Glossy Black is not actually 'Black': Evidence from Psycholinguistic Colour-Naming Studies in 14 European Languages

[1]Mari Uusküla
mari.uuskula@tlu.ee
[2]Martin Eessalu
eessalu@gmail.com

[1]Tallinn University,
School of Humanities
[2] Independent researcher

ABSTRACT

Since Berlin and Kay's seminal monograph, most studies on colour vocabulary and categorization have concentrated on the three main characteristics of colour – hue, lightness and saturation – which play a major role in the semantics of colour terms. This paper addresses a rarely discussed phenomenon, the appearance and naming of the surface of the colour stimuli, and argues that researchers should pay careful attention to possible unintended consequences when selecting their materials for psycholinguistic experimental (field) work. Until recently, researchers have remained true to examining the main colour characteristics, not observing beyond, in spite of glaring evidence from some less-studied languages. Native speakers of fourteen typologically diverse languages spoken in Europe participated in two colour-naming experiments carried out with Color-Aid or Munsell stimuli. Having a single colour term black in the spotlight, the paper argues that glossiness might be an extra-linguistic feature which contributes to the semantic meaning of a colour term. According to the evidence gathered, black only seems to refer to a non-shiny, matte colour and has therefore been underused for glossy-surfaced stimuli in our datasets, resulting in a risk of elimination from the inventory of basic colour terms due to its low naming frequency and object-relatedness.

KEYWORDS

Semantics, field methods, experimental methods, colour naming, cross-linguistic comparison, colour appearance

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Mari Uusküla is Associate Professor of Linguistics and Translation Theory at Tallinn University, School of Humanities. Her research interests include semantic typology; colour naming, categorization and perception, field linguistics, and psycholinguistics. She has published research articles on colour semantics and categorization in a range of European languages including Italian, Russian, Hungarian, Finnish, Czech and others.

Martin Eessalu is currently an independent researcher, whose body of research includes musical instruments, ethnobiology and colour perception among others. The common denominator to bring the topics together would be psycholinguistics and human perception of objects and senses.

1. INTRODUCTION

It is widely known that colour consists of three main features – hue (or colour in non-technical English), saturation and lightness (Biggam, 2012: 3-4). However, there are languages which do not build their colour vocabulary on these particular features, but concentrate on other aspects, such as surface texture or the impression of colour. Despite the fact that these features have been discussed to a certain extent in the literature (Conklin 1955), the wider audience still concentrates on hue, lightness and saturation, especially when stimuli are selected to carry out a (psycholinguistic) colour-naming experiment. The aim of this paper is to shed some light on other features of colour which Carole Biggam has classified as *"other aspects of appearance"* and *"non-appearance aspects"* (Biggam, 2015: 5-6). Bringing examples from various languages spoken in Europe, this paper shows that certain aspects of colour affect the way the speakers of these languages perceive colours and talk about them. The purpose of the article is not to attack the theory by Berlin and Kay, as might be perceived, but to bring new understanding and fresh knowledge into the discussion on colour naming, where the emphasis is essentially placed on colour naming, appearance and semantics.

The aim of this paper is to contribute to the general controversy of psycholinguistic colour research with an emphasis on a rarely discussed feature. We investigate the selection of colour stimuli shown to subjects during psycholinguistic (field) experiments, or more precisely, the surface of the selected stimuli. Taking the category black as an example, we argue that the rather overlooked feature of surface is an important one and should be taken into account when choosing appropriate stimuli for psycholinguistic colour-naming studies.

While carrying out psycholinguistic fieldwork on the Estonian language within the project Evolution of Semantic Systems (EoSS) (Majid, Jordan, Dunn, 2015), run and coordinated at the Max Planck Institute for Psycholinguistics, we observed that subjects had difficulties recognizing and naming glossy colour chips of the darker hues. More specifically, despite the fact that colour selection contained one black colour tile, there was a remarkable lack of consensus between subjects cross-linguistically, i.e. the glossy surface of a black stimulus caused misunderstandings and confusion in the colour naming task – the black tile was not actually named *'black'* by participants as it was probably perceived differently.

We replicated the EoSS study with Estonian subjects in 2015 keeping the exact study design and yet obtained the same results. If we analysed the Germanic language data from the EoSS project (courtesy of our colleagues, see acknowledgement) the same pattern could clearly be identified: in only a couple of languages from the Germanic language group were the participants able to name the black stimulus with a relatively high level of consensus. By consensus we mean that at least 50% of the interviewees of one particular language named the specific stimulus using the colour term *'black'*. In the majority of languages the black stimulus was named differently.

On the other hand, in a colour naming field experiment which was similar design-wise, but contained different stimuli based on the Ostwald colour system, no similar issue could be identified. In every language, there was at least one stimulus which was constantly named *'black'* with high consensus among the participants. We therefore conclude that some other aspects besides the hue of the stimulus may contribute to such a vast difference in colour naming between the two studies. Leaving aside a minor dissimilarity in stimulus hue, the most notable discrepancy between the two sets of stimuli emerged in the matte vs glossy surface: Color-Aid tiles had matte surfaces, while the Munsell set was glossy.

2. PARTICIPANTS

The languages chosen for this study constitute a convenience sample: we needed a reasonable amount of data for both Munsell and Color-Aid Corporation stimuli, and were able to retrieve the data for the languages listed in Table 1. There is almost no overlap between the investigated languages, but as our goal was to exemplify a wider cross-linguistic phenomenon, we argue that the imbalance of the two groups was not an obstacle. Group I data were gathered using Color-Aid Corporation stimuli, while Group II data were collected using Munsell stimuli.

The results for Germanic languages and their colour systems have been published in (Vejdemo et al. 2014). The constitution of the two groups shown in Table 1 is comparatively different: Group I data (using Color-Aid stimuli) were gathered with the idea of keeping the internal structure of the language sample balanced in terms of age and gender. The amount of data per language was also (usually) larger. Group II (EoSS data) language samples had younger mean ages as the target groups were undergraduate students with no particular knowledge of linguistics (Majid, Jordan, Dunn 2015). Nevertheless, nearly every language sample of Group II included some older subjects too. There is a slight possibility of a bias due to EoSS studies normally having fewer subjects, but it is rather unlikely that the effect of bias

Group	Language	Number of subjects	Females/ males	Mean age (W/M)	Data collector
Group I	Finnish	68	42/26	39.5 (38.4/41.4)	Mari Uusküla
	Lithuanian	51	35/16	42.3 (40.5/46.3)	Simona Pranaityte
	Italian	102	56/46	38.6 (36.8/40.9)	Mari Uusküla
	Czech	52	33/19	34.7 (32.6/38.2)	Mari Uusküla
	Hungarian	125	66/59	35.6 (37.0/34.1)	Mari Uusküla
	Spanish	38	20/18	42.7 (49.2/35.5)	Kelly Parker
	Estonian	19	10/9	32.7(33.8/31.5)	Triin Kalda
Group II	Swedish	20	10/10	27.2 (24.8/29.6)	Susanne Vejdemo
	Estonian I	29	16/13	28.7 (27.1/30.7)	Martin Eessalu, Mari Uusküla
	Estonian II	20	15/5	30.9 (N/A/N/A)	Liina Kivimets
	English	20	9/11	22.3 (22.8/21.8)	Linnaea Stockall
	Swiss German	20	10/10	25.6 (26.9/24.3)	Martina Zimmermann
	Danish	20	11/9	26.5 (27.2/25.4)	Carsten Levisen
	Icelandic	21	10/11	29.0 (33.6/24.8)	Matthew Whelpton, Thorhalla Beck
	German	20	10/10	21.1 (21.0/21.2)	Cornelia van Scherpenberg
	Norwegian	20	9/11	28.4 (26.2/31.1)	Aashild Naess

Table 1 - The sample of languages, the number of subjects, their mean age and female/male ratio.

was responsible for the entire phenomenon we describe here.

3. STIMULI AND PROCEDURES

Two experimental methods were used to gather the data: the data for Group I languages were obtained using the field method established by Ian Davies and Greville Corbett (1995); the data for Group II languages were gathered using a method devised by Majid and Levinson (2007).

In the studies conducted with the field method established by Davies and Corbett (1995), the subjects were instructed to name all 65 colour stimuli that were presented to them one by one, placed on a neutral grey cloth. The order of the stimuli was random. The stimuli were 65 coloured papers from the Color-Aid Corporation 220 set. These were glued on 5x5 cm plywood squares. The colour naming was fully unconstrained. Participants' answers were recorded or written down manually as said and were not analysed or shortened any further.

Color-Aid uses a modification of the Ostwald colour system, which incorporates three main characteristics: hue, blackness or shade, and whiteness or tint. Colour-Aid codes are read in the following manner: Y stands for yellow, YOY stands for yellow-orange-yellow, S in a code represents shades as in Y S2 (the scale is given from 1 to 3 where 3 indicates the darkest shades) and T represents tints, as in YOY T4 (the scale is given from 1-4 where 4 represents the lightest tints). In the field method developed by Majid and Levinson (2007) the participants were shown 84 Munsell tiles in a single fixed random order where N2 was always preceded by 5Y 4/6 and always followed by 10P 8/6. Out of 84 Munsell chips, four were achromatic: N2, N4.5, N7 and N9.5. The remaining 80 chips varied in hue, brightness and saturation, so that there were 20 equally spaced hues in four degrees of brightness (Majid and Levinson, 2007). Saturation was generally at the maximum point. Participants were asked to name all colours shown to them with appropriate colour terms. The study used an unconstrained naming method, all answers were recorded, written down and analysed. If participants offered compound words, only the second part of the compound was used for the later analysis in the original study. Here we preserve and use all the data as originally offered by the subjects without further reductions.

Since the Munsell colour system is widely known, we refrain from an in-depth description of it here. The analysis of the results is given with the assumption that Color-Aid BLACK and Munsell N2 are perceptually similar, and the main characteristic differentiating the two stimuli is the glossiness of the surface for Munsell N2 stimulus.

Both studies were carried out in natural daylight avoiding shadow or exposure to direct sunlight.

The researchers were instructed carefully beforehand to ensure the comparability of the data. All participants were recruited volunteers. They were not introduced to the subject of the research until the beginning of the experiment in order to avoid priming effects. Unfortunately we were unable to measure the coordinates of our stimuli in CIE L*a*b*.

4 RESULTS AND DISCUSSION

Table 2 shows the naming pattern for the black category in 14 languages with the black colour terms in the respective languages, and the overall naming frequency, the dominant frequency (both frequencies depend on the overall number of informants per language), the number of stimuli that were named *'black'*, and the specificity index first calculated by Davies and Corbett (1994). For technical details consult 1995 [3]. Overall, the frequency measure includes the frequency of all the stimuli that were named with the colour term *'black'*. Dominant frequency indicates the summed frequency of stimuli that were mainly labelled with the colour term *'black'.* Dominant frequency is calculated taking into account the consensus of 50%, i.e. at least half of the participants had named that stimulus *'black'* in their respective languages. Specificity index (SI), which essentially is a measure of proportion (varying between 0 and 1), was calculated in the following manner: dominant frequency divided by the overall naming frequency (Davies and Corbett, 1995). If the index value was 1, all participants named the stimuli with the same label, i.e. the colour term *'black'* in their native language. If, however, the index value was 0, black was the label given to some stimuli, but it was not the dominant colour term for that particular stimulus (in our data N2 or BLACK). In conclusion, the specificity index is a value showing the strength of a category, with overall frequency and the number of stimuli characterising the borders.

Table 2 shows that on one hand, Group I languages had very little variation for naming black: nearly all tiles that were labelled with the colour term *'black'* in their respective languages were dominant. If the number of the stimuli labelled as *'black'* was 2, these two stimuli were always BLACK and GRAY 8. Any additional stimuli had very small naming frequencies. On the other hand, the Munsell data in Group II languages rarely showed any dominant naming patterns whatsoever (excluding Danish and Swiss German samples). For example, if such colour naming data was used to establish the basic colour terms in a language, black could easily be excluded from the inventory of basic colour terms. This might evoke misunderstandings and serious problems in the basic colour term inventory of any language. According to the evolutionary sequence postulated by Berlin and Kay, black, together with white, should lexicalize among the first two colour terms in any language (Berlin and Kay, 1969). In the Universality and Evolution model (Kay and Maffi, 1999) the initial hypothesis was revised into white-warm and

Table 2 - The naming pattern of the black stimuli across fourteen languages

Group	Language	Number of subjects	Colour term	Overall frequency	Dominant frequency	Number of stimuli	"strength" of category
Group I	Finnish	68	musta	97	95	4	0.98
	Lithuanian	51	juoda	77	77	2	1.00
	Italian	102	nero	173	169	5	0.98
	Czech	52	černá	86	85	3	0.99
	Hungarian	125	fekete	185	182	5	0.98
	Spanish	38	negro	59	59	2	1.00
	Estonian	19	must	33	33	2	1.00
Group II	Swedish	20	svart	25	0	5	0.00
	Estonian I	29	must	24	0	5	0.00
	Estonian II	20	must	14	0	4	0.00
	English	20	black	14	0	5	0.00
	Swiss German	20	schwarz	37	13	7	0.35
	Danish	20	sort	42	33	5	0.79
	Icelandic	21	svartur	2	0	1	0.00
	German	20	schwarz	4	0	1	0.00
	Norwegian	20	svart	13	0	4	0.00

dark-cool categories.

In Table 2, we notice that the area of variation as measured by the number of stimuli was rather similar to Group I data. As black had almost no dominance in the experiments using Munsell stimuli (Group II), other colour terms occupied the area that could be expected to be called 'black'. N2, the blackest stimulus of the data gathered with Munsell stimuli, usually co-existed with grey. The modifier *'dark'* was often added to *'grey'* forming a morphologically complex expression *'dark grey'*. Here, as implied before, we used raw data as gathered from our participants.

Many participants labelled the stimulus N2 with the following expressions instead of naming it *'black'*. For example, the Estonian participants used hall *'grey'* and tumehall *'dark grey'*; the Swedish participants used mörkgrå *'dark grey'*; the English ones *'grey'*; the German ones dunkelgrau *'dark grey'*; the Icelandic interviewees dökkgrár *'dark grey'*, etc. We were also interested in which other stimuli were called *'black'* instead of Munsell N2, and were able to notice that *'black'* was extended to such stimuli as, for example, 5Y 2/2 or 10Y 2/2. However, *'black'* was not the most commonly used colour term for either of them. The most dominant names given to 5Y 2/2 were the Estonian pruun *'brown'* and tumepruun *'dark brown'*; the Swedish brun *'brown'* and mörkgrön *'dark green'*; the Swiss German bruun *'brown'* and dunku bruun *'dark brown'*; the Danish brun *'brown'*, etc. Intriguingly, the stimulus 10Y 2/2, which veers towards the green area of the colour spectrum, was often named *'dark green'*, but also *'dark brown'*, e.g. Swedish mörkgrön *'dark green'*, Swiss German dunku grüen *'dark green'* and dunku bruun *'dark brown'*, Norwegian brun *'brown'* and mørkebrun *'dark brown'*, and Estonian tumeroheline *'dark green'* and tumepruun *'dark brown'*.

Above we have shown the very narrow and consensual variation of black in Color-Aid studies (Group I) and the blurry co-variation of black, (dark) brown and dark green in the Munsell group studies (Group II). Comparing Munsell N2 and Color-Aid BLACK (see Table 2), we noticed that BLACK was the conventionally established hue named as *'black'*. However, N2 was probably perceived differently by the participants due to its glossy surface, resulting in unexpected naming results. We therefore argue that glossiness is a feature that influences colour perception and contributes towards difficulties naming the colour stimuli in the darker regions of the colour body. This feature can be further illustrated by the example of car colours, as cars are often painted glossy: it is easier to detect and label the colour of lighter cars than the darker ones (Anishchanka, 2013).

5. CONCLUSION

As shown by the empirical data analysis, we consider the semantic meaning of black to be extended to attributes such as the appearance of a surface. On the one hand, our study demonstrated that besides the black hue, the surface of the stimulus seems to play a certain role in seeing black tiles as black and labelling them with a colour term *'black'* accordingly or, if the stimulus was glossy, participants had problems with naming it *'black'*. On the other hand, the speakers of many languages seemed to expand the colour term *'black'* to encode darker colours in general (dark brown, dark grey, and even dark green or dark purple), perhaps with an etymological or analogical connotation with dirt or impurity, deriving historically from the distinction of Latin ater vs niger *'shiny black'*. However, this hypothesis requires further in-depth analysis. As seen from the results, the semantic meaning of black is quite restricted to rather matte colours. Quite opposite results are obtained if glossy tiles are presented, providing much wider possibilities for interpretation. We therefore call on field linguists to carefully select their stimuli kits in anticipation of a probable bias in gathered results. Nevertheless, it must be emphasised that the present study only focuses on black and some darker colours. There is no conclusive evidence to claim that the phenomenon could be extended to other colours.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest with other people or organizations.

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BIBLIOGRAPHY

Anishchanka, A..(2013)'Seeing it in color: a usage-based perspective on color naming in advertising', PhD Thesis, University of Leuven.

Berlin, B. and Kay, P. (1696/1991) Basic Color Terms. Their Universality and Evolution, Berkeley.

Biggam, C. P. (2012) 'The Semantics of Colour: A Historical Approach. New York: Cambridge University Press, 1–6.

Conklin, H. (1955) 'Hanonoo Color Categories' Southwestern Journal of Anthropology, 11, 441–446.

Davies, I., Corbett, G. (1994) 'The basic colour terms of Russian', Linguistics 32, 65-89.

Davies, I., Corbett, G. (1995) 'A Practical Field Method for Identifying Basic Colour Terms', Languages of the World, 9, pp. 25-36.

Kay, Paul, & Maffi, Luisa (1999). 'Color appearance and the emergence and evolution of basic color lexicons'. American Anthropologist, 86, 65-79.

Majid, A., Jordan, F. and Dunn, M. (2015), 'Semantic systems in closely related languages', Language Sciences, 49, pp. 1–18.

Majid, A. and Levinson, S. C. (2007) 'The language of vision I: Color, Field Manual, 10.