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THE ROLE OF ENVIRONMENTAL ELEMENTS IN THE PROCESS OF
IMPROVING THE QUALITY OF THE THERAPEUTIC SPACES OF
CHILDREN IN TEHRAN WITH THE EMPHASIS ON GREEN SPACE

Laleh Khodakhah Jedi, Vahid Ghobadian, Vahid Shali Amini*

Department of Architecture, Central Tehran Branch, Islamic Azad University, Tehran, Iran.

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ABSTRACT

oor design of children's therapeutic spaces can exacerbate behavioral disorders and anxiety. One of the factors that can reduce this trend is the use of green space and green design in this environment so that attention to the quality of the created environment and its significant effects on the treatment of patients and reducing anxiety in them play an essential role. This study aims to change the perspective of designers in designing and analyzing and presenting strategies concerning the design of green space in therapeutic centers to improve the quality of the hospital environment and therefore accelerate the patient's improvement trend and decrease anxiety in them. The required information is collected through questionnaires between male and female children who have experienced the hospital environment. T-test was used To analyze the data in SPSS 18 software. According to the statistic amount obtained from t-test about the research hypotheses and the significance level ($\text{sig} = 0,000$), we can say that there is a significant difference between the average impact of green space design in the hospital and accelerate the process of improving the patients, reduce children's anxiety, improve the environmental quality of the health center and responding to the children's sanitary and psychological needs. Since the average effect of green space design on these factors is more than theoretical mean, it can be concluded that the design of green space in children's hospitals has affected these factors, and its effect is more than average. Therefore, the research hypotheses are confirmed.

INTRODUCTION

Most psychologists have described childhood as a period of fate because, in this period, human character and behavior are formed. Many experts believe that every human personality is formed in the first seven years of his life. Over these years, the child has become more affected by the surrounding environment. Thus, the spaces associated with child activity should be such that the appropriate conditions for his physical, mental, emotional, and social development be provided. It is possible to accomplish

this by applying the design elements in accordance with the physical and mental conditions of the child. Therefore, the full recognition of the child and the assiduity of the relationship that he communicates with the environment is necessary. (Biedekamp & Copple, 2003: 15)

therapeutic spaces, in terms of importance, are from first. In essence, grade monuments and therapeutic spaces are considered with regard to mental health and physical health, and lots of importance should be considered in their design. Lack of attention to architecture and correct principles of design thought and correct understanding of behavior and its performance will reduce the efficiency and stress for patients. Professionalism in hospitals and therapeutic environments is a major part of architects' design thinking (Iraj Zahmati, 2015: 2).

Hospitals have diverse architectural spaces, which, due to providing medical services and referring to different groups of people to these spaces, are very important in terms of design and function. Sometimes, the forced presence in this space may give us a certain sense, where it is accompanied by pain and anxiety or stress to the patient, and this may be intensified in the case of children with the poor mentality, weak body, etc. As a result of little recognition of this environment, it is possible to disrupt the therapeutic process and impose problems for children and parents of the children (Khodakhah jeddi, et al.: 2016: 1).

Poor design of therapeutic environments can negatively affect the health and the psyche of the child. And good design can help strengthen their abilities and reduce stress. It can even lead to the authorship of creativity and the growth of children. Therefore, the purpose of the study of children is to apply the best and the most effective way to understand them. Unfortunately, the physical autopsy of the building is evaluated purely from the sanitary term of the available spaces. And the feeling of the child's self - satisfaction and tranquillity have not much importance. According to psychologists, children do not need only physical attention. Instead, it also requires social, emotional, personality, and intelligence should be considered. Weak design of these environments can cause the aggravation of behavioral disorders as well as fear and anxiety in children (Rahimloo and Hadafi, 2018: 64)

On the other hand, the hospital is considered one of the main points and requirements for community health affairs. Patients in the hospital require medical care and treatment at different levels according to their type of illness. According to the very important role of hospitals and other health centers in maintaining or restoring health to the classes of society, which is vital, the necessity of attention to the design of hospital architecture is more than ever felt in terms of physical and functional aspects or in terms of internal architecture. Paying attention to the patient's condition and studying his needs in terms of mentally and physically with regard to that he is more vulnerable to the healthy person requires architects to observe more scientific and more accurate of all principles and components of the architecture. So that visual elements such as visual effective forms, light, color, etc. have to be scientifically evaluated far beyond their use in different parts of the hospital and selection applied based on scientific evidence and examining the effects that affect the patient's psyche and body as well as on the functioning of the health center employees (Hamilton, 2003: 18 - 26).

The psychology of the environment is also one of the fledgling specialized fields that emphasize the interaction of behavior, physical, architectural, and spatial conditions of the atmosphere more than other aspects. Whereas, in the internal design of the therapeutic spaces due to their function, the most excellent effect is directed to the characteristics of light, color, and also the creation of effective visual forms. The use of natural factors in hospital space regulates the biological cycle of the body, transparency of optical clarity in the environment, reducing technical faults, reducing inpatient time and feeling of pain in patients, reducing the feeling of depression, increasing positive attitudes towards the hospital environment and other cases. In long-term hospitalization in hospitals, the presence of natural and herbal factors is necessary to perform metabolic and circulation processes properly. Among the critical factors related to environmental psychology, which play an essential role in maintaining physical health and mental balance and improving the quality of life of a child, are the topics of green spaces. The use of environmental, psychological factors such as green spaces and plants leads to tranquility, happiness, vitality, and a sense of belonging in the child's mind and body. Natural open and green spaces are forces that affect humans and create a sense of comfort or discomfort, activity, or inertia. Correct use of plants in hospitals can cure patients (Ulrich, R., Zimring I, 2004: 44)

As Ingham and Spencer (1997) found that the use of green spaces and plants, proper light, beautiful and comfortable furniture alongside the physical and architectural body of the building is effective in reducing the stress levels of patients (Ingham, B; Spencer, C, 1997, 17 - 20).

Attention on the functional dimension and the internal and external layout of the green space during the design of hospital architecture in line with the increased productivity and the level of service to patients has very important. This skeletal environment affects children's behavior, and the excellent design of this place can help to strengthen their abilities and reduce stress (Adams, Gwinner, et al., 2010: 658 - 667).

Therefore, poor design of the therapeutic environment can negatively affect the health and mental psyche of the child, and therefore, more studies are needed to design a favorable environment for children.

It is also worth mentioning that the design of such a kind of environment is a combination of technical requirements and environmental quality that all come from the needs of children.

In Iran, according to the importance of the mentioned topic, poor design of therapeutic environments in most cases has destructive effects on the mental condition and physical condition of children, and in the design of these environments, a proper combination of technical requirements and environmental quality emanating from the childish needs is not observed. The present study seeks to investigate the characteristics of specific hospitals of children from the aspect of influential factors of architecture and satisfaction of the clients with an emphasis on the green space in Tehran city in order to investigate the characteristics and useful elements of the architecture to increase the comfort of the hospitalized children and their parents in these spaces.

RESEARCH BACKGROUND

In the context of practical factors in the design of the therapeutic environment in the year 1859, Florence Nightingale, in his book named *Notes on Hospitals*, he said that designing, lighting, ventilation and...are essential elements to accelerate the healing of patients and reduce psychological pressure in hospitals (Dilani, 2000, 32).

Since the mid - 1970 s, researchers focused on such buildings, especially in the case of children's therapeutic buildings, and pointed out that the windowless passages, the twisted corridors, sterilized indoor areas with unpleasant odors, produced a sense of unpleasantness in the space and thus increased the mental pressure and stress in the patients (658, 2010; Adams et al.). In 1987 a researcher named Kellman studied the importance of furniture type and light available in hospitalized space for sick children (1987, Kellman).

Several researchers in 2001 were obtained using semi-structured interviews with positive effects of natural elements on hospitalized children in hospitals in the USA (Whitehouse et al, 2001: 102). Also, recent research on environmental psychology shows that architectural factors such as motivation, the multiplicity of diversity, complexity, novelty, sound, light, coloring, crowding, visual manifestation, proximity, neighbors, communication, readability, organization, subject structure, predictability, signs, path positioning, differentiation, external perspectives of background functions, ambiguity, sudden perceptual changes, perceptual conflict, feedback, crowd control, constraints, light control, climate, territory, symbols, flexibility, deep, deprivation, functional paths, native points, harmonious furniture arrangement and rejuvenation (minimum distraction, mobility, protection, seduction, privacy) suggests that architectural factors such as motivation are associated with perceptual positive and negative stress (Hashem Zehi, 2014: 3).

Taghipour et al(2015), studied Risk analysis in the management of urban construction projects from the perspective of the employer and the contractor. Rezvani Befrouei & Taghipour (2015), discussed Identification and Management of Risks in Construction Projects. Taghipour et al.(2015), studied Construction projects risk management by risk allocation approach using PMBOK standard. Taghipour et al(2020), studied Evaluating CCPM method versus CPM in multiple petrochemical projects. Seddigh Marvasti MA et al(2015), studied Assessing the Effect of FRP System on Compressive and Shear Bending Strength of Concrete Elements. Jalili et al(2015), studied Utopia is considered to be the physical form of an ideal human society where the goals are met. Rezvani Befrouie A et al(2015), discussed the design of high-rise building with ecological approach in Iran (Alborz Province). Taghipour et al(2015), studied Seismic Analysis (Non-Linear Static Analysis (Pushover) and Nonlinear Dynamic) on Cable-Stayed Bridge. Taghipour et al(2018), studied the Study of the Application of Risk Management in the operation and Maintenance of Power Plant Projects. Taghipour et al(2020), studied Assessment and Analysis of Risk Associated with the Implementation of Enterprise Resource Planning (ERP) Project Using FMEA Technique. Taghipour et al(2015), studied Necessity Analysis and Optimization of Implementing Projects with The Integration Approach of Risk Management and Value Engineering. Taghipour et al(2015), studied Risk assessment and analysis of the state DAM construction projects using

FMEA technique. Taghipour & Ahmadi Sarchoghaei(2015), studied Evaluation of Tourist Attractions in Borujerd County with Emphasis on Development of New Markets by Using Topsis Model. Abdollahzadeh & Taghipour(2015), studied Identify and Priorize Suitable Area for Ecotourism Development using Multi-criteria Analysis for Development of the Tourism Market in Iran (Nathanz City). Mirzaie et al(2020),studied The Relationship Between Social Bearing Capacities with Conflict as a Result, in the Perception of the Visiting Historical Sites.Taghipour et al(2020), studied Application of Cloud Computing in System Management in Order to Control the Process. Taghipour et al(2015), studied The Relationship Between Social Bearing Capacities with Conflict as a Result, in the Perception of the Visiting Historical Sites. Khodakhah Jeddi et al(2016), studied The Analysis of Effect Colour Psychology on Environmental Graphic in Childeren Ward at Medical Centers

In Iran, the specialized Hospital of children Shahid Muhammad Hussain Fahmideh (formerly the lion and the Sun) was established in the year of 1333. After that, the Children's Hospital in Tehran was established almost from 1967, the Prophet Ali's Hospital in 1976, and this Hospital is ready to serve the children and babies in the neonatal unit.

The state hospitals of Shahid Fahmideh, Ali Akbar, and Mofid are also among other children's hospitals in Iran. Among the children's private hospitals can be named to Bahrami Children's Hospital, the pediatric medical center Hospital, the Pegah specialist clinic, and the mother and child's specialist clinic.

Also, in several studies, the psychological advantage of plants has been investigated. It has also been necessary research in the 1980 s and 1990 s suggesting that nature has a positive effect on health. According to a poll conducted by patients in several hospitals (patients who differed in age, place of hospitalization, and type of disease), it was found that almost all of them were highly sensitive to the importance of physical conditions of the therapeutic environment, most of which tend to take refuge in nature outside the building. The first systematic assessment of the gardens of the therapeutic areas in the United States was conducted in 1994, where four yards were analyzed in San Francisco hospitals by observation, analysis, and interview. People liked the traditional gardens with the lawn, the flower, the tree, and 90 % of them felt a positive change after spending time on the green field. Based on the theories of Delvin and Arnil (2003), health care environments and their effects on patients have extensive literature and scope, as many managers and experts have absorbed in fields such as architecture, counseling, and psychology. In the present era and considering architectural samples, designing health care facilities as treatment machine in medical environments, instead of environmental design to promote health has been considered. Many researchers, such as Lamprecht (1996), believe that sensitive design can increase the process of improvement and affect the mental and physical health of patients greatly (influenced by the design of therapeutic buildings). Environmental health research has focused mainly on the role of the hospital environment in inpatient experiences during treatment. An essential part of this experience is related to the therapeutic quality that patients receive.

France (2010) proceeds a study as a way towards greener pastures in U.S. hospitals, concluding that the Hospital's plan to be greener as one of the right methods is to reduce costs and improve the hospital environment for patients and employees (Ferenc, 2010: 13).

Carpenter (2010) studied the relationship between sustainable environmental and green hospitals in the United States and concluded that the first and most important motivation for moving toward the standards of green hospital standards was energy efficiency (Carpenter, 2010: 18).

Saemeh Hadi Zadeh (2016), in an article with the title of creative ideas in the design of children's treatment centers with a sustainable green space approach, said that in the above research, children's personality is evaluated. The question of what children like is answered then fits into the process of treating the disease; ideas expressed to provide a safe place for the child and parents by creating child spaces next to the hospitality building principles.

Ghorbani and Enayati (2015) in a paper, examines the effect of green space design in cancer children's Hospital with the approach of reducing anxiety in children, concluded that the effect of green space in coordination with other architectural spaces for children's Hospital had played an important role in creating a more favorable environment and reducing anxiety and mental relaxation of children.

Victoria Karimi, in research with the title of art therapy, color, form, and space and its effects on children's hospital environment, states that necessary to use color, shape, and space as an active factor in improving and treating patients is inevitable.

Sahar Sadiq Akbari and Roya Noori (2013), in a study examining the psychology of light and color environment in designing child-centered therapeutic spaces; Case study: Mofid Children's Hospital stated that today, considering the impact of environmental psychology concepts on environmental quality, it is important to consider this issue in designing health centers to achieve a desirable space for patients. The results obtained from hospitalized children in Mofid hospital (the oral and practical question of 100 children with the age group of 6 - 10 years) showed that color and light play a vital role in children - specific spaces that ignoring them in hospital design will reduce the quality of environment and treatment quality.

Motalebi and Vojdanzadeh (2015) in a study with the title of the impact of the physical environment to reduce patients' stress (Case study dental office), examined environmental factors such as lighting, silencing, noise, privacy, and color to determine its effect on patients' stress level of a dental practice. Based on the results of this study, using the internal architecture of therapeutic spaces and attention to physical factors such as color, lighting, privacy, etc., based on the principles of aesthetic and function of architecture, to create appropriate and qualified for spaces, to reduce the stress and anxiety of patients caused by the presence in medical or disease centers, and to promote people's health, which is the most important goal of healing environments.

Isaa Hojjat and Marjan al-Sadat Ibn al-Shaheed (2011), in research entitled "redefining the hospitalization area of a pediatric hospital based on the needs assessment and analysis of children with an environmental fear reduction approach" conclude that children in both groups have joint needs

that by considering these needs and integrate them with the solutions extracted from previous studies in the field of fixing problems in children's therapeutic environment, that can be suggested particular guidelines for designing children's hospitalization space which can create a more favorable environment during hospitalization.

THEORETICAL FOUNDATIONS OF RESEARCH

Children's Health Centers

The clinic in the word means the place to keep and treat the patients (Moein, 2001: 201).

The hospital consists of an entity that is designed and equipped for diagnosis and treatment of diseases and injuries, both in medicine and through surgery of the patients and the injured and their hospitalization during these stages (Khani Zad, 2010:10)

The main structure of the planning and design of a hospital or clinic will determine by the number of beds. Hospitalized wards of the hospital are referred to places where the patient is confined to the doctor's order for diagnosis and maintenance and treatment of therapeutic procedures. Undoubtedly, the central core of each hospital or clinic is its bed area, also in terms of area, the highest amount of infrastructure in any hospital belonging to its hospitalization departments. Today, the architecture of treatment centers, and mainly the inpatient departments, are directed towards the role of family presence in the process of treatment has been felt more. Public hospitals are generally found to have four hospitalization wards of surgery, internal hospitalization, gynecology, and children. In addition to these sectors, it can also be considered specialized, other hospitalization (Shamagli, 134, 2011).

Generally, the proper internal design of children's health centers requires knowledge of comprehensive information about child recovery stages, how to care for the child as well as parents' role in improving the child in the child's design sectors. The design of the interior architecture as a context that defines the quality and environment of the place may be reached to the appropriate idea, considering the conditions of the users, and implement it in a proper design. (Khodakhah jeddi, et.al:2016: 1).

Today, no one can overlook the role of the environment and its effects on the arts and behavior of children. Children's hospitals should have a specific and proper design, even for children's parents. In addition to the nurses, trainers and psychologists are also present in the environment and take care of children psychologically and mentally. Children's appropriate hospitals are not only facing medicinal and medical needs, but the needs of the movement, social, evolutionary, and emotional needs of children should also be considered. One of the active factors in the child's recovery, who is hospitalized in the hospital, is accompanied by one of the parents with, so the proper place to relax and to think and pray for parents is essential. Collective movements and games are part of the daily activities of children that, in an environment like the hospital, a room should be designed to the game in which utensils and furniture with soft angles should be used. Children are usually quickly tired of sitting and waiting. So, in a children's hospital, waiting room and hallways should be diverse and fun and make children interested in staying in such an environment. Therefore, the prospect and

entertaining landscapes and proper designs and paintings are essential for the Children's Hospital.

The environment around us must have harmony. Co-ordination or harmony should be created in such a way as to have a balance limit because, in the hospital environment, each patient differs from the viewpoint of psychology, customs, and cultural and ethnic contexts.

3.2 Urban green spaces:

Part of the green space that is designed and constructed within the city spans is called urban green space, or part of the city's face composed of a variety of plants. Urban green space is a part of open urban areas that in its natural or artificial arenas are located under the establishment of trees, flowers, lawns, and other plants and based on human supervision and management considering the criteria, rules, and specialties associated with it to improve the biological, habitat and welfare of citizens conditions and population centers of non-rural, have been maintained, or structured (Saeedia, 31: 2004).

Semi-public green spaces

Green spaces that have ecological efficiency, but their users are more restricted to public spaces. The open areas of hospitals, garrisons, government offices, etc. fall into this category.

RESEARCH HYPOTHESES

First hypothesis: The design of green space at the Children's Hospital is effective in responding to the sanitizing and mental needs of children.

Second hypothesis: Green space design in hospitals is effective in enhancing the environmental quality of health centres.

Third hypothesis: Green space design in hospitals is effective in stimulating patient's healing process.

Fourth hypothesis: Green space design at the Children's Hospital is effective in reducing child anxiety.

RESEARCH METHOD

This research, in terms of purpose, is applied and, in terms of research design, is descriptive-survey. The population of this study consists of girls and boys who experience hospitalization in the hospital, and the number of them is about 40 people. The data gathering tool is a standard questionnaire. Variable measurement has been done through the Likert 5 options range. Cronbach's alpha test was used to measure the stability or reliability of the polls, the value of which is 0.88, the number obtained, and higher than the number 0.7, which indicates the acceptable balance of the questionnaire. To analyze the data and test the hypotheses, the Kolmogorov-Smirnov test, and t-test through Spss software was used.

Table 1: Kolmogorov-Smirnov Test Statistics, Reference: Author

H0: (P=0)	The distribution of observations follows the normal distribution.
H1: (P≠0)	The distribution of observationdo not follows the normal distribution.

Test result	The value of Sig	Test statistics	Number of samples	Variable
normal distribution	0.513	0.058	80	Mental health needs
normal distribution	0.678	0.134	80	Environmental quality of health centers
normal distribution	0.649	0.028	80	Accelerate the process of improving patients
normal distribution	0.639	0.203	80	Reduce children's anxiety
normal distribution	0.534	0.163	80	Green space design

Given that the Kolmogorov-Smirnov statistic value of the variables at confidence level is higher than (p. value $e > 0.05$), it can be concluded that the above variables have a normal distribution and obtain the license to use the Pearson test.

Hypothesis 1: The design of a green space in a children's hospital is effective in responding to children's mental and health needs.

(H1: $\mu_1 \neq \mu_2$ and H0: $\mu_1 = \mu_2$)

Table 2: Results of t - test single sample for first hypothesis, source: author

Significance level (Sig.)	Degrees of freedom	T value	Standard deviation	Theoretical average	Average	Abundance	Variable
0.000	35	26.13	0.24	3	4.05	36	The impact of green space design in hospitals to meet the needs of health and psychological

According to the test statistic value (t-26.13) and significance level (sig = 0.000), it can be said that there is a significant difference between the average impact of green space design in the hospital and responding to the children's mental and psychological needs (4.05) and theoretical average (3). Since the average effect of green space design in hospitals and responding to the health needs of children is more than theoretical mean, it can be concluded that the design of green space in children's hospital is useful in response to their health and psychological needs and the impact is more than average.

Hypothesis 2: Designing green spaces in hospitals is effective in proving the environmental quality of health care centers.

(H1: $\mu_1 \neq \mu_2$ and H0: $\mu_1 = \mu_2$)

Table 3: Results of the t-test from the single sample of the second hypothesis, Reference: Author

Significance level	Degrees of freedom	T value	Standard deviation	Theoretical average	Average	Abundance	Variable
0.000	35	16.79	0.36	3	4.02	36	Designing a hospital green space and improving the environmental quality of the treatment center

According to the test statistic value (t-16.79) and significance level (sig = 0.000), it can be said that there is a significant difference Between the average impact of green space design in the hospital and the improvement of the quality of the therapeutic environment (4.02) and the theoretical average (1). Since the average effect of green space design in hospitals and responding to the health needs of children is more than theoretical mean, it can be concluded that the design of green space in children's hospital is effective in improving the quality of the therapeutic environment and the impact is more than average.

Hypothesis 3: Designing the green spaces in hospitals is effective in accelerating the improvement of patients.

(H1: $\mu_1 \neq \mu_2$ and H0: $\mu_1 = \mu_1$)

Table 4: Results of the t-test from the single sample of the third hypothesis, Reference: Author

Significance level	Degrees of freedom	T value	Standard deviation	Theoretical average	Average	Abundance	Variable
0.000	35	11.65	0.54	3	4.06	36	The effect of green hospital design on accelerating the recovery process of patients

According to the test statistic value (t=11.65) and significance level (sig = 0.000), it can be said that, there is a significant difference Between the average impact of green space design in the hospital and the speeding up the recovery process for patients (4/06) and the theoretical average (3). Since the average effect of green space design in hospitals and speeding up the recovery process for patients is more than theoretical mean, it can be concluded that the design of green space in children's hospital is effective to accelerate the recovery process of patients and the impact is more than average.

Hypothesis 4: Designing the green space in a children's hospital is effective in reducing children's anxiety

(H1: $\mu_1 \neq \mu_2$ and H0: $\mu_1 = \mu_2$)

Table 5 Results of the t-test from the single sample of the fourth hypothesis, Reference: Author

Significance level	Degrees of	T value	Standard deviation	Theoretical	Average	Abundance	Variable
0.000	35	13.44	0.49	3	4.1	36	The effect of green hospital design on reducing children's anxiety

According to the test statistic value (t=13.44) and significance level (sig = 0.000), it can be said that, there is a significant difference Between the average impact of green space design in the hospital and the speeding up the recovery process for patients (4/1) and the theoretical average (3). Since the average effect of green space design in hospitals on the reduce children's anxiety is more than theoretical mean, it can be concluded that the design of green space in children's hospital is effective to reduce children's anxiety and the impact is more than average.

DISCUSSION AND CONCLUSION

The results of the research show that environmental architecture affects child behavior using factors such as green space, color, light, etc. and what should be considered in the design of specific children's care environments is that a child health center may be able to support patients who are in the dire mood with fear and anxiety. Settings with positive experiences can cause an individual to overcome his stress. In this regard, the design and application of green space in coordination with other architectural areas for the hospital environment can be a useful step in increasing environmental quality, responsive to health and mental needs, and decrease anxiety and accelerate the process of improvement in these centers. Therefore, the use of green space with therapeutic property in our country's hospitals is essential today.

According to the t-test statistic value of research hypotheses and obtained significance level (Sig=0.000), it can be said that there is a

significant difference between the average impact of green space design in the hospital and accelerate the process of improving the patients, decreasing the anxiety of children, improving the environmental quality of the health center and responding to children's mental and health needs. Since the mean effect of green space design effect on these factors is more than the theoretical mean. It can be concluded that the design of the green space at the Children's Hospital has affected these factors, and its effect is higher than that of the average. So, the research hypotheses are confirmed.

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