

## 0. The research of perceptual and environmental psychology topics as a source of inspiration for the designer architect

- 0.1. The goal of this dissertation, the criteria for subject selection and personal motivation
- 0.2. Can we use the research results of visual perception in the design practice?
- 0.3. The parallel presence of the researcher attitude and the designer-intuitive attitude

### THESIS VIII. It would be beneficial for the standard of the Hungarian architectural education to teach design methods based on interdisciplinary themes and research, concerning the crossroads of architecture and psychology.

In this chapter I introduce the approach, and research-design programme of the creative researcher group called the New Vision, focusing on the work of the Hungarian designers (Marcell Breuer, László Moholy Nagy, György Kepes). Certain research outputs are presented concerning visual perception (the biological process of seeing) and some designer experiments linked to them, showcasing through the example of two buildings of Marcell Breuer<sup>21</sup>. The architect consciously created such a facade structure, that provides field to analyse – on the one hand the method of continuous support of attention, on the other hand the effect of the view with various readings (‘excitingness’ arisen from the rhythm of visual complexity, ‘excitingness’ arisen from ambivalence). The New Vision think tank models that ideal creative platform, which was formed in a special era, and may awaken the need in us for a similarly intense and inspiring intellectual cooperation. The structure and syllabus of the Hungarian architectural education raise creative thinkers, who could be able to work on both intuitive and scientific design projects. With this idea the final chapter turns back to the theme of the first chapter and my personal motivation.

### VIII. Perception experiments through designing facades and the New Vision think tank

- VIII.1. Interdisciplinary research projects, research-based design and the subject’s Hungarian relevance
- VIII.2. The approach and program of the New Vision group
- VIII.3.1. Practical application of the results of the visual perception research project – architectural examples
- VIII.3.2. An overview of the results of visual perception research projects
- VIII.3.3. Marcell Breuer: Atlanta Public Library (USA, Georgia) 1971-762
- VIII.3.4. Marcell Breuer: Armstrong Rubber Company, West Haven (USA, Connecticut) 1965-692
- VIII.4. Perspectives as an afterword

### THESIS VII. The work of the researcher-designer architect can create unique results through the junction of theoretical research and the designer’s practice as well as the parallel support of the researcher-designer attitude.

The mental map is the image of the environment in the people’s (and other living creature’s) mind, which is originated mostly from perception, and built due to a logic different from the traditional geographical maps. It is distorted according to subjective value judgments and viewpoints, and constantly develops through the utilization of the environment. There is a common intersection of the particular individuals’ mental maps, which provides the people’s collective mental image of a particular environment (Lynch<sup>1960</sup>). The presentation of Kevin Lynch’s work provides an exemplary proof, that the parallel support of the researcher and designer attitude as well as the continuous junction of the research and practice can produce fruitful outcomes. The investigations on mental mapping is still in the focus of several researchers’ interest today, and presumably there will always be some open questions on this subject. The introduction of the main steps of the research on mental mapping also provides a background to our research ‘Perceptual tuning of a Simple box’<sup>19</sup>, giving context to the proposed theme. Some key question arisen in the chapter is analysed in connection with some of my personal experiences in Atlanta (such as the contradiction between the real environment and the reconstructed one according to our mental map; the mental map key elements chosen environmental specifically), concerning which I come to valuable conclusions for designers.

### VII. The interaction between the mental map and perception

- VII.1. Mental map
- VII.2. Is everybody’s map different? Kevin Lynch’s research findings
- VII.3. Kevin Lynch’s design suggestions
- VII.4. Reconstructed environment and real environment
- VII.5. What did we learn from the rat experiments?
- VII.6. Mental map research questions in 2011
- VII.7. The rhythm of receiving key stimuli

### THESIS VI. The preciseness and complexity of the mental map of the environment are affected by the succession and the rhythm of the spatial key informations about the environment, that got into the observer’s view and focus of attention during the course of exploration.

This chapter introduces our research pursued at Faculty of Architecture at Georgia Institute of Technology as well as the content of our publication titled ‘Perceptual tuning of a Simple box’<sup>19</sup>. Experiments reveal that the mental map of a particular space obtained during movement can possess extremely different complexity and quality depending on the walked paths. The intelligibility and reading of the spatial relations and quality of the given space sequence depends largely on the order and rhythm of the appearance of ‘new spatial elements’ provided by the particular path. The diverse succession of revelation guides the attention differently, thus spatial readings of diverse complexity and substance are generated. In order to gain the most complex and precise mental map, the ‘good pace’ of arrival of the ‘relevant new informations’ is needed.

### VI. Different perceptions of Tadao Ando’s St. Louis space depending on the path of exploring – research method and experimental results

the edited Hungarian extract of the publication titled ‘Perceptual tuning of a Simple box’ (Authors: Sonit Bafna, Anna Losonczi, John Peponis; Georgia Institute of Technology Atlanta, 2011)

- VI.1. Abstract
- VI.2. Logic of experiments
- VI.3. The case
- VI.4. First experiment
- VI.5. Second experiment
- VI.6. Results
- VI.7. Discussion
- VI.8. Concluding Comments

### THESIS V. Such space sequences exist, of which particular views (p.e. the view of an interior from the same viewpoint) can be interpreted in different ways, depending on the spatial and temporal context. The particular interpretations cumulates during the multiple interaction, thus a unique architectural space experience can be generated through the design of such space sequences, that potentially implicate diverse interpretations.

This chapter presents the ‘matrix’<sup>18</sup> dealing with the formerly introduced Tadao Ando space. The ‘matrix’ is a table, that indicates the roles of the particular space generating elements in the course of perception one by one, associated to the different paths of exploration. We developed an experience based expert method<sup>19</sup>, which does not only study the effect of space on the whole, but breaks it up to the effects of those components, which can be modified directly by the architect (thereby redesigning the space in order to achieve the desired effect). We also split the cognitive perceptual process functioning during movement in space into its elements, which were considered to be dominant from the environmental psychological viewpoint (concerning the showcased building these are: categorization, localization, motivation, own space, attention, feeling). According to our hypothesis, the effect of the space impacting the observer can be manipulated through the systematic modification of the selected elements. Hence, we are testing the processes through redesigning the original space. We alter or vanish that element of the space, which plays a key role in the effect, and analyse its consequences through experiments (comparing with the effect of the original space). According to the experiments, it is detectable, that the perception during the movement in the space is influenced by the previous experiences linked to a particular path, as well as the spatial and temporal context. It is possible to design such spatial situations, that effect a long term impact during the spatial expeditions of the observer. For example we call ‘preparing’ that phenomenon, when a recurring or one time spatial situation impacts the observer, that he accentuates his attention more firmly than usual, in order to accept a particular information. The matrix highlights the generating factors of the space experience, which are related to perceptum shift or ambivalence.

### V. Influencing the perception of the built space through the instruments of architectural design in Tadao Ando’s gallery space in St. Louis

Continuing the research according to my interest and skills as designer-architect (ongoing research with Klára Sarbák, Attila Kurucz, Levente Gulyás and professors Andrea Düll and Sonit Bafna; 2013–2014 Budapest)

- V.1. Foreword – Transforming the research into designer issues
- V.2.1. The role of ‘prior spatial experience’ in perception during movement in the space
- V.2.2. The complex effect of space and dividing this effect into the effects of single elements
- V.2.3. A description of the Matrix
- V.2.4. Introducing the ‘intuitive method’ and presenting its methodological validity
- V.3. A study of the cognitive process of spatial perception: navigation, categorization, orientation, attention, ‘own space’, motivation, emotion
- V.4. The matrix as a measurement tool: the causing factors of the richness of stimulus in space, spatial perception and spatial interpretation (excitingness factors)
- V.5. Types of constellations and spatial situations with lasting impact
- V.6. The method of changing spaces and the result of the investigative study

## Anna Losonczi CONSTELLATIONS 2014 Architecture and perceptual psychology

Learning the crossroads between architecture and psychology (here perceptual and environmental psychology), as well as the achievements of scientific research can be inspirational and useful for the designer architect. The ideas of architects are not interlocked through the design process mechanically, but their decisions are rather shaped by both their knowledge from various sources and their inner intuitions. The goal to make the scientific results and academic language usable for the average reader and the further consideration of these achievements and research topics in order to inspire the design practice fills a gap. The investigations on the visual perception focus on the understanding of the procedure of seeing our environment and the processing of the perceived image. This issue seems to be isolated from the design practice; however, the preference research in environmental psychology, which analyse what kind of environments we like<sup>1</sup>, can be a link. The acquaintance with the research topics may raise such questions that have already played a role in the creative process intuitively, but pointing out these questions consciously can open up new further possibilities for our intuition.

**THESIS 0. The research on the topics of perceptual and environmental psychology can provide a source of inspiration and useful knowledge for the designer architects. From these ideas always those are used and considered further, which are judged necessary by the designer in the given architectural situation.**

### I. Interpreting ideas known in environmental psychology for the built environment

- I.1. What environments do we like? (Introducing the dimensions of ‘intelligibility’ and ‘excitingness’)
- I.2. The biological course of processing information received from the environment – psychological concepts
- I.3. Interpretation of the concepts presented above, and the development of the architectural experience through the example of a building facade
- I.4. Considering Gestalt principles of grouping and closure when designing, and their impact on the likeability of our environment

In this chapter first I introduce Stephen Kaplan’s theory (1987), according to which the loveliness of a place is created by its ‘intelligibility’ and ‘excitingness’. Then, I represent the process of perception through some examples of building facades as well as the key concepts of psychology relevant in this process<sup>21</sup> (Perception, Cognition, Attention, Grouping and Addition, Recognition, Categorization, Prior knowledge, Context, Gestalt principles), which are usually demonstrated by abstract figures in environmental psychology<sup>1</sup>. After interpreting them to the built environment, I unfold that the processes by which the content of vision is organized play a crucial role in the development of the dimensions of ‘intelligibility’ and ‘excitingness’. The pattern of the differently assembling elements ruled by different viewpoints create overlapping facade surfaces, initiating a never ending chain reaction of dilemmas and explorations, conducting our attention consecutively to the locations of the retrieved information. However, in order to get the ‘call to play’ from a facade, it is also necessary to find a structural logic in its sight. Through learning its structural logic, we recognise the beauty hidden in the complexity of the structure. Thus, the ‘intelligibility’ and ‘excitingness’ give rise to each other, and in most cases the precondition and generator of the dimension of ‘excitingness’ is the structural logic. In this chapter the notion of the special architectural experience arises, created through the ambivalence and the rhythm of the patterns.

**THESIS I. In most cases the structural logic is a precondition and generator of the dimension of ‘excitingness’, as it creates the order in the complex environment. This order and complexity generate visual ambiguity, comparison, dialogue, hence layeredness, maintaining the attention focused on cognition at the same time.**

### II. Creating architectural ‘excitingness’ in the light of perceptual principles

#### Further exploration of the subject discussed in the previous chapter in relation to public places Szentendre, Master work

- II.1. Articulation by scale and excitingness by scale
- II.2. Excitingness arising from the rhythm of visual complexity and structural logic
- II.3. Designing visually complex, legible environments and using the Gestalt perceptual principles
- II.4. Using Gestalt grouping principles in relation to public spaces in Szentendre
- II.5. Using the ‘principle of good continuation’ in relation to public spaces in Szentendre

In this chapter I showcase the theme concerning the above mentioned facade structure through the examples of urban public spaces. I continue exposing the achievable impacts of the Gestalt perception grouping and addition principles’ also in connection with horizontal surface patterns. The effects are similar, but a difference is detectable as utilization is generated through ‘defining place’, thus the revealing of the pattern also involves functional consequences. I also showcase the design questions of scale and disproportion varying due to the distance of the spectator, and I underline, that the architectural ‘legibility’, ‘excitingness’ and thus architectural experience is generated by the elements of different size typology varying due to their scale. This articulation linked to the diverse scales can be planned, but it is also a challenge at the same time. The grouping and addition principles make it possible to define the visual information arriving from the environment as interference of units, improving the understanding of our environment, the utilisation, and they also can provide the articulation of the environment in all scales. The ambivalence, interim situations, and interferences created by the combinations of the generated units’ characteristics can create a stimulating and harmonic environment. This ambivalence enriches the stimuli of the surrounding world, awakens and maintains the interest of the spectator towards the environment, and also accentuates and fine-tunes the layers of its interpretation. In the chapter I introduce the notion of ‘excitingness generated by the rhythm of visual complexity’, which concerns the variety, comparison and rhyme of the appearances of the different recurring architectural situations or elements.

**THESIS III. In the course of environmental perception the operation of the grouping and addition mechanisms of the Gestalt perception can generate both order and ‘excitingness’ arisen from the rhythm or ambivalent situation of visual complexity. Thus the conscious utilisation of perception principles during the architectural design process can contribute the creation of an understandable, enriched environment.**

### III. The interaction and balance of intelligibility and excitingness in interior spaces

- III.1. Studying the spatial experience in Tadao Ando’s gallery building in St. Louis; the key roles of the beholder and the chronological context
- III.2. Correlations between the dimensions of ‘intelligibility’ and ‘excitingness’ in Tadao Ando’s building in St. Louis

In this chapter I study the development of the experience of space<sup>18</sup> through the example of the interior space structure of Tadao Ando’s building in St. Louis. I deal with this particular space through several chapters, defining a range of designer and researcher approaches and methods. This chapter builds on the designer’s intuition and weaves the brief presentation of the research results into the story of the intuitive observation. Concerning the environments discussed here timeliness comes into focus as the space sequence becomes fully realised through the prolonged duration of exploration. Due to this feature, on the one hand, the information and the richness of stimulus coded in the geometry of the building can be experienced through the movement on a path (with the gradual shift of the viewpoint); on the other hand it can result the cumulation of the different readings of the repeated visits. The latter can be caused by the noticeable changes of the light conditions, as well as the differences in the directions of the visitor’s arrival or his previous expectations. The beholder compares the sequential sceneries, hence the differences and similarities of the sequential views play a key role in his perception. The particular interpretations of space cumulate and the unique architectural experience is generated through this combined impression. This phenomenon can not be felt in the case of every building, but there are some particular physical factors, that can be responsible for this shift of perceptions, and the cumulation of the different perceptions. According to this, the architectural experience caused by the shift of perceptions is predictable, an exciting task of the architect-designer, for which a conscious vision and range of tools are needed. It is a challenge to design those multi-emphasized spaces, that links each reading to a functional content. In the second part of the chapter I analyse the correspondences of the dimensions of Stephen Kaplan’s ‘environmental preferences concerning the space sequence of Tadao Ando. The ‘excitingness’ and ‘intelligibility’ of the environment are correlated dimensions. The shift of the focus to one direction results the change of the other dimension. That is the way how for instance chaotic (that is of enriched stimuli but yet unintelligible, too many stimuli) or boring (intelligible, but not enriched enough) environment can occur.

**THESIS IV. The differences and similarities of the sequential views during the various occasions of the perception of the same spatial situation or the movement in space reveal additional information and strongly define the architectural experience.**

### IV. Approaching ‘excitingness’ by introducing the concept of richness of stimulus

- IV.1. Elaborateness and spatial richness of stimulus, structural and psychological differentiation – introducing two necessary concept pairs (of my own)
- IV.2. What is exciting for anybody and can we generalize?
- IV.3. Preserving the emphasis of the ‘elaborateness sneaked back’ into Tadao Ando’s building in St. Louis and the spatial richness of stimulus (contemporary architectural dilemmas)

After introducing the dimension of ‘excitingness’ the need arises to define it more precisely. The notion of ‘excitingness’ was approached from the concept of richness of stimulus. We called richness of stimulus the quantitative value of information, that is generated by the interaction of the environment and the recipient in the particular situation. We distinguished spatial, space perceptual, space interpretational and detailing (ornamental, decorational) richness of stimulus, while we also defined the structural and psychological articulation of the environment<sup>18</sup>. Those architectural solutions that are structurally more articulated, generate approximately the same level of psychological articulation but different kind of thoughts and associations, compared to the structurally less articulated ones. Man is capable of ‘creating’ his ideal richness of stimulus through tuning his attention filter to the right stimulus (in the case of relatively few stimuli) or the right amount of stimuli (if there are respectively too many stimuli). The need for intelligibility, the realization forms of intelligibility and the need for ‘excitingness’ are rooted deeper (evolution, culture), while the particular realization forms of ‘excitingness’ are much more personal and variable during an individual’s life. The contemporary architect uses a series of methods to bring back the elaborateness, the details to their straight lined buildings. If the designer intends to take effect through a space perceptual, space interpretational game, then it is beneficial to form the structural articulation in such ways, that also strengthens this goal.

**THESIS V. The notion of ‘excitingness’ can be approached through the concept of ‘richness of stimulus’, which are interacting characteristics of the built environment.**