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## THE IMPORTANCE OF RHYTHM IN HUMAN CREATIVITY AND SPACE PERCEPTION

Rhythms accompany humans on many existential levels. They are part of both their inner and outer worlds. Rhythms occur in the human body, in daily activities, in nature, as well as in creative works, music, poetry, architecture, and urban planning. Contemporary architectural design increasingly observes a shift away from typical rhythmic and symmetrical forms in favor of dynamic, stimulus-rich structures. According to the author, new buildings adjacent to historic buildings often disrupt the previously uniform spatial expression of a street or square because their facades fail to incorporate the tranquil, rhythmic spatial arrangements of existing historic buildings. In the article, the author decided to examine the importance of rhythm for humans in visual form and the perception of historical spaces in which new buildings have appeared that do not take into account the existing context. The new architecture emerging in the city generally attracts attention as a manifestation of modernity and is generally received positively. However, research has shown that in historical developments, which were built based on symmetrical layouts and rhythms, and which clearly strive for harmony, new buildings that do not adhere to these standards are perceived very negatively.

**Keywords:** rhythm, harmony, architecture, facade composition, historical buildings, place identity

### 1. INTRODUCTION. RHYTHM, TERMINOLOGY, AND MEANING

#### 1.1. Rhythm – terminology

Rhythms accompany humans on many existential planes. They are part of both their inner and outer worlds. Rhythms can be found in various areas of life, in living organisms, such as the rhythm of the heartbeat, pulse, and rhythmic breathing; in nature, such as the earth's rotation and its orbit around the sun, the succession of day

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and night, the seasons, and so on. Rhythms also appear in everyday human activities, such as walking and running, in the objects around us (the ticking of a clock), as well as in our creativity, in music, poetry, architecture, and so on.

Rhythm is a term that can be interpreted in several ways, depending on the context. Generally, rhythm can be understood as an element or pattern repeating itself at a given time interval, encompassing sounds, movements, or even certain events. For example, in poetry, rhythm can be built by repeating syllables within lines, using rhymes or repeated phrases. More specifically, rhythms are built by maintaining a regularity in the number of syllables within lines, or by repeating word endings (rhymes), or by repeating entire phrases.

The PWN Polish Language Dictionary provides the following definitions of rhythm: „regular repetition of something at equal intervals in time or at equal distances in space”; „a fixed sequence of events, processes, etc.”; „an even repetition of sonic and syntactic elements”; „a factor regulating the duration of sounds in a musical piece and determining their sequence in time” [<https://sjp.pwn.pl/slowniki/rytm.html>, accessed 05.05.2025].

In music, rhythm is a fundamental element that gives a composition its dynamics and structure. It can be said to be the way sounds are arranged in time, creating specific patterns, for example, by varying the length of notes or accentuating them. In music, the following elements of rhythm are distinguished: – meter, the way rhythm is organized based on regular intervals of time (bars); – rhythmic values, which determine the duration of individual sounds; – accents, or stronger sounds, as elements that give rhythm dynamics and character; – rests, intervals where sounds are absent and which, like sounds, also create rhythmic patterns. In the performing arts, rhythm is the timing of events on a human scale: musical sounds and silences that occur in time, dance steps, or the meter of spoken language and poetry. In some performing arts, such as hip-hop music, the rhythmic delivery of lyrics is one of the most important elements of style. Rhythm can also refer to visual presentation, as „synchronized movement in space” [Jirousek 1995].

Rhythm also appears in the visual layer, so the language of patterns also relates to it. In architecture, we often speak of the rhythm of individual building elements, such as the rhythm of columns, supports, the rhythm of windows on the façade, the presence of accents, bay windows, turrets, details, ornaments, etc.

## **1.2. The importance of rhythm in composition as exemplified by music and architecture**

The Many researchers have noted analogies between music and architecture. By treating works of music and architecture as compositions and analyzing their structures, one can discover many common features belonging to both disciplines. Concepts such as rhythm, articulation, proportions, the distances between individual elements (in space and time), and accents appear in both buildings and musical works. Proportions

are the relationships between individual elements, but also the relationships between elements and their gaps, as well as the relationship of parts to the whole work. In architecture, these relationships can be considered in relation to individual elements as well as groups or larger fragments of a composition. Beginning with the simplest window openings and their complexes, arranged on the flat surfaces of external walls, the organization and number of accents, and ending with larger sections of a building protruding from the façade face as the relationship of the parts of the form to the whole.

In musical pieces, individual sounds, intervals and their spacing, intensity, and frequency are distinguished within the overall composition. The spacing between window openings, balconies, or other recurring elements on a building's facade also create rhythmic patterns. The most distinct common element found across various creative fields is rhythm, which, regardless of the art form, is defined as the repetition of certain clear patterns. In music, for example, repetition applies to individual sounds, their sequences, and also to slightly larger sections of a piece. In architecture, this repetition can be found in the arrangement of building facade elements, for example, in the rhythms of window openings, loggias, balconies, columns, pillars, and accents. Repeating elements can be spaced at equal or varying intervals, creating repetitive sequences. Simple, regular, and more complex rhythms can be found in both architecture and music. It can be argued that the composition of a musical and architectural work is essentially a relationship between emptiness and fullness. In architecture, façade elements occur at intervals; the gaps between elements are as important as the elements themselves, as they constitute the overall composition of the façade. Similarly, in a musical piece, there are pauses, longer or shorter breaks, between sounds and their sequences. Charles Jencks compares the arrangement of window openings on a building's façade to the notation of a musical piece, the notation of notes on the staff of individual floors [Jencks, 2013].

It can therefore be stated that the individual elements of a musical or architectural composition, together with the breaks and repetitions between them, occur in time [See.: Trickett, 2018, accessed 15.03.2021].

According to the author, articulation is an important term for both disciplines, offering endless possibilities for shaping a composition [Cf.: Encyclopedia of Music, 1995]. Articulation of elements in an architectural work offers the designer numerous possibilities and ways of shaping it, as it can run in both directions, vertically and horizontally, although horizontal rhythms are more easily and quickly recognized and noticed. Rhythms can occur in the arrangement of: – window and door openings, balconies; – vertical or horizontal parts of a building; elements protruding from the facade face, such as projections, bay windows, or cornices; – elements protruding above the eaves or roof, such as gables, dormers, skylights, chimneys, etc.; – details, pilasters, sculptures, bas-reliefs, and other ornaments. According to the author, rhythms can be built on the principle of a calm continuation of the same elements, but also on the principle of contrast, in which case the accents of the composition can be particularly highlighted.

## 2. HARMONY OF COMPOSITION, THE IMPORTANCE OF SYMMETRY AND RHYTHM

### 2.1. The importance of compositional harmony, rhythm, and symmetry throughout the centuries

Vitruvius already discussed the importance of harmony in composing a work of art in his work „On Architecture, Ten Books,” where he attempted to explain, among other things, the principles relating to the composition of sounds and those relating to the composition of buildings. All these principles had one thing in common: compliance with the laws of harmony [Vitruvius 1956, pp. 86–94]. Renaissance philosophers and aestheticians also emphasized the importance of harmony and cohesive forms. Alberti’s concept of „concinnitas” is synonymous with harmony, which is described as the clarity and unambiguity of all the individual parts of a work, as well as the composition of the entire work. Such qualities as clarity and unambiguity are achieved through the use of symmetry in the creation of a work [as cited in Żórawski 1973, p. 21].

In many ancient writings, the term „harmony” is used interchangeably with „symmetry.” Symmetry, as a shape or visual composition, has accompanied humans throughout history, from the structure of their bodies through their surroundings to their minds and mentality. Depending on the era, interest in it and its significance increase or decrease. For example, in ancient times, symmetry referred to the entire reality. For ancient philosophers, symmetry signified a specific order, a certain regularity, and above all, proper and appropriate proportion, which could be perceived by the senses and understood by the mind [Gajda-Krynicka 1993].

The first comprehensive and consistent concept of symmetry was presented by the Pythagoreans at the end of the 6th century BCE. They primarily tested it in mathematical form. They also associated it with the cosmos, understood as a model of perfection. The word symmetry comes from Greek and is translated as „co-measurement” or „consonance” (in music).

When considering harmony, rhythm, in addition to symmetry, is also important. Like symmetry, rhythm has always accompanied humans, from the rhythm of their hearts through their surroundings, seasons, days, and even their creativity. Rhythm can be defined as periodicity or recurrence in time (in musical compositions) or space (ornaments, building elements), as a result of a chain of chords or proportions. Proportions are associated with concepts of beauty, harmony, rhythms, and symmetry. In ancient times, proportions primarily referred to music and poetry.

The Greek word „rythmós” derives from the verb „rheo” („I flow”). Ghyka believes that the word „rhythm” should be reserved for characterizing the harmonicity and periodicity of events in time, while the concept of symmetry describes the interrelationships between elements and the whole in a spatial sequence [Ghyka, 2006].

According to the definition of Aristoxenus of Tarentum, rhythm is an order defined by temporal intervals. Expanding this definition further, rhythm is that property of a sequence of events occurring in time that evokes in the observer's mind a sense of proportionality between the durations of the various events or groups of events that comprise the sequence. Put simply, rhythm is in time what symmetry is in space [Ghyka 2006].

Juliusz Żórawski, in turn, describes rhythm as a set of forms arranged in a single sequence and having identical fields of formal activity [Żórawski 1973, p. 110]. The author believes that in the perception of space, the absence of an element in rhythm will always be perceived by the observer as a deficiency or even an error. In such situations, the observer most often experiences an unpleasant feeling of something missing, and their mental balance will be somewhat disturbed. The observer will develop a desire to correct this error by complementing the rhythm of the elements. According to the author, this occurs because human beings have ingrained patterns of psychological structure and preferences that prevent them from accepting mutilations of form that are inconsistent with the guidelines of the whole, rhythmic or symmetrical. The understanding of symmetry and rhythms has its origins deep within human brain processes [Żórawski 1973, pp. 22-23].

## **2.2. Rhythms and symmetry in architecture and urban planning as a pursuit of order and beauty**

The Humans have always strived to organize their surroundings, from their homes to their settlements and cities. To achieve this, they have utilized ingrained preferences for forms such as symmetry and rhythm. These preferences likely stem from, and derive from, the structure and functioning of their bodies (symmetrical structure, heartbeat rhythm, walking strides) and from functioning in an environment characterized by rhythmic changes, such as the seasons of the day and year, and so on.

In ancient human settlements, both small and large, and in contemporary single-family housing estates and larger urban developments such as cities, rhythm was already utilized at the stage of designing plots for building houses, although it was not yet clearly perceived visually in these two dimensions. The aforementioned rhythm became decidedly more visually apparent after buildings were constructed on the designated plots, i.e., with the emergence of the third dimension. Another dimension influencing the visual perception of rhythm is time, which is related to the observation of space as the observer moves. Sometimes, the observer's movement in the city is accompanied by the rhythm of smaller forms than buildings, closer to the human scale, such as trees, shrubs, or flower beds, which can be touched and which are perceived very positively by the observer.



A



B



C



D

Fig. 1. A, B, Rhythm of arcades, windows, balconies, Cagliari, C, D, Rhythm of green forms and architectural elements, Poznań, (photo: Sobczykńska)

Rhythms play a significant role in both urban and architectural composition. Whether we're dealing with a larger space, such as a city or street, or a specific architectural form, rhythm in each case introduces a certain order.

In all eras, regardless of architectural style, symmetries and rhythms can be found in buildings and facades. In representative buildings, a combination of these two compositions, or symmetry of the rhythms of individual building elements, often occurs. When designing important structures such as town halls, palaces, public buildings, museums, and temples, people often sought to create an ideal composition—one that was distinct, powerful, clear, and unambiguous to the observer. Designers intuitively knew that this goal would be achieved through the use of shapes such as symmetry and rhythms.

In the perception of any space, rhythms create a certain order, and when present in symmetrical arrangements, they give a building or urban space a distinctive, clear, and distinctive character. Since ancient times, symmetry has been associated with elegance, harmony, and perfection of form and composition.



Fig. 2. A, Poznań, rhythm of greenery, windows, B, Cagliari, rhythm of trees, flowerpots, columns, (photo: Sobczyńska)

### 3. THE IMPORTANCE OF RHYTHMS IN THE PERCEPTION OF ARCHITECTURAL SPACE – SURVEYS

According Rhythms play a significant role in both urban and architectural composition. The rhythm of similar elements, along with gaps, creates a compositional whole [Sobczyńska, Kaszuba 2016, pp. 17-18]. For example, the rhythm of buildings with gaps between them, or the rhythm of windows or bay windows on a building's facade.

Juliusz Żórawski, in his work „About the Construction of Architectural Form,” emphasizes that every form has its own „formal guideline” [1973, p. 42], which is, for example, a symmetrical form. According to the author, „formal guideline” applies to both larger spaces, the urban layout, and smaller forms, such as the building's mass, facade composition, plan, greenery layout, etc. A larger urban space, such as a district (Montmartre in Paris or the historic centers of European cities), a street, a frontage, or a single architectural structure, can possess its own formal guideline, its own individual character. Such a formal guideline (characteristic feature) of an urban or architectural composition might be, for example, the rhythm of its elements and their symmetry (the rhythm of buildings and trees in an urban layout, or the rhythm of windows, bay windows, and avant-corps on a façade), as well as specific colors and materials. These characteristic features, such as the

symmetrical arrangement of windows, bay windows, and other building elements, and certain characteristic rhythms, can be found in individual parts of cities built during similar historical periods. This can be observed in the frontages of squares and streets, where buildings were built in a similar style and character. Such spaces are characterized by a uniform, clear expression, space image, and coherent composition.

Observing the historic building's facades, one can notice that their elements have always created a specific, easily decipherable rhythm. The composition of the facades of old buildings reveals attention to shaping rhythms and proportions, and the elements are arranged according to a specific, clear guideline. In contemporary buildings, on the other hand, it is difficult to see the meticulously designed rhythms of windows and projections as in previous centuries.

In contemporary design, it is observed that the ancient concept of ideal symmetry and eurythmy, as very static, and the aforementioned considerations regarding the formal guidelines of the overall composition, are increasingly being replaced by a more dynamic, stimulating vision of the spatio-temporal perception of the form of an architectural structure. The rhythms of building elements, once inextricably linked to symmetry, are now associated with the phenomenon of movement and space-time and are used in a very dynamic and loose interpretation. In newly constructed buildings, contemporary designers often deliberately introduce rhythmic disruptions and inconsistencies in the vertical direction, on individual floors. The author decided to investigate the consequences of this in the perception of city space and how it is experienced by users of these spaces and visiting tourists through survey study no. 2. This study was preceded by survey study no. 1, in which respondents were asked what importance visual rhythm has for them (the rhythm of windows, balconies, bay windows, details in an architectural building, the rhythm of trees in the street, the rhythm of buildings, etc.).

### **3.1. The Survey Study No. 1. Study's description and results**

The survey was conducted among 15 respondents, women and men aged 30-70. The question asked was, „What is the importance of visual rhythm to you? What feelings do you experience?” After asking this question, the author provided the respondents with examples of visual rhythms, including the following: the rhythm of windows, balconies, bay windows, columns, and other elements in architectural structures; rhythms in urban spaces, such as the rhythm of trees on the street, the rhythm of buildings in a housing estate, etc.

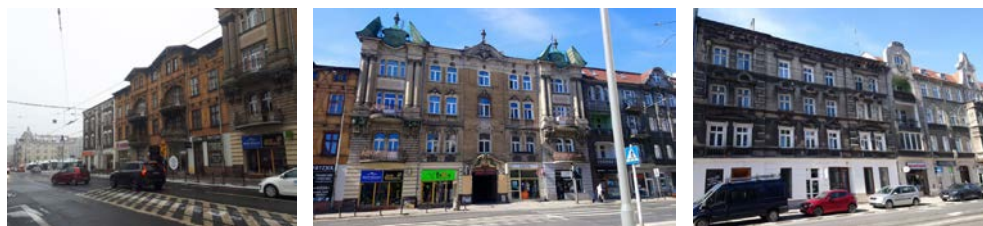
The author recorded respondents' responses to the questions. Tables include respondents' responses (words and phrases), starting with the most frequently repeated ones, and the number of responses.

Table 1. Results of survey no. 1.

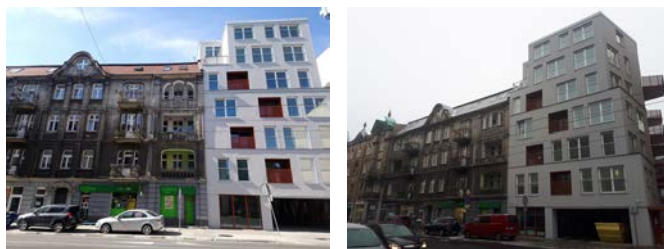
answers to the question „the meaning of rhythm in space, feelings”	number of responses/ 15 people
tidiness, order	15
peace, calmness	14
sense of harmony	12
sense of coherence, homogeneity	10
sense of security	9
clarity, specificity of space	8
raising the status of a place	5
systematisation	3
remembering a place, associating a place	3
enhancing the place’s significance, expressive, power of space	2
attachment to place	2

[Sobczyńska 2025]

### 3.2. The Survey No. 2. Study’s description and results



A



B

Fig. 3. J. H. Dąbrowskiego Street, A. street character, B. new building in the historic frontage, lack of continuity of rhythms and window proportions (photo: Sobczyńska)

The survey was conducted among 15 respondents, women and men aged 30-70. Respondents were shown two areas of Poznań: Jana Henryka Dąbrowskiego Street

and Plac Bernardyński, where new buildings were constructed to complement the historic buildings. They were asked for their opinions and feelings about the form and facades of the new structures in relation to the character of the existing buildings and the overall composition. Thirteen of the respondents live in and around Poznań, including seven in these districts, and the remaining two were tourists from Spain. The tables present respondents' responses (words and phrases), starting with the most frequently repeated ones, and the number of responses.

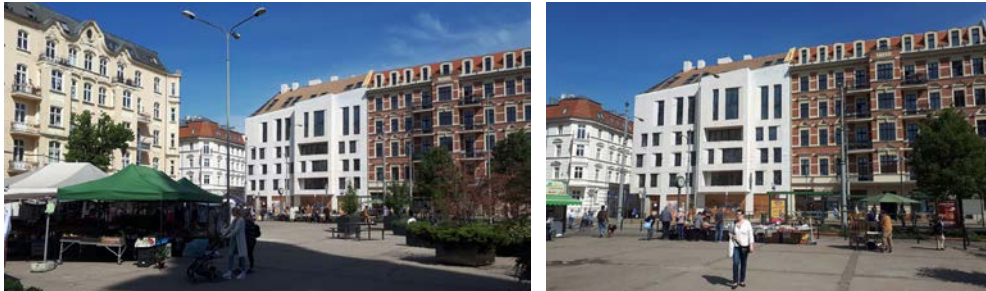


Fig. 4. Poznań, Bernardyński Square, new building as a complement to the historical buildings, lack of similarity in rhythms and window proportions (photo: Sobczyńska)

Table 2. Results of survey no. 2. Perception of the new building in the existing historic development of Jana Henryka Dąbrowskiego Street and Bernardyński Square in Poznań

Jana H. Dąbrowskiego Street, Responses (number of responses/15 people)	Bernardyński Square, Responses (number of responses/15 people)
<b>negative perception of space (15)</b>	<b>negative perception of space (15)</b>
not matching the existing buildings (15)	not matching the existing buildings (15)
too high, too large, coarse elements (15)	strange window shapes and their arrangement (15)
does not match all the elements, shape and size of windows, height, colour (15)	the new building is detached from the existing buildings (14)
windows too large and chaotically arranged (14)	chaos, lack of coherence and clarity (12)
chaos, lack of order (13)	scary, ugly, trashy, coarse (9)
overwhelming (10)	aggressive (8)
terrible (5)	weird (6)
weird (5)	overwhelming (6)
massacring the street space (3)	looks like a prison, a penitentiary (2)

[Sobczyńska 2025]

The new architecture emerging in the city generally attracts attention as a manifestation of modernity and is generally received positively. However, research has shown that in historical developments, which were built based on symmetrical layouts and rhythms, and which clearly strive for harmony, new buildings that do not adhere to these standards are perceived very negatively. In the examples of historical spaces shown above, where new buildings lack similar rhythms, proportions, and symmetry, there is a clear sense of disruption to the existing layout and space expression. During the research, the author observed that the most negative opinions, characterized by very strong emotions, were expressed by people living in the immediate vicinity of these spaces. Therefore, it can be concluded that not only the space composition but also the identity of the place was disrupted.

#### 4. CONCLUSIONS

Although contemporary design tends to strive for highly dynamic, stimulating forms, it turns out that in historical spaces with their homogeneous character, these objects are not positively received. For centuries, these spaces have been created based on the principles of harmonious composition, taking into account symmetry and rhythm, as outlined by architectural aesthetic theorists. As we can see, symmetry and rhythms stemming from the anatomy of the human body and being deeply rooted in it, are timeless values stemming more from need than fashion. The shape of a space influences human emotional responses, feelings, and behaviors, so designers of architectural and urban spaces should not forget about human preferences stemming from their psychophysical constitution. According to the author, dynamic, eye-catching objects are necessary in cities, but their locations should be carefully considered. It often happens that such anti-rhythmic, chaotic objects, placed adjacent to historic frontages, unnecessarily destroy their homogeneous character and space expression, as well as the historically valuable identity of the place, and evoke negative feelings in the users of these spaces. People should be able to choose to be in a space full of stimuli or, if necessary, leave it and go towards more peaceful and homogeneous compositions such as historic districts, streets or squares, characterized by a specific, individual space expression.

According to the author, the rhythms of building facade elements play a crucial role in creating a clear and uniform spatial expression of a historic development block or frontage. Therefore, she believes that when designing new buildings to complement the historic development, the existing rhythms and proportions of individual architectural elements characteristic of a given historic space should be taken into account. This way, a new building appearing within the historic development, adjacent to the block or frontage, will not disrupt the „formal guidelines” and individuality of that space, thus preserving a uniform, clear spatial expression and the identity of the place.

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## ZNACZENIE RYTMU W TWÓRCZOŚCI CZŁOWIEKA I PERCEPCJI PRZESTRZENI

### Streszczenie

Rytm towarzyszą człowiekowi na wielu płaszczyznach egzystencjonalnych. Są częścią zarówno jego świata wewnętrznego jak i zewnętrznego. Rytm występuje w ciele człowieka, w jego codziennych czynnościach, w przyrodzie, a także w jego twórczości, w muzyce, w poezji, architekturze i urbanistyce. We współczesnym projektowaniu architektonicznym coraz częściej obserwuje się odejście od typowych ukształtowań rytmicznych i symetrycznych na rzecz dynamiki bogatej w bodźce. Według autorki nowopowstałe budynki w sąsiedztwie historycznej zabudowy często zaburzają jednorodny dotąd wyraz przestrzenny ulicy czy placu dlatego, że nie uwzględniają w swoich fasadach spokojnych rytmicznych układów przestrzennych istniejącej historycznej zabudowy. W artykule autorka postanowiła zbadać znaczenie rytmu dla człowieka w formie wizualnej i odbiór historycznych przestrzeni, w których pojawiły się nowe budynki nieuwzględniające zastanego kontekstu. Powstająca w mieście nowa architektura generalnie budzi zainteresowanie jako przejaw nowoczesności i jest raczej pozytywnie przyjmowana. Jednak badania pokazały, że w historycznej zabudowie, która powstawała w oparciu o układy symetryczne, rytm i w której widać dążenie do harmonii, pojawiające się nowe budynki, które nie zachowują tych standardów, odbierane są bardzo negatywnie.

**Słowa kluczowe:** Znaczenie rytmu w twórczości człowieka i w percepcji przestrzeni