambiguity] ve duygudaşlık [empathy] kavramları, bahsi geçen bilim dallarının bilgisi ışığında yeniden yorumlanmıştır. Bu kavramlar, mekan algısında duyular arası rezonansı [intermodal resonance], diğer bir deyişle farklı duyu modalitelerinin etkileşimini tetikleyebilecek bağlamsal ve duyumsal etmenler olarak ele alınmıştır. Duyular arası rezonans ise, mimari estetiğin özünü oluşturan temel bir kavram olarak daha kapsamlı şekilde değerlendirmeye alınmıştır.

Duyumsal bir sürecin ürünü olan duyular arası rezonansın; tasarımın algılayıcı, algılayıcının algılama biçimi ve tasarımcının algısal hedefi olmak üzere üç ana bileşen altında incelenmesi uygun bulunmuştur. Öncelikle, algılayıcının mekanla kurduğu zihinsel, duygusal ve bedensel iletişim, fenomenolojik bir bakış açısı üzerinden ele alınmıştır. Ardından, hedeflenen algılanma biçiminin, mekansal atmosfer içerisinde çözünebilir, ancak, yüksek seviyede odaklanma gerektiren bir yapısının olduğu vurgulanmıştır. Homojen bir konsantrasyon içeren bu algı biçiminin, mekanı algılayan kişinin duyular arası rezonans fazına nüfuz edebilmesini sağlayan ortam olarak işlev gördüğünün altı çizilmiştir. Son olarak, sinestezi kavramından yola çıkılarak kurgulanan sinestetik rezonans modeli üzerinde durulmuş ve bu modelin, duyular arası rezonansın en yoğun olarak tecrübe edildiği fazı en iyi şekilde ifade edeceği belirtilmiştir. Ayrıca, duyular arası nihai iletişimi ve çift yönlü geçişliliği öngören sinestetik rezonans kavramının, mimari tasarımın temel hedeflerinden biri olarak benimsenmesi gerektiği belirtilmiştir.

Tezin başlangıcında, kendisini oluşturan etmen ve bileşenleri detaylı olarak ele alınan duyular arası rezonans, tezin ilerleyen bölümlerinde, titizlikle derlenen mimari proje örnekleri paralelinde incelenmiştir. Projelerin tez kapsamına dahil olmasını sağlayan özgün özellikleri, mimari mekanda duyular arası rezonans oluşumunda rol oynayan etmenlerden beslenmekte olup; dört ana başlık altında gruplanarak irdelenmiştir. Söz konusu olan dört ana kategorinin ilkinde, işlevsel ve mekansal

çözümlemelerin; ikincisinde, mekansal öğelerin; üçüncüsünde, doğal elementlerin; dördüncüsünde ise, çevresel adaptasyonun duyular arası rezonans üzerindeki rolü tartışılmıştır.

İşlevsel ve mekansal çözümlemelerin duyular arası rezonans üzerindeki rolünü inceleyen ilk ana bölüm, iki ana alt başlık altında değerlendirmeye alınmıştır. Alt başlıkların ilkinde, çok yönlü işlevsel akış şemaları, fonksiyonel mekansal çözümlemeleri ve incelikli detaylarıyla öne çıkan projelere referans verilmiştir. Bu projelerde, mekanın işleyişine ve strüktürüne dair özelliklerin hangi açılardan ve ne şekilde duyular arası rezonansa zemin hazırladığı tartışılmıştır. İkinci alt başlığı takip eden bölümlerde ise kamusal, özel mülkiyet ve mahremiyet kavramlarını sıra dışı yaklaşımlarla ele alan projeler üzerinde durulmuştur. Şehir dokusu ile mimari mekan arasındaki esnek eşğin veya mekan içi bölünmeler arasındaki çokanlamlı izlerin, söz konusu projeleri duyular arası rezonansa açan kritik geçişler olduğu ifade edilmiştir. Mekan dizim [space syntax] terminolojisi ve Bachelard'ın mekana dair fenomenolojik yaklaşımına dair referanslar ise, projelerin kritik noktalarındaki geçişken kimliğin daha iyi aydınlatılmasına yardımcı olmuştur.

Mekansal öğelerin duyular arası rezonans üzerindeki rolünü inceleyen ikinci ana bölüm ise, bu öğelerin niteliklerinin ve birbirleriyle eklemlenme biçimlerinin hangi duyuları ne şekilde harekete geçirdiği sorusu üzerinde odaklanmıştır. Dokunma duyusu, kinestetik duyum, işitsel duyum ve mekansal atmosferin duyumuna değinen başlıklar altında, seçilen projelere ait mekansal öğelerdeki görsel, dokunsal, biçimsel ve işitsel özelliklerin aynı anda birden fazla duyuyu harekete geçirebilme başarısının ardındaki sebepler araştırılmıştır. Bu esnada, dokunma duyusu, temasta bulunan yüzeyler ve cisimler hakkında bilgi veren bir duyu olmaktan öte, mimari mekanda gözün görebildiği her şeyi dokunsal anlamda da kavramamıza yarayan bir algı kanalı olarak değerlendirilmiştir. Kinestetik duyum ise kişinin, kendi bedenini mimari mekan üzerinden algılaması esnasındaki hislerine referans vermesi açısından ele alınmıştır. İşitsel duyum ise, mekan ve onu algılayan kişi arasındaki iletişimi farklı yönlerden besleyen örnekler çerçevesinde irdelenmiştir. Seçilen projelerin özgün özellikleri doğrultusunda, müziğin matematiğinin mekansallaştırılması, mekanın müzik kompozisyonunun tamamlayıcısı haline gelmesi ve doğanın tınısının katmanlaştırılarak mekansallaştırılmasına dair değerlendirmeler yapılmıştır. Mekansal atmosferin duyumu ise, bahsi geçen duyumların çoğunu birbiri içinde eriten etkileşimli ve yoğun mekanların bıraktığı algısal izlenimlerin sorgulandığı bir alt başlık olarak karakterize edilmiştir.

Doğal elementlerin duyular arası rezonans üzerindeki rolünü inceleyen üçüncü bölümde, güneşliği, su ve peyzaj öğelerinin adeta tasarımın ayrılmaz bir parçası haline geldiği projeler örneklenmiştir. İlk olarak, çizgisel veya yaygın güneşliği kullanımının mekansal atmosferde yarattığı çok yönlü etkileşimler üzerinde durulmuştur. Güneşliğin adeta elle tutulur bir tasarım elemanı olarak değerlendirildiği projelerde, ışık ve gölgenin geçişken birlikteliğinin, üç temel kanal aracılığıyla duyular arası rezonansı harekete geçirdiği belirtilmiştir. Güneşliğin, görsel, dokunsal ve duygusal algıda eşzamanlı değişimler kurgulamaya, homojen bir mekan içerisinde algısal farklılıklar yaratmaya ve zamanın akışına mekansal olarak referans vermeye yaradığı ortaya konmuştur. Diğer bir doğal element olan su ise, mimari tasarımın doğayla bütünleşmesini ya da kendini oluşturan bileşenlerinin birbirine eklemlenmesini sağlayan aracı bir zemin olarak ele alınmıştır. Bölümün son alt başlığında ise, ağaç

ve doğal taş gibi peyzaj elemanlarının mimari anlamdaki değeri, doğal çevre ve yapma çevre arasındaki geçişi farklı bir pencereden yorumlayan projeler üzerinden tartışılmıştır.

Çevresel adaptasyonun duyular arası rezonans üzerindeki rolüne değinen dördüncü bölümde, var olan çevre ve içine dahil olan yeni tasarım arasındaki etkileşimin içeriği, birbirinden farklı temalara değinen üç alt başlık altında işlenmiştir. Birinci alt başlıkta, kentsel veya kırsal dokunun belirli bir parçasına eklenmedeki duruşuyla özelleşen projeler değerlendirme altına alınmıştır. Seçilen projelerin, içine dahil oldukları yaşamsal kesitin görsel, tarihsel, sosyal ve kültürel değerlerine referans verirken; günümüz yaşam tarzının ve teknolojisinin getirilerini içselleştirmedeki başarısının altı çizilmiştir. Benzeşim veya aykırılık arz eden bir duruşla kendini gösteren bu başarının, mimari algının derinleşmesine olan katkısı dile getirilmiştir. İkinci alt başlıkta ise, dönüşüm veya yenileme projeleri esnasında karşı karşıya gelinen tarihsel ve zamansal izlere yönelik tavrın, mekansal algıya özel bir anlamsal boyut kazandırma konusundaki mevcut potansiyeli sorgulanmıştır. Üçüncü alt başlıkta ise, mimari ürünün mevcut kentsel örüntü veya el değmemiş doğal doku karşısındaki baskınlığının giderilmesi yönündeki çabaların mekanın algısal değerini de yükseltebileceği, ilgili örneklere referans verilerek ortaya konmuştur. Özellikle, ortalamanın üzerinde bir kütleli büyüklük ile şehirsiz dokuyu ve kentsel silüeti zedelemeye meyilli mimari ürünlerin dahi, farklı duyular arasında çoklu geçişler sağlayan bir yaklaşımla, yarattığı negatif ölçek etkisini bertaraf edebileceğinin altı çizilmiştir. Ardından, tekil bir mimari ürünün doğa ile iletişimindeki bağlamsal bütünlüğü sağlamak adına neler yapılabileceği, projeler örnekleri üzerinden sorgulanmıştır. Pallasmaa'nın ifade ettiği anlamda 'kırılgan' bir mimarlık yaklaşımının beraberinde getirdiği mimari duruşun, bağlamsal bütünlüğe ne şekilde katkıda bulunabileceği tartışılmıştır.

Tez çalışması kapsamında, mimari mekanın estetik kalitesinin, mikro bilinçlilik, muğlaklık ve duygudaşlık yoluyla harekete geçen duyular arası rezonansın yoğunluğuyla orantılı olarak artırılabilirliği ortaya konmaya çalışılmıştır. Mimari estetik, mekanın ölçülebilir nitelikleri arasındaki mutlak dengeden öte, algılayan üzerinde bıraktığı duyumsal ve duygusal izlenimlere bağlı olarak ele alınmıştır. Diğer bir deyişle, mimarinin kullanıcılar üzerinde bıraktığı algısal ve duyumsal yorumun en az fonksiyonel ve bağlamsal örüntüsü kadar önemli olduğunun altı çizilmiştir. Bu bakış açısının, bitmiş mekanların estetik değerlendirmesine yönelik bir yaklaşım olmanın yanı sıra, tasarım sürecinde mekanın kalitesini artırıcı bir araç olarak da işlev görebileceği öngörülmüştür. Mimari estetiğe disiplinler arası bir bakışla olgunlaşan teorik çerçeve, seçilen örnek projeler üzerinden açıklığa kavuşturulmuştur. Sunulan bakış açısı ile, mimari düşünce ürününün katmanlı yapısını inceleme yolundaki çabalara gerçekçi ve ilham verici bir katkıda bulunulduğu umulmaktadır.





## **1. INTRODUCTION**

The question of aesthetics is as ancient as the history of human being. Consciously or not, tracing trails of aesthetic quality is an endless seeking, which deeply shapes our preferences and likings about objects, buildings, nature, people and so on. Therefore, comprehension of the core of aesthetic experience contributes to the understanding of not only our sophisticated pleasures but also basic choices in daily life.

As an instinctive dimension of human perception, aesthetic appreciation more or less influences our personal evaluations about animate and inanimate entities. Remarkably, aesthetic contemplation gains a fundamental value and even priority during evaluations of man-made design works. This fact bears the requirement to analyze the nature of aesthetic contemplation in order to come up with a better understanding of aesthetic tendencies especially about artistic objects and architectural works.

The critical aspect in analyses about appreciation of design products is the fact that personal aesthetic taste mostly stems from a subjective point of view. Specifically, architectonic contemplation is a more complex process that depends on not only the beholder and the design object in question but also the surrounding environment and the other explicit conditions of the case. Therefore, investigations relevant to architectural aesthetics demand a comprehensive approach that does not exclude the specific roles of the subject, the object and the medium of aesthetic experience.

Corresponding to the area of architectural aesthetics, the current research takes the mentioned facts into consideration and attempts to bring in a theoretical frame of aesthetic evaluation in architectural realm. The aim of the research, research method and brief content of the study are to be further elaborated under the following captions.

## **1.1 The Aim of the Research**

Architects have always sought for design cues to aesthetic architectural compositions in a wide variety of fields including geometry, biology, music, applied arts and so on. Although successful adaptations of compositional rules in other disciplines may have indeed escalated the aesthetic value of architectural design, the rationale of the aesthetic contribution has remained unknown. In wider sense, theories of architecture are deprived of a general frame that defines the rationale of architectonic appreciation and introduces a set of criteria for aesthetic evaluation.

The thesis study focuses on the lack of a common evaluative frame for architectural aesthetics. Such frame of aesthetic evaluation is considered essential for not only critics and comparison of final design products but also qualitative improvement of progressing designs. Therefore, the aim of the research is identified as to come up with a set of criteria in order to evaluate and improve the aesthetic value of architectural design products.

## **1.2 Literature Review**

Due to the difficulty of bringing in certain parameters to evaluate aesthetic value, aesthetics has always been a controversial topic. Looking into a wide range of disciplines that touch on the issue of aesthetic quality, an interdisciplinary approach to architectural aesthetics is considered as the first and foremost principle of the thesis research. Based on the cognitive, perceptual, psychological and social dimensions of aesthetic contemplation, the preparatory stage of the thesis study is devoted to an intensive search of theories related to aesthetics.

As well as philosophy, aesthetics has become a subject of debate in an increasing number of fields in social and empirical science. Furthermore, growing importance attributed to aesthetics has triggered formation of new sub-fields to specifically deal with the aesthetic questions related to the main field. Similarly, neuroaesthetics, one of the latest sub-fields of neuroscience, sets out to enlighten the neural background behind the aesthetic contemplation of artworks. In wider sense, the field of neuroaesthetics aims to address aesthetic appreciation of all types of art and architecture. During the research to form a knowledge base on the topic,

neuroaesthetics comes to the fore as a prominent field of reference in terms of its attempt to shed light on cognitive and perceptual dimensions in aesthetic contemplation of design artifacts. Apart from neuroaesthetics, other fields of empirical science such as neuropsychology, behavioural psychology and evolutionary aesthetics are utilized to go deeper into the psychological dimension in aesthetic contemplation of architecture. Moreover, philosophy and architectural theories including theories of computational architecture are benefited to further consider about both perceptual and social dimensions of architectonic contemplation.

### **1.3 Terminology and the Thesis Argument**

As the question of aesthetics in architecture is handled in an interdisciplinary sense, terms adopted from specific fields are interpreted under the cumulative knowledge of a range of fields. Therefore, a compact vocabulary is formed out of existing terms in literature. Basically, desired aesthetic qualities of architectonic space are determined based on three terms adopted from neuroaesthetics, yet, elucidated in relation to other disciplines. The first term, micro-consciousness, is introduced as the temporary hierarchy of sensations, yet interpreted as a mode of dynamic perception in which the attention of the beholder shifts from one phase to another. The second term, empathy, is demonstrated to form an organic connection with inanimate objects, which fire sensory modalities to response to architectural forms. The third term, ambiguity, is treated as a resonant layer of design that enriches the perception of architectonic space by inducing multiple interpretations and sensations.

These three key terms are regarded as the criteria of the central term of the thesis, that is, intermodal resonance. Considered as the core factor in aesthetic appreciation of architecture, intermodal resonance is defined as the mode of sensation, in which stimulation of one sensory modality triggers or alters a sensation formed via another modality/modalities. During elaboration of the definition, perceiver of design, perceptual mode of perceiver and perceptual aim of designer are introduced as three components of intermodal resonance. Overall, the argument of the thesis is born out of the definition, the components and the criteria of intermodal resonance. The argument of the thesis study is that the aesthetic quality of an architectonic space is equivalent to the sensual excitement formed through chains of stimulations across

sensory modalities. Moreover, micro-consciousness, empathy and ambiguity refer to the set of criteria which points to a high level of potential for intermodal resonance.

#### **1.4 Validation of the Thesis Argument**

In order to thoroughly consider the validity of the thesis argument, criteria of intermodal resonance are sought in specific design examples on the basis of interrelations between architectonic space and all aspects corresponding to architectural design. In order to pursue a coherent and comparative analysis of samples, four main categories are defined to pile design examples.

The first part focuses on the role of functional and spatial solutions on intermodal resonance. First, functional solutions for the space or the flow of users and specific details are demonstrated to direct the attention to resonate between the whole and the part, the dynamic and the static. Following, gradient separations between zones of privacy and publicity or mild transitions between urban space and architectonic space are regarded as initiators of intermodal resonance in terms of forming ambiguous thresholds or boundaries.

The second part takes a closer glance into the role of sensory aspects of spatial elements on intermodal resonance. As a complementary sensory channel for vision, tactile aspects of space are shown to give rise to micro-consciousness since they provide haptic information about not only touched but also merely seen architectonic surfaces. Kinaesthetic perception of space is handled as a sensation that unfolds a dynamic sensory dimension since it leads the user to experience the architectonic space by means of his own posture. Moreover, specific auditory compositions are demonstrated to cause intermodal resonance across sensations of architectonic space and aural space. Finally, genuine use of all sensory aspects of space are considered to trigger a stronger intermodal resonance among multiple sensory modalities, which has a strong influence on the perception of spatial atmosphere.

The third part deals with the role of environmental elements on intermodal resonance. First, interaction between sunlight and space is elaborated in detail since daylight is able to elicit concurrent alterations in visual, haptic, emotional perception of space and sense of time. Secondly, water is tackled as a bounding design element

as it plays role in cross-modal interactions among senses while interconnecting spatial components and merging architectonic layers. Lastly, use of landscape elements is considered to give rise to intermodal resonance by opening an interactive dialogue between discrete atmospheres of the natural environment and the built space.

The fourth part investigates the role of environmental adaptation on intermodal resonance. Infill projects are evaluated in conjunction with their surroundings since the maximum degree of proximity to adjacent buildings converts the ambient environment into an explicit parameter of intermodal resonance. Renovation and conversion projects are also regarded as potential initiators of intermodal resonance since juxtaposition of the old and the contemporary touch brings about a powerful sensorial communication across different layers of time, matter and space. The act of resolving the abrupt encounter between a massive space and urban space or between an architectonic space and open landscape is also regarded to open up a zone of direct and highly transitive communication, which paves the way for intermodal resonance.

In order to consider the validity of the thesis argument, the theoretical discourse is evaluated along with analyses of specific design examples. The inventory of projects involves a wide variety of architectural styles ranging from works of late modernism to contemporary interpretations of Mexican vernacular architecture as well as up-to-date samples of Japanese architecture. Out of thousands of samples reviewed, the current projects are selected according to the criteria of intermodal resonance, being regardless of architectural style, designer architect, location or year of construction. A broad look is cast onto award-winning projects or works of well-recognized architects such as Louis Kahn, Peter Zumthor, Luis Barragán, Ricardo Legoretta and Hiroshi Nakamura, who are famous for their sensuous designs. When a project is believed to fulfill the criteria of intermodal resonance, research about that specific example is conducted more deeply. As there is not the chance to personally visit all these architectural works, visual information in digital or hard-copy sources is the primary source for aesthetic evaluation. In order to get assured about the aesthetic value of works, all available video-films, photographs, plan, section, perspective and detail drawings are thoroughly analyzed. All writings of renowned designers or

thinkers that refer to the selected samples are comparatively evaluated and taken into consideration as another important source of information. Overall, personal point of view is mingled with available critics in literature in order to present aesthetic evaluations as objectively as possible.

## **2. THE ROLE OF INTERMODAL RESONANCE ON PERCEPTION OF ARCHITECTONIC SPACE**

Intermodal resonance is regarded as a multi-layered conception that awakens an aesthetic taste in the beholder of architectonic space. In the first part of the current section, some key terms of neuroaesthetic theory are discussed in conjunction with other disciplines so that a specific vocabulary can be built to discuss the concept of intermodal resonance within architectural realm. In the second part, an idiosyncratic definition of intermodal resonance is rendered and its components are elaborated based on the specific vocabulary.

### **2.1 Neuroaesthetics**

The word aesthetics is broadly mentioned in not only critics or reviews related to different fields of profession but also in conversations of daily life. Ever since German philosopher Baumgartner introduced the term aesthetics to the literature, it has been used in different courses. The principal use of the term is based on the Greek origin of the word, *aisthesis*, which can be defined as the mode of sensation or the act of dealing with senses. This basic, somehow, classical use refers to sensual reaction arisen by appreciation of artworks. As for another use, aesthetics points to a notion upon the appraisal of any data set within a scientific field (Brown & Dissanayake, 2009, p. 43).

Depending on the manner in which the question of appreciation is addressed, aesthetics has elicited new sub-fields under a wide variety of scientific courses. For instance, empirical aesthetics, emanated from the book “*on Experimental Aesthetics*” by Gustav Fechner in 1871, is an old sub-field of experimental psychology with a history of nearly one and a half century (Seeley, 2011, p. 1). Evolutionary aesthetics, environmental aesthetics and computational aesthetics are some other instances of these sub-fields, which have been introduced mostly in the late twentieth century. Neuroaesthetics is another recent sub-field dealing with the neuro-based ground of

aesthetic experience within the field of cognitive neuroscience (Cinzia & Vittorio, 2009, p. 682). Nadal and Pearce connote that “an aesthetic or artistic approach towards a (western or non-western) work of art (used in the broad sense to include music, film, theatre, poetry, literature, architecture and so on), a non-artistic object or a natural phenomenon” (2011, p. 174) are included in the study field of neuroaesthetics.

## **2.2 Neuroaesthetics and Interdisciplinary Evaluation**

Although neuroaesthetics preserves the potential to contribute to the understanding of aesthetic perception of art and architecture, knowledge gained from this field must be evaluated within interdisciplinary medium. Apart from the high requirement for collaboration with other disciplines, neuroaesthetics also faces some challenges in its own course. Chatterjee (2010) points to two methodological problems arising from the quantitative nature of the experiments and the uncertainty of reverse inference. The initial one brings about the problem of whether ratings upon beauty, liking or preference sufficiently define aesthetic experience. The second one points to a possible mismatch between the observed brain activity and the inferred cognitive process since the activated brain region might be an indicator of various cognitive processes.

Moreover, neuroaesthetics itself is not regarded competent enough to tackle not only sensational and formal but also cultural and intentional aspects of art (Nadal & Pearce, 2011, p. 180). In addition, there is scepticism about whether neuroaesthetics may say ‘something new’ about what makes an artwork special. In spite of all these speculative points, reveal of neural underpinnings of artistic contemplation seems to be beneficial to shed a light onto the understanding of architectural aesthetics. However, in order to get benefits out of the field, neuroaesthetic data should be evaluated in relation to not only other sub-fields of neuroscience but also social sciences and philosophy.

### **2.2.1 Evaluation of neuroaesthetic data with adjacent neuroscience disciplines**

Rooting from the field of cognitive science within the enormous domain of neuroscience, neuroaesthetics is inevitably dependent on the cumulative knowledge of adjacent disciplines. Like other sub-fields of neuroscience, neuroaesthetics



collects neuro-based data via empirical methods. Leaving behind brain-damage studies, neuroimaging has turned out to be the primary method of empirical studies in the field of neuroaesthetics. This technique provides the opportunity to monitor neural activities of the brain in response to aesthetic appreciation. However, the empirical data gained through neuroimaging studies require be evaluated in relation to other fields such as neuropsychology and evolutionary aesthetics.

Evaluation of neurological data within a neuropsychological frame contributes to the understanding of multiple-layered processes during aesthetic contemplation. Leder (2011) proposes a psychological model of aesthetic appreciation discussing that the model might be utilized as a schema to elaborate the information derived from neuroimaging and brain damage studies. According to the model, perceptual aspects such as symmetry, grouping, complexity etc. are initially analysed. Next, a memory-based analysis of familiarity and meaning is done, leading to an explicit classification of the stimulus. In the last stage, a subjective and art-specific interpretation of the stimulus is performed. Earlier cognitive steps prepare the ground for aesthetic judgement whereas the latter ones evoke emotional responses (Nadal & Pearce, 2011, p. 174). This model helps to detect most of the neural mechanisms included in the process of aesthetic appreciation. Considered within the architectural domain, the model reminds us of the fundamentality of individual repertoire and subjective judgement of architectonic space.

Evolutionary aesthetics is another field that may be utilized for a deeper understanding of neuroaesthetics. Nadal and Pearce contend that neuroaesthetics should also be interrelated to the accumulative information obtained from evolutionary studies as well as neuropsychology (2011, p. 179). According to the theory of mate selection investigated by evolutionary theorists, the more desirable attributes an individual detects in a potential mate, the more beautiful he finds the other individual (Chatterjee, 2010). Any sign of health and life energy is conceived to be the factor that makes a potential mate seemingly more beautiful. In this case, it is obvious that the perception of beauty is a matter of utilization, where reward system is in action. If this view is to be reflected to the architectural discourse, functionality, which is a desirable attribute of architecture, might be expected to be a factor that escalates aesthetic value.

Overall, scientific subfields as well as neuroaesthetics collaboratively propose a wide range of neural data that may be utilized to feed the theory of architectural aesthetics. Even the two distinct disciplines referred in this section display the multi-layered nature of aesthetic perception. As mentioned above, perception, memory, decision-making, emotion, attention and reward system play role in aesthetic experiences (Nadal & Pearce, 2011).

### **2.2.2 Evaluation of neuroaesthetic data with social sciences and philosophy**

As Bergeron underlines, the field of neuroaesthetics should not be conceived to exist only to represent the neural correlates of aesthetic appreciation (2011, p. 6). Instead, empirical data gained from cognitive science should be regarded as a valuable set of physiological and psychological facts that may cast light to our understanding of aesthetic experiences. At this point, collaboration among all fields engaged in aesthetics is of fundamental importance. As well as neuroscientists, philosophers, art critics and art historians are necessarily to be involved in the discussions related to aesthetic contemplation of artworks. Though, it is also not enough as long as there is a lack of continuous feedback among the field of neuroaesthetics, philosophy, other sub-fields of neuroscience and social sciences.

The continuous interdisciplinary feedback keeps our critical sense alive as well as deepening our judgements upon questions of aesthetics. For instance, in the previous section, it was deduced based on evolutionary knowledge that functionality might be an aspect that awakens a sense of aesthetic appreciation. However, Kant argues that judgement of beauty does not lie on any kind of interest; in other words, beauty does not arise from satisfaction of any specific interest. Rather, beauty itself “merely pleases” the beholder in a “disinterested” mode (Kant, 2000). On the contrary, Chatterjee points out that aesthetics should not be degraded to the question of beauty, mentioning the artworks that are intentionally designed as irritating and/or provoking. He states that since such kind of artistic products also cause arousal of strong sensations, they are relevant to the question of aesthetics (2010, p. 58). Even these three contradictory proposals originating from different fields lead us to reach a synthetic comprehension through critical thinking.

## 2.3 Propositions of Neuroaesthetics

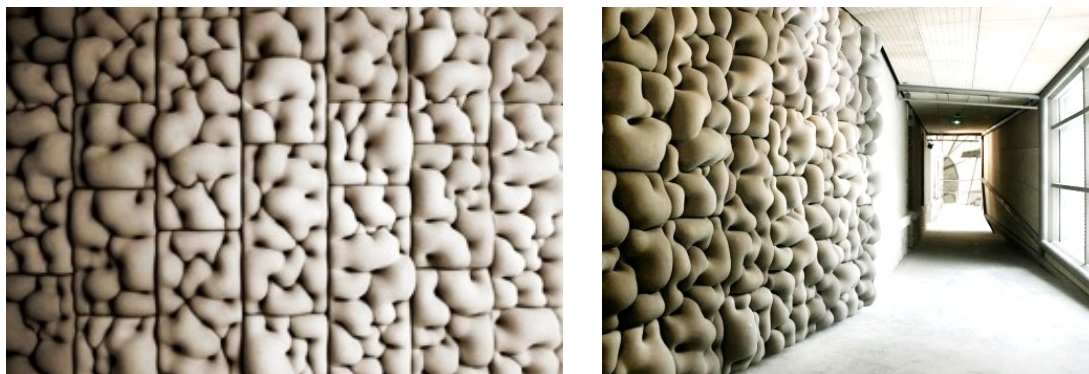
As a recent field, studies in neuroaesthetics are performed by a limited number of researchers. Semir Zeki, who coined the term neuroaesthetics, is one of the pioneering names in the field. He sets off from visual perception and passes on to the question of aesthetics through vision. His neuroaesthetic theory includes some key terms that may shed light on architectural aesthetics from a different perspective. In this regard, the following three terms have been chosen to encapsulate the neuroaesthetic theory: micro-consciousness, empathy [*Einfühlung*] and ambiguity. Nourished by other disciplines, each of them is to be interpreted within architectural discourse.

### 2.3.1 Micro-consciousness

The first term to be elaborated is micro-consciousness. Zeki describes the term micro-consciousness as a sub-set of the mode of visual consciousness (Zeki, 2004, p. 177). Micro-consciousness results from parallel processing, in other words, multiple pathways coping with different perceptual aspects of visual input (Zeki, 1998, p. 3). As these parallel systems accomplish their tasks in different visual areas and in diverse durations, micro-consciousness is distributed not only in neural location but also in time (Zeki, 2004, p. 177). This finding is counted as the reason for *perceptual asynchrony in vision*, which leads to a short-term hierarchy in visual perception. As a result, colour is realised faster than form, which is also perceived prior to motion (Zeki, 1998, p. 3). Although one might not be aware of this nuance in perceptual order, it may play a role on the first impression of (architectural) forms. Moreover, one figure or object may cause diverse micro-consciousness evoked by multiple neural activity in either the same or discrete locations in the brain (Zeki, 2010, p. 70). Therefore, the concept of micro-consciousness leads us to the conclusion that more than one perceptual shift may occur during perception of a form. When the form or the space is capable of canalizing attention recursively but through an altered route, perceptual shifts may also reoccur in differentiated ways. A series of micro-consciousness may then be expected to take place in not only visionary but also holistic perception.

As an architectural concept and also the name of Greg Lynn's renowned book, *intricacy* can be regarded as an architectonic aspect that can keep the attention of the

beholder alive, triggering a chain of micro-consciousness. In an interview (Derinboğaz, 2009), Kolarevic elaborates the term intricacy as an intrinsic property of an arrangement that is compiled with unique parts. Mentioning an experiment, he states that an intricate pattern, surface or form evokes a long-lasting sensual response. As far as the experiment puts forward, when one encounters a simple form, he immediately classifies it and his attention shifts elsewhere. Similarly, one's attention is immediately distracted when he encounters an extremely complex form. Nevertheless, when the person faces an intricate form, he focuses his attention in order to contemplate the embedded visual language. In such kind of contemplation, attention shifts from one point of the intricate surface to another, expectedly, resulting in a range of micro-consciousness. "P-wall" by Andrew Kudless (**Figure 2.1**) seems to fit to the definition of intricacy. What is special about this small-scale case study is that apart from visual shifts among unique parts of the whole, a tactile shift occurs between the hardness of the material (plaster) and the softness effect of the resulting surface. As a result, the beholder and the surface remain in a continuous and lively dialogue, in the way that an architect would desire.



**Figure 2.1** : Intricate structure of "P-wall" by Andrew Kudless (Url-1).

### **2.3.2 Empathy [*Einfühlung*]**

Empathy, in German origin of the word, *Einfühlung*, is the second term to be handled. First, the concept of empathy is to be discussed within aesthetic realm and then, in relation to neuropsychology. Finally, the concept is to be disclosed in the field of neuroaesthetics, in parallel to the mirror neuron theory.

#### **2.3.2.1 Empathy in aesthetics**

The literal birth of the concept of empathy [*Einfühlung*] in aesthetics dates back to the second half of nineteenth century. The first person that points to the existence of

sensual involvement in artistic products is Friedrich Theodor Vischer. In the year of 1866, he talks about an inner pictorial representation of the outer world, which is both symbolic and sensual. For him, sensual connection to inanimate forms is not a conditioned act, rather, an intimate bond. Vischer describes the tendency of the brain to sensually internalize the ambient environment as a “unifying and contracting feeling [*Ineins- und Zusammenföhlung*]”, which provides us with the possibility to find our own self and sensations through the forms around us (Mallgrave, 2010, p. 77).

Friedrich’s son Robert broadens the notion of his father and brings in the term *Einföhlung*, which was first mentioned in 1873 in his essay, entitled “*On the Optical Sense of Form: A Contribution to Aesthetics [Ueber das Optische Formgeföhl: Ein Beitrag zur Aesthetik]*”. He uses the term to refer to a state of active involvement in artworks or any other type of visual form (Nowak, 2011, p. 304). In this regard, the philosophical use of the term within Robert Vischer’s theory differs from its use for scientific purpose, e.g. in the field of psychology. Apart from its broad use as a basic term in the field of psychology, empathy also points to a wide range of meanings.

Before encapsulating other connotations of the term, it is a good idea to begin with how it is rendered to English. The common translation of the German word *Einföhlung* is empathy, coined by Titchener in 1909 (Baston, 2009, p. 6). ‘Feeling into’, ‘understanding’ and ‘sympathy’ are other English terms that are conceived close to the original meaning and they have been either semantically merged or replaced one another within time (Nowak, 2011, p. 302). Mallgrave even regards *Einföhlung* as an untranslatable word, which underlines its semantic density (2010, p. 79).

In this section, the semantic density of the term is aimed to be uncovered within aesthetic discourse. In 1968, Wispé talked about *aesthetic empathy*, a different kind of imaginative projection, in which the ‘other’ is an inanimate object instead of a human (Baston, 2009, p. 6). Here, the inanimate object could be thought as an artwork, architectonic space and so on. Therefore, the nature of aesthetic empathy differs from the conventional sense of empathic relation between one person and the other(s). Mallgrave regards (aesthetic) empathy as interpretation of artworks based on an experiential ground rather than a mere translocation of humanely sensations to the art object (2010, p. 79). Pointing to a state of mental as well as sensual

engagement in artworks, aesthetic empathy is closer to what the term empathy in Zeki's neuroaesthetic theory refers to, which is to be broadened under further captions.

When it comes to the question of how aesthetic empathy with an inanimate object takes place, two ways can be proposed. First, as Gallese puts forward, the beholder of a static image executes an embodied simulation of the actions or psychological states of human figures or animals that are depicted in the visual (2010, p. 62). This kind of empathic connection is usually viable during contemplation of figural paintings or statues. As a second way, as well as apparent figures demonstrating or implying an emotional state, abstract artworks and architectural forms give rise to a resonance between the perceiver and the perceived object (Freedberg & Gallese, 2007 p. 198). Hence, the second way of aesthetic empathy is more relevant to the perception of architectonic space, which is to be further detailed.

According to the clarification of the two possible ways of aesthetic empathy, visionary contact seems to be the initiator of the process. At this point, it is necessary to remind that Vischer underlines the distinction between seeing [*sehen*] and looking [*schauen*]. He emphasizes that looking [*schauen*] is a more active and conscious mode of visual reception, both resolving and reunifying forms (1873, p. 3). Based on this distinction, Nowak states that Robert promotes the act of perceiving and the perceiver, underlining that the sensual interaction with the perceived object re-shapes the form within the perception of spectator (2011, p. 304). Therefore, aesthetic empathy should be conceived as a dynamic and subjective sensation and looking may be conceived as the first step that leads to the sensual penetration to objects.

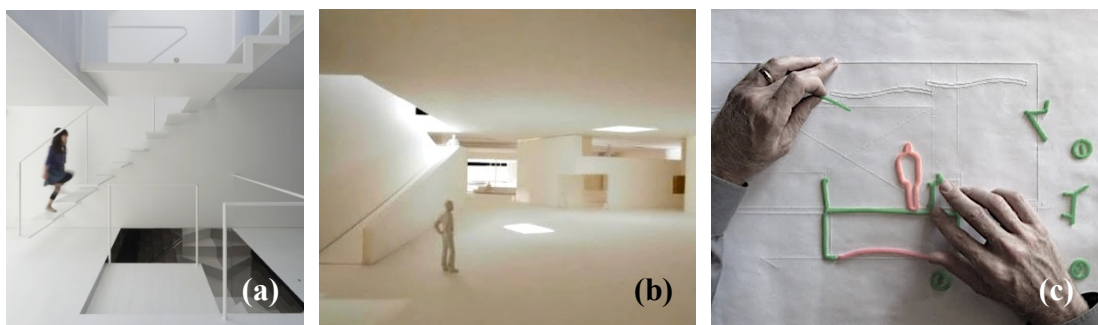
Although awareness by sight supplies input for aesthetic empathy, Nowak regards imagination as a critical aspect that drags the spectator into the real empathic interaction with the object (2011, p. 305). Seeley also agrees with the view that beholders perceive the artistic content through imagination, for instance, acquiring the sense of three-dimensionality through two-dimensional paintings (Seeley, 2006, p. 783). Gallese contends that artworks trigger the mind to generate associations based upon imagination and former experiences (2010, p. 64). It seems possible to interpret the word imagination as the associative power of the brain in attributing new meanings to what is seen by recalling past connections based on former visual experiences. Thus, aesthetic empathy can be described as bodily response activated

by the observation of a form through multiple channels rather than a mere imitation of the sensations traced through visual metaphors.

### 2.3.2.2 Empathy in psychology

In psychology, the term social empathy is intensively addressed when communication among people is the subject matter. Through an indirect path, social empathy appears to be relevant to aesthetic empathy within architectural realm. Psychologist Batson sorts out the act of social empathy into eight categories and two of them are correspondent to the scope.

Under the second category entitled as “*Adopting the Posture or Matching the Neural Responses of an Observed Other*”, Batson underlines that perception of actions of another individual does not always result in imitation or motor mimicry of what is observed. As an instance, he states that although we find ourselves making similar movements to someone trying to keep balance along a tightrope, we don’t have a tendency to mimic someone who is filing papers (2009, p. 5). This fact canalizes us to think that the more vital, more thrilling the action is, the more inclined we are to imitate the observed action. In this regard, we may think that we are also inclined to build an emphatic connection with someone seen in an architectonic space as long as the scenery strongly touches our humanely feelings. Architectural photographs involving human figures (**Figure 2.2a**) trigger us to catch such kind of empathy, which provides us with a better understanding of what it would feel like to be ‘there’. Likewise, scale figures are used in order to facilitate the comprehension of architectural models and drawings (**Figure 2.2b**, **Figure 2.2c**). It may also be true to say that we intuitively project our own self to a given architectural environment even if there is nobody photographed or depicted in the scenery.



**Figure 2.2** : Samples of empathy induction: (a)Human body in photography (Url-2). (b)Scale figure in architectural modeling (Url-3). (c)Wax scale figure in embossed plans (Heylighen, 2012).

Another related category by Batson is “*Intuiting or Projecting Oneself into Another’s Situation*”, which is identified as somebody’s mental projection into the state of another person (2009, p. 5). The mental projection also depicts how somebody gets bodily involved in especially realistic artworks of human figures that evoke sensations through gestures, mimics or actions. Gallese believes that spectator builds up a connection between himself and the art object via subliminal reflection of his own body image into the state of the ‘other’ in the artwork (2010, p. 62).

To sum up, one can have access to aesthetic empathy through either imagining his own self within the atmosphere of an architectonic space or in the place of another person who bodily experiences the same environment. However, it is unrealistic to expect an identical grasp of other’s situation. Batson asserts that memory and general knowledge are involved in the process of empathic connection with others; and even so, an exact understanding of the internal state of others does not seem possible (2009, p. 5).

### **2.3.2.3 Empathy in neuroaesthetics**

As mentioned before, in neuroaesthetics, the question of empathy is handled in conjunction with its neural grounds. Aesthetic empathy, that is, bodily response to artworks and architecture is accepted to stem from the action of mirror neuron mechanism. Mirror neurons are a set of motoric cells that are activated when an action is carried out or somebody else performing an action is observed (Iacoboni, 2009, p. 659). The discovery of mirror neurons not only contributes to the understanding of emphatic relationship but also refreshes the common view about human perception. Mirror neuron system (MNS) confronts the dominating notion that defends the discreteness of action, perception and cognition, by demonstrating that they are bound up with one another (Gallese, 2010a, p. 442).

During emphatic connection, it is important to note that intensity of mirror neuron execution is dependent on what is observed. Gallese (2010a) asserts that the more familiar to beholder’s mental records an observed action is, the more strongly the mirror neuron system responds to that action, which takes him to the conclusion that MNS is trained via learning by doing. This fact supports the view that profession and personal cultural repertoire of the spectator are influential on the way the artworks and architecture are contemplated.



Taking all of these neural facts into consideration, Freedberg and Gallese contend that emphatic responses triggered by artworks are grounded on a certain neurological base rather than being solely “introspective, intuitive or metaphysical” (2007, p. 446). In their theory, they define “ ‘what’ of aesthetic experience” as the content of art like sensual implications and depictions of acts or aims. As for “ ‘how’ of aesthetic experience”, they identify it as artistic footprints like genuine trails left by brush or chisel, peculiarly driven by the artist. Although they put emphasis on the requirement of experimental confirmation for stimulating role of these two features, they foresee that artistic gestures on artworks –like paintings of Pollock or Fontana- do indeed result in embodied simulation (**Figure 2.3, Figure 2.4**).



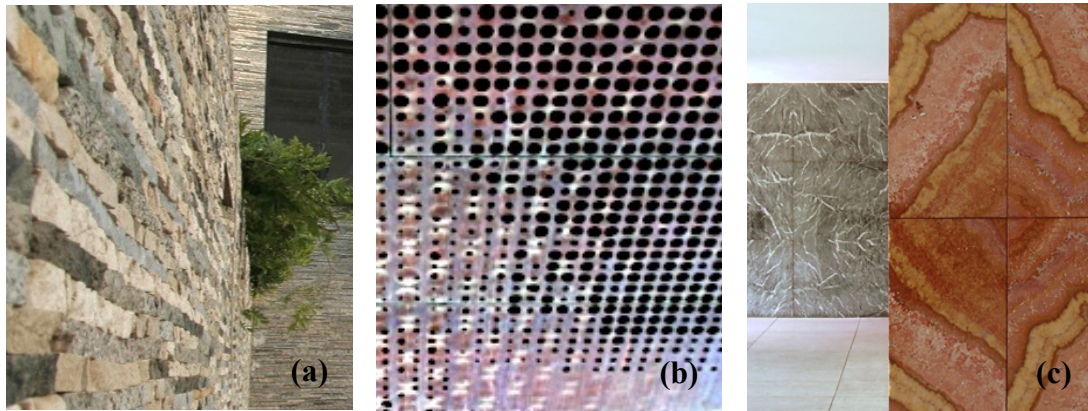
**Figure 2.3** : Exciting nature of abstract paintings by Pollock (Url-4, Url-5).



**Figure 2.4** : Examples of Fontana paintings (Url-6, Url-7).

In the case of architectural output, ‘the content of art’ is more or less equivalent to the context of design. In this sense, contextual wisdom in characterisation of an architectonic space is expected to lead to embodied simulation, that is, arousal of bodily resonance between the beholder and his surroundings. As for ‘the genuine

trails of artist’, the expression corresponds to unique surface characteristics such as traces of handcraft (**Figure 2.5a**), special fabrication (**Figure 2.5b**) and special material effect (**Figure 2.5c**).



**Figure 2.5 :** ‘Genuine trails’ in architecture: (a)Traces of handcraft (*Seramik:43*, p.59). (b)Special fabrication (Url-8). (c)Special material effect (Url-9).

The pioneering name in the field of neuroaesthetics, Semir Zeki, proposes a definition for empathy in aesthetic sense. He propounds that empathy is “a link between the ‘pre-existent’ forms within the individual and the forms in the outside world which are reflected back” (as cited in Mallgrave, 2010, p. 146). According to Mallgrave, these pre-existent forms imply formal priorities of the brain that are dependent on some preferential ratios, special geometric or proportional configurations and some certain shapes, lines or colours, which are able to activate special neural cells that are hardly stimulated. Golden ratio, for instance, is believed to have a special visual effect and it was therefore explicitly used in frontal compositions of renowned classical buildings. However, it should not be ignored that the reason why these ‘pre-existent forms’ appeal to us is a matter beyond mathematical definitions, as discussed throughout the thesis.

### 2.3.3 Ambiguity

The last term to be addressed is ambiguity. First, the term will be elaborated within boundaries of Zeki’s neuroaesthetic theory. Then, it will be discussed within architectural design theory.

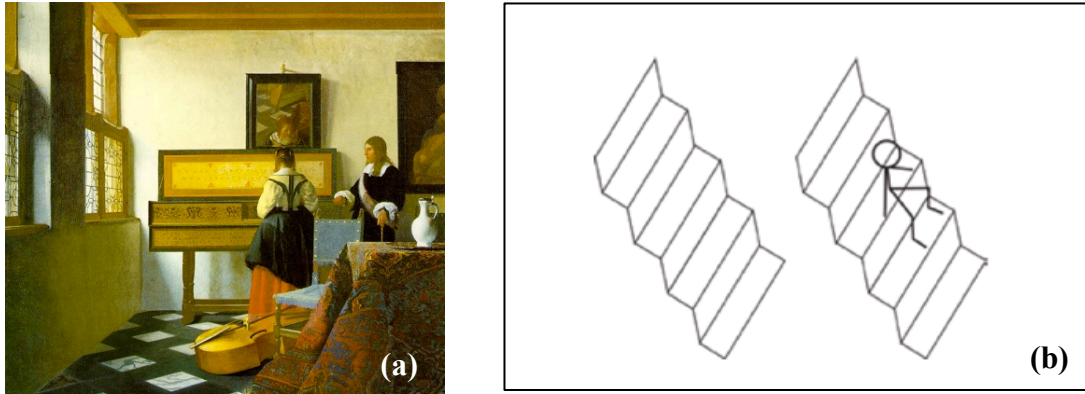
#### 2.3.3.1 Ambiguity in neuroaesthetics

In Collins English Dictionary (1991), the word ‘ambiguity’ addresses to two discrete meanings: “1. The possibility of interpreting an expression in two or more distinct

ways. 2. Vagueness or uncertainty of meaning” (Stacey & Eckert, 2003, p. 11). The first meaning seems to be closer to the sense of ambiguity in Zeki’s theory. He conceptualises ambiguity as an occasion that leads the beholder to produce a set of equally valid interpretations. He regards *ambiguity* as a reverse proposition to *the law of constancy*, which postulates that only stable attributes of the perceived object appeal to the brain, although the data acquired is continuously altered (2010, p. 67). Recognition of a face from different perspectives or in any facial expression is an instance of perceptual constancy (Zeki, 1998, p. 2). Ambiguity, to the contrary, elicits a wavering from one perception to another even though the brain is provided with steady data (Zeki, 2010, p. 67).

Zeki believes that ambiguity results from a multifactorial process. He states that ambiguity may be solely a consequence of any change in the state of micro-consciousness as well as being connected with ‘higher cognitive factors’ such as memory, learning, judgement, experience (2010, p. 68). Zeki gives the Vermeer’s painting “The Music Lesson” (**Figure 2.6a**) as an instance of artwork that guides us to ‘true ambiguity’. He conceives that the man and the woman in the painting may be imagined to have a private, academic or familial relationship. It can be also figured out that they could have a discussion about a daily issue or debate on a more serious subject. Zeki regards all of these ideas probable, which directs himself to come up with a neurological definition of ambiguity. According to him, ambiguity is “not vagueness or uncertainty, rather, certainty of different scenarios” (Zeki, 2010, p. 70), which are all plausible.

For a deeper understanding of the neurological definition of ambiguity, two properties of the case should be grasped. One of them is *non-simultaneousness of multiple interpretations* in the way that each percept is only momentarily available (Zeki, 2010, p. 69). For instance, the staircase in **Figure 2.6b** is perceived in two different ways and as the result of ‘interpretational flip-flop’, only one percept is valid at a time. The other property is *the stability of perceptual instability*, which blocks the attempts to disambiguate an image via use of additional items (Zeki, 2010, p. 69). Although a stick figure is attached to the illustration in **Figure 2.6b** in order to direct our brains to assign a certain position to the staircase, perceptual shift is inevitable.



**Figure 2.6 :** Examples of ambiguity: (a)Contextual ambiguity in the painting “The Music Lesson” by Vermeer (Zeki, 2010). (b)Visual ambiguity in the staircase illustration (Zeki, 2010).

Entirely, Zeki conceptualizes ambiguity as a desirable attribute of artworks that escalates aesthetic perception by leading to a dynamic interpretation through different mechanisms of the brain. In the same sense, ambiguity is also expected to intensify architectural experience.

### 2.3.3.2 Ambiguity in architectural design theory

The concept of ambiguity in architectural design theory differs from its conception in neuroaesthetic theory. Diverging from Zeki’s definition, Stacey and Eckert assert that ambiguity is a case of uncertainty, in which possible interpretations vary in quality (2003, p. 11). Here, inequality of various renderings and consideration of ambiguity as a vague state is contradictory to Zeki’s view. Though, even if not for art, such a heterogeneous conception seems more consistent to architectural experience, where the matter of utilization may lead the beholder to overrate one interpretation among others.

Stiny, a seminal name in the discourse of architectural computation, has a slightly different sense of ambiguity. He suggests that ambiguity is an intrinsic characteristic of every geometric form. Based on this proposition, Stiny believes that any shape can be parsed into parts in any desired manner at any time. Knight comments that Stiny’s sense of ambiguity is noteworthy since it attempts to decompose the given form (2003, p. 154). Stiny contends that ambiguity is also an inherent attribute of art. He remarks that “[t]he origin of art is clear only because seeing is vague and ambiguous. There’s art anytime I observe the miscellaneous things around me and change them to see as I please” (Stiny, 2010). According to Stiny’s point of view, it can be

deduced that what makes an artwork or an architectural form ambiguous, to a great extent, is the perceiver itself.

Another seminal name in the field, Oxman, defines ambiguity as the case when forms are both semantically and syntactically readable in multiplicity (2002, p. 140). She draws attention to the possibility to grasp new things in a form, considering the manner of shape initialization and the way of form parsing as discrete acts (2002, p. 140). In other words, she thinks that beholder's varying perception of an architectural form is free from its production method and even from the intention of its architect. She also mentions Marr's explanation, which defines vision "as a process that *produces a shape description* from images of the external world" (as cited in Oxman, 2002, p. 138). Overall, Oxman suggests that architectural forms are continuously reshaped through perception of their beholder.

Following the former definitions, the dynamic mode of perception via ambiguity is now to be elaborated in conjunction with the terminology mentioned in both neuroaesthetics and architectural design theory. Namely, it is the special perceptual mode of '*seeing as*' that comes into existence via bodily feelings arisen by the process of mirror neurons (Gallese, 2010, p. 64). The complete terminology, '*seeing as - seeing that*', can be identified as an interactive mode of looking, in which ambiguous shapes guide the contemplator to reach a further interpretation. According to Gallese, it is one of two ways in which embodied simulation may canalize aesthetic judgement. In the architectural theory, Goldschmidt calls it 'the dialectics of sketching' that stimulates the architect to come up with new ideas based on what he sees in the sketch (1991, p. 138). For Goldschmidt, '*seeing as*' is the decisive moment in which the designer starts to treat the ambiguous shape as a certain kind of 'thing' through an updated analogy. As for '*seeing that*', it is the shifting point when a new argument stems from the evaluation of the current form interpretation. Sequentially, visual reasoning shifts from the mode of '*seeing as*' to '*seeing that*', which is considered to be the rationale of designing through ambiguous sketches. Although patterns of interpretational shifts may range from one architect to another, architect's mind continuously oscillate between '*as*' and '*that*' arguments. Shifts between arguments do not always result in a graphical input to the sketch, remaining on mental level. The purely intellectual switch between modes of '*as*' and '*that*'



better delineates the manner in which the beholder deals with the ambiguity of an architectonic space.

## **2.4 Critics towards Neuroaesthetics**

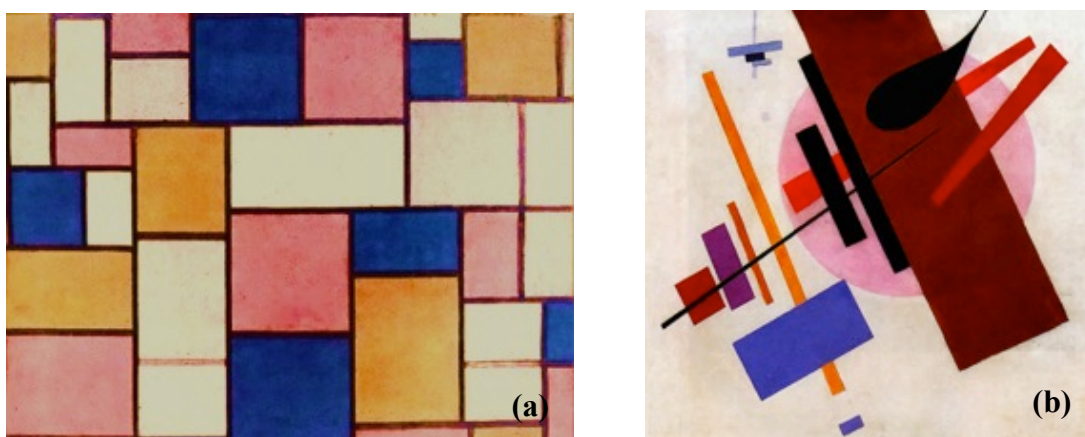
Whereas studies of prominent researches in the field of neuroaesthetics converge at certain points, other disciplines direct quite a critical view towards the field. The current section represents a collection of the criticising remarks on neuroaesthetics.

In the paper entitled “*The Science of Art: A Neurological Theory of Aesthetic Experience*”, Ramachandran and Hirstein state that the perception of art mostly stems from the stimulation of some certain neural mechanisms that are basically dependent on eight principles such as *peak shift* principle and *grouping* effect (Ramachandran & Hirstein, 1999). In this sense, they agree to Zeki’s proposition that physiology of the brain is the medium where the art is derived from. However, about Ramachandran and Hirstein’s view, Richard Gregory, emeritus professor of Experimental Psychology at the University of Bristol, draws attention to the lack of importance assigned to the personal knowledge about the world and art (as cited in Huang, 2009, p. 25). Although some researchers in neuroaesthetics do root their theory on a limited ground, the fact that researches are focused on different sides of the issues could be beneficial to constitute a more in-depth neuroaesthetic theory.

Objections against some propositions of neuroaesthetics are raised from the field of philosophy, as well. To exemplify, Oxford Philosophy Professor John Hyman (2010) makes critics to the way Zeki and Ramachandran relate art to neuroscience. He finds Ramachandran’s view highly reductionist thinking that he tries to assess a theory upon misuse of some neurobiological principles (mainly, *peak shift effect*), relating them to a limited type of artworks. Hyman also stands against his degradation of art into ‘caricature’, which is always expected to distort reality. Overall, he puts emphasis on Ramachandran’s lack of knowledge about art, pointing to his negligence about significant features; namely, specific tools, materials and techniques, which give birth to artworks through hands of artists. At this point, Hyman states that these tools, materials and techniques are the means, by which artworks are able to evoke meaning and interact with sensational, mental and perceptual involvement of the beholder (2010, p. 254).

Hyman's critics about neuroaesthetic theory show not only his dissatisfaction about ignorance of some fundamental aspects but also his doubts about whether neuroaesthetics can say something new about aesthetic perception. In Zeki's neuroaesthetic theory, Hyman is critical about his statement: "artists are in some sense neurologists, studying the brain with techniques that are unique to them" (Zeki, 1999, p. 10). As understood from this sentence, Zeki regards an artwork as a neurological instrument for artists to explore the boundaries of brain in terms of visual comprehension. Hyman asserts that this view cannot give a clue about why artworks appeal to us in a different way than other objects simply, an ice-cream or a hamburger, that are also produced to excite our neurobiological mechanisms (2010, p. 255). Also, in his theory, Zeki explains that different kinds of artistic aspects entail stimulation of different visual areas in the brain. Hyman again asserts that this fact does not present anything distinguishing about artists.

In spite of all his critics, Hyman accepts that artists are specially focused on visual system, which makes them "prime investigators of visual perception" (as cited in Huang, 2009, p. 24). He also approves that the existence of special neurons fired by the perception of vertical, horizontal or diagonal lines, does indeed amplify the aesthetic experience of paintings by Mondrian and Malevich (**Figure 2.7a**, **Figure 2.7b**). Hyman also underlines his strong belief that neuroscience may make a contribution to contemplation of visual arts (Hyman, 2010, p. 261). Altogether, criticism towards the field is not an underestimation of the value of neuroaesthetic theory, rather, an attempt to contribute to the enhancement of the theory and to encourage interdisciplinary collaboration.



**Figure 2.7 :** (a)Painting by Mondrian (Url-10). (b)Painting by Malevich (Url-11).

## **2.5 Intermodal Resonance within Architectural Realm**

Intermodal resonance is the mode of sensation, in which stimulation of one sensory modality triggers or alters a sensation formed via another modality/modalities. Intermodal resonance takes place in response to either series of micro-consciousness in the sense that an intricate surface would fire or formal and semantic ambiguities of space. In any case, the perceiver is embedded to ambient space through embodied simulation, namely, aesthetic empathy. Empathic connection results in mental and bodily articulation with the space, which keeps the beholder in a resonant mode. Franck (2008) regards this resonant mode of cross-modal perceptual shifts essential for architectonic experience. For instance, he asserts that a visual effect of a surface is dead unless it awakens a tactile feeling to have an idea about what it would be like to touch that surface. He believes that it is possible to talk about architectonic quality only as long as visual effect of architectural space has a strong impact of one's bodily awareness. In this way, he contends, the body acquires posture within an escalated spatial quality (p. 25). In this regard, intermodal resonance is the means by which the body is nestled in the space and the bodily interaction by which the space is enriched. For a better understanding, the concept of intermodal resonance is now to be elucidated, parsed into three components as follows: perceiver, perceptual mode and perceptual aim.

### **2.5.1 Perceiver of Design**

The perceiver, under this caption, is to be addressed as the beholder who bodily and sensually interacts with architecture, in the broader sense, with the world. This sensual and bodily presence is, as Pallasmaa argues, the entity that transforms an architectonic space into a "lived existential space" (1999, p. 129). Pallasmaa (1999) propounds that existential space is quite a different spatiality from what empirical science confines by rules. He describes it as a unique fusion of the cluster of meanings, values and sensations, which are shaped by memory, imaginative power and experiential reservoir of the individual. The argument of Feld seems to explain the core of 'lived existential space' in the best way in terms of multiplicity of sensation: "as place is sensed, senses are placed; as places make sense, senses make place" (as cited in Howes, 2006a, p. 167). It also emphasizes the role of bodily sensation in building a 'sense(d)-place' out of an unfamiliar space. Franck articulates



the position of body during the re-build of space into 'sense(d)-place'. He maintains that architectonic space is the dwelling of bodily presence, where the body is situated in two-fold sense. On the one hand, the body itself is a physical thing through which the architecture confronts its own physicality. On the other hand, the body is the centre of the field of sensation which houses the interplay of bodily feelings, tuned by both the body and its ambience (2008, p. 28). His articulation draws attention to the bidirectional nature of the encounter between body and architecture in the way that the body not only senses architecture but also is sensed by architecture.

The two-fold interaction of the perceiver and the perceived is best elaborated by Merleau-Ponty. He speaks of reversibility of vision and touch exemplifying that in the case of handshake, one feels both to touch and to be touched (1968, p. 142). Then, the same principle of reversibility is indeed valid for the manner in which one experiences architecture, generally speaking, the world. Although, as Merleau-Ponty underlines, we are not always aware of it, such subtle reversibility blurs the boundary between two entities. At this point, Merleau-Ponty asks: "Where are we to put the limit between the body and the world, since the world is flesh?" (1968, p. 138). Here, what the word 'flesh' refers to is neither a substance in the sense of physicality nor a mental representation in the sense of spirituality, rather, "an element of Being" (Merleau-Ponty, 1968, p. 139) in the ancient sense of four elements (fire, earth, water and air). As Jormakka clarifies, Merleau-Ponty characterizes 'the flesh' to be 'the sensible' in a dual sense, as the one that senses and is sensed (2005, p. 161). According to him, not only the world but also the body is flesh, sharing the same elemental gist of 'being'. Merleau-Ponty goes on to propose a fleshly unity of the body and the world, arguing that "[t]he world seen is not "in" my body, and my body is not "in" the visible world ultimately: as flesh applied to a flesh, the world neither surrounds it nor is surrounded by it" (Merleau-Ponty, 1968, p. 138). Overall, his point of view renders a delicate intertwining of (being) the perceiver with (being) the perceived.

As for elaboration of the communication across the entwined presence of body and the world, Grange's conception is to be probed. Like Merleau-Ponty, Grange adopts the word 'flesh' as well, in order to designate human body whose cardinal endeavour is to sense and welcome its surroundings in its own self (1985, p. 72). He specifies

four aspects through which ‘fleshly articulation’ arises: posture, orientation, feel and comprehension.

The first aspect, posture, could be defined as the momentarily pose within environment. Dependent on backbone, he states, posture is specified according to bodily structure and it embeds the flesh into space. Then, posture is bound up with the architecture of both the body itself and the surroundings. If so, Merleau-Ponty’s “body image”, which refers to “a total awareness of posture” (2005, p. 114), also supplies one with the awareness of his surroundings since posture momentarily discloses a relative space.

The second aspect, orientation, in Grange’s sense, is the intrinsic ability of knowing ‘whereness’. Based on postural structure, orientation situates the body image in a fine-tuned sense of spatial intimacy. The body image, according to Merleau-Ponty, dwells in “a spatiality of situation” rather than “a spatiality of position” (2005, p. 115). In this regard, orientation is far beyond being the issue of navigation or positioning, yet, the reflexive act of spatial embedding.

For Grange, the third aspect, feel, is the resonating mode between the body and the surroundings. On the one hand, a healthy, normal body has a kind of perceptual transparency such that “the body seems not to be there” (Grange, 1985, p. 74). On the other hand, the body is aware of its ‘otherness’ in the environment. This duality makes both the feel of distance to the near and an intimate engagement in the distant possible. In other words, Merleau-Ponty’s principle of reversibility is in action, such that the near and the distant continuously translocate.

The fourth and last aspect of Grange’s conception, comprehension, is the act of ascribing a meaning to a space through a united sense of posture, orientation and feel. In comprehension, meaning unfolds itself as the understanding of space and the unique mood attributed to spatial ambience. Overall, on the way to architectonic comprehension via posture, orientation and feel, body is fleshly articulated based on the principle of sensual reversibility. Only when articulated within the flesh of a fine-tuned environment, the body becomes capable of dissolving into a fluxional phase, where intermodal resonance is born.

### 2.5.2 Perceptual Mode of Perceiver

The ideal perceptual mode for intermodal resonance is grasped in a specific mode of looking. In order to establish a resonant interaction across sense modalities, visionary attention should be neither too concentrated nor too dispersed. Vischer (1873) talks about ‘mere vision’ [*Hinsehen*] without any special effort, that is, no more than the degree of neural stimulation required by the nature of the physical act of seeing. This mode of seeing, he contends, is enough to distinguish one part of the scenery from the other in terms of physical properties although there is no conscious intention to classify what is seen. Although ‘mere vision’ in Vischer’s sense recedes dominance of vision and prepares the body to penetrate into multimodal awareness, it should be accompanied by a special degree of attention.

In order to come up with a fine description of the required state of attention, relevant terminology in psychology appears to be useful. In psychology, attention is categorized as *effortful* and *effortless*. Both types of attention are used to refer to a state of high-concentration mode whereas effortless attention is adopted via relatively higher ease of concentration (Csikszentmihalyi & Nakamura, 2010, p. 183). Therefore, effortless attention does not describe a mode of ‘less attention’, rather, it is ‘more attention’ reached through ‘less effort’ (Csikszentmihalyi & Nakamura, 2010, p. 186). In this sense, the definition of *effortless attention* appears to be a good departure point.

When regarded in architectonic sense, the constituents of effortless attention reveal the characteristics of our perceptual engagement in the space. Csikszentmihalyi and Nakamura (2010) mention three components that prepare the ground for the mode of effortless attention. The first one, what they call *clear goal*, is the short-term aim of the current move within a long-lasting action. For instance, the clear goal of a pianist playing a song is to truly display the next pile of musical symbols rather than successfully completing the whole musical piece. Then, in the case of architectonic experience, clear goal is to comprehend our intimate space that ‘touches’ us, rather than an attempt to reach a global understanding of our position. The second component is *immediate feedback*, such as the sound of the piano that keeps the pianist’s attention alive while he strikes the notes. In architectonic sense, it is simply the echoic reply of a wall in response to our voice or the squeaking sound of an old wooden floor responding our footsteps. The third one is *the proximity between the*

*level of challenges and the level of personal abilities.* On the one hand, greater challenges make the person invest extra effort and more inclined to give up. The reverse condition, on the other hand, causes the person to spend less effort but again have tendency to be distracted. Therefore, the moment of ‘absolute balance’ between the degree of environmental challenges and the level of individual’s skills is described as the most convenient time for highest concentration. Within architectonic context, it corresponds to the concept of ‘intricacy’, in which an architectural form or surface is neither ultra-complex nor too coarse. However, at this point, it is important to note that ‘a prepared mind’ contributes to reduction of apparent level of challenge. In a similar way, mental serenity eases and deepens our interaction with the ambient spatial atmosphere.

Csikszentmihalyi and Nakamura (2010) also speak of possible ways to train our attention in order to reach the desired perceptual mode. They state that effortless attention could be improved either via ‘direct paths’ such as meditation, attention-focusing techniques or ‘indirect paths’ such as high level of interest and sensual involvement in the current action. The last one is also what gives rise to *flow experience*, that is, deepest level of attachment to an action in the way that sense of time, even the sense of self is forgotten in a mode of effortless attention. In architectural case, it might be conceived that the more appealing the space is, the more the beholder is engaged in his surroundings, which, in turn, escalates the quality of attention. This cyclic feedback indeed promotes the role of attention in architectonic experience. Csikszentmihalyi and Nakamura even propound that “[t]he way we use attention is not only a means for having various experiences but can also become an experience in itself” (2010, p. 181).

In order to elaborate the state of concentration mode in effortless attention, Walter Benjamin’s term *Zerstreuung* is adopted. Though the term is generally rendered into English as ‘distraction’, Franck (2008) believes that this term points to not only the disperse mode of attention and tranquillity of responsiveness but also the phase when all sense modalities are cooperated in stillness. Here, tranquillity refers to the mental serenity of ‘prepared mind’ whereas responsiveness corresponds to the reaction of the beholder in reply to the ‘immediate feedback’ of architectonic space. Based on Franck’s enclosure, ‘clear goal’ might also be handled as the goal of attention itself, which is to be dissolved in order to penetrate into the surrounding space. In addition,

Franck clarifies that cooperation of all senses is possible only when attention is not focused on one sensory channel (2008, p. 24). To put it differently, cross-modal interaction of sense modalities is possible as long as ‘absolute balance’ in the perceptual mode is obtained. Overall, by means of *Zerstreuung*, architectonic space might be hoped to give rise to a ‘flow experience’, in the way that both the beholder and the architect of the space would desire.

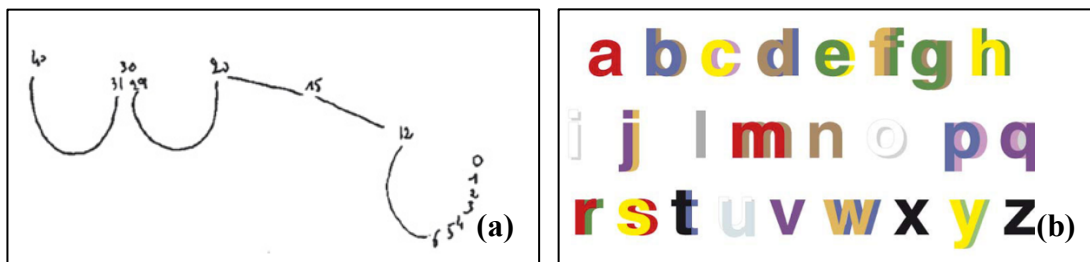
### **2.5.3 Perceptual Aim of Designer**

As mentioned in the former section, true mode of attention is the path to stimulation across sense modalities, which is the core of intermodal resonance. The more intensively the stimulation occurs, the higher the degree of intermodal resonance is. Franck (2008) describes the highest possible level of continuous stimulation and harmonic tuning among senses as *synesthetic resonance*. He asserts that high concentration in a mode of extensive relaxation is the key to synesthetic resonance. Therefore, perceptual aim of architect should be to lead the perceiver in the mode of *Zerstreuung* to verge on the phase of synesthetic resonance, which can be theoretically counted as the peak point of intermodal resonance.

In order to have a better understanding of the concept of synesthetic resonance, the phenomenon of synaesthesia is to be elaborated. Cytowic et al. (2009) define synaesthesia as ‘joined sensation’, based on how the word is derived: *-syn*: union; *-aesthesia*: sensation (p. 1). Campen (2009) prefers to use a slightly different rendering: *-syn*: together; *-esthesia*: perceiving (perception). Pointing to the origin of the word, he contends that synaesthesia itself refers to an internalized sensation “between the senses” (2009, p. 7).

The semantic configuration of the word synaesthesia provides insight about its neuroscientific definition. As a term in neuroscience, “synaesthesia is a condition in which stimulation in one sensory modality evokes an additional perceptual experience in another modality” (Sagiv & Ward, 2006, p. 259). In more than fifty types of reported synaesthesia (Campen, 2009, p. 1), the most common three types are day-colouring (association of weekdays to certain colours), colour-grapheme (perception of letters and numbers in colours) and colour-auditory synaesthesia (sounds evoking colours and/or patterns) (Suslick, 2012, p. 557). Based on the type of the trigger, Grossenbacher and Lovelace prefer to categorize synesthetic

experience into two types: *synesthetic perception* and *synesthetic conception*. According to them, number-location (**Figure 2.8a**) or time period-location synaesthesia is a synesthetic conception since numbers or time periods are to be conceived only in mental space. However, colour-grapheme synaesthesia (**Figure 2.8b**) is a synesthetic perception as certain colours are attributed to letters that are actually seen or read in an external source (2001, p. 36). In literal sense, synesthetic resonance should be considered to be relevant to both types of synesthetic experience, since architectonic space is comprehended not only physically but also mentally and sensually.



**Figure 2.8 :** (a)Number-location synaesthesia (Hubbard & Ramachandran, 2005).  
 (b)Colour-grapheme synaesthesia (*Cognitive Neuropsychology*, 22, p.1069).

Although synaesthesia has been a hot topic for researchers, proposals about the underlying mechanisms of the phenomenon are still controversial. Currently, three scientific models of synaesthesia are discussed, which are ‘*local cross-activation*’, ‘*long-range disinhibited feedback*’ and ‘*re-entrant processing*’ (Hubbard & Ramachandran, 2005, p. 512). In the simplified sense, the first model indicates a cross-wiring mechanism among some brain areas and the second model focuses on an altered type of communication between sensory levels whereas the last one suggests a hybrid model of the first two. On the one hand, each model might be expected to explain a different type of synaesthesia, contrary to the view that a single common mechanism underpins all kinds of synesthetic perception. On the other hand, genetic inheritance of synaesthesia is considered as a sign to the existence of common mechanisms underlying all types of synesthetic perception (Hubbard & Ramachandran, 2005, p. 514).

Despite the fact that synaesthesia is literally addressed as an anomaly, Sagiv and Ward assert that synesthetic perception stems from neural mechanisms existing in not only synesthetes but also non-synesthetes. They also draw attention to the

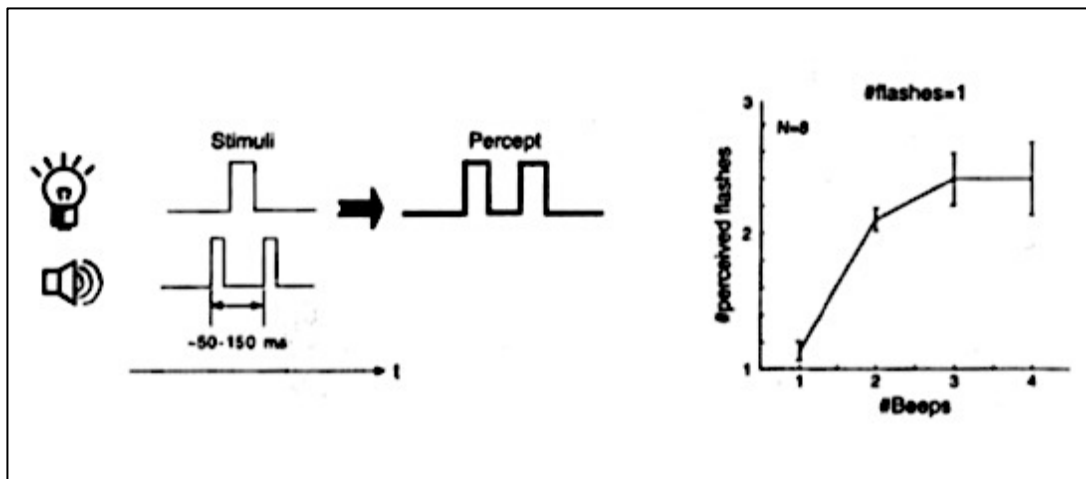
existence of cross-modal interactions observed in both synesthetes and non-synesthetes. Therefore, Campen argues that synaesthesia is a concealed sensation, which is not fully betrayed in most people (2009, p. 7). Naming synaesthesia as 'hidden sense', he exemplifies the holistic perceptual experience of new-borns as an early and implicit phase of synaesthesia.

Infant perception indeed can be accounted as synesthetic. How babies up to five-six months perceive their ambience is a 'sensory primordial soup', in which, any scent, light and sound are merged (Campen, 2007, p. 29). Maurer and Mondloch (2005) believe that early infant perception is an instance of *neonatal synaesthesia*, hypothesized to take place in 'strong form' and 'weak form'. In the strong form, even if only one sensory modality is excited, an additional percept is formed through a second modality (p. 221). In the weak form, the baby cannot distinguish which modality the current stimuli originates from, rather, senses an energy pattern as a blend of total stimulations in all sensory modalities (p. 223). Based on the data gained from neuroimaging and behavioural studies, this special kind of infant perception is ascribed to pre-phase of developmental changes during neurologic maturation of new-borns.

When the point comes to questioning the existence of synaesthesia in adult perception, relevant information comes from brain damage studies. The visual cortex of even congenitally blind people is observed to be active during engagement with tactile (e. g. reading Braille) or auditory tasks whereas auditory cortex of deaf people is activated by visual presentations such as sign language (Maurer & Mondloch, 2005).

Under the light of all these scientific evidences, two questions strike the mind: whether cross-modal interaction among senses is an evolutionary gift blunted afterwards and whether synaesthesia can be learned. Merleau-Ponty regards synaesthesia even as the core of normal perception, though, he believes that it has been such strongly suppressed by generalizations of science that "we have unlearned how to see, hear, and generally speaking, feel" (2005, p. 266). Regarding synaesthesia as a matter of fact in the nature of normal human perception, the question of how to deal with this fact is now to be elucidated.

Although synaesthesia implies synchronized execution of senses, it may not always be realistic to expect absolute equality in the degree of stimulation pertaining to different sense modalities. As *modality appropriateness hypothesis* postulates, the prevailing modality of perception during a specific task is determined according to reliability. In other words, relative dominance of a modality in a task is about how “greater reduction in uncertainty” (Driver & Spence, 2000) that modality supplies. Vision is discovered to dominate spatial tasks whereas audition has a dominant role in tasks of temporality (Shams, Kamitani & Shimojo, 2004, p. 28). Elaborated by Massaro and Cohen (2000), *fuzzy logical model of perception (FLMP)* also suggests that cross-modal interaction functions through task-specific modality weighting. Moreover, visual perception is demonstrated to alter by auditory and tactile stimulation (**Figure 2.9**). Overall, these findings show not only the heterogeneous nature of cross-modal perception but also the possibility of perceptual alteration by interaction across sensory modalities (Shams, Kamitani & Shimojo, 2004, p. 32).



**Figure 2.9 :** Sound-induced illusory flash effect as a demonstration of visual perception altered by auditory simulation (Shams, Kamitani & Shimojo, 2004).

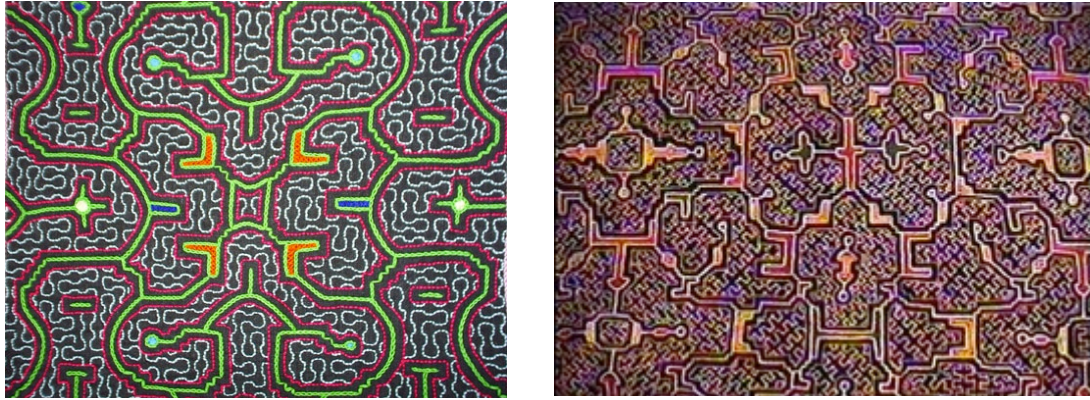
Synesthetic experience is expected to acquire its form in relation to factors specific to the perceiver as well as to the characteristics of tasks. Anthropology professor David Howes (2006a) insists that synesthetic experience is shaped by individual differences and cultural dimension. Howes names creation of an interplay of senses in rituals as ‘*cultural synaesthesia*’ (2006a, p. 162). From a cultural and anthropological perspective, Howes underlines three points to be considered when cultural synaesthesia is to be discussed. First, he asserts that the relative value of a modality



may overwhelm others depending on special cultural way of engagement in senses. Second, he suggests that varying patterns of modality togetherness might be possible rather than an overall synchronization of sense modalities. Third, he propounds that the manner different senses are blended may evoke different meanings (2006a, p. 164). Notably, his notion of cultural synaesthesia is in accordance with the scientific view, as previously detailed along with modality appropriateness hypothesis and the fuzzy logical model of perception.

Howes also draws attention to the requirement of interdisciplinary study in order to fully understand the crosstalk of senses, suggesting a new sub-field called “cultural neuropsychology” (2006b, p. 386). He maintains that not only neuropsychology but also language could help to trace synesthetic connections. After his ethnographic research in Papua New Guinea, Howes believes that audio-olfactory synaesthesia is possible pointing to the phrase in Melanesian languages: ‘hearing an aroma’. He argues that this type of crosstalk may arise from the intensity of facial conversations and use of special odorous substances, which magnifies not only the impression of self-odour but also the verbal power of an individual (2006b, p. 386). In this regard, attribution of gustatory adjectives to fragrances points to the description of a synesthetic perception rather than solely being an example of metaphorical use of language.

Howe also gives reference to Diana Young’s report of colour-odour synaesthesia in the Western Desert of Australia (2006b, p. 386). As for taste-odour sensation, Howes regards it as a common type of synaesthesia resulting from the concurrent olfactory and oral stimulation during the act of eating and drinking (2006b, p. 384). In addition, he addresses synesthetic dimension of the ritualistic healing sessions of Shipibo-Conibo Indians in Peru. In this indigenous type of ‘aesthetic curing’, special geometric designs (**Figure 2.10**) are internalised along with aromatic fragrances and tones of healing songs. Through the interplay of senses, Shipibo designs go beyond being mere abstract patterns and turn out to be “matrices of inter-sensory perception” (Howes, 2008, p. 77). Such kind of intermodal play of senses evoked by a specially created atmosphere well corresponds to the desired perceptual aim of architecture, that is, to awaken synesthetic resonance.



**Figure 2.10 :** Samples of Shipibo designs (Url-12, Url-13).

Overall, when referred to the rare and special kind of adult perception, synaesthesia is defined as simultaneous co-operation of two discrete sensory modalities in the way that a conjoint perception is experienced. As for intermodal resonance, it refers to moments of stimulations across sensory modalities. However, intermodal resonance may not result in a conjoint perception since it cannot be produced by exactly simultaneous and equally dominant operation of sense modalities. Rather, intermodal resonance is a vibrant mode in which the strength and the direction of stimulations may change. As a consequence, the resulting perception is heterogeneous in terms of hierarchy of stimulated sensations. Stemming from the definition of synaesthesia, synesthetic resonance then points to the strongest and most uniform mode of intermodal resonance, in which sense modalities co-operate by continuous feedback and equal dominancy. However, absolute equivalence and concurrence of sensory stimulations are hard to be authenticated for non-synesthetes. In this regard, synesthetic resonance may only be a theoretical definition that assumes a peak and precise operation mode for intermodal resonance.

Although, under the current caption, desired perceptual aim of architecture has been articulated as to give rise to synesthetic resonance, namely, the theoretically highest level of intermodal resonance; possible paths in which architectonic space comes closer to this goal are due to be elaborated in further parts of the thesis. Meanwhile, it is also expected to discover clues to answer to the main question asked by the art historian Heinrich Wölfflin: “How is it possible that architectural forms are able to express an emotion or a mood?” (as cited in Mallgrave, 2010, p. 80).

### **3. THE ROLE OF FUNCTIONAL AND SPATIAL SOLUTIONS ON INTERMODAL RESONANCE**

As elaborated in the previous part, the aim of architectural design should be to lead the beholder into a special mood, in which he gets bodily embedded in the ambient environment via the mode of intermodal resonance. The very basic architectonic characteristics essential for the creation of this special perceptual mood lie behind subtle details, true functional flow and spatial balance in terms of transition from publicity to privacy.

#### **3.1 Subtlety of Functional Solutions**

Architecture is expected to supply any space with the highest possible degree of functionality. However, this expectation should be fulfilled without impairing comfort conditions of future users. In order to find a middle course that will concurrently satisfy the functional requirements and the comfort conditions, functional organisation should be adapted to habits and daily use patterns of users. In parallel to this view, Franck gives reference to the description by Walter Benjamin, which proposes a recipe of architecture that emerges through both via conscious channels of perception and subconscious channels of use and habits (2008, p. 21). In a space tuned by the pattern of use and habits, one does not need excessive attention to find his route or to benefit from the space for his daily actions. Only when man feels spatial comfort, his concentration can penetrate into deeper layers of the architectural atmosphere.

What is noteworthy is that the relationship between habitual patterns of use and functional organization of space is bidirectional, that is, the user's habits are also formed by space. To put it in the words of Bachelard, our attachment to architecture is embedded in "how we inhabit our vital space, in accord with all the dialectics of life, how we take root, day after day, in a 'corner of the world' " (1994, p. 4). Apparently, Bachelard confirms that the existential space is shaped according to the

manner of inhabitancy as well as to the habits and rituals of daily life. During this process, he conceives time as a bounding factor. By situating the inhabitant inside ‘a corner of the world’, he also points to our intimate attachment to the outer space even if we are enveloped by the core spatiality, namely, our dwellings. Such pattern of inhabitancy proposes an ambiguous and dynamic interaction between the user and the space, which is desirable to seize a tone of intermodal resonance.

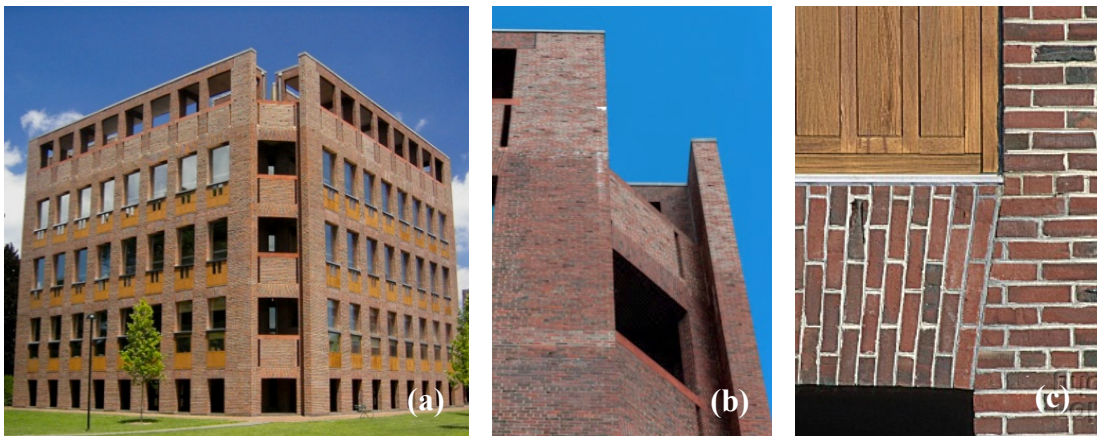
### **3.1.1 Subtlety of details**

Architectural details are the critical points where the continuity of comfort conditions and functional solutions are ensured. Moreover, details specify and modify the overall impact of an architectural product. Zumthor talks about our inclination to grasp details in order to get attached to a finished building (1988, p. 25). Indeed, what makes a building recognizable and apprehensible are the subtle details that are wise solutions to specific structural or functional requirements. Franck believes that architectural details with such subtle solutions evoke an aesthetic taste because they achieve to subliminally attract the attention of the beholder (2008, p. 63). Altogether, subtle details are contextual nodes beyond being mere constructional joints; hence, they are inseparable from the whole. To describe this physical and contextual dependency in the words of Zumthor, “[e]verything refers to everything” (1988, p. 25).

Samples of classic architecture are renowned and beloved by their unique details. To a great extent, these subtle details ‘classify’ the building. Franck states that classic architecture is the one which is no more to be repeated since its solutions are unique to the conditions of an era of former time and in coherency with the requirements of a case belonging to past (2008, p. 66). In this sense, most of the works of Louis Kahn are to be listed under the architectural classics of twentieth century. Pallasmaa underlines that works of Louis Kahn are beyond the rules of the flow of time and symbolizations of any sensation, rather, they are the architectonic mediums to drag the beholder to an intensified experience of his own self (1999, p. 133). “Philips Exeter Academy Library” is one of his masterpieces, where he establishes such medium by combining brick, concrete and wood in an elegant manner.

Initially, this unique library building welcomes the visitor by the warm and modest appearance of its exterior walls (**Figure 3.1a**). These load-bearing brick walls are

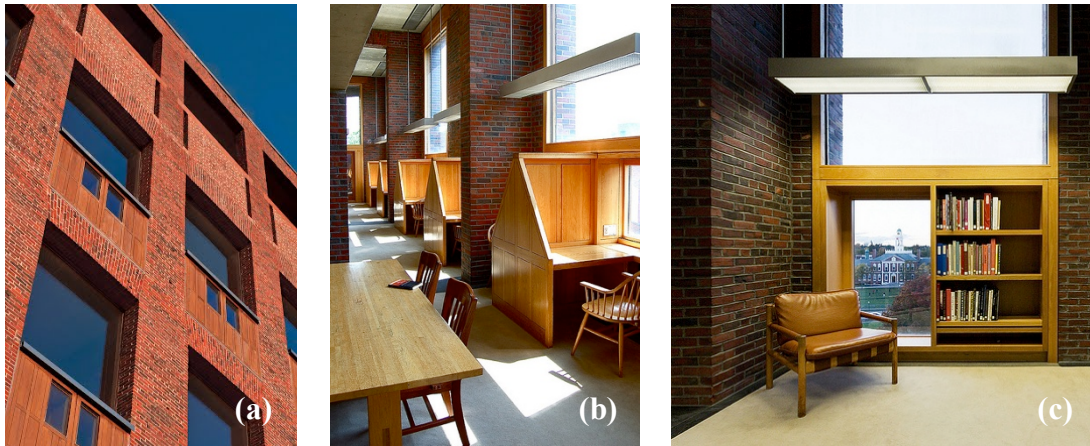
bounded by angular corner detail, which moderates the transition among heavy outer walls (**Figure 3.1b**). When a closer glance is cast onto the walls, it is noticed that the bricks are in different colours ranging from deep red to brown or even black; generating a natural-looking facade textile, which in turn awakens a tactile sensation. Moreover, upper parts of the windows are covered with vertically placed bricks, whose angular deviation slightly increase beginning from the mid-point above the window opening and reaching to (**Figure 3.1c**). This nuance evokes an illusory impression as if the window was placed under an arch. Almost, stated by Louis Kahn himself, “[t]he brick wants to become an arch” (Pallasmaa, 2005, p. 67). All along the facade, variation in the colours of bricks forms a haptic granularity whereas angular positions of bricks comprise visual ambiguity.



**Figure 3.1** : (a)“Philips Exeter Academy Library” by Louis Kahn (Url-14). (b)Angular corner detail (Url-15). (c)Brickwork detail (Url-16).

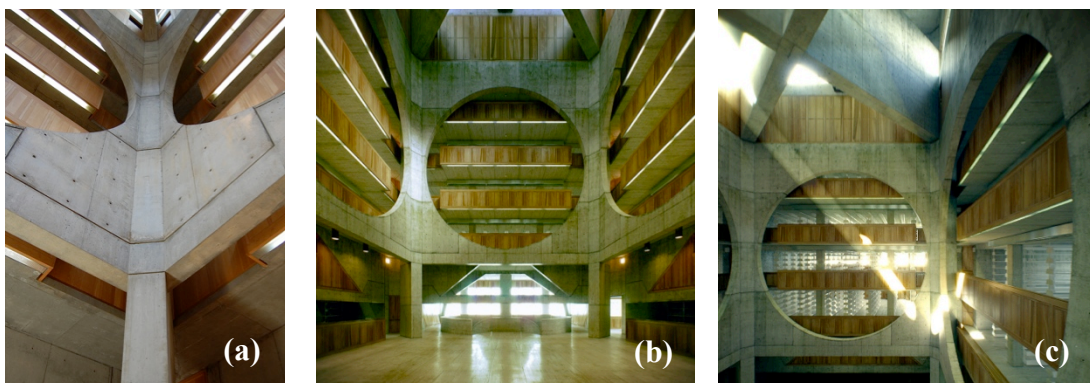
As for the wooden elements placed below glazed openings, from the outer view, they seem to be the base structures where the windows are laid on (**Figure 3.2a**). As a surprise in the interior, they function as either private study desks (**Figure 3.2b**) or book-shelved reading niches with highest possible gain of daylight and landscape view (**Figure 3.2c**). Apart from its functionality, the special wooden detail is so accurately dimensioned that it is an inseparable part of not only the facade but also the interior design. The solution has the kind of subtlety that attracts the visitors by their tendency to prefer reading or studying in day-lit, window-side corners. Louis Kahn seems to have transformed this general tendency into built-in furniture and the elegance of the solution is hidden in this silent but powerful reference to daily habits of users.





**Figure 3.2 :** (a)Outer view of wooden elements (Url-17). (b)Built-in study desks (Url-18). (c)A reading niche (Url-19).

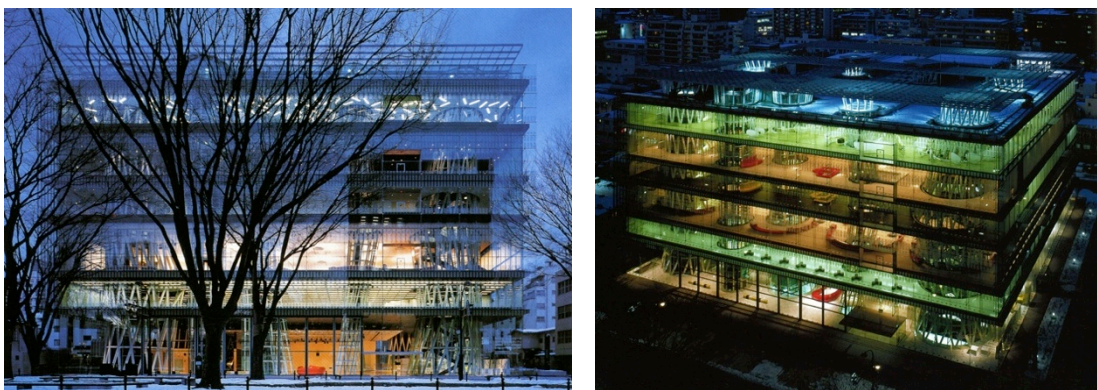
From the walls of the facade into the core of the building, the difference in the system and the material of load-bearing structure also enriches the spatial atmosphere of the building. Behind the load-bearing brick walls, book stacks are aligned on reinforced concrete slabs, which are carried by the inner load-bearing structure. Surrounded by this inner concrete structure, a remarkable volume of void forms an atrium, whose aura is softened by the angular corner detail (**Figure 3.3a**) and the round openings within the raw concrete (**Figure 3.3b**). What is more striking is that the dramatic mood the atrium gains when sunlight beams leak in through the huge concrete cross below the roof level and hit to the interior surfaces (**Figure 3.3c**). In this way, the atrium turns into an intermodal blend of sounds and gleams where footsteps of visitors are glorified and merged into the plays of sunlight. Contrary to the silent density of study areas on the upper floors, the atrium forms an enormous void bearing a strong resonance among senses. Moreover, juxtaposition of these two contrasting modes of spatial atmosphere sets a contextual ambiguity.



**Figure 3.3 :** (a)Angular corner detail (Url-20). (b)Round openings surrounding the atrium (Url-21). (c)Rays of sunlight cast onto inner surfaces (Url-22).

### 3.1.2 Subtlety of functional flow

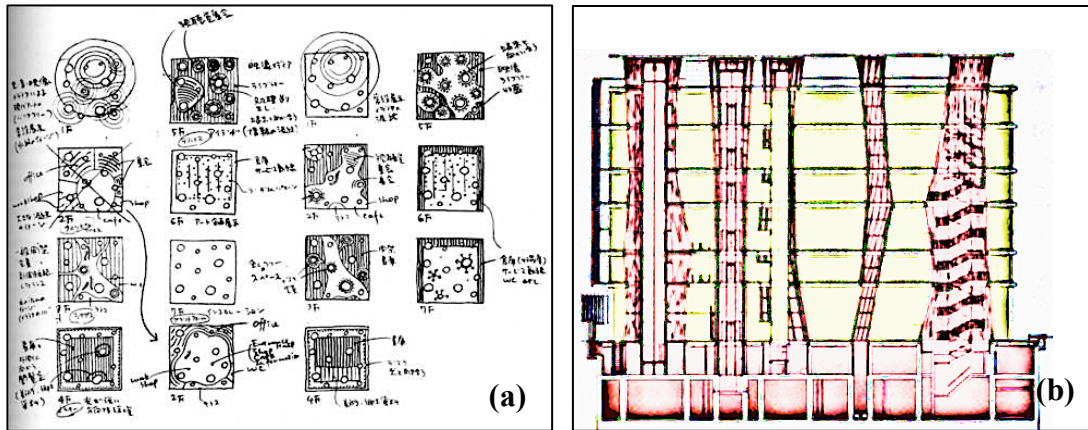
Regardless of scale and typology of architectonic space, realization of true functional flow is of fundamental importance. True articulation of multiple functions is possible via overlapping conceptual schema of activity zones with the sketch of spatial organization. As Bernard Tschumi states, “[t]he architecture of pleasure lies where concept and experience of space abruptly coincide, where architectural fragments collide and merge in delight” (1977, p. 268). Here, Tschumi portrays a vibrant encounter between the conceptual and the spatial. In terms of such synergetic togetherness of functional flow and spatial organization, “Sendai Mediatheque” by Toyo Ito is an outstanding example. Through a quick look from outside, the transparent facade reveals the multi-purpose nature of the building by the variance in the floor height and illumination type (**Figure 3.4**). In this way, the building achieves to enter into a visual communication even with the passer-by.



**Figure 3.4** : “Sendai Mediatheque” by Toyo Ito (Url-23, Url-24).

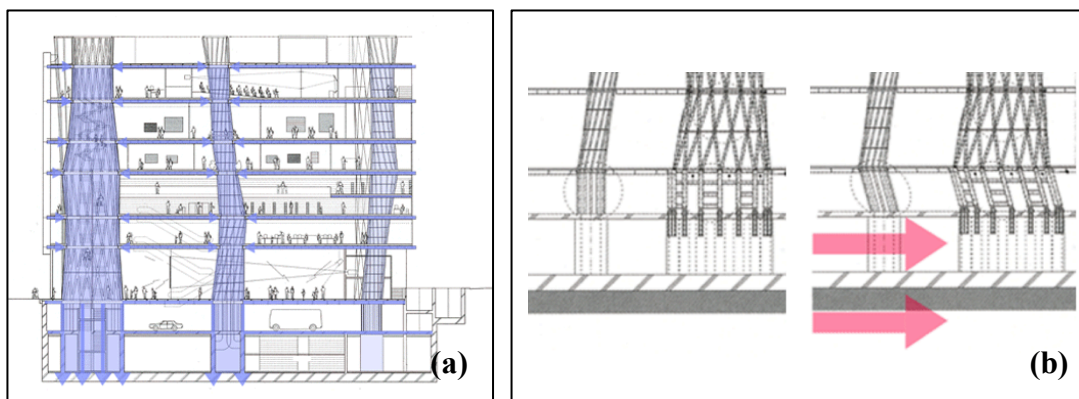
However, speciality of the building is more about its success in the maximization of clear space for social activities and the method of separating the served space from the serving space. In this regard, the vertical steel bundles are the most critical elements whose multi-functional utilization innovates the common types of functional organization, ascribing a unique value to the project. The vital veins of the building, namely, thirteen vertical steel tubes undertake a wide variety of functions. To begin with, functional flow diagrams drawn specific to each level of the building delineate how the vertical steel tubes act as pivot points in horizontal distribution of activity zones (**Figure 3.5a**). The section demonstrates how all the serving facilities and elements of vertical circulation are encapsulated by the tubes in the way that the remaining space is completely left open (**Figure 3.5b**).





**Figure 3.5 :** (a)Diagrams of functional flow on different floors (Ur1-25). (b)Section defining vertical tubes by pink colour as servant spaces and the remaining volume by green colour as served spaces (Ur1-26).

As can be expected, the tubes take part in the structural system of the building. Four largest tubes near the corners are the principle means of support and bracing. One of the most fundamental properties of these columns is that they have been specially designed to play an active role in minimization of the destructive effect of earthquakes. In case of exposure to seismic loads, rigid lattice tubes connected to the foundation start to display ductile behaviour (**Figure 3.6a, Figure 3.6b**). For a seismically active country like Japan, it is a lifesaving design which, indeed, helped the building to survive from the largest Japan earthquake of all times with the magnitude of 9.0  $M_w$  (according to moment magnitude scale).

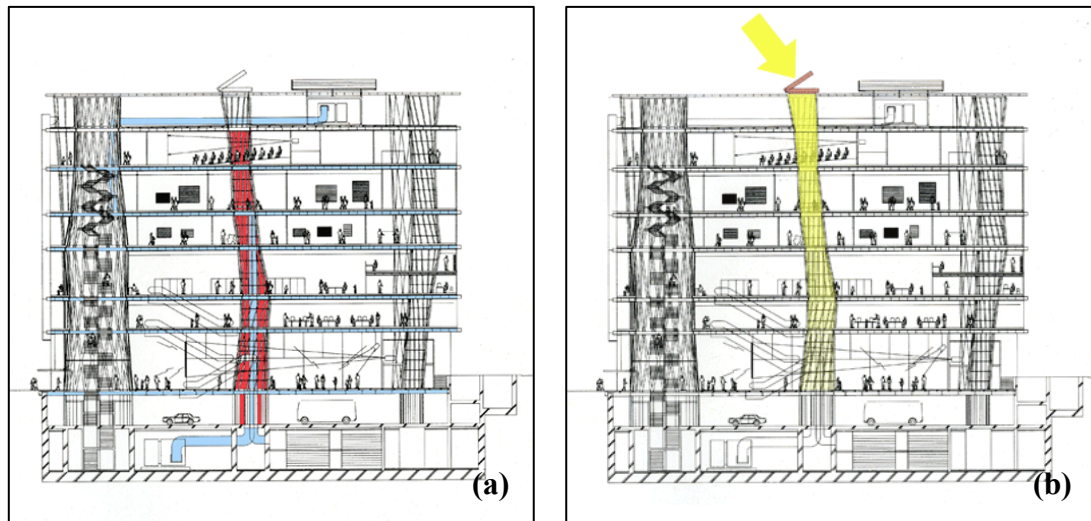


**Figure 3.6 :** (a)Gravity load distribution system (Ur1-27). (b)Ductile behaviour of rigid lattice tubes in case of exposure to seismic load (Ur1-28).

The tubes do not only play role in the structural system but also take part in the lighting and the passive climate control systems. Enclosing ducts and wires, some of the tubes act like supply or return pipe of air-conditioning system (**Figure 3.7a**). Moreover, two of the tubes transmit daylight to lower floors via sunlight tracking



system (**Figure 3.7b**). The remaining five tubes envelope the elevators and the stairs, which open into the floors varying in typology, floor height and interior design.



**Figure 3.7 :** (a)Diagram of air-conditioning system (Url-29). (b)Diagram of sunlight tracking system (Url-30).

Hosting different typologies such as art studio, gallery, library, information centre and plaza, the inner atmosphere of floors are characterized by the choice of materials, lighting system and furniture, which are all specific to the functional requirements (**Figure 3.8**). Each floor exhibits a different spatial atmosphere, where the furnishing is implemented according to the layout of the multi-functional steel tubes. Correspondingly, flow of users is also shaped in relation to functional zoning, which is clarified by furnishing. At this point, vertical tubes act as nodes where people gather around, come out and go in. Altogether, both infrastructural requirements of the building and social expectations of users are fulfilled within or around the steel tubes in the way that vital needs of a living organism are perfectly met via its veins.



**Figure 3.8 :** Interior views of two floors in “Sendai Mediatheque” (Url-31, Url-32).

Thus, the building achieves to act like a natural mechanism whose functional systems are smoothly integrated and always process in absolute cooperation. Moreover, the organic articulation of functional flow confronts the users with contextual micro-consciousness. While one vertically circulates through the building, he becomes aware of the operative mode of steel tubes. However, when the tubes are perceived from inside the floors, they appear to be stationary. As for the outer view, the steel bundles evoke the impression that as if they were a group of twisting tree trunks. Overall, the multi-functional configuration and the formal design of the tubes refer to the organic flow of life, dragging the user into an empathic connection based on this two-folded analogy.

### **3.2 Spatial Balance of Privacy and Publicity**

Spatial balance in terms of filtering between zones of privacy and zones of publicity is another critical feature of architecture, which preserves the potential to ascend architectonic quality. Conceptually, boundaries and thresholds are regarded as two basic types of architectural filters. As Heidegger asserts, “[a] boundary is not that which something stops but, [...] from which something begins its presencing” (as cited in Norberg-Schulz, 1988, p. 46). In this sense, boundaries can also be conceived as initiators of a new degree of privacy. The nuance between boundary and threshold is a matter of degree, as well. Compared to boundaries, thresholds should be thought as more permeable passages among spaces with varying degrees of privacy. To call by the description of Norberg-Schulz, threshold is a “gathering middle”, which on the one hand, connects and on the other hand, separates (1988, p. 46).

Thresholds and boundaries may also be intangible dimensions such as time and verticality as well as tangible artefacts such as walls and doors. In either case, they are benefited to fine-tune the transitions between outdoors and indoors or within the interior itself. Playing a critical role in the articulation of spaces with discrete characteristics, boundaries and thresholds also trigger the emergence of authentic spatial relations besides mediating different levels of privacy.

### 3.2.1 Transition between outdoors and indoors

Nested within urban space or inside open landscape, quality of architectonic space is highly affected by the shift from outdoors into indoors. This critical transition is characterized by the manner in which the publicity or openness is transformed into privacy or closeness. Venturi emphasizes the importance of this transition by stating that the encounter of spatial and functional forces belonging to inner and outer environments is where architecture comes into existence (as cited in Norberg-Schulz, 1988, p. 34). Indeed, when it is considered within architectural scale, transition between outer and inner environments can be regarded as the most crucial threshold since ambient characteristics dramatically change.

The encounter between the exterior and the interior should also be conceived in relation to the macro scale of urban space as well as to the micro scale where the urban space palpates architectonic space. Franck (2010) emphasizes that architectural space extends itself into the urban space through a continuous chain of connecting and connected spaces, which exhibits gradient transition from publicity to privacy. He suggests the intertwined concept of ‘urban space-time’, in which ‘the hierarchy of nested spaces’ and ‘the hierarchy of synchronized rhythms’ are inseparable complementary aspects. As Franck elaborates, ‘the hierarchy of nested spaces’ refers to the gradient degree of privacy across interlaced spaces, which, in the end, unfolds itself into the urban scale. On the one hand, ‘the hierarchy of nested spaces’ is understood as the interaction of spatial layers hosting varying functions, thus, requiring different degrees of privacy. On the other hand, the definition proposes a continuum of space, where the boundary between the exterior and the interior could be left ambiguous.

Architects of the new era seem to have been innovatively engaged in the issue of spatial hierarchy, which have led them to come up with inspiring solutions. Radically breaking the rigid rules of home privacy, “House NA” by Sou Fujimoto offers an unconventional domestic lifestyle (**Figure 3.9a, Figure 3.9b**). Not only the never-ending communication with the surroundings via maximized transparency but also the instant interaction among multiple levels pose a new way of home-life.



**Figure 3.9 :** (a)Physical model of “House NA” by Sou Fujimoto (Url-33).  
 (b)Frontal view of the house (Url-33).

“House NA” is comprised of twenty-one different levels interlocked by furniture-like steps. Via the tree-like hierarchy of nested spaces, all volumes remain in a continuous dialog with one another through horizontal, diagonal and/or vertical communication; either visually or auditory or both (**Figure 3.10**). However, if desired, curtains swaying between different levels may be used to temporarily block the visual contact.



**Figure 3.10 :** Interior views from “House NA” (Url-33).

During daytime, the dwelling synchronizes itself to the rhythm of street life in terms of absolute awareness of the movement of the sun and the intensity of shifts among different hierarchical levels. Hiding itself behind the curtains after sunset, domestic life becomes introverted; just like the urban space that lends the crowds of people to their homes, only to borrow them back the following day. Moreover, one is awarded with an augmented vista of the surroundings in the way that the neighbourhood is



perceived as multiple horizontal fragments when observed from each level of “House NA” (**Figure 3.11**).



**Figure 3.11** : Perspective street views of “House NA” (Url-33).

Overall, the house drags the dweller into a continuum where surrounding vista, sense of time, muscular movements directed by verticality, alteration of daylight and exposed rhythm of daily habits bear an intermodal resonance. If not by exactly the same means, such resonance is also evoked by another work of Sou Fujimoto, “House N” (**Figure 3.12**).



**Figure 3.12** : Perspective street views of “House N” by Sou Fujimoto (Url-34).

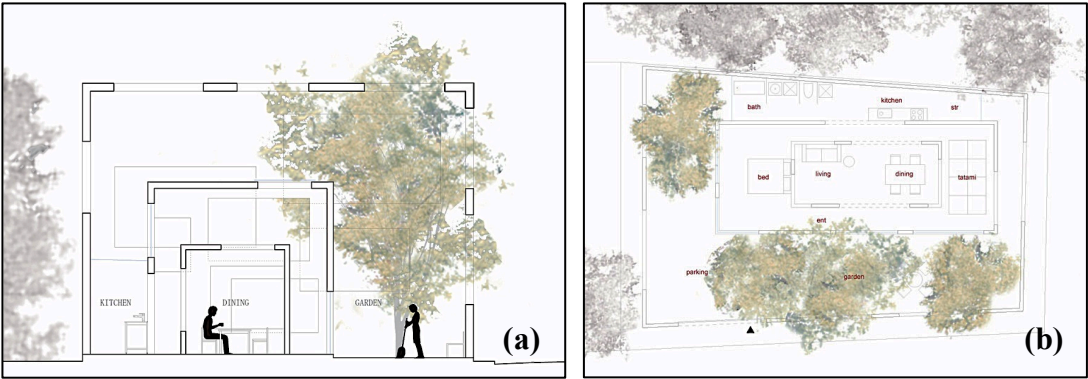
“House N” loosens the tension arisen by the sudden collision of inner and outer spaces via remarkably extending the transitional zone between outdoors and indoors (**Figure 3.13**). Ambiguation of the strict separation between the interior and the exterior opens up a new concept of ‘future house’. Designed as a product of this concept, “House N” is aimed to host a rich collection of “fluid transitions” (Norberg-

Schulz, 1988, p. 34), in which the spatial encounter between inside and outside is blurred.



**Figure 3.13 :** Schematic description of the concept of “House N” (Url-34).

When compared to “House NA”, “House N” provides the dweller with a higher degree of privacy in terms of visibility of indoor activities to the passer-by. Though, the user is not deprived of a wide field of exterior view. The house consists of three nested boxes which permeates daylight, square-framed view of the ‘other side’ and even fresh air directly via glassless openings. Although the dweller does not physically ascend to an upper level, alteration in the ceiling height (**Figure 3.14a**) and spatial volume gradually enlarging from the core to the outer skin (**Figure 3.14b**) make him feel like so. In this way, even though the dweller is ‘inside’, he remains in close contact with not only ground level but also the sky and the sun.



**Figure 3.14 :** (a)Section of “House N” (Url-34). (b)Plan of “House N” (Url-34).

Apparently, daylight is intensively benefited as a natural source of illumination. As can be seen in **Figure 3.15** and **Figure 3.16**, daylight is dispersed via reflections across white surfaces of walls and filtered through partly overlapping ceilings. In this

way, the dweller is not disturbed by direct sunlight. Moreover, sunlit and shaded zones themselves direct the user about the choice of place for an activity. For instance, one may choose to place his study desk inside a sunlit zone whereas he prefers his armchair to be in the shaded zone of the living area (**Figure 3.15**). Altogether, permeable walls and daylight act as ambiguous thresholds between different activity zones, parsing the space into fragments of daily life. Overall, ambiguity about the physical boundaries of indoor and outdoor activities and gradual evolution of the city life into domestic life escalate the aesthetic value of the dwelling.



**Figure 3.15** : Spatial transitions in “House N” (Url-34).

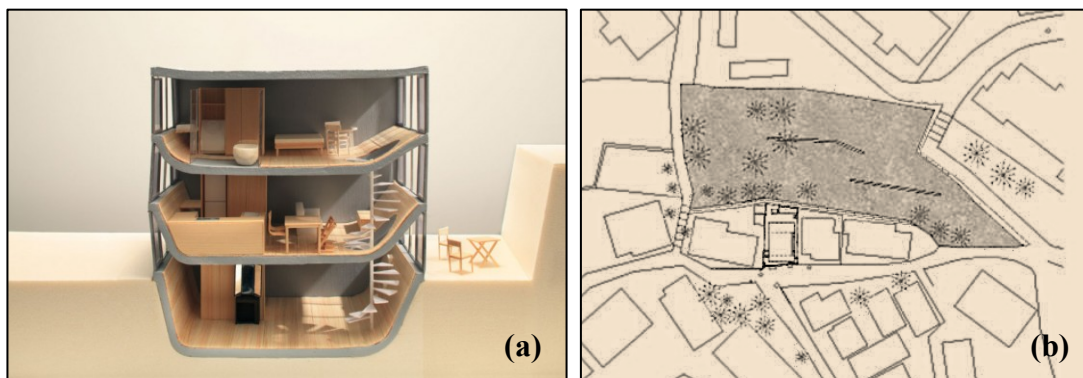
Designed by another Japanese architect, Takeshi Hosaka, “Yokohama House” is another outstanding architectural sample in which the issue of home privacy is genuinely tackled (**Figure 3.16a**, **Figure 3.16b**). The wise structural solution not only results in utilization of the buildable space at maximum efficiency but also helps the dweller to avoid visual contact with a passer-by on the street level.





**Figure 3.16 :** (a)Back view of “Yokohama House” (Url-35). (b)Street view of “Yokohama House” (Url-35).

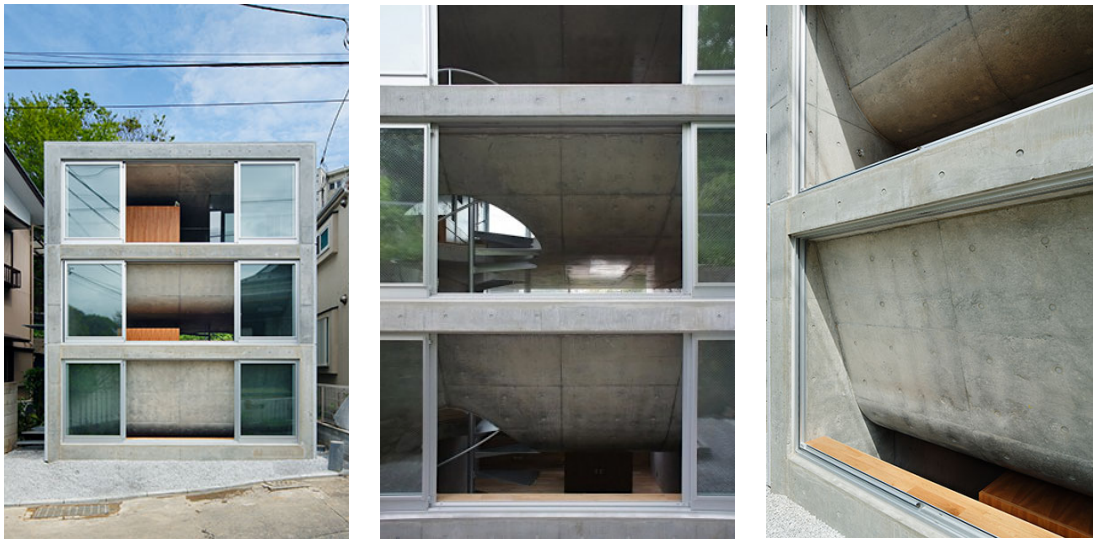
As the physical model shown in **Figure 3.17a** clearly exhibits, concrete floor slabs become concave up as they approach the facade of the house. Notably, slabs bend more steeply as they reach up to the front facade in order to provide the user with the comfort of knowing not to be seen by a passer-by. Although the curvature of slabs block undesired glances, it does not seriously interfere with the level of sunlight gain. The formal alteration of slabs is more or less valid for the back facade. However, the slabs turn out to be concave up at a milder slope as the required level of privacy has already been supplied by a retaining wall a couple of metres away from the back facade. Instead, the function of the concavity is to direct the look of the dweller upwards, where there is a view of landscape opening up above the wall (**Figure 3.17b**). Whether it is the front or the back facade, concavity angle of slabs and degree of hollowness of the floor decrease from the ground floor to the top floor. In this way, every floor, which also functions as a separate room, earns a different spatial character.



**Figure 3.17 :** (a)Model of “Yokohama House” (Url-36). (b)Site plan (Url-35).

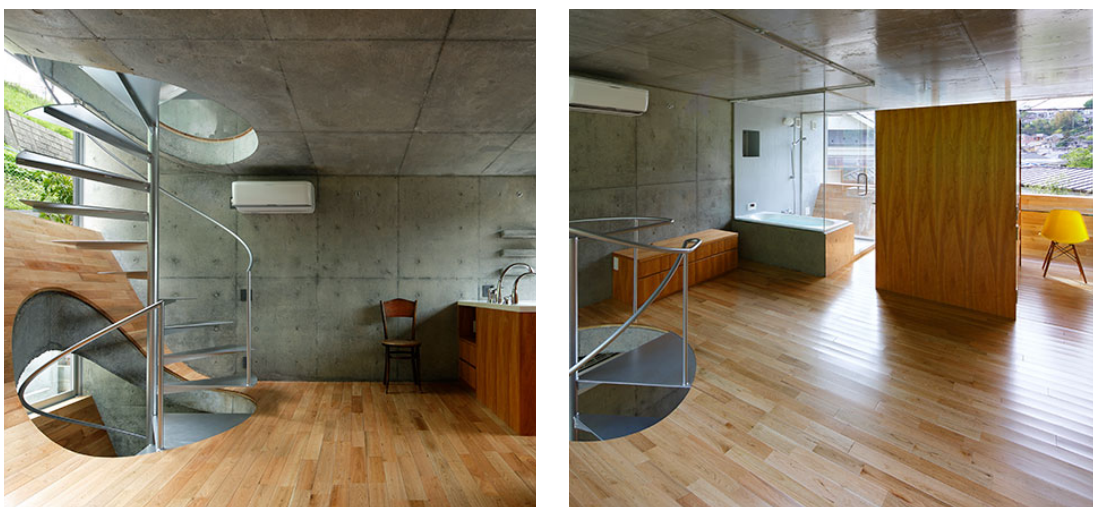


When one looks at the facade of the house from a certain distance, he may get the impression that grey curtains behind the sliding windows screen the domestic life. However, as one approaches the house, he realizes that the filter of indoor life is of nothing light and soft like curtain, yet, rigid concrete (**Figure 3.18**). This case of micro-consciousness indicates that the beholder falls into not only a perceptual but also contextual fallacy. All of a sudden, the dwelling turns out to be an introverted space for an eye looking from outside.



**Figure 3.18** : Different views of concrete slabs (Url-35, Url-36).

However, when experienced from inside, the impression gets reversed for two reasons. First, the interior is surprisingly bright, gaining daylight via not only both facades, but also the staircase. Secondly, the dwelling captures quite a nice view of landscape to be enjoyed all through the floor (**Figure 3.19**, **Figure 3.20**).



**Figure 3.19** : Interior views from “Yokohoma House” (Url-35).



**Figure 3.20 :** Interior views from “Yokohoma House” (Url-35).

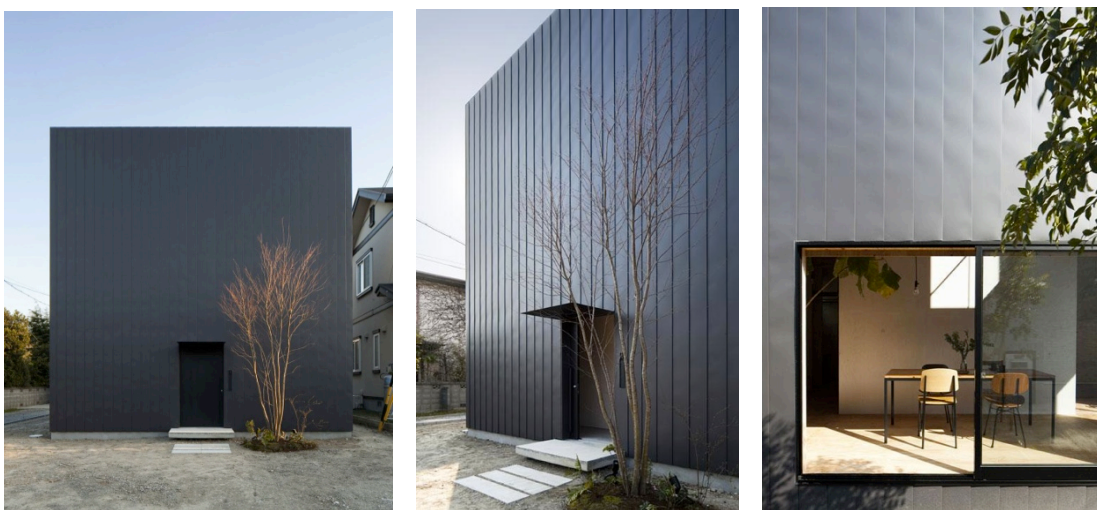
In order to be able to deal with the spatial ambiguity of “Yokohoma House”, it may be beneficial to consider some definitions that are related to the point. Zumthor, for instance, suggests two main identifications of spatial configuration: closed and open. He identifies closeness as introversion of space whereas he defines openness as extroversion of space into eternal spatiality (1988, p. 21). In this sense, welcoming the external world into the body of the architectural space is the way of entering communication with the world in not only local but also global sense. To mention, Heidegger believes that “[l]iving among things is the basic principle of human existence” (as cited in Zumthor, 1991, p. 34), which regards the interaction with environmental elements essential. Though “Yokohoma House” preserves a certain level of closeness, it does not deny its vital dependence on the environmental elements and even to a limited degree, opens itself to interact with the outdoor life. Thus, the building fits to a mid-place on the scale ranging between openness and closeness.

### **3.2.2 Transition inside indoors**

In terms of characterization of architectonic atmosphere, inner spatial transitions are as fundamental as the transitions from outdoors to indoors. To a great extent, the manner in which tangible or intangible thresholds are utilized as an architectural filter determines the spatial quality. In this section, time, void and verticality are to be evaluated as thresholds of inner spatiality since they preserve the potential to awaken intermodal resonance when wisely articulated to tangible thresholds or boundaries.

To begin with, time is an intangible filtering element of architecture. Even though the functional layers are physically detached, they are linked by patterns of use through time. Here, these layers should be understood as either juxtaposed or overlaid, but never totally separated since every human activity is more or less fed from others. The idea is similar to what Franck (2010) intends to mean by ‘the hierarchy of synchronized rhythms’ in urban scale, in other words, time-based distributed patterns of simultaneous urban space use. The overall pattern of daily use of urban space is what makes the city co-function as a whole living mechanism. Although it is also possible to adopt Franck’s definition to refer to the daily use of architectural space in a macro-scale building, small-scale architecture may require an additional description.

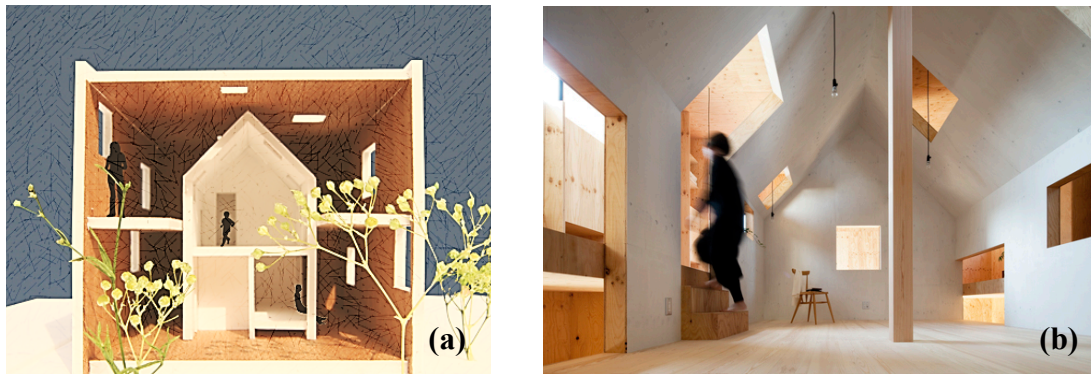
The basic reason bearing the requirement for a new definition is the vast difference in the number of users dramatically varying from macro to micro scale. Urban scale is more concentrated on time-based common activity patterns formed by crowds of people whereas small-scale architecture tends to focus on the individual-based daily patterns of activity. Urban scale shows interest in relatively long-term estimations whereas small-scale architecture is also challenged by short-term life cycle. From now on, ‘successive rhythm’ is to be used in order to give reference to user-centred, daily activity patterns of micro-scale space. Shared by limited number of people, private dwellings exemplify successive rhythms rather than synchronized rhythms, which is to be demonstrated by the following project, “Ant House” (**Figure 3.21**).



**Figure 3.21** : Exterior view of “Ant House” by mA-style Architects (Url-37).



To a surprise for a newcomer, the house discloses a gable-roofed inner space whose floor heights differ as inversely proportional to the primary space (**Figure 3.22a**). Therefore, as can be seen in **Figure 3.22b**, both of the main levels of the house are included in the visual field of the room below the gable roof. Altogether, the user encounters a variant space in which floor height and geometric configuration of rooms are notably altered.



**Figure 3.22 :** (a)Sketch showing spatial interactions in “Ant House” (Url-38). (b)Visibility of the gable-roofed room (Url-38).

As one settles down at the kitchen table, he is confronted with either the exterior view through or high white wall and he gets the feeling of extra spaciousness by the two-storey height of the dining area (**Figure 3.23a**). When it comes to cooking, the dweller is led to a warm corner under a lower ceiling, which could partly be observed from the second floor (**Figure 3.23b**). In this regard, when man passes onto another daily action within the course of a day, he feels the change in the characteristics of space (**Figure 3.23c**).



**Figure 3.23 :** (a)Dining area (Url-37). (b)Cooking area seen from the second floor (Url-37). (c)Differentiation of spatial characteristics (Url-37).

To continue with the second floor, the mid-space acts as a common transition room between the two private rooms. By its colour, geometric form, illumination level and visual connection to the other rooms of the house, the gable-roofed room is an open-ended space. Looking from one of the private rooms, one gets the impression that as if it the gable-roofed room was an adjacent neighbour house, whose interior could be seen through its unglazed windows (**Figure 3.24**).



**Figure 3.24** : Gable-roofed room view from both sides (Url-37).

When experienced from inside, the gable-roofed room resembles an attic space, which gains daylight via skylights. In reality, the roof-like ceiling of the room does not have direct connection to the exterior environment. However, the openings inside the real roof of the house and the unglazed openings of the room visually overlap so that an illusionary perception could be created (**Figure 3.25**).

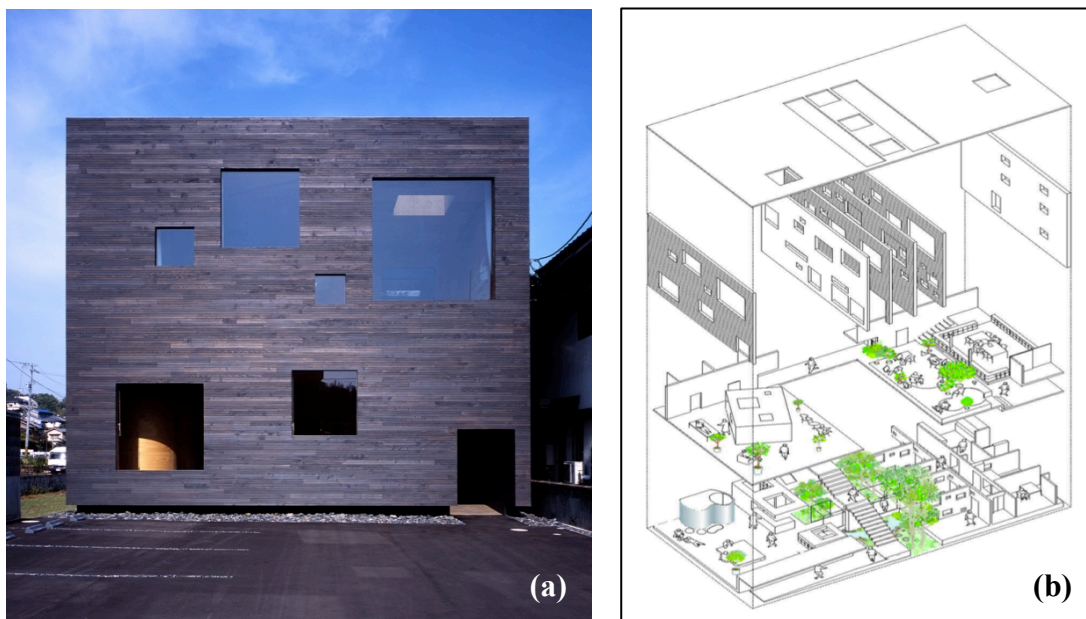


**Figure 3.25** : Visual overlap between the unglazed openings of the gable-roofed room and the glazed openings of the roof (Url-37).

As a result of its unusual spatial layout, “Ant House” attempts to solve the problem of separation and connection by means of not only spatial levelling but also timing of daily actions. During daytime, while some users are engaged in cooking and other activities on the ground level, gable-roofed room seems to be an ideal space to deal

with a task without losing audial and visual contact with the other people sharing the house. If one needs more privacy, he can also prefer to be in his own private room on either side of the upper floor. However, at night, the gable-roofed room is expected to function as a space divider between the two private bedrooms. The mentioned cases should be conceived as only one of many possible daily scenarios that are highly dependent on user profile and number of habitants. In any way, the flexible layout differentiates the patterns of daily use. Altogether, the ambiguity of spatial thresholds allows the user to try out new patterns of successive rhythms.

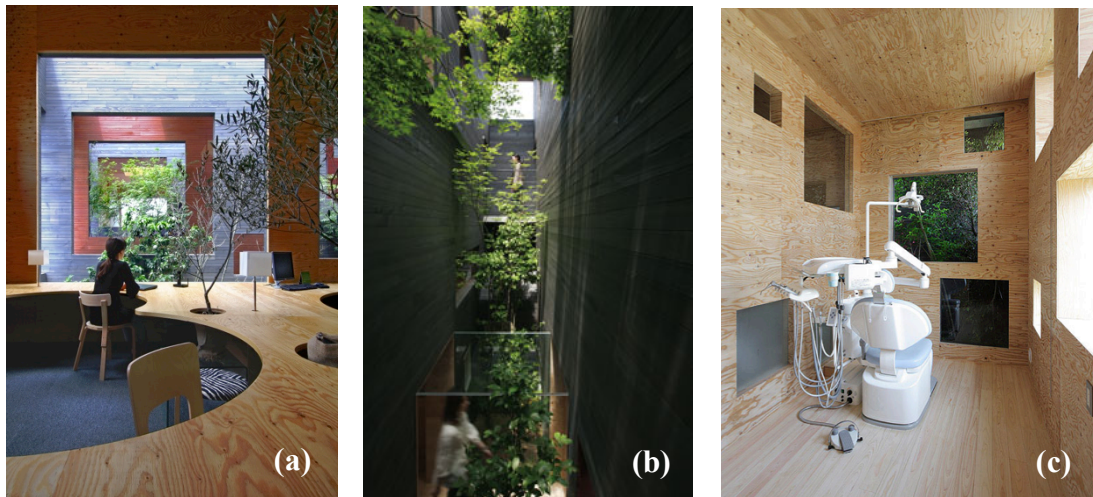
In some cases, the real spatial threshold or boundary is not exactly a tangible separator placed between two spaces, yet, the distance between them and sometimes the void itself. A dentist's surgery called "Mori X Hako" (**Figure 3.26a**) designed by UID Architects exemplifies an interior space where void is utilized as a threshold along with the help of plants and semi-closed vertical dividers. Hosting a staircase and horizontal passages bridging the two halves of the building, the void establishes a buffer zone between the two open-space rooms on the second floor. Moreover, most of the rooms are awarded with the green view of the vertical garden lying along four different layers of walls. Illusorily perceived to have been nested one within the other, the square-formed openings form a visual multiplicity when they overlap across the distance (**Figure 3.26b**).



**Figure 3.26 :** (a)Front view of "Mori X Hako" (Url-39). (b)Axonometric view of the vertical garden (Url-39).



In the same way, one wall of each surgery room appears to face an exterior garden though it has no exterior wall. Perceptual micro-consciousness in these illusionary encounters intensifies the aesthetic taste extracted from the inner gradient transition. Overall, the inner void is utilized as a vertical garden (**Figure 3.27a**), circulation area (**Figure 3.27b**) and a threshold of privacy (**Figure 3.27c**), by which the spatial quality of the whole building is enhanced.



**Figure 3.27 :** (a)Vertical garden viewed from the open-space room (Url-39).  
 (b)Passages connecting the two halves of the building (Url-40).  
 (c)Garden view acting as a threshold for privacy (Url-41).

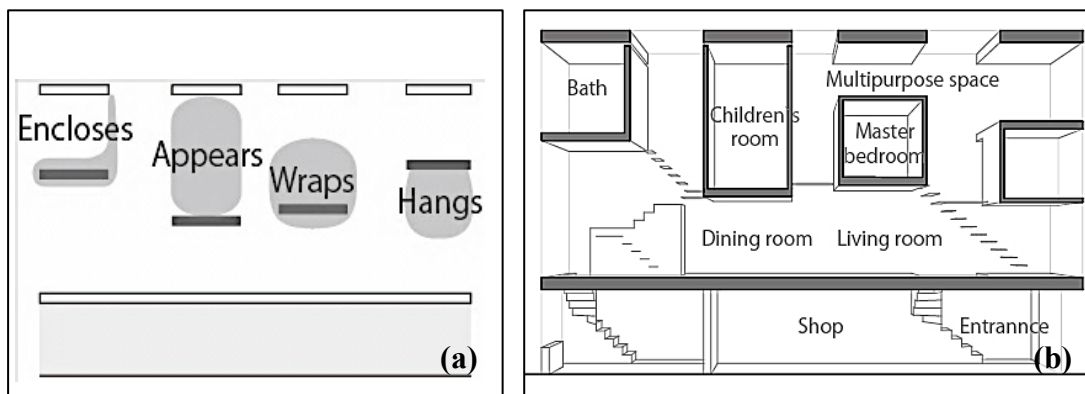
Verticality may also act as an architectonic threshold. Bachelard (1994) puts emphasis on the intimacy value of verticality in architecture, especially in the spatial hierarchy of dwellings. In Bachelard’s sense, cellars can be regarded as the ‘roots’ of the house whereas attics are the inner space underneath the ‘hoods’ of dwellings. As for stairs, they are the bounding element of domestic life loops, in which the muscular movement of going up is more challenging since it marks ascension into the ‘next level’ of space. From the cellar to the attic, the dweller feels as if the vertical levels of the house were separated by his act of climbing stairs. In this regard, the bodily action is the separator between the levels of the dwelling, starting from “the cellar of fears” and going up to “the attic of daydreams” (Bachelard, 1994).

“Kozuki House” is a ‘vertical house’ in the sense of Bachelard. Designed within a limited buildable volume, the house suggests a space-saving vertical life. Along with the whiteness of interior surfaces, the floating boxes nestled inside one single space evoke the feeling that the interior is more spacious than it actually is (**Figure 3.28**).



**Figure 3.28 :** Feel of spaciousness in “Kozuki House” (Url-42).

As can be read from the conceptual diagram (**Figure 3.29a**) and the section of the house (**Figure 3.29b**), verticality is not only the connector of successive levels but also the determinant of spatial characteristics in floating rooms. As a space demanding high-level privacy, bath is designed as an ‘enclosed’ box, nestled within the top corner. The children’s room, which needs to be kept under eye, ‘appears’ as the most visible space with the highest ceiling. Master bedroom seems to be a more isolated floating cube, ‘wrapped’ by void from all directions. As for the other corner module, it appears to be ‘hanging’ over the entrance, configuring a multipurpose space within and above itself.



**Figure 3.29 :** (a)Conceptual diagram (Url-43). (b)Section of Kozuki House (Url-43).

Although the house does not have a cellar and an attic space in the conventional type, the entrance floor gives the sense as if it was the cellar of the house since it is notably darker than the upper floor. Literally, the multipurpose space hovering just below the skylights gives the sense of an attic space, which is expected to embrace daydreams

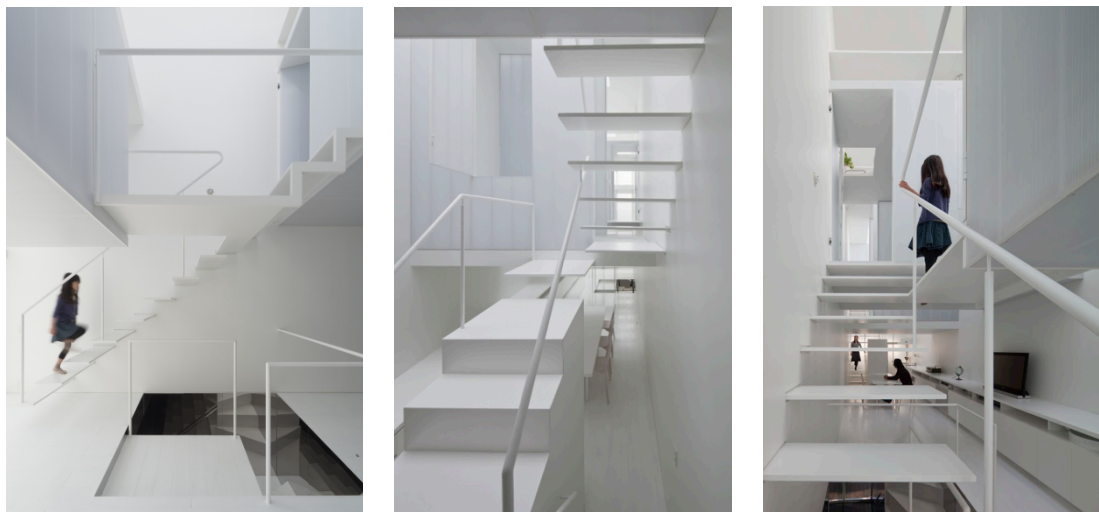


(**Figure 3.30a**). Gaining daylight also through a skylight, children's room with high ceiling also seems to have the light atmosphere to easily drag the kids into daydreams in the way that Bachelard would wish (**Figure 3.30b**, **Figure 3.30c**).



**Figure 3.30** : (a)Multi-purpose space (Url-42). (b)Children's room seen from inside the master bedroom (Url-42). (c)Children's room seen from above the master bedroom (Url-42).

By its vertical life, in which the users are dispersed throughout different levels, the house holds a successive rhythm. Varying in length and type, stairs specify the transitions among daily actions and directs the domestic rhythm (**Figure 3.31**). Due to loose spatial definitions, the dwelling forms a flexible pattern of home life without disregarding variant user expectations and alternatives of habitual use. Thus, ambiguity of the spatial layout allows each dweller to determine his own personalized rhythm, which enriches the chart of successive rhythms.



**Figure 3.31** : Stairs acting as spatial transition and determiner of domestic rhythm (Url-42, Url-44).



#### **4. THE ROLE OF SENSORY ASPECTS OF SPATIAL ELEMENTS ON INTERMODAL RESONANCE**

Apart from spatial and functional solutions, spatial elements themselves do play a fundamental role in intermodal resonance. Unique textures on architectonic surfaces, special joint details among components and nature of materials trigger resonance between tactile sense and vision. Variance in spatial proportions, dimensions, scale or geometric contours, built-in cavities forming nooks for dwellers and step-challenging details across the floor or stairs contribute to bodily self-awareness, namely, proprioceptive sense. Though auditory aspects of architectonic space are generally neglected, true combinations of materials and forms awaken a harmonic resonance between visual impact and aural atmosphere. Overall, haptic, kinaesthetic and aural properties of space bear a warm architectural atmosphere that reveals a strong resonance across multiple senses.

##### **4.1 Tactile Sensation via Spatial Elements**

When the point in question is architectural contemplation, there is a common bias that gives priority to vision over other senses. Contrary to the general view, especially tactile sense plays a fundamental role in appreciation of architectonic surfaces. Anthropologist Ashley Montagu underlines that all other sense organs are evolved from skin, which is regarded by Pallasmaa as a medical proof demonstrating that the sense of vision is also a differentiated form of haptic sense (2000, p. 322). In this regard, tactual perception can be regarded as an integral layer of all types of sensations. Vermeersch et al. (2011) believe that comprehension of blindness could help to overcome visual bias in architecture since visually impaired people achieve to obtain in-depth information about their ambient environment only through haptic, auditory and olfactory sensations. Tactile sense is a prominent source of information for not only the blind but also people with normal vision. However, the significant

advantage of haptic sensation for the normal-sighted people is that it may provide perceptual information about a faraway surface as well as a touched one. Therefore, Pallasmaa (2005) considers tactile sense as a latent layer of vision since it is the channel of sensation that actually elicits bodily impression of any distant surface that eyes can fetch. He goes on to say that the experience of the distant and the near weigh equal and fuse into one holistic sensation (p. 43). Indeed, tactual sensation may dramatically alter the nature of architectural contemplation by cooperation with other senses as well as vision.

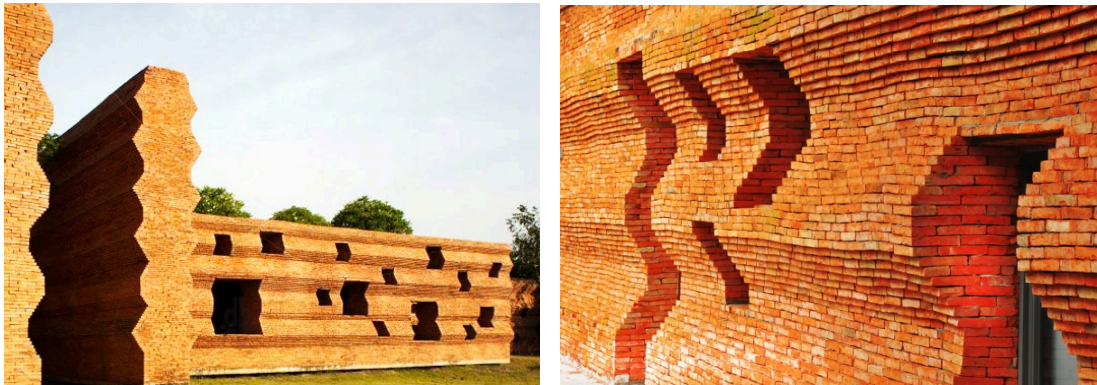
As elaborated above, there is an inevitable resonance between tactual and visual sensation. However, the more the haptic sensation is left in dilemma about what a surface or structure would feel like, the more powerful the intermodal resonance between vision and touch grows. In other words, moments of tactile micro-consciousness swaying between hardness and softness, heaviness and lightness, roughness and smoothness etc. open up a cross-modal ambiguity, which make a resonant perception out of the contradiction between visual and haptic sensation. Such ambiguity is experienced through haptic interpretation of the paper wall of a fashion boutique in New York. At first sight of the encounter with the boutique, twenty-five thousand paper lunch bags fully covering the interior wall evoke the sense that as if the wall was made from a soft fabric to be stroked. Contrary to the first impression, a closer glance makes the customer recognize the material and realise the actual tactile sense of the surface (**Figure 4.1**).



**Figure 4.1** : The paper wall of “Owen” by Tacklebox Architects (Url-45).

Similar to the paper wall of “Owen” swaying between the perception of softness and hardness, undulating brick walls surrounding “Kantana Film and Animation

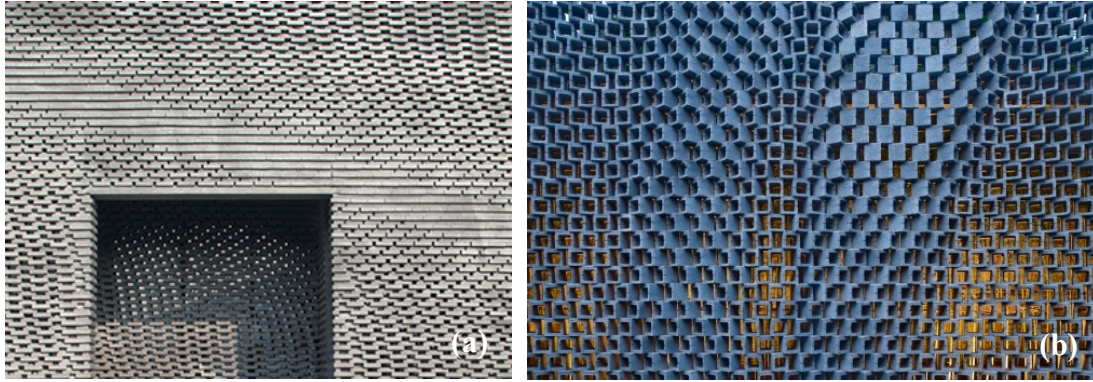
Institute” exemplify a haptic sensation shifting from smoothness to roughness. For a person who confronts with the building from a certain distance away, the brick walls appear to be smoothly undulated monolithic components. However, a closer look reveals the fact that the walls are made from thousands of bricks that are slightly offset along vertical axis so that an undulation effect can be given (**Figure 4.2**). Therefore, as one approaches the wall, a haptic micro-consciousness occurs, which astonishes the beholder by the fine granular structure that is able to give a smooth-looking waving effect. In addition to the arousal of resonance between vision and tactile sense, waving effect of the facade invites the perceiver to an empathic connection based on its similarity to the curvilinear lines of human body. Thus, while one enters a door or sits on one of the windowsills, he bodily perceives the wall via multiple sense modalities.



**Figure 4.2** : Undulating brick facade of “Kantana Film and Animation Institute” by Bangkok Project Studio (Url-46).

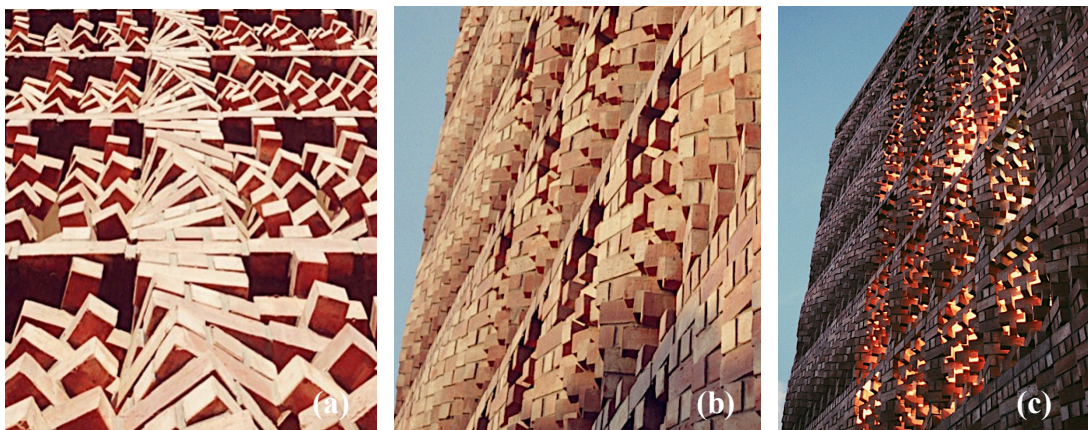
In a similar way, parametric configuration of two different brick walls designed by Archi-Union Architects evokes not only a variant haptic perception but also a special motoric sensation. Differing from the two former examples, haptic shifts take place independently of sight distance. Sharp shadows that are cast among the small bricks of “Lanxi Curtilage” reveal the kinaesthetic texture of the wall (**Figure 4.3a**). By the parametric arrangement of hollow bricks placed at almost all angles, the facade of “AU Office and Exhibition Space” evokes even a deeper kinaesthetic sensation (**Figure 4.3b**). As for the haptic impact, tactile shifts take place not only between concavity and convexity but also between transparency and opaqueness. As the eye wanders across the facade, the changing perceptual hierarchy of micro-consciousness leads the beholder to focus on either the kinaesthetic impact or tactile sensation.





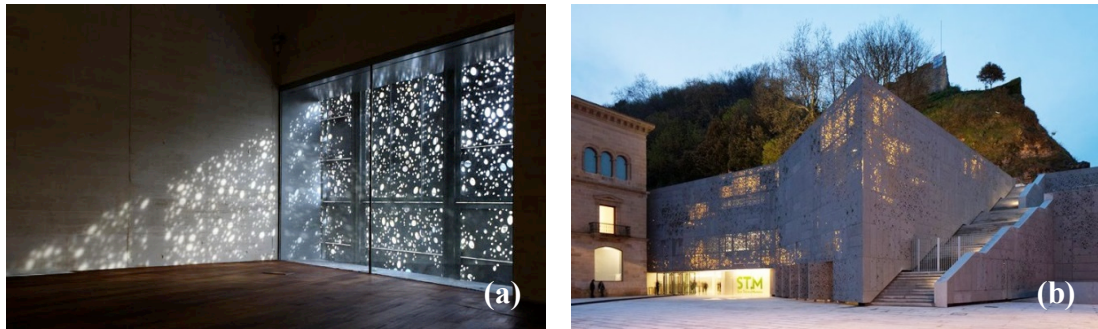
**Figure 4.3 :** (a)Exterior wall of “Lanxi Curtilage” (Url-47). (b)Facade of “AU Office and Exhibition Space” (Url-48).

The western facade of “South Asian Human Rights Documentation Centre” is another brick wall that has a special tactile effect (**Figure 4.4**). Functioning as a secondary barrier against excessive sunlight gain during summertime, the wall is almost entirely blinded. However, the rectangular zones of twirling bricks in the mid-part of the wall act like filtered windows so that undesired heat gain could be blocked. Although these semi-permeable zones do not look like any type of window during daytime, at night, indoor light leaking out through the twirling bricks re-characterises the wall. The common colour of artificial light turns out to be reddish due to the reflections among angled facets of red bricks in the way that the mid-part of the facade seems to be on fire (**Figure 4.4c**). In this regard, the tactual perception dramatically alters from day to night. Also, regardless of time, the facade evokes quite a different haptic effect when viewed from changing perspectives. Angle of view raises a haptic dilemma swinging between smooth undulation (**Figure 4.4b**) and sharp twirling effect (**Figure 4.4a**).



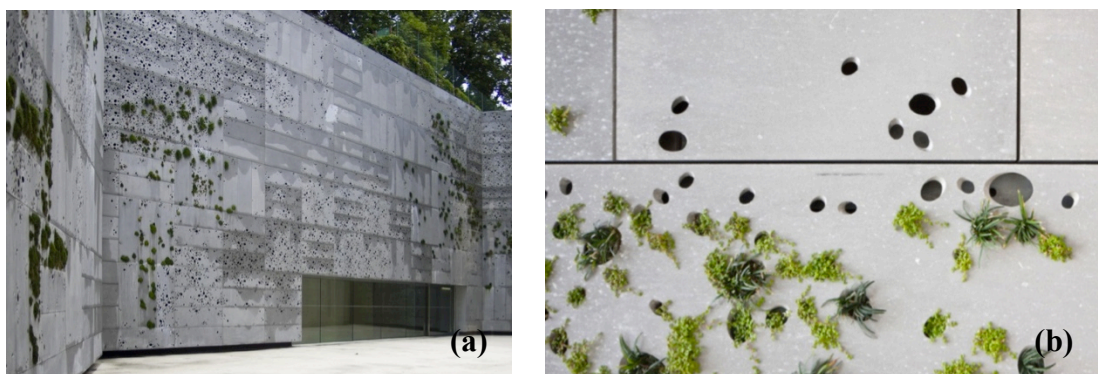
**Figure 4.4 :** The brick wall of “South Asian Human Rights Documentation Centre”: (a)Twirling (Url-49). (b)Undulation (Url-49). (c)Fire effect (Url-49).

Similar to the former example, the metal facade of “San Telmo Museum” gains different time-dependent characters, as well. During day, seemingly blind facade lets the sunlight in, which casts a granular light pattern on interior surfaces (**Figure 4.5a**). At night, the reverse occurs; granular light patterns become visible on the facade itself (**Figure 4.5b**). Dispersed across the steel enclosure, fine trails of indoor life configure a smooth transition from the natural landscape in the background to the built environment in the foreground (**Figure 4.5b**).



**Figure 4.5 :** (a)Granular light pattern on interior surfaces (Url-50). (b)Granular light pattern on the facade (Url-51).

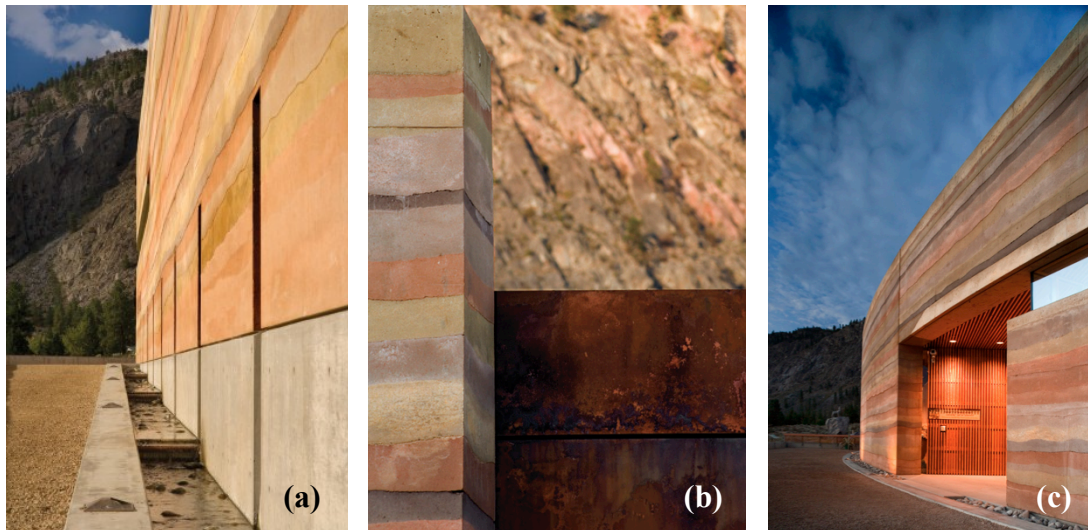
When a closer glance is taken during daytime, haptic connection to the natural background is better realised. Seen from a certain distance, the steel facade gives the impression that as if it was made of rectangular grey stones, which are partly wet or of concrete bricks, which are partly blossomed (**Figure 4.6a**). In fact, the wall is grown out of an intricate arrangement consisting of variant perforated steel panels whose outer surfaces are dyed in grey-scale gradient (**Figure 4.6b**). Apart from the alteration in colour and density of permeability, the blossomed perforations give rise to a haptic shift between naturalness and artificialness, leaving the exact nature of the wall ambiguous.



**Figure 4.6 :** (a)Facade view (Url-52). (b)Detail of facade panel (Url-53).



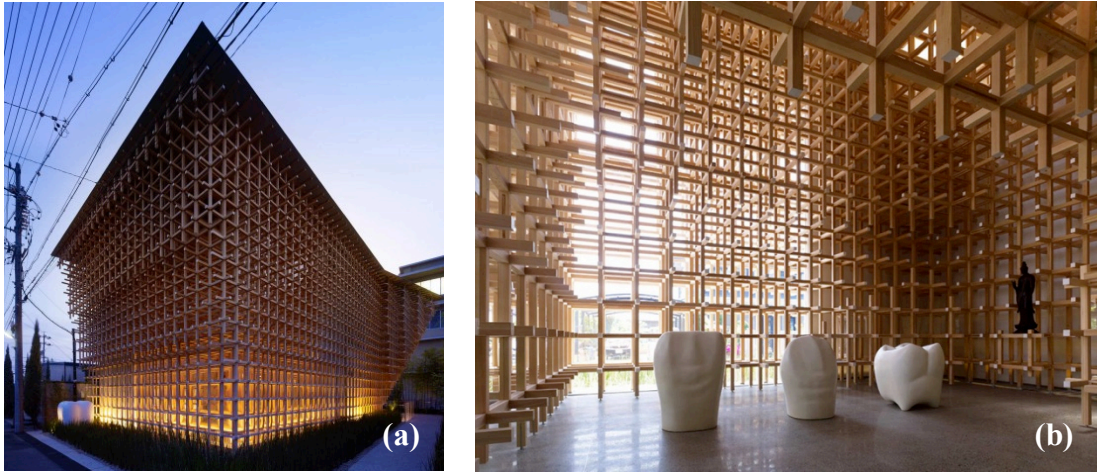
The facade of the following project exemplifies softness effect produced by rigid materials. Despite being built up from layers of different types of rammed earth, the exterior wall of “Nk'Mip Desert Cultural Centre” appears to be made from a self-textured, monolithic material (**Figure 4.7a**). However, when the wall is perceived closely, stripes of varying pastel colours betray themselves to be separate layers of discrete materials. Indeed, every single pastel colour stems from the mixture of cement with a different kind of local earth rammed under the upper layer of earth. Pastel-coloured stripes of varying types of local earth do not only represent haptic mildness but also bring out a great harmony with the background view of mountains (**Figure 4.7b**). Slightly curvilinear movement of the facade also contributes to the desired softness effect (**Figure 4.7c**). Colour change and textural differentiation within the same layer of earth strengthen the haptic effect, as well.



**Figure 4.7 :** (a) Monolithic appearance of rammed earth facade[54]. (b) Harmony with the mountain view (Url-54). (c) Curvilinear movement of the facade (Url-54).

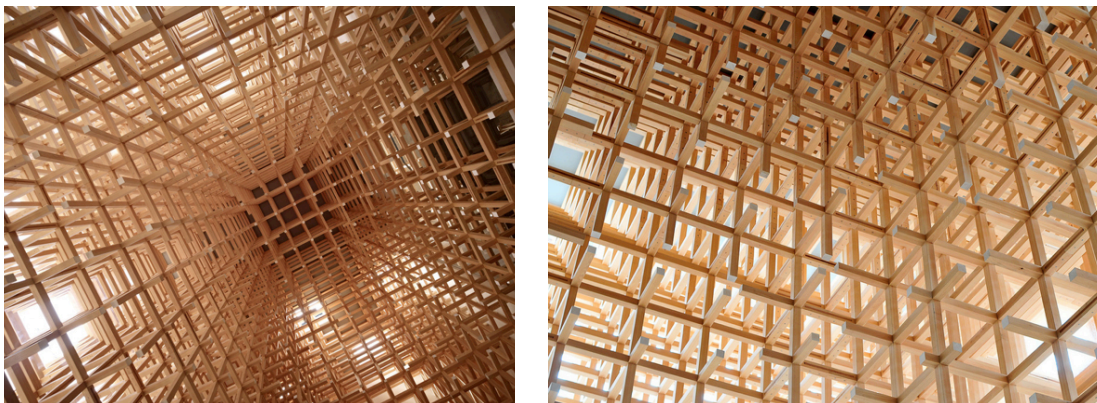
The last project to be mentioned is the special wooden structure of “GC Prostho Museum Research Centre”. Inspired by the system of Chidori, an old Japanese toy, the museum is structured by an assembly of wood sticks with special joints. The wooden framework can be extended into any direction merely by twisting sticks, which allows the system to not only constitute the facade (**Figure 4.8a**) but also configure the load-bearing structure (**Figure 4.8b**). As a product of high-level craftsmanship, the wooden structure achieves to stand still despite the absence of any nails or metal fittings. Altogether, the building seems to have grown out of an integral wooden web.





**Figure 4.8** : “GC Prostho Museum Research Centre”: (a)Exterior view (Url-55). (b)Interior view (Url-56).

Although the structure is comprised of the repetition of rigid frames, interplay with daylight and illusionary merging effect break the tactile homogeneity of the wooden web (**Figure 4.9**). As the cells of the lattice structure seem to be interlaced, the tactual perception alters. Depending on the viewpoint, the haptic experience of the structure resonates between softness by density and rigidness by sparsity.



**Figure 4.9** : Variant tactility of the wooden structure (Url-56).

## 4.2 Kinaesthetic Sensation and Proprioception via Spatial Configuration

As man experiences architecture, either his posture or his body movements are shaped by ambient space. In some cases, surrounding space is able to lead the beholder into a kinaesthetic realisation of his self through the body of architecture. In general, kinesthesia refers to sensation of bodily movements. Categorized as one of sensory modalities, kinaesthetic sense can be defined as one’s self-awareness of the pose and motion of his trunk and limbs (Proske & Gandevia, 2009, p. 4139). In the

literal sense, kinaesthetic sensation is used to describe self-perception of body movements whereas the word proprioception is preferred in order to speak of one's momentarily posture.

In healthy state of the body, proprioception is not the kind of sense to be switched off like vision, which can be temporarily left out of perception simply by closing eyes. Although one does not necessarily pay attention, he adjusts his posture according to the proprioceptive sensation until he feels bodily comfort in where he settles. Even if there is not a close contact with an architectonic component, spatial proportions and alteration in architectural scale have an indirect impact on body posing. The more a spatial design grows consistent with the ergonomic expectations of the user, the more gratified the proprioceptive sense becomes. As long as the physical togetherness of the user and the space bears a kinaesthetic satisfaction, architectonic quality escalates. In this sense, proprioception may be regarded as a means for evaluation of architectural aesthetics.

Indeed, Montero (2006) claims that proprioception enables one to make judgements about aesthetics of his self-movements. He contends that a dancer is aware of whether his momentarily posture seems aesthetic or not, even if he does not have the chance to observe his movements in a mirror (p. 232). As a 'self-perception of the self', proprioception differs from other senses in terms of subject-object duality. In case of proprioception, both the subject and the object of sensation is the person himself. Thus, differing from other sensations, architectural space is not the object of proprioception, yet, the medium that fine-tunes the posture of the subject.

Kinaesthetic fine-tuning of the dweller may take place in a variety of ways. Spatial geometry is one of the architectonic aspects, which is able to change the nature of kinaesthetic sensation. For instance, roundness, curvilinear contours of spatial components and circular configuration of space demand adaptation of body movements and postural decisions. "[W]e live in the roundness of life, like a walnut that becomes round in its shell" (1994, p. 234) says Bachelard, emphasizing the existential strength of circularity. To put it differently, the dweller (the walnut) acquires posture within the ambient space (the shell). For Bachelard, phenomenological value of roundness incarnates from centeredness and brevity of the round. "[W]hen a thing becomes isolated, it becomes round, assumes a figure of being that is concentrated upon itself" writes Bachelard (1994, p. 239). Indeed,

roundness demands cohesion between its own phenomenological stance and the ambient space. The self-enclosed circular spatiality first gathers the surrounding bodies around and then pulls them towards itself. Settling in a curved nook (**Figure 4.10a**), sitting at the open edge of a curvilinear floor (**Figure 4.10b**) or taking curvilinear steps only to enter into another circularity (**Figure 4.10c**), one kinaesthetically experiences the manipulative power of roundness. Unconsciously adapting the position of his trunk and limbs according to the curvilinear contours of the space, the beholder gains a vista that is subliminally specified by the rounded space.



**Figure 4.10** : Sense of roundness in “Pit House”: (a)Curved nook (Url-57). (b)Curved floor (Url-57). (c)Curvilinear steps (Url-57).

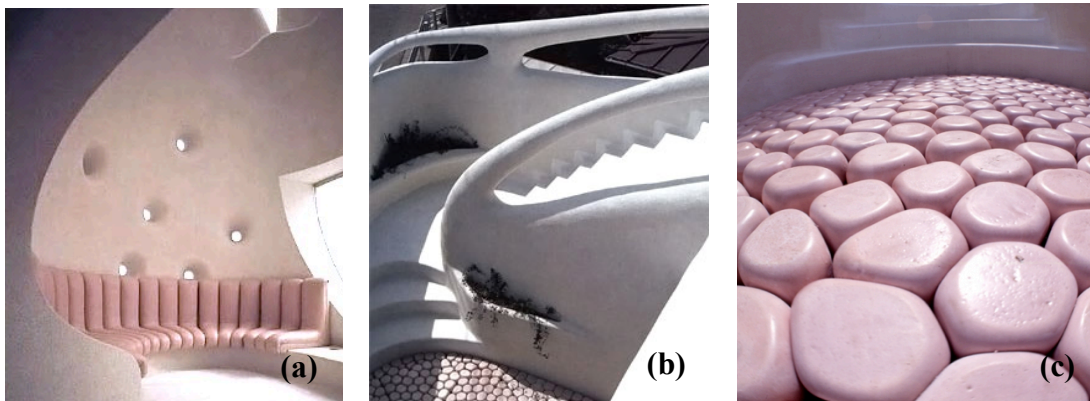
Another architectonic factor affecting kinaesthetic sensation is the variance in spatial proportions and dimensions, which, in turn, alters the perception of architectural scale. According to Pallasmaa, architectural scale is comprehended by means of bodily measurement of dimensions and self-projection into spatial proportions (2005, p. 67). His point of view suggests an empathic connection with the body of architecture in the way that metric configuration determines the type of kinaesthetic interaction with the space. Simply, one tends to rest his elbows on a windowsill whereas he is inclined to lean his body against a high wall. For instance, by its continuous dimensional and volumetric change, “Villa Kanousan” offers a gradient series of such kinaesthetic encounters. As a result of volumetric variance, illumination level differs from one corner to another, which also adds another dimension to one’s proprioceptive sensation (**Figure 4.11**).





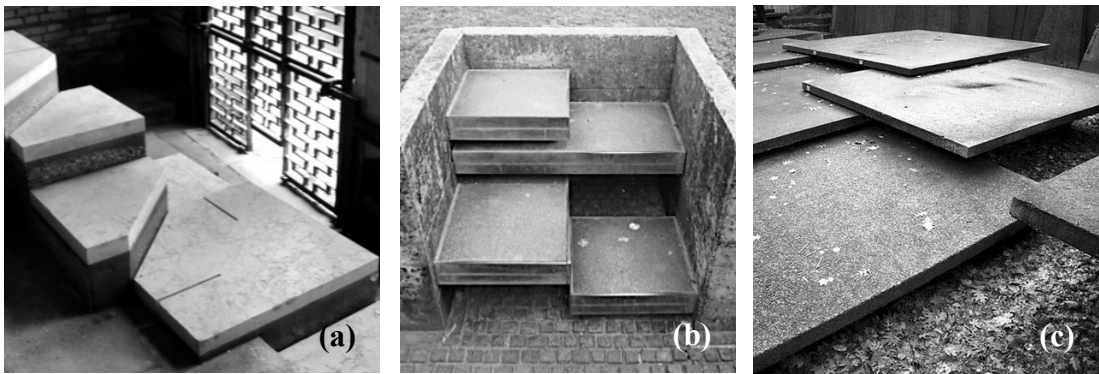
**Figure 4.11** : Dimensional and volumetric changes in “Villa Kanousan” (Url-58).

Similarly, built-in formations betray the architectonic capability to construct an intimate bond with the human body. Such spatial experience involves direct bodily contact with an architectonic formation, which deeply shapes proprioceptive sensation. As an affirmative proposition, Pallasmaa contends that one experiences a form through his skeletal system without being aware of his bodily mimesis (2005, p. 67). While settling down on the curved nook of Ushida Findlay’s “Truss House”, one feels to be wrapped up by the series of mildly bending pink cushions, which almost turn the proprioceptive perception into a gustatory satisfaction (**Figure 4.12a**). Holding onto the white concrete elliptical handrail, the experience of going down the white stairs with concave rises awakens an elegant kinaesthetic sensation (**Figure 4.12b**). Though the interacted surfaces have the coarseness of cement, the body is smoothly guided downstairs. As soon as one encounters the unique design of the courtyard ground, he gets inevitably focused on his kinaesthetic sensation so that he can ensure himself not to step into the joint gaps between the stone-like pink modules (**Figure 4.12c**). Overall, the extraordinary design of Findlay bears unusual kinaesthetic experiences.



**Figure 4.12** : (a) Built-in sitting corner (Url-59). (b) White concrete elliptical staircase (Url-60). (c) Detail of courtyard ground (Url-59).

Similar to the detail of flooring across the courtyard of “Truss Wall House”, Carlo Scarpa’s step-challenging stairs (**Figure 4.13a**, **Figure 4.13b**) and floating-like step design by Lawrence Halprin (**Figure 4.13c**) exemplify bodily confrontations only to be comprehended via kinaesthetic perception. Pallasmaa (2000) considers such “bodily confrontations” with architectonic space as “authentic architectural encounters”. As he insists, true architectural experience could only be delineated by one’s corporeal interaction rather than a mere qualitative description of the interacted space.



**Figure 4.13 :** (a)Scarpa’s stairs raising out of a canal in Querini Stampalia (Url-61). (b)Scarpa’s stairs in “Brion Cemetery” (Url-62). (c)Floating-like steps in “Ira Keller Fountain” by Lawrence Halprin (Url-63).

### 4.3 Auditory Sensation via Aural Space

Acoustical ambience of any built environment constructs an auditory space, namely, ‘aural architecture’, which is an integral layer of architectonic space. Blesser and Salter remind that aural architecture, which every single space has of its own, raises an audial awareness of space via cumulative feedback of spatial elements in response to sounds (2007, p. 2). Blesser and Salter (2007) also indicate that the audial awareness highly contributes to the overall impression of a space, leading the beholder to sense a spatial mood and discern a specific social meaning. For instance, one feels warmth and intimacy when he speaks in a room where his sound is absorbed by carpets, cloth of chairs and soft fabric of curtains. On the contrary, one may feel alienated in a room whose marble floor and high ceiling sharply reflect and reverberate the sound of his footsteps as he enters inside. Aligned with the aural sensation, one acquires the conclusion that the first room is intended to preserve a certain degree of privacy whereas the second room appears to open itself to a higher degree of publicity. Auditory feedback by architectonic elements does not only

highly contribute to social and spatial ambience but also provides the beholder with aural hints about the physical presence of the surrounding space. These aural cues build up a “navigational spatiality” (Blessner & Salter, 2009, p. 58), which is benefited either as supplementary or, in the case of blindness, primary source of navigational information. Apart from transmitting social or navigational messages, a wisely designed aural architecture is able to dramatically alter the ambience of a musical event. To go further, even the sound of the nature may be transformed.

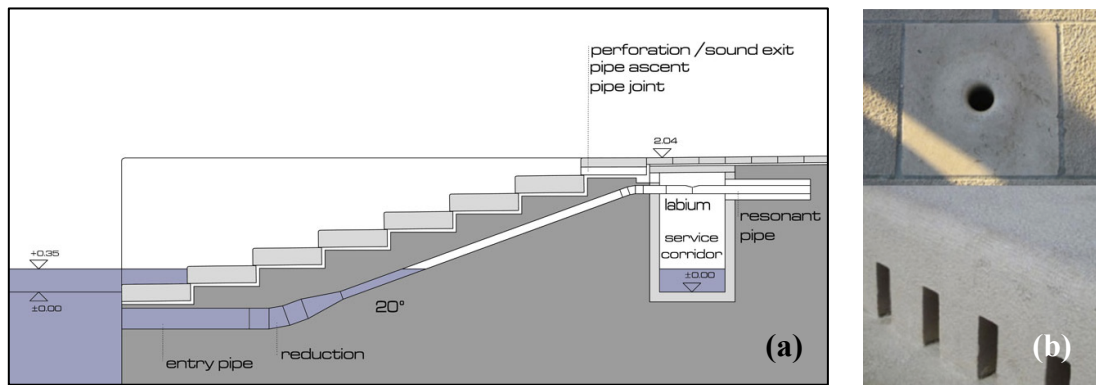
#### 4.3.1 Spatial articulation to the sound of the nature and musical events

Aural architecture preserves the intrinsic power to enhance the sonic effect of the surrounding sound environment, be it a musical performance or the sound of the nature. “Sea Organ of Zadar” by Nikola Bašić is an unusual project that achieves to transform the sound of sea waves into endless variations of harmonic melodies, which sound like to be coming out of a musical instrument (**Figure 4.14**).



**Figure 4.14** : “Sea Organ of Zadar” by Nikola Bašić (Url-64, Url-65).

“Sea Organ” basically consists of thirty-five entry pipes hidden underneath the stone stairs, series of perforations carved in the rises of stone steps, resonant pipes and a resonant void (**Figure 4.15a**, **Figure 4.15b**). Seawater pushes the air inside the entry pipes towards the resonant pipes. Resonating within the void, the air is blown out of the perforations, which are fine-tuned by the two harmonic accords of major diatonic scale. Changing the length and the velocity of waves, the wind and the tide also play indirect roles in the formation of melodic outcome.



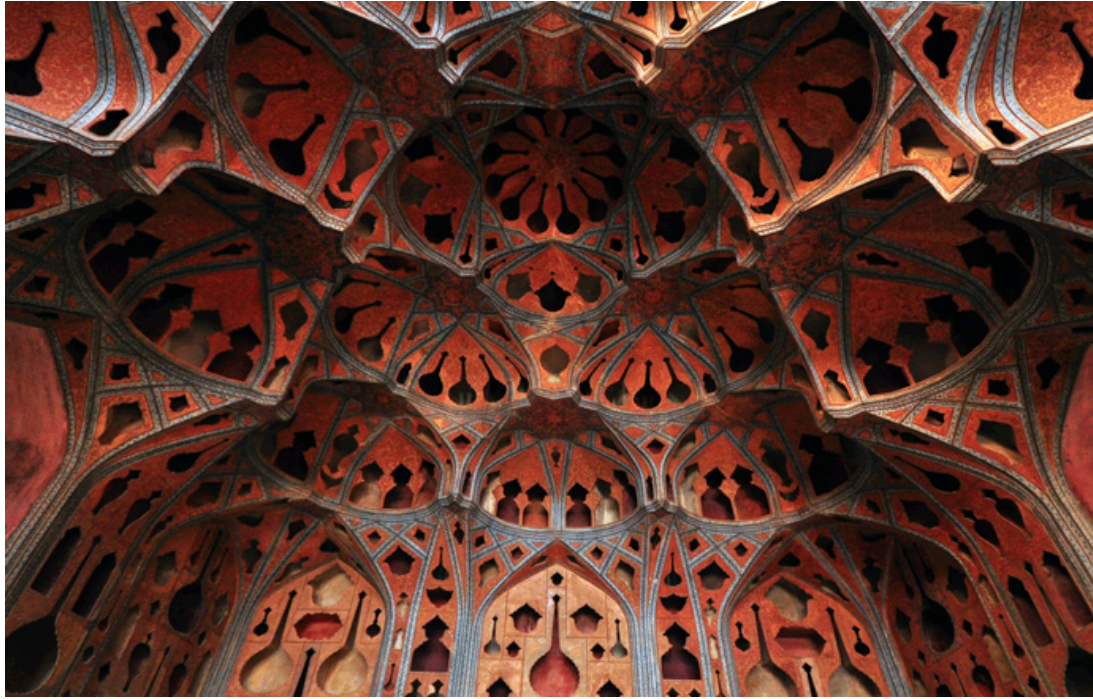
**Figure 4.15 :** (a)Functional schema of “Sea Organ” (Url-66). (b)Details of “Sea Organ” (Url-67).

The fascinating impact of the wave melody stems from not only harmonic togetherness of accorded sounds but also the ubiquitous character of this aural blend. As a sonic effect, ubiquity refers to a phase of acoustic diffusion in the way that the exact location of the sound source could hardly be detected (Amphoux & Chelkoff, 2008, p. 150). In the extreme version of ubiquity effect, one feels as if the sound was coming from everywhere and also, from nowhere. Though the sound of the sea is highly diffused, Amphoux and Chelkoff contend that it cannot be defined as ubiquitous since the sonic source is known (2008, p. 151). Even if the sea is assumed not to produce ubiquity effect, the melody played by the sea organ may be categorized as ubiquitous since the instrumental mechanism, that is, the sound source is hidden. Synchronized perception of visible splashes of waves and invisible ubiquitous melody of the sea organ generates an ambiguity between audial and visual sensation. Thus, the taste of the aural blend of the nature is deepened by the intermodal resonance across vision and audition.

As well as the sound of the nature, characteristics of an audio performance can dramatically be altered by spatial acoustics. In some cases, association between sound source and spatial acoustics is so strong that they become an inseparable whole, which is called ‘*soundscape*’ (Blessner & Salter, 2009, p. 54). The music chamber of “Ali Qapu Palace” in Esfahan is a unique space whose walls act like an integral part of musical instruments in the way that the togetherness of a sonic event and the space is experienced as an extraordinary soundscape. Cavities within both the poche walls and the vaulted ceiling (**Figure 4.16**) are designed in order to reduce reverberation and lengthen the duration of higher and lower tones. Along with the dimensional appropriateness of the chamber, the cavities are so fine-tuned that the



public went on to claim that they could hear the sound of instruments even after the orchestra had left (Hensel & Menges, 2009, p .201). Mingling the special acoustic experience and the unique tactile sensation, the music chamber becomes a medium for a high-level intermodal resonance.

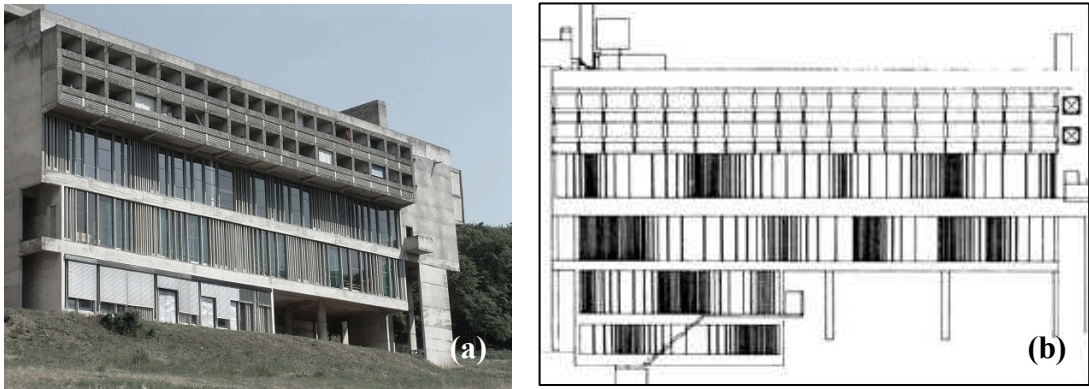


**Figure 4.16 :** Unique design of the music chamber in “Ali Qapu Palace” (Url-68).

#### **4.3.2 Spatial articulation to musical grammar**

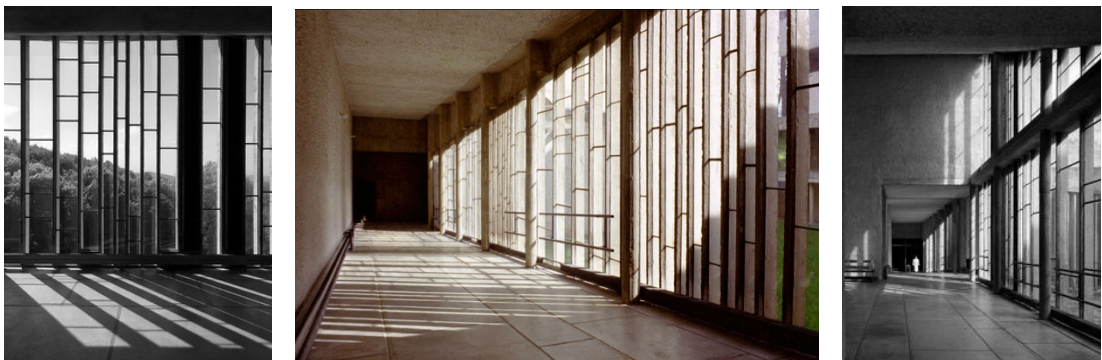
Recognized works of architecture and music have long been associated in terms of compositional harmony. Some designers have even set out from direct analogies in the hope of reflecting musical harmony into spatial compositions. Iannis Xenakis is a special name by his valuable attempts to build an analytical bridge between architectural and musical compositions. Sterken (2007) elaborates how the works of Xenakis genuinely intertwine mathematical proportions of music and spatial concept of architecture. Designed by Xenakis upon Le Corbusier’s request, the western facade of “the Monastery of La Tourette” constitutes a unique example of spatial articulation to musical grammar. Instead of dealing with a rhythmical composition of individual elements, Xenakis canalizes himself to adjust the density of intervals, which results in either fluid or abrupt transition patterns (Sterken, 2007, p. 36). Consequently, the facade gains a rhythmical dynamism by the fine-tuned variance in the width of glass panels (**Figure 4.17a, Figure 4.17b**).





**Figure 4.17 :** (a)Western facade of “the Monastery of La Tourette” (Url-69).  
(b)Facade composition by Iannis Xenakis (Url-70).

Moreover, Xenakis achieves to generate a “vertical polyphony” that elicits a polyrhythmic interplay of light and shadow (Sterken, 2007, p. 37). Thus, the floor and the walls of the corridor behind the western facade altogether trigger the sense of rhythm through patterns of sunlight gradually changing within the course of the day (**Figure 4.18**). Continuous alteration in thermal, visual and rhythmical sensations gives rise to an intermodal experience.



**Figure 4.18 :** Indoor interplay of light and shade (Url-71, Url-72, Url-73).

#### 4.4 Sensation of Spatial Mood via Architectonic Atmosphere

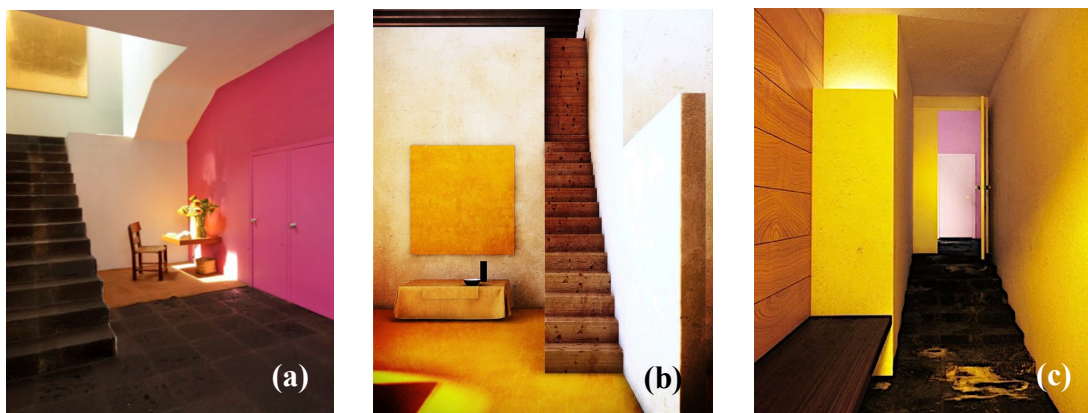
While a kinaesthetic, haptic or an auditory sensation predominately initiates a resonant mode among senses, some architectural works achieve to trigger a stronger intermodal resonance via almost all sensory channels. In this regard, the works of world-renowned Mexican architect Luis Barragán just fit to the definition of multi-sensory architecture. By the resonating flux of colours, materials, spatial and natural elements, Barragán achieves to generate a warm and sensuous spatial atmosphere. Pointing to the poetic power of Barragán’s works, “[A]n apparently strong image glides into the elusive world of dreams”, writes Pallasmaa (2000, p. 332). Indeed, his

private houses intimately welcome their dwellers, pulling them into a vivid image of home. Walking along the stone courtyard surrounded by warmly coloured walls and trees, one is prepared to experience the inner cosiness of home (**Figure 4.19a**, **Figure 4.19b**).



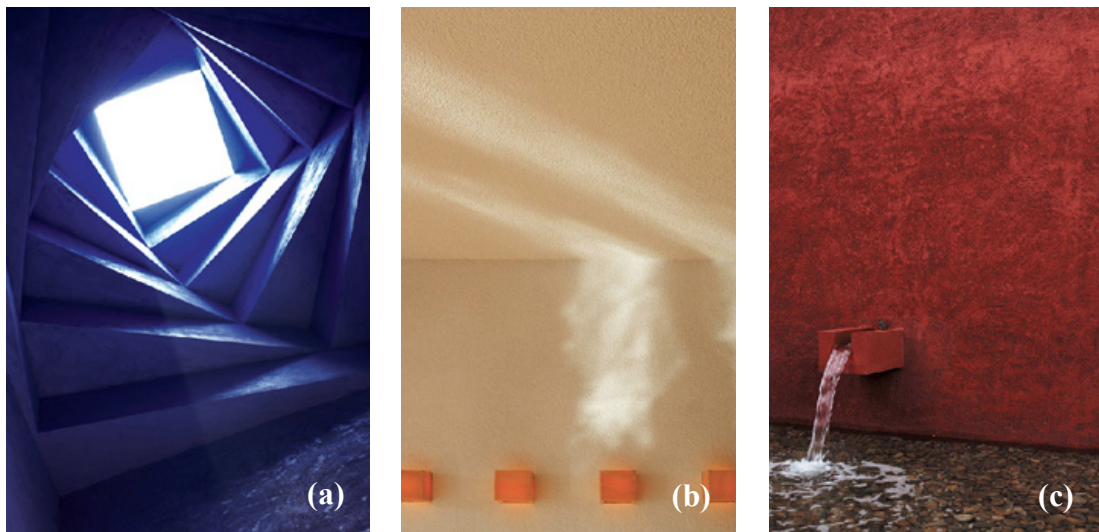
**Figure 4.19** : (a)Courtyard view from “Casa Gilardi” (Url-74). (b)Courtyard view from “Casa Barragán” (Url-75).

To specify, the interior of “Casa Barragán” hosts the dweller in a sensual composition that combines the warmth of wood and natural stone with bright tones of pink and lemon yellow. A bunch of daylight cast just on the cosy corner (**Figure 4.20a**), wooden stairs folding towards a door with no room behind (**Figure 4.20b**) and a yellow corridor ending up with a pink room (**Figure 4.20c**) offer poetic spatial encounters. The poetic essence is also recognizable in the connection between Barragán’s spatial components and natural elements, which is to be elaborated under different captions in further sections.



**Figure 4.20** : (a)A cosy corner in “Casa Barragán” (Url-76). (b)Folding wooden stairs (Url-75). (c)Yellow corridor opening to the pink room (Url-77).

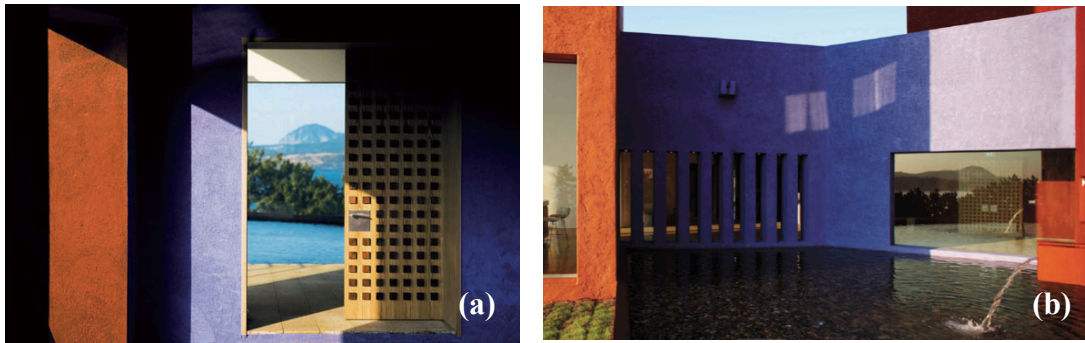
Another Mexican architect, Ricardo Legoretta, who interprets the vernacular architecture of Mexico in an idiosyncratic manner, also succeeds in awakening multiple cross-modal sensations. Notably influenced by his contemporary, Luis Barragán, Legoretta meticulously and sensuously combines architectonic elements. “I think that a space, or a building, has to have an emotional reason to exist” says Legoretta (as cited in Mutlow, 1997, p. 21), betraying his deepest design motivation. Legoretta’s works do indeed seem to stem from a sensuous gist. In his works, one is suddenly captured by bright daylight creeping in through a blue violet skylight, almost a surreal stairwell viewed from bottom (**Figure 4.21a**). In another corner, eyes catch sight of a dim bunch of sunlight gently stroking the ceiling and rippling down the milky wall (**Figure 4.21b**). Otherwise, one turns his head to the sound of water that jumps onto gravels, coming out of a hidden source behind the deep red wall (**Figure 4.21c**). Stairs ascend to the sun; the sun ripples like water; water jumps into gravel pool like a gravel. The nature of elements translocate, sensations resonate.



**Figure 4.21** : Sensuous details in “Gallery Casa Del Agua”: (a)Blue violet skylight (Url-78). (b)Rippling sunlight on the wall (Url-79). (c)Water jumping into the gravel pool (Url-80).

Legoretta builds a resonant synthesis out of transverse colours, interplay of light and shade and haptic contrast between water and landscape elements, like he does in “Gallery Casa Del Agua” (**Figure 4.22**). As a characteristic of his works, the building either invites the open landscape via a bare frame of walls (**Figure 4.22a**) or peers out through series of vertical openings (**Figure 4.22b**).





**Figure 4.22** : Resonant blend of contrasting elements in “Gallery Casa Del Agua”: (a)Framed landscape view (Url-81). (b)Vertical openings in the wall (Url-82).

A similar attitude is also to be recognized in “Casa Sotogrande” designed by Francisco Cortina and Ricardo Legoretta. Be it a courtyard or open landscape, the spectator on the inner side is led to perceive the outer view from a different perspective. For instance, the wide view of open landscape is gradually scaled down across the series of frame-like vertical shadows (**Figure 4.23a**). On the contrary, the inner courtyard is scaled up via a wall-wide bare opening (**Figure 4.23b**). Real dimensions melt and then revive under a relational ambiguity.



**Figure 4.23** : Ambiguity of architectural scale in “Casa Sotogrande”: (a)Scaled-down landscape view (Url-83). (b)Scaled-up courtyard view (Url-84).

In Legoretta’s works, vertical and horizontal planes of different scales are united in such proportion that light and shade fire a dramatic interplay across coloured surfaces (**Figure 4.24a**). To set an example, shadows cast on two opposing walls overlap so precise that emergence of an illusionary image of stairs ambiguates visual perception (**Figure 4.24b**).



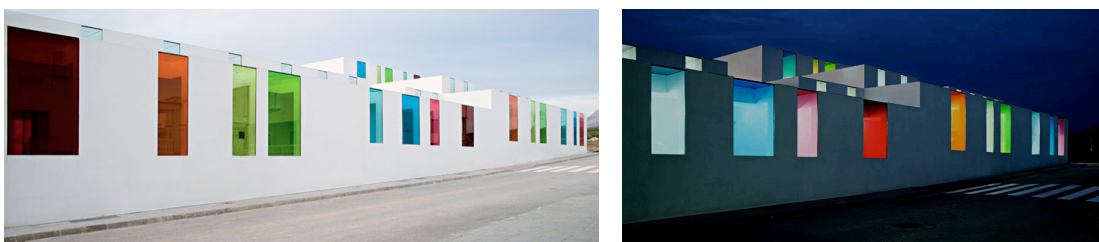
**Figure 4.24 :** (a)Interplay of light and shade (Url-85). (b)Visual illusion (Url-86).

Not to mention, the blend of spatial and natural elements is so characteristic that it is named as “Legoretta Style” (Mutlow, 1997, p. 15). Overall, Legoretta Style achieves to evoke a special tone of warmth due to the intimate dialogue between spatial and natural elements (**Figure 4.25**), which offers a variant chart of cross-modal sensations.



**Figure 4.25 :** Legoretta-Style blend of spatial and natural elements in the courtyard of “Casa Sotogrande” (Url-87, Url-88).

Designed by Alejandro Muñoz Miranda, “Chaparrai Kindergarten” is to be the last sample of sensuous space. Throughout the building, glasses of variant colours placed inside the L-shaped openings provide visual integration between white walls and the ceiling. Outside, the frontal composition of colourful glass panels varying in size evokes a strong sense of rhythm (**Figure 4.26**).



**Figure 4.26 :** Perspective outer view of “Chaparrai Kindergarten” (Url-89).

As for inside, the beholder gets wrapped by the unique energy of every single colour, finding himself in the middle of a resonant aura. Walking through a corridor, one is confronted with an endless chain of sensual encounters (**Figure 4.27**). Transitions between sensual moods are also marked by alteration in the floor height and the width of glazed openings.



**Figure 4.27** : Daytime views from different corridors of “Chaparraí Kindergarten” (Url-90, Url-91, Url-92).

During changing hours of day and seasons of year, the ambience of each room is altered by the sliding reflections of coloured daylight dropping onto the white surfaces (**Figure 4.28**). Endless parade of colours awakens resonating sensations out of gradient character of thermal, visual and rhythmic aura.



**Figure 4.28** : Hourly changing mood of a room in “Chaparraí Kindergarten” (Url-93, Url-89).

## **5. THE ROLE OF ENVIRONMENTAL ELEMENTS ON INTERMODAL RESONANCE**

As well as surface qualities and composition of spatial elements, the manner in which environmental elements are embedded into an architectural space plays a fundamental role in triggering intermodal resonance. In the case that daylight, water and landscape elements are genuinely treated as integral components of built environment, a resonant perception results from the interaction between architectonic space and fragments of nature. Among others, daylight seems to be a more critical natural element since it not only continuously renovates the perception of forms and colours but also gives strong reference to time and spatial differentiation. Another crucial natural element, water, both separates and unites architectonic layers by its reflective nature, soothing sound, surface movements and thermal warmth. The use of landscape elements such as trees, stones and earth blurs the transience from the natural to the built environment, unfolding visionary, auditory and olfactory articulations.

### **5.1 Daylight in Spatial Articulation**

As long as a building is not completely buried in the ground, encounter between the sun and the space is inevitable. Wisely articulated encounter between space and daylight gives rise to multifaceted and vibrant perception. Continuous and gradual change in the amount and the incident angle of sunlight highly contributes to the resonant nature of daylight-space interaction. Time-correspondent properties of sunlight cause perceptual renewal of forms, colours and textures. As a result, the beholder is provided with continuous differentiation in visual and haptic sense, which, in turn, affects one's sensual reaction in response to spatial ambience. In addition, alteration in sunlight gain and transformation of shadow patterns result in varying levels of indoor daylight intensity. Based on the fluid and complementary togetherness of light and shade, space is parsed into perceptual zones. Moreover,



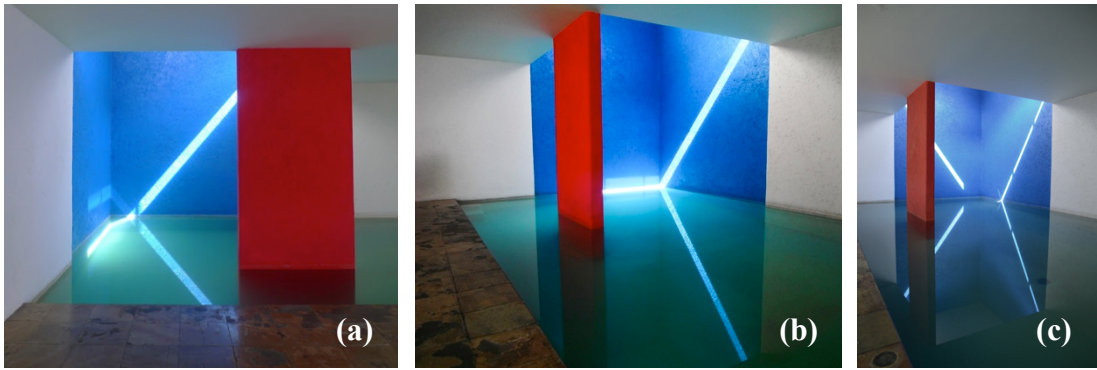
moving trails of the sun lead the beholder to the realization of the fourth dimension, namely, time.

### **5.1.1 Visual, haptic and sensual alteration by daylight**

Throughout the history of architecture, the dialogue between daylight and spatial elements has always been paid special attention. Louis Kahn best describes the deepness of the dialogue by declaring that light cannot be separated from structure (as cited in Flagge, 2002, p. 70). It would not be wrong to say that Kahn regards light almost as an architectural design element. Unlike stable elements of space, daylight constantly transforms visual, haptic and sensual impact of architectonic forms and surfaces.

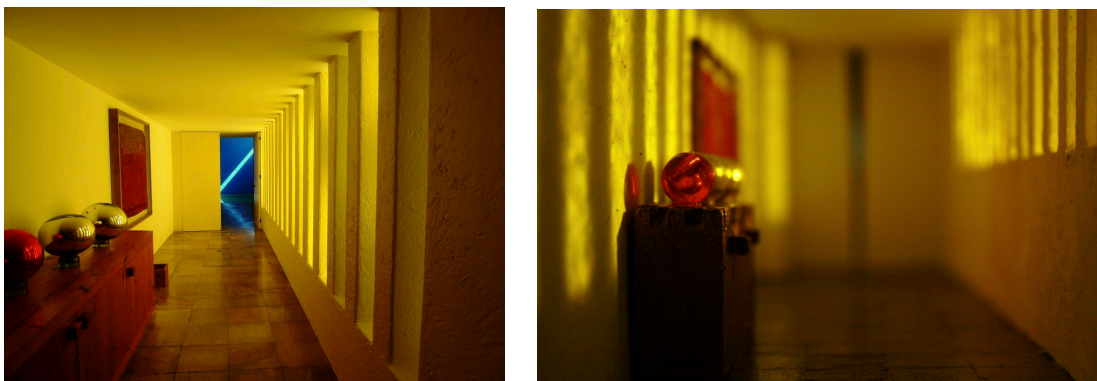
The character of daylight-based alterations in visual, haptic and sensual perception of space is dependent on the manner the sunlight is benefited. Basically, the sun and a building enter into close contact in two ways; either “light hits the side of an edifice, or natural light is let into the interior”, as Gerhard Auer writes about the works of Louis Kahn (as cited in Flagge, 2002, p. 70). The initial case describes a sudden, inevitable encounter whereas the second case emphasizes the role of architect in distributing sunlight to the interior.

Both types of contact are to be found in the works of Luis Barragán. Embedding a wide variety of entities into the interplay of light and shade, he puts emphasis on the daily change of architectural atmosphere. Auer believes that Luis Barragán is highly successful in “effacing the dividing line between energy and materiality”, turning his buildings into a “radiant material or materialized light” (as cited in Flagge, 2002, p. 71). **Figure 5.1** demonstrates three different photographs from a corner of “Casa Gilardi”, exemplifying the case of abrupt encounter where Barragán utilizes daylight as a spatial ingredient. Along with their reflections in the water, variant trails of daylight give rise to three separate versions of visual perception. The light trail in **Figure 5.1a** builds a fragile connection between the two facets of the blue wall whereas the **Figure 5.1c** displays two converging traces of sunlight, which assign discrete identities to the intersecting walls. As for the daylight pattern in **Figure 5.1b**, two beams meet on the corner so precisely that the perpendicular walls and the horizontal water surface altogether appear to be a united entity.



**Figure 5.1 :** Interplay of sunlight and spatial elements in “Casa Gilardi”: (a)Fragile encounter of sunlight beams (Url-94). (b)Precise connection of sunlight beams (Url-95). (c)Convergence of sunlight beams (Url-96).

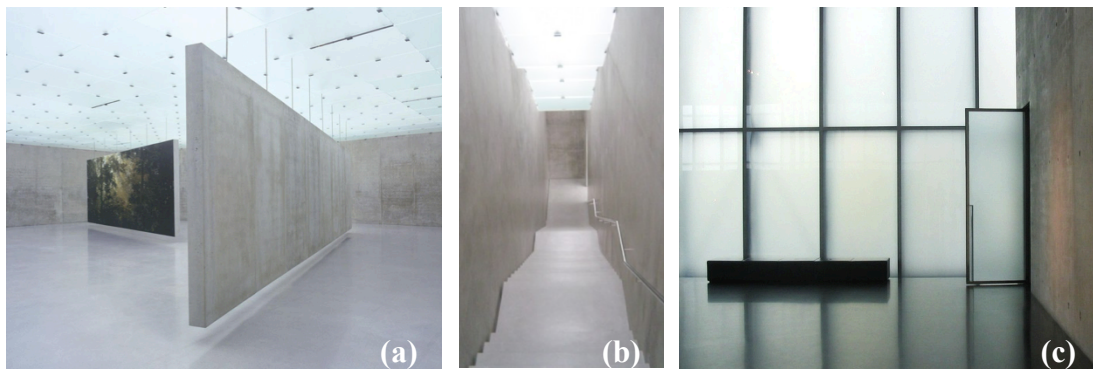
In the case of diffused utilization of daylight, Barragán discloses the fine texture of his spatial elements. In his works, self-pattern of wooden or stone surfaces and coarse finish of brightly coloured walls are revealed as they are washed by daylight (**Figure 5.2**). Making use of granular shadows, Barragán unveils the unique tactility of naturalness. However, haptic effect of the yellow interior walls in “Casa Gilardi” stems from not only granular shadows in sun-lit parts but also vertical stripes of shade. As well as daylight partially held on the surface, total darkness highlights the tactual traces. Moreover, the verticality of sequential shadows softens the sense of longitudinal expansion. Overall, to say in the words of Pallasmaa, “[d]eep shadows and darkness are essential, because they dim the sharpness of vision, make depth and distance ambiguous, and invite unconscious peripheral vision and tactile fantasy” (2005, p. 46).



**Figure 5.2 :** Total and granular shadows on the interior walls of “Casa Gilardi” (Url-97, Url-98).

Apart from eliciting softened and slowed-down haptic experiences, diffused use of daylight triggers mild sensual transitions aligned with time-dependent alteration of

spatial mood. “Kunsthhaus Bregenz” sets a unique example for spatial diffusion of daylight, by which Zumthor offers a wise and elegant solution to the problematic aspects of direct sunlight gain in museums. Due to almost uniform dispersion of daylight throughout the ceilings, natural light is highly benefited on every single level of the museum. In this way, the exhibition areas (**Figure 5.3a**) and the stairwells (**Figure 5.3b**) completely surrounded by blinded walls are softly illuminated. Moreover, use of translucent glass turns the facade into a ‘sun screen’, which neither breaks nor reflects, yet, gently inhales the daylight from outside and softly exhales it into the entrance hall (**Figure 5.3c**).



**Figure 5.3 :** Kunsthhaus Bregenz by Peter Zumthor: (a)View from one of the exhibition areas (Url-99). (b)View from a stairwell (Url-100). (c)View from the entrance hall (Url-101).

Depending on atmospheric conditions and the relative position of the sun in respect to the museum, the colour tone rendered by both the glass facade and the glass ceilings gets altered (**Figure 5.4**). As a result, changing mood of the spatial atmosphere gives rise to sensual shifts in beholder’s responses to his ambient environment. For instance, as the weather turns out to be sunny after from a heavy rain, one feels and sensually reacts to the change in the weather conditions even if he is inside the building.



**Figure 5.4 :** Changing tones of the translucent facade aligned with the altered colour of the sky (Url-102, Url-103, Url-104).

Moreover, colours of big-scale artworks or installations displayed in the museum are softly reflected by the translucent ceiling in the way that the mood of interiors is also exposed to alterations based on the content of exhibitions (**Figure 5.5**). Overall, the ceiling behaves like an inner sky, which mildly projects the colours of indoors and outdoors.



**Figure 5.5** : Reflected colours of the installation called “The Mediated Motion” by Olafur Eliasson (Url-105).

### 5.1.2 Perceptual zoning by daylight intensity

Whereas diffused use of natural light constructs a holistic perception, sudden changes in daylight intensity cause shifts in space perception. In the case of abrupt transition between the complementary zones of light and shade, the resulting daylight pattern either coincides with spatial zoning or brings in a new fragmentation independent of functional differentiation.

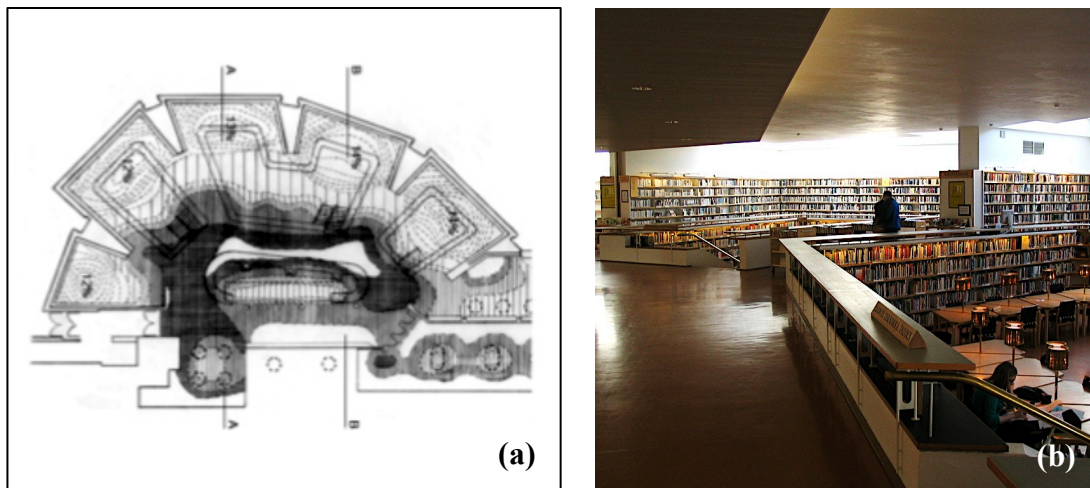
As an architect specialized in architectural lighting, Merete Madsen believes that distribution of daylight throughout a space plays role in functional zoning and exemplifies Alvar Aalto’s “Rovaniemi Library” in terms of consistency between its spatial layout and the existing daylight zones (2007, p. 55). By means of the conical skylights placed above segments of the fan-shaped wall (**Figure 5.6**), reading niches inside are awarded with maximized gain of daylight.



**Figure 5.6** : Conical skylights of “Rovaniemi Library” (Url-106, Url-107).



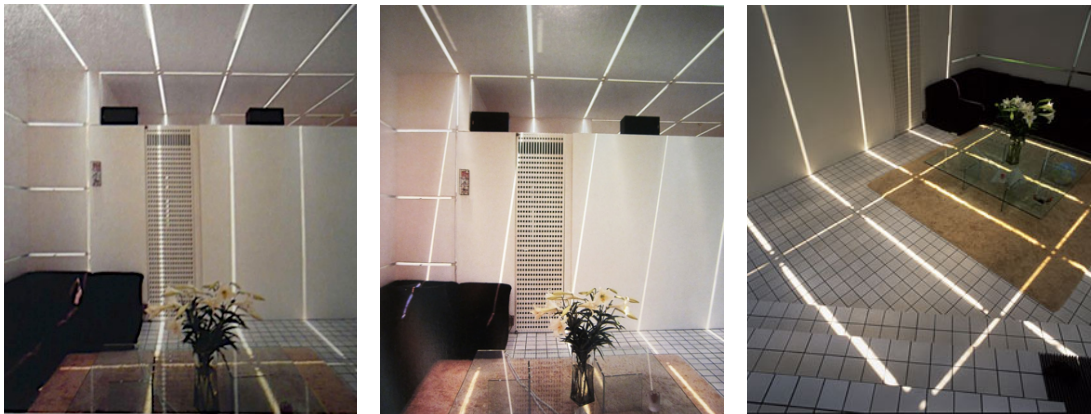
However, when daylight distribution values of the whole lending room is analysed (**Figure 5.7a**), it is noticed that the intensity of natural light suddenly decreases starting from the inner edge of the reading niches reaching up to the mid-part of the room. As a result, the zones of shade between the central control desk and the reading niches function as modifiers of light zones. Marking perceptual boundaries around the zones of high-level brightness, shadow-zones altogether turn out to be the circulation route. According to Madsen, the mentioned case of functional specification stems from the fact that zones of light generate welcoming places to stay while zones of darkness form verges or passages to go through (2007, p. 52). Indeed, the lending room of “Rovaniemi Library” seems to benefit from the stripe of shade as a transitional area that constitutes a buffer zone between spatial segments with different functions (**Figure 5.7b**).



**Figure 5.7 :** (a)Daylight distribution values of the lending room of “Rovaniemi Library” (Madsen, 2005). (b)Visibility of difference in the brightness level of the room (Url-107).

Contrary to “Rovaniemi Library”, “Light Lattice House” exemplifies the case where zones of shade give rise to perceptual fragmentation of space rather than contributing to functional zoning. Slits placed inside both the ceiling and the walls of the living room are utilized to produce a light lattice among the shaded zones. Consequently, rectangular shade zones divide the living room into sequential fragments, which appear to serve no definite function. In parallel to the relative location of the sun, daylight beams leaking through the slits are projected onto the inner surfaces as bright stripes of sunlight at varying angles (**Figure 5.8**). Thus, the dweller is

confronted with a gradual alteration in spatial perception due to the illusionary effect of rotation resulting from the changing inclination angle of daylight beams.

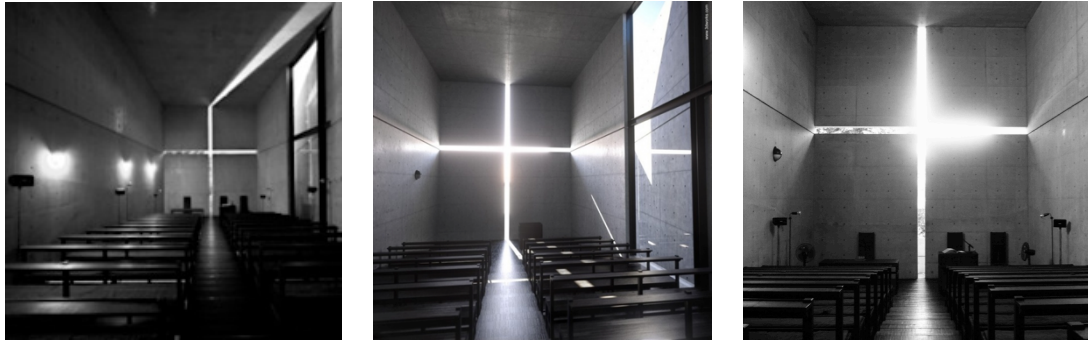


**Figure 5.8 :** Daytime scenes from “Light Lattice House” by Shoji Yoh Architects (Plummer, 2009; Url-108, Url-109).

Overall, “Light Lattice House” demonstrates that the interplay of shadow and light may not only disclose a new form of spatial layout but also cause shifts in the visual interpretation of perceived forms. As the sliding shadows reconstruct the visual comprehension, the dweller faces the “extraordinary, stretched, flattened, fractured, ill-jointed autonomy” of Ruskin’s shadows (as cited in Anderson, 2001, p. 45).

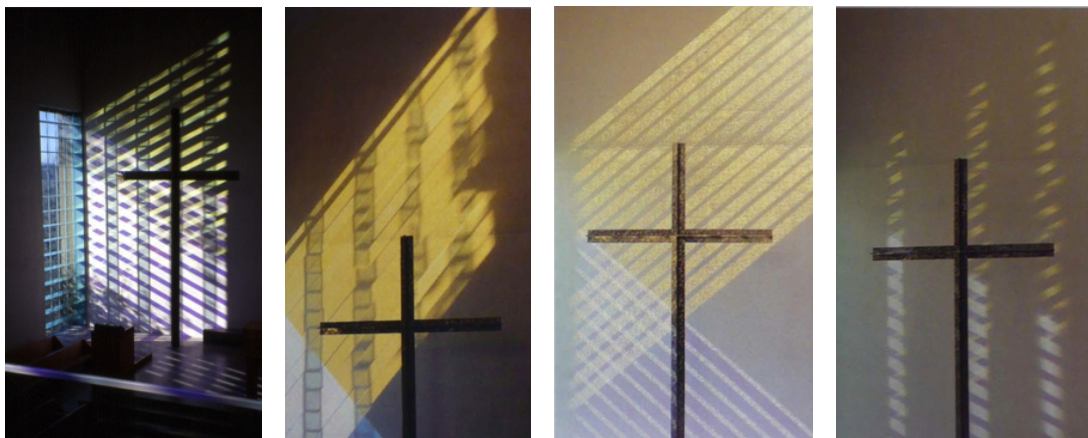
### **5.1.3 Sense of time by daylight trails**

Apart from deeply affecting the perception of multiple architectonic aspects, daylight embeds the fourth dimension into the three-dimensional nature of architectural forms. In certain parts of some architectural works, almost a sundial is designed in order to strengthen the reference to the flow of time. Such powerful sense of time is generally perceivable in the works of Tadao Ando. Plummer indicates that Ando has a special skill to vitalize a building through the daily movement of the sun, no matter whether the place is a chapel or somewhere to dwell or to work (2009, p. 19). In this way, Ando succeeds in providing us with a wide range of daytime scenes, which, in his own words, point to the “feeling of transience” and “passing of time” (as cited in Plummer, 2009, p. 19). In Ando’s “Church of Light”, the visitor is stroked by the dominant view of the backlighted cross and its ever-changing, lengthening and then shortening bright extensions (**Figure 5.9**). By this dramatized encounter with the sunlight, Ando seems to desire to put emphasis on not only the rapid flow of time but also temporariness of life.



**Figure 5.9 :** Backlighting cross in “Church of Light” (Url-110, Url-111, Url-112).

Similarly, the special window design of “Sweeney Chapel” casts a daily sequence of unique daylight patterns onto the wall behind the cross (**Figure 5.10**). As time flows, the wall hosts gradual but constant alteration in colour tones, brightness levels and formal composition of reflected rays of daylight. To say with the words of Pallasmaa, the chart of light projections “concretises the cycle of the year, the course of the sun and the passing of the hours of the day” (2005, p. 41). Apart from giving strong reference to the flow of time almost in a cinematic taste, the continuous transformation of light patterns creates a mystical ambience.



**Figure 5.10 :** Daily sequence of daylight patterns on the wall of “Sweeney Chapel” (Plummer, 2009; Url-113).

“Slit House” designed by Eastern Design Office is another instance where daylight is utilized as a reminder of time (**Figure 5.11**). On the one hand, the dweller of this introverted house is made aware of the daily flow of time. On the other hand, the long and narrow corridors of the house are illuminated by stripes of sunlight whose dimensions and sharpness are dependent on the angle and the width of the slits. Thus, heavy darkness of the corridors is broken by the row of light frames, which evolves them into mysterious passages.





**Figure 5.11 :** Frames of daylight in the corridors of “Slit House” (Url-114).

## **5.2 Water in Spatial Articulation**

As well as daylight, another basic life source, water, can also be utilized as an architectural element. The qualities of even still water are sufficient enough to awaken versatile sensations. However, when water interacts with other natural elements or living entities, its latent features are also revealed. The soothing sound of water appeals to auditory sense whereas ripples sliding on the surface stimulate the sense of motion. The surface reflections challenge the visual perception by means of ambiguity between connection and separation. Moreover, water also addresses to haptic sense via its thermal warmth and tone of colour as a reference of depth.

### **5.2.1 Connection to the nature via water**

Especially when used in open space design, water strongly refers to the nature and the natural life in it. “Sea Bathing Facility” project for Paimogo Beach designed by Carlos Mourão Pereira is a unique proposal, which makes use of all aspects of water. In his project, the renowned Portuguese architect who suffers from visual impairment represents a remarkable example of sensibility against all perceptual aspects of designing with(in) water. As can be sensed in the “Sea Bathing Facility” design, the way Pereira’s sense of architecture transformed by his blindness leads him to get more and more bodily involved in space (Vermeersch et al., 2010). As a response to loss of vision, haptic, auditory and olfactory senses are observed to have gained more dominance in his awareness of space, guiding him to a multi-sensory design approach.

In the mentioned project, Pereira proposes conversion of an old abandoned fishery into water tanks where varying types of species would continue their lives inside the

main basin designed to be a ‘sea bathing’ facility (**Figure 5.12a, Figure 5.12b**). Planned to be built from recycled concrete, the main basin comes forward as a sensible suggestion for a safer environment to interact with the water of wild Atlantic Ocean. Thus, while one is invited to enter into a new dialogue with the seawater and the species, he is intended to stay in close contact with the touch of the wind, the heat of the sun, the smell and thermal warmth of the seawater, the rocks and the sand. Inside this aqua-platform, one is expected to discover his bodily gesture towards all multi-sensory aspects of the seashore (**Figure 5.12c**). As a necessity of natural life cycle, waves of high tide are allowed to wash over the basin, refreshing not solely the existing water, yet, the life source of the sea species inside the tanks. Overall, one is guided to settle in the water on the ambiguous threshold waving between the touched and the untouched nature, the wild and the safe.



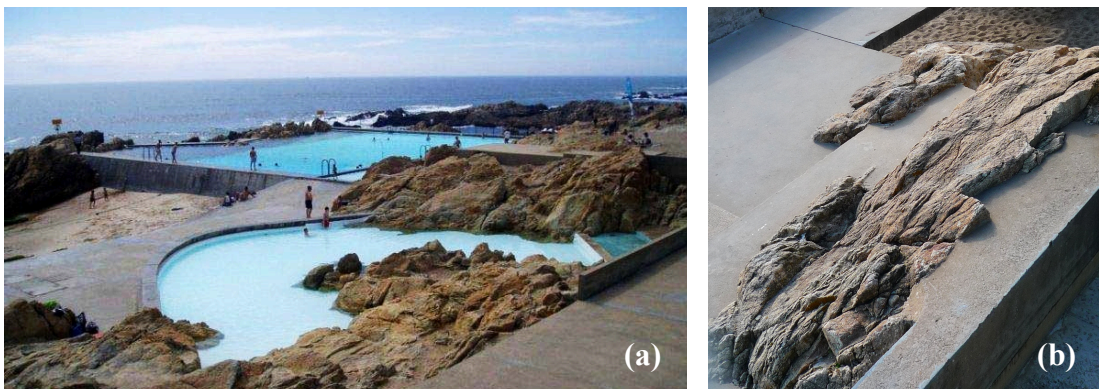
**Figure 5.12 :** (a)Existing abandoned fishery in Paimogo Beach (Url-115). (b)Proposal of “Sea Bathing Facility” by Pereira (Url-115). (c)Bodily gestures of people inside the main basin (Url-115).

Contrary to Pereira’s “Sea Bathing Facility” awaiting to be built, “Leça Swimming Pool” designed by another Portuguese architect, Alvaro Siza, is a realized project renowned for its respectful attitude against the nature (**Figure 5.13**). The threshold between the natural elements and the built environment is so subtle that the project manifests a relational ambiguity. On the one hand, the man-made intervention appears to be an integral part of the rocky coastline. On the other hand, fine-tuned transition between the nature and the design reveals itself in qualitative distinctions.



**Figure 5.13 :** Views from “Leça Swimming Pool” (Url-116, Url-117, Url-118).

Since the relational ambiguity is nourished from visual, kinaesthetic, tactile, olfactory and auditory aspects, it awakens a strong resonance among multiple sense modalities. Preserving the rock formations to the highest possible degree, Siza embeds the swimming pools into the existing landscape in the way that the project seems to have naturally grown out of the coast (**Figure 5.14a**). However, the colour of the concrete is deliberately chosen one tone lighter than the natural colour of rocks, marking a cautious gesture in such a high degree of haptic proximity (**Figure 5.14b**). The pools are located right on the ocean level so that the experience of water could be expanded in a natural continuum. Yet, the colour and the surface movements of water betray the real depth of the different waterscapes (**Figure 5.14a**). Overall, whereas water blurs the boundaries by its smell, vibrant sound and resonant liquidity, it attaches a distinctive character to its own reserve.



**Figure 5.14 :** (a)Diverse tones of blue across the waterscapes (Url-119). (b)Tonal difference between the rocks and the concrete (Url-120).

### 5.2.2 Interconnection of design elements via water

Apart from being a vital natural source, water also shines out as a versatile design element in terms of its tuneable characteristics. Luis Barragán seems to benefit from

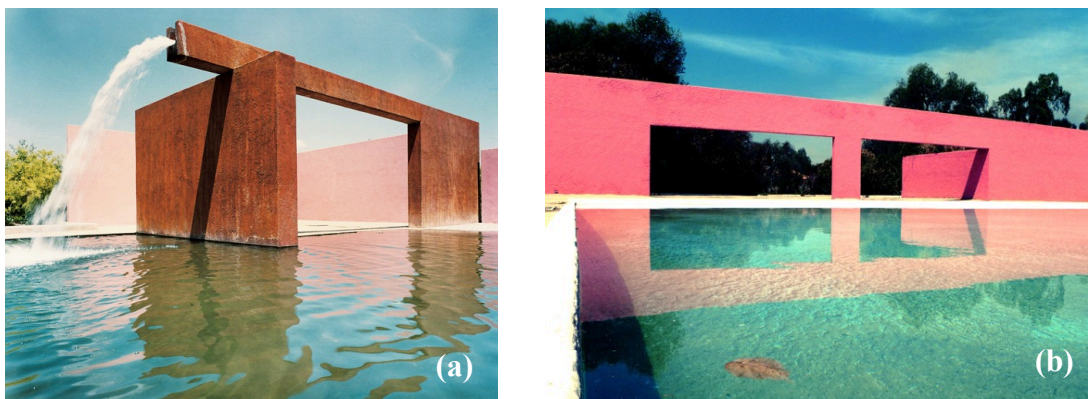


all perceptual aspects of water by masterly fine-tuning his waterscapes. For instance, in “Cuadra San Cristobal”, bright colours of textured walls and landscape elements interpenetrate each other through the rippling reflections accorded by Barragán-style fountains (**Figure 5.15**). Barragán utilizes water “as a mirror, as a rushing waterfall, a tranquil aqueduct, a babbling brook, a peaceful pool, or as a fountain whose splashing interrupts the baking midday heat” (Flagge, 2002, p. 72).



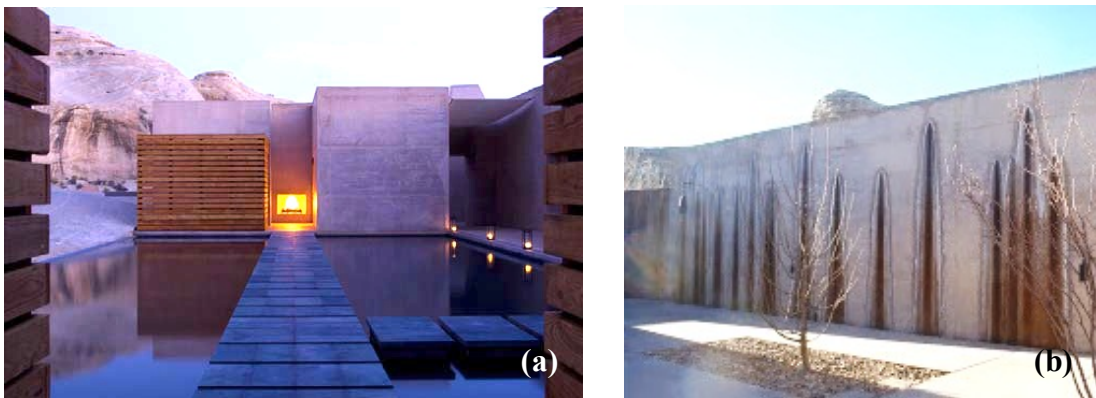
**Figure 5.15** : Rippling reflections on the waterscapes of “Cuadra San Cristobal” (Url-121, Url-122).

In addition to the articulation with spatial elements by its soothing sound, vibrant surface movements and vivid reflections, water seems to amplify and differentiate the manner in which shade is attached to sunlight. While Barragán’s fountains fracture shadows (**Figure 5.16a**), his waterscapes polish the colour of surrounding walls that are washed by the hot sun (**Figure 5.16b**). In the hands of Barragán, water turns into a resonant medium that “diffracts the light, makes it shimmer, sparkle, glisten and gleam” (Flagge, 2002, p. 72).



**Figure 5.16** : (a) Diffraction of light under the Barragán-style fountain (Url-121). (b) Gleaming reflection of the wall of “Cuadra San Cristobal” (Url-122).

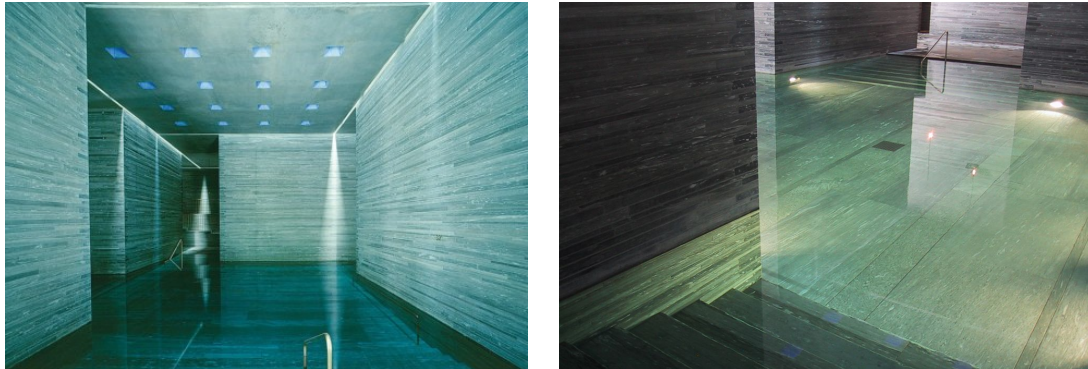
Also, throughout the design of “Amangiri Resort” by Rick Joy, water seems to act as a bounding element, mediating between different characteristics of spatial and natural elements (**Figure 5.17a**). Nevertheless, the water-washed concrete wall surface comes to the fore as a special design detail (**Figure 5.17b**). The dry wall becomes textured by the trails of water leaking out of the small holes placed at varying intervals. Besides the contrast between the mat surface of rigid concrete and the vivid liquidity of running water, the wetness of the wall represents a sharp contradiction against the dryness of the leafless tree trunks, non-humid air of the Grand Canyon and its arid landscape. Thus, such a simple detail is able to give rise to visual, haptic and thermal shifts.



**Figure 5.17 :** (a)Water as bounding medium of spatial and natural elements (Url-123). (b)Water-washed concrete wall surface (Url-124).

Designed by Peter Zumthor, “Thermal Bath at Vals” is a unique project in terms of resonant togetherness of natural stone, light and water (**Figure 5.18**). Along with dim rays of light, water acts as a connective base by filling in the distances between the stone walls. As well as horizontal positioning of fine-cut stones, thermal warmth of water and visual warmth of light make the walls seem lighter. Throughout the building, water, light and stone appear to have been brought together to initiate a holistic intermodal experience. Zumthor himself best delineates the playful design process of the thermal bath that seeks “for the reflection of light upon water, for the diffusion of light through steam-filled air, for the different sounds that water makes in stone surroundings, for warm stone and naked skin, for the ritual of bathing” (1996, p. 10). In this regard, sensations merge into one another meanwhile every single design element resonates with the other one, which sets the scene for a multi-sensory experience of thermal water. Overall, thermal bath seems to be built on the tranquil essence of bodily contact with water and the nature of encounter with

varying degrees of thermal warmth in variant atmospheres of stone (Zumthor, 1996, p. 10).



**Figure 5.18** : Unique blend of light, water and stone in “Thermal Bath at Vals” by Peter Zumthor (Url-125, Url-126).

### 5.3 Landscape Elements in Spatial Articulation

Featured by well-articulated use of landscape elements such as trees, earth, stones etc., some projects achieve to either extend the threshold between the natural and the built environment or embrace their surroundings as they are. In the first case, the boundaries between man’s dwelling and natural habitat are blurred. In the second case, the two environments are strongly intertwined.

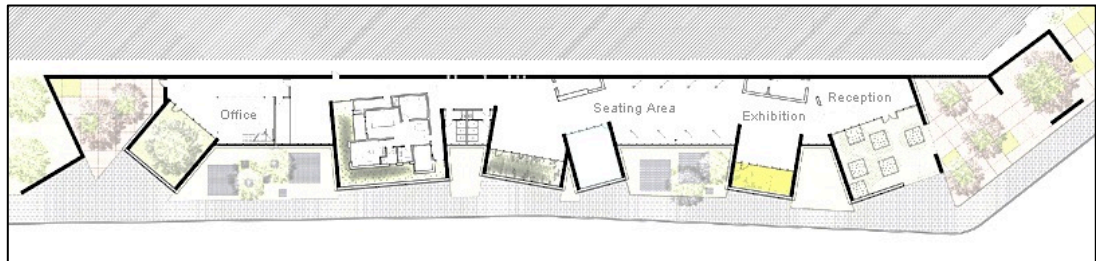
As an example from open space design category, Pikionis’ parkways can be regarded as a product of ‘natural intervention’ (**Figure 5.19**). Although trails of man-made intervention are obvious, the sense of naturalness is evoked by the way varying types of stones are brought together. According to Pallasmaa, Pikionis’ works do not refer to a definite designer, rather, look like trails of a historic custom settled over time (2000, p. 330). In this regard, not only the casual composition of stones but also the reference to duration and durability empowers the sense of naturalness.



**Figure 5.19** : Parkway design by Dimitris Pikionis (Url-127, Url-128, Url-129).



As a sample from the category of architectural design, “Momentary City Studio” by Vector Architects exemplifies the first case of articulation of the landscape elements to the built environment. As the plan view in **Figure 5.20** exhibits, certain parts on the south facade of the longitudinal space envelop trees behind permeable walls, forming transitory zones between outdoors and indoors.



**Figure 5.20** : Plan view of “Momentary City Studio” (Url-130).

On the one hand, these transition areas function as privacy screens which block the visibility of the interior. On the other hand, rows of thin tree trunks act like sunshades and windshields that promise a milder transition from outside to inside (**Figure 5.21**). In this way, the extended threshold between the outer and the inner environment not only re-characterises the spatial relationships but also ambiguates the exterior boundaries. Utilized in an innovative manner as multi-purpose design elements, the trees do more than merely configuring niches of relaxation.



**Figure 5.21** : Utilization of landscape elements as integral part of design (Url-130).

In parallel with the description of the second case, Hiroshi Nakamura’s project called “Dancing Trees, Singing Birds” sets a unique example (**Figure 5.22**). As an instance of high-level sensibility against the existing landscape elements, a pre-designed

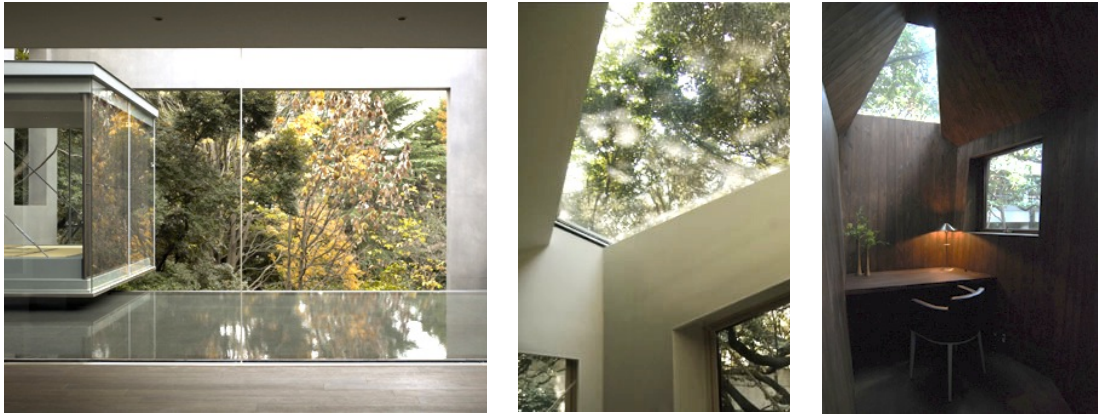
dwelling is not implanted into the nature, instead, it is designed with(in) the nature. The spatial design is adapted to the site according to the data gained from the simulations made for the growth of trees and their maximum span of sway in case of strong typhoons. Though the resulting rooms have irregular shapes, they are strongly connected to the nature via visionary, auditory and olfactory channels.



**Figure 5.22 :** (a)Physical model of the house (Url-131). (b)Elevation drawn based on the simulation data (Url-132). (c)Exterior view during daytime (Url-133). (d)Exterior view at night (Url-133).

The dwelling not only widely opens itself to the soothing view of trees but also multiplies the diverse tones of green by reflections upon its mirroring surfaces (**Figure 5.23**). Such close contact with the nature unfolds auditory and olfactory interactions as well. While one enjoys the green vista, he is dragged into the audial dialog between the rustling leaves and singing birds. Moreover, scents of the nature add another layer to the multi-sensory interaction. As well as the smells of trees, other elements of landscape altogether compose such a unique odour that the intensity of olfactory stimulation generates a '*smellscape*', namely, space of scents. Howes (2006a) speaks of the smellscape of the Ongee Village, which extends itself through a fluid layout of olfactory zones whose radiuses are dependent on atmospheric conditions such as the strength of wind. Also for Nakamura's dwelling, wind is responsible for spreading the smellscape of outdoors out into indoors, blending the smell of home with the fragrance of the nature. Consequently, intimate integration with the landscape results in an ambiguated inner atmosphere, where the

spatial aura of the built environment is resonated by the multi-sensory touches of the nature.



**Figure 5.23** : Inner visibility of the connection with the nature (Url-133).



## **6. THE ROLE OF ENVIRONMENTAL ADAPTATION ON INTERMODAL RESONANCE**

No matter how well articulated an architectonic entity is, as long as there is not a contextual coherence, the incoming cannot resonate with the existing. In terms of environmental articulation, the new entity has to overcome some challenges in four basic cases that are given as follows. First, the new building has to be inserted into a certain fragment of urban or rural pattern in the way that the project is an infill. Second, a contemporary design is expected to settle within an abandoned or ancient building, which describes the process of renovation or conversion. Third, the destination of the design is pure nature to the degree that eyes cannot fetch any other manmade artefact in the visual field. Fourth, the mass of architectural entity is so much above the average that it gives rise to 'bigness effect'. In all cases, if an adaptive, non-dominating, that is to say, a '*fragile*' architectural approach is used, the building achieves to enter into resonance with the surrounding landscape, the urban or rural pattern and the trails of time.

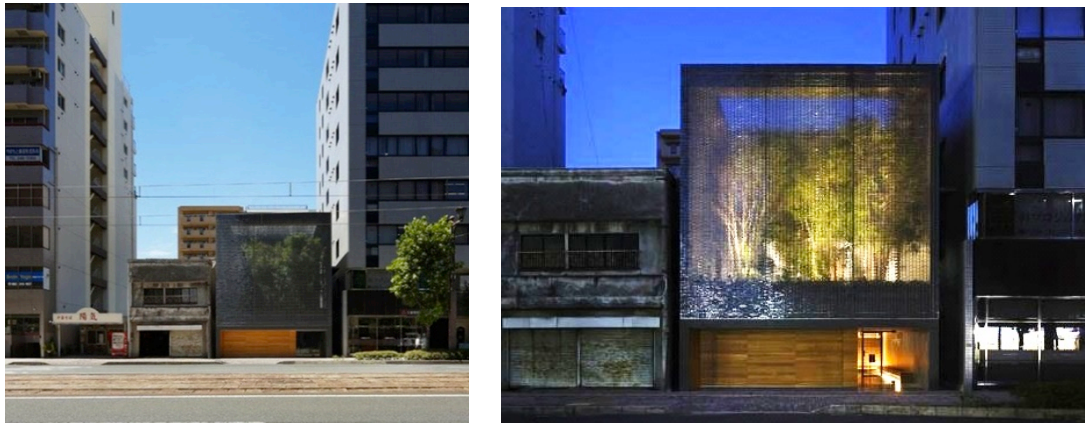
### **6.1 Environmental Adaptation in Infill Projects**

In infill projects, where new designs are implemented between two existing buildings, the qualities of articulation to the existing pattern are of great importance. If the articulated space draws a close analogy to the urban tissue in terms of dimensional, proportional or figural composition, infill is mostly based on similarities. Although the infill exhibits a certain degree of reference to its neighbourhood, it may have deliberately been planned to present a contradictory appearance, which nourishes the articulation by the strength of contrast. Unless either type of articulation impairs the contextual coherence, integration to the surroundings fulfils the basic requirement in order to provide a basis for a resonant coexistence.



### 6.1.1 Infill by similarity

Besides bringing an up-to-date spatial interpretation, some infill projects are so successful in reflecting the characteristics of their neighbourhood that they are in a fine-tuned accord with the adjacent buildings. “Optical Glass House” by Hiroshi Nakamura is an infill project that exemplifies well-accorded integration with the existing urban forms (**Figure 6.1**). At first sight, the green trees behind the glass facade of the infill house appear to be a blurred mirror reflection of the nearby tree on the pavement. As for the facade composition, it shows similarity to the front view of the adjacent old building. Moreover, the height of the dwelling is so accurate that it forms a mild transition between the two high blocks. In this regard, the dwelling meets all basic requirements in order to initiate a coherent coexistence with the available forms of the city.



**Figure 6.1** : “Optical Glass House” by Hiroshi Nakamura (Url-134, Url-135).

As well as the external appearance, the indoor ambience is the product of the same sensible and elegant design approach. The facade made of glass bricks acts as a privacy filter for the second-floor terrace, allowing a translucent contact with outdoors (**Figure 6.2a**). The glass wall not only evolves the direct sunlight into diffused daylight but also liquidates it into wavy reflections, eliciting a unique visual effect (**Figure 6.2b**). Just like Pallasmaa argues, glass confronts the beholder with the coexistence of the lucid and the opaque, the mirrored and the merged, the present and the absent, which opens doors to illusionary and oneiric experiences (2003, p. 204). Indeed, the translucent facade stands as an ambiguous threshold between the high and the low, the old and the new, the exterior and the interior, the reality and the inverted, in the way that the visual boundaries are transcended.





**Figure 6.2 :** (a)Glass brick wall as an ambiguous threshold between indoors and outdoors (Url-136). (b)Liquidated reflections of sunlight (Url-136).

“Yufutoku Restaurant” renovated by ISSHO Architects is another infill project, whose adhesion to the adjacent buildings exhibits a strong cohesion (**Figure 6.3**). Zumthor puts emphasis on the necessity of building a meaningful conversation between the new building and the current circumstances (1988, p. 18), which is also the key point for infilling. The renovated restaurant seems to highly gratify this basic necessity. The dimensions, the colour and the haptic effect of the facade are in such accordance with the chaotic nature of the neighbourhood that the implemented design seems to be an inseparable part of it. Despite its dark and opaque appearance, the facade allows permeation of light and limited visibility. Moreover, the waving effect of the facade inverts the cold and rigid impact of metal into mild and soft tactility, which invites the haptic sense to an emphatic connection. In addition, the facade attracts the passer-by via momentary perceptions of micro-consciousness, which are dependent on the angle of view.



**Figure 6.3 :** The renovated facade of “Yufutoku Restaurant” (Url-137, Url-138).

If not from the heart of a dense urban segment, “Maritime and Beachcombers Museum” by Mecanoo Architects is an infill project that has been inserted into a rural tissue. Taking different angles of roof slopes and average entrance level as reference, the museum achieves to blend all basic characteristics of the local building style in its own composition (**Figure 6.4a**). As a result, the building resonates with not only the adjacent row of buildings but also the remaining rural pattern that enters to sight in front of the back view of the museum (**Figure 6.4b**). In this sense, the infill seems to fit to Zumthor’s description of memorable buildings, which are so strongly attached to the ground and to their ambient environment that their surroundings are almost unthinkable without their absolute existence (1988, p. 18). Indeed, the proximity of the facade colour to the tones of the ground and the lack of any visible threshold such as doorstep or doorsill make the building seem as if it had been folded out of the ground (**Figure 6.4c**). In this way, the design exhibits a strong connection to the base it settles as well as to the existing forms it touches.

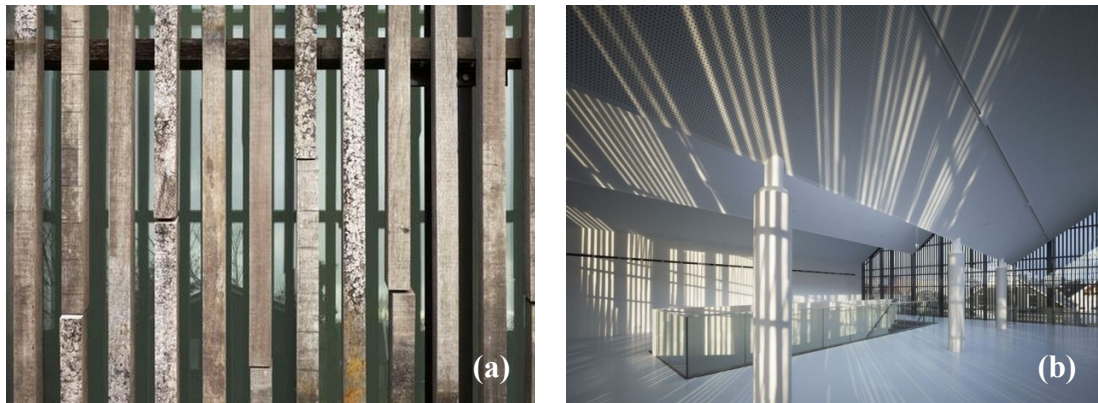


**Figure 6.4 :** (a)Similarity of roof slopes and entrance levels (Url-140). (b)Back view of the museum (Url-141). (c)Strong attachment to the ground (Url-142).

When a closer glance is taken, the facade reveals its fine fabric that arises from the subtle alterations in the colour tones and the texture of metal rods, which casts a



natural look onto the facade (**Figure 6.5a**). Whereas the array of vertical steel rods of the facade do not block the visual contact between indoors and outdoors, they also function as sunshades, giving rise to an indoor interplay of light and shadow (**Figure 6.5b**). Altogether, apart from its resonant articulation to the surroundings, the design is capable of appealing to multiple sensory modalities by means of the special facade composition.



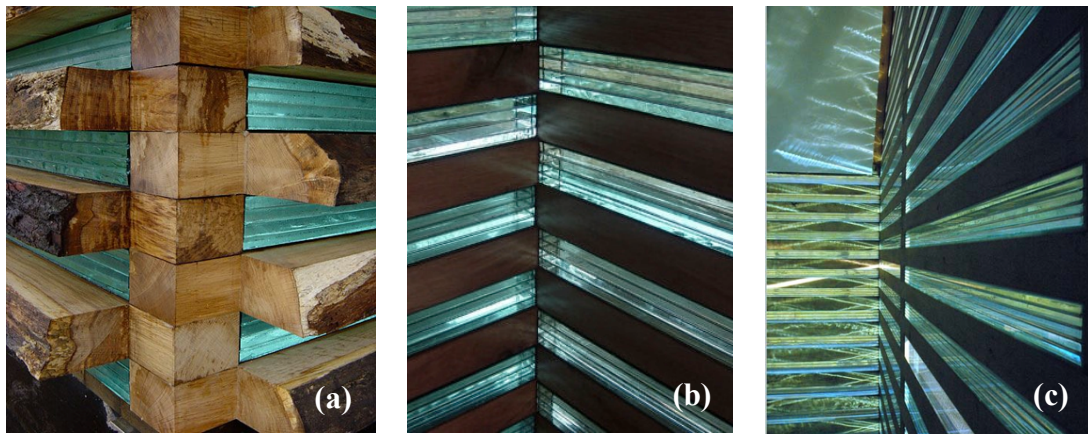
**Figure 6.5 :** (a)Facade detail (Url-140). (b)Interplay of light and shade (Url-140).

The last sample of the section, “Dairy House” by Charlotte Skene Catling is not an infill project inserted into a highly concentrated urban or rural fragment. Rather, it is an extension between an old dairy and the open landscape (**Figure 6.6**). Therefore, the new design confronts with the necessity to respect not only the trails of time but also the touch of the nature. According to Pallasmaa, as long as space, matter and time are mingled into the very essence of presence, architecture is able to permeate into our awareness (2005, p. 72). That is exactly what “Dairy House” achieves to do. Respecting the trails of time on the old walls, the articulated space displays its own presence through the language of matter.



**Figure 6.6 :** “Dairy House” by Charlotte Skene Catling (Url-143, Url-144).

As the product of a unique and special technique, the facade consists of oak planks and layers of laminated glass, which are interlocked by an innovative method (**Figure 6.7**). While the outer faces of the glass and the timber are left rough (**Figure 6.7a**), both of them are polished inside (**Figure 6.7b**), which is a wise gesture that marks a subtle transition from the old and natural traces of the exterior to the sterile modernity of the interior. Not only the tactile but also the visual effect of the wall is dramatically altered from the outside to the inside. Refracted by the thin layers of glass, daylight is almost liquidated, casting watery reflections onto the inner surfaces (**Figure 6.7c**). Overall, the facade acts as a resonant mediator between the old and the nature, the outside and the inside, the vivid outdoor atmosphere and the vibrant indoor ambience.



**Figure 6.7 :** (a)Rough outer surface (Url-145). (b)Polished inner surface (Url-146). (c)Refraction of daylight through the glass layers (Url-146).

### 6.1.2 Infill by contrast

Infill projects may also act as contrasting hinge points in the urban tissue as well as being complementary articulations to the current cluster of cultural fragments. Some infill projects are so outstanding by their contradictory stance that they turn the city into “an endless collage and montage of impressions” (Pallasma, 1996, p. 145). The following two projects exemplify two remarkable pieces from inside countless city collages.

The first project, “Ipera 25” by Alataş Architecture, is an infill whose contrasting pose is meticulously embedded into the existing architectural fabric. First of all, the vertical movement of the facade is in contrast to the horizontal layering of the neighbour buildings (**Figure 6.8a**). During daytime, the facade appears to be a rigid screen of an introverted life (**Figure 6.8b**) whereas, at night, it barely betrays the



silhouette of the inner life (**Figure 6.8c**). Here, daily course of time transposes the connection between the infill building and its surroundings. As Pallasmaa contends, such settlement of architecture “enables us to perceive and understand the dialectics of permanence and change [...] and to place ourselves in the continuum of culture and time” (2005, p. 71).



**Figure 6.8 :** (a)Vertical effect of the facade (Url-147). (b)Closeness of the building during daytime (Url-147). (c)Betrayal of inner life at night (Url-147).

To continue with the facade characteristics, the wooden filter that characterizes the frontal view of the building does not only determines a time-correspondent attitude towards the neighbourhood but also acts as a sunscreen (**Figure 6.9a**). Though the dweller seems to be isolated from the outside, in fact, it remains in close contact with a wide perspective of street view visible both from the glass facets of the facade extensions (**Figure 6.9b**) and through the wooden tulle curtain (**Figure 6.9c**). Thus, the infill grasps a moderate balance between openness and closeness, contradiction and congruity; which makes the building shine out as an ambiguous blend that is fine-tuned by space, matter, culture and time.



**Figure 6.9 :** (a)Wooden tulle as sunscreen (Url-147). (b)Glass facets enhancing visual contact (Url-147). (c)Wooden tulle as privacy screen (Url-147).

“House SH” by Hiroshi Nakamura is the second example of contrasting infill project, which is a private dwelling with an unusual facade characterized by an extraordinary gesture (**Figure 6.10a**). The bump on the pure whiteness of the facade awakens an emphatic connection, which inspires the beholder to call it ‘the pregnant house’. As for the inner perception, the dweller is provided with a curvilinear niche to curl up, which presents an analogical reference to mother’s lap or even a cavity inside a cave (**Figure 6.10b**). The phenomenological density of this simple architectonic gesture is highly congruent with Pallasmaa’s view, which declares that architecture must also mirror the primal steps of humane presence meanwhile it situates the self within the technology of the present (1995, p. 311). Indeed, “House SH” allows a retrospective collage of dialectics of human existence to emanate from architectonic mimicry. In addition, contrary to the absolute opaqueness of the facade, the interior welcomes the dweller in a well-lit, pleasant ambience due to the daylight gained from the skylight and the soft colours of inner surfaces. Overall, although the dwelling sets out with the idea of a contrasting outer shell, it achieves to generate an empathic and intimate connection with both the passer-by and the dweller.



**Figure 6.10 :** (a) Unusual architectonic gesture of “House SH” (Url-148). (b) Outer gesture inverted into a curvilinear niche (Url-149).

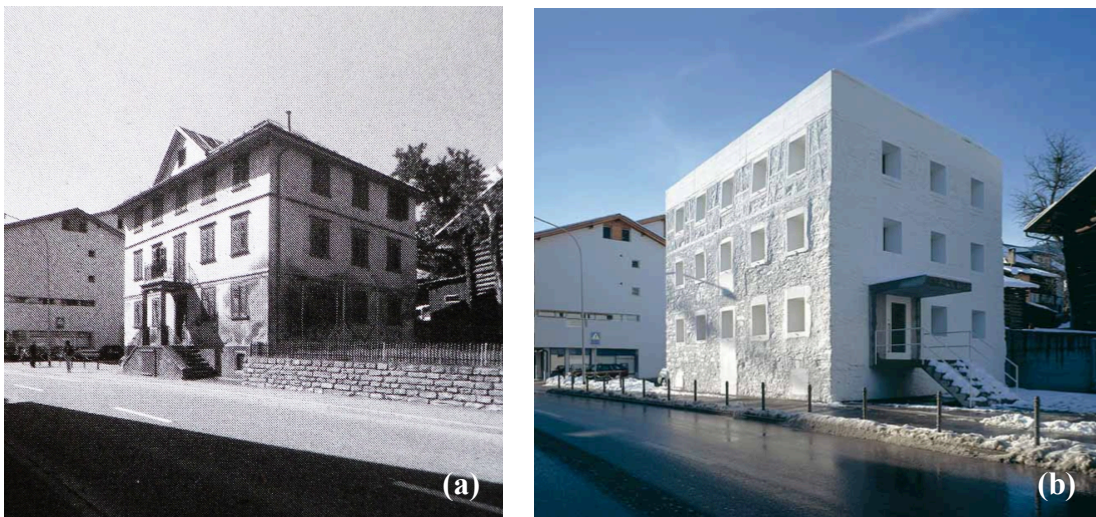
## 6.2 Adaptation to Trails of Time in Conversion and Renovation Projects

The architectonic and aesthetic quality of architectural conversions and renovations are dependent on how the visible traces of former lives are integrated to the contemporary intervention. In this process, trails of time should be handled with great care and respect as both the memento of the past and ambiguous marks that



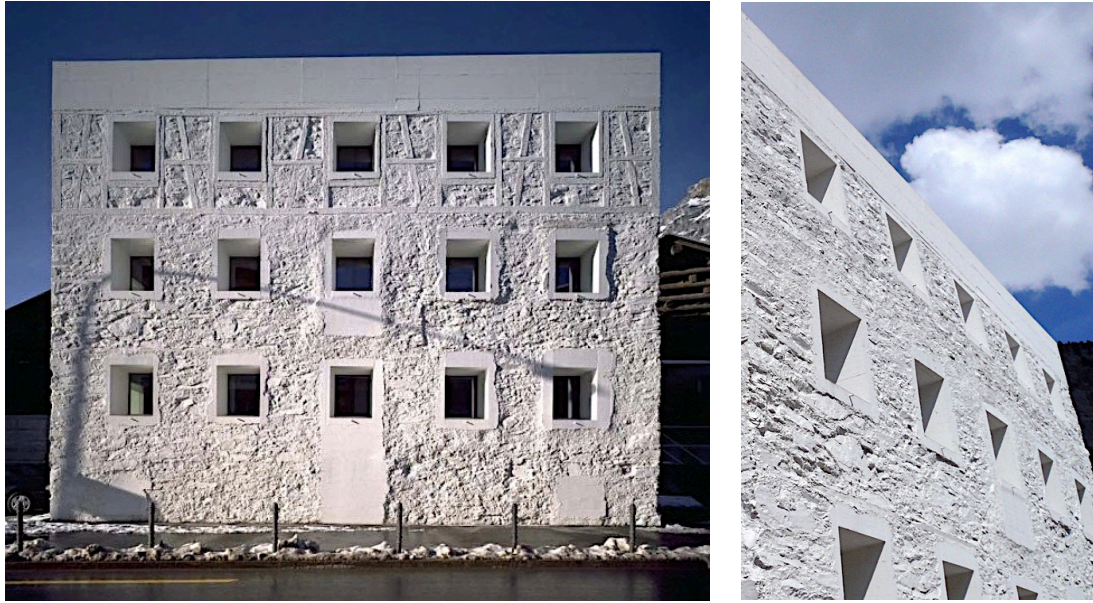
refer to the natural flow of life. John Ruskin believes that “in all things that live there are certain irregularities and deficiencies, which are not only signs of life but sources of beauty” (as cited in Pallasmaa, 2000, p. 332). Then, according to Ruskin’s view, buildings as living entities do also host a certain level of imperfection that deepens their presence instead of impairing their assessment.

For instance, “The Yellow House” renovated by Valerio Olgiati is the conversion of an unoccupied house into a museum, in which almost all architectonic characteristics of the old facade are entirely preserved (**Figure 6.11a, Figure 6.11b**). Except for changing the colour from yellow to white and turning a few doors into window openings, the old configuration and the texture of the facade is left as it is. Consequently, the new appearance of the building portrays a sincere scene of imperfection, which does not deny the former expression on the outer skin of the building.



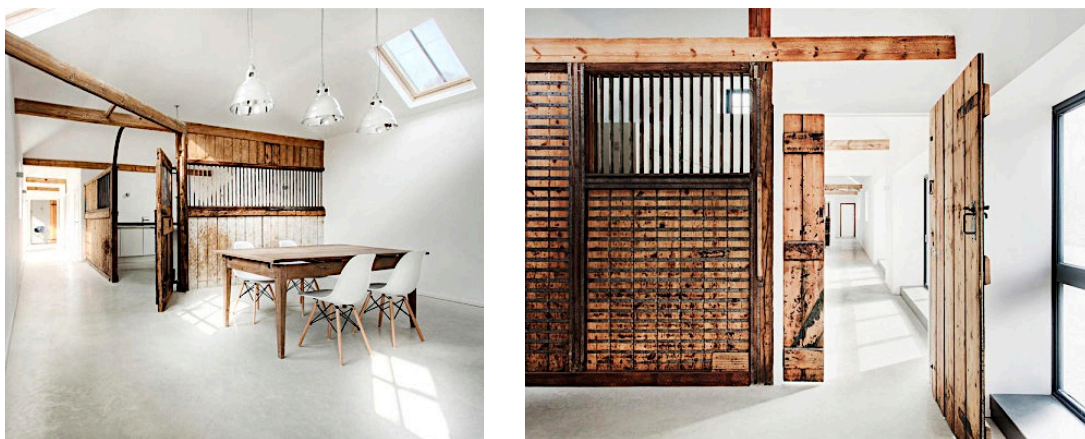
**Figure 6.11 :** (a)“The Yellow House” before rennovation (Url-150). (b)“The Yellow House” after rennovation by Valerio Olgiati (Url-151).

In the meantime, the significant contribution of Olgiati’s unique approach should not be ignored. Breitschmid (2008) calls his designs as products of “pure architecture”, which stems from one single idea and provides an integrative-holistic solution to all corresponding aspects of the building. Indeed, the renovated facade evokes a monolithic tactility that not only elicits a unique haptic sensation but also challenges the beholder by the ambiguity that makes it appear both perfectly finished and imperfectly unfinished (**Figure 6.12**).



**Figure 6.12 :** Closer views of the facade of “The Yellow House” (Url-152, Url-153).

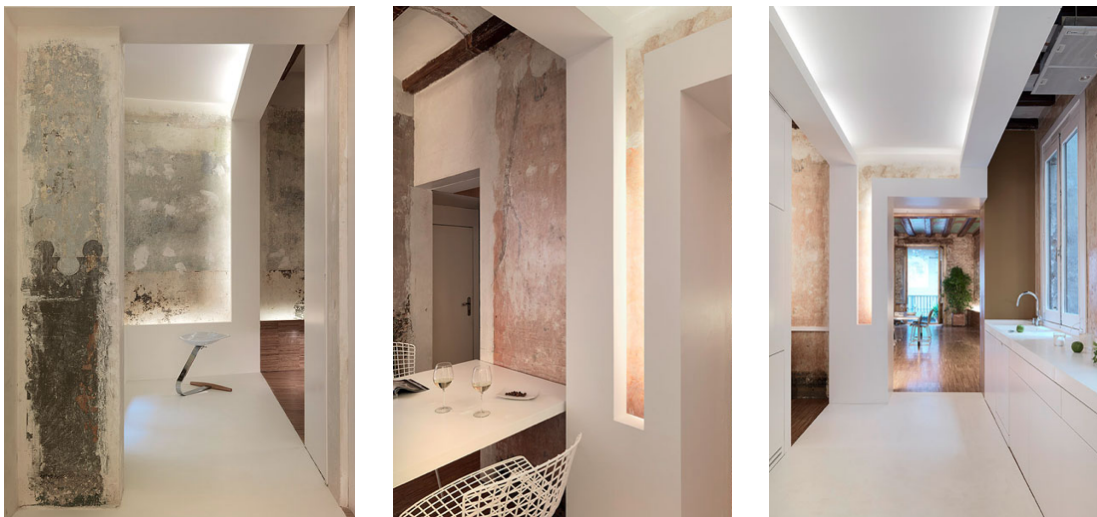
“Manor House Stables” by AR Design Studio is another conversion project whose primary identity is driven forward by the recessive character of the renovation (**Figure 6.13**). The exactly preserved wooden components reveal the marks of former tenants as the frozen witnesses of the building life cycle. In fact, as an organic construction material, wood itself also holds the tracks of its own lifetime. Pallasmaa contends that wooden surfaces display the trails of time coming not only from a former life as a tree but also from the transformative process of manmade intervention (2000, p. 324). In this regard, the old wooden components in the renovated house represent the overlaid traces of two discrete life spans. Thus, the bare existence of the wood extends the historic deepness of the house and enriches the aesthetic contemplation by its resonant mediation among time, matter and space.



**Figure 6.13 :** Renovated interior of “Manor House Stables” (Url-154).



The last example of conversion projects, “Manor Crusch Alba” by Gus Wüstemann, attracts attention by its charming contrast between the old and the new (**Figure 6.14**). Framed behind the floating white walls, stained colours of the old walls evoke the impression that as if they were abstract works of art in the theme of ‘frozen time’. Going beyond the metaphor, the house literally succeeds in fulfilling the immense desire of mankind, that is to say, achieves “to halt, suspend, and reverse the flow of time” (Pallasmaa, 1995, p. 308). On the one hand, the past and the present are juxtaposed via a meticulous adhesion. On the other hand, fine-tuned gestures offset the contemporary touch. Overall, the intertwining of time threads and haptic tension between the roughness of the old and the plainness of the new awaken a resonant perception.



**Figure 6.14 :** Resonant togetherness of the old and the new (Url-155).

### **6.3 Elimination of Architectural Dominance**

As man-made artefacts, architectural entities have tendency to hold a dominant pose against their surroundings. Under some circumstances, a building is more inclined to appear in a hegemonic character. First, beyond a certain mass, the building inevitably faces the risk of drawing an aggressive and clumsy portrait. Second, in the case that the architectural entity is inserted into intact nature, artificial intervention is prone to surpass the nature, impairing the integrity of natural elements. In either case, there are things to do in order to eliminate the effect of dominance, which are to be elucidated in the following sections.

### 6.3.1 Elimination of scale effect

The heavier the functional load is, the more massive the building has to be. When the available site is not big enough, the building turns out to be high-rise so that the requirements of a heavy functional program can be fully met. If the architectonic mass is expanded across the horizontal plane as well as the vertical axis, then, the building becomes inclined to put on a bulky appearance. Hovering over the city, the big mass tends to bear a negative scale effect. Franck (2008) underlines that the dominance of the big form becomes unbearable when there is something forcing in its demand for stature and stability. So that the big form gets tuned, he asserts that it must adopt something compelling (p. 89). Otherwise, bigness factor turns into a threat for not only the image of the building but also the urban silhouette.

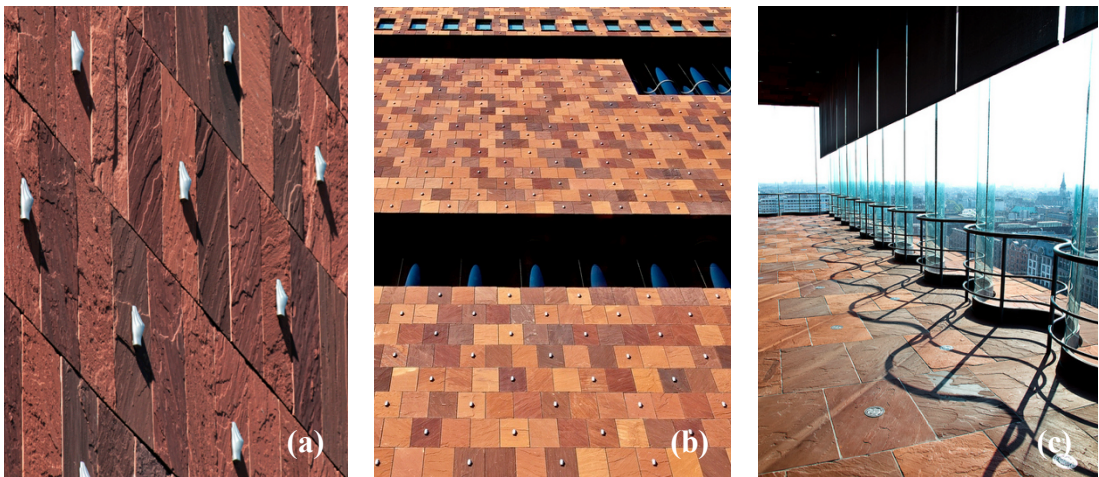
Bigness in architecture has been a hot topic for architects especially in terms of its side effects for the silhouette and the texture of the city. Koolhaas sorts out five theorems of a 'Theory of Bigness', which are, he believes, tacitly connoted by "Delirious New York". Referring to one of these theorems, he draws attention to the proposition that bigness is in existence independently of any urban pattern, at best, it is able to coexist with its surrounding (1994, p. 308). In this regard, though the domination of the architectonic bigness cannot be completely eliminated, it can be moderated to a certain extent.

Franck (2008) speaks of two common cosmetic measures in order to disguise the natural dominance of the big form. According to him, transparency is one of these measures, which dissolves the massive appearance of the building in the window area (p. 92). For instance, "Museum Aan de Stroom (MAS)" by Neutelings Riedijk Architects is a monumental example of big-scale architecture, which breaks the massive effect by its precisely proportioned balance between opacity and transparency (**Figure 6.15a**). Apart from the aesthetic togetherness of opaque and transparent parts, there are some other aspects that accord its scale effect. Due to the heterogeneous arrangement of diverse facade tiles ranging among the tones of burnt orange, reddish orange and red brown; the facade bears not only a contrasting colour match with the blue tones of its own transparency, the sea and the sky but also elicits a delicate haptic granularity. The tactile effect of the tiles is perceivable even from quite a long distance (**Figure 6.15b**).



**Figure 6.15 :** “Museum Aan de Stroom” (MAS) by Neutelings Riedijk Architects:  
 (a)Delicate balance between opacity and transparency (Url-156).  
 (b)Tactile effect of the facade tiles (Url-157).

However, when a closer glance is taken, it becomes recognizable that every single tile has also a unique texture of its own (**Figure 6.16a**). In addition to this, it is realized that the size and the square form of the tiles bring out a horizontality effect on the opaque parts (**Figure 6.16b**), which is in contrast to the vertical undulating effect of transparent parts (**Figure 6.16c**). Overall, the building moderates its bulky mass and achieves to charm the beholder by the resonant contrast of visual and tactile aspects.



**Figure 6.16 :** (a)Texture of tiles (Url-158). (b)Horizontality effect by square tiles (Url-159). (c)Vertical undulating effect of glass panels (Url-160).

The building is not necessarily to be high-rise in order to evoke a bigness effect. A facade that is over-extended along horizontal axis may produce a negative scale effect, as well. However, the undesired impression of the horizontal dominance can be eliminated by an elaborate facade composition to such degree that bigness, as Koolhaas believes, provides some measure of composure and even gentleness (1994,



p. 309). “Sky Courts” by Höweler & Yoon Architecture well exemplifies the case in which a big facade gains an intimate naturalness by the composite frontal view (**Figure 6.17**). As well as the diversity in the dimensions, types and positions of the window openings, heterogeneity in the colour, texture and material type of opaque parts elicit an intricate facade composition. The contrast between rusty-looking steel window niches and the partly wet-looking brick pattern is such striking that the grey wall appears to be a fragment from nature, which acts as a sublime background for the conjoint pattern of window niches. Also, by their complementary colour and the slender pose of their trunks, the green trees on the foreground add a translucent layer to the composition. As a result, the facade awakens an ambiguity by its seemingly multi-layered enclosure, which evokes the sense of an architectonic collage rather than the rigid perception of a single compact block.



**Figure 6.17** : Resonant facade composition of “Sky Courts” (Url-161, Url-162).

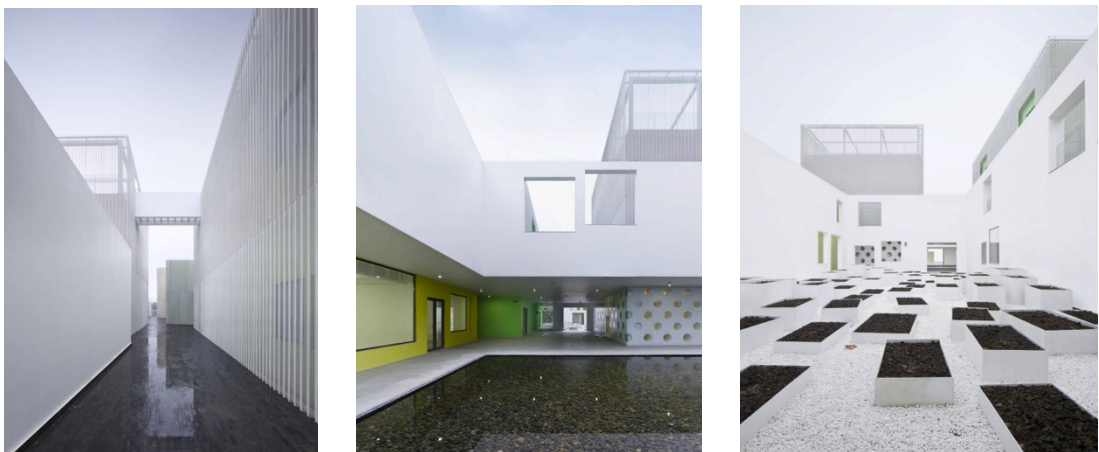
As another characteristic of massive buildings, Koolhaas points to the existence of autonomous parts that have to co-function in a form of bigness (1994, p. 308). When the heavy functional programme of the big mass is not truly articulated, disconnections between contextually coherent units and compulsory juxtaposition of discrete functions become inevitable. Consequently, the building cannot adopt a credible integrity. Therefore, as long as the building site is available for horizontal expansion, fragmenting the big mass into separate sub-forms may be a wise solution in order to prevent any kind of functional or contextual mismatch. “Youth Center of Qingpu” by Atelier Deshaus exhibits a good sample of well-fragmented mass (**Figure 6.18**). Since the separate units varying in size are located at quite a short distance to one another, one gets the impression that as if one building had been segmented by slits. Though the differentiated dimensions of the segments put emphasis on the existence of fragmentation, facades referring to one another in terms

of colour and composition remind that all parts belong to one whole. Moreover, two-layered facade design leaves a resonant taste by the illusively translucent look of its smaller windows left behind the perforated steel skin. The light colour and the permeable look of the steel panels soften the rigidity of opaque walls, as well. Altogether, the facades display an ambiguous appearance by their gentle shifts from opacity to diverse degrees of transparency.



**Figure 6.18 :** Fragmented mass of “Youth Center of Qingpu” (Url-163).

In the same way, different types of interconnections among the masses make them sway between separation and cohesion. Articulated to one another by passages, bridges and overlaid spaces; or separated by inner courtyards, pools etc., the facility benefits from a variant chart of transitory zones (**Figure 6.19**). Overall, elegant combinations of different degrees of transparency, pure white surfaces, soft colours, gravels, stones and water not only assign distinct characters to each transition but also elicit multimodal sensations. As one walks across one of the transitory zones, he receives continuously alternating stimuli from all sense modalities, which gives rise to intermodal resonance.



**Figure 6.19 :** Examples of diverse transitory zones inside the facility (Url-163).

### 6.3.2 Elimination of dominance against the nature

Recently, more and more architects have been showing great interest in designing with natural elements or giving reference to the nature even if their designs are to be embedded into a dense urban tissue. Whereas the use of natural elements and materials moderates the artificiality of man-made intervention, architectural works inserted into intact nature carry the risk of being rejected by the natural habitat. In order to make the architectonic layer resonate with its surroundings, persisting and prevailing gestures should be avoided. Elimination of dominance against the nature is only possible by means of a fine-tuned dialogue between the two habitats. Surface qualities, material choices, and the articulation in critical points where architecture palpates the nature are of fundamental importance.

To begin with the surface qualities, the small-scale studio project of Johnsen Schmalig Architects sets a good example (**Figure 6.20**). By the colours and the texture of its surface, the enclosure of the studio is the reminiscent of tree barks and autumn leaves, which marks a strong reference to its surroundings. However, although the outer shell vividly mimics the natural patterns, the light band visible between the two levels of the studio shines out as a subtle trace of human intervention. In this way, the architectonic artefact achieves to manifests itself in humility.



**Figure 6.20** : Surface qualities referring to the natural surrounding (Url-164).

As for material choice, another important factor for designs in the heart of nature, “Liyuan Library” constitutes a fine sample (**Figure 6.21**). By its outer skin tiled with panels of tree branches, the library mutes its rigid geometry and initiates a resonant dialogue with the natural elements. In Ignasi de Solà-Morales’ sense, the design artefact achieves to draw a “tangential and weak” figure, which he favours over an “aggressive and dominating” image of architecture (1987, p. 623). To mention at this



point, Pallasmaa also adopts quite a similar approach to Solà-Morales’. However, in order to eliminate negative associations, Pallasmaa (2000) prefers to use the word ‘*fragile*’ instead of ‘*weak*’ in order to refer to an architecture of humility and duration, in which matter suppresses the persistence of geometry.



**Figure 6.21** : Material choice referring to natural surroundings (Url-165, Url-166).

In a fragile architectonic case, just like in the case of “Liyuan Library”, architectonic space enters into an intimate conversation with not only its surroundings but also the beholder. For instance, as well as weakening the architectonic dominance against the nature, wooden panels of “Liyuan Library” act as sunshades and tuners of interior atmosphere (**Figure 6.22**). Although the design roughly uses very basic forms of solid geometry, haptic and contextual strength of the raw material achieves to drag the beholder into a resonant perception.



**Figure 6.22** : Wooden panels as permeable filters between indoors and outdoors (Url-166, Url-167, Url-168).

‘*Fragility*’ of the design artefact is also highly dependent on the third factor, namely, the articulation of critical points where architecture palpates the nature. By the subtle gestures of its figural composition, “Meiso no Mori Municipal Funeral Hall” by Toyo Ito represents a respectful sensibility against the morphologic properties of natural forms (**Figure 6.23**). The most outstanding feature of the project, the white

concrete roof, appears to be so fluidly and arbitrarily formed that it seems as if it had been generated by the laws of the nature, just like the green hill in the background. Zumthor believes that architectonic engagement in the intrinsic rules of the natural elements such as mountains, rocks, water etc. paves the way for an architecture that departs from and arrives in genuine matters (1991, p. 29). Indeed, Toyo Ito's design goes beyond solely mimicking natural forms and uses the inherent logic of amorphous natural formations. On the level where it touches the hills, the building elicits an analogy to the geography of mountains whereas, on the level where it touches the water, its reflection associates with the smooth movement of damping waves.



**Figure 6.23** : Fragile articulation of spatial transition points (Url-169, Url-170).

In the meantime, also from the interior, the heavy concrete roof evokes the impression of a frozen liquid poured down from above (**Figure 6.24**). The pure white colour, reduced thickness and smoothness of the concrete make the roof seem soft and almost weightless. Consequently, the knowledge about the material and the way it is implemented give rise to a contradiction, which awakens a phase of micro-consciousness shifting from heaviness to lightness, or vice versa. Altogether, naive inspiration that stems from the inherent rules of the nature unfolds a fragile and adaptive attachment to the nature.



**Figure 6.24** : View of concrete roof from inside and outside (Url-171, Url-172).



## **7. CONCLUSION**

Throughout the thesis, architectural aesthetics is handled based on a comprehensive perspective that accentuates contextual, perceptual, cognitive and sensorial aspects of architectonic appreciation. Intermodal resonance, namely, interrelated alteration or stimulation of sensations, is considered as the central factor for architectural aesthetics. Originally adopted from neuroaesthetic theory and nourished through an interdisciplinary approach, the following three concepts; micro-consciousness, empathy and ambiguity are considered as the criteria of intermodal resonance. Altogether, the aesthetic quality of an architectural work is attributed to the degree to which the beholder gets excited by cross-modal interactions across multiple sense modalities. Correspondingly, the aesthetic goal of architectural design is determined as to awaken a stronger intermodal resonance among as many sense modalities as possible via eliciting micro-conscious perceptions, empathic connections and ambiguous articulations.

### **7.1 Scope of the Thesis**

Along with the emergence of sub-fields like neuroaesthetics, the nature of aesthetic quality in architecture has begun to be investigated in conjunction with neuroscience as well as art critics and philosophy. Indeed, throughout the long way departing from the classical view of architectural beauty and arriving at the brand-new notions of the new era, aesthetic evaluation of architecture is more and more in strong need to be handled under the light of an interdisciplinary frame. Novel changes in design ideologies and design technology strengthen the requirement for a versatile elaboration of architectural aesthetics, even more than ever. Based on this requirement, the current thesis research is an attempt to envisage an interdisciplinary frame in which aesthetics in architecture could be questioned.

## **7.2 Contribution**

Architectural aesthetics is tackled as a question of quality in sensual impressions rather than solely being a matter of optimum solutions to quantitative aspects of design. The argument of intermodal resonance is proposed and then, the criteria of the argument are elucidated in parallel to the selected projects. During the meticulous elaboration of aesthetic qualities of the selected projects, micro-consciousness, empathy and ambiguity come to the fore as the three basic criteria of intermodal resonance. Sophisticated articulation of spatial and natural elements is shown to be essential so that the interplay among design ingredients gives rise to intermodal resonance. Resonant coexistence of design elements is demonstrated to stem from fine-tuned balance between privacy and publicity, true functional flow, subtle architectural details and sensible embracement of the urban, rural or natural pattern in which the design is embedded.

Throughout the thesis, aesthetic engagement in architectonic space is tackled via existential, sensational and mental layers of perception. Altogether, a resonance-based argument of aesthetic embodiment is articulated in order to cast light upon human interaction with architecture. Overall, the study is presented in the hope of making an inspiring interpretation on the multifaceted nature of architectonic contemplation.

## **7.3 Future Studies**

The study aims to provide a set of criteria for an objective evaluation of architectural aesthetics. However, the argument of intermodal resonance originates from perceptual and cognitive processes, which are prone to be affected by individual differences. Therefore, factors eliciting intermodal resonance may not give rise to equivalent perceptions in every single beholder. This fact bears the necessity to collect as many personal projections as possible in order to authenticate the validity of the argument of intermodal resonance.

At this point, the best option seems to be paying attention to the impressions of people who are able to personally experience a space since 2D or 3D virtual displays can never give the sense of a real architectonic encounter. Taking all factors affecting

personal projections (age, gender, disability status etc.) into consideration, visitors of the space can be invited to a special kind of protocol analysis. However, evaluation of protocol analyses cannot reveal the neural underpinnings of the current case of architectonic contemplation. In this regard, both personal presence in the architectonic space and neural data pertaining to the current spatial experience are essential, which requires further studies and improvement of new experimental equipment.

If further studies allow the argument of intermodal resonance to be scientifically tested, personal responses to spatial experiences can be comparatively evaluated via quantitative data about neural activities. Only then, the argument of intermodal resonance might turn into a more reliable judgment measure for aesthetic evaluation of final designs. In addition, neural data gained from scientific evaluation can also be computed in order to produce a quality-enhancing digital tool for any design process. Such tool may guide the designer to overrate the more aesthetic solution among all optimum design solutions. In this way, the argument of intermodal resonance can also be benefited to escalate the aesthetic quality of design products while they are still in design process.



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- **DarcAN, T.,** Gürer, E., 2012: A Poe-(gene)tic Algorithm Medhod to Compute Gradient Spatiality. *XVI SIGraDi Conference*, November 13-16, 2012 Fortaleza, Brasil.
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