

The unique colour worlds of painters with colour vision deficiency

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In previous research about colour vision deficiency in artists, colour-deficient painters were judged in terms of their painting ability through comparison with the colour usage of painters with normal colour vision. Researchers have focused on the colour usage skills of colour-deficient painters in a similar manner to “normal” painters, but have not explored whether colour-deficient painters choose colours according to the “normal” colour world or a desire to create works in line with their own colour worlds. Objectives: The purpose of the current study was to obtain insight into how modern artists with colour vision deficiency use colours. Methods: We conducted in-depth interviews with three award-winning (national or international) professional Japanese painters. We asked them questions related to their attitude toward their colour vision and colour choice strategies, and qualitatively analysed the interview responses. The three participants were T. Harada (born in 1954), who mainly uses watercolours and is an internationally renowned creator of picture books; J. Goto (born in 1968), a Japanese-style artist internationally renowned for paintings of ethnic Asians and a creator of picture books; and Y. Kurosaka (born in 1991), who is entering the contemporary art field, mainly uses oil paints, and won one of the biggest national art competitions in 2019. Findings: Japanese society has perceived people with colour vision deficiencies as unsuitable to be artists because of their lack of colour sense. The artists in this study nevertheless made their colour vision deficiencies public when they were aspiring to become artists, because they wanted to improve society’s understanding of colour vision deficiency and encourage children with such deficiencies who may want to be artists in the future. We found that all three painters felt that the use of colours was important to express their feelings and aesthetic sense, and they disliked choosing colours using a personal computer or a colour-measuring device merely to comply with normal colour vision. At the same time, they were also keen to ensure that their colour usage was not strange to people with normal colour vision and used harmonious colour combinations in their works for people with all types of colour vision. Conclusion: Each painter in this study has their own colour use strategy. The strategies are not only based on the “normal” colour world but also on the painters’ colour worlds. The painters are aiming to create original works as professional artists on the basis of their unique colour vision.

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Introduction

In previous research, colour vision deficiency in artists was explored in two ways. The first approach aimed to identify historically famous artists with colour deficiency on the basis of their unusual colour usage. Their paintings were often nearly monochromatic, relying mainly on variations in lightness.

Some artists predominantly used two colours, typically blue and yellow, in their works, and others intentionally created polychromatic paintings with high-contrast colour combinations. It was also suggested that colour-deficient artists show little interest in colouring their creations [1]. However, there is evidence that artists with colour vision can use colours normally through the application of several strategies, such that colour blindness does not preclude the possibility of achieving fame [2-3]. These strategies included checking the colour name on the labels of colour tubes, developing a regular order for arranging colour pigments on the palette, and seeking assistance from individuals with normal colour vision with whom they were in close proximity during the creative process [1]. Both approaches evaluate colour-deficient artists' ability through comparison with artists with normal colour vision. There is evidence that colour-deficient painters obtain insight from their unique colour worlds that promote originality [4]. However, the nature of this insight has not yet been explored in depth.

Few peer-reviewed papers on this topic have been published in Japan. In Japanese society, colour-deficient people have been viewed as inferior. For example, colour-deficient children may quickly lose interest in art because of using the "wrong" colours, according to friends or teachers, when making sketches or reproducing a famous picture in art class. Moreover, many art and design departments of universities and design companies ask candidates to complete a colour perception test, and ophthalmologists published a poster in 2015 warning colour-deficient children that obtaining a job in fields requiring precise colour distinguishment would be difficult [5].

To change this situation, the term "colour vision variation" was introduced by the Genetics Society of Japan in 2017 [6]. According to this term, colour vision exists on a continuum rather than being divisible into binary normal/abnormal categories. However, this notion has not been fully assimilated by Japanese society; most people still believe that colour deficiency prevents people from being an artist or a designer. Nevertheless, there are several colour-deficient professional artists in Japan, although it is not clear if they use colours in the same manner as artists with normal colour vision by employing certain strategies or intend to create works according to their own colour worlds. It is also unclear if they obtain insight for their creations via their unique colour vision. This study aimed to determine whether modern artists with colour vision deficiency are affected by their limited colour vision and how they apply strategies to deal with this. The goal was to provide a basis for evaluating the works of these artists from the perspective of colour vision diversity.

Methodology

We conducted in-depth interviews with three award-winning (national or international) Japanese professional painters (Table 1). Takehide Harada (born 1954) is a painter who combined watercolours and pastels in his works. This internationally renowned creator of picture books has won several major international picture book awards. Jin Goto (born 1968) is a Japanese-style painter who uses natural mineral pigments and is known for his paintings of ethnic Asians. He has also created picture books. Finally, Yu Kurosaka (born 1991) is entering the contemporary art field and mainly uses oil paints. He won one of the biggest national art competitions in 2019. We conducted semi-structured online interviews with Takehide Harada and Jin Goto; Yu Kurosaka was interviewed in person. The main questions concerned how they selected and applied colours, how they deal with their colour vision deficiencies, the essence of their works, and how they want those works to be evaluated. The research was conducted from December 3, 2022 to February 7, 2023. We analysed the interview data using a qualitative method.

Name (year of birth)	Colour vision type	Main painting materials	Awards
Takehide Harada (1954)	Deuteranopia	Watercolours, pastels, pencils, etc.	Grand prize, UNICEF the Ezra Jack Keats international picture book Award, 1994
Jin Goto (1968)	Deuteranomaly	Natural mineral pigments (Japanese-style painting)	The White Ravens 2014, Internationale Jugendbibliothek München
Yu Kurosaka (1991)	Deuteranopia	Oil paints	Grand prize, Shell Art Award 2019

Table 1: Basic details of the colour-deficient artists participating in this study.

Results and discussion

Overview of the artists' works

Takehide Harada is known for sensitive use of pastel colours (Figure 1). He has published many picture books and has abundant experience in the production of cover illustrations for books authored by famous Japanese writers. He prefers to use watercolours even though pale colours are difficult to distinguish for colour-deficient people.

Goto's works use vivid colours and a Japanese painting style (Figure 2), and the main motif is Asian beauty. He has been to several Asian countries, meeting people and looking at scenery directly before trying to reproduce them. Red is a special colour for Goto; indeed, red is loved in many Asian countries, and there are many different types of red.

Kurosaka's works are abstract, and some are representational paintings (Figure 3). The character of this young painter's work is changing. He won the grand prize of the Shell Art Award in 2019, which is one of the biggest competitions for young artists in Japan. During the interview, he described his use of trustworthy colours [7], i.e., colours perceived similarly between those with colour vision deficiencies and trichromats, such as blue and yellow. However, his colour choices have changed as his colour world has developed.



Figure 1 (left): *Letters de Pacheral*, by Takehide Harada (watercolours and pencils, 7 × 5 cm (cover for a picture book published by Asahi Shimbun in 1999).

Figure 2 (middle): *Deo Maiju* —*Chiisana megami* (in Japanese)/*Kumari* —*The living goddess* (Nepal), by Jin Goto (natural mineral pigments, 60.6 × 50 cm. (from the website of Jin Goto; published in 2010).

Figure 3 (right): *Between night and morning*, by Yu Kurosaka (145.5 × 97 cm; published on the idemitsu website in 2019).

Colour choices

All three painters said that colour was one of the most important elements of their works, such that they paid considerable attention to it. However, they do not use colour measurement devices or rely heavily on colour names when choosing colours, and dislike using colours merely because they are considered “correct” by trichromats (e.g., red sun or green trees) if they feel those colours are not in accordance with their feelings.

None of the painters aimed to use colours in the same way as trichromat painters, owing to a desire for originality as professional artists. This does not accord with previous research on the colour usage tendencies of colour-deficient artists. The artists in this study fought against feelings of inferiority regarding their lack of colour sense, but subsequently established their own strategies to express their colour worlds. Harada could not distinguish among some pale colours used in his works. He concentrates when using colours and eschews the use of “correct” colours that are unfamiliar to him for fear of losing the richness of his works. He also uses colours mixed inadvertently on his pallet. Kurosaka uses the same strategy of applying inadvertently mixed colours, but he masks the colour names printed on tubes of paint and moved his atelier from Tokyo to a village rich in nature to escape from the colour world of trichromats and trying to systematise his own colour world. Goto used the “*okikae*” skill in his works, i.e., he used colours to express motifs in an idealised way, where this technique arose from the limited colour variation of natural minerals. In Japanese-style painting, adherence to real-world appearances is not required; painters can choose their own colours. Therefore, Goto could express his own colour world according to his firsthand impressions of Asian countries. He also doubted that there was a marked difference in colour sense between himself and those with normal colour vision viewing his paintings, but he did not focus on this issue and sought to create original works as a professional painter.

Insights arising from colour vision

Despite his love of drawing, Harada despaired about pursuing a career in art when he noticed social oppression of the colour blind in his youth. He had been afraid of using colour, even after being awarded several notable prizes, given his bad experiences in relation to his colour usage. He could not distinguish some colours in his works and could not be sure about how people perceived his colour usage. Therefore, he sometimes asked his family to appraise his colour usage, especially when using a new colour, and the answers from his family were always to the effect of “not strange.” This indicated that his colour usage was harmonious and not discomforting for trichromats. Harada believed that the actual colour world must be more beautiful than his own colour world, but he knew he would never be able to perceive the former. This instilled a sense of loss and fueled his desire to use idealised colours; his sense of loss and this desire in fact arose from his particular type of colour vision.

Goto stated that he did not have many bad experiences regarding his colour use because his colour vision deficiency was not severe. However, his teacher in art school said that he used red excessively when drawing leaves. Although not traumatic, this experience prompted him to pay more attention to others’ perceptions of colours and to adjust colour usage such that trichromats viewing his work would not perceive it as strange. Goto remains unsure about how different his colour world is from those of others, and he also believes that originality is the most important trait of the professional artist. Goto exploits his particular colour vision as a means of achieving originality, believing that colour vision deficiency is actually a strength in this respect. He also expressed the hope that his use of colour would help children who love to express themselves through painting to achieve the confidence needed to pursue a professional art career.

Kurosaka used to have an inferiority complex regarding his use of colours, but his complex gradually dissipated after winning a major art competition in 2019. He revealed his colour vision deficiency to the public for the first time during interviews with mass media following his victory. His interest in colour use and colour deficiency increased in line with his suspicion that his colour usage was strongly affected by the trichromat colour system. Thus, he challenged himself to create art works free from the influence of his school education. Kurosaka was unhappy that society was based only on the trichromat colour world, so he resolved to systematise his own colour world through his creations. He also wanted his audience to question whether they truly see the world according to their own senses or merely as prescribed by society. To that end, some of his colour choices were designed to evoke a degree of discomfort in those viewing his works.

General discussion

All three artists interviewed in this study exploited their particular colour vision when creating works of art. Harada experienced a sense of loss in relation to his inability to sense the actual colour world, which he believes is likely more beautiful than his own colour world, and thus purposed to express beauty through idealised motifs. Goto, meanwhile, aimed to convey his impressions of Asian countries according to his unique colour sense and skills. He believes his colour vision enhances the originality of his works and therefore focuses on using colours according to his own preferences. Finally, Kurosaka's works encourage the viewer to consider society's influence on colour perceptions by evoking a degree of discomfort.

Against this background, all three artists used strategies different from those of earlier colour-deficient artists, who tried to adjust their colour usage for compatibility with the colour worlds of trichromats. As such, they do not rely on colour names or colour-measuring devices. Harada and Kurosaka even utilise colours inadvertently mixed on their palettes. All three artists aim to exploit their own unique colour worlds in their works, rather than conforming to "normal" colour use. Their harmonious use of colours can be both appealing and interesting for trichromats. After a period characterised by feelings of inferiority or doubt about their own colour vision, all three artists embraced their colour worlds as a means of achieving originality as artists. Moreover, they encourage children hoping to pursue careers as artists to have confidence in their own colour worlds and continue to express their imagination and skills accordingly, rather than conforming to trichromatic-based painting. Society may now be ready to embrace colour vision diversity because of the efforts of colour-deficient artists.

Conclusion

The purpose of the current study was to gain insight into how modern colour-deficient artists deal with their limitations and deploy colours. All three artists interviewed use specific strategies to apply colours in their works, different from those documented in previous studies. They reported being conscious of the colour worlds of trichromats but did not aim to use colours in conformity therewith. All of them stated that colour is an important element of their works and only use colours compatible with their feelings. Thus, they aim to use colours that, while not fully adherent to the colour world of trichromats, are nonetheless still attractive to them. Recently, the idea of colour vision diversity has entered into the consciousness of Japanese society but the concept remains difficult to understand; people tend to believe that everyone shares the same colour world. Colour-deficient artists have shown

us that each colour world has its own sense of harmony, and the works of such artists can convey beauty in a unique manner.

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References

1. Lanthony P (2001), Daltonism in painting, *Color Research and Application*, **S26**, s12-s16.
2. Marmor MF and Lanthony P (2001), The dilemma of color deficiency and art, *Survey of Ophthalmology*, **45** (5), 407-415.
3. Barry LC, Ross WH (2009), Colour blindness does not preclude fame as an artist: celebrated Australian artist Clifton Pugh was a protanope, *Clinical and Experimental Optometry*, **92** (5), 421-428.
4. Marmor MF (2016), Vision, eye disease, and art: 2015 Keeler Lecture, *Eye*, **30**, 287-303.
5. Japan Ophthalmologists Association. Shikikaku kensa no susume (in Japanese).
[https://www.gankaikai.or.jp/colorvision/20151005_poster.pdf – last accessed 19 February 2023]
6. The Genetics Society of Japan. Idnngaku yougo kaitei nitsuite (in Japanese).
[https://gsj3.org/wordpress_v2/wp-content/themes/gsj3/assets/docs/pdf/revisionterm_20170911.pdf – last accessed 19 February 2023]
7. The Asahi Shimbun Digital. Shikikakushougai aru gaka ga kataru “Shinrai suru enogu” sono iro towa (in Japanese).
[<https://www.asahi.com/articles/ASMDK3GK3MDKUCVL002.html> – last accessed 10 September 2023]
8. Harada T (1999), Letters de Pacheral (watercolors, pencils, 7 × 5 cm; picture book cover), Osaka: Asahi Shimbun.
9. Goto J (2010), Deo Maiju – Chiisana megami (in Japanese)/Kumari – The Living Goddess (Nepal) (natural mineral pigments, 60.6 × 50 cm).
[<https://gotojin.wixsite.com/website/works> – last accessed 10 September 2023]
10. Kurosaka Y (2019), Between night and morning (145.5 × 97 cm).
[https://www.idemitsu.com/jp/enjoy/culture_art/art/2019/winner_interview.html – last accessed 10 September 2023]