

**RESEARCH OF CHARACTERISTICS OF INTERIOR COMFORT OF MULTI-APARTMENT RESIDENTIAL BUILDINGS FOR DIFFERENT PERSONALITY TYPES**

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**Abstract.** During the period of quarantine restrictions, and later the full-scale invasion of Russia into the territory of Ukraine, issues related to the change of residence intensified, accordingly changes in the level of social communications, problems of comfort, and realization of all vital functions in the living space of apartment buildings. The main purpose of the article is to study the relationship between the architectural characteristics of comfort in the interior of a residential apartment and the personality types of residents. The subject of our research is the architectural and spatial characteristics of the comfort of a residential apartment. The analysis of scientific research in the field of psycho-design and socio-design indicates the stratification of human personality types into 4 types, which realize all their vital functions in the "field of life". Another area of research focuses on finding the most integrated characteristics of the interior of the living space. These characteristics include size, shape, color, and details.

The main research method is the construction of a two-component matrix, with the help of which it is possible to determine the relationships between the components of the interior of the dwelling and the level of comfort for its residents. As a result of the analysis and evaluation of the concept of interaction of socio-psychological features of character and the corresponding architectural and spatial characteristics of comfort depending on the type of personality, practical recommendations have been formulated that can be applied in the process of pre-project analysis and at the stage of creating architectural and planning decisions of apartments and creating interior design. Experimental verification of the results obtained in the process of creating the interior design of several residential apartments in Ivano-Frankivsk shows that the level of comfort of residential apartments where the algorithms of this study were applied is significantly higher than in architectural and planning decisions where this methodology was not used.

**Keywords:** interior design, socio-psychological comfort of housing, characteristics of the living field, apartment buildings, comfort of residential apartment, parameters of housing comfort.

**Introduction.** During the quarantine period most people need to stay at home for a long time and adapt the space of the apartment to the various needs of the life cycle. Along with the change of social communications and psychological resilience, the problems of comfort and realization of all vital functions in the living space of the apartment become a priority [1]. During a constant stay in a small room, the problem of inconsistency of interior and planning decisions of housing to the needs of an individual or family is felt very acutely and has a negative impact on the "psychological climate" [2]. As a result, a number of publications in architecture and design 2019-2021 are devoted to solving the problems of psychodesign [3-4] – providing a comfortable living environment in accordance with the social, economic and psychological characteristics of a particular person or group of people and their consideration of design decisions. Scientists point to significant differences in the comfort of housing for people of different nationalities and cultures as a result of the evolution of geometric, stylistic, volumetric-spatial and functional features of different regions of the world [5-7].

**The main purpose of this article** is to study the relationship between the architectural characteristics of comfort in the interior of a residential apartment and the residents' personality types.

**Analysis of recent research.** In the context of this study, an important field is a comprehensive analysis of the functional features of housing and assessment of the interaction of architectural-planning, volumetric-spatial and color features, interior design of a residential apartment with the most stable socio-psychological characteristics. Such characteristics include the type of personality, as the most stable innate psychological structure of man, which regulates human thinking and behavior (Freudenstein et al., 2019). Despite the many approaches to the interpretation and study of personality types and human archetype, the results of researchers from Northwestern University in Illinois, USA are used in this study (Gerlach et al., 2018). As a result of a survey of 1.5 million people, scientists have identified that depending on the level of influence on the behavior of certain human characteristics, there are 4 types of personality: changeable, leader, egocentric and closed (Figure 1).

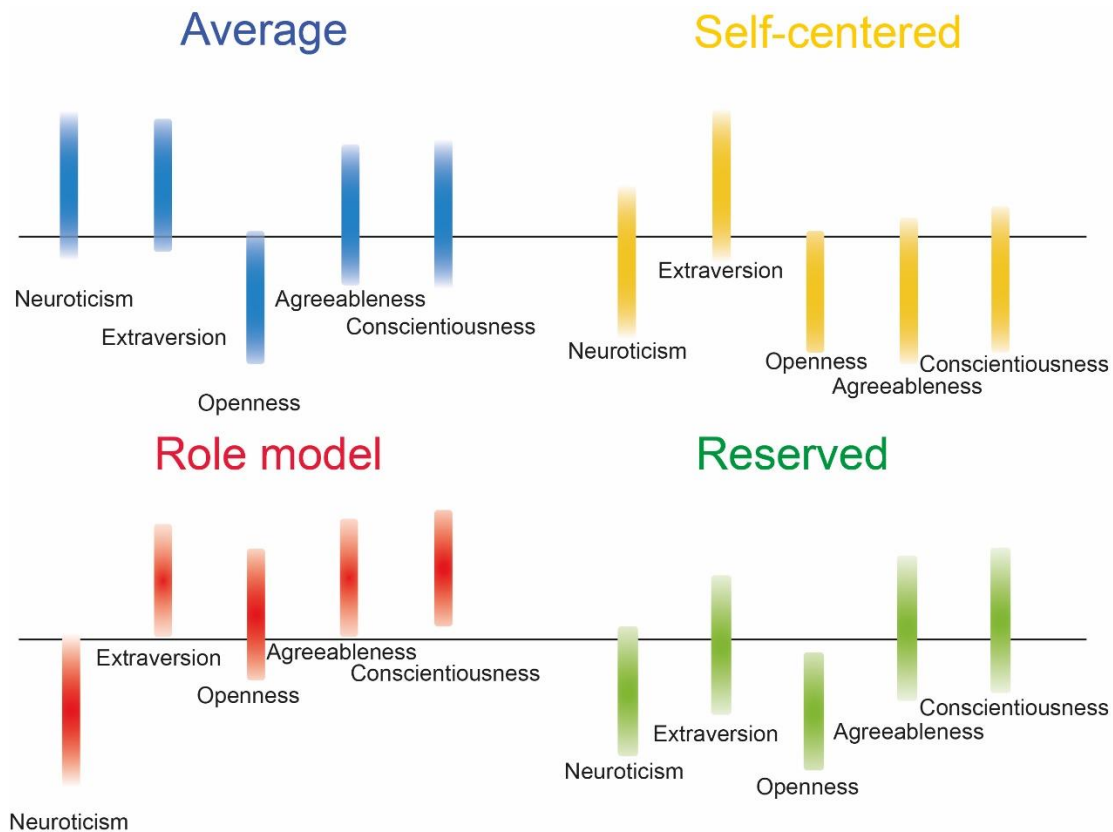


Fig. 1. Types of personality (source: Gerlach et al., 2019)

Scientists agree that "housing is the lowest level of living environment, where in one way or another all aspects of human life are realized" [8]. Graham L.T. in his research introduces the concept of the life field – the main functional components of life that are inherent in each individual [9]. This term, in contrast to vital functions, covers human behavior in the environment and allows to use these provisions for architectural research more fully. Based on data from studies of architectural sociology and psychology [10-12] Graham L.T. empirically analyzes the realization of the living field in some residential buildings in the USA and identifies a number of key components of the human living field – recreation, activity, intimacy, values, social ties, preferences (Figure 2).

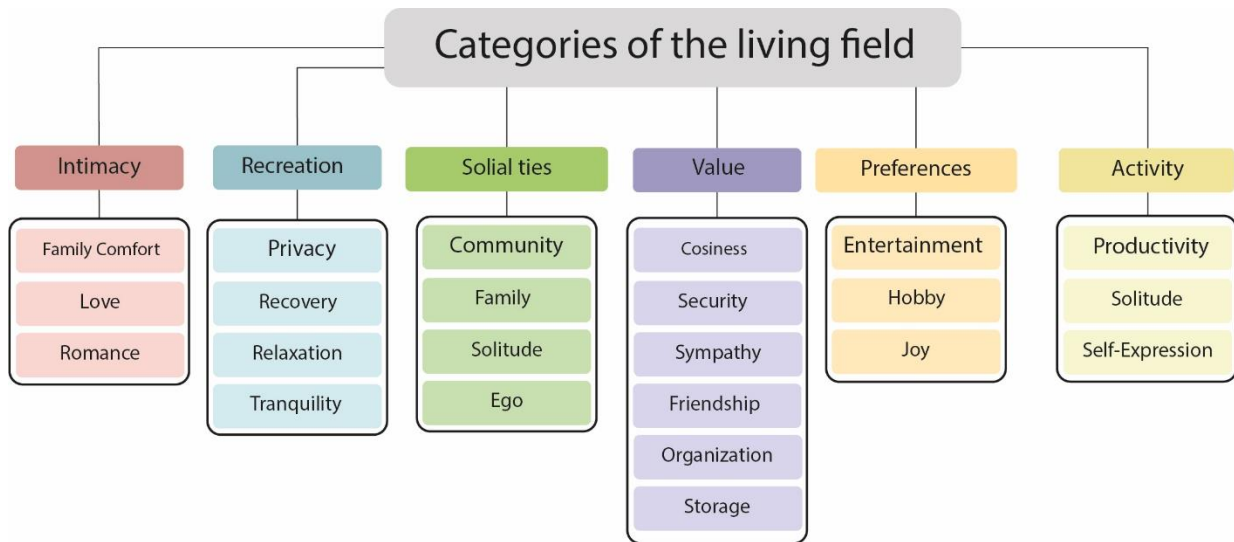


Fig. 2. Categories of the living field (source: Graham et al.,2015)

Undoubtedly, each person’s manifestation of these elements of the life field has different levels of priority, depending on lifestyle, life experience, etc. It has an impact on interior design and the formation of common features of housing, which can form a mental image of the owner (so-called informal types of "bachelor apartments", "retirement apartments", "workers’ apartments", etc.) [13, 14]. Based on the results of research of L.T. Graham and others, an interpreted scheme of implementation of the components of the living field in different types of apartments in multi-storey residential buildings in Ukraine is formed (Figure 3).



Fig. 3. Implementation of components of the living field in apartment buildings (source: compiled by the Author)

This analysis is based on typical planning decisions of residential apartments. The recommended area for apartments according to the State Building Codes of Ukraine is taken as the normative area of the sample:

- apartments with 1 living space (bedroom) – 35-40 m<sup>2</sup>;
- two-room apartments – 48-58 m<sup>2</sup>;
- three-room apartments – 65-70 m<sup>2</sup>.

In contrast to individual residential buildings, where most of the premises have a priority function, in multi-apartment residential buildings, due to lack of space, multifunctional use of rooms is by zoning space. With the increase of the number of living rooms, this multi-component of the living field is preserved, but there is a priority of 1-2 vital functions. It should also be understood that the concept of a private backyard of individual houses, which function as areas of recreation and social ties, in the apartments of apartment buildings are leveled, and their implementation is concentrated in other rooms or adjacent areas. This model demonstrates the typical implementation of the components of the living space in different rooms and may differ depending on the number and age of family members, their employment, as well as the characteristics of apartments: area, number of rooms, insulation, orientation and planning.

1. Characteristics of elements of socio-psychological comfort of a residential apartment.

Scientific models that describe the social aspects of interior design have a two-component structure, which combines the characteristics of human life and architectural and functional features of the studied space. In this study the socio-psychological characteristics of the residents of the apartment are represented by the most universal characteristics – the archetype of personality (1). Characteristics of the archetype of inhabitants (1.1) allows us to identify the most stable signs of comfort for different personality types. Functional features of the behavior of residents in the interior of a residential apartment are analyzed through the system of living space, or psycho-functional use of space (2) and its characteristics (2.1). At the same time, the analysis is based on the most integrated architectural and spatial characteristics of the room, the choice and change of which affect the comfort of residents (Figure 4).

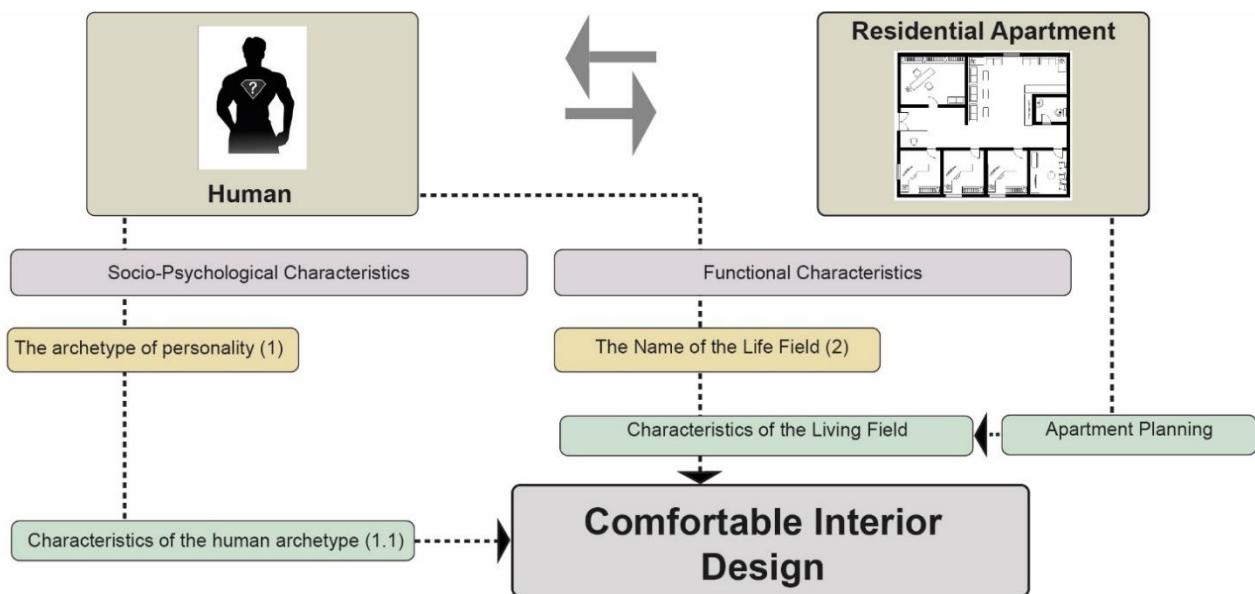


Fig. 4. The general model of providing comfort in the interior of a residential apartment (source: Author)

The main method of research is the analysis and evaluation of a two-component matrix, which can clearly represent the relationships that exist between personality types and design elements of a residential apartment. Theoretical studies by N. Ghosh, S. Castell and others are devoted to the study of the most common features that describe the architectural space of the room [15, 16]. Various authors identify from 4 to 7 basic architectural elements of interior design, such as space, line, shape, light, color, texture and pattern. In this study a 4-component structure of interior features was used, namely: *size, shape, detail and color*.

Size – indicators of 3-dimensional space, describing the physical dimensions of the room. In this case, using derivatives of interior design (such as light or color), you can visually change the size of the space at constant actual dimensions. Derivatives of size are the concept of scale or "space of the room" [17].

Form – the physical parameters of the room and all the elements in it. Hussein M. F. in his research singles out form as one of the primary links in the perception of the interior, where the line serves as a derivative of the means of creating form [18]. It is the form that has the most common features that characterize both the whole space as a whole and its individual elements. Light is an important secondary element that changes the visual characteristics of the space depending on the designer's idea. However, light is not an integral characteristic of the formation of space, but only provides the expressiveness of the perception of other elements [19].

Detail – the presence of elements or groups of interior elements, their mutual location, as well as physical properties that complement the complex concept of interior design. Some authors also include texture and patterns as elements of the study of the interior. However, texture and pattern are characteristics of the tactility of the surface and the visual perception that describes the details or the whole space.

The most studied element that provides comfort to the interior of any room is color. The issues of color perception and optimal color solutions in different areas of the home are described in detail, both from the point of research concerning the design of the environment and the person and the impact of color on his mood and comfort. Thus, Gao X.-P. Kuller R., Ballal S. and others in the study of cross-cultural perception of color prove the extreme importance of room color in the process of human recovery [20, 21]. Also, color along with light has a crucial role in creating an atmosphere of intimacy and in the process of work or relaxation. Derivative elements of color are tone and gamma, the right combination of which enhances or weakens the visual perception of space or individual elements.

The priority of the characteristics of the living field is indirectly covered in a number of scientific papers concerning the study of various functional areas of residential apartments. The physical size of the room, in contrast to persistent stereotypes, can not only positively but also negatively affect the comfort of being indoors. The relationship between the size and function of the apartment is indisputable, although these figures may vary depending on the cultural characteristics of the residents, their marital status, the number of people or their level of well-being.

Detail is a sign of style in addition to the general proportions of elements in interior design. It is thanks to the details that it is possible to convey the client's mental priorities, to recreate his zone of psychological comfort in a residential apartment [22, 23]. J. Hijazi in his article substantiates the paramount importance of details in the rooms where a person's social ties with family members or other people, as well as areas of the apartment that are used for professional activities. Based on the analysis of research data, the hierarchy of living field characteristics (2.1) in accordance with the functional features of the rooms in a residential apartment is highlighted [24].

## 2. A model of comfortable interior for different human personality types.

Characterizing human personality types, scientists point to the interrelationships of different resilience that arise between personality types and the realization of their vital functions (life field). The hierarchical structure of the characteristics of the archetype [25] (1.1) and the characteristics of the living field (2.1), which are selected from the field of scientific research provided a more complete justification of architectural methods of comfort in the design of a residential apartment. Qualitative assessment of these connections is interpreted on the principle of possibility of application in interior design: where N – connection is not present, Y – connection is, W – connection is weak, M – connection is average, E – connection is significant, U – connection should be used when creating interior design (Figure 5).

The universality of this matrix is provided by the possibility of double analysis. The analysis of the elements of the living field (2) and the hierarchy of their characteristics to ensure the comfort of the apartment (the so-called "priority of rows"). As a result, architectural techniques have been identified, the use of which provides comfort to residents (3), (Table 1).

	The Archetype of Personality (1)	Average					Self-Centered					Role model					Reserved					Methods of providing comfort in the rooms and areas of the apartment (3)
The Name of The Life Field (2)	Characteristics of The Archetype (1.1)	Neuroticism	Extraversion	Honesty	Agreeableness	Openness	Extraversion	Neuroticism	Honesty	Agreeableness	Openness	Honesty	Agreeableness	Extraversion	Openness	Neuroticism	Honesty	Agreeableness	Extraversion	Neuroticism	Openness	
Intimacy	Size																					
	Color																					
	Detail			<b>M</b>					<b>Y</b>					<b>N</b>							<b>M</b>	
	Shape																					
Recreation	Color																					
	Size																					
	Shape			<b>U</b>										<b>W</b>							<b>E</b>	
	Detail																					
Social ties	Size																					
	Detail																					
	Color			<b>N</b>										<b>M</b>							<b>Y</b>	
	Shape																					
Values	Detail																					
	Size																					
	Shape			<b>Y</b>						<b>U</b>				<b>E</b>							<b>W</b>	
	Color																					
Preferences	Shape																					
	Color																					
	Size			<b>E</b>						<b>E</b>				<b>Y</b>							<b>U</b>	
	Detail																					
Activity	Shape																					
	Size																					
	Color			<b>W</b>						<b>W</b>				<b>U</b>							<b>N</b>	
	Detail																					
Architectural features of creating a comfortable design of a residential apartment in accordance with the archetype of the resident (4)																						

Fig. 5. The matrix of comfort of a residential apartment depending on the functional zoning and personality type of residents (source: Author)

Table 1 – Architectural methods of creating comfort in the functional areas of a residential apartment (source: Author)

Number	The name of the life field (2)	Room where this aspect of the living field is realized	Architectural techniques to ensure comfort in the interior of a residential apartment
3.1	Intimacy	Bedroom, bathrooms (partly)	A priority importance in ensuring the intimacy of living spaces has the size and proportions of the elements in it. The choice of the size of the elements and the overall color scheme of these rooms provide a feeling of comfort.
3.2	Recreation	Living room, bedroom, dining room, bathroom	To ensure comfort in the recreation areas, the designer should pay special attention to the choice of colors; depending on the size of the room it needs to be visually balanced with the needs of the resident; details and shape of elements are of secondary importance.

3.3	Social ties	Kitchen, living room, entrance area	The area of social ties belongs to the category of representative zones, where the designer's attention should be paid to the size of the elements and details. It is the choice of details, their accent or nuanced meaning provides a sense of comfort in these areas.
3.4	Values	Entrance area, dressing room, living room (partly), bedroom (partly)	In rooms where the category of "values" is implemented, the details and visual size of the room are a priority. Details such as paintings, family photos or a place for souvenirs are important in these areas. The comfortable design of these zones is provided by placement of small elements of the organization of space around these elements.
3.5	Preferences	Dining room, living room, hall	The implementation of the "preference" function is concentrated in all rooms of the apartment. Shape and color are a priority to ensure the realization of comfort in these areas. Bright colors and unusual shapes of elements can be used in residential areas where this aspect of the living field is implemented. Given the priority functions of the room, such as the kitchen, the category of "preference" has a fragmentary implementation, respectively, the elements can be transformed or modular, which will ensure the variability of their use in the rooms.
3.6	Activity	Dining room (partly), living room, loggia, work area (in any living room)	The peculiarity of the implementation of this aspect of the living field (2) in the apartments is the concentration of this function in the separate zones of the bedroom, dining room, etc. The change in the functional priorities of human activities during the quarantine period indicates the need for actual or visual increase in these work areas. The characteristics of size and shape are the primary criteria when working with the interior design of the office area, meditation areas or solitude.

Highlighted architectural techniques allow the designer at the stage of pre-design analysis and zoning of the space, primarily to operate with those architectural characteristics of the room, the implementation of which has the greatest weight on the feeling of comfort.

At the next stage of the study an assessment of the socio-psychological characteristics of the potential resident of the apartment (1.1) and the functional use of space by him (2) (assessment with "priority of columns") is conducted.

This variant of the assessment allowed to highlight the architectural features of creating a comfortable design of a residential apartment in accordance with the type of personality of the occupant (4) (Table 2).

The obtained evaluation results are an example of the so-called cliché "apartment of a person of variable personality type" or "apartment of a person of egocentric type of personality") and others. Undoubtedly, these results cannot cover all many aspects of comfortable design for an individual, because in addition to socio-psychological characteristics, the formation of mental characteristics of comfort is also influenced by social characteristics (employment, marital status, age, religion, traditions, etc.).

Table 2 – Architectural features of creating a comfortable apartment design in accordance with the archetype of the resident (source: Author)

Number	The name of the archetype of the apartment owner	Recommendations for ensuring comfort in the interior
4.1	"Changeable"	The restoration of the function of recovery and implementation of lifestyle is the most important for this type of personality. Particular attention should be paid to the design of the living room, kitchen and bathroom. The customer's preference for the color and shape of the interior elements should be emphasized. The colors in the design of the rooms should not be bright. You need to maximize the customer's preferences in style decisions. Details in the interiors of the owners' apartments who have a changeable archetype of personality are of secondary importance.
4.2	"Egocentric"	Developing the interior design for this type of personality of the inhabitants, the owner's wishes should be taken into account in relation to all the characteristics of the living field: details, color, size and shape of the room and its elements (2.1). The priority is a dim range of warm colors with contrasting accents in the details. The most priority areas of the apartments of the owners of the egocentric type of personality are the entrance area, halls of any type, as well as the living room and dining room. The design of apartments for people with this type of personality should provide additional storage space, built-in closets and wardrobes.
4.3	"Leader"	For apartments of people with this type of personality, the comfort of the interior is provided by the size, shape and details of the rooms. The choice of color is not a priority, which allows you to make interesting decisions and combinations in the interior of the apartment. An important place in the apartments of residents with the type "Leader" is played by the office area, recreation area in the living room, as well as a representative area of the hall or entrance area. Clients are ready to make any non-standard and interesting decisions in planning and design of space.
4.4	"Closed"	Every piece of space should be studied in detail in the interior design of an apartment for people with this type of personality. Priority is given to all rooms where you can organize recreation, hobby, family entertainment and more. The designer should pay special attention to the color, shape and size of the space. Details are of secondary importance, so you should use such interior details that will be in the same style with the overall concept of the room.

**Research results.** Having studied the relationships that exist between the socio-psychological characteristics of a person and their implementation in the interior, a number of techniques and recommendations have been identified, the implementation of which should increase the level of comfort of residential apartments. In the process of practical activity of Antonov Design Studio, Ivano-Frankivsk, on the example of several real interior design projects, an experiment was conducted using techniques and features of comfortable design according to the archetype of the resident (Figure 6-9).



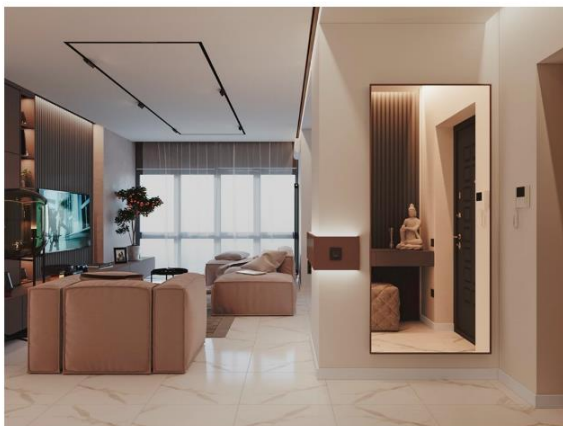
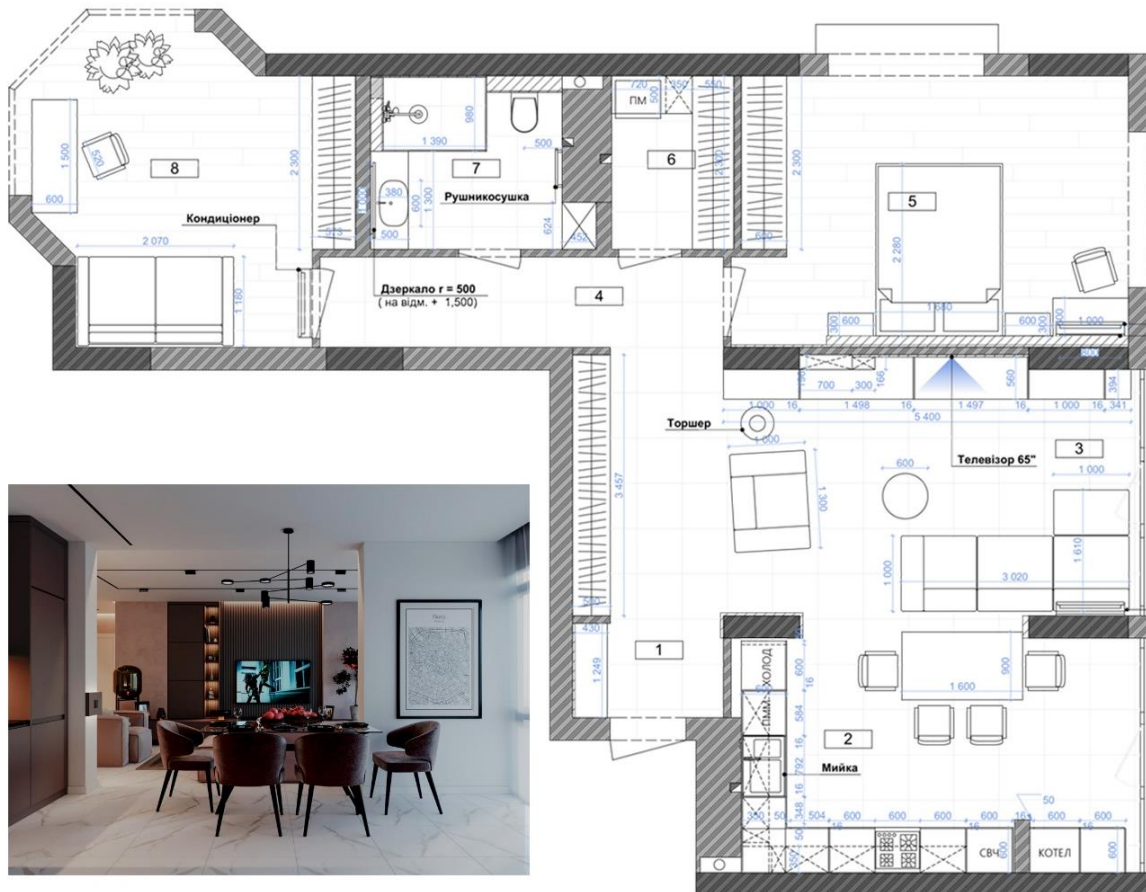


Fig. 6. Project 1. Design of a residential apartment using the analysis of socio-psychological comfort of the resident, Residential Complex Hydropark, Ivano-Frankivsk, 2021, designer Antonov Design

Project 1 defines that the client has a personality type "Leader", respectively, using the matrix of socio-psychological comfort in interior design, the main emphasis was on clear zoning, creating multifunctional spaces in each living area, the use of contract elements and multi-textured surfaces. Warm colors and hidden light provide comfort in the living room and bedroom. At the same time in the kitchen the effect of flowing to the "cold" color scheme is used.



Fig. 7. Project 2. Design of a residential apartment using the analysis of socio-psychological comfort of the resident, Residential Complex Hydropark, Ivano-Frankivsk, 2021, designer Antonov Design

In the process of developing a project of a residential apartment 2, it was determined that the owner of the apartment has a "closed" personality type. In accordance with the matrix of socio-psychological comfort and methods of providing comfort for residents with this type of character, a design project was created, which preserves the planning structure of individual rooms. According to the recommendation for a comfortable interior (Table 2), the designers focused on the color scheme of the entire apartment, which is selected on the basis of brown and white, as well as vertical articulation of elements that allows to visually increase the height of closed rooms. Minimalist furniture design provides focus on individual accent elements (chairs, lamps). Details in this project are of secondary importance, therefore, the primary aspect of creating the comfort of this interior was to create the functionality of all elements.



Fig. 8. Project 3. Design of a residential apartment using the analysis of socio-psychological comfort of the resident, Residential Complex Hydropark Christmassy, Ivano-Frankivsk, 2021, designer Antonov Design

In project 3, the customer had a clear "egocentric" personality type, as evidenced by the results of the survey. Designers from Antonov design, in accordance with the matrix of socio-psychological comfort, focused on the formation of zones that provide a living field of "values" (Figure 5). With the small size of the apartment, the designers managed to place 2 dressing rooms and several built-in closets for storing things. The field of "hobbies" is realized by creating an open kitchen-studio where the whole family can spend free time and communicate.



Fig. 9. Project 4. Design of a residential apartment using the analysis of socio-psychological comfort of the resident, Yarkovytsya-4, Kalush, 2021, designer Antonov Design

Project 4 is a smart apartment with an area of 48 sq. m. The homeowner has a "closed" personality type. In the design decision designers created a multifunctional kitchen-living area, made color accents in the furniture and cladding of individual parts of the rooms. All design decisions of the rooms are made in a single style. Visual enlargement of the space is provided by light colors of the walls, "shadow seams" and large tactile panels are used in the surface texture.

At the stage of communication with apartment owners, designer Bohdan Antonov asked clients to pass a short survey to determine the type of personality. The questionnaire of Gerlach, M. and others, which they used in their own research, was used. After studying the results of the survey and determining the client's archetype, the designers used a matrix of socio-psychological comfort of a residential apartment while working on apartment design solutions (Figure 5). After developing the design solution and completing the formal creative part of the work, a second survey of clients who participated in the experiment was conducted (Table 3).

Table 3 – Questionnaire to ensure comfort in the design solutions of this apartment

№	Question	Answer		
		"Yes"	"I cannot answer"	"No"
1	Is this design solution comfortable for you?			
2	Does this design solution reflect the full range of your life functions?			
3	Is the size of all the elements in this design solution comfortable for you?			
4	Is the color of all the elements in this design solution comfortable for you?			
5	Are all the details of this design solution comfortable for you?			

The evaluation of the answers was as follows: "Yes" – 1 points, "I cannot answer" – 0.5 points, "No" – 0 points.

The method of questionnaires determined the generalized level of comfort of the design solution of residential apartments where the matrix of socio-psychological comfort was used before and without it. For interior design projects where the method of determining the socio-psychological personality type was used, the average level of comfort was 98.5%, and in design decisions developed according to the classical scheme, the level of overall comfort according to the survey is 94.5%.

**Conclusions.** Summing up the study of the influence of socio-psychological aspects of personality on the peculiarities of the formation of a comfortable living environment, we can conclude that there are relationships between character features and signs of comfort for everyone. Based on interdisciplinary research in the areas of socio-design, psycho-design and architecture of the interior environment, macro-elements of the interior of the living space have been identified, which provide the comfort of living space. At the same time, studies of the interior of a residential apartment from the point of the characteristics of the psychology of the resident, indicate the need to use the phenomenon of "life field", a category that more fully conveys the functional content of space and behavior. As a result of the analysis of the components of the living field, the most common architectural features of comfort were identified, namely: size, color, shape and detail.

The author's concept of the interaction of socio-psychological features of character and the corresponding architectural and spatial features of comfort, depending on the type of personality, we indicate a set of recommendations and techniques that can be used in pre-project analysis and implementation of interior design. Thus, after assessing the priorities of the field of life in accordance with the archetype of personality, the architectural features of comfortable design for 4 archetypes of residents were formed: changeable, egocentric, leader, closed. Another field of the analysis focused on finding ways to ensure comfort in the rooms and areas of the apartment. Such techniques are the priority of the size of the elements and the overall color scheme in the rooms where the "intimacy" is realized as a component of the living field. For the living room, dining room and bathroom, where the component of the living field "preferences" is realized, details are of secondary importance, but the designer should pay attention to the shape of the elements and their color.

These techniques are universal, and the hierarchy of characteristics of the living field is effective at all levels of implementation of housing design. The practical effectiveness of these techniques is confirmed by checking the results obtained during the practical activities of the designer. Using the matrix of socio-psychological comfort and conducting a preliminary analysis of the personality type of residents, the designers used the recommendations of this study and formed interior solutions according to them. After the formal part of the design, a survey of apartment owners was conducted, which shows that in all 4 studied cases the level of comfort in the interior design of a residential apartment for each resident is much higher than in design solutions where this algorithm was not used.

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## ДОСЛІДЖЕННЯ ХАРАКТЕРИСТИК КОМФОРТУ ІНТЕР'ЄРУ БАГАТОКВАРТИРНИХ ЖИТЛОВИХ БУДИНКІВ ДЛЯ РІЗНИХ ТИПІВ ОСОБИСТОСТІ

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**Анотація.** Під час періоду карантинних обмежень, а пізніше повномасштабного вторгнення росії на територію України загострили проблеми, що пов'язані зі зміною місця проживання, відповідно зміни рівня соціальних комунікацій, проблем комфорту та реалізації всіх життєвих функцій у житловому просторі квартир житлових будинків. Основною метою статті є вивчення зв'язку між архітектурними характеристиками комфорту в інтер'єрі житлової квартири та типами особистості мешканців. Предметом нашого дослідження є архітектурно-просторові характеристики комфорту житлової квартири. Аналіз наукових досліджень у галузі психодизайну та соціодизайну вказує на стратифікацію типів людської особистості на 4 типи, які реалізують всі свої життєві функції в "полі життя". Інша сфера досліджень зосереджена на знаходженні найбільш інтегрованих характеристик інтер'єру житлового простору. До таких характеристик належать розмір, форма, колір і деталі.

Основним методом дослідження є побудова двокомпонентної матриці, за допомогою якої можна визначити зв'язки між компонентами інтер'єру житла та рівнем комфорту для його мешканців. В результаті аналізу та оцінки концепції взаємодії соціопсихологічних особливостей характеру та відповідних архітектурно-просторових характеристик комфорту в залежності від типу особистості сформовані практичні рекомендації, які можна застосувати в процесі передпроектного аналізу та на етапі створення архітектурно-планувальних рішень квартир та створенні дизайну інтер'єру. Експериментально перевіривши отримані результати в процесі створення дизайну інтер'єрів кількох житлових квартир м. Івано-Франківська демонструє, що рівень комфорту житлових квартир де застосовувались алгоритми даного дослідження є значно вищим, ніж у архітектурно-планувальних рішеннях, де дана методика не використовувалась.

**Ключові слова:** дизайн інтер'єру, соціопсихологічний комфорт житла, характеристики житлового середовища, комфорт житла, параметри житлового комфорту.

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