Original Article

High-rise Construction in 21ˢᵗ Century according to Health Approaches and Affecting People's Psyche and Life

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Abstract

Nowadays, people are facing specific emotions and reactions as a result of impacts of high-rise buildings in metropolises. Associated with overcoming gravity and rise of people towards megacities are sometimes role of urban symbols such as perceptions of these buildings. The impacts of this issue on daily life of human are undeniable. Regardless of type of equipment and, facilities and technologies used in the cities, many other important issues in life would be affected by these buildings. Satisfaction, performance, social behaviors, crimes, children, mental health, suicide and even in some cases, creation of disturbing shadows caused by high-rise buildings in physical form of city can cause important issues in life of citizens. Other important points in this study include the outcomes of important issues such as modern life, social-economic processes, quality of the values caused by neighbor-orientation, upbringing and educating children, gender, positioning caused by living space, taking value from indoor spaces and ability to form framework of life. Considering the above mentioned points, a clear question comes to mind of every thankful person: "why high-rise buildings?" This study tends to investigate the values and the disadvantages of high-rise construction and also present the mental and health impacts of this process. Moreover, the study also tends to have a descriptive-analytical attitude to extend urban space in direction of horizon on one hand and consequences of such extension in vertical direction on the other hand and tends also to investigate its impacts and stimulations on human life. This study is derived from the results of discussions, claims and ideas and with reliance on some historical considerations in line with the style of constructionism of human and tends to present the analysis of effects of this industry on societies involved in unemployment and economic decline. Moreover, considerations such as aesthetics, grandeur, technology or even energy management should not be ignored. It is important to be able to define proper perception of combination of the two processes of human and 21ˢᵗ century and conceptualize the communications in a general description.

Key words: High-rise buildings, Mental health, Crime, Technology, Future

INTRODUCTION

The 20th century tries to take and effective step towards solving human problems with reliance on technology and science advancement. One of these concerns may be living place. Over the decades, globalization has caused abundant social, economic and cultural evolutions in most areas of the world and maybe cities have been most affected areas in this field[1]. However, increased population and density of urban presences in light of creation of physical health of human with the advancement of medication and nutrition can cause doubled need to extension of residential areas of people. Increased density, compression, mixed applied development, development among people and smart growth are tools, methods and ideas presented over the years to control and optimize urban development and can potentially pave the way in this field and cause increase in land use, environmental life, prevention of improper growth and other advantages. However, if these tools are not used in right way, they can have reverse effects and can affect the depth of mental and psychological dimension of the society. Now, the urban vertical and horizontal extensions (high-rise buildings) and their impacts are evaluated. Regardless of this issue that high-rise building today has special position in field of economic

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explanations, one of the main goals of high-rise construction is lack of land for growing population, preventing horizontal urban growth and destruction of the natural environment. Through construction of high-rise building, land use can be saved to high extent[2].

METHODS AND MATERIALS

Methodology
In order to obtain the desired results in this study and to provide adequate solutions in this field, historical, descriptive and library methods are used including books, journals, magazines, articles and reliable scientific sites with relevant topics.

Definitions
High-rise building
One of the main definitions presented in the U.K for high-rise building is that high-rise buildings refer to buildings with taller height than adjacent buildings and the buildings

that change skyline dramatically. Moreover, according to the theory of Council on Tall Buildings and Urban Habitats in the U.S, tall buildings, without specifying their height or number of stories, are buildings that their tallness can affect one of the aspects of use of space or construction planning dramatically[3]. In Figure 1, an illustration of high-rise construction at the world is presented.

Environmental psychology
Proshansky, Ittelson and Rivlin (1970) announced emergence of environmental psychology in a book titled "Environmental Psychology: Man and his Physical Setting"[4]. In fact, environmental psychology is ecologic psychology or ecobehavior science as one of the specialized branches of psychology[5]. According to Graumann, in traditional psychology, environmental-cultural aspects are not considered sufficiently and this has led to creation of environmental psychology or ecology[6]. In this study, 2 issues of high-rise building construction in light of environmental psychology and human life effect are analyzed.
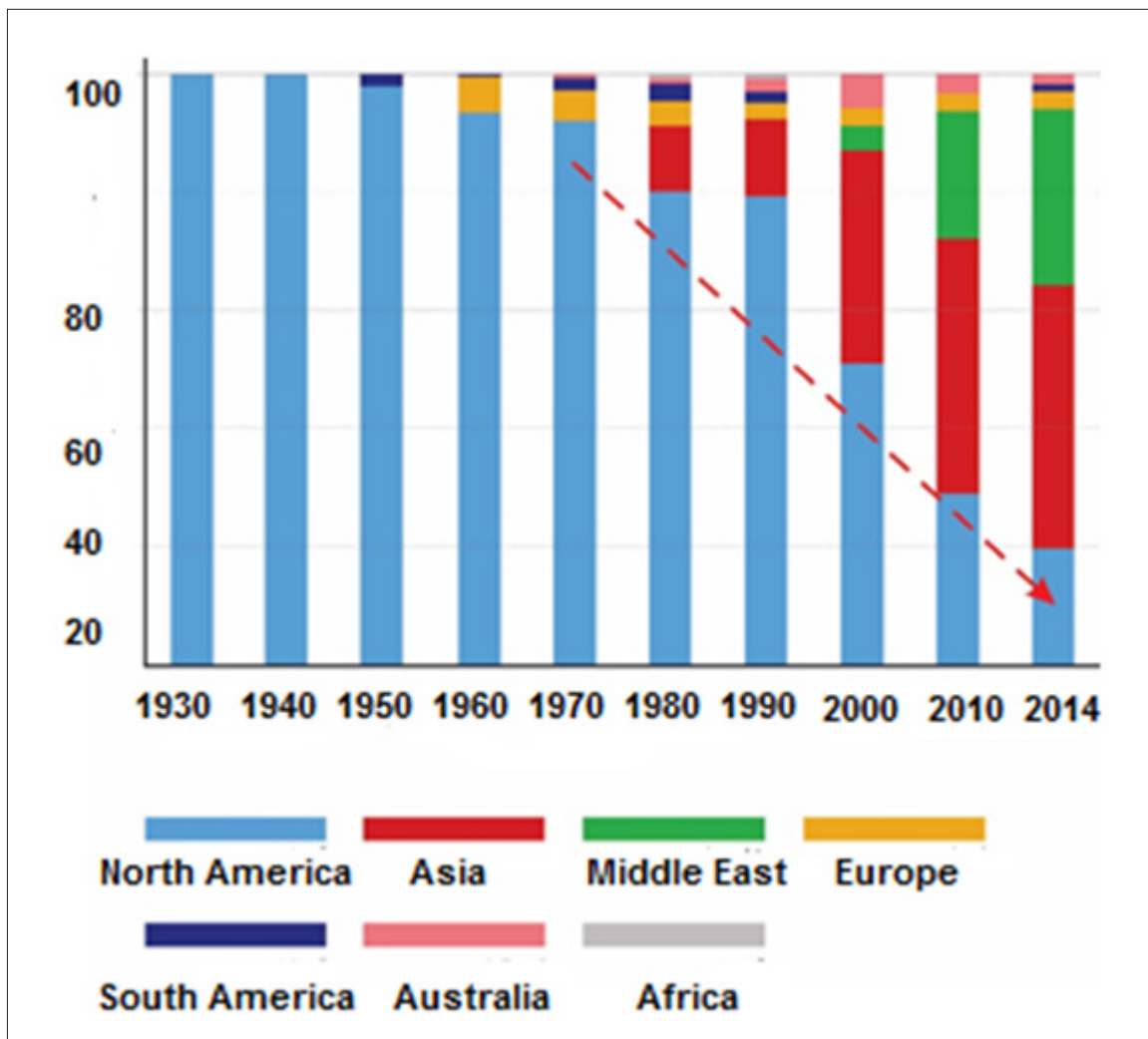

Figure 1: Growth index of high-rise building at the world

OVERVIEW OF HISTORICAL MAJORS

High-rise Building Construction and its Environmental Psychology Consequences in Ancient Times

If high-rise building is a building with more than 3 stories, it could be searches in the Era of Egyptian Pyramids (about 48-storey) and the Tower of Babel. Egyptians are pioneers of this industry and their wonderful structures are the best old large and tall buildings of the world. The great Gothic era cathedrals of Europe and the Chinese temples have had specific position and importance. Umbrella-shaped buildings with spiral staircase and hexagonal or octagonal forms and height of 95m can be referred as one of the most important symbols of China[7]. In India and in early century BC, the brick stevia composed of a 15-m dome and a stalk of 6m is considered as a brilliant age of Indian Civilization[8]. Figure 2 has illustrated history of this construction in different regions of the world.

In ancient civilizations of West Asia, they used to build a temple for goddess and the most valuable temple was named Ziggurat. The largest and the most healthy Ziggurat remained at the world is Choghazanbil Ziggurat (Vavand), which was built by Aventashegal, Elamite king, for the Anishosheniak goddess about 1250 years before Christian in the ancient city of Susa, located in the central plateau of Iran (Figure 3). The Ziggurat was built with dimensions of 103*103m and with height of 52m in 5 stories and only 25 stories is remained from it by the date.

Having access to god and passing higher degrees on one hand and popular awes of public classes and levels on the other hand can show the specific mental impact of these tall buildings by that time. Under such conditions, it is important to pay specific attention to natural models over the history (Figure 4).

AN OVERVIEW ON CHICAGO SCHOOL

Chicago High-Rise Building Construction School

over the 2 end decades of the century, the first high-rise buildings with steel skeleton, non-loading wall, and wide windows (for light) were built for the first time. The painful and shocking experience of fire could conduct minds of people towards new materials like metals as a replacement for wood or iron, cast iron and steel instead of stone and brick.

Chicago School in Domain of Urban Sociology and Public Behaviorism

Chicago school is mostly recognized because of its urban psychology and development of symbolic interaction. This school is focused on some man behaviors determined by social structures and physical indicators of the environment and not personality and genetic traits. Chicago school says:

"In these towns, where entire energy and emotions of man are released, we are in such position that we are studying the process of civilization carefully as it has been"[9].

Ultimately, in sociology and dimensions of criminology, Chicago school (sometimes called as ecology school) was the original body of affairs emerged on 1920 and 1930 focused on urban sociology[10].

The Environment Constructed and Human Behavior

In relation with the relationship of environment and behavior, 4 positions are specified (Figures 5 and 6):
- Optional approach: environment has no impact on human behavior
- Possibility-oriented approach: environment supplies human behavior and even more than it.
- Probability-oriented approach: it believes in uncertainty of man behavior and the activity environment of designers; although it assumes that the basis of man behavior is not changeable.
- Determinism approach: when people act freely. Determinism of environment is focused on some branches of theory of evolution and believes that environment is main determinant of man behavior[11].

Theoretical Framework (Analysis of Public Attitude Towards High-Rise Building Issue)

Attitude of proponents

some people believe that high-rise construction is not a probe, but also it is a valuable and serious solution:
- Creating centralization in regard with administrative and commercial uses
- Decline of motor density in cities
- A solution to accommodate people due to population growth at cities
- Taking benefit of these buildings as symbolic urban elements
- Protection of urban natural environment through saving land use

Attitude of opponents
- The problems caused by neighborhood attitude (Figure 7)
- Density of high-rise building can cause omission of natural landscapes of citizenship rights
- Violating neighborhood criteria
- A threat to personal independence and hidden family identity

This social group believes that high-rise building construction can be a threat to citizenship rights.
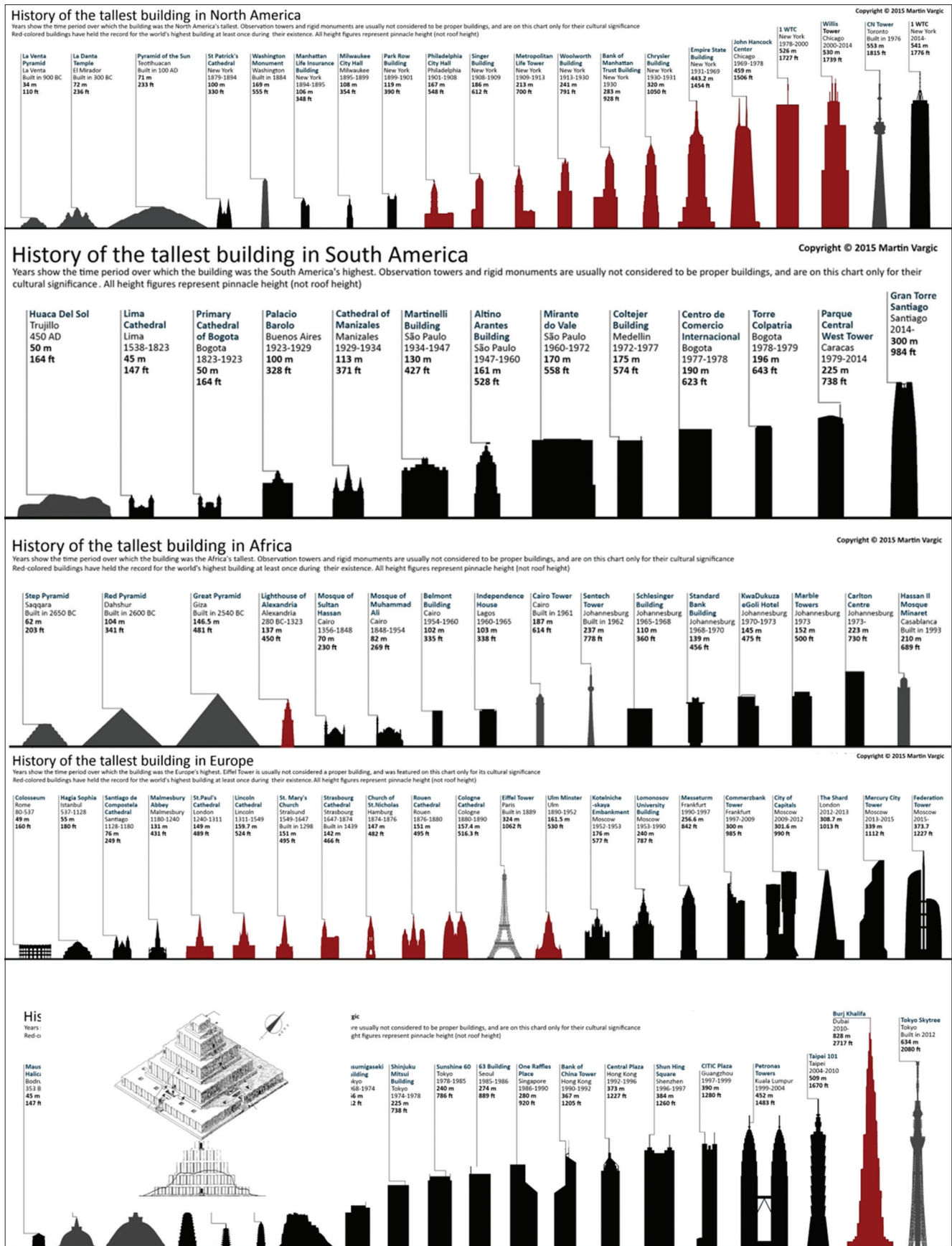
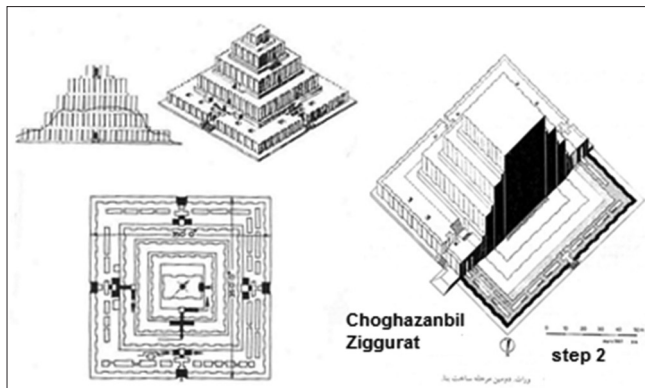**Figure 2: History of different buildings in different continents**

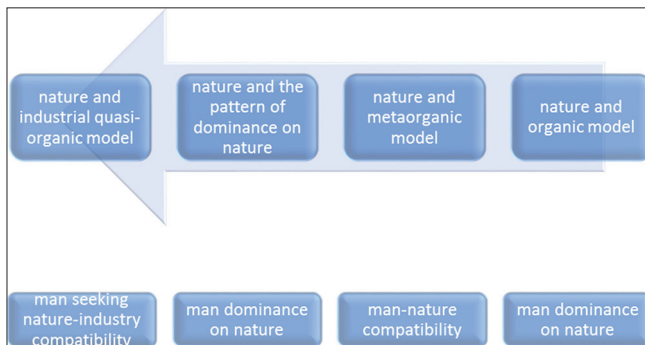Figure 3: Section, plan and cut of Choghazanbil Ziggurat

Figure 4: Nature models over the history

Behavioral Needs in High-Rise Buildings (Sustainable)

Using Abraham Maslow's needs model (Figure 7), the analysis of high-rise building construction is presented:

Biological needs

Biological needs can have the most effect on individual behavior until the time that they are satisfied to some extent. Biological needs are human needs for self-life[12]. A high-rise building can be divided to 3 sections of upper, middle and lower stories. Basically, the upper stories have better light and view compared to lower stories. Now, if the building in adjacent to another building from its own type, in addition to effect on adjacency, it may be face additional weakness in terms of front of light and landscape.

Basically, when high-rise buildings are located in a district of city solitary, they may be able to create certain identity. In this regard, quality of design, creativity, materials and localization plays key role. However, if the buildings cover the area with high density, they cannot cause solemnity and poise and expression, but also they can deprive considerable part of biological needs of citizens and can cause behavioral disorders over the time (Figures 8 and 9).

Safety needs

it refers to safety (earthquake and storm), security (social, financial, job and other) needs, and freedom from fear,
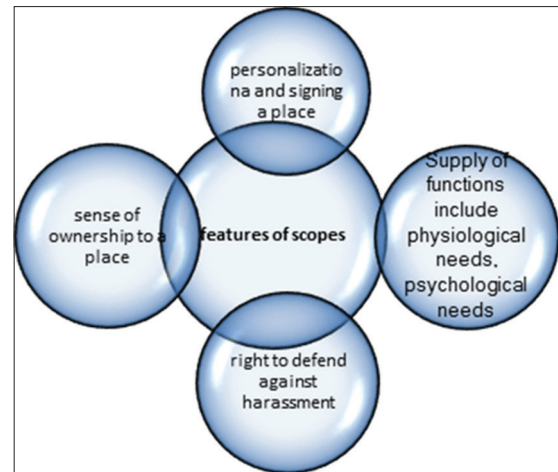

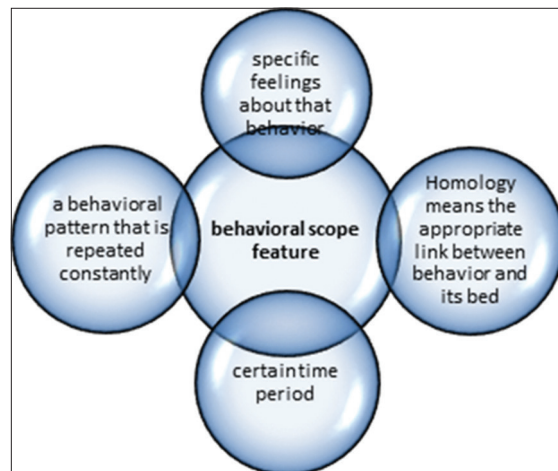Figure 5: The features of scope from perspective of Lang (source: Lang, 2004: 169)

Figure 6: main indicator of behavioral scope (source: Lang, 1987)

life safety and lack of deprivation of fundamental needs. In other words, it encompasses need to self-protection in present and future[13]. Lack of trust making in strength of the building can result in insecurity and ultimately, dissatisfaction. High-rise building means vertical city needing regulations. Security, crime management and life security are important in this field (Figure 10).

Neighborhood

The concept of placement of residential complex components was for the first time presented by Clarence Perry (1929). Studies show that in residential complexes with supplying family life needs, some similar sections and functions are conceptualized like neighborhood and these elements are placed along each other as a whole of small units.

Social needs

Sense of belonging and kindness, team work, family relationship with others, pride, avoid rejection, other's
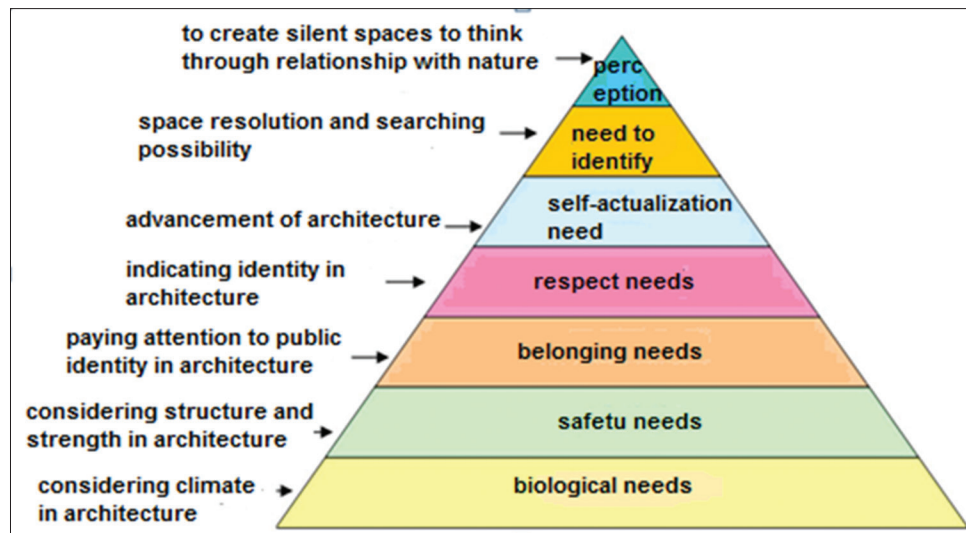
Figure 7: The relationship between human needs and response of architecture to these needs

love for individual and vice versa can be referred here. Man is a social creature[14] and space and place can increase probability of health risks and can also improve conditions of healthy life through social mechanisms. The probability of risks is not always caused by material differences among individuals, but also it can be caused by a series of inequalities and economic inequality is one of them. Wilson (1996) counts various aspects of social organization of neighborhood:

- Existence of social networks and their integration and power
- Responsibility of residents to solve public problems
- Social supervision and control of residents and the range of the control.

A neighborhood with 4 above mentioned features has practically very strong social facilities; although lack of these features in the complex can make it vulnerable against environmental hazards[15].

Respect

It refers to respect, self-esteem and skill. High-rise buildings are blocks or buildings, at which residents have common spatial points. One of the consequences of respecting or being respected is recognition of neighborhood rights and the manner of behaving them. if this perception is affected for any reason by inattentions and negligence, this can challenge neighborhood rights and as a result, life space can have negative effects on configuration of life.

Self-actualization

Finding latent and potential talents, individual evolution, justice-seeking, recognizing identity of self, motivation to achieve peak of capabilities are in this group[16]. According to Maslow, man should become everything that he can be. Certainly, need to privacy and loneliness and ability to
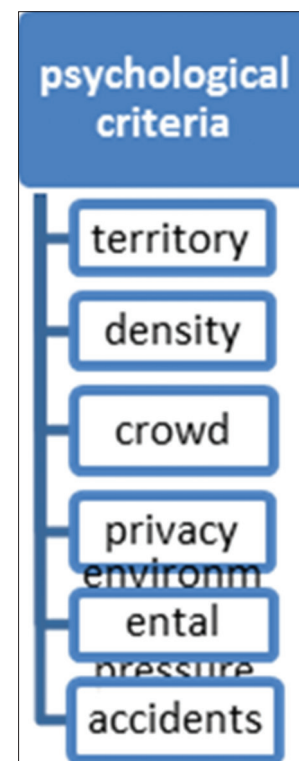

Figure 8: Diagram of types of psychological criteria of high-rise buildings

tolerate loneliness is one of the most important issues in this field (Figure 8).

Investigating the Impacts of High-Rise Buildings on Children

There are studies revealing behavioral problems of children in high-rise buildings compared to low-rise buildings. A recent study has shown that there is deep relation between physical conditions of housing and behavioral disorders of children[17], which can be met through relationship with green space and they are slow in

various skills such as dressing, helping, going to bathroom and so on[18].

The Relationship between Increased Crime and Increased Height of Buildings

Another study in India showed that the problems of children can't be a function of living in high-rise buildings by itself. According to the interpretation of the author, ecological limitations of the society, high-rise buildings, insecure streets and frightening open spaces seem as conspiracies against natural contact of urban children to play with natural happiness[19]. However, advantages of high-rise buildings are considerable in cities with sound pollution and traffic. High-rise buildings may be better for children living in higher stories.
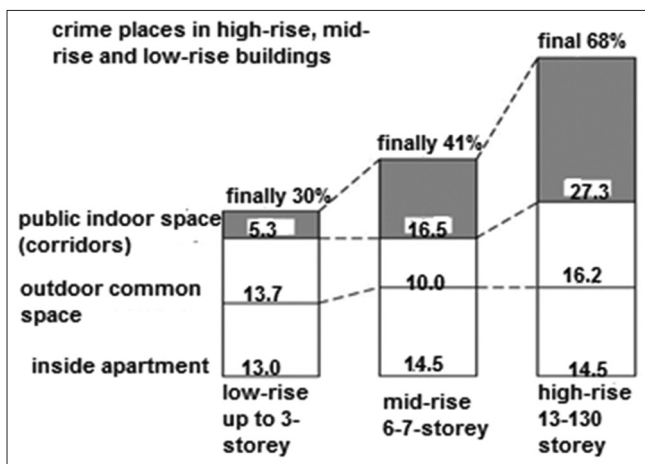

Figure 9: Relationship between increased crime and increased height of buildings

As it is illustrated in Figure 10, general health is dependent variable and social quality, physical quality and life satisfaction in neighborhood are independent variables. According to path results (diagram in Figure 11), only social quality had direct effect on general health of respondents. Figure 12 shows positive and negative effects of high-rise building construction.

Case Study of Iran Based on Two Parameters of Population and High-Rise Building Construction

Urban population has been increased more than 8 times during 55 years from the first census on 1956 to the year 2011 and has doubled the coefficient of urbanization. The highest annual growth of urbanization of population has been in the interval of census of 1956-1986. The case examples of high-rise buildings in Iran and Tehran are illustrated in Figure 12.

Effect of Urban Environment on Social Health

One of the most important issues that have challenged the society is social health and specific feedbacks of environmental-urban issues in this field (Table 3). High-rise objects disturb motion of clouds or wind in the sky and can include climate variations with the interference in mode of their displacement. Concentration in frame of different uses of high-rise buildings is important (Figure 13).

Assessment of Future Challenges

The urban landscape, the problems related to housing, environmental legibility, quality of urban landscape, skyline, place with identity, environmental pollution, blindness of urban views and panorama, creating visual abnormality and sub-climates and wide shadings are the consequences of the increasing process[20]. According to need of different urban
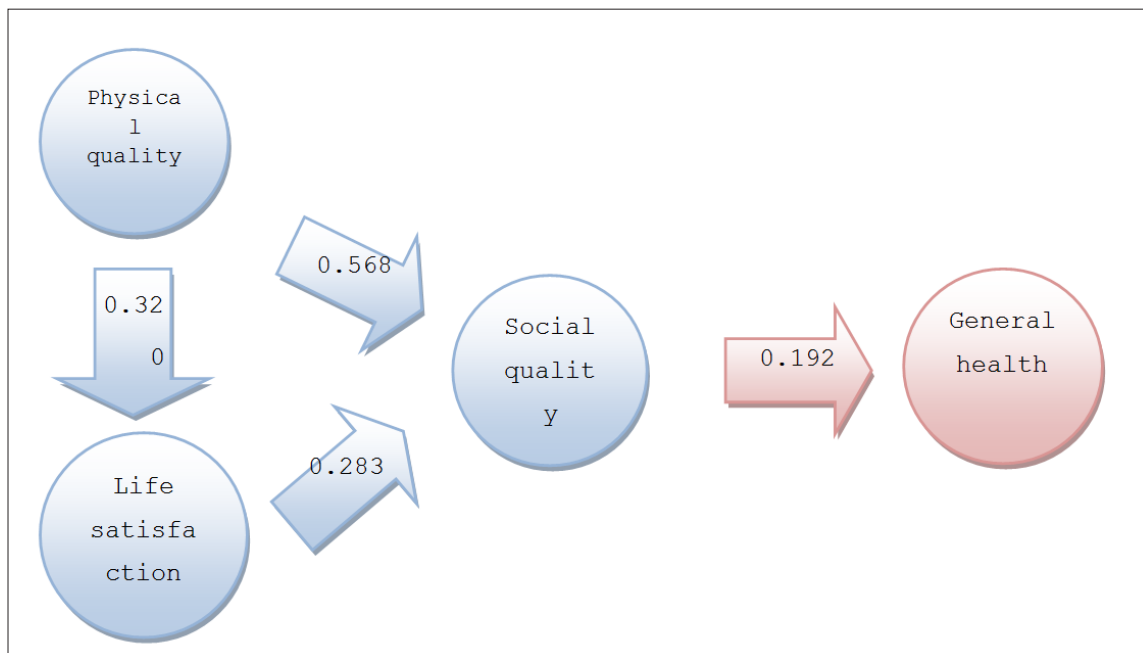

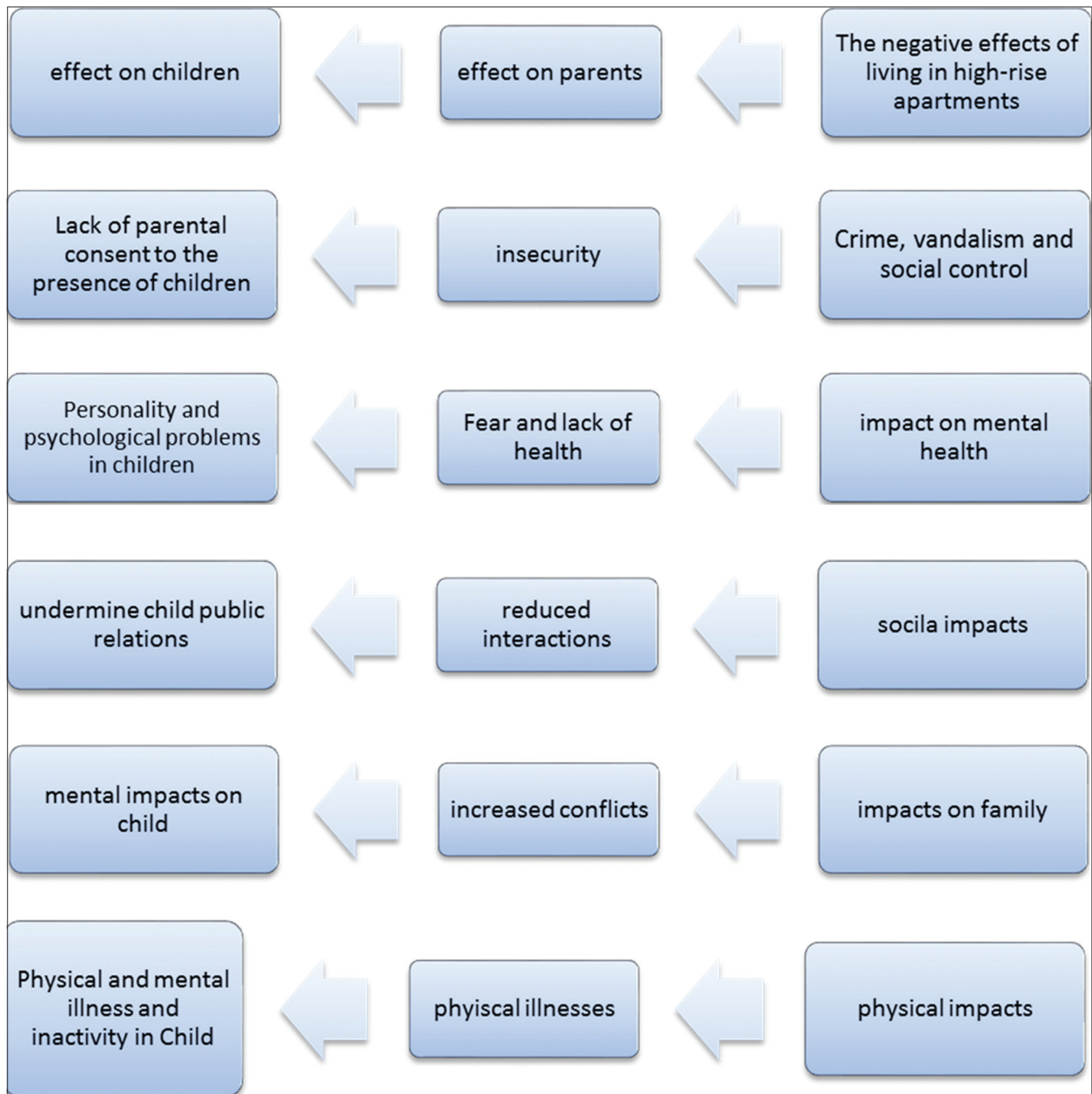**Figure 10: Diagram of general health at a society**

Figure 11: Diagram of investigating physical quality of life

uses to this kind of construction (Figure 13), considering effective indices can play key role in management of this process (Figures 14, 15 and 16).

Research summary
Through analyzing the amount of increase and capacity of high-rise building construction in residential areas, it could be found that (Tables 1-4):
- High-rise building and neighborhood relations
- High-rise building and family relations
- High-rise building and moral-educational issues

- High-rise building and mental disorders
- High-rise building and security
- High-rise building and social classes and groups
- High-rise building and ownership
- High-rise building and native identity[21]

CONCLUSION

Nowadays, people have to live in special buildings and hence, they should wait for positive and negative

consequences of this kind of lifestyle. Clearly, urban environment quality has significant effect on determining quality of social health[22].

Something that can be predictor in a population concentration as buildings or neighborhoods includes lack of urban hazards, access to urban facilities, existence of social interactions and responsibility against other residents. Quality of life of a society refers to health level of the residents. In fact, one may face a mental mechanism. A high-rise building can affect health of society, especially mental health, indirectly through paying specific attentions to all dimensions of architecture, structure and other elements through rising satisfaction of individuals[23].

Architects take step towards meeting human needs to design buildings due to the definitions of architecture.
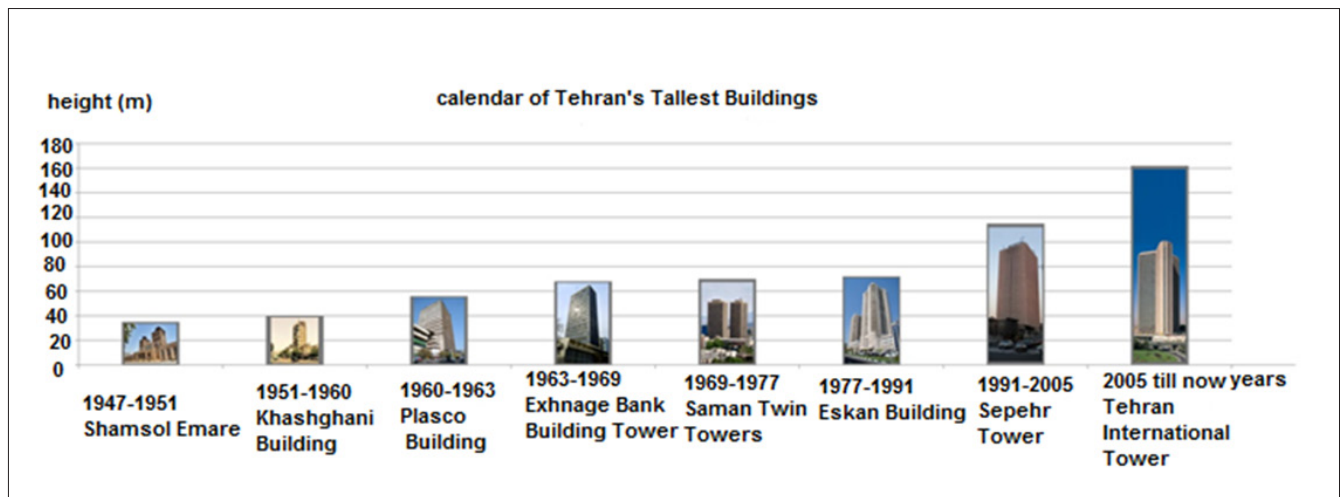

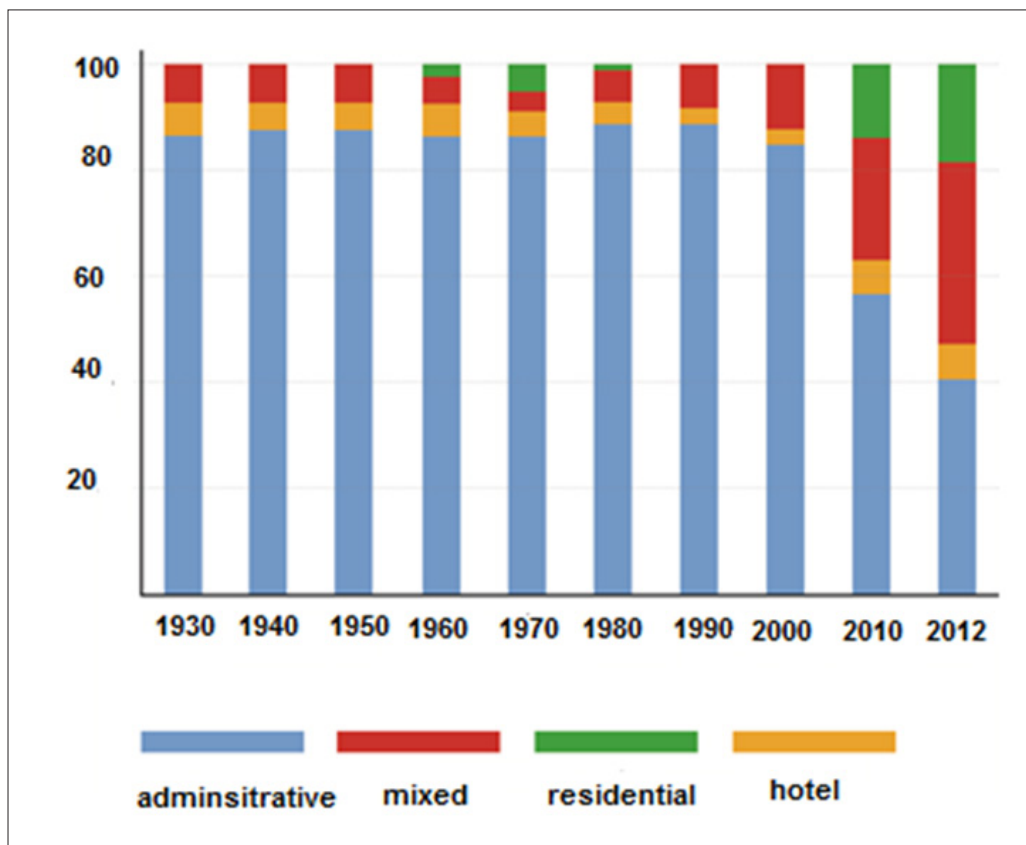**Figure 12: Iran's Tallest Buildings**

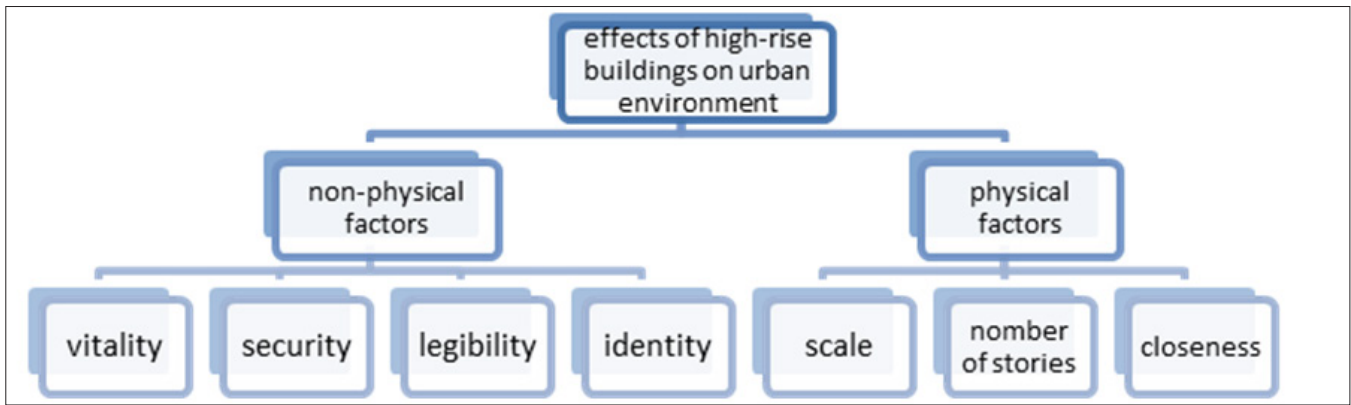**Figure 13: High-rise building construction based on different urban uses**

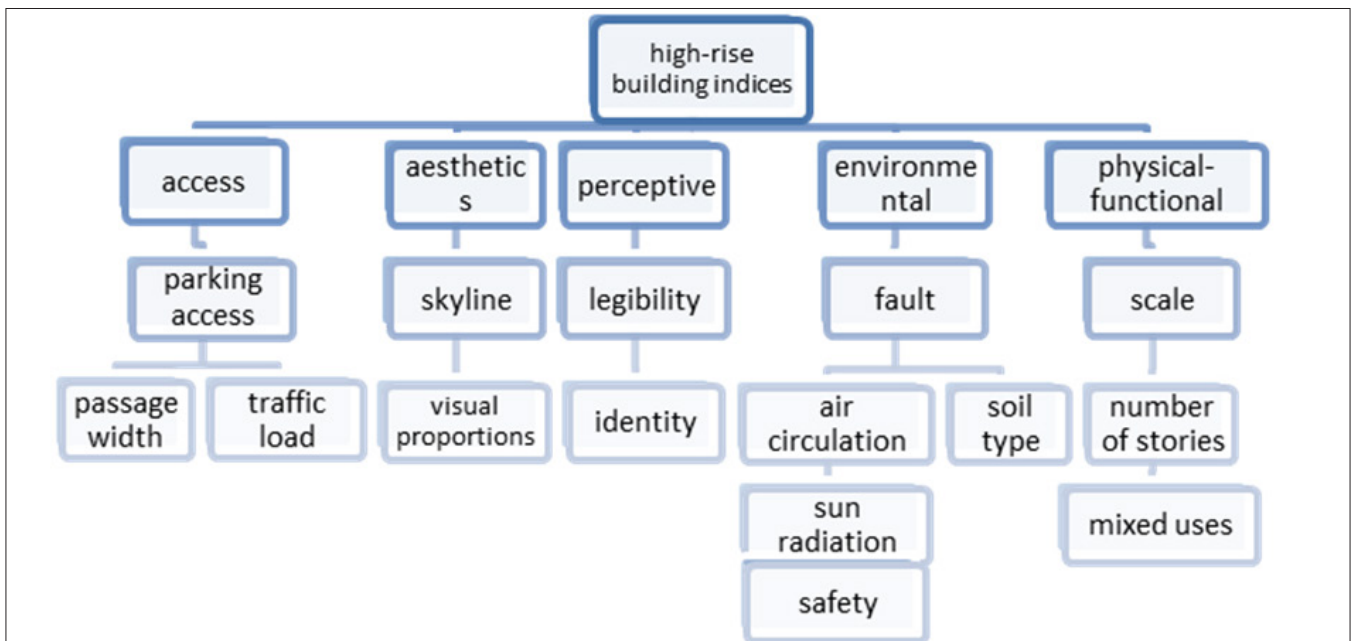**Figure 14: Effects of high-rise buildings on urban environment**

Figure 15: Indices of effects of high-rise buildings on urban environment

Figure 16: A model of behavior (Motalebi, 1988, 8)

Table 1: Assessment of favorability factors of lower and higher stories in high-rise buildings

Positive elements	Lower stories	Higher stories	Cause/source	Result
Easy access to open spaces			Nearness to land and open space	Possibility of playing and free outdoor mobility
Controlling children in outdoor space			Nearness and ability to communicate	Possibility of playing in outdoor space and increased comfort and happiness
Having better view			Visual continuity caused by reduced visual obstructions in height	Increased focus, comfort and happiness
More mobility for children			Access to open space, ability to have mobility in the apartment for the apartment without lower story	Possibility of playing in open space
Peace and farness from noise pollution			Farness from noises through having distance from land and decreased crowd in higher stories	Increased concentration for learning and education
Possibility to have more social communications			Easy access to open spaces	Reduction of mental illnesses
Use of better light and air conditioning			Less shading of nearby buildings and access to sunlight	Increased vitality and mental and physical health
Coping with types of fear (bad effects of high-rise building)			Reducing fear of heights, getting stuck during natural disasters, fire	Mental health and satisfaction
Reduced indicators of mechanized life			No necessity to use indicators of mechanized life like elevator	Adjusting effects of mechanized life in new generation
Communicating open space from indoor space			Direct audiovisual communication with land	Possibility of parent's supervision and possibility of playing in open space fir children

Table 2: Advantages and disadvantages of high-rise building

Advantages of high-rise building	Disadvantages of high-rise building
More compact cities= reduce transportation	High consumption of energy and materials to build in height
Optimal land use due to concentration of population = reduced suburban development and reduced environmental damage	High energy consumption for elevators (up to 15% of total energy consumed by building)
Centralized cities= reduced density of urban infrastructural networks	High energy consumption for maintenance and cleanness of building
Less travel within the city= less waste of time	Negative impacts on urban scale (wind storm, wide shading, light barriers)
Potential capability and possibility to create building with mixed use	High concentration of population in special places (lack of open spaces and recreation spaces)
Increased wind speed in height (higher potential ability to use wind energy)	High loadings caused by wind in height (impact on size and dimensions of structural and view elements)
Narrow and elongated and at an altitude floors= potential of natural skylight of space	Closed and isolated spaces in height (more need to air conditioner)
Space at sky= possibility of creating silent and calm spaces away from crow and noises of city, urban landscape	Safety and security problems in height (while construction for users)

Table 3: Effects and complications of high-rise building construction on urban environment (source: Heravi Torbati, 4)

Effects of high-rise buildings on soul of urban environment	
Physiologic effects	Preventing natural flow can cause respiratory diseases; increased concentration of population and cars, increased rate of accidents and mortality, reduction of air pressure can affect blood circulation and brain cells
Social effects	Social deviation, social isolation and self-alienation, different social conditions because of no agreement among residents, reduced healthy social relations because of their scale and nature
Traffic effects	Increased traffic volume, increased distance between workplace and residence because of construction of high-rise residential buildings in form of mass construction projects
Mental effects	Although living in apartments make people come close to each other in spatial terms; makes them far from each other in mental terms. Living in high-rise buildings gives artificial and mechanized state to living process
Health complications	Concentration of population (high-rise buildings) can pave the way for prevalence of infectious diseases. The pressure caused by weight of high-rise buildings can cause fracture of soil layers and interference of wastewater networks in underground water resources. Existence of parking lots in a closed space in high-rise buildings can result in pollution
Environmental effects	Destruction of natural environment (in case of improper localization), environmental pollutions because of density of cars, lack of responsibility of residents in use of green space and garden
Security complications	In case of some disasters like fire, the fire would be spread in entire building. possibility of accidents such as falling from stairs and falling from height, in case of emergencies, exiting from high-rise buildings may result in life losses

Table 4: Effects of high-rise buildings on urban landscape

Positive points	Negative points
Improvement of environmental legibility	Probability of blindness of urban views and panorama by high-rise buildings
Improvement of urban landscape quality and effect on skyline	Creating visual abnormalities in the surrounding area
Improvement of symbolic quality of these buildings in Urban landscape and its effect on creating places with identity	Creating sub-climates and wide shadings

Hence, they are aimed in creating environments to meet human needs. On the other hand, the behaviors enter into action to meet needs and hence, identification of human needs is so important for environmental designers[24].

Although high-rise building construction is one of the requirements of development of big cities to overcome spatial limitations, the solution should be implemented in line with using natural, communicative, economic and physical potentials to protect and provide mental comfort and health. Finally, according to the results, it is essential to consider the role of designers and users in all steps of construction from the time of beginning design and construction operations to the time of utilization and probable reconstruction adequately. Or this purpose, tight relationship should be considered between environmental psychology and behavioral sciences with field of architecture in all steps.

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