What determines the choice of colour in Pleistocene hominins?

Sarah Paris[1]
1 University of Cambridge

UNIVERSITY OF CAMBRIDGE

An investigation into the pigments used by four different species of hominin, and how their specific choices of colour can inform us about the evolution of colour perception.

Introduction

The research questions that I shall address are:

1. Did different species of hominin have preferences for specific colours, and if yes, do they differ (and why)?
2. Did neurobiological or cultural factors, or both bring about colour perception?
3. What do the four species' approaches to colour tell us about their cultural evolution, with particular reference to "behavioural modernity"?
4. What advantages does colour perception give a species?

Overall, my research will help decide between three different models of the evolution of colour perception in hominins:

1) Colour perception is a product of evolutionary neurobiology;
2) Colour perception is determined culturally;
3) Colour perception evolved as a result of both neurobiological and cultural elements.

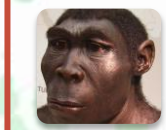
Evidence base

Homo erectus, Homo heidelbergensis, Homo neanderthalensis, and *Homo sapiens* between 1.2 million and 30,000 years ago.

I will study evidence from the full geographical range of the four species' distribution, including Africa, Europe, Asia, the Levant and Australasia.

My primary data will be pigment samples, but to contextualise these and their analysis I will also refer to site reports, geological and geographical maps, chemical analyses, ethnographic data, craniometrics, and experimental archaeology.

Map of Pigment Sites


Homo erectus


Homo heidelbergensis


Homo neanderthalensis


Homo sapiens

Method

My study will use five themes: colour, location and geology, modification, use, and palaeontology.

Colour

Colour analysis determines the colour of the archaeological pigments. The Colour Management System (CMS), which is a relatively inexpensive colour sensor, can measure areas of > 3mm. This machine removes any subjectivity from colour determination by eye. CMS will be applied to pigment samples from each of the sites.

Location and Geology

The location and geology demonstrates the effort expended by hominins to locate raw materials and create pigment. Methods include literature, site reports, geological and geographical maps, and GIS.

Modification

A review of chemical analysis, where available; site reports; and experimental archaeology will be used. Using the chemical analysis of the pigments, experiments will be carried out to determine how specific colours were created, and then the colours will be replicated. Further experiments will ascertain how colours change over time when exposed to the natural elements. Samples will be exposed to artificially intense elements in an attempt to mimic the aging processes that might affect a pigment's colour. CMS will monitor any changes in colour.

Use

Ethnographic data shall be gathered through literature and interviews with contemporary groups whose climates are analogous. By understanding the purpose of the pigments we can appreciate the importance of specific colours.

Palaeontology

Geometric morphometrics for four species shall be collected from paleontological reports. This will determine the shape of the occipital portion of the skull. Thus the effects on the visual cortex can be deduced from the neurobiological effects of changes to the occipital lobe.