Blackness

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Aims

Collect psychophysical data

To explore potential effect of culture (nationality/gender) on blackness preference

To support and test the development of blackness equations

Experiments

Paired comparison

Ranking

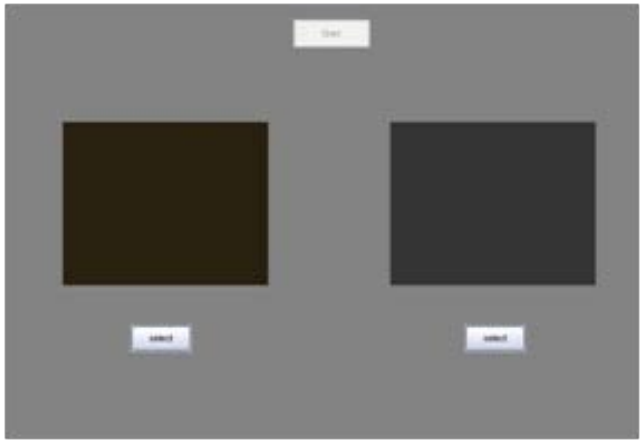
Experiments

Paired comparison

Blackness perception – which of the samples is most black?

Blackness preference – which of the samples do you prefer?

Experiments

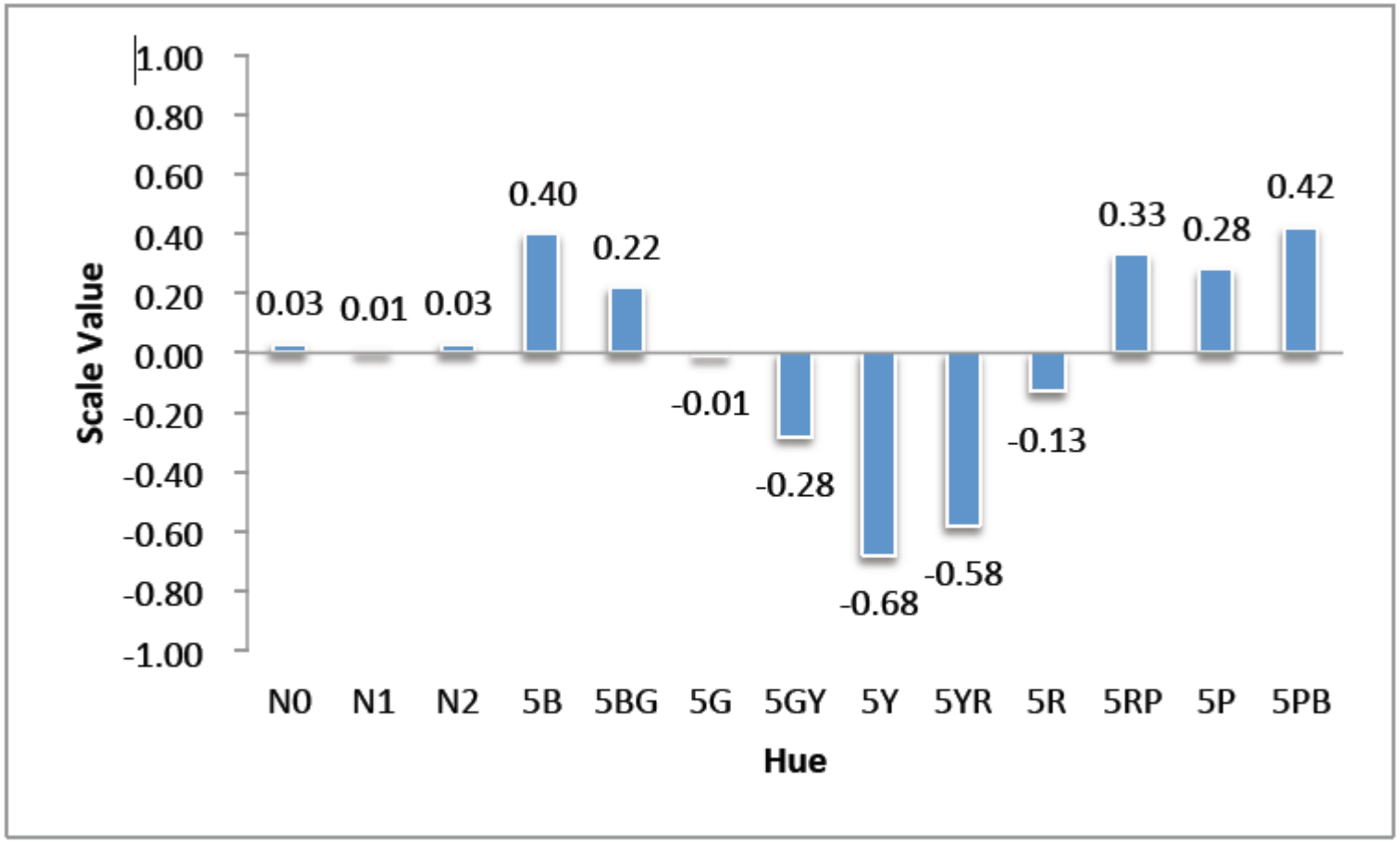


Munsell samples were simulated on a display.

N0, N1, N2, then at Value 1 and Chroma 2, 5B, 5BG, 5G, 5GY, 5Y, %YR, %R, 5RP, 5P and 5PB

Pair Comparison I – Blackness preference

40 observers: China (12 female and 8 male), UK (12 female and 8 male)



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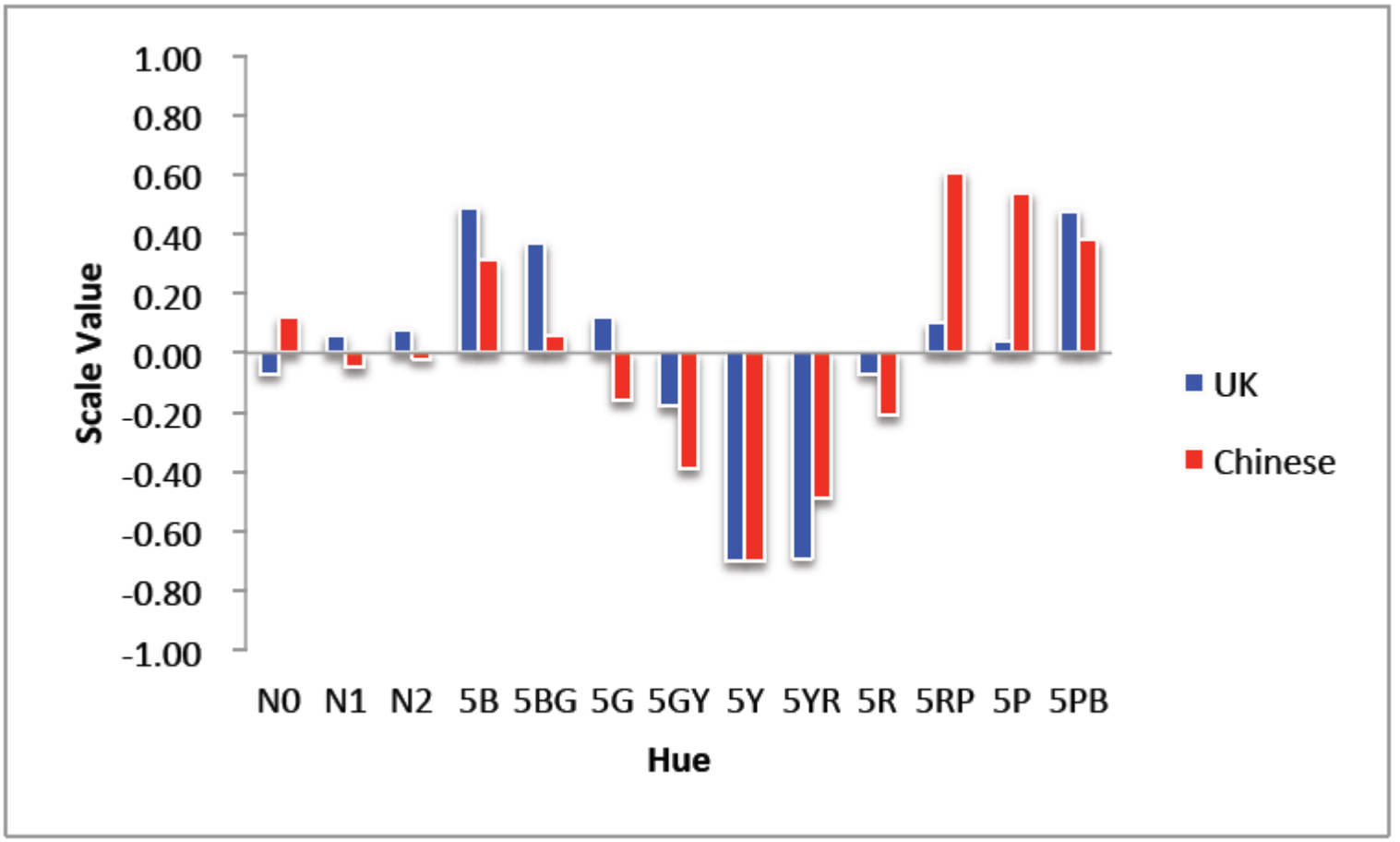

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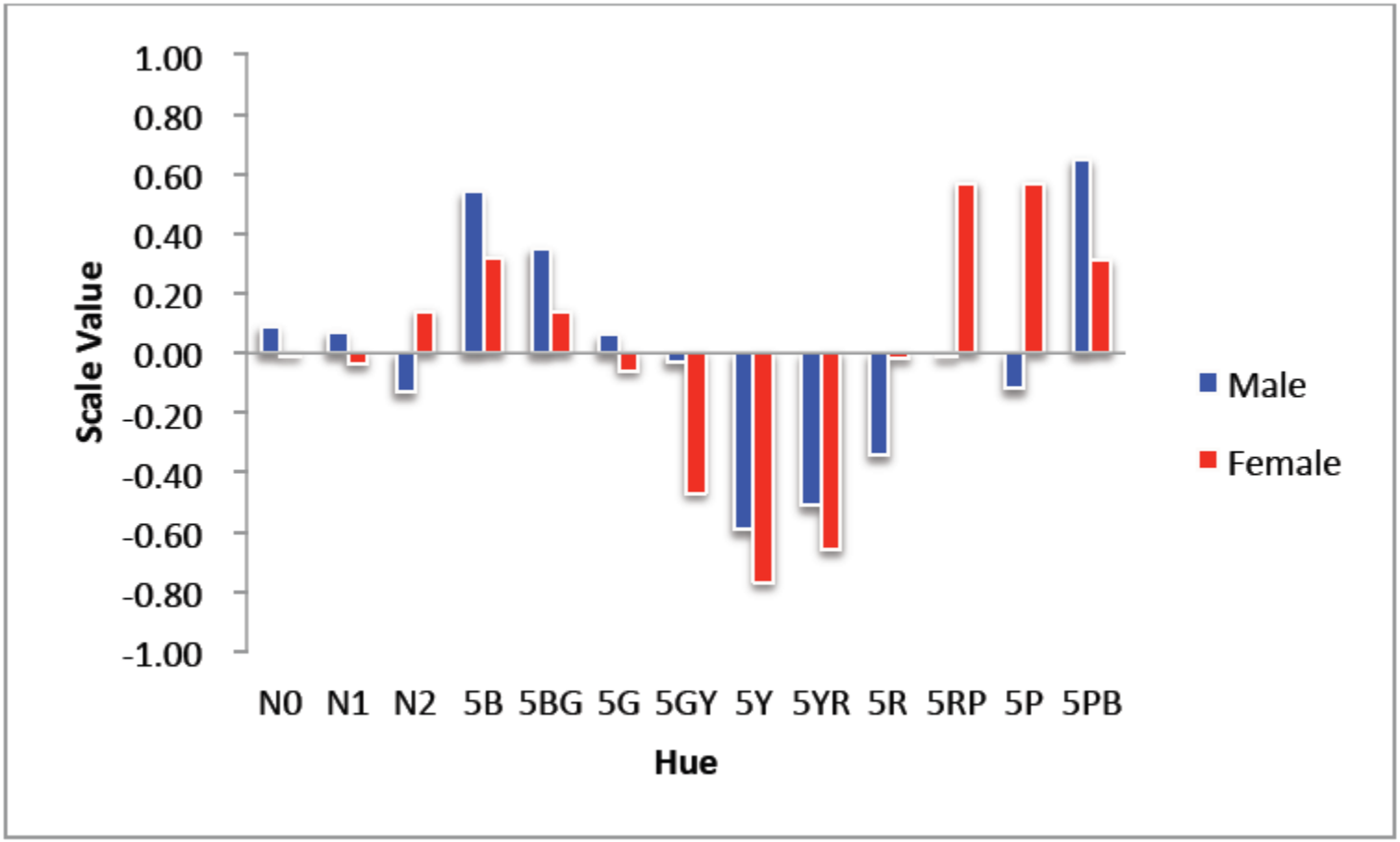

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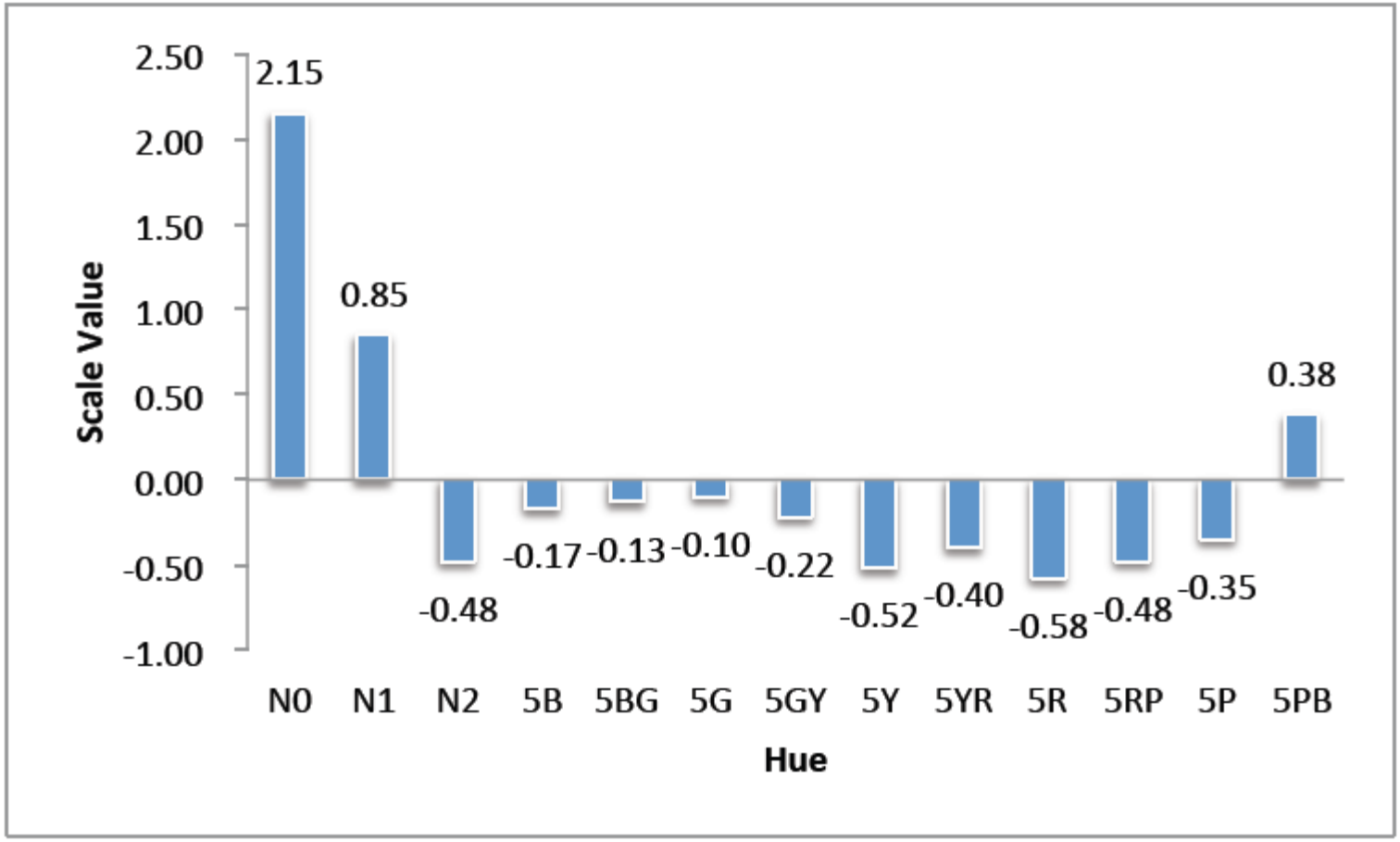

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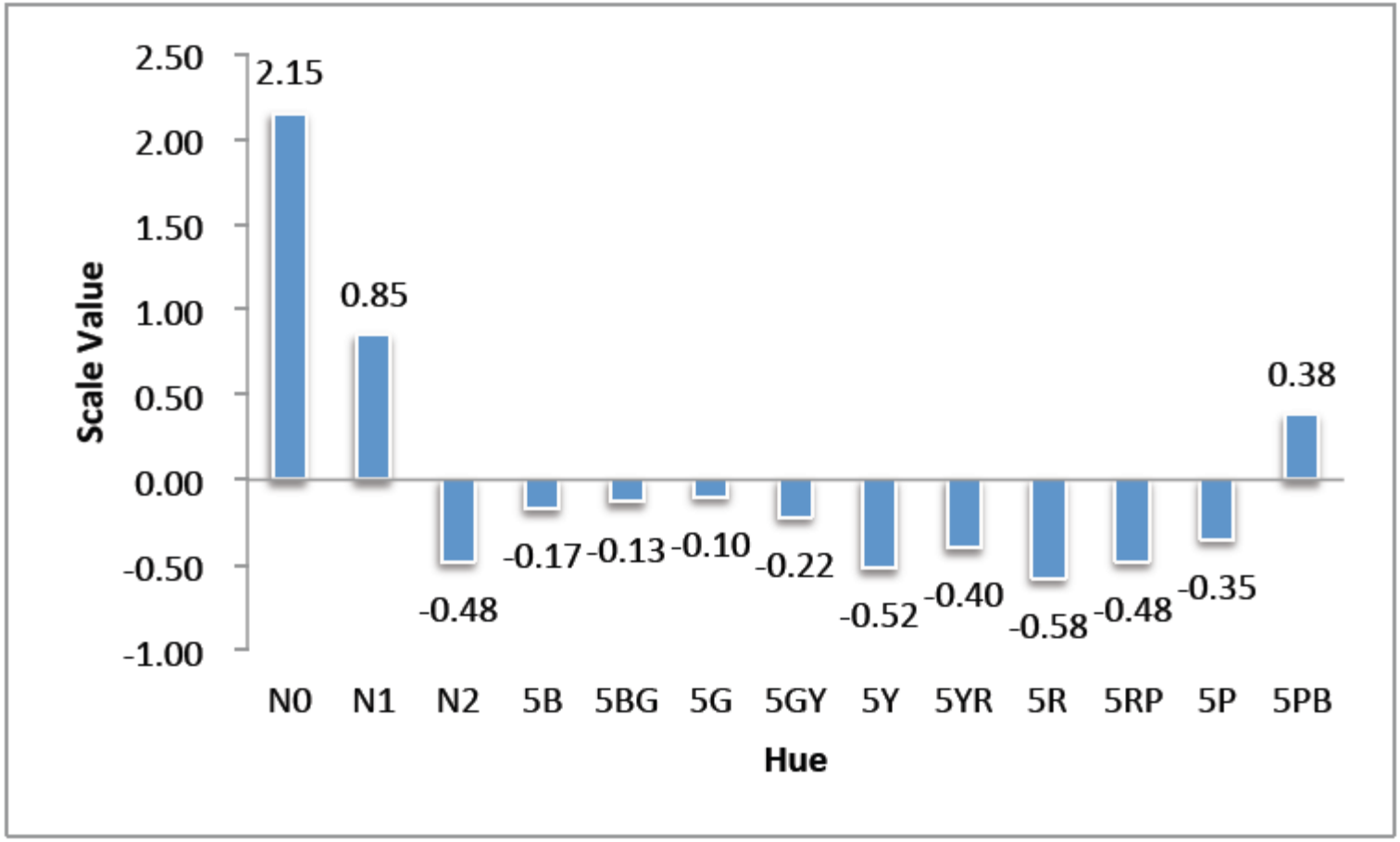

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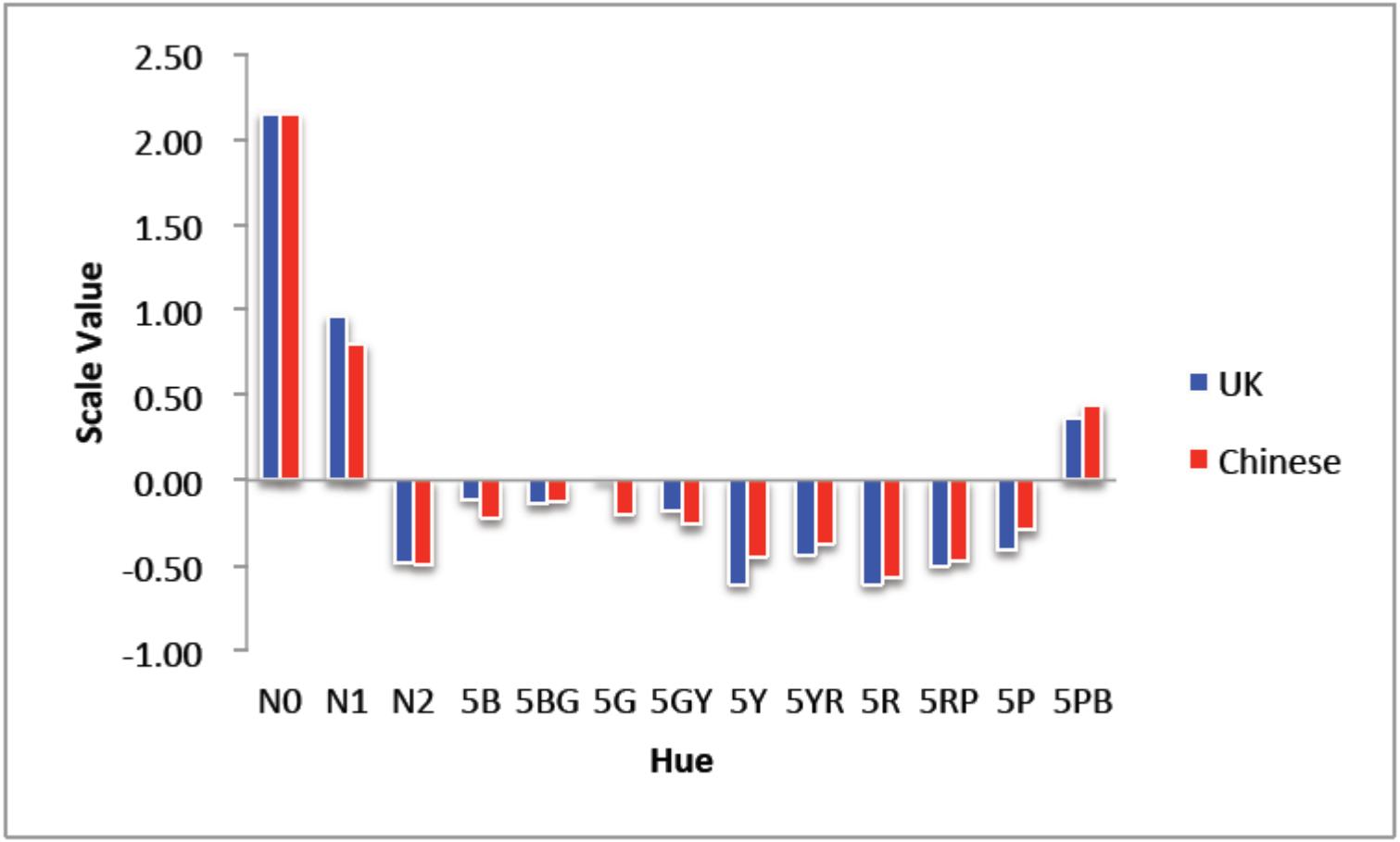


Summary – Blackness perception

Chapter	Method	Finding	Culture
3	Paired comparison	Darkest, least chromatic, samples most black. Bluish blacks (5PB) blacker than reddish and yellowish blacks (5R, 5RP and 5Y). N0 was the blackest sample.	No effect.
4	Paired comparison	The more chromatic a colour, the less black it is.	No effect.
5	Ranking	Bluish blacks blacker than reddish and yellowish blacks. The more chromatic a colour the less black it is.	No effect.

Summary – Blackness preference

Chapter	Method	Finding	Culture
3	Paired comparison	Purplish and bluish blacks preferred to reddish and yellowish blacks. 5PB preferred to N0. The darkest, least chromatic black is not the most preferred.	Chinese / female observers prefer reddish blue-blacks; UK / male observers prefer greenish blue-blacks.
4	Paired comparison	The more chromatic a colour, the less black it is.	Chinese / male observers prefer darker blacks; UK / female observers prefer lighter blacks.
5	Ranking	Purplish and bluish blacks preferred to reddish and yellowish blacks.	Chinese / female observers prefer reddish blue-blacks; UK / male observers prefer greenish blue-blacks. Chinese / male observers prefer darker blacks; UK / female observers prefer lighter blacks.

Blackness Prediction

$$B_W = 8.6542 - 0.2583L^* - 0.0052a^{*2} + 0.0045b^{*2}$$

Westland *et al.*, 2006

$$B_C = 3.02 - 0.05\{(L^*)^2 + 0.89(a^*+2)^2 + 0.36(b^* - 33)^2\}^{1/2}$$

Cho *et al.*, 2013

$$B_{CIE} = cY + d(xn - x) + e(yn - y)$$

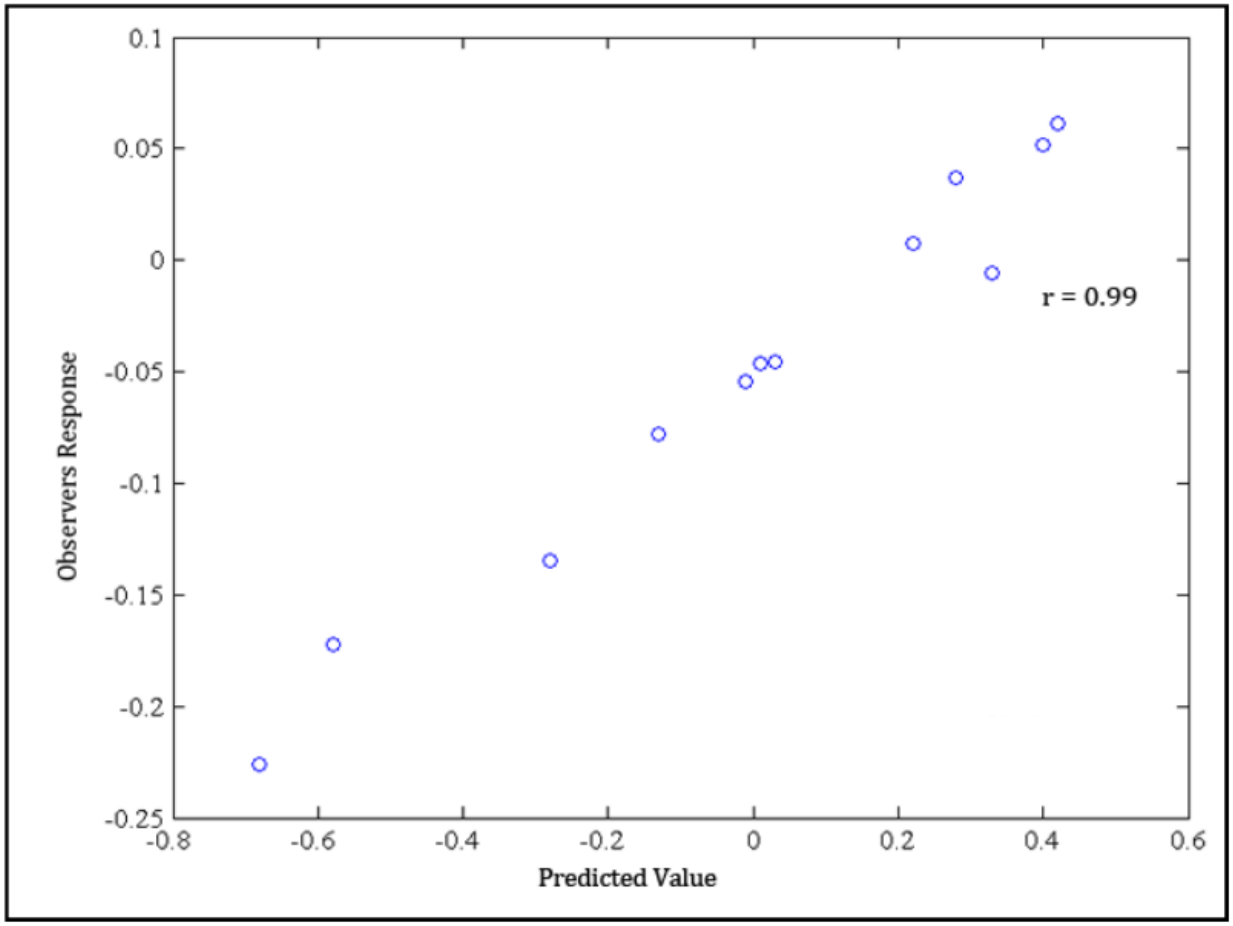
Based on CIE W

Blackness Prediction

	Westland	Cho	CIE
13 samples paired comparison (mainly hue varying)	0.25	0.59	0.99
29 samples ranking	0.17	0.13	0.60

Table shows r^2 values

Blackness Prediction



Tentative Conclusions

Asking about how black something is and how much someone prefers a black are probably very different things

For blackness perception, the results are broadly consistent with the literature and find no nationality / gender effects

For blackness preference, the results show some interesting nationality / gender effects

A modified form of the CIE W equation may be useful for predicting blackness perception