

Research on Visual Communication and Emotional Compensation of Color in Cold Region Living Spaces from the Perspective of Design Psychology

Yingxue Cao^{1*}, Lin Han¹

¹ School of Art and Design, Jilin Jianzhu University, Changchun, China

*Correspondence: Yingxue Cao

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Abstract:

In cold cities, the winter cycle is long and the natural color gradation is relatively monotonous. Residents tend to develop a combined need for warmth, brightness, security and belonging in their daily living. From the perspectives of design psychology and visual communication design, this paper interprets the color of living Spaces in cold regions as a visual medium that connects the climate environment, regional culture and the emotional experience of residents. The article focuses on four aspects: color psychology, visual identity, regional culture translation, and emotional compensation for residents. It argues that color design in cold regions should not be limited to the beautification of building facades or simple warm color decoration, but should establish a systematic path of “psychological perception - visual communication - cultural identity - design strategy”. Through the analysis of the color problems in the cold region environment, a design approach based on medium to high lightness and low to medium chroma, with warm color nodes and regional cultural color spectrum for enhanced identification, is proposed to provide a reference for the renewal of living Spaces and visual communication design in cold regions.

Keywords:

Cold-Region Color, Design Psychology, Visual Communication Design, Regional Culture, Emotional Needs

1. Introduction

In the living environment of cold cities, color is not a decorative element attached to the surface of buildings, but a visual information directly related to climate perception, spatial identification, mood regulation and regional memory. Compared with regions with mild climates, cold cities have long been affected by low temperatures, snow, greyish-white skies and seasonal changes in vegetation, and the natural environment in winter often presents a visual state of low chroma, low vitality and high repetition. Living in such an environment, residents' demand for color is no longer just “good-looking”, but further transforms into psychological expectations of warmth, safety, intimacy, brightness and a sense of belonging. Therefore, studying cold region colors from the perspectives of design psychology and visual communication design enables

the thesis to move beyond the mere study of architectural colors or environmental beautification to the emotional experience of people and the mechanism of visual communication.

The “cold color” to be discussed in this paper is not just the color of the exterior walls of residential buildings, but a comprehensive color system that includes building facades, unit entrances, public activity areas, wayfinding signs, landscape facilities, paving materials, night lighting, and the background of winter snow scenes. For visual communication design, color has functions such as information transmission, emotional suggestion, spatial guidance and cultural identification; For design psychology, color affects people’s sense of warmth, distance, light and shade, order and belonging. From this, it can be seen that the focus of research on the color of living Spaces in cold regions should be expanded from “whether the color combinations are harmonious” to “how the color is perceived, understood and identified with by the residents”.

2. Design Psychology Foundation for the Study of Color in Cold Living Spaces

2.1. The impact of cold environment on color perception

The natural environment of cold cities has distinct seasonal characteristics. Winter snow increases the overall brightness of the environment but diminishes the color gradation of ground paving, greenery and low-rise facilities; Overcast days, low temperatures and bare vegetation give the environment a visual impression of being grayish, cold and quiet. In this context, occupants tend to have a strong psychological compensatory tendency in their judgment of color. For example, entrance Spaces with a warm color tendency, wood-colored seats, warm lighting, and a brighter building base tend to give residents a sense of warmth, accessibility, and a sense of life; Large areas of deep grey, cold white or low-brightness colors may intensify the psychological experience of coldness, dullness and alienation in a winter setting.

From the perspective of design psychology, color perception is not merely a visual physiological response, but a psychological process formed by environmental experience, life memory and cultural association. Residents in cold regions, who have long lived in environments with long winters and limited outdoor activities, are often sensitive to colors in terms of “whether the space is warm”, “whether it has a sense of direction”, “whether it is safe”, “whether it has vitality”, etc. Therefore, the color design of living Spaces in cold regions should not be judged merely based on the visual beauty in the renderings, but should also take into account the psychological feelings of residents in real seasons, real lighting and real usage scenarios.

2.2. The connection between color psychology and residential mood

Color psychology emphasizes that the hue, lightness, chroma, and warm or cool tendencies of colors can affect people’s mood and spatial judgment. Warm colors are usually more likely to evoke associations of closeness, liveliness and warmth, while cool colors are more likely to evoke associations of quietness, rationality and distance; High brightness colors can enhance the sense of brightness and openness in the space, while low brightness colors are more likely to create a sense of heaviness, oppression or stability; High chroma colors have a stronger visual impact and are suitable for emphasizing nodes, but not for large areas in living Spaces.

In cold living Spaces, the psychological effect of color is more prominent. Since the natural environment already has a strong sense of coldness and low chroma characteristics, if buildings and public Spaces continue to use a large amount of cold grey, dark or neutral colors lacking gradation, residents may develop a psychological “coldness on top of coldness”. Therefore, cold color design needs to regulate the mood through moderate warming, lightness enhancement and node reinforcement. But this adjustment does not mean simply using high-saturation warm colors like red, orange, and yellow, but rather creating a stable and emotionally warm space atmosphere through a soft, enduring, materialistic warm color system.

2.3. Emotional needs of Occupants and color compensation

The emotional needs of the residents are an important basis for the color design in cold regions. The expectations of cold region residents for their living Spaces include not only functional convenience and visual neatness, but also a sense of warmth in the winter environment, a sense of security in public Spaces, a sense of closeness in community life, and a sense of belonging in local culture. Colour, as the most direct visual medium, can convey the emotional tendencies of the environment before the residents enter the specific space behavior.

The so-called color compensation refers to compensating for the psychological coldness, visual monotony and lack of activity brought by the cold climate through spatial colors. For example, installing warm lighting and warm-colored wayfinding at community entrances can enhance the sense of security of coming home; Using low-saturation vibrant colors in children’s activity areas can enhance the fun of winter outdoor Spaces; Using colors such as wood, light yellow, warm gray, etc. in public activity areas can add a sense of closeness to the interaction space. The core of color compensation is not to create a strong visual stimulus, but to provide a kind of gentle psychological support for residents in a cold environment. (Table 1)

Table 1. *Correspondence between color Psychological Effects and Design in Cold Living Spaces.*

Color attributes	Main psychological feelings	Visual communication effects	Applicable Spaces
Warm grey, off-white	Steady, soft, intimate	Form an overall base and reduce the coldness of winter	Main building facade, public interface
Wood color, light yellow	Warm, approachable, and full of life	Strengthen the sense of homecoming and the willingness to stay	Entrances, pergolas, rest areas
Low saturation orange, brick red	Vitality, recognition, and emotional arousal	Highlight nodes and directional information	Unit doors, active nodes, wayfinding
Blue and white, grayish green	Quiet, refreshing, and orderly	Auxiliary zoning and cultural translation	Partial signage, secondary interfaces

3. The Function of Cold Color from the Perspective of Visual Communication Design

3.1. The information recognition function of color

In visual communication design, color is first and foremost a message. It can help people quickly identify spatial attributes, judge directions, distinguish functional areas and form memories. In cold living Spaces, the information recognition function of color is particularly important. After winter snow cover, ground details are weakened,

and building facades, entrances, signs and public facilities become the main visual cues for residents to recognize the environment. If the colors lack hierarchy, roads, buildings, entrances and public Spaces in the residential area tend to be similar, reducing the efficiency of residents' identification.

Therefore, a clear hierarchy of colors should be established in cold-region living Spaces. Primary colors are used to create overall order, secondary colors to enrich architectural and landscape layers, and accent colors to reinforce entrances, wayfinding, public activity nodes, and service facilities. Such a color structure is consistent with the logic of information hierarchy in visual communication: important information should be more prominent, background information should be more stable, and auxiliary information should be more rhythmic. Only when the color system has a clear organizational relationship of information can cold living Spaces maintain good recognizability in the winter environment.

3.2. The emotional communication function of color

Visual communication design doesn't just convey words and symbols; it conveys emotions through color, form, proportion, and layout. Colors in living Spaces also have the ability to express emotions. Different color combinations can make residents feel different atmospheres such as lively, quiet, warm, distant, stable or depressing. Cold living Spaces that only emphasize unity and tidiness and neglect the conveyance of emotions can easily create a "standardized environment" lacking warmth.

In specific designs, emotional communication can be achieved through the contrast of cool and warm colors, lightness, and chroma control. For example, the main interface of a home can use soft warm gray, off-white, or light coffee to create a stable background; A warm yellow, brick red or wood color can be added to the entrance space to enhance the homecoming feeling; Low-saturation orange, yellowish green or blue can be added to children's activity areas and community activity nodes to make the space more vibrant but not glaring. Such color expressions can balance the order and mood of the living space and give residents a more positive psychological suggestion visually.

3.3. The guiding and behavioral functions of color

The wayfinding system in visual communication design emphasizes clear information, definite paths and user-friendly operation. Colors in cold living Spaces should also serve as wayfinding. Especially in winter when light is insufficient, roads are icy and covered with snow, clear color cues can help residents determine entrance locations, activity areas, parking areas and safe access paths.

Color guidance should not rely solely on the text on signs, but should be combined with spatial interfaces to form visual guidance. For example, unit entrances can use uniform but differentiated color codes, public service Spaces can be highlighted by higher recognition warm colors or lightness contrasts, and walking paths and activity areas can form continuous cues by paving colors and facility colors. In this way, color not only beautifies the environment but also directly participates in the organization of residents' spatial behavior. (Table 2)

Table 2. *Visual Communication design intervenes in the functional decomposition of living Spaces in cold regions.*

Functional dimensions	Design concerns	Main Carrier	Expected Effects
Information recognition	Clear hierarchy and recognizable buildings	Facade color separation, entrance color, numbering system	Enhance recognition efficiency
Emotion Conveyance	Create a warm and friendly atmosphere	Hue warm and cool, lighting, material color	Relieve the feeling of winter depression
Wayfinding guidance	The path is continuous and the nodes are prominent	Lay out ribbons, wayfinding signs, and lighting prompts	Enhance sense of direction and security
Cultural identification	Form a community-specific memory	Regional color spectrum, graphic symbols, entrance image	Strengthening local identity

4. Ways regional culture is translated in cold colors

4.1. Regional culture is not a pile of symbols

The expression of regional culture in cold region color design should not be limited to the simple piling up of decorative patterns, local slogans or landscape ornaments. A truly effective expression of regional culture should be achieved through the combination of color, material, light and shadow, and spatial atmosphere. For instance, in cold cities like Harbin, ice and snow culture, historical buildings, brick and stone materials, warm light night scenes and the architectural style that combines Chinese and Western elements are all visual resources with local identity.

In a living space, if only certain local cultural symbols are pasted on the walls or entrances, and the overall color is still a generalized grayish-white coffee system, it is difficult for residents to truly feel the regional culture. Regional culture should be transformed into sustainable perceived color relationships, such as building a base of local memory through warm yellow, brick red, off-white, grayish green, dark brown and other colors; Create a winter living atmosphere through the natural color of the material and the warm light at night; Enhance local identity through entrance nodes, public facilities, and wayfinding colors.

4.2. Extraction and redesign of regional colors

Regional culture enters the color system of cold living Spaces through a process of “extraction - screening - translation - application”. First, designers can extract typical colors from local historical buildings, block photos, natural landscapes and everyday objects; Next, in combination with resident interviews, determine which colors have emotional value and local memory; Again, adjust the lightness, chroma and proportion of the colors according to the functional requirements of the living space; Finally, apply it to the building’s main color, the public space’s secondary color, the wayfinding accent color, and the material color.

This approach avoids the stiffness of directly replicating traditional colors. Regional colors are not fixed and need to be reorganized in the context of modern living needs. For example, brick red in historic buildings can be used with reduced chroma for entrances or ground floor interfaces; The blue and white in ice and snow culture

should not be used in large areas to add coldness, but can be used for wayfinding or partial signage; Wood tones and warm light can be used in public rest areas to enhance the sense of closeness and the atmosphere of life. Through redesign, regional culture can be transformed from a traditional resource into a color language that conforms to the laws of contemporary visual communication.

4.3. Local Identity and visual memory

The color of the living space can affect residents' memory of the place. A recognizable color system can make it easier for residents to remember their community and also enhance a sense of community belonging. For cold cities, local identity comes not only from the macro image of the city, but also from the unit doors, activity venues, road nodes and public facilities that residents pass through repeatedly on a daily basis.

Therefore, the color design of living Spaces in cold regions should focus on the establishment of visual memory. Designers can create recognizable visual features for different buildings and spatial nodes through uniform and differentiated color coding; A color spectrum related to the local culture can also be used to make residents feel "this is the local space" in their daily lives. This visual memory is not necessarily strong, but it can form a stable emotional identity over long-term use.

5. Principles of Color Design for Cold Living Spaces

5.1. Build the space base with medium to high lightness and low to medium chroma

The main color of living Spaces in cold regions should not be too dark, too cold or too heavy. Medium to high brightness colors can enhance the brightness of winter Spaces, while low to medium saturation colors help maintain the stability and durability of the living environment. Warm gray, off-white, light coffee, light yellowish gray, low chroma grayish green and other colors can serve as more suitable base colors. These colors can avoid the monotony of pure white in snowy scenes and the oppression of dark gray on cloudy days.

The role of the base color is to establish overall order, not to create a visual impact. If high-saturation colors are used on large building surfaces in cold regions, they may be recognizable in the short term, but they can cause visual fatigue in long-term residence. Instead, controlling the overall space with soft base colors and emphasizing key points with node colors is more in line with the logic of living space usage.

5.2. Respond to emotional needs with warm-colored nodes

Warm-color nodes are an important strategy in the color design of living Spaces in cold regions. Entrances, unit doors, community meeting Spaces, children's playgrounds, rest pergolas and night lighting can all be key areas for color emotional compensation. These Spaces are closely related to residents' homecoming behavior, staying behavior and community interaction, and thus are more suitable for expressing intimacy through warm colors or material colors.

The design of warm-colored nodes should control the area and intensity and avoid excessive decoration. A more appropriate approach is to use low to medium chroma colors such as warm yellow, wood, brick red, light orange, warm white light, in combination with simple graphics and wayfinding systems to create a visual effect

that is both warm and orderly. This allows the colors to truly serve the mood of the residents rather than become isolated decorations.

5.3. Organize spatial information in a visual hierarchy

The color scheme of living Spaces in cold regions should follow the hierarchical principle in visual communication design. There should be clear proportions between the primary, secondary and accent colors. In general, the primary color is responsible for the overall background and has the largest proportion; Secondary colors are used for building sections, public interfaces, and landscape layers; Accent colors are used for entrances, signs, event nodes, and safety alerts.

If all the colors are equally eye-catching, the space will look messy; If all the colors are too close together, the space will lack distinctiveness. The key to cold colors lies in “focused warmth” and “orderly recognition”. This hierarchical design not only enhances visual quality but also strengthens residents’ sense of direction and security in the winter environment.

5.4. Enhance overall color quality by adapting to both winter and summer seasons

Cold region color design should not be based solely on winter, nor should it be judged based solely on summer renderings. Winter snow increases lightness and diminishes low-profile landscape colors, while summer plant colors add green and shade to the environment. Therefore, the visual effect of the same color scheme can vary significantly in different seasons.

Winter-summer simulation should be carried out in the design. In winter, it is necessary to ensure the identifiability of entrances, roads and public nodes, and avoid diluting colors by snow scenes; In summer, it is necessary to ensure harmony between the building and the plants, the sky, and the paving to avoid too much warm color causing the space to be too hot. By adapting to both seasons, cold living Spaces can create a stable visual experience throughout the year.

6. Design Strategies and Application paths

6.1. Color Strategies in the Renewal of Old Residential Areas

Renovation of old residential areas should avoid simple whitewashing or uniform color changes. The brick walls, storefronts, trees, fences and public facilities in many old residential areas, though dilapidated, also carry the long-term living memories of the residents. If the original colors are completely erased during the renewal, the space may become unfamiliar and the emotional connection of the residents will be weakened. Therefore, the color renewal of old residential areas should adopt the approach of “preserving memory, restoring order, activating nodes.”

Specifically, designers should first determine through field observations and resident interviews which colors need to be retained, which need to be restored, and which areas need to be improved. Secondly, carry out overall restoration of the building interface with low chroma and high brightness to restore the space to a neat state. Again, add warm color nodes to entrances, public activity areas and wayfinding systems to enhance the winter usage experience. Finally, create a multi-layered visual environment through the colors of plants, lighting, and facilities, rather than relying on a single wall color to change the quality of the space.

6.2. Color strategies in New residential areas

New residential areas should incorporate color into the overall visual communication system at the design stage, rather than surface color matching after the building is completed. The building volume, materials, signs, landscape, lighting and public facilities should together form an integrated color system. For new residential areas in cold regions, there should be no excessive pursuit of the "high-end" cool grey color, as this color may overlap with the cold climate in the winter environment, creating a detached living experience.

New residential areas can use soft bases, regional accents and node embellishments. The base color remains stable, the regional accent color reflects the local culture, and the node accent color reinforces the entrance and public activity space. The wayfinding system should be in harmony with the building's color to avoid the isolation of signs. Night lighting should also be incorporated into the integrated color design to enhance the sense of homecoming and security through warm light.

6.3. The possibility of visual communication design intervening in cold space

Visual communication design can provide a more explicit approach to the study of color in cold living Spaces. First, visual communication emphasizes the hierarchy of information, which can help establish a clear hierarchy of colors in the living space; Secondly, visual communication emphasizes user perception, which prompts designers to focus on how residents recognize, understand and remember the space; Again, visual communication emphasizes symbols and culture, which can transform regional culture from abstract concepts into color, graphics, wayfinding and interface systems.

Therefore, cold region color design should not be done solely by the architecture or landscape profession; it can also incorporate brand identity, information design, and emotional design methods from visual communication design. Community entrances, wayfinding systems, public facilities, activity Spaces and cultural display interfaces can all form a more complete living experience through a unified visual language.

7. Conclusions

To sum up, color design for living Spaces in cold regions should shift from merely beautifying the appearance to a comprehensive study of design psychology and visual communication design. The low temperature, snow accumulation and low chroma background of the cold environment make residents have a stronger psychological compensation need for color; The information recognition, emotional communication, and behavioral guidance functions in visual communication design provide a clear methodological path for color design in cold regions.

This paper argues that the core value of cold region color does not lie in creating vivid visual effects, but in enhancing residents' sense of warmth, security, belonging and local identity through appropriate lightness, chroma, warm and cool relationships and regional cultural translation. In the future, the color design of living Spaces in cold regions should pay more attention to the real feelings of residents, establish an integrated color system, and form recognizable, perceptible and sustainable spatial qualities through visual communication design methods.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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