

Original Article

ENHANCEMENT IN CHROMOSTEREOPSIS DUE TO EFFECT OF IMPASTO (THICK PASTE OF COLOUR)

Rajendra Bhatia ^{1*} , Dr. Kumkum Bharadwaj ²

¹ Research Scholar, MA (Drawing and Painting), DAVV, Indore, India

² Head and Professor, Department of Drawing and Painting, Government Maharani Laxmi Bai Girls PG College, Kila Bhavan, Indore, India



ABSTRACT

In a practice of art work, particularly while painting, an artist seems to bring about visual depth of certain areas of the painting with help of changing or altering hue using tints, shades, and tones of different colours. Here, in this paper I have discussed a property of a pair of colours causing Chromostereopsis, that is, a visual effect of certain pair of colours where one colour is seen ahead of the other colour even though they are on a two-dimension surface. At the same time, I have discussed the possibility of enhancement of depth when these colours are applied over a textured surface created with help of Impasto.

I have used experiments to access the hypothesis, where I conducted three experiments; one each for showing the known Chromostereopsis with complimentary colours, second using same pair of colours over a textured surface created with help of Impasto (thick paste) of white and grey colours. I conducted the third experiment by reversing the places of the two colours of the pair that was used earlier. Some amazing results were found, which have been noted and discussed in the discussion

The hypothesis was established both by reading on internet about Chromostereopsis and Impasto and with findings from my experiments.

Keywords: Chroma, Color, Stereopsis, Perception of Depth, Impasto, Thick Layering of Color

INTRODUCTION

In an era of augmented reality, where images have started to popping up and out, this research paper is written on the very root cause of an illusion that is perceived as a visual depth in an art work, done with colours that cause Chromostereopsis and the physical layering of thick colour called as Impasto.

There are two things that seems to cause a little or more change in visual perception of depth; one is Chromostereopsis, which is an illusion of one layer of colour being ahead than the other layer of colour in a two-dimension art work, whereas the other is a physical layering of Impasto, which causes an exaggerated illusion of depth.

*Corresponding Author:

Email address: Rajendra Bhatia (rajbhatia5556@gmail.com)

Received: 15 December 2025; Accepted: 09 January 2026; Published 26 February 2026

DOI: [10.29121/granthaalayah.v14.i2SCE.2026.6727](https://doi.org/10.29121/granthaalayah.v14.i2SCE.2026.6727)

Page Number: 80-85

Journal Title: International Journal of Research -GRANTHAALAYAH

Journal Abbreviation: Int. J. Res. Granthaalayah

Online ISSN: 2350-0530, Print ISSN: 2394-3629

Publisher: Granthaalayah Publications and Printers, India

Conflict of Interests: The authors declare that they have no competing interests.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' Contributions: Each author made an equal contribution to the conception and design of the study. All authors have reviewed and approved the final version of the manuscript for publication.

Transparency: The authors affirm that this manuscript presents an honest, accurate, and transparent account of the study. All essential aspects have been included, and any deviations from the original study plan have been clearly explained. The writing process strictly adhered to established ethical standards.

Copyright: © 2026 The Author(s). This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

With the license CC-BY, authors retain the copyright, allowing anyone to download, reuse, re-print, modify, distribute, and/or copy their contribution. The work must be properly attributed to its author.

Figure 1



Figure 1

There is even a third factor that seems to cause an alteration in the perception of depth, that is the illumination of the colours used. Here the alteration is different. There may be uplifting of the colour layer which has brighter illumination.

HYPOTHESIS

Will impasto, which is a thick layering of color, enhance the illusion of depth created by Chromostereopsis? Also, does the illumination of a bright colour used in the back drop alter the whole process of Chromostereopsis?

CHROMOSTEREOPSIS

- Chromostereopsis is a type of visual perception where a specific colour is perceived closer to or farther from the observer than the other colours in a plane pattern.
- “Colours on a flat two-dimensional surface can appear to lie in different depth planes. This phenomenon, readily seen on a computer monitor, is called Chromostereopsis.” [Thompson et al. \(1993\)](#)
- The mechanism is considered to be binocular stereopsis by the chromatic aberration of the eyeball optical subsystem. This possibly occur due to difference of wavelength of the two colours.

“Individual Differences in Chromostereopsis under Natural Viewing Condition” [Hayashi et al. \(2012\)](#)

Figure 2



Figure 2 Chromostereopsis on Plain Paper

IMPASTO

“Paintings are generally considered in terms of their (2D) depiction, but the physical artwork also has a third dimension. Artists deliberately created 3D textural effects on the surface. For instance, the use of impasto to create additional reflections for highlights” [Willemijn \(2019\)](#).

“Impasto creates a richly textured, three-dimensional surface that can catch the light or create tiny areas of shadow, enhancing the drama of a painting”. [Willemijn \(2019\)](#).

Figure 3



Figure 3

Figure 4

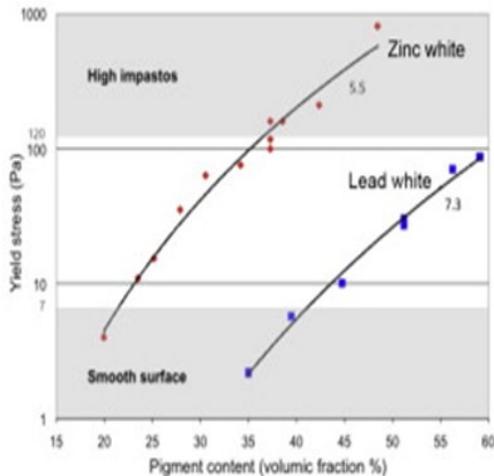


Figure 4

“This artwork by Vincent Van Gogh depicts thick colours (Impasto) uses.

“In the work by Elkhuisen and colleagues investigated the rheology of white paints, specifically lead white and zinc white, to explain how Vincent Van Gogh achieved his famous impasto technique”

“Impasto is an additive technique that creates a tangible, three-dimensional surface, strengthening the sense of depth and layers.” [Baxter et al. \(2004\)](#).

“Research consistently highlights that the raised surfaces of impasto catch light differently, creating a dynamic interplay of light and shadow that changes with the viewer's position or the light source's angle.” [Baxter et al. \(2004\)](#).

METHOD

Although, there is no research on the use of a combination of Impasto and the Colours causing Chromostereopsis to study Visual Enhancement of depth in either of the two; Chromostereopsis and Impasto. So, I had no choice but to depend on Experiments to assess my hypothesis. I conducted different experiments to depict Chromostereopsis, and enhancement of its effect by adding elements of Impasto. I am enlisting my experiments and their findings here one by one and discussing their results in relation to my hypothesis.

EXPERIMENT ONE

Figure 5



Figure 5 Chromostereopsis on Plain Paper

- I selected to paint tints and shades of orange and vermilion alongside of tints and shades of different Blues on plain sheet of paper.
- The material used were acrylic colours with water as solvent, on cold pressed 300 gsm sheet from Canson.

Findings: A positive “Chromostereopsis” effect was found on plain sheet of Paper, using only the high contrast colours.

EXPERIMENT TWO

Chromostereopsis on textured (Impasto) paper

Figure 6



Figure 6 Plain Impasto

Figure 7



Figure 7 Chromostereopsis on Impasto (Textured Paper)

- In the second experiment, I applied thick paste of self-prepared Impasto [Figure 5](#), which was later painted with complementary colours bearing Chromostereopsis effect

- I selected to paint tints and shades of orange and vermilion on upper layer of dried impasto, the higher layer of texture, and tints and shades of different Blues on the lower layers of the texture.
- An increased positive “Chromostereopsis” effect was found as compared the same set of colours applied on a plain surface sheet (Experiment One)

EXPERIMENT THREE

Figure 8



Figure 8 Chromostereopsis on Textured Paper

Here, I reversed the placement of paint by applying the tints and shades of different Blues on the upper layer of an impasto (the higher layer of texture) and tints and shades of orange and vermilion on the lower layers of the texture.

Some strange results are seen here, as I see

- The blue colour that was painted on the upper part of the texture has receded and seen as the far colour.
- The orange and vermilion, which was painted on the lower surface of the texture, seems to have come up and seen as the near colour.

DISCUSSION

- While Experiment One reconfirmed the known effects of Chromostereopsis, which is realisation of depth in two contrasting colour layers.
- Experiment two showed an enhancement in the illusion of depth with additional use of Impasto as first layer, followed by colouring with colour-pair that causes Chromostereopsis
- The experiment three shows some interesting things. The orange along with vermilion, which were painted on the lower layer seems to have lifted the surface to the extent that it looked nearer to the observer, and the blue had receded to the extent that it not only nullified the raised impasto surface, but took it further down to show the blue to be far.
- One observation is that the orange was not made dull. Hence probably the illumination of it brought it near to the observer.

EXPECTED OUTCOME

Figure 9



Figure 9 The Picture Depicting Illusion of Dual Depth with Impasto and Chromostereopsis

- Although it will be little too early to conclude, however, relearning with the dual effect of the depth with Chromostereopsis and Impasto may bring about a new understanding in the latest of the science of creating depth in the paintings, murals, and other forms of Art.
- The question for further analysis: Is this research paper leading to a new practice of an enhanced visual effect in art of Painting? And my emphasis is that "Is this enough of proof to call it a beginning of Chromo-Impasto-ism.
- Further study on illumination effect of different colours and formation of their pair for effect of Chromostereopsis should be carried out to make it more practical for use in the practice.
- A comparative study of the Stiles-Crawford effect (as mentioned by Thompson and et al), to this nearing of the surface due to illumination may also be carried out to further explain the illusion experienced here by the author.

ACKNOWLEDGMENTS

First and foremost, I want to thank my mother Late Shiv Mohini Bhatia to have brought me to this world and give me this instinct to do an artwork and also a thoughtfulness to analyse it. At times I feel that it is she who does it and I am just a channel.

I sincerely want to thank my guide Dr. Kumkum Bharadwaj, HOD (DandP), Maharani Laxmi bai Govt. Girls Post Graduate college, Kila Maidan, Indore, to always motivate and encourage me to write this paper.

REFERENCES

- Baxter, W. V., Wendt, J., Lin, M. C., et al. (2004). IMPaSTo: A Realistic, Interactive Model for Paint. Proceedings of the 3rd International Symposium on Non-Photorealistic Animation and Rendering. <https://doi.org/10.1145/987657.987665>
- Hayashi, T., Kawai, Y., and Sakata, Y. (2012). I-Perception.
- Thompson, P., May, K., and Stone, R. (1993). Chromostereopsis: A Multicomponent Depth Effect. Vision Research. [https://doi.org/10.1016/0141-9382\(93\)90093-K](https://doi.org/10.1016/0141-9382(93)90093-K)
- Willemijn, S. E. (2019). This is Not a Painting: Scanning and Printing a Painting's Appearance. In T. W. J. Callewaert (Ed.).