

ISSN 0389-9357

Volume 37

Number 6

2013

日本色彩学会誌

JOURNAL OF THE COLOR SCIENCE
ASSOCIATION OF JAPAN日本色彩学会
THE COLOR SCIENCE ASSOCIATION OF JAPAN日本色彩学会第1回秋の大会特別号
発表論文集

会期：2013年 11月15日-17日

会場：倉敷公民館
倉敷市民会館
大原美術館

口頭発表：22件

ポスター発表：10件
(カラーデザイン作品発表1件を含む)

大会案内とプログラム

LIGHTNESS CONSTANCY BY USING REAL SPACE ENVIRONMENT

Chanprapha Phuangsuwan

Color Research Center, Rajamangala Univ. of
Technology Thanyaburi (RMUTT), Thailand

Soros Mooklai

Graduate School, RMUTT, Thailand

Mitsuo Ikeda

Color Research Center, RMUTT, Thailand

Keywords: Lightness constancy, Real space, Whiteness, Illumination, Elementary color naming.

1. Introduction

The purpose of this study is to demonstrate the lightness constancy by using a real space. Most studies in the past demonstrated it on 2D displays^{1, 2)}. As we live in 3D spaces it is important to demonstrate the phenomenon in the real situation. The present paper shows the lightness constancy in a normal room.

2. Experiment

The experimental room was the size of 120 cm wide, 310 cm long, and 200 cm high. The room was divided to two rooms A and B of the size 230 cm and 80 cm long, respectively by a separating wall as shown in Fig. 1. The room A was pasted by a white wall papers. There was opened on the separating wall a small hole at the subject eye level when he/she sat on a chair. Two experiments were conducted, Experiment 1 and 2. Room A was illuminated by fluorescent lamps of the daylight type attached at the ceiling and room B by fluorescent lamps of the same type as the room A. The lamps were attached horizontally on the separating room above and below the hole in Experiment 1 and on the back wall at a slightly higher position than the subject head in Experiment 2. Both rooms were decorated by some objects such as books and artificial flowers to simulate a normal room.

2.1 Experiment 1

The surface of the separating wall in room B was a brown plywood. A subject looked at two places in the room A, just above the front shelf and just below the shelf where a shadow was made by 25 cm deep the shelf locating at 87 cm high from the floor. In the outside phase of experiment he/she looked at these two points monocularly through the hole of the size 1 x 1

cm² and in the inside phase the subject moved inside the room A and directly looked at these points binocularly. He/she judged amount of whiteness and blackness by the elementary color naming method.

Five illuminance levels were investigated, 10, 100, 200, 300 and 400 lx, when measured on the shelf in room A and on a shelf in room B (not shown in Fig. 1) attached behind the subject at the same height as room A. In the inside phase the subject wore a cap to eliminate ceiling lamps from his/her visual field.

The distance of the subject eyes from the wall in the outside phase was 29 cm and was 215 cm from the front wall in the inside phase.

2.2 Experiment 2

The separating wall in room B was pasted by the same white wall paper used in room A and the observing hole was increased to 2 x 2 cm². The vertical plane illuminance was kept constant at 170 lx in room B when measured on the observing hole. Six illuminance levels were employed for room A, 12.5, 25, 50, 100, 200 and 400 lx. When the illuminance was 183 lx the luminance of the upper side of wall in room A became same as luminance at the hole in room B.

Five subjects participated both in Experiment 1 and 2 and the judgment was repeated for five times.

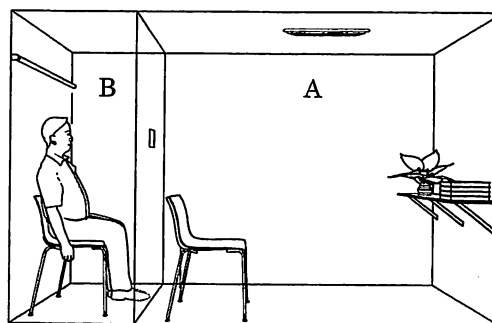


Fig. 1 Experimental apparatus

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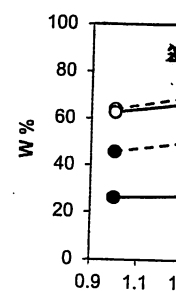


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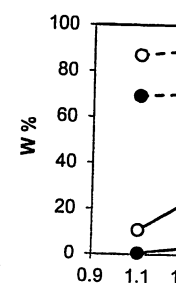


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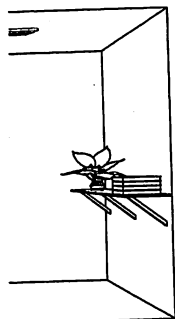
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3. Result and discussion

The averaged results from the five subjects are shown in Fig. 2 for Experiment 1. The abscissa shows the illuminance employed for both rooms and the ordinate the whiteness amount in percentage. Solid lines indicate the whiteness judged in the outside phase and dotted lines in the inside phase. Open circles are for the upper portion of the shelf and filled circles for the lower portion of the shelf.

When the wall of room A was observed through a small hole the pasting phenomenon took place. That is, the wall appeared to be pasted at the small hole and the subject observed it as one of objects in the room B. The luminance of the wall under the shelf in Room A was low and the subjects judged its whiteness low to reflect the luminance as shown by filled circles connected by solid lines. When the wall was observed in the inside phase the whiteness increased as shown by filled circles connected by dotted lines. Subjects recognized the front wall was made of a same wall paper and the lightness constancy took place for the wall showing less difference between the upper portion and the lower portion.

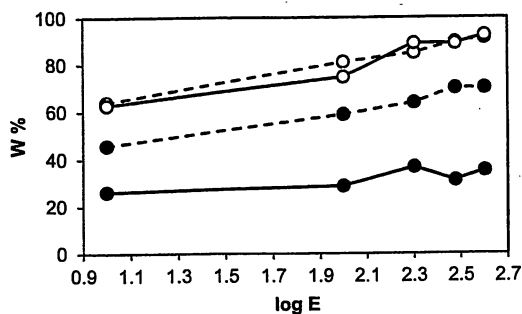


Fig. 2 Results from Experiment 1.

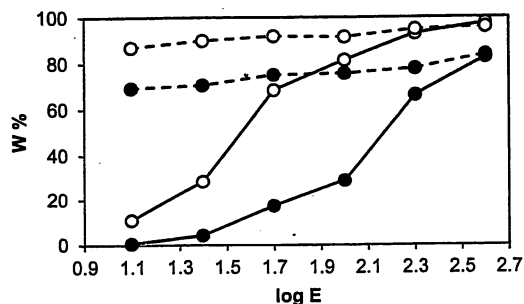


Fig. 3 Results from Experiment 2.

All the curves increased for higher illuminance. This shows that the whiteness increased for brighter room in agreement with results shown by Hurvich and Jameson³⁾.

The results from Experiment 2 are shown in Fig. 3. Here the illuminance of the room B was kept at 170 lx and only the illuminance of the room A was changed, which is shown along the abscissa. Symbols and line types are same as in Fig. 2. Two curves obtained in the inside phase showed similar trend as in Fig. 2, namely a gradual increase for higher illuminance of the room A and lower judgment of whiteness for the lower portion of the shelf.

In the case of outside phase the whiteness is very low at 12.5 lx of room A and it was almost zero for the lower portion of the wall. The whiteness gradually increased for higher illuminance of room A reaching the amount of whiteness judged in the inside phase at the illuminance of the room A which gave same luminance as for the room B.

The most important feature in Fig. 3 is the large difference between the outside phase and the inside phase at low illuminance. In the outside phase the whiteness was judged by the luminance of the wall but in the inside phase it was judged by the lightness of the wall. The lightness constancy took place in the inside phase while it did not take place in the outside phase. It is important for a subject to stay in the room A to have the lightness constancy.

References

- 1) A. Gilchrist and A. Jacobsen: Lightness constancy through a veiling luminance. *Human Perception and Performance*, Vol 9 (1983) 936-944.
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- 3) D. Jameson and L. M. Hurvich: Complexities of perceived lightness. *Science* 133 (1961) 174-179.

編集後記

日本色彩学会第37巻第6号をお届けします。

今回の内容は記念すべき第1回秋の大会の研究発表論文集です。

この秋の大会は、学会の活性化を目的として、地方会員の拡大、若手研究者の育成、そして研究会活動の活性化を狙いとしています。その狙い通り、当初の発表想定件数を上回り、32件もの発表が行われる運びとなりました。またそれに伴い、この号も充実した内容となり、皆様に満足いただける構成となっております。

秋の大会号における編集委員会の作業は、基本的に春の全国大会号での作業を6ヶ月ずらす形で踏襲しました。かなりタイトなスケジュールの中、開催地が倉敷であることを考慮して、関西支部の委員で編集委員会の審査小委員会(河本委員、嶋津委員、能口委員、近藤桂司臨時編集委員、西)を立ち上げ、辻埜氏と連携をとりながら、閲読依頼や閲読結果の整理、申込者への閲読結果の送付等を行いました。またプログラム編成は、実行委員長でもある河本委員が大会実行委員会において何度も調整を行いました。今回初めて編集作業に携わりましたが、要旨集作成は色々とバランスをとりながら進捗していく作業であり、簡単な仕事ではないことをまざまざと実感した次第であります。個人的に秋の大会特有の問題(?)と懸念していた、お盆休み

による作業の遅延はどうやら杞憂に終わったようです。これも大会実行委員会の方々や閲読者のご協力の賜物と心より感謝しております。

私の記憶が定かであれば、学会誌編集委員会のもとで行われる全国規模の大会の発表概要閲読は、今回で6回目になるようです。概要閲読に関しては色々とご意見もあるようですが、ひとまずは皆様のご協力により、この制度は定着しつつあると認識しております。色彩学会の特徴として、学際的な研究・教育・活動が多いことが挙げられますが、分野によっては閲読者が非常に少ない現状があり、今回の閲読依頼でも少々骨を折りました。この秋の大会をきっかけに新たな交流が生まれ、そこから学会の活性化につながることを切に願います。

さて、この秋の大会では研究会による催しも目玉の一つです。残念ながら本号にはその内容を掲載することはできませんが、どれも非常に魅力的な内容となっております。是非とも実際に足をお運び頂き、研究会企画を存分に楽しんで頂くことを期待しております。

それでは秋深まる倉敷にて、記念すべき第1回秋の大会が大盛況の運びとなることを祈念し、後記の結びといたします。

(西 省吾)

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印刷・発行 2013年11月1日

ISSN 0389-9357

発行人 池田光男 編集人 名取和幸

発行所 日本色彩学会 東京都新宿区下落合3-17-42(208) 〒161-0033 (電) 03-3565-7716

支部 関東支部 横浜市港北区日吉4-1-1 慶應義塾大学第8校舎心理学教室内 〒223-8521
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