

RESEARCH ARTICLE

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INFLUENCE OF COLOR SOLUTIONS ON THE PERCEPTION OF SPACE IN RESIDENTIAL INTERIORS

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Abstract

Color solutions should be taken into account in interior design because they have a direct impact on the visual, and emotional perception of space. In this regard, the main goal is to study how different color palettes and their combinations affect the perception of the size, shape, and functionality of premises. The methodology included a comprehensive analysis of publications, recommendations, and practical examples demonstrating the influence of color on the perception of rooms. Experiments were also conducted on the use of various color solutions in simulated interiors, which allowed us to identify the most effective approaches to creating a harmonious design.

The results showed that warm shades such as red, orange, and yellow visually “warm” the space, creating a cozy atmosphere and reducing the feeling of coldness, while cool colors such as blue, green, and purple expand the space, adding a feeling of freshness and coolness. Light shades can visually increase the area of the room, making it spacious, while dark colors add depth, and accentuate certain areas of the interior. In addition, the correct use of contrasting, complementary color combinations helps to zone the space, creating visual divisions without the need for physical partitions. The conclusions emphasize the importance of choosing a color palette that can not only emphasize the stylistic orientation but also influence the perception of volume and light in a residential area.

Keywords Color solutions, interior design, perception of space, color palette, visual effects, zoning, interior.

INTRODUCTION

Color schemes in interior design are a factor that influences the perception of space in residential areas. Color can shape not only the overall mood and style of an interior but also visually alter its dimensions and proportions. A thoughtful approach to color selection highlights specific architectural features, adjusts the perception of volume, and creates a sense of coziness and comfort. Modern research in psychology and design confirms that colors can affect a person’s emotional state, making them an essential element in planning residential spaces.

The relevance of this study is driven by the need to create functional and aesthetically pleasing residential interiors. In the context of limited space in urban apartments and the growing demand for personalized design solutions, color strategies used in interior design play a crucial role. Skillful use of color palettes allows for the visual expansion of small spaces, emphasizes specific areas, and lends uniqueness and completeness to an interior. When space optimization and the creation of a harmonious environment are priority tasks for designers and architects, understanding

the mechanisms of color perception becomes especially significant.

The objective is to determine how various color solutions influence the perception of space in residential interiors, as well as which strategies are most effective in creating a comfortable, functional design.

The hypothesis is that colors affect the visual and emotional perception of space in residential interiors, altering its size, shape, and atmosphere. Selecting a color palette allows for a combination of stylistic elements in the interior, creating visually comfortable and harmonious spaces.

Research tasks:

1. Study how color palettes and their coherence impact the size, shape, and characteristics of rooms.
2. Analyze scientific publications, professional recommendations, and practical examples demonstrating the effect of color on spatial perception.
3. Identify zoning principles through color schemes that enable visual separation of spaces without physical partitions.
4. Assess the impact of different color schemes on the perception of residential interiors, considering the psychological effects of color on emotional states.

METHODS

The human eye perceives color through the function of specialized receptors—cones—that are sensitive to different wavelengths of light. These receptors allow for color differentiation and response to intensity and brightness [4]. Stepkina A.V. considers interior design as a field with broad boundaries, encompassing a significant array of techniques for creating harmonious spaces within homes or apartments. A crucial aspect of interior finishing is the proper color scheme, which can be

either uniform or varied. A high level of taste and professionalism is evident when all rooms are styled cohesively, often in a similar palette [1].

From the perspective of visual and emotional perception, color is the most critical of the elements mentioned. It sets the overall mood of the interior, highlights its style, and helps to focus attention on volumes, shapes, and elements within the space.

Kortkov V.V. notes that, scientifically, "color is a rather subjective concept, as it results from human perception of light waves of different lengths hitting the retina. Light waves, in turn, are part of electromagnetic radiation. Interestingly, the waves themselves are not colored; colors, essentially, are created in our minds" [2]. Furthering this idea, Mironchuk E.V. and Ustinova E.D. [5] analyze color as a means of expression, noting its role in shaping the unique look of modern interiors.

Colors are divided into three primary categories:

- Primary: red, blue, and yellow. These colors cannot be obtained by mixing other colors.
- Secondary: orange, violet, and green, created by mixing primary colors.
- Tertiary: six shades that result from mixing primary and secondary colors.

The first step is to select a main color as the base for the interior palette, which is complemented by two or three additional colors [3].

Harmony in the interior is achieved not only by selecting a primary color but also by adding accents. Accent colors are bright and contrasting, allowing for the highlighting of specific areas in a room and directing attention to particular elements. For instance, using contrasting colors in furniture or on walls helps break monotony and introduces dynamism to the interior.

However, balance must be maintained, as an excess of bright or contrasting elements can

overwhelm the interior and strain the eye. Harmonious color schemes based on combinations of shades within the same spectrum or neutral colors with vibrant accents create aesthetically pleasing and comfortable interiors.

Color schemes are sets of colors that can harmoniously complement each other, as illustrated in Figure 1.

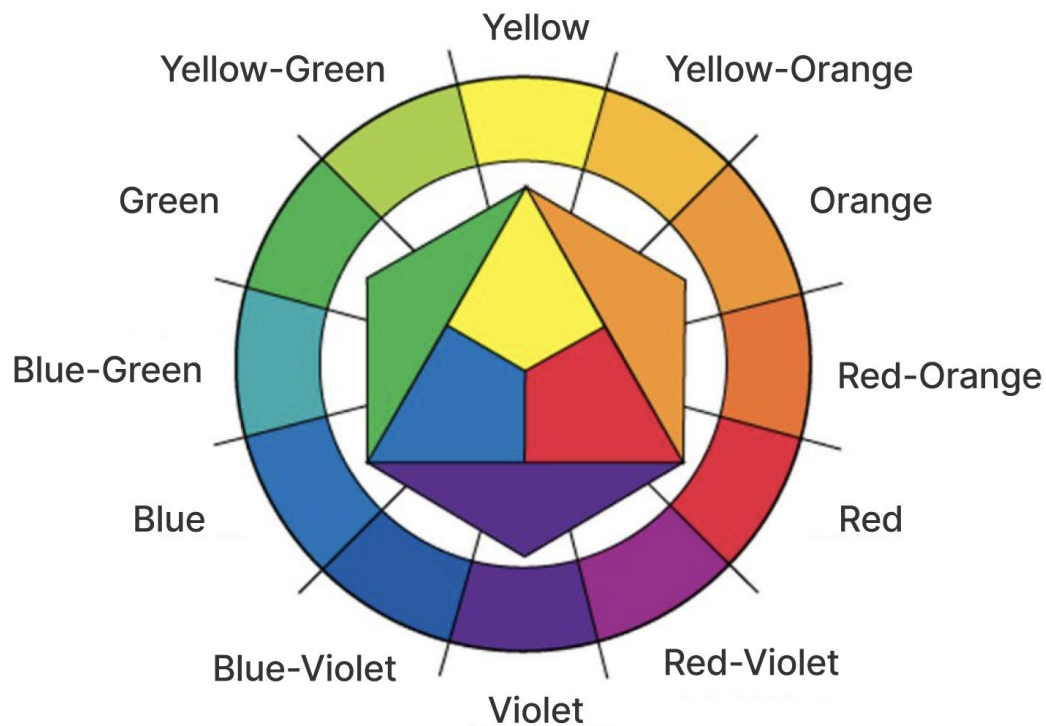


Fig.1. Color scheme [8].

Subsequently, color sets are created based on the color wheel, which serves as a tool for selecting optimal color solutions for various purposes.

- Complementary colors are positioned opposite each other on the color wheel. Examples include red-green and blue-orange. These colors have high contrast and are often used to create vivid, memorable accents.

- Analogous colors are located next to each other on the color wheel. For example: blue, blue-green, and green. These combinations allow for soft, harmonious color solutions, ideally suited for calm, comfortable interiors.

- Triadic colors are evenly spaced across the color scheme. Examples: red, blue, and yellow. They

create bright, balanced compositions.

- Split-complementary colors represent a variation of the complementary scheme, using one main color and two adjacent colors to its complement. This approach softens the contrast and creates a balanced combination.

The psychological influence of color must also be considered in the perception of visual objects. For example:

- Warm colors (red, orange, yellow) are associated with energy, activity, and warmth. They evoke a sense of closeness and comfort but can cause feelings of anxiety when overused.

- Cool colors (blue, green, violet) are, in contrast, associated with calmness and tranquility. They

relax, creating a sense of spaciousness [4].

Thus, creating a harmonious interior requires not only the proper selection of colors but also a deep understanding of their effects on the psycho-emotional state. It is essential to maintain a balance between accents and the overall color scheme, avoiding overload and dissonance, which is a key factor in interior design.

RESULTS AND DISCUSSION

In practice, the choice of color palette in residential interiors often depends on the objectives set by the designer. For instance, in small urban apartments, a minimalist color scheme with predominantly light shades is commonly used to create the illusion of a larger space. Mirrored surfaces and glass elements are frequently employed to enhance this effect.

The careful selection of color combinations allows for the achievement of not only aesthetic balance but also the resolution of complex spatial modeling tasks. This section examines examples of professional-level color applications, with a focus on a detailed approach to organizing residential spaces [5].

The active use of color accents on vertical surfaces,

such as walls or doors, contributes to altering the perception of room height. Vertical stripes and bright elements emphasize ceiling height, while horizontal lines "stretch" the space in width. This technique is widely applied in interiors with limited space, where maintaining a sense of volume is essential.

The role of lighting in the perception of color schemes cannot be overlooked. Natural and artificial light interact differently with colors, altering their saturation. Natural daylight gives colors a more authentic, muted shade, whereas artificial lighting can increase brightness or make colors appear cooler or warmer, depending on the light's temperature. This must be taken into account when selecting colors for residential spaces, where a balance between light and color should create a comfortable atmosphere.

For smaller spaces, light pastel shades combined with soft, diffused lighting are recommended to visually enlarge the space. In larger rooms, by contrast, there is the opportunity to experiment with deeper, richer colors, such as dark blue, burgundy, or emerald, adding a sense of coziness to the interior [5]. Figure 2 below illustrates the influence of colors on room perception.

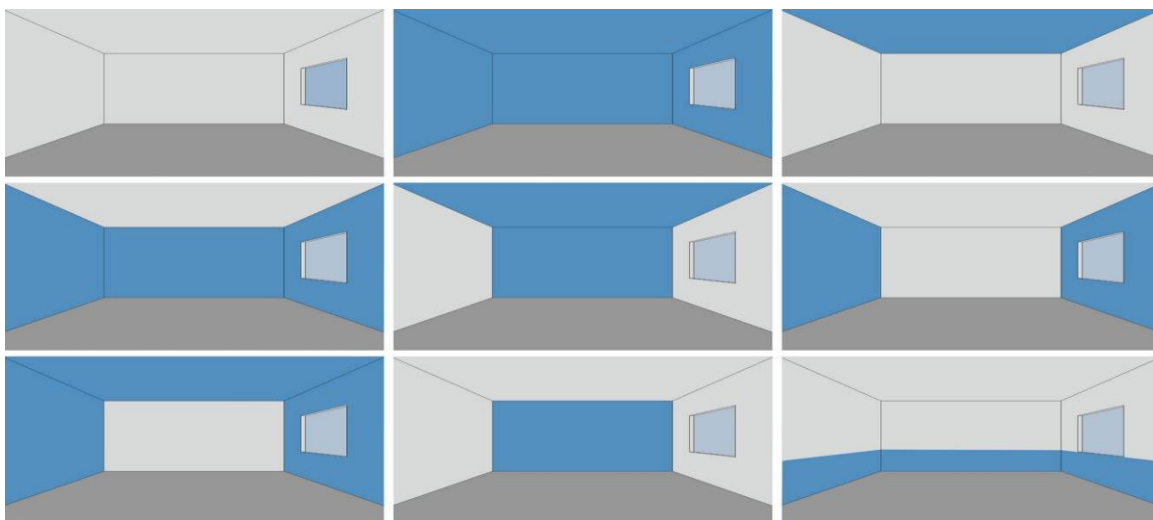


Fig.2. The influence of colors on the perception of a room [4].

Figure 2 illustrates various ways of applying color to alter the visual perception of a room's dimensions and proportions. For example, painting a single wall creates a focal point while maintaining openness, whereas painting three walls in color reduces the space, making it feel more intimate. Painting the side walls broadens the room visually while emphasizing the back wall extends its length. Half-wall painting around the perimeter adds structure, creating a "belt" effect, and using color on just one part of the wall helps to zone the space.

These examples demonstrate how different color

approaches can shape the atmosphere of a room by altering its proportions and focal points. In other words, combining various colors is an effective way to divide space into zones: to separate the kitchen from the living room, highlight a work area, or designate a relaxation space. Simply painting walls in different colors or shades can create the visual effect of distinct rooms. This method can also solve decor challenges creatively; in cases of active color zoning, additional accessories may become unnecessary—offering a cost-saving advantage. Figure 3 below provides an example of room division through the use of different colors.



Fig.3. An example of dividing a room due to different colors [6].

Not only the walls but also the floor can be in different colors within a room. Using various flooring materials (or the same material in

different shades) easily delineates zones within an apartment. This type of color zoning is particularly relevant for studio apartments, as demonstrated in Figure 4.



Fig.4. An example of color zoning for apartments with studio layout [9].

To adjust room proportions, light colors should be used. However, the trend of all-light interiors has nearly passed—now, rich, deep tones are in fashion.

Thus, it is important to note that color psychology plays a significant role in creating a comfortable atmosphere in residential interiors. Each space should correspond to its functional purpose, with the color palette selected based on the room's intended activities. For example, warm shades like orange or yellow stimulate appetite and create a cozy feeling, making them commonly used in dining rooms and kitchens.

Bedrooms, in contrast, benefit from more calming, relaxing colors. Shades of green and blue help reduce tension, supporting restful sleep. These colors also positively affect sleep quality, making them ideal for relaxation spaces.

In office areas and study rooms, neutral tones such

as gray, beige, or white are preferable. These colors minimize distractions, helping with concentration and creating a calm atmosphere.

However, some limitations must be considered when using color schemes to organize residential spaces. These limitations are influenced by several factors:

1. Excessive use of bright, saturated colors. Bright accents can visually "overpaint" the space, creating visual noise that leads to fatigue and reduces comfort.
2. Improper combination of warm and cool shades. For example, colors like red, orange, and yellow visually reduce space, creating a feeling of enclosure. Excessive warmth can result in an overly intense atmosphere, which is undesirable in confined spaces. Cool tones, on the other hand, expand space but, when overused, can introduce a sense of chill and detachment.

3. Dark tones. While they add depth, they also visually reduce space, making it feel more enclosed. In small rooms, this exacerbates a sense of confinement, especially if dark tones dominate large surfaces.

4. Psychological impact of color. Certain colors evoke specific emotional states; for example, an excess of red may induce anxiety. It is thus necessary to consider color's impact on emotional well-being to avoid undesirable psychological effects.

These limitations require a well-thought-out, balanced approach to color selection, taking into account room size, functionality, lighting, residents' psychological preferences, and the creation of a comfortable and harmonious interior.

CONCLUSION

The conducted study confirmed the hypothesis that color schemes play a vital role in shaping the perception of space in residential interiors. The proper selection and combination of colors allow not only for the enhancement of a room's stylistic direction but also for the adjustment of its visual characteristics, such as volume, proportions, and functional zones. Warm colors, with their ability to create a cozy and inviting atmosphere, contribute to the visual "warming" of an interior, while cool tones add a sense of freshness and expand the visual boundaries of a space.

Moreover, light colors proved effective in visually enlarging small rooms, whereas the use of darker shades helps to accentuate specific design elements and add depth to the space. The results thus underscore the importance of skillful color application in residential interiors. Applying scientifically-based approaches to color palette selection enables the creation of harmonious, comfortable spaces tailored to residents' needs and preferences. This confirms that color is a tool that can significantly enhance the quality and

functionality of living spaces, making them not only aesthetically pleasing but also comfortable for living.

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