

**ColourTurn 2026**

An Interdisciplinary and International Journal

**Volume 2, Special Issue, No. 2**  
**Spatialities and Colour**

with guest editor Verena M. Schindler



## II. Colour and the Mind

### Material and Immaterial Colours in Interaction: Josef Albers' Murals 'Homages to the Square' at the Rochester Institute of Technology

*Juan Serra, Michael Murdoch*

#### Abstract

When a group of uniform colours interact on a flat surface, they can be interpreted as being material or immaterial finishings, opaque or transparent, and having different spatial positions. These phenomena were experienced in Josef Albers' artwork, particularly in his Homage to the Square series, with over 2,000 paintings, prints and other works experimenting with colour interactions. At the Rochester Institute of Technology campus, Albers created one of his rare large-scale Homage to the Square pieces, titled *Growth*, comprising two opposing murals in the lobby of the administration hall. We developed a detailed study of this artwork, and based on archival research and on-site observations, interpreted how its geometric composition and colour interactions create material and immaterial effects, making possible different spatial layering interpretations. Albers' paired set, *Growth*, acts as an abstract *trompe l'œil* and successfully demonstrates that colour depth perception is contextual rather than absolute.

Keywords: architecture, colour, Josef Albers, square, space, layer, material, immaterial, transparency



**Prof. Dr Juan Serra**

Universitat Politècnica de València  
*juaser11@ega.upv.es*



**Assoc. Prof. Dr Michael Murdoch**

Director of the Munsell Color  
Science Laboratory  
Rochester Institute of Technology  
*mmpocs@rit.edu*

## 1 INTRODUCTION

Colour has long been understood to influence perceived depth: Warm hues often appear to advance toward the viewer, while cool hues tend to recede.<sup>1</sup> These phenomena are well documented in flat, two-dimensional imagery,<sup>2</sup> but their implications in three-dimensional architectural space have received far less attention. Josef Albers (1888–1976) devoted much of his later life to exploring such colour interactions in his renowned

Homage to the Square series. Beginning in 1949, aged 62, he produced over 2,000 of these paintings featuring nested squares, through which he experimented with colour relativity.<sup>3</sup> Albers considered that colour was the most relative medium in art, acting upon our perception like an actor on stage. Therefore, colour relationships can shift identity and suggest spatial depth, turning opaque surfaces into translucent ones, and turning the material into the immaterial. In his own words, Albers stated: “Painting is colour acting. To act is to change character and behaviour, mood and tempo. An actor makes us forget his name and individual features. He deceives us and functions as other than himself. Acting colour loses identity, appears as another colour, lighter or darker, more or less intensive, brighter or duller, warmer or cooler, thinner or lighter or thicker or heavier, higher and nearer or deeper and farther away, opaque turns translucent, joining colour colours appear overlapping each other.”<sup>4</sup>

<sup>1</sup> Christophe R. C. Guibal and Birgitta Dresch, “Interaction of colour and geometric cues in depth perception: When does ‘red’ mean ‘near?’” *Psychological Research* 69, nos. 1–2 (2004), <https://doi.org/10.1007/s00426-003-0167-0>.

<sup>2</sup> Osvaldo Da Pos, Dhanraj Vishwanath, and Liliana Albertazzi, “Color determinants of surface stratification,” *Color Research and Application* 46, no. 1 (2021), <https://doi.org/10.1002/col.22585>.

<sup>3</sup> Heinz Liesbrock and Ulrike Growe, eds., *Josef Albers: Interaction* (Yale University Press, 2018).

<sup>4</sup> Jeannette Redensek, “Farbenfabeln: On the Origins and Development of the Homage to the Square,” in *Josef Albers: Interaction*, ed. Heinz Liesbrock and Ulrike Growe (Yale University Press, 2018): 190.

Most Homage paintings are modest in size, allowing an intimate examination of these effects. Albers rarely worked at architectural scale, and of his twenty public art commissions, only three were Homage to the Square murals.<sup>1</sup> Two of these are the *Growth* murals present at the Rochester Institute of Technology (RIT) in New York State; the third is a church commission titled *Let There Be Light* (Mt Bethel Church, New Haven, Connecticut, 1973). Scaling up introduces technical challenges, as colour balances that work on small panels may shift when magnified. Albers himself stressed the difficulty of mixing consistent large areas of colour. He preferred small swatches and reproducible pigments, noting that mixing paint is often “difficult, time-consuming and tiring.”<sup>2</sup> As artist Elaine de Kooning noted when observing Albers at work, enlarging a design alters the established relations of colour and form: “He can’t simply square off a sketch he likes and blow it up, but has to change a tone here or a proportion there to achieve the effect of the original.”<sup>3</sup> Twenty years later, Albers would keep testing the possibilities of working with colours at several scales for an exhibition in Düsseldorf containing monochromatic Homages using more than one hundred different red pigments. “An interaction of colour phenomena that seemed insignificant when rendered small, might reveal itself triumphantly at a larger scale, and conversely the phenomena might sing in the smallest Homages and be rendered mute in the larger paintings.”<sup>4</sup>

This study focuses on *Growth* in RIT’s George Eastman Building lobby, the most architecturally significant Homage murals. We first outline the commission’s history and setting, then describe the murals’ geometry and palette. We analyze the perceptual layering of the colours as viewed in situ, drawing on Albers’ teaching of “vibrating” and “vanishing” boundaries, transparency exercises, and actual colour perception research. Finally, we discuss the integration of *Growth* with the surrounding architecture.

---

<sup>1</sup> James Hamm, “Josef Albers’s Monumental ‘Homage to the Square,’” *Studies in Conservation* 49, suppl. 2, (2004), <https://doi.org/10.1179/sic.2004.49.s2.039>.

<sup>2</sup> Josef Albers, *Interaction of Color* (Yale University Press, 1963): 6.

<sup>3</sup> Elaine De Kooning, “Albers Paints a Picture,” *ARTnews* 49, nos. 7 (November 1950): 57.

<sup>4</sup> Redensek, “Farbenfabeln,” 190.

## 2 THE *GROWTH* MURALS: COMMISSION CONTEXT AND DESIGN

In the early 1960s, RIT commissioned architect Kevin Roche, who was principal designer at Eero Saarinen’s architecture firm, to design an administration building on its campus. Roche’s design was clad in rust-red brick to match the existing campus buildings and featured a tall lobby with full-height glass sidewalls. The main lobby space was bisected by a slanted ceiling plane, with two large opposite wall planes on the right and left with respect to the entrance, appropriate for mural decoration illuminated with natural lighting. In 1966, Warren Platner, who had worked with Saarinen’s firm and Roche, approached Albers to create murals for these walls. Initially, Albers’s first colour design did not satisfy the architects’ expectation. In archived correspondence, Platner urged Albers to “give an expansive, airy quality to the space” and suggested using a pale, cool-green palette to complement the building materials. Platner wrote that the colours should be “light and airy, somewhat vague and not intense [...] quite pale and foggy, definitively green.”<sup>5</sup>

Figure 1. Left: *Study for Homage to the Square: Lone Whites*, 1963. Oil on Masonite, 24 x 24 inches (60.9 x 60.9 cm). Right: *Homage to the Square: Summer Noon*, 1964. Oil on Masonite, 48 x 48 in. (120 x 120 cm). Source: Heinz Liesbrock and Ulrike Growe, eds., *Josef Albers: Interaction* (Yale University Press, 2018), Figures 142 and 110. © 2025 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

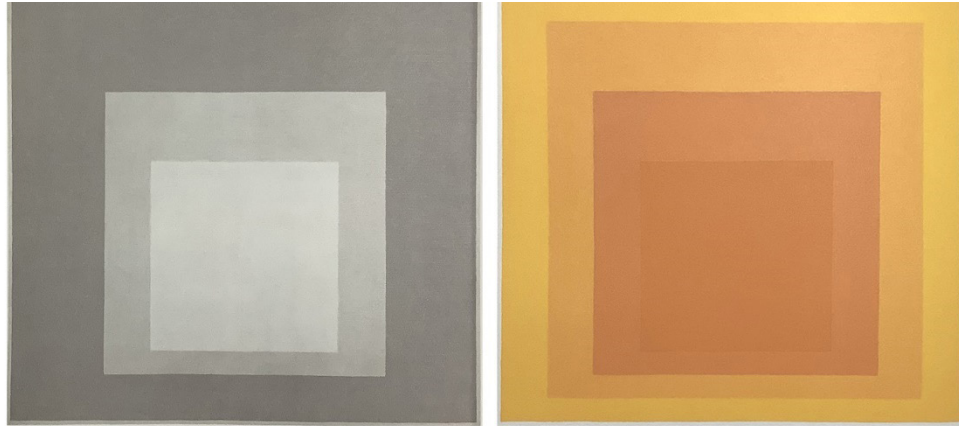
Albers had another idea for the colours of these murals and, not without reluctance, initially accepted to develop a different version of *Growth*.<sup>6</sup> According to his assistant Robert Bryden, Albers painted a first version on the north wall with four concentric squares in a subtle white-on-white scheme, aiming for a translucent effect, as could be verified during the restoration process.<sup>7</sup> Bryden described this early version as using translucent gesso layers, “to produce a transparency

<sup>5</sup> Warren Platner, Kevin Roche John Dinkeloo and Associates LLC, to Josef Albers, correspondence, 1966, Archives of the Josef and Anni Albers Foundation, Bethany, CT.

<sup>6</sup> Josef Albers to Warren Platner, Kevin Roche John Dinkeloo and Associates LLC. Correspondence, 1966. Archives of the Josef and Anni Albers Foundation, Bethany, CT.

<sup>7</sup> Hamm, “Josef Albers’s Monumental.”

effect, like layers of tissue paper in a 4-3-2-1 pattern.”<sup>8</sup> There is no photograph of this initial mural, but working with achromatic colours was not unusual in Albers’ investigations during the 1960s (Fig. 1). However, Albers was apparently dissatisfied with the monochrome result for the lobby that remained for a few months before Roche withdrew from the project.<sup>9</sup> After that, Albers set aside the greyish



scheme and painted both murals in a new palette of warm oranges and yellows. In the definite version of *Growth*, each mural consists of four nested squares (or frames) of uniform warm hues, but with the sequence of colours reversed on the two walls. This pairing creates a dialogic tension: each square on one wall has its counterpart colour on the opposite, but in reverse order and thus, a golden yellow square in the centre of the north wall faces a deep orange on the south wall (Fig. 2).

Once completed, the murals were well received. Architect Kevin Roche acknowledged that the paintings and the space “work very well together,” and the project received the Collaborative Achievement in Architecture Medal of the American Institute of Architects in 1972 for the synergy between art and architecture.<sup>10</sup>

<sup>8</sup> Robert Bryden to Neal David Benezra, correspondence, in Neal David Benezra, “The Murals and Sculpture of Josef Albers” (PhD diss., Stanford University, 1983), 167.

<sup>9</sup> Kevin Roche to Josef Albers, correspondence, 1968, Archives of the Josef and Anni Albers Foundation.

<sup>10</sup> Kevin Roche to Josef Albers informing about the award, correspondence, 1971, Archives of the Josef and Anni Albers Foundation.



Figure 2. From left to right: a) Scheme with the dimensions and labels for each of the nested squares; b) Photograph of the north mural; c) Photograph of the south mural. Source: Created by the authors, 20 July 2023.

## 2.1 Conceptual and Formal Opponents

The arrangement of the two murals, positioned opposite each other in the same lobby, is crucial for comprehending this artistic creation. Albers himself articulated the significance of this setup, noting that “studies in pairs demonstrate clearly the desired effects.”<sup>11</sup> This specific architectural setting provided Albers with the ideal circumstance to explore contrasting or complementary duos. Out of the twenty public art commissions undertaken by Albers, other projects employed similar pairings; *Structural Constellations* (1959) and *Two Portals* (1961) being the most notable instances known so far.<sup>12</sup> In *Growth*, the two murals utilize an identical palette, but the colours are applied in the inverse sequence, underscoring the multitude of outcomes achievable with a restricted set of resources (Fig. 2). As a former pivotal member of the Bauhaus,<sup>13</sup> Albers adhered to Mies van der Rohe’s principle “Less is more,” striving to elicit the greatest impact by using the minimal materials.

The titles for these two compositions have occasionally been documented as “Growth” and “Youth,” terms that function as conceptual opposites and emphasize the inherent complementarity between the pair. Some critics interpret this terminological contrast as the artist advocating for a harmony between science and technology,

<sup>11</sup> Albers, *Interaction of Color*, 10–11.

<sup>12</sup> Benezra, “The Murals,” 171.

<sup>13</sup> Albers started as a student in 1920 and later became a master and professor who taught the preliminary course and workshops in glass and furniture.

and art—a concept that Albers championed during his lecture series at Trinity College in 1965. This aligns perfectly with the mission of RIT, a university dedicated to science and technology.<sup>14</sup> However, despite the titles *Growth* and *Youth* resonating with Albers’ philosophical viewpoint, their use for this specific artwork remains ambiguous. Personal documentation from Albers indicates that the designation for both Homages at RIT is simply “Growth.”<sup>15</sup>

## 2.2 Visual Composition and Colour

The multiple effects of colours in the Homages series relied on a compositional framework of four nested squares with a proportion of 4:6:8:10 units from innermost to outermost, and a narrow white frame around the outermost square, of 0.1 unit. This extremely simple configuration was meticulously planned to result in a plethora of illusory layers.<sup>16</sup> In *Growth*, Albers chose to place these squares closer to the floor than to the ceiling, as was usual in his Homages paintings on canvas, but in this case aligning the centres of the squares with the architectural horizon of the lobby. In a sense, he “extended” the lobby walls into painted perspective, a point we discuss later.

The two *Growth* murals are visually identical in size and structure, but they use the four chosen colours in the opposite sequence. The palette of colours spans from a vivid golden yellow to a rich reddish orange. Although we lack Albers’ exact pigment recipes, NCS and approximate Munsell notations have been identified on site: NCS S0570-Y30R, S0560-Y30R, S0570-Y10R, S0570-Y ( $\approx$ Munsell 5YR 7/12; 7.5 YR 7/10; 1.25Y 8/12; 5Y 8.5/12). Visually, the north mural has a primary yellow inner square surrounded by increasingly reddish-orange bands, while the south mural reverses this order with the most reddish orange at centre progressing towards a yellow outer band. The colour combination criterion is a succession of colours with the same low blackness (high Munsell value), almost identical high chromaticness

---

<sup>14</sup> Benezra, “The Murals,” 172.

<sup>15</sup> Josef Albers, *Lists and Notes of Architectural Commissions*, n.d., Archives of the Josef and Anni Albers Foundation.

<sup>16</sup> James Mai, “Planes and Frames: Spatial Layering in Josef Albers’ Homage to the Square Paintings,” *Conference Proceedings of Bridges 2016*, 233–240. Tessellations Publishing, 2016. <https://www.bridgesmathart.org>.

(Munsell chroma) and adjacent hues that range from a fundamental yellow to an orange.

In the four coloured squares of the Homages, we can interpret three variables that are useful for the visual analysis: (1) *Illusory depth*, with up to four distinct layers (I, II, III and IV); (2) *Opacity* of each square that may be interpreted as either opaque or translucent (O or T); and (3) *Form*, so that each square may be seen as the edge of either a plane or a frame (P or F)<sup>17</sup> (Fig. 3).

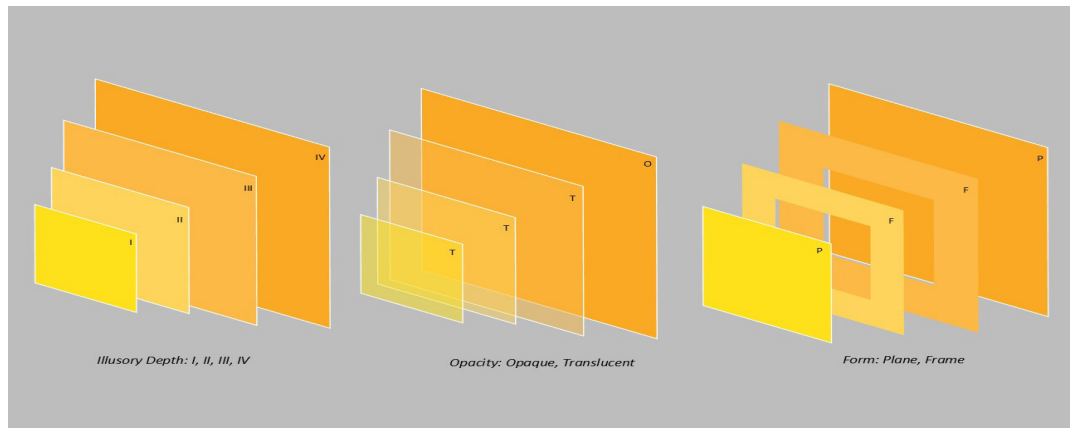


Figure 3. Schemes indicating the three variables for colour layering analysis: Illusory depth (I, II, III, IV), opacity (O, T) and form (P, F). Source: Created by the authors.

### 3 Perceptual Layering and Colour Interaction

When viewing the murals in person, one quickly experiences a depth ambiguity. According to the classification by James Mai, the murals *Growth* correspond to Homages type I, and the total number of colour layering possibilities is 120. Nevertheless, based on our personal impressions of the colours on site, we identified three main spatial interpretations for each mural. We used the following code to label them: (1) The letters N and S refer to the mural placed north or south respectively; (2) The spatial order of the colours is described in order and separated with commas, with the leftmost position being the nearest in illusory space and the rightmost position being the furthest; (3) Numbers 1 to 4 identify each square in order from the centre to the exterior (Fig. 2), and the use of two numbers indicates a frame instead of a square, that is, 1-3 is a frame with the exterior size of

<sup>17</sup> James, “Planes and Frames.”

square 3 and a hole with the size of square 1; (4) Finally, the letters o and t indicate whether the colour is opaque or transparent. Following this nomenclature, our perceptual interpretations of *Growth* are: N1 = original painting; N2 = 1o, 2o, 3o, 4o; N3 = 1-3t, 2o, 4o; N4 = 1o, 2-4t, 3o; S1 = original painting, S2 = 3-4o, 2-3o, 1-2o, 1o; S3 = 1-3t, 2-4o, 2o; S4 = 2-4t, 1-3o, 1o (Fig. 4).

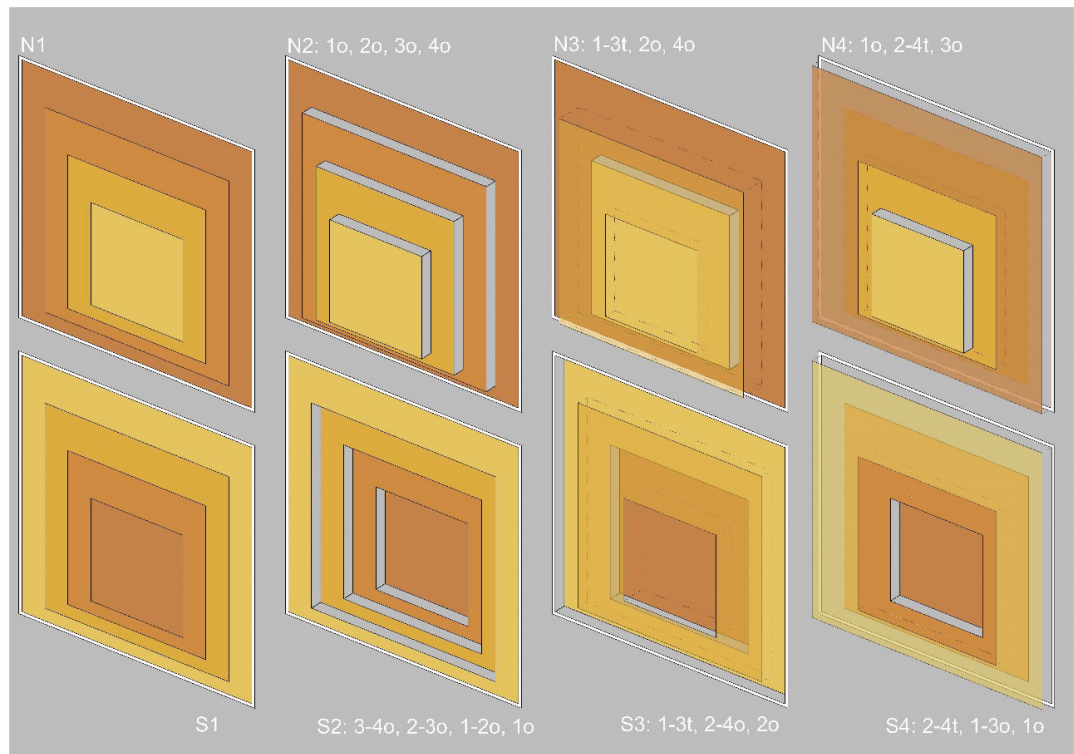


Figure 4. Personal interpretations of the colour spatial layering in the north (N1) and south (S1) murals. The coding indicates the position of the squares/frames in illusory space, from nearest to furthest, and whether the colours are opaque (o) or transparent (t). Source: Created by the authors.

### 3.1 Superimposition of Material Colours

At first glance, the concentric bands look like nested opaque planes: on the north mural, the yellow centre seems to hover in front of the darker orange background (N2 in Fig. 4), while on the south mural, the orange in the centre may seem to project forward (S2 in Fig. 4). This matches a common depth cue: lighter surfaces tend to appear nearer than darker ones,<sup>18</sup> and yellow compared to orange seems perceptually lighter. Indeed, in the north mural the most chromatic yellow appears to float out, with the deepest orange on the wall

<sup>18</sup> Da Pos et al., "Color determinants."

surface. By contrast, in the south mural the outer yellow band seems on the walls and the inner orange receding farther away. This simple layered interpretation yields a telescoping view: a smaller square on top of a larger square, and so on. We built a physical model to better visualize in 3D the interpretation of colour layering N2 with opaque surfaces (Fig. 5).

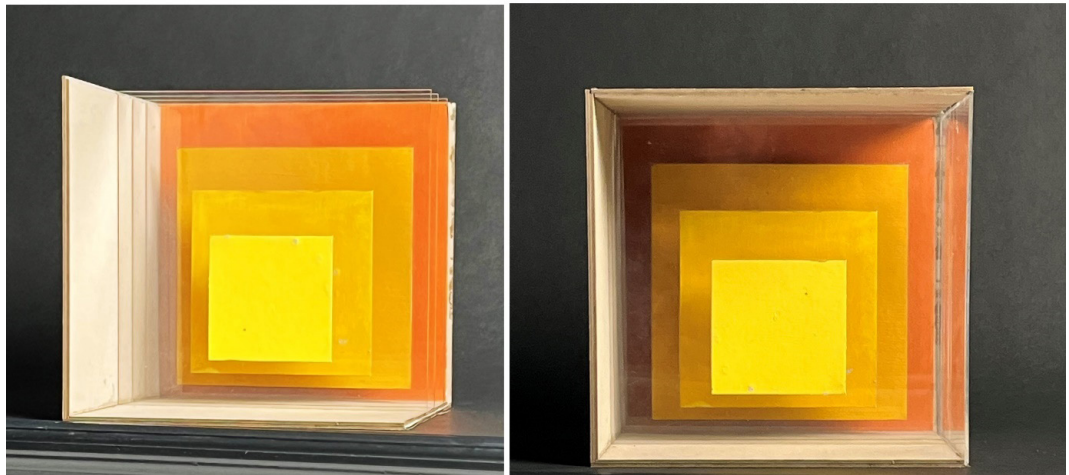


Figure 5. Interpretation in 3D of colour layering N2 with opaque surfaces, after Josef Albers' *Growth* (north mural), 1965. Source: Created by the authors.

This illusion of opaque, overlapping squares or frames is significantly amplified by the phenomenon of simultaneous contrast along the edges of the nested forms (Fig. 6). This contrast creates a kind of bright or dark luminous halo around the contours. The lighter, outermost colour appears to cast a subtle shadow onto the adjacent square or frame, what strongly reinforces the perception of spatial layering. This specific effect is more pronounced in the upper sections of the murals, where the bands are wider, and when the observer views the artwork up close. Conversely, it is less distinct in the lower sections, which feature thinner bands, and when viewed from a distance. This technique is reminiscent of Albers' teaching exercises on "Vibrating Boundaries," where students were instructed to select two colours that would generate a visual vibration or a bright fizz along their shared border. Achieving this effect required combining very chromatic and contrasting hues that possessed a similar value.<sup>19</sup> This also echoes what Albers referred to as the "flute effect"—a term he used for exercises

<sup>19</sup> Danilowitz, Josef Albers.

involving colour gradations in bands that specifically emphasized the intensity of their boundaries.

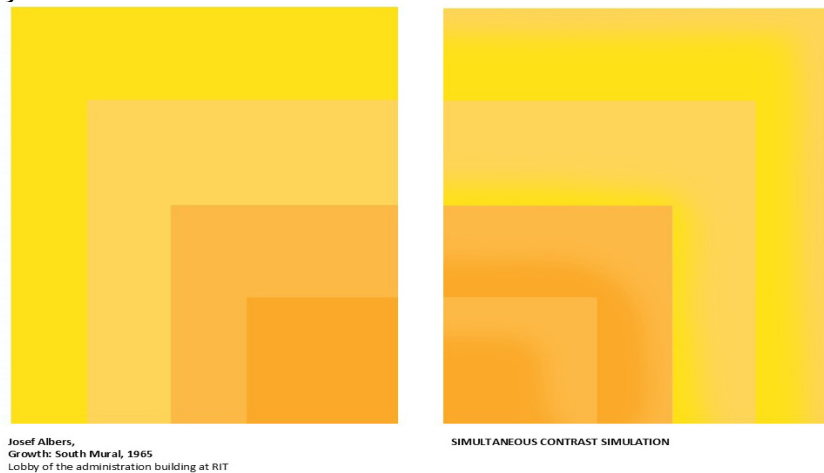


Figure 6. Left: Josef Albers, *Growth* (south mural), 1965. Right: Simulation of the simultaneous contrast effect, which causes a sense of shadow to appear at the contours of adjacent colours. Source: Created by the authors.

### 3.2 Superimposition of Immaterial Colours

The interpretation of the spatial layering in *Growth* is not limited to opaque colours and there are other possibilities for superimpositions of transparent colours over opaque ones. In this sense, the northern Homage can be interpreted to have either a former transparent frame 1-3 (N3 in Fig. 4) or a former transparent frame 2-4 (N4 in Fig. 4). Similarly, in the southern Homage, former transparent frames 1-3 and 2-4 can be interpreted in the same way in S3 and S4, respectively. Logically, these transparent colours are perceived to be overlapped onto the opaque colours, and interestingly, to be closer in distance or at the same depth as the purest yellow (N3 and S3 in Fig. 4). Therefore, it is demonstrated Albers' principle applies: colours act in different ways depending on the context, and the purest yellow is not always interpreted to be the closest. In a similar way, despite the advantages due to wavelength and colour stereopsis, the reddest colour is not always interpreted as near, as demonstrated in other experiments.<sup>20</sup> As mentioned above, we created a physical model to better visualize the 3D interpretation of colour layering S3 with translucent surfaces by using a transparent coloured foil acting as the frame 1-3 (Figs. 4 and 5).

<sup>20</sup> Guibal and Dresp, "Interaction of colour."

In his exercises on colour transparency, Albers tasked the students with identifying an appropriate opaque colour that, when placed between two others, would visually register as their perfect blend or mixture. This exercise is particularly insightful due to its spatial implications, because the colour between two others can give the impression of an overlapping film. For instance, if a yellowish orange is placed between yellow and red, the viewer perceives a transparent yellow layer seemingly superimposed over the red. Conversely, if a reddish orange is used, the effect reverses, and a transparent red layer appears to overlap the yellow.

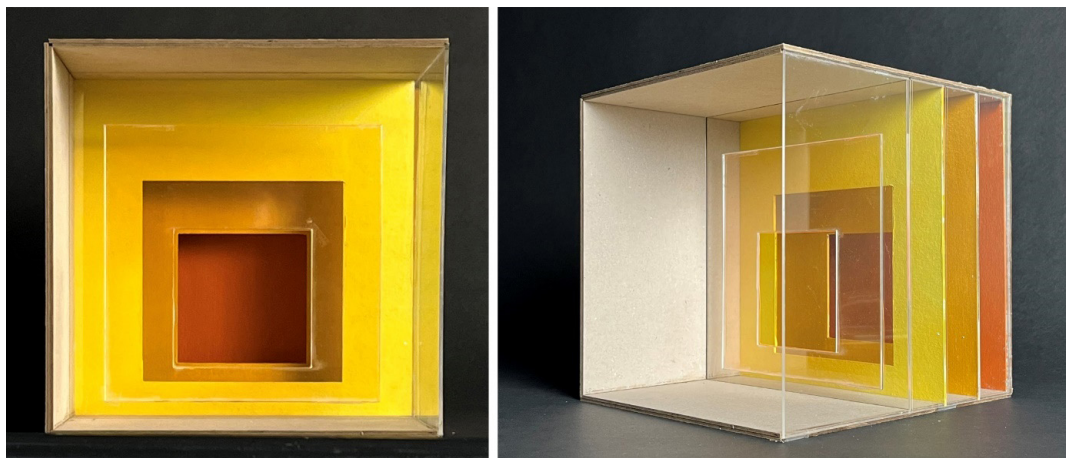


Figure 7. Interpretation in 3D of colour layering S3 with translucent surfaces, after Josef Albers' *Growth* (south mural), 1965. Source: Created by the authors.

In the interpretation of *Growth*, we can also see an effect of “vanishing boundaries,” that Albers indicated is “confined to adjacent, neighbouring colours and depends most decisively on equal ‘light intensity’.”<sup>21</sup> In the opinion of some authors, the distinction between the boundaries of adjoining colours is greater at the bottom of either mural, and more elusive at the sides, and particularly so at the top. Neal David Benezra (1983) states: “While the lower ranges suggest a four-colour Homage, the upper bands of *Growth* lead us to perceive only three colours.”<sup>22</sup>

In sum, the murals invite the viewer to toggle between different depth readings. At one moment, each band reads as a solid layer

<sup>21</sup> Albers, *Interaction of Color*, 63.

<sup>22</sup> Benezra, “The Murals,” 170.

occluding what lies behind; at another, each can be seen as a transparent frame revealing the colour beneath. Local contrasts produce micro-shadows and strengthen the multi-layer illusion. This interplay of translucency, contrast, and adjacency fulfils Albers's goal of making colour "in motion," giving static geometry the vitality of architectural space.<sup>23</sup>

#### **4 COLOUR Integration IN Architecture**

An intriguing discovery relates to the size and placement of the geometrical structure within the *Growth* murals. The four nested squares can be interpreted as an abstract, conical perspective representation of squares of an identical size. This reading allows for the calculation of the corresponding horizon line and central vanishing point within the 2D artwork (as illustrated by the black lines in Fig. 8). Remarkably, when an observer stands at the centre of the lobby facing either mural, the murals' calculated horizon lines and vanishing points perfectly align with those of the actual surrounding architecture. This achieves a sophisticated, modern form of mock perspective—an artistic technique rooted in the history of architectural painting, notably during the Renaissance. Albers intentionally scaled up his typical Homages to the Square and positioned them not vertically centred, but closer to the floor. This deliberate choice significantly enhances the coherence between the real spatiality of the lobby and the suggested space within the nested squares, making both the actual and the depicted spaces geometrically harmonious.

---

<sup>23</sup> Ulrike Growe, "Homage to the Square," in Josef Albers: Interaction, ed. Heinz Liesbrock and Ulrike Growe (Yale University Press, 2018), 193.

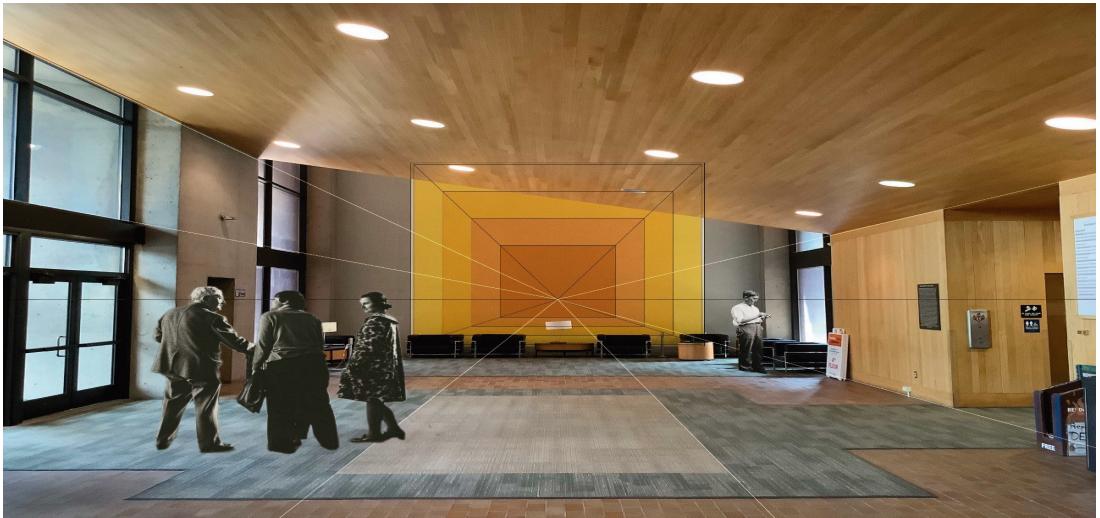


Figure 8. The perspective of the existing architecture (white lines) is coincident with that of the nested squares (black lines), obtaining a modern mock perspective. Source: Photomontage with images of Josef and Anni Albers from “Josef Albers Murals,” 1969, in Jessica Boissel, ed. *Josef Albers and Wassily Kandinsky Friends in Exile* (Yale University Press, 2015).

## 5 CONCLUSION

Josef Albers’ *Growth* murals at RIT demonstrate the artist’s masterful use of colour to modulate space. By applying his Homage to the Square principles to an architectural setting, Albers created a “modern mock perspective” that both complements and animates the lobby interior. The rich, warm palette and precise geometry generate a spectrum of depth effects that are at once static and dynamic.

Our analysis shows that no band of colour in *Growth* has a fixed depth; instead, depth is assigned through relational cues, such as relative lightness, chromatic contrast, and contextual transparency. This aligns exactly with Albers’ philosophy that the depth and identity of each colour is not an intrinsic property, but the result of interaction within the whole composition.<sup>24</sup> Albers conceived of colour as an “actor” whose behaviour (warmth, transparency, proximity) can change under different “directors” (neighbouring hues).<sup>25</sup>

Moreover, *Growth* fulfils the architectural purpose of enhancing the space. Its opposite placement and complementary schemes were designed to emphasize the lobby’s expansiveness and to engage visitors in the built environment. The famous Bauhaus maxim, “Less is more”,

<sup>24</sup> Liesbrock and Growe, eds. Josef Albers.

<sup>25</sup> Danilowitz, Josef Albers, 106–110.

was literally realized: with only two identical structures and four colours Albers enriched the entire room. In finishing *Growth*, Albers advanced an idea that he had first tested in countless studio paintings: that limited formal means can yield infinite experiential possibilities.

In short, *Growth* is a masterpiece of spatial colour layering. It proves that, in Albers' work, colour is not merely decorative, but existential: it constructs space, influences movement, and invites contemplation. These murals remind us that perception is relative, and that our eyes and brains actively work to place colour in depth. *Growth* acts upon its viewers and the room, fulfilling Albers' grandest ambition of creating a work of art that is more than the sum of its parts, resonating with both the architecture and the human eye.

## 6 ACKNOWLEDGEMENT

This text builds upon a previous study by Juan Serra and Michael Murdoch, titled "Colour Spatial Layering in Architectural Interiors after Josef Albers' Homages to the Square at RIT," presented at the 15th Congress of the International Colour Association in Chiang Rai, Thailand in 2023.<sup>26</sup> Our gratitude goes to Brenda Danilowitz (Chief Curator) and Amy Jean Porter (Assistant Curator and Digital Manager) of the Josef & Anni Albers Foundation for providing us with original material about Albers' architectural commissions. Our thanks also go to Amelia Hugill-Fontanel, Associate Curator at the RIT Cary Graphic Arts Collection, for providing material from the RIT archives.

## 7 REFERENCES

- Albers, Josef. *Interaction of Color*. 1st ed. Yale University Press, 1963.
- Benezra, Neal David. "The Murals and Sculpture of Josef Albers." PhD diss., Stanford University, 1983.
- Boissel, Jessica, ed. *Josef Albers and Wassily Kandinsky Friends in Exile: A Decade of Correspondence 1929–1940*. Yale University Press, 2015.
- Da Pos, Osvaldo, Dhanraj Vishwanath, and Liliana Albertazzi. "Color determinants of surface stratification." *Color Research and Application* 46, no. 1 (2021): 88–102. <https://doi.org/10.1002/col.22585>.

---

<sup>26</sup> Juan Serra and Michael Murdoch, "Colour Spatial Layering in Architectural Interiors after Josef Albers' Homages to the Square at RIT," in Proceedings of the 15th Congress of the International Colour Association 2023 (International Colour Association, 2023).

- Danilowitz, Brenda. *Josef Albers: To Open Eyes*. Phaidon, 2009.
- De Kooning, Elaine. "Albers Paints a Picture." *ARTnews* 49, nos. 7 (November 1950): 40–43, 57–58.
- Growe, Ulrike. "Homage to the Square." In *Josef Albers: Interaction*, edited by Heinz Liesbrock and Ulrike Growe, 193–196. Yale University Press, 2018.
- Guibal, Christophe R. C., and Birgitta Dresp. "Interaction of colour and geometric cues in depth perception: When does 'red' mean 'near'?" *Psychological Research* 69, nos. 1–2 (2004): 30–40. <https://doi.org/10.1007/s00426-003-0167-0>.
- Hamm, James. "Josef Albers's Monumental 'Homage to the Square'." *Studies in Conservation* 49, suppl. 2, (2004):179–184. <https://doi.org/10.1179/sic.2004.49.s2.039>.
- Josef and Anni Albers Foundation, Archives, The Josef and Anni Albers Papers 1899–1994, Bethany, CT. <https://www.albersfoundation.org>.
- Liesbrock, Heinz, and Ulrike Growe, eds. *Josef Albers: Interaction*. Yale University Press, 2018.
- Mai, James. "Planes and Frames: Spatial Layering in Josef Albers' Homage to the Square Paintings." *Conference Proceedings of Bridges 2016*, 233–240. Tessellations Publishing, 2016. <https://www.bridgesmathart.org>.
- Redensek, Jeannette. "Farbenfabeln: On the Origins and Development of the Homage to the Square." In *Josef Albers: Interaction*, edited by Heinz Liesbrock and Ulrike Growe, 173–190. Yale University Press, 2018.
- Rochester Institute of Technology, Cary Graphic Arts Collection, Archival Collections, Rochester NY. <https://www.rit.edu/carycollection/>.
- Serra, Juan, and Michael Murdoch. "Colour Spatial Layering in Architectural Interiors after Josef Albers' Homages to the Square at RIT." In *Proceedings of the 15th Congress of the International Colour Association 2023*, 260–266. International Colour Association, 2023.

#### List of Figures

- Figure 1. Left: *Study for Homage to the Square: Lone Whites*, 1963. Oil on Masonite, 24 x 24 inches (60.9 x 60.9 cm). Right: *Homage to the Square: Summer Noon*, 1964. Oil on Masonite, 48 x 48 inches (120 x 120 cm). Source: Heinz Liesbrock and Ulrike Growe, eds., *Josef Albers: Interaction* (Yale University Press, 2018), Figures 142 and 110. © 2025 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York.
- Figure 2. From left to right: a) Scheme with the dimensions and labels for each of the nested squares; b) Photograph of the north mural; c) Photograph of the south mural. Source: Created by the authors, 20 July 2023.
- Figure 3. Schemes indicating the three variables for colour layering analysis: Illusory depth (I, II, III, IV), opacity (O, T) and form (P, F). Source: Created by the authors.
- Figure 4. Personal interpretations of the colour spatial layering in the north (N1) and south (S1) murals. The coding indicates the position of the

squares/frames in illusory space, from nearest to furthest, and whether the colours are opaque (o) or transparent (t). Source: Created by the authors.

Figure 5. Interpretation in 3D of colour layering N2 with opaque surfaces, after Josef Albers' *Growth* (north mural), 1965. Source: Created by the authors.

Figure 6. Left: Josef Albers, *Growth* (south mural), 1965. Right: Simulation of the simultaneous contrast effect, which causes a sense of shadow to appear at the contours of adjacent colours. Source: Created by the authors.

Figure 7. Interpretation in 3D of colour layering S3 with translucent surfaces, after Josef Albers' *Growth* (south mural), 1965. Source: Created by the authors.

Figure 8. The perspective of the existing architecture (white lines) is coincident with that of the nested squares (black lines), obtaining a modern mock perspective. Source: Photomontage with images of Josef and Anni Albers from "Josef Albers Murals," 1969, in Jessica Boissel, ed. *Josef Albers and Wassily Kandinsky Friends in Exile* (Yale University Press, 2015).