Psychological aspects of architecture and urban planning in crime prevention

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Abstract: Today over a half of the world's population lives in cities, where dense building surrounds the individual and makes architecture an integral part of one's life. Although the influence of architecture and urban planning on human functioning and psyche seems obvious, research on this subject began to be carried out, just over half a century ago. Therefore, this article was devoted to the presentation of information on the relationship between the manner of shaping land development plans and buildings, aiming at providing the safety and comfort of urban residents. The focus was on the aspect of density and construction height, urban greenery solutions and ways of arranging space, meant to improve and humanize housing conditions, to care for the psyche and physical health of city residents.

Key words: psychology in architecture, architecture's psychology, man and building, man and urbanism, contemporary psychology, contemporary architecture

Introduction

At the turn of the XIX and XX century European architecture became strongly influenced by modernism, a trend rejecting historicism and ornament for economy and functionality. After the II world war ideas and projects of the French architect Le Corbusier, the ideas of Bauhaus school, the works of Werkbund as well as the activity of an American architect Mies van der Rohe (all propagating the primacy of function over form) became very popular in Eastern Europe. While whole cities were destroyed in the mayhem of war, the possibility of building cheaply and quickly was spotted and popularized by the communistic propaganda. Corbusiers idea of *machine-à-habiter*, or residential housing with minimized inhabitable surface and height, was enough to meet the needs of the society at the time [1]. (Fig. 1) Although socialistic architecture and urban planning was influenced by modernism, many of its key principles, such as freeing the space at ground level by raising the building up on pillars, providing residents with access to gardens and other meeting-places, as well as spaces dedicated for local services, were completely ignored by the Eastern Bloc regime. Within the framework of the centrally planned economy, architecture was created schematically, in hurry and on a mass scale, resulting in complete negligence of the psyche of its users. First studies on this topic began to appear only at the turn of the 1950s and 1960s.

It is currently considered common knowledge, that both architecture and urban planning have a considerable influence on human behaviour. Studies show [3] that even the colour of the walls in a room, in which one is staying, can change not only the mood of the user, but also decrease or increase the efficiency with tasks which they perform. Ceiling height modulates the attitude towards a assignment and the ability to process information [2].

Fig. 1. Original modernism – villas designed by Le Corbusier in Pesac, France. [Own photographs]
Pierwotny modernizm – wille projektu Le Corbusiera w miejscowości Pesac, Francja. [Fot. autorzy]

Architectural features and their impact on residents' safety

Inhabitants of high apartment blocks feel more vulnerable to crime than residents of other types of buildings. [4] The concern is, unfortunately, confirmed by statistics – research made by Oscar Newman [5] indicates that the height of the building is positively correlated with the number of crimes committed in it. However, this correlation does not specify a cause-and-effect relationship between these two variables. Newman's study was conducted in the 1970s in the United States of America when high-risers were often inhabited by people with very low income. Additionally, many of them were parts of social housing projects.[6]

Fig. 2. Modernism in Wroclaw, Poland, housing estate by designed by Jadwiga Grabowska-Hawrylak – humanization of buildings in high prefabricated buildings – technical condition from before renovation (beginning in 2015). [Own photographs]
Modernizm we Wrocławiu, Polska, osiedle wg. proj. Jadwigi Grabowskiej–Hawrylak – humanizacja zabudowy w wysokich obiektach prefabrykowanych – stan techniczny z przed remontu (początek w 2015 r.). [Fot. autorzy]
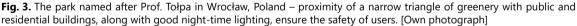
   In order to dispel the doubts Sommer [7] conducted a study comparing the number of crimes *per capita* among the students inhabiting high, multi-floor and lower dormitories. Limiting the research sample to students living on the same campus ruled out the socio-economic factor. Although most of the crimes committed on the campus during the observation were soft, their number was almost two times higher in the high buildings.

According to Katyal [9] the cause of increased crime rates in high residential buildings may be the inhibitors' indifference towards actions taking place in corridors and other common areas, caused by anonymity. It should also be noted that many of the prefabricated facilities located in Europe and the United States, despite good architectural solutions, are currently in a bad technical condition, which in many aspects has a negative impact on residents and the city panorama. (Fig. 2)

Interestingly enough, low intensity of housing may prove just as dangerous as high.[9] The mechanism behind this phenomena is as follows: situating ones' residential unit far from others ,prevents the potential neighbours from observing the unit, although this may seem very attractive, it is the watchful adjacent inhabitants, that provide natural and efficient equivalent to monitoring.

Among the elements, which are not to be omitted in urban planning directed at safety are parks. Their presence in the immediate surroundings of the residential area might increase the probability of crime occurrence, especially of sexual offences, such as acts of exhibitionism. [10] Despite the high pressure put on increasing the amount of greenery in the urban areas, what is rarely discussed is how to design it in the aspect of safety. According to Thani, Hashim and Ismali [8] a safe park should be narrow enough, so that the inhabitants of the nearby buildings can have the possibility to observe its interior. For the same reason it is crucial to maintain illumination and to control the state of flora, preventing it from overgrowing which could lead to formation of natural hideouts for potential criminals. (Fit. 3)

Fig. 3. The park named after Prof. Tołpa in Wrocław, Poland – proximity of a narrow triangle of greenery with public and residential buildings, along with good night-time lighting, ensure the safety of users. [Own photograph]

Park Prof. Tołpy we Wrocławiu, Polska – sąsiedztwo wąskiego trójkąta zieleni z zabudową użyteczności publicznej i mieszkaniową, wraz z dobrym, nocnym doświetleniem, zapewniają bezpieczeństwo użytkownikom. [Fot. autorzy]

Defensible space

"Defensible space" is a term first used in 1972 as a concept of organisation and optimalization of urban composition in order to reduce crime. Its author, Oscar Newman, analysed the police statistics and came to a conclusion, that most crimes and acts of vandalism occur in densely populated areas, where it is easier to stay anonymous and where the inhabitants do not form a closely cooperating community. Their sense of responsibility for the security of their own territory blurs due to the size of both their group and the area. [11]

Having considered most of the possible factors, Newman extracted, that positively affect the safety on the given territory and presence of which makes the "defensible space" [12]:

1. Territoriality – the physical elements that define the borders of the property, including: facades of the buildings, fences, hedges, walls, trees, gates and elements of small architecture. In addition to the main function (disabling strangers from entering) it also increases the sense of territoriality among the inhabitant, which makes them more security-orientated.

2. Surveillance – the ability to observe the territory without interrupting everyday activities. It consists of: permanent external illumination, windows overlooking the whole area, CCTV and videophones. Lack of tall trees and shrubs opposite to the glazing is also essential.
3. Image connected to maintaining tidiness in common areas. Elements such as: new or regularly restored elements of small architecture (benches, swings, litter bins) regularly re-painted elevations, frequent tiding and signs informing about entering a private area contribute to convincing the potential intruders that they are in a well-kept, and therefore well-protected area.
4. Milieu – additional elements increasing the security, such as: dense traffic in the area, close proximity to a police station or other well-guarded buildings. (Fig. 4)

Fig. 4. A housing estate with a "defensive space" – Verde 25, Turin, Italy, clearly defined architectural and urban identity of the place outside and inside the complex. [Own photographs]

Osiedle z „przestrzenią obronną" – Verde 25, Turyn, Włochy, wyraźnie określona architektoniczno-urbanistyczna tożsamość miejsca na zewnątrz i wewnątrz zespołu. [Fot. autorzy]

In some publications "image" and "milieu" are merged into one category – "symbolic barriers" [13]. It is so because their functions are mostly psychological and there are no exact criteria enabling distinction between them.

A great example of a housing unit built just as the opposite to "defensible space" is Trellic Tower, New Kensington, London. [22] The building won many design awards and ideally matched modernist standards – 175 apartments were located on 31 floors with many common areas. However, these spaces were not supervised in any way, and due to the huge number of inhabitants, the sense of territoriality was minimal. As a result of budget cuts, Newman's idea of an "image" was also not taken care of, numerous acts of vandalism did not meet any response. This provoked next doings, and by such vicious circle led to the situation in which the Londoners began calling the Trellic Tower, the "terror tower". The situation had only been stabilized when the residents took control of the area, created a monitoring system and hired 24-hour security.

Risk Terrain Modelling

Risk Terrain Modelling is a system developed by Joel Caplan and Leslie Kennedy of Rutgers University and its main function is selecting areas particularly exposed to crime [12]. The authors concluded that some urban, organizational and spatial configurations are more conductive to crime-committing than other. The mechanism behind this phenomenon is analogous to how playgrounds affect children's behaviour making them more spirited, as they contain many devices and spatial elements useful for playing. [15] From the studies conducted by Caplan and Kennedy, it appears that many factors, for example:

- co-occurence of:
  - gas stations,

    ☐ liquer stores,
    ☐ night clubs,
    ☐ deserted buildings,
- distance between buildings,
- streets width,
- illumination,
- type and height of trees and shrubs,
- may influence the number of crimes committed at a given territory [14]. (Fig. 5)

Fig. 5. Athens, Greece – city centre, residential development with abandoned service premises, with visible acts of vandalism on the façades. [Own photographs]

Ateny, Grecja – centrum miasta, zabudowa mieszkaniowa z opuszczonymi lokalami usługowymi, z widocznymi na fasadach aktami wandalizmu. [Fot. autorzy]

Based on the gathered data, the authors created a computer program (Risk Terrain Modeling Diagnostics or RTMDx), which performs an automatic analysis of high-risk areas occurrence. The program user must first asses what types of risk factors may occur in the examined territory, contacting the authorities and social workers is very helpful at this point. Having received the above mentioned data and the figures on the location and timing of past crimes, the program performs a statistical analysis reflecting which factors and to what extent, correlate with the frequency and type of crimes committed. Based on that information, the program is later able to calculate not only which areas are more vulnerable to crime, but also which types of felony is most likely to occur there.

Results of a programme conducted in the USA and co-financed by the Ministry of Juistice in which the authors of RTMDx worked with police and local authorities, to reduce crime in specific areas, provide evidence for the effectiveness. Its description should help explain the principles of the operation of the program [16] that is why we decided to illustrate a number of cases included in the project:

1. In Colorado Spring after analysing 19 potential risk-factors for the crime of car theft, using the RTMDx, 6 important variables were identified: multifamily housing units, foreclosures, parks, restaurants, commercial zones and the frequency of disorder calls for service by the inhabitants. Having assessed the potential high-risk areas, an increase in the police activity as well as in the number of community meetings designated to instruct residents towards appropriate response to crime were applied. As a result theft-car rates dropped by 33% compared to a control area, where no intervention was made.

2. In Newark among the risk-factors for gun violence 11 were found to be statistically significant (including the proximity of: foreclosures, restaurants, gas stations, stores, take-out restaurants, bars and liquer stores). As a part of intervention the number of police patrols in the area had been increased and the police officers were told to visit local businesses during duty in order to gather information and make their presence noticeable. As a result of the analysis-based intervention gun violence dropped by 35% in the experimental area in comparison to the control one.

3. Among statistically significant risk factors for gun violence identified in Chicago was the proximity of: foreclosure, gas stations, liqueur stores, schools, bars and bus stops. For reasons beyond the researchers control the intervention in Chicago didn't take place. However, this part of the study also provides evidence for the effectiveness of RTM, as only 15% of the territory covered by the program was identified as high-risk areas and yet in the months following the experiment over 56% of gun violence took place within them.

Solutions adapted to specific conditions

The methods of crime prevention through architecture and urban planning mentioned in the previous points describe system solutions which are designed to be universal. However, examples of effective criminal activity reduction using made to measure architectonical and structural changes also exist.

Zavorski describes an example of such an intervention in a housing development in Hartford, USA, which struggled with a great number of violent crimes [18]. Many of its inhabitants were living below the poverty threshold and among them were criminals, making a leaving as drug dealers. Most of the offenses, especially the violent ones, took place near the main street connecting two housing units. Local authorities concluded that impeding the escape of potential offenders by setting a barrier in the middle of the road, dividing it into two dead-end streets, might help in eliminating the problem.

Data collected 15 months before and 15 months after raising the barrier show that the method succeeded – number of violent crimes dropped by 33% in the street of the intervention and 50% in the adjacent streets. At the same time the number of drug-related offenses increased by 100% – the author speculates, that the reason for this might have been the transfer of drug dealers, from the intervention street to the nearby streets, however this inferences seems inconsistent, as the number of drug-related offenses hasn't dropped on the main street.

Another city that has been grappling with the growing number of violent crime for years is Chicago. In 2015, the concept of reducing this problem by applying urban changes was presented at the Architecture Biennale by Jeanne Gang. Analysing the style of police station construction over the years, she noticed a tendency to increasingly isolate these buildings from their surroundings, which in her opinion may also translate into the formation of larger interpersonal barriers between residents and the police.

Basing her concept on fire stations, which often (especially in smaller cities) serve as integration centres for local inhabitants, and drawing inspiration from the report of the President's Task Force on 21st Centruy Policing, Gang decided to design a system of police stations that would also fulfil the function of social centres. To achieve this goal, the author proposes creating safe, yet open to all people, recreational zones and various types of sport courts in the territories of stations. The development of the integration of police officers with the local community should increase trust and facilitate cooperation between both groups, resulting in not only increase in effectiveness of detection of criminal acts, but also reducing the popularity of criminal groups among young people. [19]

The first attempt to implement the project took place in the North Lawndale district, where a small basketball court was set up in a part of the parking lot of the police station. Although this is a very small step towards the implementation of Jeanne Gang's idea, both the representatives of the police and the local community declared satisfaction with its effects, and have also agreed to further expand the system. Currently, design works are underway, the culmination of which is to build a public park around the police station in North Lawndale [20].

Summary

Architecture and urban planning influence our daily lives, including safety. Although the principles of "defensible space" developed by Oscar Newman have already found application in both construction law and urban planning practice in many countries [11, 21], they are yet to influence the Polish legal system.

While there is no information yet that RTMDx is being used as a tool for assessing security on architectural projects in the conceptual phase, it seems that such a solution could contribute to the creation of safe housing

estates with minimized risk areas and its implementation at the level of creating plans of spatial development would have the potential to reduce crime in cities.

Despite the existence of several important (largely consistent) theories, the study of the impact of architecture on crime and more generally on the human psyche is still a very young field in which much remains to be discovered.

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Wpływ architektury i urbanistyki na psychikę jako metoda zapobiegania przestępstwom

Streszczenie: Ponad połowa populacji świata żyje obecnie w miastach, gdzie gęsta zabudowa otacza jednostkę i sprawia, że architektura staje się nieodłącznym elementem jej życia. Pomimo, że wpływ architektury i urbanistyki na funkcjonowanie i psychikę człowieka wydaje się być oczywisty, badania na ten temat zaczęto prowadzić zaledwie ponad pół wieku temu. Stąd, niniejszy artykuł poświęcono prezentacji wiadomości na temat relacji pomiędzy sposobem kształtowania planów zagospodarowania terenu i budynków, a bezpieczeństwem i komfortem mieszkańców miast. Skoncentrowano się na aspekcie gęstości i wysokości zabudowy, rozwiązaniach zieleni miejskiej i sposobach urządzania przestrzeni, nakierowanych na poprawę i humanizację warunków mieszkaniowych, celem dbałości o psychikę oraz zdrowie fizyczne mieszkańców miast.

Słowa kluczowe: psychologia w architekturze, psychologia architektury, człowiek a budynek, człowiek a urbanistyka, współczesna psychologia, współczesna architektura