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Semantic variation and semantic change in the color lexicon

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Abstract: Color terms show a remarkable variation in their possible lexicalization patterns across different languages. In the literature, the interest has been especially to describe the color lexicon of a certain language and to determine whether it may abide or not by Berlin and Kay's universal evolutionary sequence, e.g., whether a certain color denomination may be considered as a basic color term, or whether a certain color category is lexicalized by more than one basic color term, by which criteria, etc. It has not been established, however, which are the most common lexical sources of basic color terms on a comparative basis, and which semantic changes are more common in this semantic field. On the basis of data drawn from 70 ancient and modern Indo-European languages, we aim at answering precisely these research questions concerning the origin and the development of basic color terms. We discuss the various lexical sources of the basic color terms for white, black, red, green, yellow, blue, brown, gray, orange, pink, and purple, and we show the most important semantic changes leading to these color meanings. We also discuss to which extent these terms are likely to be inherited or borrowed. All this aims at being a contribution to the study of diachronic semantics.

Keywords: semantics; general linguistics; historical linguistics; color; Indo-European

1 Introduction

This paper investigates the possible patterns of semantic variation and change in the color lexicon of numerous ancient and modern Indo-European languages. Color terms represent one of the most complex semantic fields. On the one hand, color itself has a composite character, resulting from the interaction among hue, brightness, and saturation, which may overlap or be lexicalized differently

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across different languages as well as in different stages of the same language. On the other, color terms may also be used in non-chromatic or figurative senses, which may reflect the different symbolic values of colors in different societies and cultures. As a result, it is still controversial as to whether some universal tendencies may be identified in this variety of usages. Some scholars, following the well-known study of Berlin and Kay (1969), claim that languages tend to lexicalize color categories by means of basic color terms according to a certain universal order, which may be represented by a universal evolutionary sequence as in (1).

(1) white / black < red < green / yellow < blue < brown < purple / pink / orange / gray.

That is, the lexicalization of a color category by a basic color term at a certain point in the sequence implies the presence of basic color terms for all color categories higher (or more to the left) in the sequence. Synchronically, if a language has a basic color term for green, for example, it will also have basic color terms for white, black, and red, but not necessarily for the other color categories. Diachronically, a language will acquire a basic color term for green after already having basic color terms for white, black, and red. According to Berlin and Kay (1969), a color denomination may be considered a basic color term if it presents certain formal and functional features. Formally, a basic color term is morphologically simpler, or at least not more complex, than a non-basic color term. In English, for example, the adjective *greenish* presents the suffix *-ish*, and therefore is more complex than the adjective *green*. From the point of view of function, a basic color term is usually more frequent and can occur in a larger variety of contexts with respect to non-basic color terms. The adjective *green*, for example, is much more frequently used than the adjective *greenish* and also appears in more idiomatic expressions. Although it may be difficult to establish whether a color denomination is a basic color term, universalists essentially maintain the tenability of the sequence in (1), despite various updates which take into account the data of more languages (cf. Kay et al. 2009; Kay and Maffi 1999). The sense of the term "universal" is that commonly used in typological studies, that is, as a generalization holding true with more than chance frequency across many languages belonging to different language families and to different geographical areas. In fact, typologists usually support Berlin and Kay's (1969) color theory. In the World Atlas of Language Structure (https://wals.info/chapter), for example, various chapters by Kay and Maffi (2013a, 2013b, etc.) illustrate the number and type of basic color categories and of basic color terms on the basis of the data of the World Color Survey, which enlarges and refines the databank of Berlin and Kay (1969) while retaining its main principles.

The core of Berlin and Kay's (1969) theory is, however, contested by other studies, especially those developed in the field of anthropology, according to which many societies outside the sphere of influence of the West lexicalize color in different ways that cannot be captured by the sequence in (1). Some societies are not so interested in distinguishing shades of hue, but rather in brightness or saturation, as well as in describing the distinct physical properties of colored objects, such as their smooth or rough surface, their freshness or dryness, their size, shape, etc. Eventually, it is argued, each culture lexicalizes color in its own way (cf. Saunders and van Brakel 1997: 175). Relativist assumptions are usually appreciated among historians, who relate the spread of color terms to the availability of coloring agents or coloring techniques, as well as among historical linguists, who prefer to study the color lexicon of different languages, independently of each other, or the etymological development of a specific color term in a certain language. However, there are no diachronic studies that have been systematically performed across different languages and that may test the validity of Berlin and Kay (1969). Neither is there an alternative theory that may explain the lexicalization of color in a constructive way, rather than just saying that no generalization holds. Compromise solutions between universalists and relativists are also not explored sufficiently, in order to enable a refinement of Berlin and Kay's (1969) theory on the basis of the evidence of specific languages, as opposed to being refused in toto.[1]

In order to study these problems, I have gathered the main color denominations in 70 Indo-European (IE) languages, here indicated:

- From *Anatolian*: Hittite;
- From *Indo-Iranian. Iranian*: Avestan, Old Persian; Sogdian; New Persian, Tajik, Dari, Pashto. *Indic*: Vedic, Classical Sanskrit; Kashmiri, Nepali, Panjabi, Gujarati, Hindi, Bengali, Marathi, Konkani, Sindhi, Sinhala, Dhivehi;
- *Greek*: Ancient Greek, Modern Greek;
- From *Italic*: Latin and Sabellic languages (Oscan and Umbrian, here counted as one language as they agree in their color lexicon). *Romance*: Italian, Spanish, Portuguese, Catalan, French, Occitan, Romansh, Romanian, Sardinian;

1 For example, the fact that brightness may be more relevant than hue in the color lexicon of some languages, such as Sanskrit (cf. Hopkins 1883), is not in contradiction with Berlin and Kay's (1969) evolutionary sequence in (1), which only concerns hue. This just means that other aspects of color, in addition to hue, have to be taken into account for a comprehensive analysis of the language's color lexicon. In fact, the change from brightness to hue is typologically well established in the universalist research tradition (cf. MacLaury 1992). Similarly, the fact that some languages lexicalize macro-categories such as *yeen* (yellow + green) or *grue* (green + blue) does not contradict Berlin and Kay's (1969) evolutionary sequence, where a specific color category may emerge from the splitting of a previous macro-category. That is, a language having a *yeen* color category at a certain stage may develop later a color category for green or a color category for yellow. Cf. Biggam (2012: 61–62, 74–76) for a correct understanding of the role of macro-categories in Berlin and Kay's (1969) color theory.

- From *Germanic*: Gothic, Old English, Modern English, Old High German, Modern German, Dutch, Frisian, Old Norse, Modern Icelandic, Faroese, Danish, Norwegian, Swedish, Yiddish, Afrikaans;
- From *Celtic. Goidelic*: Old Irish, Modern Irish. *Brittonic*: Welsh, Breton;
- From *Baltic*: Old Prussian, Lithuanian, Latvian;
- From *Slavic*: Old Church Slavonic, Bulgarian, Macedonian, Serbo-Croatian, Czech, Slovak, Polish, Slovenian, Russian, Ukrainian;
- *Albanian*;
- *Armenian*: Classical Armenian, Modern Eastern Armenian;
- *Tocharian*: Tocharian A and B (counted as one language).

Comparisons with further cognate IE languages will be mentioned when necessary. In the literature on color terms, some languages have been investigated more thoroughly than others. English is predictably the language for which we have the most information on the color lexicon – it is enough to mention the valuable diachronic studies by Biggam (1997, 1998, 2010, 2012, etc.). In general, Buck's (1949: 1050ff) dictionary devotes much more attention to Germanic and Romance than to other IE branches, some of which, such as Anatolian, Armenian, Tocharian, and Albanian, are not even considered in his analysis (knowledge of Anatolian and Tocharian was still relatively undeveloped at that time). Among the ancient IE languages, a consistent literature exists especially for color terms in Ancient Greek and in Latin (notably since Gladstone's [1858] contested study on the Homeric color lexicon [cf. also André 1949; Irwin 1974; Lyons 1999; Moonwomon 1994, etc.]), while Indo-Iranian is much less explored, despite its long diachronic record (cf. Viti 2020: Section 4). My analysis therefore considers a much broader and more varied database as compared to the existing literature on IE color terms. For each IE branch/subbranch, I gathered the main color terms on the basis of different authoritative lexica.[2] The dictionary sources have provided the definitions presented through the

2 For Hittite, I consulted Tischler (1977–2010); Puhvel (1984); Kloekhorst (2008). For Indo-Iranian: Iranian, cf. Bartholomae (1904); Morgenstierne (1927, rev. 2003); Hayyim (1934–1936); Kent (1953); Bailey (1979); Gharib (1995); Pashtoon (2009); Indic, cf. Grassmann (1873, rev. 1996); Monier-Williams (1899); Carter (1924); Grierson (1932); Mayrhofer (1956–1980, 1992–2001); Turner (1962–1966); Singh (1895); Bahri (1989); Schmidt (1994); Bhattacarya (2003). For Greek: Ancient Greek, cf. Frisk (1960–1972); Chantraine (1968–1980); Beekes (2010); Modern Greek, cf. Babiniotis (1998). For Italic: Latin and Sabellic, cf. Walde and Hofmann (1938); Ernout and Meillet (1959); Untermann (2000); de Vaan (2008); Romance, cf. Meyer-Lübke (1935) (REW); Puşcariu (1905); von Wartburg (1922–1967); Battisti and Alessio (1950–1957); Nascentes (1955); Wagner (1960–1964); Pfister and Schweickard (1979–); Cortelazzo and Zolli (1979–1988); Corominas and Pascual (1980–1991); Spano and Paulis (1988); Kramer (1988–1998); Liver (2012); Cunha (2014). For Germanic, the Toronto Dictionary of Old English (DOE); Kluge and Seebold (2012); de Vries (1962); Lehmann (1986); Watkins (2011); Kroonen (2013). For Celtic, De Bhaldraite (1959); Vendryes et al. (1959–1996); Thomas et al. (1967–2002); Ó Dónaill (1977);

article: when I say that a certain term expresses a certain color category, the meaning assigned is taken from the dictionary – it is not my interpretation. I also consulted secondary literature which may indicate how the various color terms were deemed to be basic or non-basic in a language.[3] For the modern languages, I have also interviewed native speakers (recruited by means of the online language learning platform *Italki*). The etymological analysis of the main color terms of all these languages have allowed me to identify the different lexical sources of the color lexicon.

Note that my analysis does not concern lexical typology. The latter studies how a certain meaning is packaged in different ways in languages belonging to different language families and areas. In the case of color, lexical typology may study, for example, how some languages lexicalize red and yellow by means of the same basic color term while other languages have different basic color terms for each of these categories, etc. (cf. Dowman 2007). This is substantially in line with the universalist research tradition on color terms. By contrast, I study the lexical sources of color terms in *one* language family, that is, IE, by means of the principles of the comparative method and of IE etymology. This will allow me to point out paths of historical semantics more in depth with respect to a typological comparison, which is usually not interested in the history of specific lexical items. I focused on the IE languages precisely because this is my special field of study. In the elusive field of meaning, being familiar with a large number of languages can give access to better understand relations between different meanings in synchrony as well as semantic shifts in diachrony.

In my database, I seek to identify the main lexical sources of basic color terms for white (cf. Section 2.1), black (Section 2.2), red (Section 2.3), green (Section 2.4), yellow (Section 2.5), blue (Section 2.6), brown (Section 2.7), gray (Section 2.8), orange (Section 2.9), pink (Section 2.10), and purple (Section 2.11), and how such terms change diachronically. I will only marginally discuss chromatic macro-categories such as

Matasović (2009); Favereau (2016). For Baltic, Fraenkel (1962–1965); Maziulis (1988–1997); Derksen (2015); Hock et al. (2015), in addition to Petit (2004). For Slavic, Vasmer (1953–1958); Machek (1968); Derksen (2008). For Albanian, Demiraj (1997); Orel (1998). For Armenian, Kouyoumdjian (1970); Granian (1998); Martirosyan (2009). For Tocharian, Hilmarsson (1996); Pinault (2008); Adams (2013); Carling and Pinault (2023). For IE in general, I consulted IEW (1959), LIV et al. (2001), NIL (2008), and Buck (1949).

3 For reasons of space, since I am dealing with many color terms in many different languages, I cannot list all bibliographical references assessing the (non-)basic status of the IE color terms. In the following, I will only cite the ones that are functional to my argumentation. I have discussed the (non)-basic status of color terms in two papers devoted to the areal distribution of color terms in the IE languages of Europe and of Asia (Viti 2024, forthcoming). For a comprehensive list of the secondary literature used in my study, cf. Viti (2020: Section 8).

yeen or *grue*, as well as micro-categories such as dichotomies in the blue domain.[4] I will not specifically investigate the lexical sources of further color categories, such as silvery or golden (although I can discuss color terms having these meanings, among others).[5]

This material may give us insights into certain controversial issues of color theory. My data led me to the conclusion that neither universalist nor relativist claims are correct in their *pure* form, and that both contain some valid principles, albeit not necessarily in the same proportion, which must be evaluated case by case. Moreover, once the directionality of a common semantic change has been identified in color categories, it can be also used for semantic reconstruction, which is a largely unexplored field.

2 Patterns of semantic change in the color lexicon

2.1 Lexical sources of the main terms for white

According to my data, basic color terms for **white** are originally mainly coded by expressions of brightness, more rarely by structures describing lack of saturation or paleness, as well as by non-chromatic denominations of simplicity or plainness – which may overlap and be difficult to disentangle.

4 It is true that meanings such as green, yellow, greenish yellow, and yellowish green may be sometimes difficult to disentangle (cf. van Brakel 1994). However, a good dictionary usually makes clear distinctions among these values. In the case of a *yeen*-category, for example, the dictionary translates the term as 'yellow, green' (that is, it will report both meanings, cf. Puhvel (1984–: III, 3) about Hittite *ḫaḫli-* 'green, yellow'). Besides, a good dictionary gives information about the kinds of referents described by a certain color term (e.g., Puhvel reports uses of Hittite *ḫaḫli-* and related terms describing verdure, the moon, pollution, jaundice, etc.). When the investigator has knowledge of the languages at issue, s/he can distinguish meanings of focal categories from meanings of mixed categories. Although my study also considers languages having *yeen*-categories, such as Hittite (cf. Section 2.4), and languages having *grue*-categories, such as Breton (cf. Section 2.6), in the tables I have calculated them differently from languages having a specific basic color term for green, such as Latin, or a specific basic color term for yellow, such as Old English. That is, when a language in my corpus has a color term for *yeen*, I count this language as having neither a basic color term for green nor a basic color term for yellow. Cf. footnote 16.

5 This is because gold/golden and silver/silvery are primarily used in the sense of material, rather than color, and therefore are lexicalized by basic color terms more rarely than the color categories in (1) (cf. Berlin and Kay 1969: 6). This does not mean that categories of golden or silver cannot be expressed by basic color terms in some languages or in some types of discourse – they are especially relevant in poetic texts. Allen (1879: 264ff), for example, noted that *golden* is more frequent than *yellow* in English poetry.

Brightness, for example, is expressed by the lexical sources of English *white* and of the cognate basic color terms for white of the Germanic languages, as in (2a), all of which derive from Proto-Germanic **hwīta-* and ultimately from the PIE root **ḱwit-* 'shine', cf. Old Church Slavonic *svĭtěti* (*sę*) 'to shine', Lithuanian *švitė́ti* 'id.', etc. The same root, added with other suffixes, underlies not only numerous expressions of brightness and whiteness in ancient Indo-Iranian, but also the basic color terms for white of many of their daughter languages, as shown in (2b). In particular, Avestan *spaēta-* 'bright, white' has the same morphological structure as the New Persian basic color term *sefīd* 'white'. From Iranian, these terms have been borrowed in most modern Indic languages,[6] as in Hindi, Kashmiri, and Gujarati *saphed* / *safed*, which is also the basic color term for white in these languages. Instead, the Old Indic cognate *śvitrá-* 'whitish, white' is the native source of the Panjabi basic color term *ciṭṭā* 'white', and Old Indic *śvaitra-* n. 'white leprosy, vitiligo' (a rarely attested derivate of *śvitrá-*) is the source of the Nepali basic color term *seto* 'white'. Basic color terms such as Sinhala *sudu* 'white' and Dhivehi *hudhu* 'id.' independently attest the same semantic pattern, as they derive from Old Indic *śuddhá-* 'cleansed, purified, clear, bright, white' from the root *śudh* 'to purify; be or become pure, cleansed, clear', from PIE **ḱud^{h}-*.

(2a) PIE **ḱwit-* 'shine' in Germanic: Gothic *hveits*, Old English *hwīt*, English *white*, Old High German *(h)wīz*, German *weiß*, Yiddish *vays*, Dutch *wit*, Frisian *wyt*, Afrikaans *wit*, Old Norse *hvítr*, Modern Icelandic and Faroese *hvítur*, Danish *hvid*, Norwegian *hvit*, Swedish *vit*, etc. – all meaning 'white'.

(2b) PIE **ḱwit-* 'shine' in Indo-Iranian: Avestan *spaēta-* 'bright, white', Pashto *spīn* 'white', Tajik *safed* 'id.', New Persian and Dari *sefīd* 'id.' (term borrowed from Middle Persian into early variants of Hindi, Kashmiri, and Gujarati *saphed* / *safed* 'white'); Old Indic *śvetá-* 'bright, white', Panjabi *ciṭṭā* 'white', Nepali *seto* 'id.', etc.

A similar semantic pattern, from brightness to whiteness, is attested by several other terms for white of the IE languages, such as Hittite *ḫarki-* 'bright, white', etymologically related to the PIE name of silver (cf. Latin *argentum*); Ancient Greek *leukós* 'bright, white, fair', related to English *light*; Latin *candidus* 'shining white', related to Latin *candēla* which has been borrowed into English *candle*; Irish *bán* 'bright, white'; Albanian *bardhë*, the basic color term for white in this language, and so on.

6 The Middle Iranian form *spytk'* 'bright, white' has been also borrowed into Armenian, where *spitak* is still nowadays the basic color term for white, at least in the linguistically more conservative variety of Eastern Armenian. Western Armenian, mainly spoken by the Armenian diaspora, prefers *jermag* as a basic color term for white. This form means 'bright, shining' in Eastern Armenian, which confirms the semantic change from brightness to whiteness.

A semantic change from **paleness** or lack of saturation to whiteness can be seen in the development of the Marathi basic color term *pā̃ḍhrā* 'white', derived from Old Indic *páṇḍara-* 'pale, whitish-yellow, white'. The latter adjective is connected to Old Indic *pāṇḍú-*, also meaning 'pale, whitish-yellow, white' (a word with unclear etymology, probably borrowed from a non-Indic substrate). In the Mahābhārata, Pāṇḍu was so called because his mother became pale at the frightening sight of her husband during conception. A lexical source describing **plainness** or simplicity underlies the Bengali basic color term *śādā* 'white', which has been borrowed from Persian *sāde* 'simple', a term widely adopted in many languages of Central Asia and of the Middle East with non-chromatic values. In Turkish, *sade* 'plain' can be used to describe a kind of coffee without sugar.

The derivation of terms of white from expressions of paleness or plainness – be they inherited from previous stages of the languages or borrowed from other languages – is much rarer in my database than the semantic change from brightness to whiteness illustrated in (2). The typical situation observed in my data is that the basic color term for white of an IE language is related to expressions of brightness – adjectives and verbs of shining, as well as nouns of brilliant objects, such as light, silver or the moon – attested in numerous other IE languages.

As we try to identify the most common lexical sources of color terms, it is also important to identify which sources are uncommon or lacking – with two provisos. Firstly, as anticipated in Section 1, we speak of *basic* color terms, and not of all possible chromatic denominations. Otherwise, one may have the wrong impression that everything is equally possible, which is not the case.[7] Secondly, when dealing with ancient languages, the apparent rarity or lack of structure may be due to the deficient transmission of ancient texts. Even the presence of a structure must be handled with care, since the texts we have available often represent the literary language and can only give partial insights on ancient everyday speech. In this case as well, we maintain that formulating one hypothesis, as imperfect as it may be, is always better than no hypothesis at all. Moreover, my database is not limited to ancient languages – it contains many languages from different stages and from all IE branches, as illustrated in Section 1. This, in my view, may provide more reliable results.

7 As anticipated in Section 1, a procedure exists to determine whether a color denomination can be considered to be a basic color term – a procedure established by Berlin and Kay (1969) and refined by other scholars following the universalist framework (cf. the useful observations in Biggam [2012: 21ff]). Even if it may be sometimes debated whether a color denomination is also a basic color term, the procedure is by no means subjective or arbitrary. For ancient languages which have not been tested for basic color terms in the literature, we can observe which color terms are more frequent or can be found in more contexts on the basis of lexica and texts.

According to my data, the basic color terms for white in the IE languages are *not* commonly drawn from names of objects, plants, or animals. This may happen for marginal denominations of white, e.g., the Latin poetical adjective *niveus* 'snow-white', derived from the name of snow, Latin *nix*, *nivis* f. But it does not often occur for basic color terms for white. In my database, only two out of 70 IE languages analyzed (=3 % of the cases) present their basic color term for white with a nominal origin – Modern Greek *áspros* and Konkani *dhavo*. The former, borrowed from Latin, derives from the (elliptic) denomination of a silvery coin, the *nummus asper*, which was widely used in late antiquity in the Eastern Roman Empire. This matches the above-mentioned tendency to use names of shining metal as a lexical source for denominations of white. Konkani *dhavo* 'white' derives from Old Indic *dhavá-* m., first attested in the Atharva Veda as the name of a plant, a kind of axlewood (*Grislea tomentosa* or *Anogeissus latifolia*) which is native to South and Southeast Asia, and which is used for many purposes, from firewood to tanning, the production of varieties of gum, wild silk, etc. Continuations of Old Indic *dhavá-* are widely attested in Middle and New Indic names of this tree or similar plants, cf. Pali *dhava-*, Oriya *dhaa*, *ḍhaū*, *ḍhaa*, Hindi *dhau*, *dhawā*, Sinhala *davu*, etc. This means that the derivational pattern from the name of a plant to a basic color term of white is well possible, though still turns out to be not preferred. This rarity may be therefore interesting from a theoretical perspective.

In 96 % of the cases, instead (cf. Table 1), the IE basic color terms for white has a non-denominal formation. Their underlying roots rather represent the *source* of names of referents characterized by a bright, clear or white aspect.[8] In addition to silver, we often have names of the moon, a light, a cloud, the white of the eye, white spots (as in leprosy), egg white, flour, etc. which are derived from a root of brightness or a main term for white. The Romance names of the moon, such as Spanish, Occitan, and Italian *luna* (from Latin *lūna* f. 'moon' and ultimately from PIE **le/owk-s-neh$_2$-*), come from the same PIE root **lewk-* as Ancient Greek *leukós* 'white, bright'. The name of the moon in Old Indic (*candrá-* m.) and in Albanian (*hënë*) is taken from the same PIE root **(s)kend-* as Latin *candidus* 'shining white'. The root of the PIE stem **alb^{h}o-* (cf. Pinault 2022) which underlies Latin *albus* '(mat) white' and Umbrian **alfu** 'id.' (acc.n.pl), as well as Romansh *alf* / *alv* and Romanian *alb*, gives rise to Latin *albūmen*, *-inis* n. 'egg white', Ancient Greek *álphi*, *álphiton* n. 'flour', Hittite *alpa-* c. 'cloud', etc.

8 We need to add one case (=1 %) where a term for white is not attested, that is, in Old Persian, owing to the lacunose documentation of this language. However, Old Persian must have lexicalized this color, since Middle Persian has *spyt'* (=*spēd*) 'white', cognate with Avestan *spaēta-* and also continued in New Persian. Moreover, Middle Persian has *arūs* 'white', cognate with Avestan *auruša-* 'white' (while the Vedic correspondent *aruṣá-* is an expression of red).

The same occurs for names of plants or animals characterized by a white or clear color. The PIE root **ḱwit-* of English *white* and its cognates in (2) also underlies English *wheat* (in this case, the Proto-Germanic color term **hwīta-*/**hwitta-* 'white' is the source of the Proto-Germanic noun **hwaitja-*, from which we also have German *Weizen* m. 'wheat', Icelandic n. *hveiti* 'id.', etc.). The PIE root **b^{h}reh$_{1}$ǵ-* of Albanian *bardhë* 'white' gives rise to English *birch* and its numerous IE cognates (German *Birke* f. 'birch', Lithuanian *béržas* m. 'id.', Russian *berëza* f. 'id.', etc.). For animals, we especially find names for the swan and for the pigeon / dove. Latin *albus* '(mat) white' derives from the same root as Russian *lébed'* m. 'swan', Serbo-Croatian *làbūd* m. 'id.', Czech *labut'* f. 'id.', as well as Germanic nouns such as Old High German *albiz*, *elbiz* m. 'swan'. Ancient Greek *kúknos* m. 'swan' is derived from the same PIE root **ḱuk-* 'shine' as Old Indic *śukrá-* 'shining, bright, white'. Lithuanian *balañdis* m. 'pigeon' derives from the PIE root **b^{h}elH-* which forms the basic color terms for white of Lithuanian (*báltas*), of Latvian (*balts*), and of all Slavic languages (cf. Old Church Slavonic *bělŭ*, Bulgarian *bjal*, Serbo-Croatian *bȉjel*, Polish *biały*, Ukrainian *bilyy*, etc.). There are multiple further examples of this in my data.

2.2 Lexical sources of the main terms for black

According to my data, the lexical sources of basic color terms for black indicate darkness or dirtiness or have meanings of smoking, burning, or shining.

Darkness is the most common source in this case, whereby expressions generically meaning 'dark, obscure' later establish a meaning of 'black' as well as of other dark colors. An example of this can be seen in New Persian *siyāh* 'black' and in its Indo-Iranian cognates, which express various dark colors (3). In New Persian, *siyāh* shares the status of a basic color term for black with the most recent term *meškī*. From Iranian, this term has also been borrowed in Armenian (Classical Armenian *seaw* 'black', Modern Eastern Armenian *sev* 'id.').

(3) PIE **ḱi(H)-* 'dark, obscure' > Vedic *śyāmá-* 'dark, black, dark blue or brown or gray or green, sable', *śyāvá-* 'dark, dark-brown, brown', Avestan *siiāuua-* 'black' (used besides Avestan *sāma-* 'id.'), Sogdian *š'w* (=*šāw/u*) / *šw* (=*šōw*, *šaw*) 'black' (maintained in Yaghnobi *šōw* 'id.'), *š'w-β'm'k* (=*šāw-βāmē*) 'colored', New Persian and Dari *siyāh* 'black', Tajik *siyoh* 'id.'; Tocharian B *kwele* 'black, dark gray', etc.

A different lexical source but the same semantic pattern emerges in Pashto, where the basic color term for black *tūr* is derived from the PIE root of darkness **temH-*, cf. Vedic *támas-* n. 'darkness', *támisrā-* f. 'darkness, dark night', *tamasá-* 'dark', Avestan *tamaŋha-* 'id.'; Latin *tenebrae* f.pl. 'darkness'; German *finster* 'dark', etc. Another example may be provided by the Modern Greek basic color term *mávros* 'black', a

variant of Post-Classical Greek *maurós* 'black' and of a much more ancient form *amaurós* 'dark', attested since Homer and probably of non-IE origin. Cf. also Ancient Greek *mauróō* 'to darken, make obscure'. The basic color terms for black of the Celtic languages, such as Irish *dubh*, Welsh and Breton *du*, present a similar semantic pattern, as their underlying PIE root *d^hub^h- is also the basis of expressions of darkness such as Old Irish *dobur* 'dark, obscure, unclean'.

A semantic change from **dirtiness** to blackness, sometimes overlapping with that from darkness to blackness, is quite common, as stains or dirtiness make an object dark or black. This is the semantic pattern of the basic color terms for black in all Germanic languages (except English), such as German *schwarz*, which is related to English *swarthy*, cf. (4). In English, *swarthy* has been displaced by *black* in the function of basic color term and only remains as a marginal expression of this color, mainly denoting skin color.

(4) PIE **sword-* 'dark, dirty' > Proto-Germanic **swartaz* > Gothic *swarts* 'black', German *schwarz* 'id.', Dutch *zwart* 'id.', Frisian and Afrikaans *swart* 'id.', Yiddish *shvarts* 'id.', Modern Icelandic and Faroese *svartur* 'id.', Danish *sort* 'id.', Norwegian and Swedish *svart* 'id.'; Latin *sordēs* f. 'dirt, filth', *sordeō* 'to be dirty', *sordēscō* 'to become dirty', *sordidus* 'dirty, filthy, sordid; abject, vile, despicable' (borrowed into English *sordid*, first attested in relation to a bodily sore).

Another example of this semantic change can be seen in the Albanian basic color term for black *zi*, which is probably drawn from the same PIE root *g^wewh_1-d^h- denoting excrement, dirt, or disgusting objects in different IE languages, as in German *Kot* m. 'feces', cf. also Sanskrit *guváti* 'cacat', *gūtha-* n. 'feces, ordure', Avestan *gūþa-* n. 'id.'; Middle Welsh *budyr* 'filthy, mean'; Old English *cwéad* n. 'dirt'; Serbo-Croatian *gȁd* m. 'loathing, nausea', Russian *gad* m. 'reptile, vermin', etc.[9] The

9 Although all these forms are often presented as related in etymological dictionaries, their phonetic correspondences are problematic. The Indo-Iranian forms presuppose a PIE root *g^wewh_1-. The Celtic forms presuppose a PIE root *g^wew-d^h-. The Germanic, Baltic, and Slavic forms presuppose a PIE root *g^weh_1-d^h-. The Albanian forms presuppose a PIE root *g^we-d^h-. While the absence of an enlargement in Indo-Iranian vs. the presence of it in all other branches can be explained by Benveniste's (1935) theory of the PIE root, the mismatches in the diphthong and in the laryngeal are difficult to justify. In principle, it can be hypothesized on the one hand that the absence of the laryngeal in Celtic is due to a derivation from a *o*-grade with the Saussure effect (*$g^wowh_1d^h$- > *g^wowd^h- > Proto-Celtic *bowd-). On the other hand, the absence of the diphthong in Germanic, Baltic, and Slavic may be due to a dissimilatory delabialization in proximity of the radical labiovelar (*$g^wewh_1d^h$- > *$g^weh_1d^h$-). Both laryngeal and diphthong are absent in the Albanian forms. As can be seen, these etymological connections imply an extensive restructuring, probably because of taboo reasons that are often associated to words denoting excrements *et similia*. The alternative is to consider these forms to be etymologically unrelated.

hypothesis that the meaning of dirty is primary with respect to that of the black color is suggested by the fact that the former is much more widely attested in the analyzed languages. We can see another example of this in the development of the cognate basic color terms for black of Ancient Greek *mélas* and of Latvian *mę̃lns*, which are also related to expressions of stains and spots (cf. Ancient Greek *molúnō* 'to defile, pollute, stain') or of other dark colors (cf. Lithuanian *mė́lynas*, the basic color term for blue in this language) – all from the PIE root **melh$_2$-*. Outside these two branches, this root emerges in Vedic *mála-* m./n. 'dirt, filth, bodily excretion or secretion', *malinā́-* 'dirty, filthy, impure', *málavat-* 'id.', etc.

Expressions of **smoking, burning, or shining** can also bring about basic color terms for black, because what is burnt and carbonized acquires the aspect of a black color. A typical example of this semantic change is attested in Latin *āter*, which is cognate with several forms related to burning and fire in IE, as illustrated in (5).

(5) PIE **h$_2$eh$_1$-* 'burn' > Latin *āter* 'black, mat black', Umbrian **atru** (acc.n.pl) 'black, dark', further Latin *āreō* 'be dry', *āra* f. 'altar' (originally 'fireplace', where the sacrifice was burnt). Cf. also Hittite *ḫāšš-* c. 'ash, dust', Palaic *hāri* (3SG) 'be warm'; Avestan *ātar-* m. 'fire'; Tokharian AB *ās-* 'dry up'; Old Irish *áith* f. 'oven'; Serbo-Croatian *vàtra* f. 'fire', etc.

Since the roots of burning and especially of shining were also common sources of basic color terms for white, cf. (2), the same lexical source may underlie basic color terms for both white and black. English *black* derives in fact from the same Proto-Germanic stem **blanka-* which is the base of German *blank* 'shiny', and which has been widely borrowed into Romance basic color terms for white such as French and Catalan *blanc* (Old French *blanc* has been borrowed, in its turn, into English *blank*), Italian *bianco* (borrowed into Sardinian *biánku*), Spanish *blanco*, Portuguese *branco*, Catalan, Occitan and French *blanc*, etc. (Cf. also Haitian Creole *blan* from French. Owing to its spread, this formation has been adopted in the main term for white in Esperanto: *blanka*.) The Proto-Germanic stem **blanka-* is also related to Proto-Germanic **blinkan*, cf. German *blinken* 'to flash, blink', Dutch *blinken* 'to shine', etc. All these forms ultimately derive from the same root as Ancient Greek *phlégō* 'to burn' (tr. and intr.), Latin *fulgeō* 'to flash, lighten, shine', Tokharian B *pälk-* 'shine, be highlighted', etc.

Instead, no basic color term for black among the IE languages in my database has a denominal origin, from the noun of a black referent.[10] Consider that nature is

10 Again, in one case, that is, in Old Persian, a term for black is not attested, although the language must have had it – New Persian *siyāh* 'black' is cognate with Avestan *siiāuua-* 'id.', Vedic *śyāvá-* 'dark, brown', etc., as illustrated in (3).

rich in black or dark animals, as well as in plants with black fruits. In principle, it is therefore possible that black is lexicalized as the color of X animal or plant. This occurs in fact for minor denominations of black in IE, e.g., the rare and technical Ancient Greek adjective *korákinos* 'raven-black' is transparently derived from the noun *kórax*, *-akos* m. 'raven'. For basic color terms of black, however, we have the opposite pattern, that is, an X animal or plant is lexicalized as 'the black one'. We will later see that the situation is different for other color terms. Basic color terms for black or their underlying roots in fact represent common lexical sources for names of black or dark plants and animals, as well as of concrete and abstract objects. Cf. English *blackberry*, *blackbird*, *blackboard*, *blacklist*, *blackmail*, *blackout*, etc. In Sinhala, from *kalhu* 'black', we have *kalhu dhiri* 'plant *Nigella damascena*', *kalhu faana* 'fish whitespotted grouper', *kalhu kan'dhili* 'plant trailing eclipta', *kalhu landaa* 'bicolor parrotfish', *kalhubilamas* 'skipjack tuna', *kalhuhutthumeyvaa* 'fruit of the pond apple', *kalhukalhlha* 'zig zag plant', etc. In the ancient IE languages, where compounds represent a somewhat marked strategy of word formation, names of objects, plants, or animals rather derive from the roots for black with various suffixes, e.g., Ancient Greek *melainás* f. 'a black fish', *melánion* n. 'ink'; Latin *ātrāmentum* n. 'ink', *nigella* f. 'a plant', etc. Latin *niger* '(mat) black', the source of the basic color terms for black in most Romance languages (cf. Italian *nero*, Spanish *negro*, Catalan and Occitan *negre*, French *noir*, Romansh *nair*, Romanian *negru*, Sardinian *ni(gh)éḍḍu*, the latter from Latin *nigellus* 'blackish'), has an unclear etymology, but is certainly not denominal. Its stem rather presents an adjectival word formation with the suffix *-ro-* which is quite common for color terms in IE, similarly to the adjectival suffix *-no-*. The latter suffix occurs in the basic color terms for black of all Slavic languages (cf. Serbo-Croatian *cȓn*, Bulgarian *čéren*, Ukrainian *čórnyj*, Polish *czarny*, etc.), which go back to PIE **kr̥s-no-*, with the same word formation as Old Prussian *kirsnan* 'black' and Old Indic *kr̥ṣṇá-* 'black, dark', the main expression for blackness in this language. They derive from the PIE root **kers-* 'black, dark, dirty'.

2.3 Lexical sources of the main terms for red

Studies of history of art show that painting in red was practiced much earlier than painting in other colors in prehistory, since red pigments may be easily produced using certain kinds of earth (cf. Jones and MacGregor 2002). It is therefore understandable that a root for red – PIE **h₁rewd^{h}-*, attested by English *red* – is one of the most ancient and widespread expressions of this color in the whole IE

domain.[11] It is also understandable that basic color terms for red often go back to expressions meaning '**paint, painted, colored**', since red was originally considered as the color par excellence. As can be seen in (6), Old Indic *rakta-*, a verbal adjective derived from the Old Indic root *raj* 'to color' (and ultimately from PIE **(s)reg-*, cf. Ancient Greek *hrézō* 'to color, immerse in the dye'), is the lexical source of the basic color terms for red of Nepali, Sinhala, and Dhivehi, in addition to minor denominations for color, red, blood, or fire in many other Middle and New Indic languages.

(6) Old Indic *rakta-* 'painted, dyed, colored; reddened, red; excited, passioned, fond of; beloved, dear, lovely, pleasant' > Pali and Prakrit *ratta-* 'dyed, red', Nepali *rāto* 'red', Sinhala *ratu* 'id.', Dhivehi *raiy* 'id.', etc.

A similar semantic pattern underlies the basic color term for red in Sindhi, *gāṛho*, derived from Old Indic *gāḍha-* 'dived into, bathed in', since textiles were immersed into the dye to be colored. The numerous Indic cognates of Sindhi *gāṛho* 'red' therefore represent images of immersion, compression, or solidity, often referring to liquids or tissues, and related metaphors (cf. Pali *gāḷha-* 'thick, strong', Panjabi *gāṛhā* 'thick, close', m. 'a thick kind of cotton cloth', Hindi *gāṛhā* 'thick, dense, viscous, muddy; deep, dark (of a color); coarse, heavy (of a cloth); close, intense (of a friendship or enmity); bitter (of an experience); m. a type of coarse, thick cloth', etc.

On the one hand, what has been painted may therefore appear as being **darkened or dark** with respect to the background. From this point of view, a term for red can have similar sources as a term for black, which we have seen often go back to roots of darkness or dirtiness. That is probably the reason for the etymological connection between English *dark* and Proto-Celtic **dergo-* 'red', the source of the Modern Irish basic color term for red *dearg*, cf. (7). The same PIE root is in fact a cognate with some Lithuanian expressions of bad weather, since something wet may also appear as soiled, dirty, or dark.

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11 Nowadays, this root (added with different suffixes) underlies the basic color terms for red of only one part of the European domain of IE, that is, in all Germanic languages (besides English *red*, cf. German *rot*, Yiddish *royt*, Dutch *rood*, Afrikaans *rooi*, Frisian *read*, Modern Icelandic *rauður*, Danish and Norwegian *rød*, Swedish *röd*, Faroese *reytt*, etc.), in most Romance languages (cf. Italian *rosso*, Spanish *rojo*, French *rouge*, Occitan *roge*, Sardinian *ruju*, etc.), as well as in Breton (*ruz*), Slovenian (*rděč*), and Lithuanian (*raudónas*), while in other IE languages only minor denominations of the color red or of red objects can be traced back to PIE *h_1rewd^h-. In particular, this root has decayed from the basic color terms for red of the modern IE languages of Asia, that is, of Armenian and Indo-Iranian. In the past, however, PIE *h_1rewd^h- was attested in the main terms for red of virtually the whole IE space, as in Vedic *rudhirá-* 'red', Ancient Greek *erythrós* 'id.', Latin *ruber* 'id.', Umbrian **rufru** (acc.m. pl) 'id.', Old Irish *rúad* 'id.', etc. Cf. (20).

(7) PIE **dʰerg-* 'colored, dark' > Old Irish *derg* 'red', Modern Irish *dearg* 'id.', cf. Lithuanian *dargà* f. 'bad, rainy weather', *darĝti* 'get wet, get soaked, become bad (weather)', *dargùs* 'rainy, bad, ugly', etc.

On the other hand, what has been colored may be seen as something **beautiful, lovely, or pleasant** with respect to a plain undecorated object – what seems contradictory at first sight may well be explained simply from another point of view. It is enough to think of *krásnyj*, the basic color term for red in Russian, literally meaning 'beautiful' (as can be seen in Slavic cognates such Old Church Slavonic *krasĭnŭ* 'beautiful', Serbo-Croatian *krâsan* 'id.', Czech *krásný* 'id.', etc.). Consider also Serbo-Croatian *ljubičast*, used for a variety of red, such as purple, and clearly related to *ljúbiti* 'to love, desire'. We have also seen in (6) that, in addition to its basic meaning 'painted', Old Indic *rakta-* not only means 'red', but also 'dear, lovely'. Another example of this semantic pattern is illustrated in (8), where the basic color terms of most New Indic languages represent borrowings from a Persian expression, *lāl*, characterized by this range of meanings.

(8) New Persian *lāl* 'darling, dear; red; inflamed; an infant boy; dumb; ruby-like red gemstone; a red bird' > borrowed from Middle Persian as *lāl* 'red' into Hindi-Urdu, Panjabi, Gujarati, Marathi, Bengali *lāl* 'red'.

Although the etymology of the Persian source *lāl* is not watertight, a basic meaning 'dear' may explain not only its usages in the sense of red and various red objects, but also its semantic extensions as a denomination of a child as well as of a mute person – people with disabilities are often denoted by forms of endearment. All these meanings have cognates in Indic, where the root *lal* is attested with the meanings 'to favor, desire; to play, sport, dally, frolic, behave loosely or freely' (cf. Kashmiri *lalawun* 'to fondle'; Gujarati *laḷvũ* 'to be in an ecstasy of love', Hindi *lalaknā* 'to long for'), as well as to denote a child or a boy (cf. Hindi *lalā*, *lallā* m. 'boy, darling', etc.). Moreover, the Indic root *lal* may indicate the loll of the tongue by a sort of onomatopoeia and, by metonymy, saliva or mucus (cf. Hindi *lāl*, *lār* 'saliva'). In highly polysemic lexical units as these, it would be wrong, in my opinion, to search for one meaning that may be compatible with all other usages. Rather, we have to reconstruct a meaning, in this case a meaning of endearment, fondness, and pleasure, which is more widely attested and may give rise to most other semantic extensions. The latter, in their turn, are the source of further partly overlapping (and sometimes contrasting) figurative usages, by a relation of family resemblance, in Wittgenstein's sense. In general, suggesting a broader meaning may be the only way

to explain apparently widely divergent meanings in related terms which can often cause scepticism even among linguists.

As a manifestation of beauty and pleasure, the color red is often associated with other bright and warm colors and draws on lexical sources of **burning and shining**. In this sense, basic color terms of red may be cognate with denominations of brightness and whiteness, as in (9), where the basic color term for red of Tajik and Pashto, *surx* and *sūr*, respectively, derive from an Old Iranian expression of redness and warmth and are related to Old Indic denominations of bright and (more marginally) white. In New Persian and in Dari, *surx* is also common as a term for red, but is higher in register and relatively less frequent in daily speech with respect to *qermez*, see below.

(9) PIE **ḱuk-* 'burn, shine' > Old Indic *śukrá-* 'shining, bright, white' (> Pali *sukka-* 'bright', Hindi *suk* 'bright, white', etc.); Avestan *suxra-* 'red, warm', New Persian and Tajik *surx* 'red', Pashto *sūr* 'id.', etc.

New Indic structures such as Kashmiri *surakh*/*surkh* are borrowed from Persian. A similar semantics underlies the Kashmiri basic color term *wŏzul*^{u} 'red', derived from Old Indic *ujjvala-* 'burning, blazing up, bright, luminous', an assimilated form from the prefixed root *ud-jval* 'burn brightly, blaze, glow, shine'. In IE, which originally presents a different morphology for the verb and for the noun, expressions of red are much more commonly derived from verbal roots of burning and shining than from the noun of fire. Ancient Greek *pyrrós* 'flame-colored, red', which is clearly derived from *pûr*, *pyrós* n. 'fire', is only a minor denomination of red, mainly used for the color of red hair (also used as an anthroponym as *Pýrros* m., *Pýrra* f.).

Other nouns denoting typical examples of red objects, e.g., the name of **blood**, are also attested as lexical sources of terms for red, although they are more common for minor expressions than for basic color terms of redness. An example of this can be seen in Hittite *išḫarwīl-* / *ešḫarwīl-* 'red', transparently derived from the noun *ēšḫar*, *išḫan-* n. 'blood', and less commonly used than *mi(t)ta-* / *miti-* (SA_5) (adj.) 'red'; (c.) 'red wool'. The latter is etymologically unclear. We are probably dealing with a pre-IE substrate to be compared with phonetically irregular correspondences such as Ancient Greek *míltos* f. 'red earth, ochre' and Latin *minium* n. 'red-lead' (cf. Cotticelli-Kurras forthcoming). Names of metals may be in fact quite relevant for expressing color categories. We have seen that terms of white are often cognate with names of silver. Terms for red are related to names of **copper**. Old Indic *lohá-*, derived from a late or dialectal variant of the PIE root **h$_1$rewd^h-*, means 'reddish' as an adjective and 'copper' as a substantive (m./n.). From the same root, the adjective *lóhita-* (a variant of *róhita-* 'red, reddish', see

below) means both 'red' and 'made of copper' – both these values are attested for *lóhita-* since the Atharva Veda. The basic color term for red of Konkani, *tāmbḍo*, goes back to an Old Indic form *tāmrá-* 'made of copper; copper-colored, reddish, red'; n. 'copper' with an extra-suffix *-ḍa-*, which brings about names of copper recipients in various Indic languages, e.g., Sindhi *ṭrāmiṛī* f. 'copper pot'. The ultimate source of Old Indic form *tāmrá-*, however, is the same PIE root **temH-* as in Old Indic *támas-* n. 'darkness' discussed in Section 2.2. This tallies with the semantic pattern whereby terms for red are often derived from expressions of dark colors, as we have seen in (7). Nominal sources of basic color terms for red are quite frequent, instead, when they indicate the material substance, such as **grains or larvae**, from which red pigments are produced. This semantic pattern is found, in an Eastern area of the IE domain, in the basic color terms for red of most Slavic and Iranian languages, as shown in (10).

(10) PIE **k^{w}r̥mi-* 'worm' > Old Church Slavonic *črŭmĭnŭ* 'red', *črĭvljenŭ* 'id.', Bulgarian *červén* 'id.', Serbo-Croatian *crȉven* 'id.', Czech *červený* 'id.', Polish *czerwony* 'id.'; Sogdian *krm'yr* (=*karmīr*, *kərmīr*) 'id.' (maintained in Yaghnobi *kimīr*), New Persian and Dari *qermez* 'id.', etc.

A borrowing from Iranian (cf. Middle Persian *klmyr*) brings about the Armenian basic color term *karmir* 'red', as well as, outside IE, Turkish *kırmızı* (which shares the functional domain of red with the inherited form *kızıl* in this language) and the Arabic minor denomination *qirmizī*, expressing a deep kind of red. (From Arabic, the word passed to Old Italian *carmesi* / *cremesi* / *cremisi*, which was later borrowed in several other languages of Europe, such as English *crimson*, in the wake of the trade of textiles, especially of silk, from East to West.) A similar semantic change independently occurs in some Romance languages, where Portuguese *vermelho* and Catalan *vermell*, the basic color terms for red in these languages, go back to Latin *vermiculus* m. 'little worm' (a derivate of Latin *vermis* m. 'worm, maggot' and ultimately of PIE **wr̥mi-*), which is also the source of minor denominations of red such as French *vermeil*. They are cognate with Old Prussian *wormyan* 'red'.[12] In the same vein, the Modern Greek basic color term *kókinos* 'red' (Ancient Greek *kókkinos*) is a derivate of Ancient Greek *kókkos* m. 'grain, seed; gall of kermes oak used to dye scarlet'. This is the earliest attested basic color term for red with a denominal source in IE. Its Latin borrowing *coccum* n. 'berry growing upon the scarlet oak' has been further borrowed into Welsh *coch* 'red'.

12 It is also possible to unify the results of synonymous forms such as PIE **wr̥mi-* and **k^{w}r̥mi-*, illustrated in (10), if the former is considered to be a variant (with a simplified consonant nexus) of the latter.

Vulgar Latin **cocceus* has been also borrowed into Albanian *kuq* 'red'. The derivation *coccinus* 'scarlet-colored' is the source of the basic color term for red of Romansh *cotschen*, this time by inheritance.

As can be seen, names of objects represent a lexical source for basic color terms of red more often than for basic color terms of white or black. In the case of red, 22 out of 70 IE languages analyzed (=32 %) present a color term with a denominal formation – especially a derivation from the name of grains, worms, or larvae producing red pigments, such as Portuguese *vermelho* and Ukrainian *červónyj*. I also counted Konkani *tāmbḍo* in the group of denominal formations, although its Old Indic source *tāmrá-* also denotes the color red, in addition to copper (cf. also Old Marathi *tāṁbaḍā* 'red', besides *tāṁb* f. 'rust' and *tāṁbeṁ* n. 'copper' – Marathi is very close to Konkani).

In the majority of cases, however (47 out of 70 = 67 %), the main terms for red of the IE languages again have a non-denominal word formation, from roots meaning 'to be red, painted, colored', 'to be dark', 'to be warm, bright', or 'to be beautiful, dear'.[13] Similarly to what we have seen for white and black, for red as well the preferred lexical pattern is to name an X plant or animal as 'the red one', rather than to name red as 'the color of X', although nature abounds in red or reddish animals, flowers, or fruits. In Old Indic, for example, deer, gazelles, antelopes, horses, mares, and cows are often named as red animals. Old Indic *rohít-* 'red', drawn from the above-mentioned PIE root **$h_1$rewd^h-* 'red', for example, is a common name for a red deer or a red mare, as are its cognates *róhita-* 'red, reddish'; m. 'red or chestnut horse' and *rohiṇī-* f. 'red cow'. The same occurs in Marathi *rohī* f., *roheṁ* n. 'antelope'. Cf. also Old Indic *aruṇa-kamala-* n. 'red lotus', *aruṇa-cūḍa-* m. 'a cock' (lit. 'red-combed'), *aruṇa-dūrvā-* f. 'red fennel'; French *rouge-gorge* m. 'robin', *rougeot* m. 'common pochard', *rouge-queue* m. 'a kind of redstart'; German *Rotdorn* m. 'type of rose', *Rotrübe* f. 'beet', *Rotalge* f. 'dulse', *Rotvieh* n. 'kind of cattle', and so on.

2.4 Lexical sources of the main terms for green

Basic color terms for green turn out to mostly derive from roots denoting **growing plants** in my data. A typical example of this can be seen in the etymological connection between forms such as English *green*, *grow*, and *grass*, according to a

13 In this case as well, Old Persian does not attest a form for red but certainly must have had one, since New Persian has *surx* 'red', coradical of Avestan *suxra-* 'red'. Similarly, Middle Persian and New Persian *rōy* 'copper, brass' presupposes the existence of an Old Persian form for red that is cognate with Avestan *raoδita-* 'red, reddish'.

semantic pattern which is widely attested in Germanic (11). The basic color terms for green of all Germanic languages derive in fact from this root. Meanings related to growing plants, however, are more common in IE for this root than color meanings of green, which are limited to Germanic. The latter may be therefore considered to be the target of the semantic change.

(11) PIE *g^hreh_1- 'grow, turn green' > Proto-Germanic *grōni- 'green' (> English *green*, German *grün*, Yiddish *grin*, Dutch and Afrikaans *groen*, Frisian *grien*, Modern Icelandic *grœnn*, Faroese *grønt*, Danish *grøn*, Norwegian *grønn*, Swedish *grön*, etc.); Proto-Germanic *grōan- 'grow' (> English *grow*, Dutch *groeien*, etc.); Proto-Germanic *grasa- n. 'grass' (> English *grass*, German *Gras* n., Dutch and Modern Icelandic *gras* n., Danish *græs* n., Norwegian *gress* n., Swedish *gräs* c., etc.); cf. also Hittite *kariia̯nt-* c. 'grass'; Latin *grāmen, -inis* n. 'id.', etc.

Owing to this, basic color terms for green also often express succulence or freshness (and metaphorically youthfulness). Moreover, since growing and ripening plants often turn from green to yellow, the same term may be used for both **green and yellow** or for kinds of greenish-yellow. An example of this polysemy is attested by Hittite *ḫaḫli-* (SIG_7) 'green, yellow, greenish-yellow', which also presents various suffixed variants such as *ḫaḫḫaluwant-*, *ḫaḫlawant-*, *ḫaḫliwant-* with the same meaning, and which is derived from the form $^{(GIŠ)}$*ḫāḫḫall-* n. 'plant, vegetable'. In Hittite, the same term is therefore used for both chromatic categories, which may be more precisely distinguished from the context.

Alternatively, green and yellow may be expressed by synchronically different forms which originally go back to the same lexical source. In Classical Armenian, for example, the form *dalar* 'green, fresh' (replaced in Modern Eastern Armenian by the etymologically obscure basic color term *kanač'*) is cognate with *dełb*, *dełin* 'yellow, pale' (cf. Modern Eastern Armenian *deghin* 'yellow'), as well as with *dełˁ* 'grass, potion, poison', *dełj* 'peach', etc. They derive from the PIE root *d^helh_1- 'to sprout, grow', which is also at the basis of Ancient Greek *thállō* 'to sprout, grow, thrive, bloom'. In Baltic and in most Slavic languages, the basic color terms for green and for yellow are also cognates, see Old Prussian *saligan* 'green' and *gelatynan* 'yellow', Czech *zelený* 'green' and *žlutý* 'yellow', which are also related to nouns of vegetation such as Czech *zelí* n. 'cabbage', pl. *ziele* 'herb, weed'. Their source, the PIE root *$ǵ^helh_3$-/*$ǵ^hleh_3$-, yields basic color terms for green in most New Indic languages (cf. Nepali *hariyo*, Panjabi and Hindi *harā*, Marathi *hirvā*, etc.), in Eastern Iranian languages such as Sogdian (*zrγwny* = *zəryōnē*) and Pashto (*zarghun*), and in Classical Greek (*khlōrós*). At the same time, PIE *$ǵ^helh_3$-/*$ǵ^hleh_3$- also gives rise to basic color terms for yellow in Western Iranian, as in New Persian, Dari, and Tajik *zard*.

A similar phenomenon emerges in borrowing, whereby terms of green may be borrowed in the sense of yellow or vice versa. Latin *viridis* 'green', typically used to describe vegetation in this language, is the source of the basic color terms for green in all Romance languages (Italian, Spanish, Portuguese, and Romanian *verde*, Catalan, Occitan, and Romansh *verd*, French *vert*, Sardinian *vírde* / *bírde*, etc.) – Latin *viridis* represents the most stable color term from Latin to Romance. This term has also been borrowed in Brittonic Celtic, cf. Modern Welsh *gwyrdd* 'green' and Modern Breton *gwer* 'id.', as well as in Albanian *verdhë*, which, however, means 'yellow'. On the other hand, the (rarely attested) Latin form *galbinus* 'yellow-green', inherited as the basic color terms for yellow of most Romance languages (French and Occitan *jaune*, Romanian *galben*, etc.), has been borrowed in Albanian *gjelbër*, meaning 'green'. In Albanian, *gjelbër* can be used besides *jeshil* and (less frequently) *blertë* as a denomination of green. While Albanian *jeshil* is a borrowing from Turkish *yeşil* 'green', Albanian *blertë* is cognate with English *bloom* and German *blühen* 'bloom, flourish', *Blume* f. 'flower', *Blatt* n. 'leaf', etc.

Despite the different lexical sources and the different routes either by inheritance or by contact, the semantic change from expressions of growing plants or fruits to basic color terms for green is strikingly consistent across different areas and different periods of IE. A variant of Persian *sabz* 'green, verdant, fresh, unripe, raw' (cf. also Tajik and Dari *sabz* 'green'),[14] which has several cognates denoting vegetables, has been borrowed into Indic in the basic color terms for green of Kashmiri (*sabạz*) and Bengali (*śobuj*). Sinhala *koḷa* 'green', also meaning 'leaf', derives from Old Indic *kuvala-* n. 'jujube fruit'. Similarly, Dhivehi *fehikula* 'green' literally means 'leaf-colored' (it is formed by *kula*, a borrowing from English *color*, and *faiy* 'leaf', the latter from Old Indic *páttra-* n. 'wing, feather; leaf, petal', cf. Sinhala *pata* 'id.').[15] Modern Greek *prásinos* 'green' is derived from the name of leek (*práson* n. in Ancient Greek), and originally meant 'leek-colored'.

Other sources are definitely less common. In South Asia, renowned in antiquity for its precious stones, some languages derive their basic color terms for green from the name of the emerald. An example of this can be observed in Konkani *patsvo* 'green; emerald' (while Konkani *tarno* 'green', derived from Old Indic *táruṇa-* 'young, tender', is especially used for unripe fruits, cf. also Marathi *tarṇā* 'young'). Names of

14 These Iranian terms may also indicate black, blue, or dark colors, as can be seen also from some of their compounds, such as Persian *sabz-badbān* 'sky', *sabz-pul* 'id.', *sabz-chashm* 'blue-eyed', etc., according to a common polysemy between blue and black on the one hand and blue and green on the other, cf. Section 2.6.

15 Note that Sinhala and Dhivehi are not only closely connected (as both are derived from Elu Prakrit), but also have always had extensive contact. The similar formation of their basic color term for green from the name of the leaf may be due to a semantic calque from Sinhala into Dhivehi, where the suffix *-kula* represents a more marked structure.

gems, however, more commonly give rise to minor denominations of green, rather than to basic color terms, as in English *emerald-green*, or in Sanskrit *mārakata-* 'green', a quite rare form derived from *marakata-* n. 'emerald'.

In my data, basic color terms for green derive from the name of a green object in five out of 70 IE languages analyzed (=7 % of the cases). Apart from Konkani *patsvo* 'green' from the name of the emerald, the other cases are derived from the name of a plant, as can be seen in Modern Greek *prásinos*, Sinhala *koḷa*, Dhivehi *fehikula*, and Sogdian *zrγwn'k* / *zrγwnyy* (=*zəryōnē*), the latter derived from Sogdian *zrγwn* (=*zəryōn*) 'plant, vegetable'. In 58 out of 70 cases (=83 %), basic color terms for green derive from roots of growing or ripening vegetation, which may have cognates, but not lexical sources, in specific names of plants.[16] Plants, or places rich in plants, are often named on the basis of the basic color terms for green, cf. English *greengage* for a sort of green plum, *greenfield*, *greenfly* for an insect which is harmful to plants, *green onion*, *green pepper*, *green salad*, *green tea*, etc. Persian *sabz-bāl* 'a sort of grape', *sabz-dāya* 'a violet', *sabz-roshan* 'a kind of pigeon', *sabz-qabā* 'a kind of yellowish-green bird', *sabz-girā* 'another bird', etc.

2.5 Lexical sources of the main terms for yellow

We have seen in Section 2.4 that the roots of basic color terms for green often bring about basic color terms for yellow, either in the same language or in related languages. The above-mentioned PIE root *$*ǵ^helh_3$-/*$*ǵ^hleh_3$-, the most polysemic root of the PIE color lexicon, is the source of basic color terms for both yellow and green in Baltic and in most Slavic languages, e.g., Polish *żółty* 'yellow' and *zielony* 'green' (the exception, in Slavic, is represented by Slovenian, where the basic color term for yellow, *rumen*, is drawn from the PIE root *$*h_1rewd^h$- expressing red, on the basis of a polysemy between yellow and red). The same PIE root *$*ǵ^helh_3$-/*$*ǵ^hleh_3$-, which underlies Hindi *harā* 'green', for example, is the source of the Germanic and Iranian basic color terms for yellow as well, cf. (12). Moreover, the PIE root *$*ǵ^helh_3$-/*$*ǵ^hleh_3$- is the basis of denominations of gold (Vedic *híraṇya-* n., Gothic *gulþ*, etc.) and of bile (Avestan *zāra-* m., Ancient Greek *khólos* m. / *kholé* f., Latin *fel*, *fellis* n., etc.) in many IE

16 A specific color term for green is not attested in seven out of 70 cases (=10 %) of my IE database. In Gothic, this may be due to a gap in our documentation, since a Proto-Germanic form **grōni-* 'green' may be reconstructed on the basis of the consistent evidence of the other Germanic languages, cf. (11). Gothic only attests the form *gras* n. 'grass' from the PIE root *$*g^hreh_1$-. A similar case may be seen in the Sabellic sub-branch, as Oscan and Umbrian do not present a term for green while in Latin the form *viridis* 'green' is widely attested since the archaic age. In other cases, as in Hittite, Avestan, Old Persian, Vedic, and Classical Sanskrit, the lack of a specific term for green depends on the fact that these languages rather have polysemic expressions for yellow-green, i.e., a *yeen*-category.

languages. This polysemy between **yellow and green**, based on the growing and cultivation of plants and fruits, may motivate the development of the basic color terms for yellow of Spanish (*amarillo*) and of Portuguese (*amarelo*), derived from diminutive forms of Latin *amārus* 'bitter, sour', since green fruits often have this flavor. Here we can observe a synesthesia from the area of taste to that of color.[17]

(12) PIE *$ǵ^{h}elh_{3}$-/*$ǵ^{h}leh_{3}$- 'yellow-green' > Latvian *dzęltęns* 'yellow', *zaļš* 'green'; Proto-Germanic **gelwa-* > English *yellow*, German *gelb*, Yiddish *gel*, Dutch and Afrikaans *geel*, Frisian *giel*, Modern Icelandic *gulur*, Faroese *gult*, Danish, Norwegian and Swedish *gul* – all meaning 'yellow'; Avestan *zairi-* 'yellow, yellowish, golden', *zairita-* 'yellow, pale yellow', Khotan Saka *ysar-* 'be yellow, reddish' (Khotan Saka *ysara-gūna-* 'yellowish, golden' presents the same formation as Avestan *zairi-gaona-* 'yellow, golden' as well as Sogdian *zrywny* and Pashto *zarghun*, both meaning 'green'), New Persian, Dari, and Tajik *zard* 'yellow', etc. (vs. e.g., Marathi *hirvā* 'green' in Indic).

Polysemies other than yellow-red and yellow-green are much rarer but still attested for the lexical sources of the main color terms for yellow. Tocharian *tute* 'yellow', for example, may be ultimately derived from the same PIE root *$d^{h}uH$- underlying denominations of dark or black colors, as well as of smoke or dust, in other IE languages, cf. Old Indic *dhūmá-* m. 'smoke, vapor, mist', *dhūmrá-* 'smoke-colored, dark, gray, purple'. The latter is the source of Sinhala *dumburu* 'brown', as we will see in Section 2.7. The motivation for these usages may be that objects covered with dust may appear as yellowish, or that a pale aspect may be described as yellow or as dark, as deprived of luminosity.

Moreover, basic color terms for yellow are often derived from denominations of yellow referents, either typical examples of this color category or items which are used to produce yellow pigments. Lexicalizations based on concrete practices of making colorants prevail over more abstract comparisons with objects characterized by a certain color. In both cases, as in the domain of green, the lexical sources of basic color terms for yellow are mainly represented by **nouns of plants or plant products**. Greek *kítrinos* 'yellow', for example, a minor denomination of this color in Classical Greek but a basic color term in Modern Greek, is a derivate of Ancient Greek *kítron* n. 'lemon', and originally meant 'lemon-colored'. Catalan *groc* 'yellow' derives from Latin *crocum* n. / *crocus* m. 'saffron (*Crocus sativus*)' (borrowed in its turn from Ancient Greek *krókos* m. / f. 'saffron'). The Catalan term has been adopted in the form *gròga* in Alghere, a dialect of Catalan spoken in Alghero, in the northwest of

17 A synesthesia from taste to color is also implied if the formation of the Spanish and Portuguese terms for yellow from Latin expressions of bitterness are related to the yellow color of the bile (see below) in the context of the Medieval theory of humor (cf. Corominas and Pascual [1984: I, 233]).

Sardinia, and has later become the basic color term for yellow in the whole island. (*Gròguˈ* is used besides borrowings from Italian such as *giallu* / *zallu*, whose usage varies according to different regions of Sardinia.) The use of dried stigmas and styles of saffron to produce yellow colorants was introduced to the Roman Empire from the East, where the cultivation of this plant was much more widespread since antiquity. Even today, saffron is mainly produced in Iran. Accordingly, denominations of the color yellow based on the name of saffron, as well as, more frequently, of turmeric, are attested in several Asian languages.

Turmeric (*Curcuma longa*) is actually a different plant, belonging to the ginger family, whose roots are ground to obtain yellow pigments. Its production requires a simpler process than in the case of saffron, and consequently saffron is a much more expensive spice than turmeric. However, since their pigments have a similar color – a vivid yellow or orange – the two plants are often confounded, to the point that turmeric is also called 'Indian saffron', as it is native to South and Southeast Asia. In Old Indic, turmeric has about fifty different names, owing to its widespread use in Ayurvedic medicine, as a healing spice, in addition to culinary practices (e.g., to prepare curry), dyeing textiles, cosmetics, etc. Old Indic *haridrā-* f. '*Curcuma longa*', built on the basis of the Vedic form *hári-* 'yellow-green, yellow-red, tawny, golden, brown' and ultimately derived from the PIE root *$*ǵ^helh_3$-* in (12), is the most common among these denominations. Old Indic already attests a *vṛddhi* derivate *hāridrá-* with a chromatic meaning 'colored with turmeric, yellow'; m. 'a yellow color' (cf. also *hāridraka-* 'yellow'), although they are just marginal color denominations at this stage. In contrast, the name of the curcuma later gives rise to authentic basic color terms for yellow in Kashmiri, Bengali, and Konkani, among others, as illustrated in (13). In Dhivehi *reen'dhookula* 'yellow', which is also a basic color term in this language, the cognate name of turmeric (*reen'dhoo*) has been remotivated with the noun *kula* 'color'. Similarly, the Sinhala form *kaha*, meaning 'yellow' and 'turmeric, saffron', derives from Old Indic source *kaṣāya-* m. / n., which indicates a yellowish plant and its astringent juice.

(13) Old Indic *haridrā-* f. 'Curcuma longa, turmeric' > Pali *haliddā*, *haliddī* f. 'turmeric', Prakrit *hariddā*, *haliddā*, *haraddā*, *haladdā* f. 'id.' > Hindi *harad*, *hardī*, *haldī*, *haladdī* f. 'id.', Bengali *holud* 'turmeric; yellow', Konkani *haḷduvo* 'id.', Kashmiri *lĕd^{ü}r^{ü}* f. 'curcuma', *lḛ̆dur^{u}* 'yellow' (*lidürü* is also the name of a river, the river Liddur, in Kashmir), Dhivehi *reen'dhookula*, 'yellow', etc.

In most Indic languages, however, basic color terms for yellow go back to a rare Old Indic form *pītala-* 'yellow' (> Nepali *pahẽlo*, Hindi and Panjabi *pīlā*, Gujarati *pīḷo*, Sindhi *pīlu*, etc.) or from a cognate Middle Indic form *pīvala-* 'yellow' (the source of Marathi *pivḷā*). They are possibly derived from a root *pi* or *pyai* (intr.) 'swell, abound';

(tr.) 'fatten, cause to swell', as fat and oily substances often have a yellowish aspect (cf. the English expression *yellow grease* to denote a kind of cooking oil). Names of **animals or animal products** turn out to be anyway much less common than names of plants or vegetal substances as lexical sources of basic color terms for yellow. Examples of this can be seen in Celtic. In Brittonic, in particular, Modern Welsh *melyn* 'yellow' and Modern Breton *melen* 'id.' can be traced back to the name of honey (cf. Welsh and Breton *mel* m. 'honey') and therefore originally meant 'honey-colored'. Similarly, Romansh *mellen*, *melen* 'yellow' derives from Latin **mellinus* 'honey-colored' (cf. REW 5483). Instead, Latin *melinus* 'related to honey' and *melleus* 'id.' were rare (and not always meant in the sense of color) in this language, which did not have any established basic color term for the yellow color category. Alternatively, a basic color term for yellow may derive from another color expression which was especially used to describe the coat of an animal. In Goidelic, Old Irish *buide* 'yellow' and Modern Irish *buí* 'id.' derive from a Proto-Celtic stem **bodyo-* 'yellow-brown'. The Celtic form has been probably borrowed into Latin *badius* 'brown, chestnut-color', a rare form specialized for the color of some horses (> French *bai*, Italian and Portuguese *baio*, Spanish *bayo*, etc.). In the language of farming, the color of animal hair is important to distinguish and classify animals.

This may find a parallel in the use of expressions of yellow to describe the color of **blond hair**. In Homeric Greek, the etymologically obscure adjective *xanthós* 'blond, yellow, yellow-red, reddish-brown' mainly refers to human hair or animal fur. The proper name *Xánthos* denotes one of Achilles' horses, as well as a river of the Troad. The latter usage may be motivated by the fact that some kinds of earth or mud of the riverbed make its water appear yellowish (cf. the Chinese *Huáng Hé*, the Yellow River) or to the fact that hair may be associated with the image of waves (cf. the expressions in English *wavy hair*, French *cheveux ondulés*, etc.). In Classical Greek, *xanthós* extends its usage and is applied to all kinds of yellow or yellowish objects, from honey to wine, fried food, etc., but the color of blond hair continues to be its main functional domain (this has also remained as the main meaning of the minor color denomination *xanthós* in Modern Greek). Latin *flāvus* 'golden yellow, reddish yellow, flaxen-colored' (cognate with Old Irish *blá* 'yellow') and Latin *fulvus* 'deep yellow, reddish yellow, gold-colored, tawny' are also mainly used to describe blond hair, as well as the waves of a river. They are, however, poetic expressions (often translating Homeric *xanthós*), which predictably decay in the Romance languages.

In my database, I found 11 out of 70 (=16 %) cases of basic color terms for yellow which are derived from names of yellow referents. As we have seen for the color green, nominal sources of basic color terms for yellow also mainly denote plants or plant products. On the other hand, terms for yellow may represent the lexical source for naming the most various yellow or yellowish referents. Cf. English *yellowhammer* 'a bird (*Emberiza citrinella*)', German *Gelbklee* m. 'a plant of the clover family

(*Medicago lupulina*)', *Gelbholz* n. 'a tree, also called American yellowwood (*Cladrastis kentukea*)', *Gelbwurst* f. 'a kind of sausage from Bavaria', Dhivehi *reen'dhoo iru-vaahudhu* 'a kind of yellow-white heron' (*hudhu* means 'white' in Dhivehi), etc. The usual pattern is that of naming an X animal, plant, or object as 'the yellow one', and not that of naming yellow as 'the color of the X animal/plant/object' – apart from the case of some plants producing yellow pigments, such as saffron and turmeric. Moreover, as roots of yellow terms often denote bile, basic color terms for yellow often represent the source for the name of jaundice, which is determined by bile pigments in the blood, and which causes a yellowish, pale, or livid color of the skin or of the eyes. English *jaundice*, borrowed from Old French *jaunice* (French *jaunisse* f.), also shows this pattern, as the French forms are derived from Old French *jaune, jalne* (French *jaune*) 'yellow', from the rare adjective *galbinus* 'yellow-green' mentioned in Section 2.4. Cf. also the English expression *yellow fever*.

2.6 Lexical sources of the main terms for blue

Expressions of blue originally had a marginal status in IE. Some ancient IE languages, such as Early Latin, Homeric Greek, and Vedic, did not have a proper basic color term for blue, which developed only later in their color lexicon from denominations of **blue-green, blue-black, or other mixed color categories**. PIE did not have any root specifically used for blue either. The PIE root **ǵʰelh₃-/*ǵʰleh₃-*, probably meaning 'yellow-green' in origin, and widely used for basic color terms of green or yellow in IE, cf. (12), rather describes varieties of blue-green in Celtic, cf. Breton *glas* 'blue-green' (from Proto-Celtic **glasto-* 'green, blue', cf. Matasović [2009: 160]). Proto-Celtic was therefore a *grue*-language. Old Irish *glas* was even more polysemic and could express green, blue as well as gray. Later, phenomena of semantic specialization are observable, as Modern Welsh *glas* tends to be used as the main expression of the color blue, while Modern Irish *glas* is used more in the sense of prototypical green (contrasting with the Modern Irish basic color term for blue *gorm*, see below). In Baltic, the root **ǵʰelh₃-/*ǵʰleh₃-* also gives rise to the Latvian basic color term for blue: *zils*. The change of PIE **ǵʰelh₃-/*ǵʰleh₃-* therefore follows a semantic path from yellow-green to green in some languages, to blue-green, and then to blue in others, owing to the continuous distribution of colors on the visible spectrum. As anticipated in Section 1, macro-categories such as *grue* or *yeen* are not in contradiction with Berlin and Kay's (1969) sequence of basic color categories in (1) (cf. Biggam 2012: 76: "successive sub-dividings of these large categories result in increasing numbers of single-hue categories"). The development from the meaning of blue-green to that of blue is anyway much less frequent in IE than the semantic change from black or dark to blue. In most modern Indic languages, for example, basic color terms for blue, as in

Hindi *nīlā* 'blue', are coded by forms derived from Old Indic *nílla-*, which at the stage of Vedic, however, did not mean 'blue', but rather 'black' or generically 'dark' (14), although it was minoritarian for black as well with respect to Old Indic *kr̥ṣṇá-*.

(14) Vedic *nílla-* 'dark, black, black-blue' (cf. also Classical Sanskrit *nīla-varṇa-* 'blue-colored') > Hindi and Panjabi *nīlā* 'blue', Kashmiri *ɲyūlᵘ* 'id.', Sindhi *nīrū* 'id.', Nepali *nīlo* 'id.', Bengali and Maithili *nīl* 'id.', Marathi *niḷā* 'id.', Konkani *niḷo* 'id.', Oriya *niḷa* 'id.', Sinhala and Assamese *nil* 'id.', Dhivehi *nū* 'id.', etc.

Expressions of dark colors in fact represent a common lexical source for terms of blue. Serbo-Croatian *plâv*, the basic color term for blue in this language, derives from the PIE root **pel(H)-*, which is one of the most typical IE denominations of gray, especially of gray or hoary hair, e.g., Vedic *palitá-* 'gray, hoary, old' (cf. Section 2.8). In Section 2.2, we have seen that Lithuanian *mélynas* 'blue' has cognates in basic color terms for black, such as Ancient Greek *mélas*. In this case, the semantic change from black or dark to blue may have started, in my opinion, in contexts referring to bruises, whose livid aspect may be seen as an expression of these colors. It is enough to think at expressions such as English *to beat someone black and blue*, or to the fact that similar expressions using terms for blue in a language may be translated with terms for black in another language, e.g., German *blaues Auge* vs. English *black eye*. The Germanic basic color terms for blue are consistently drawn from Proto-Germanic **blēwa-* (> German *blau* 'blue', Yiddish *bloy* 'id.', Dutch *blauw* 'id.', Afrikaans *blou* 'id.', Frisian *blau* 'id.', Modern Icelandic *blár* 'id.', Faroese *blátt* 'id.', Danish, Norwegian and Swedish *blå* 'id.', etc.) and borrowed into the Romance languages (cf. Romansh *blau* / *blo* 'blue', French *bleu* 'id.' (> English *blue*, cf. Biggam [2006]), Catalan and Occitan *blau* 'id.', etc.). Originally, however, these terms were extended to other dark colors, cf. Old Norse *blár* 'blue, black, dark', Old High German *blāo* 'blue, dark, gray', etc. We can observe the relics of this polysemy in certain idiomatic expressions of North Germanic, where a black person is literally called 'blue person' (Modern Icelandic *blámaður*, Swedish *blåman*, etc.). The same usage appears in Celtic, as in Modern Irish *duine gorm* 'black person' (lit. 'blue person'). This is because Old Irish *gorm* meant not only 'blue', but also 'dark, black', as can also be seen in some results of Proto-Celtic **gurmo-*, such as Middle Welsh *gwrm* 'dark, dark blue' and Old Breton *wurm* 'dark'. This usage may have been further reinforced by the Old Norse expression, as a semantic loanword, at the time of the Viking occupation of Britain and Ireland, in the mid-9th century.

On the other hand, terms of light blue, or blue in general, may be also derived from expressions of brightness, although in this case they tend to remain marginal denominations of this color, rather than basic color terms. Latvian *dziedrs* 'azure', for example, is etymologically connected with several Lithuanian expressions of a

clear sky or serene weather, e.g., Lithuanian *giẽdras* 'clear' and *giedrà* f. 'fine weather', as well as with Ancient Greek *phaidrós* 'bright, clear' – ultimately from a PIE root *$*g^{wh}h_2eyd$- indicating luminosity.

The relatively late development of denominations of blue in IE, as compared to the terms of other colors discussed above, may be explained by the fact that blue coloring agents are difficult to find. They can be obtained by extraction from certain plants, such as the *Indigofera tinctoria*, and derived from precious stones, such as the lapis lazuli or the azurite, which were originally imported into Europe from various regions of Asia. The *Indigofera tinctoria*, whose fermented leaves produce the indigo dye, was imported from India – the name *indigo* comes from Latin *indicum* n. 'Indian (substance), indigo', borrowed in its turn from Ancient Greek *indikòn phármakon* 'Indian dye'. The lapis lazuli mainly came from the mountains of Afghanistan. In the Roman Empire, blue pigments were therefore expensive and considered as luxury products (cf. Pastoureau 2006: 17ff). In my data, I could observe that names of mineral and vegetal coloring agents are in fact the most common lexical sources for basic color terms of blue.

The case of terms for blue going back to **names of gems and precious stones** appears in (not always synonymous) Romance forms such as Italian *azzurro* 'light blue, azure', French *azur* 'azure', Spanish and Portuguese *azul* 'blue', etc. (In Spanish and in Portuguese, *azul* is the basic color term for blue.) These forms have been borrowed from Arabic *lāzuward* / *lāzaward* 'lapis lazuli; azure' (the latter also produced derivates such as Arabic *lāzuwardī* 'azure, sky-blue, cerulean'). Arabic *lāzuward*, in its turn, is borrowed from Persian *lājward* (probably derived from the toponym *Lāžvard*, in the Badakhshan region of Central Asia, which is particularly rich in these gems). Persian *lājward* is also the source of the Turkish borrowing *lacivert* 'dark blue', as well as of the Sanskrit borrowing *rājāvarta*- m. 'lapis lazuli' (lit. 'royal jewel', with a folk etymology on the basis of *rājan*- m. 'king'). Another example from Iranian is presented in (15).

(15) Names of gems > basic color terms for blue, cf. Old Indic *akṣa*- n. 'blue mineral, vitriol' (so called for its cube-like crystals, cf. *akṣá*- m. 'die for gambling, cube, seed'), *akṣaja*- m. 'diamond' > borrowed into Iranian **axšaina*- 'connected with blue (mineral)', cf. Avestan *axšaēna*- 'dark', Old Persian *axšaina*-, *axšainaka*- 'dark blue', Khotan Saka *āṣṣeiṇa*- 'blue', Sogdian *'γs'yn'k* / *'γs'yn'y* (=*axsēnē*) 'greenish', Pashto *shīn* 'blue-green, sky-blue', the main term for blue in this language.

In the same vein, Modern Greek *γalázjos* and *γalanós*, expressing light blue, derive from Ancient Greek *kalaïs*, the name of a precious stone of greenish blue, probably a kind of turquoise or chrysolite. *γalázjos* is relatively more common than *γalanós*. It is often used in opposition to Modern Greek *ble* 'blue, dark blue', (the latter borrowed

from French *bleu*). Romanian *albastru* 'blue' goes back to a Vulgar Latin form *albaster* 'whitish', a derivate of Latin *albus* 'white, mat white'. The semantic change from white to blue is not usual (while that from black to blue, we have seen, is frequent). This apparently idiosyncratic pattern originated from the description of a prestigious kind of white marble characterized by blueish shades. Names of blueish kinds of metal are less frequent than names of gems but are also attested. Classical Greek *kuáneos* 'dark blue' (often opposed to *glaukós* 'light blue, blue-green, bluish gray' at this stage of the language), derives from *kúanos* m. 'dark-blue enamel', used to decorate armor. In Homeric Greek, where *kuáneos* rather indicates varieties of black or dark colors, the reference to metal is still evident.

Denominations of blue derived from **names of vegetal coloring agents** can be seen in the basic color terms for blue of some Slavic languages, such as Czech and Slovak *modrý* (16), which go back to PIE *mod^h-ro-*, and which have Germanic cognates denoting coloring plants, such as English *madder*. These forms especially indicate the *Rubia tinctorum*, which is usually employed to produce red or purple pigments. They therefore meant a generic colorant rather than specifically a blue dye in origin. Other forms derived from the same PIE root *mod^h-/*$m̥d^h$- may also be found in the old IE languages, e.g., in Hittite *antara-* /*andara-* 'blue' (ZA.GÌN) and in Tocharian B *motartstse*, which, however, meant 'green'. The polysemy between blue and green is especially common in the languages of Central and Eastern Asia – in fact, the Tocharian denomination of blue, that is, *tseṃ*, is probably a borrowing from Middle Chinese *chieŋ* (Mandarin Chinese *qīng*), meaning 'blue-green'. Another example of this semantic pattern (involving a borrowing) appears in Albanian *kaltër* 'blue', taken from a Vulgar Latin derivate **calthinus*, from Latin *caltha*, the name of a kind of *Calendula officinalis*, which could be used for dyeing.

(16) Names of plant products > basic color terms for blue, cf. PIE *mod^h-ro-* 'dye plant' > Old Church Slavonic *modrŭ* 'blue', Czech and Slovak *modrý* 'id.', Slovenian *moder* 'id.'; cf. Old Norse *maðra* 'madder', Old High German *matara* 'id.', Old English *mædere* 'id.', etc.

Alternatively, terms for blue may be drawn from **names of animals**, such as the dove or the pigeon, characterized by certain shades of this color. A typical example of this is provided by Russian *golubój* 'light blue', which is derived from *golub'* 'dove, pigeon', and which in Russian is opposed to *sínij* 'dark blue'. This dichotomy has been amply discussed in the literature, according to which Russian possesses 12 basic color terms and therefore contradicts the maximum number of basic color terms predicted by Berlin and Kay (1969: 35–36), cf. Paramei (2007). I have identified a similar formation in Old Prussian *golimban* 'blue' (a cognate with Russian *golubój*), which can be further approached to the semantic pattern of Tajik *kabud* 'blue' and Armenian *kapowyt* 'blue, dark blue'. The latter is a borrowing from an Iranian

denomination related to Old Persian *kapautaka-* 'blue' (cf. also Sogdian *kp'wt* (=*kapōt*) 'blue, gray-blue', *kp'wtk* (=*kapōtē*) 'id.') and further to Vedic *kapóta-* m. 'dove, pigeon'. In New Persian, the minor denomination *kabûd* means 'dark blue' and is translated as Russian *sínij*.

Also of note are terms of blue derived from names of objects that can be seen as typical examples of the color blue, as **the names of the sky or of water** (17). Spanish *celeste* 'light blue', from *cielo* 'sky', has acquired the status of a basic color term in some varieties of South America, as in Uruguay (Lillo et al. 2018), although in Standard Spanish it is minoritarian with respect to *azul*. In Italian, *celeste* 'light blue' is also marginal with respect to *blu* 'blue'.[18]

(17) Names of the sky > basic color terms for blue, cf. Polish *niebo* n. 'sky' > *niebieski* 'blue'; Dari *asmān* 'sky' > *asmānī* 'blue'; Gujarati *vādaḷ* n. 'cloud, sky' > *vādaḷī* 'blue', etc.

A basic color term for blue based on the name of water is attested in New Persian *ābī* 'blue', also existing in Dari, a transparent derivation from *āb* 'water', therefore literally meaning 'watery, water-colored'. The same semantic pattern has been borrowed into Turkish *mavi* 'blue', although in this case the specific lexical source comes from Arabic *mā'* 'water', *māwiyy* 'watery' (which is not the basic term for blue in Arabic – the Arabic basic color term for blue is rather *'azraq*).

As can be seen, basic color terms for blue derive from the name of an object more frequently than the basic color terms previously analyzed. According to my data, this occurs in 23 out of 70 languages, that is, in 33 % of the cases. Their lexical sources denoting gems, colorant plants, etc. are also quite consistent. In this case as well, however, most basic color terms have a non-denominal formation, especially from roots denoting dark colors.

2.7 Lexical sources of the main terms for brown

To denote the brown color category, PIE had one main root available, that is, **b^{h}er(H)-*, the same as in English *brown*. Germanic is in fact one of the two branches where this root has been better maintained until the present day (18a). The other branch is Indic, where the root **b^{h}er(H)-* is used to express brown since the earliest

18 As minor denominations of blue derived from the name of the sky, we can also mention Albanian *bojëqielli* 'blue', a compound consisting of *bojë* 'dye' and *qiell* 'sky' (the latter borrowed from Latin *caelum* 'sky'). This form is less frequent than Albanian *blu* 'blue' (borrowed from Italian *blu*) and *kälter* 'blue'. A compound structure usually is associated to non-basic color terms. Consider also Armenian *yerkna-gowyn* 'light blue', compounded from *gowyn* 'color' and *yerkink'* 'sky', which is less frequent than the above-mentioned form *kapowyt* 'blue, dark blue' in everyday language.

Vedic period. According to my data, Vedic is the first IE language where we have a basic color term for brown, such as *babhrú-*, which could also describe varieties of reddish-brown. Modern Indic basic color terms for brown mainly derive from a cognate non-attested form **bhrūra-* (18b).

(18a) PIE **b^{h}er(H)-* 'brown, tawny' > English *brown*, German *braun*, Yiddish *broyn*, Dutch and Afrikaans *bruin*, Frisian *brún*, Icelandic *brúnn*, Faroese *brúnt*, Danish, Norwegian and Swedish *brun* – all meaning 'brown'. The Frankish form **brūns* has been borrowed into Romance terms for brown such as Romansh *brün* / *brin* and French and Occitan *brun*, besides Occitan *burèl* (as well as Italian *bruno*, which, however, is now only a minor poetic denomination of the brown color category. The same holds true for Spanish and Portuguese *bruno*, borrowed from Occitan). Latvian *brūns*, the basic color term for brown in this language, is also a borrowing from Germanic.

(18b) PIE **b^{h}er(H)-* > **bhrūra-* 'brown, tawny' > Hindi and Panjabi *bhūrā* 'brown', Marathi *bhurā* 'id.', Gujarati *bhuro* / *bhūruṁ* 'id.', etc. Cf. also Vedic *babhrú-* 'deep brown, reddish-brown, tawny' (with a reduplicated PIE word formation **b^{h}e-b^{h}r-ú-* which in other languages is used to denote the beaver, cf. German *Biber*, Lithuanian *bẽbras*), etc.

Other languages attest the PIE root **b^{h}er(H)-* in some marginal denominations of brown, as in Lithuanian *bė́ras* 'tawny, brown'. Not all ancient IE languages, however, attest a specific term for brown. In my database, brown is not lexicalized in ten out of 70 IE languages (=14 %), that is, in Hittite, in Avestan, in Old Persian, in Ancient Greek, in Latin, in the Sabellic languages, in Gothic, in Old Church Slavonic, in Classical Armenian, and in Tocharian. In Gothic, this may be due again to a lacuna in our source material, as a Proto-Germanic form **brūnaz* may be reconstructed by comparing the Germanic terms of brown in (18a). In the other languages, this lack is rather due to the usage of polysemic forms expressing a **dark color in general**, which can be interpreted as brown from the object at issue (e.g., if a piece of wood is described) and from the context. The Classical Greek form *órphninos*, for example, which according to Plato (*Timaeus* 68c) expresses a combination of white, red, and especially black, generically indicates a dark color. Latin also has various terms expressing darkness, such as the cognate forms *furvus* 'dark, dusky, gloomy, swarthy, black' and *fuscus* 'dark, swarthy, dusky, tawny', which may be occasionally used to describe brown referents. They are derived from the same root as English *dusk*, *dusky* as well as Irish *donn*, cf. (19). In Old Irish, in particular, *donn* competes with the forms *odar* and *cíar* (now obsolete in Modern Irish) to express the brown color category. In Modern Irish, *donn* is the basic color term for brown. According to my

data, Old Irish is the ancient IE language that is richest in color terms, presenting even denominations for color categories that are not expressed, or marginally expressed, in other ancient IE languages.

(19) PIE *d^hus-no- 'dark, black' > Proto-Celtic *dusno- > Old Irish *donn* 'dun, brown, a light brown inclining to yellow or red', Middle Welsh *dwnn* 'dark, brown', etc.

According to the same semantic pattern anticipated in Section 2.5, the Sinhala basic color term *dumburu* 'brown' goes back to Old Indic *dhūmrá-* 'smoke-colored, smoky, dark-colored, gray, dark-red, purple', a derivate of the name for smoke (Old Indic *dhūmá-* m.) which could express the most varied dark colors.

Basic color terms for brown can also derive from denominations of (varieties of) **red or yellow**, although these patterns are less common than that derived from expressions of dark or black. The Lithuanian basic color term *rùdas* 'brown', for example, is cognate with Lithuanian *raudónas* 'red' and is drawn from the PIE root *h_1rewd^h- which gives rise to denominations of red in most IE languages (20). Modern Breton *ruzdu* 'brown' is a transparent compound formed by the main Breton terms for red (*ruz*, again from PIE *h_1rewd^h-) and for black (*du*), the constituents of the mixed brown chromatic category. The same pattern appears in Welsh *cochdu* 'brown', which, however, is minoritarian with respect to Welsh *brown*, borrowed from English.

(20) PIE *h_1rewd^h- 'red' > Lithuanian *rùdas* 'brown'; Modern Breton *ruzdu* 'id.' (cf. also Old Indic *rudhirá-* 'red, blood-red, bloody'; Ancient Greek *erythrós* 'red'; Latin *ruber* 'id.', *rūfus* 'red, red-haired', *rubeus* 'red, reddish', *russus* 'red'; Old Irish *rúad* 'red, of a brownish or dark red, red-haired' [Modern Irish *rua* is mainly limited to the color of red hair]; Gothic *raups* 'red'; Tocharian A *rtär*, B *ratre* 'id.', etc.).

In Modern Breton, *ruzdu* is used besides *gell* to express brown, the latter properly denoting a light kind of this color. Modern Breton *gell* is cognate with Celtic denominations of white (cf. Old Irish *gel*) or of yellow (cf. Middle Welsh *gell*), derived from the PIE root *$ǵ^helh_3$- which we have seen in (12) to underlie most IE terms for yellow or green. The highly polysemic Vedic form *hári-*, derived from the same root, can also be used for varieties of brown, reddish-brown, tawny, pale yellow, or golden.

Alternatively, basic color terms for brown can be derived from the names of brown referents, which are very common in nature – earth, wood, many fruits, the coat of many animals, or the color of human hair and eyes, etc. In Western IE, notably in most Romance languages, the dominant pattern is that of a basic color term for brown derived from the name of a **chestnut**. Italian *marrone* 'brown', Spanish *marrón* 'id.', Catalan *marró* 'id.', Brazilian Portuguese *marrom* 'id.', French *marron*

'id.', Romanian *maro* 'id.', etc. go back to the homonymous names of the chestnut (cf. French *marrons glacés*) and ultimately to a Vulgar Latin form **marrō, -ōnis* 'chestnut'. In the variety of Portuguese spoken in Portugal, the basic color term for brown is rather *castanho*, which is also derived from a name of the chestnut, that is, Portuguese *castanha*, from Latin *castanea*.[19] A similar pattern appears independently in Modern Armenian, where the basic color term *shaganakagowyn* 'brown' literally means 'of the color (*gowyn*) of the chestnut (*šaganak*), chestnut-colored'.

In Eastern IE, particularly in South Asia, the color brown is often expressed by adjectives derived from the name of the **almond**, as illustrated in (21). In this case, an originally Persian source *bādām* 'almond' has been borrowed into most modern Indic languages as the name of the fruit and, with an adjectival derivation, of the color brown. In Bengali, in particular, *bādāmī* is the main term for brown, while in other Indic languages the correspondent forms may have a more marginal status (usually denoting a kind of light brown, as in Hindi) as compared to the results of PIE **bhrūra-* in (18b).

(21) Gujarati, Panjabi, and Nepali *badām* 'almond', Hindi, Kashmiri, and Bengali *bādām* 'id.', etc. > Gujarati, Panjabi, and Nepali *badāmī* 'almond-colored, brown', Hindi, Kashmiri, and Bengali *bādāmī* 'id.', etc.

In the Middle East and in Southeastern Europe, by contrast, the source of basic color terms for brown is especially the name of **coffee**, according to my data. Modern Greek *kafé* 'brown', Albanian *kafe* 'id.', New Persian and Dari *qahve'ī* 'id.' ultimately go back to Arabic *qahwa* 'coffee' through an intricate pattern of borrowings. In particular, Modern Greek *kafé* is borrowed from French *café* m. 'coffee' (and not 'brown'), which is borrowed in its turn from Italian *caffé* m. 'id.', borrowed from Ottoman Turkish *kahve* 'id.', borrowed from Arabic *qahwa* 'id.'. The latter is also the source of the Persian borrowing *qahve*' 'coffee' and *qahve'ī* 'brown'. In Tajik *qahvarang* 'brown', the name of coffee is remotivated with *rang* 'color' (cf. Modern Turkish *kahverengi* 'brown'). All these borrowings reflect the trade in this product and its cultural significance especially in the Middle East, as well as in the Balkan extensions of the Ottoman Empire, where coffee shops (although occasionally banned) always retained an important role for meeting and socializing. Cf. also

19 Apart from this variety of Portuguese, derivates of Latin *castanea* represent minor denominations of brown, usually to describe a brown human hair color (cf. Italian *castano*, French *châtain*, Spanish *castaño*, etc.). In Italian, for example, one says *capelli castani* 'brown hair' and *barba castana* 'brown beard'. *Marrone* is, however, encroaching in the domain of *castano*. It is the only possibility for the color of animal fur (*un cane marrone* 'a brown dog', **un cane castano*), and for eyes both adjectives are possible (*occhi castani* 'brown eyes', *occhi marroni* 'id.'). Moreover, even in the domain of human hair, *castano* is at variance with *moro*, derived from Latin *maurus* 'Moor', borrowed in its turn from Ancient Greek *maurós* 'dark'.

Bulgarian *kafjáv* 'brown' and Macedonian *kafeav* 'id.'. In Arabic, the lexical source of the basic color term *bunnī* 'brown' is different but the semantic pattern is the same, as this term is transparently derived from *bunn* 'coffee bean' and therefore literally means 'of the color of coffee beans'.

Alternatively, terms to describe brown are often derived from names of kinds of **tobacco**. This especially occurs in some modern Indo-Iranian languages. Pashto *naswārī* 'brown', for example, a basic color term in this language, is transparently formed on the base of the noun *naswār*, indicating a sort of powdered, dipping tobacco commonly consumed in Afghanistan. Dari also uses *naswārī* besides *qahve'ī*. Luri *triaki* 'brown' literally means 'opium-colored'. The Marathi basic color term *tapkirī* 'brown' comes from *tapkīra* f. 'chewing tobacco'. Konkani *puditso* comes from *puḍī* f., which denotes a kind of powder used as tobacco. In Sindhi, the main term for brown is *nāsī*, derived from *nās*, the name of a sort of tobacco taken by the nose and also used as medicine (this name of tobacco derives in fact from Old Indic *nāsya-* n. 'nose-cord; errhine', itself a derivate of Old Indic *nāsā-* f. 'nose'). The practice of chewing tobacco, especially the consumption of betel leaves and areca nuts (the seeds of the *Areca catechu* palm), is widespread in the whole of Asia. In India, they usually call it *paan* (from Old Indic *parṇá-* n. 'leaf'). In the same vein, the name of the *Acacia catechu*, which can also produce the catechu extract as the areca palm, is the lexical source of the Nepali basic color term for brown *khairo* 'brown' (from Old Indic *khadira-ja-* 'made from the Khadira wood', that is, a kind of *Acacia catechu*). In Hindi, the *Acacia catechu* is named *katthā*, and its derivate *katthā'ī* (lit. 'of the color of the *Acacia catechu*) means 'brown', especially a dark kind of this color. The same denominations recur in virtually all modern Indic languages, although they may have a more or less central function in the color lexicon of different languages. Outside of Indo-Iranian, the names of tobacco are not common sources of terms of brown in IE. An example emerges in Sardinian *tabakkínu* 'brown', lit. 'tobacco-colored', from Italian *tabacco* m. (Sardinian *tabakkínu* is, however, minoritarian with respect to *castanzu* from the name of the chestnut).

Other **phytonyms** also bring about terms of brown. In South Asia, besides the names of almonds and tobacco and the results of the PIE root **b^{h}er(H)-*, we can also identify the name of turmeric as lexical source, which is also the basis of many common expressions for yellow in this area (cf. Section 2.5). The Kashmiri basic color term *kāʦsur^{u}* 'brown' goes back to the (rarely attested) Old Indic form *karcūra-* m. 'turmeric'; n. 'orpiment'. Unlike Old Indic, the ancient Iranian languages, Avestan and Old Persian, do not attest any specific term for brown (which does not imply that they did not have any). By contrast, in Middle Iranian, I did find expressions for this color. Sogdian attests the form *cnt'n β'm'k* 'brown', literally meaning 'with the color of the sandalwood', from *cnt'n=čandan* 'sandalwood' (cf. Classical Sanskrit *candana-* m. / n. 'sandal, *Sirium myrtifolium*', the name of the tree, of the wood, and of its

derived substance used to prepare highly esteemed ointments and perfumes) and *β'm'k = βāmē, fāmē* 'color' (cf. Avestan *bāma-* m. 'light, splendor', connected with the Vedic root *bhā* 'to shine' < PIE *$*b^heh_2$-*). A similar pattern emerges in Eastern Slavic, where Russian and Ukrainian *koríčnevyj* 'brown', for example, goes back to the name of 'cinnamon' (*koríca*, a typical Slavic diminutive form of the name of the 'bark', *kora* f. in Russian). Welsh *gwinau*, a minor denomination of brown with respect to the recent English borrowing *brown*, derives from the name of wine (Welsh *gwin*, borrowed from Latin *vīnum* n. 'wine').

According to my data, **names of animals** are remarkably less common than names of plants as lexical sources of basic color terms for brown. A rare case can be identified in Dhivehi *mushi kula* 'brown', literally meaning '*mushi*-colored', from the name of a fish, the horse mackerel, called *mushi* or *mushimas* in this language (the noun *mas* means 'fish' and may be used as a suffix to form names of specific fishes). The rarity of lexical sources denoting animals may seem surprising for brown, since this color is very common in the animal domain. On the contrary, it turns out that names of animals often derive from expressions of brown in IE, as we have seen above for English *beaver*, derived from the PIE root of brown *$*b^her(H)$-*. Another example is provided by the cognate form *bear* (cf. also German *Bär* m., Dutch *beer* m., etc. from Proto-Germanic **beran-* m. 'bear'), a taboo denomination of bear as 'the brown (animal)' – an animal originally called *$*h_2\underset{\circ}{r}t\acute{k}o$-* in IE (cf. Hittite *hartagga-* c.; Vedic *$\acute{r}\underset{\circ}{k}$ṣa-* m.; Ancient Greek *árktos* f., etc.).

Apart from plant products, names of other concrete objects are also not so common lexical sources for basic color terms for brown. In my database, I identified examples of this pattern in some Slavic basic color terms for brown derived from **names of metals**. Polish *brązowy* means 'brown' and 'made of bronze' and is clearly derived from the name of this metal (Polish *brąz* m. 'bronze', borrowed from French *bronze*, which in its turn is borrowed from Italian *bronzo*). Slovenian *rjav* 'brown' originally meant 'rusty' and derives from a Proto-Slavic name of rust (**rʁd'a*), ultimately derived from the PIE root *$*h_1rewd^h$-* 'red' illustrated in (20). This is consistent with the above-mentioned semantic pattern of basic color terms of brown which go back to denominations of the color red.

I counted 29 out of 70 cases of terms for brown derived from the name of a brown referent (=42 %), again more than we have seen for the previous color category. That is, languages show a lexical pattern of naming brown as 'the color of the X referent' much more commonly than a lexical pattern of naming white, black, red, yellow, green or blue as 'the color of the X referent'. This is not completely due to the fact that brown animals and plants are easy to find in nature, since, as mentioned above, names of animals are very rare lexical sources for basic color terms of brown in the analyzed languages. As in the case of yellow and green color categories, names of plants or plant products remain the preferred source for expressions of brown as well.

2.8 Lexical sources of the main terms for gray

Denominations of the color gray are ancient in IE, where at least two widely attested roots may be reconstructed for PIE. The first one, PIE *$ǵ^{h}er(h_1)$-, illustrated in (22), is the source of English *gray* and of the basic color terms for gray of all Germanic languages. Armenian *gorsh* 'gray' also comes from the PIE root *$ǵ^{h}er(h_1)$-, but it is marginal with respect to *moxragowyn* (see below) for the color gray. A Proto-Germanic form **grīsa*- 'gray', probably etymologically unrelated to **grēwa*- 'id.' in (22), has been borrowed (through Frankish **grīs*) into Romansh *grischun* 'gray', French, Occitan, and Catalan *gris* 'id.' (borrowed in its turn into Spanish *gris* 'id.' and Italian *grigio* 'id.'), etc. French *gris* has been also borrowed into Modern Greek and in Albanian *gri* 'gray' (as well as in Turkish *gri* 'id.').

(22) PIE *$ǵ^{h}er(h_1)$- > Proto-Germanic **grēwa*- 'gray' (> English *gray*, German *grau* 'gray', Yiddish *groy* 'id.', Dutch *grijs* 'id.', Afrikaans *grys* 'id.', Faroese *gráur* 'id.', Modern Icelandic *grár* 'id.', Danish, Norwegian and Swedish *grå* 'id.', etc.); Armenian *gorsh* 'gray', etc.

The second root, PIE **pel(H)*-, underlying English *fallow*, is even more widespread and certainly more polysemic. Nowadays, **pel(H)*- is the source of basic color terms for gray in Celtic (cf. Modern Irish *liath* 'gray', Modern Welsh *llwyd* 'id.', Modern Breton *louet* 'id.') and in part of Baltic (Lithuanian *pìlkas*, cf. Hock et al. [2015: 772]). The PIE **pel(H)*- underlies minor denominations of gray and related colors, such as black or white, as well as varieties of yellow, in other IE languages (cf. Latin *pullus* 'dark, blackish, blackish-gray, dusky'; Old Church Slavonic *plavŭ* 'white', *pelesŭ* 'gray, grayish black'; Lithuanian *pal̃vas* 'yellowish, grayish', etc.). We have seen above in Section 2.6 that this root has also given rise to the Serbo-Croatian basic color term for blue *plâv*. This does not imply that the root *pel(H)*- could express the most varied range of colors – it did not express red or other vivid colors, for example. Instead of reconstructing a vague chromatic meaning, I see the motivation for this polysemy in the connotative potentials of the color gray, and particularly on the one hand in the grayish or whitish hair color of old people, and on the other in the grayish or blueish livid color and lack of saturation of a bruise or of a sick body – old age, weakness, and sickness being often naturally associated. These are in fact the connotations expressed by most derivates of the root **pel(H)*-, as can be seen in Vedic *palitá*- 'gray, hoary, old, aged', Avestan *pouruša*- 'gray, gray-haired'; Ancient Greek *poliós* 'gray, grizzled, grisly', *peliós* 'discolored by extravasated blood, livid'; Latin *pallidus* 'pale, pallid', etc. Even Old Irish *líath* 'gray, gray-haired, aged' privileged the description of hair color of old people, while its Modern Irish descendant has widened its functional domain.

Denominations of gray derived from **terms for other dark colors** are especially common. An example of this emerges in Tocharian B *kwele* 'dark gray, black', derived from the PIE root **ḱi(H)-* and cognate with New Persian *siyāh* 'black', cf. (3), as well as with Old Prussian *sywan* 'gray' and Lithuanian *šývas* 'light gray'. Further cognates may be identified in the basic color terms of several Slavic languages, such as Serbo-Croatian *sîv* 'gray', Bulgarian, Macedonian, and Slovenian *siv* 'id.', and Slovak *sivý* 'id.'.[20]

The most common lexical sources for terms for gray, however, are represented by denominations of **ashes, dust, or powder** in my data. In Western IE, this pattern is rare – it emerges in Portuguese, whose basic color term for gray is *cinzento* (in Portugal) and *cinza* (in Brazil). *Cinzento* is a derivate of *cinza*, which also means 'ashes' and goes back to a Vulgar Latin form **cinīsia*, from Latin *cinis, -eris* m. 'ashes'. In Eastern IE, instead, the semantic change from names of ashes to terms of gray is consistently found with different lexemes, and can be especially observed in Indo-Iranian, as well as in Armenian, which as usual presents borrowings or semantic calques from Iranian, notably from Middle Persian, in its color lexicon. The New Persian and Dari basic color term *xākestarī* 'gray' is a transparent derivate from *xākestar* 'ashes' and therefore literally means 'ashy, ash-colored'. The same holds true for Tajik *xokistarang*, where the name of ashes is reinforced by means of the form *rang* 'color'. In Armenian, the basic color term for gray is *moxragowyn*, literally meaning 'ash-colored', cf. Armenian *mokhir* 'ashes' and *gowyn* 'color'. We have here a semantic calque. In Indic, I identified this pattern in Nepali, for example, whose basic color term *kharānī* 'gray' also means 'ashes', its original meaning. This term goes back to Old Indic sources expressing the process of being destroyed and reduced to ashes by caustic substances, as can be seen in (23).

(23) Old Indic *kṣā́yati* 'burn', *kṣāra-* 'caustic, biting, corrosive, acrid, pungent, saline, converted to alkali or ashes by distillation' > Nepali *khār* 'alkali, pungent fumes from burning ghee', *chār* 'pungent fumes' > *kharānī* 'ash; gray' (widely attested in Indic, cf. Pali *khāra-* m. 'alkali, potash', Kashmiri *khāra* 'saline', Sindhi *khāru* f. 'alkali', *chāru* f. 'ashes', Bengali *khālāṛi* 'salt factory', *chār* 'ashes', *char-khār* 'reduced to ashes, destroyed', etc.).

The basic color term for gray of Kashmiri *sūr*^{ü} derives from *sūr* m. 'ashes' (cf. also Kashmiri *sūr rang* 'ash-colored'). Basic color terms such as Gujarati *rākhōḍī* 'gray' and Marathi and Konkani *rākhāḍī* 'id.', derived from the name of an ash pit (Old Indic

20 By contrast, the Czech basic color term *šedý* 'gray', which is also usual in Slovak, is etymologically unclear. Cf. also Slavic **śěrъ* 'gray', which according to Derksen (2008: 447) is cognate with Germanic forms such as Old English *hār* 'gray-haired' (> English *hoary*), from PIE **ḱHe/oiro-*, while Kroonen (2013: 201) considers Slavic forms such as Russian *sěrъ* 'gray' to be borrowed from Germanic.

rakṣā-kuṇḍaka-*), also mean 'ashes'. Gujarati also presents *bhūkhro* 'gray', derived from the homonymous name of a powder. Similarly, the Bengali basic color term *dhūśor* 'gray' goes back to Old Indic *dhūsara-* 'dusty, dust-colored, gray', from an Old Indic root *dhvaṁs* 'fall to pieces or to dust, decay, be ruined, perish'. Its PIE source **dʰwens-*/dʰuns-* may be connected to the PIE root **dʰus-*, which we have seen in Section 2.7 to underlie English *dusky* and other expressions of dark colors. Cognates of Bengali *dhūśor* emerge as minor denominations of gray across other modern Indic languages, as in Hindi *dhūsar*, which, however, is nowadays less common than *saleTī* as an expression of the color gray (the latter, also prevailing in Panjabi, is a borrowing from English *slate*, the name of a gray stone). The Sinhala basic color term *aḷu* 'gray' also means 'ashes'. In Dhivehi, we have *alhikula*, that is, '*alhi*-colored', where *alhi* is again 'ashes', related to Sinhala *aḷu*.

Apart from the recurrent derivation from names of ashes (and to a lesser extent of slate stones), other nominal sources denoting gray referents turn out to be not so frequent for basic color terms of gray, or at least much less frequent than roots expressing darkness or lack of saturation, gray hair, livid complexion, etc. My data present 16 out of 70 denominal basic color terms for gray (=23 % of the cases), which is much less than what we have observed for basic color terms for brown. This is probably because names of plants, the most frequent lexical source for denominal basic color terms of brown, among other colors, are not commonly found for terms of gray, as gray is not as common as brown in vegetation. Similarly to basic color terms for brown, however, basic color terms for gray also disfavor nominal sources denoting gray animals, although animals of this color are easy to find in nature. A rare example of this semantic pattern can be identified in Latvian *pelēks*, the basic color term for gray in this language, derived from Latvian *pelẽ* f. 'mouse' and therefore properly meaning 'mouse-colored'. It ultimately goes back to the above-mentioned PIE root **pel(H)-*, which underlies so many denominations of gray in ancient and modern IE languages. Otherwise, names of animals are attested for marginal denominations of gray, rather than for basic color terms (cf. the late and rare Ancient Greek form *killós* 'donkey-colored, gray' from *kíllos* m. 'donkey'). I see a further piece of evidence indicating the markedness of color terms derived from names of animals in the fact that, according to my data, these denominations present phenomena of analogy to color terms derived from names of plants more commonly than the other way round. Sardinian *múrru* 'gray', for example, is derived from Latin *mūrīnus* 'mouse-colored' (cf. Latin *mūs*, *mūris* m. 'mouse'), but its syncope presupposes an analogy to Sardinian *múrino* 'brown, dark', derived from Vulgar Latin **mōrĭnus* 'having the color of the blackberry' (cf. Sardinian *múra* f. 'blackberry'). The source of an analogy is typically unmarked with respect to the target, which undergoes its influence.

2.9 Lexical sources of the main terms for orange

Similarly to what we have observed in the case of brown and other color categories, basic color terms for orange are also mainly drawn from names of plant products characterized by this color, although different plants may be taken as reference in different languages. In most IE languages, these terms derive from the name of the **orange fruit**, as in the case of English *orange* (24a). This fruit, and often also its correspondent color, presents different denominations, which are related either to Portugal (24b) or, less frequently, to the orange fruit as the 'Chinese apple' (24c).

(24a) Name of the orange fruit > basic color term for orange, cf. English, German, Danish, Swedish *orange*, Norwegian *oransje*, etc.; French *orange*, Italian *arancione*, Spanish *naranja*, Portuguese *laranja* / *cor-de-laranja* (i.e., color of orange), Romanian *oranj*, etc.; Modern Irish *oráiste*, Welsh *oren*, Breton *orañjez*, *oranj*; Lithuanian *oránžinis*, Latvian *oranžs*; Slovak *oranžový*, Slovenian *oranžen*, Ukrainian *pomaránčevyj*, etc.; New Persian, Dari, and Pashto *nārenjī*; Hindi, Gujarati, Panjabi *nāraṅgī*, Marathi *nāriṅgī*, Dhivehi *orenju kula* (i.e., 'orange color'), etc.

(24b) Name of Portugal > basic color term for orange, cf. Modern Greek *portokalís*; Albanian *portokalli*; New Persian *portakalī* (Outside IE, cf. Turkish *portakal*; Arabic *burtuqalī*, etc.). Name of the Portuguese city of Sintra > basic color term for orange, cf. Hindi and Panjabi *santarī*, Nepali *suntale*, Kashmiri *sangtar (rang)*, etc.

(24c) Name of orange as 'Chinese apple' > basic color term for orange, cf. Modern Icelandic *appelsínugulur*, lit. 'yellow (*gulur*) as the Chinese apple', Faroese *appelsingult*, etc.

The first pattern in (24a), which is more familiar in Central Europe, uses a name of the orange fruit that is originally borrowed from Dravidian, as this plant is native of South Asia (cf. Malayalam *nāraŋŋa* 'citrus'). From Dravidian, it passed to Indic (cf. Sanskrit *nāraṅga-* m. 'orange tree'), from Indic to Persian *nārang*, from Persian to Arabic *nāranj*, and from Arabic to the various European languages. In English, this term arrived from Old French, since the orange fruit, as well as the tinctures of this color, were a privilege of the Norman aristocracy. The second pattern, related to the name of Portugal, as in Modern Greek *portokalís* 'orange' (24b), is due to the fact that the Portuguese were prominent in the trade of oranges at the beginning of the modern era. (When the Turks were blocking the connection to the East through the Mediterranean, the Portuguese could avoid the impasse by circumnavigating South Africa.) According to my data, the lexicalization of the color orange based on the name of Portugal is especially common in the area of the Eastern Mediterranean and

of Southeastern Europe. A variant of it appears in some modern Indic languages, as in Hindi *santarī*, where the color orange is named after the Portuguese city of Sintra, close to Lisbon. The third pattern, where orange is described as yellow as the Chinese apple, is attested in a certain number of North Germanic languages, as in Faroese *appelsingult* (24c). The Chinese apple refers to China as the origin of a sort of orange (the sweet orange or *Citrus sinensis*, cf. Bogushevskaya [2018]) or as a general expression for the East. More frequently, the Chinese apple is the expression used only for the fruit, while the color orange is named according to the dominant European pattern in (24a). In German, for example, the color orange is consistently *orange* or *orangefarben*, but the orange fruit and the orange tree may also be called *Apfelsine* f., in addition to *Orange* f. and *Orangenbaum* m. I identified this distribution in Germanic and in Baltic, so we are therefore dealing here with a Northern IE isogloss. Cf. also Dutch *oranje* 'orange (color)' vs. *sinaasappel* 'orange (fruit)', Danish *orange* 'orange (color)' vs. *appelsin* 'orange (fruit)', Swedish *orange* 'orange (color)' vs. *Apelsin* 'orange (fruit)'; Lithuanian *oránžinis* 'orange (color)' vs. *apelsinas* 'orange (fruit)', Latvian *oranžs* 'orange (color)' vs. *apelsīns* 'orange (fruit)', etc. We may hypothesize that the speakers of these languages tried to find synchronically transparent compounded expressions, which manifest a relatively recent development, to motivate the expression of a fruit which was not widespread in their northern regions.[21]

These lexicalization patterns often overlap in function or in form. Firstly, a language may present expressions drawn from more than one pattern, especially in Indo-Iranian. In Hindi, for example, *santarī* is used besides *nāraṅgī* for the color orange, and native speakers often hesitate as to which is more important or which are their semantic or pragmatic differences. Secondly, expressions of a certain pattern may represent formal combinations with another pattern. For example, a lexicalization such as Polish *pomarańczowy* 'orange (color)' (derived from Polish *pomarańcza* f. 'orange fruit; orange tree') presents a first member *pom-* which originally means 'apple' (Polish *pomarańcza* is borrowed from Italian *pomarancia*, an earlier variant of *melarancia*, where both *pomo* and *mela* mean 'apple', cf. French *pomme*). In this, color expressions such as Polish *pomarańczowy* combine the orange pattern in (24a) with the pattern of the Chinese apple in (24c). Similarly, Yiddish *marants* 'orange (color)' is a short form of *pomerants*.

In Indic, the Bengali basic color term *komolā* 'orange' is also based on the name of the orange fruit, which in this case, however, is so named for its pale-red color. Its

21 In the same vein, relatively recent compounded structures for the color orange are attested in Armenian, where *tsiranagowyn* and *gazaragowyn* literally mean 'of the color of the apricot (*tsiran*)' and 'of the color of the carrot (*gazar*)'. These are, however, minor denominations with respect to Armenian *narnǰagowyn*, built according to the pattern in (24a).

lexical source is Old Indic *kámala-* 'pale-red, rose colored', also used as the name of the lotus flower (*Nelumbium*). I could also identify Indic denominations of orange based on the name of other plant products, especially **saffron**, which in Section 2.5 we have seen to be a common source for terms of yellow. Saffron pigments have a yellow-red color and therefore may provide a convenient example for various warm chromatic categories. As illustrated in (25), basic color terms for orange such as Gujarati *kesarī* and Marathi *keśrī* derive from their noun for saffron (Gujarati *kesar*, Marathi *kēśar*), a pan-Indic expression (cf. also Hindi and Nepali *kesar* 'saffron', etc.), which in other modern Indic languages brings about minor denominations of the color orange. It derives in its turn from the Old Indic form *késara-* n., denoting the filament of a plant (in addition to hair, on the basis of a metaphor between animal or human hair and vegetal fibers), since pigments of saffron are precisely produced with the stigmas and styles of the *Crocus sativus*, and not with its petals or leaves.[22]

(25) Old Indic form *késara-* m. / n. 'human or animal hair (hair of the brow, mane of a horse or lion, tail of an ox); filament or fiber of a plant (lotus, mango, etc.)' > Gujarati *kesar* 'saffron', Marathi *kēśar* 'id.' > Gujarati *kesarī* 'orange (color)', Marathi *keśrī* 'id.', Konkani *keśrī*, *kesrī* 'id.', etc.

My data show that basic color terms for orange are among the most recent acquisitions of the color lexicon of the analyzed languages. This is in agreement with Berlin and Kay's (1969) low ranking of orange on their universal evolutionary sequence reported in (1). The ancient IE languages usually do not have a basic color term for orange – either they do not lexicalize it at all, at least as far as we can observe from their documentation, or they only have marginal color expressions for it. This does not depend on the fact that the orange fruit was not popular in antiquity in the West,[23] since many other referents characterized by this color exist in nature and therefore offer potential lexicalization patterns – a flame, the colors of a sunset, as well as many flowers, fruits, and vegetables, such as pumpkins, melons, etc. These

22 Old Indic has no basic color term for orange. It is, however, significant that the few expressions for this color, attested since Classical Sanskrit, derive from the name of the saffron or similar plants, cf. Classical Sanskrit *kausumbha-* 'dyed with safflower, orange'; m. 'wild safflower'; n. 'safflower prepared as a potherb, anything dyed with safflower'; *kausumbhaka-* 'dyed with safflower', from *kusumbha-* m. 'safflower (*Carthamus tinctorius*); saffron (*Crocus sativus*)'. These forms remain marginal, although the color orange is appreciated in the Indic tradition (in contrast to the West in antiquity and in the Middle Ages). When Sanskrit poetry refers to objects characterized by this color, it prefers to describe them as "golden" (by using the PIE root **ǵʰelh₃-*/**ǵʰleh₃-*, which underlies Sanskrit *hári-*, expressing various yellowish, tawny or brown colors [cf. Sections 2.5 and 2.7], as well as *híraṇya-* n. 'gold').

23 Unlike sweet oranges, sour oranges have been known in Greece (since the Hellenistic period) and later in Rome (cf. Bogushevskaya 2018), but they were a very expensive product and therefore remained limited to the high classes.

vegetables were cultivated in Eurasia since antiquity. The Romans had specific names for various sorts of gourd (*cucurbita* f.) and melon (*mēlō*, *-ōnis* m.), for example.[24] Still, they never used these names as sources for basic color terms. The Latin adjective *flammeus* could mean 'flame-colored' (from *flamma* f. 'flame'). The expressions *velum flammeum* 'flame-colored bridal veil' and *flammārius* m. 'artisan specialized in dyeing with orange color' show that techniques of orange dyes existed. Still, *flammeus* remains a marginal color expression in Latin (and therefore decays in Romance). It mainly has a concrete meaning 'flaming, fiery' related to a fire. As we have seen in Section 2.5, terms such as Latin *flāvus* and *fulvus*, meaning 'golden yellow, reddish yellow, flaxen-colored' – again mainly poetic expressions, which are not continued in Romance – were chiefly used to describe hair color in the sense of 'blond' and therefore did not mean 'orange'. Similarly, Ancient Greek forms such as *krókeos* 'saffron-colored' and *krokóeis* 'id.', derived from the name of saffron (Ancient Greek *krókos* m.), are rare and poetic. We may assume that the Ancients, at least in the IE world, were not particularly interested in the color orange and did not assign to it any particular symbolic meaning.

Another finding of my data is that all languages analyzed that do have basic color terms for orange – the modern IE languages – consistently use nominal lexical sources denoting plants or plant products, rather than the name of the flame, of the sun or of fire, for example. Their preference for names of plants matches with the denominal lexicalization patterns that we have observed above for other colors. However, their constant association with denominal word formation contrasts strikingly with that. We have seen that only a minority of the IE basic color terms for white, black, red, yellow, green, blue, brown, and gray are derived from the name of an object (in different proportions according to different colors). By contrast, when they are available, IE basic color terms for orange *all* turn out to be derived from the name of an object in my data. In principle, they could lexicalize orange by means of derivations from other color categories such as red or yellow – these patterns are cross-linguistically attested for basic color terms of orange. Tibetan *mar ser* 'orange', for example, literally means 'red-yellow'. In IE, however, this lexicalization is only found for marginal denominations of orange, such as Modern Irish *flannbui* (lit. 'bloodred-yellow'), which is less frequent and more contextually marked than Modern Irish *oráiste* in (24a) for this color category.

Among the denominal patterns attested, the one based on the name of the orange fruit largely prevails, within and outside of IE, clearly because of the influence of

24 The Romans also had a name for the carrot (*pastināca* f.), which typically has an orange color. However, as a reviewer rightly points out, the orange carrot was first produced by hybridization in the modern era, at least as a stable variety, while in antiquity carrots were white or purple. When considering types of plants as possible origins of color categories, we must therefore be careful that a certain species may be characterized by different colors in different times, places, and societies.

English, French, and other Western languages that have adopted this lexicalization strategy. Other semantic patterns, however, emerge, often with an areal distribution, as the derivation from the name of saffron which is so common in Indic. Similarly, the Sinhala basic color term *tembili* 'orange' derives from the name of the king coconut, *Cocos nucifera*, which is native to Sri Lanka and which is therefore particularly relevant to the experiential domain of its inhabitants. In this case as well, what is lexicalized is primarily what is of most interest to the speakers.

2.10 Lexical sources of the main terms for pink

The case of the color pink is similar to that of orange, in that the dominant semantic pattern derives from the name of a plant-based product originally coming from the East and therefore lexicalized at a relatively recent stage in most IE languages. Both orange and pink may be seen as kinds of light red, and the above-mentioned example of Bengali *komolā* 'orange' (Section 2.9) ultimately derived from Old Indic *kámala-* 'pale-red, rose-colored' indicates that these colors may be lexicalized by similar sources. In the case of pink, the vast majority of the IE languages have basic color terms originally derived from the name of the **rose**. On the one hand, in most modern IE languages of Europe, the forms at issue are inherited or borrowed from Latin *rosa* f. 'rose'.[25] In this group, illustrated in (26a), the denomination of the rose and of the color pink may be identical, as we can see in French *rose*, or may be slightly different but anyway transparently related, as in Dutch *roos* f. 'rose' and *roze* 'pink'.

(26a) Latin name of the rose (*rosa* f.) > basic color term for pink, cf. Italian, Romansh, Spanish, Catalan, Portuguese *rosa* (cf. also Portuguese *cor-de-rosa*, lit. 'color of rose'), French *rose*, Occitan *ròse*, Romanian *roz*, Sardinian *in colori de arrosa*, etc. More or less direct borrowings[26] are attested in German, Norwegian and Swedish *rosa*, Dutch *roze*, Frisian *rôze*, Yiddish *rozeve*, etc.; Breton *roz*; Lithuanian *rõžinis*, Latvian *rozā*; Slovenian *roza*, Polish *różowy*, Ukrainian *rožévyj*, etc.; Albanian *rozë*; Sinhala *rosa*, etc.

25 Latin also attests the derivate adjective *roseus* 'made of or decorated with roses; rose-colored, rosy', which was, however, a marginal color denomination in Latin and is not continued in Romance with this meaning. Its rare reflexes rather mean 'red', as the Romanian basic color term for red *roșu* 'red'.

26 That is, sometimes the terms for the rose or for pink are directly borrowed from Latin, as in German *rosa* 'pink'. Sometimes they arrive through another Romance language, mainly French (as in Dutch *roos* 'rose'), or from a language that is geographically and culturally closer to the target language (as in Latvian *rozā* 'pink', borrowed from German). Similarly to the case of orange, all these intense borrowings manifest the adoption of a relatively recent color term related to an object, in this case the rose, which typically prefers a warm weather and therefore was originally not common in

Armenian *vardagowyn* 'pink' goes back to a non-Latin source but presents the same semantic pattern, as it literally means 'of the color (*gowyn*) of the rose (*vard*)'. In this case, the name of the rose is borrowed from an Old Iranian form **wr̥da-* (cf. New Persian *gol* 'flower').[27] On the other hand, in most IE languages of Asia, especially in Eastern Iranian and in Indic, basic color terms for pink go back to a Persian compounded structure which originally means '**rose water**', as in (26b). In Hindi, for example, *gulābī* 'rosy, pink' is derived from *gulāb* 'rose', which is originally a compound from *gul* 'flower' and *āb* 'water' – the rose is seen as the flower par excellence. Consider that rose water, a liquid made of roses' petals, especially developed during the Middle Ages in Persia. It is therefore understandable that a Persian lexical source is also recruited for that.

(26b) Persian name of rose water > Indo-Iranian name of the rose flower > basic color term for pink, cf. Pashto and Dari *gulābī*, Tajik *gulobī*, etc.; Hindi-Urdu, Panjabi, Gujarati, Marathi, and Konkani *gulābī*, Kashmiri *gŏlöbī*, Nepali *gulāphī*, Bengali *golāpī*, etc.

In New Persian, instead, the basic color term for pink is rather *Suratī* (also meaning 'facial'), a derivate from Persian *Surat* 'face; form, shape' (ultimately from Arabic *Sura* 'form, shape; picture'), which therefore literally means 'face-colored'. This is the most idiosyncratic pattern for pink in my data, where most denominations of the color pink are drawn from names of plants or plant products. Even English *pink*, which is not related to English *rose*, and which has been also widely borrowed (cf. German and Danish *pink*, Afrikaans *pienk*; Welsh *pinc*, etc.), was originally the denomination of a flower, a sort of *Dianthus*. The situation of English is therefore not so different from the semantic pattern illustrated in (26a).[28] Names of other plants are in fact attested as lexical source for pink, albeit minoritarian with respect to the rose. In Dhivehi, for example, pink is *fiyāthoshi kula*, that is 'color of the onion peel'

Northern Europe. In this case as well, however, we must pay attention to different species – the wild rose (*Rosa canina*), for example, is native to Europe, including Scandinavia.

27 The presence of similar forms such as Aramaic *wardā'* 'rose', Hebrew *vered* 'id.', Arabic *warda* 'rose', etc. may be interpreted either as borrowings from Iranian or, more probably, as the reflexes of a Mediterranean substrate word. Ancient Greek *hródon* 'rose' (to be reconstructed as *wródon* on the basis of Mycenaean evidence as well as of Aeolic *bródon*) may belong to this pattern, which may be also the source of a borrowing for the synonymous Latin form *rosa* (cf. Chantraine 1968–1980: 976–977).

28 While English only borrows the Latin name of the rose flower (through old French), and not of the color, other languages may present the opposite situation of only borrowing the color term. In Modern Greek, for example, *roz* 'pink' (borrowed from French) contrasts with the name of the rose, which is here *triandafilo* (lit. 'thirty-leaved', referring to the many leaves or petals of the rose). The latter derives from Byzantine Greek (*triantáphyllon* n. 'rose'). Similarly, Albanian has *rozë* 'pink' (again a French borrowing) vs. *trëndafil* (borrowed from Greek), Romanian has *roz* 'pink' vs. *trandafir* 'rose', etc. This is a Balkan pattern.

(*fiyā* means 'onion'; *thoshi* means 'bark, peel' and is often used as a suffix to denote plants or parts of plants, e.g., *fanthoshi* 'woven coconut palm fronds').

According to my data, basic color terms for pink may be also derived from structures which mean **'light red'**, **'pale red'**, **'white red'**, *et similia*, and which express the low chromatic saturation of the color pink. In IE, this pattern only emerges in scattered linguistic spots, especially in Northern Germanic and in Celtic, as in (27), where Icelandic *bleikur* 'pink' originally means 'pale', for example; it is etymologically related to German *bleich* 'pale'. Danish *lyserød* and Irish *bándearg* are transparent compounds. The former means 'light red' (Danish *lyse* is a cognate with English *light*). The same holds true for Faroese *ljósareyður*. Irish *bándearg*, instead, means 'white-red' and consists of the Irish basic color terms for white (*bán*) and for red (*dearg*). We may compare the German compounded form *rosarot* 'pink'.

(27) Expressions such as 'light red', 'pale', 'pale red', 'white red' > basic color term for pink, cf. Modern Icelandic *bleikur*, Danish *lyserød*, Faroese *ljósareyður*; Modern Irish *bándearg*, etc.

The case of basic color terms for pink derived from the name of the rose (or rose water) and of similar flowers is, however, much more common than the case of basic color terms for pink represented by expressions such as light red, white-red, or pale. The former case has 51 out of 70 occurrences (=73 %) in my IE database, the latter has four occurrences (6 %). All these terms are morphologically derived or compounded expressions. This suggests that pink is not a primary color in the IE color lexicon. This result, which is consistent with the low position of pink in Berlin and Kay's (1969) sequence, is also supported by diachronic evidence, as the ancient IE languages usually did not have a basic color term for pink (this occurs in 15 out of 70 languages, that is, in 21 % of the cases). No main expression of pink is attested in Hittite, Avestan, Old Persian, and Vedic, for example. Consequently, no specific root for pink can be reconstructed for PIE. The ancient IE languages can well describe referents characterized by pink or similar rosy shades, e.g., some flowers, the skin or the cheeks of a young woman, the colors of the dawn, etc. The dawn, in particular, is represented as a beautiful woman in IE mythology and is often associated to the color pink. In Homeric Greek, it is typically described with the compound *hrodo-dáktulos* 'rosy-fingered', which is, however, a complex word formation. Other forms such as Ancient Greek *hrodóeis*, *hródeos*, or *hródinos* (derived from Ancient Greek *hródon* n. 'rose') are also poetic expressions, and are usually meant in a concrete sense of material as 'consisting of roses, decorated with roses', rather than as expressions of the color pink. The same holds for Classical Sanskrit *pāṭala-* 'pale red, pink, pallid'; m. 'name of a flower (*Bignonia Suaveolens*, etc.); rose color' and *pāṭala-varṇa-* 'rose-colored'. They are not basic color terms.

2.11 Lexical sources of the main terms for purple or violet[29]

In the West, purple has been a highly appreciated color since antiquity, as the production of a variety of purple (the Tyrian purple dye) from the mucus secreted by a kind of murex was particularly difficult and time-consuming to extract and was therefore very expensive and typically used in garments worn by high magistrates, kings, or bishops (cf. Dedekind 1898–1908). In fact, in many IE languages, the basic color term for purple derives from the name of the **purple substance**. In Ancient Greek, we have the noun *porphúra* f. 'purple fish and the dye obtained from it' and the adjective *porphúreos* 'purple-colored'. Ancient Greek *porphúra* has been borrowed into Latin *purpura* f. 'purple fish; purple color; purple cloth' (from which the poetic adjective *purpureus* 'purple-colored' is derived). On the one hand, Latin *purpura* has been inherited by Sardinian *púrpura* and by other minor denominations of this color, such as Italian *porpora*, French *pourpre*, Occitan *polpra*, Catalan *porpra*, etc. On the other, Latin *purpura* has been early borrowed into various Germanic and Celtic languages. Nowadays, not only English *purple*, but also Modern Irish *corcra* and Welsh *porffor* represent basic color terms for purple (while in other IE languages, as in Baltic, borrowings such as Lithuanian *purpurìnis* and Latvian *purpurs* represent minor denomination of the color purple with respect to Lithuanian *violètinis* and Latvian *violets*, see below).

More commonly, basic color terms for purple or violet are drawn from names of flowers, fruits, or vegetables characterized by this color, according to my data. The most frequent pattern, at least in the IE languages of Europe, is a word formation on the basis of the name of the **violet flower**, as reported in (28). Most of the time we deal with a synchronically transparent structure, as in Romance, where the names of the violet flower and of the purple or violet color are identical or similar – but this is not always the case. Lithuanian uses *violètinis* for purple or violet and *žibuoklė* f. for the violet flower. Most of the time, as we have seen for the pink color category, the source is found in Latin, in this case in the Latin name *viola* f. 'violet flower; violet color', which has been more or less directly borrowed, in its bare form with suffixes, in other languages outside Romance. But this is not always the case either. Armenian *manowšakagowyn* 'violet, purple', clearly meaning 'of the color (*gowyn*) of the violet

29 The color categories of purple and violet are not identical, as purple is lighter and closer to red, while violet is darker and closer to blue. Since their hues are, however, close in the visible spectrum, their linguistic expressions often overlap, and some languages have only one basic color term for both. While in English *purple* is more basic than *violet*, according to Berlin and Kay (1969), in Italian *viola* is more prominent than *porpora*, for example. Moreover, when different terms exist for the two hues in a language, they often do not differ only in their chromatic denotation, but also depend on their different referents, contexts or linguistic registers, and they are often confounded in everyday speech. An analysis of the specific usages of these terms is beyond the scope of the present paper.

(*manowšak*)', is borrowed from Persian, as usual. New Persian *banafš* presents the same pattern, since it means both 'violet flower' and 'violet-colored'.

(28) Name of the violet flower > basic color terms for purple or violet, cf. Italian *viola*, Spanish and Catalan *violeta*, French, Occitan, Romansh, and Romanian *violet*, etc.; Lithuanian *violètinis*, Latvian *violets*; Slovenian *vijóličen*, Czech *fialový*, Polish *fioletowy*, Russian *fiolétovyj* 'purple', etc.; Albanian *vjollcë*; Armenian *manowšakagowyn*; New Persian *banafš*, etc.

Some languages present more than one expression for violet and purple. Albanian, for example, has both *vjöllce* and *lejla* for this color, showing a derivation from the name of **lilac** which is also frequent as a source of terms for purple in my data. Consider German, Yiddish and Swedish *lila*, Danish, Norwegian and Faroese *lilla*; Spanish and Catalan *lila*; Bulgarian *liláv*, etc. The name of the lilac flower and of its color reached the European languages through Arabic, where we have the basic color term *lailkī* 'purple', formed by means of a nisba derivation from the noun *lailak* 'lilac'. Arabic, in its turn, has borrowed *lailak* from Persian. The name of the **mallow** flower, characterized by violet petals, is also documented as a source of denominations of purple in my data. Basic color terms such as Occitan *malve* 'purple', Romanian *mov* 'id.', Modern Greek *mōv*, *mov* 'id.' ultimately go back to Latin *malva* f. 'mallows'. While Occitan is directly inherited from Latin, Modern Greek *mōv*, *mov* is a borrowing from (the spoken form of) French *mauve*; Romanian *mov* is also a borrowing from French (possibly through Greek. In French, however, *mauve* is only a minor color denomination, in addition to being the name of a plant – the French basic color term for this color category is rather *violet*). A similar pattern emerges in some Iranian languages, such as Pashto and Dari, whose main color term for purple is *arghawānī*, clearly derived from *arghawān* 'mauve; flower of the Judas tree'. The same holds true for Tajik *arġuvon*. Sogdian already attests the form *'ryw'n* (=*argywān*) 'purple', ultimately borrowed from Akkadian *argamanu* through Aramaic *argwānā*, as purple dyes and purple garments were precious objects of trade in the Middle East and in Central Asia along the Silk Road.

The most common names of fruits appearing as lexical sources of terms for purple are those denoting kinds of berries and plums in my data. Spanish *morado* and Catalan *morat* derive from Spanish *mora* and Catalan *móra*, the name of the **blackberry**, inherited from Latin *mōrum* n. 'mulberry, blackberry' (in its plural form *mōra*). We are probably dealing with an originally substrate Mediterranean word denoting a dark berry, cf. also Ancient Greek *móron* n. 'black mulberry, blackberry' (borrowed into Turkish *mor* 'purple, violet'), Armenian *mor* 'blackberry', etc. The latter is also a basic color term for purple. Classical Armenian *cirani* 'purple, purple-colored' derives from *ciran* 'apricot' (while the Modern Armenian compound *tsiranagowyn* 'apricot-colored' is an expression of orange). Another example of this

pattern, connecting the purple color to the name of a fruit, is extremely frequent in the modern Indic languages (29). In this case, Old Indic *jambu-* f. 'rose apple tree' (denoting the *Eugenia jambolana* and similar plants growing in tropical landscapes) is continued in numerous Middle and Modern Indic forms denoting this tree or its characteristic purple fruit, often called **jamun**, jambul, or jambolan (cf. Pali *jambu-*, Prakrit *jaṁbū-*, Sindhi *j̄amũ*, Panjabi *jammū*, Nepali *jāmu*, Bengali and Hindi *jām*, Gujarati *jām* / *jãbu*, Marathi *j̈ãb(h)*, Konkani *jãmba*, Sinhala *daṁba*, etc.). From these and similar forms we have derived adjectives denoting varieties of purple or violet.

(29) Name of the plum > basic color terms for purple, cf. Hindi, Panjabi and Nepali *jāmunī*, Gujarati *jāmbalī*, Marathi *zāmbhaḷā*, Konkani *zāmbḷo*, etc.

The same semantic pattern appears in Dhivehi *dhan'bu kula* 'purple', lit. '*dhan'bu*-colored', where *dhan'bu* or *dhan'bu gas* is the Java plum (*gas* means 'tree' in Dhivehi and is often used as a suffix to denote specific trees). Similarly, Sinhala *dam* indicates both the color purple and a kind of berry or small plum, called *dan* (*Syzygium caryophyllatum*), which is typical of Sri Lanka.

Consider that the jamun plays a very important role in Indian cultural and religious traditions. Its tree is a massive plant, which can grow up to 30 m and live more than a century. Its purplish fruits could be eaten raw by hermits wandering in the forest. Crucial events of many stories, in both Indic and Dravidian literature, happen beside the rose apple tree. Buddha entered into the first stage of his Jhāna meditation while sitting under a jambu tree. In the Tamil tradition, the poetess Avvaiyar was also sitting under a jambu tree when she decided to retire from her literary work, and only Murugan made her change her mind, and so on. India itself is often called *jambu-dvīpa-* m., that is, 'island of the jambu tree'. It is understandable that the Indic languages take their main terms of purple, as well as of other colors, from the names of those objects that are more relevant for their experiential field.

Similar principles underlie basic color terms for purple derived from names of other vegetables. Nepali *pyājī* 'purple', a basic color term in this language, expressing various shades from dark pink to blueish red, is clearly derived from the Nepali noun *pyāja* 'onion' (the latter being borrowed from Persian). We have seen in Section 2.10 that the name of the onion provides a source for the basic color term for pink in Dhivehi. Much more commonly in Indic, the color purple is coded by expressions of the **aubergine**, as in (30). In this case, an originally Dravidian denomination of the aubergine (cf. Malayalam *vaṟutina*) had been borrowed into Indic in antiquity (cf. the rare form Old Indic *vātiṅgaṇa-* m. 'aubergine'). Its reflexes can be seen e.g., in Hindi *baiṅgan* 'aubergine, eggplant', Nepali *baigun* 'id.', Bengali *begun* 'id.', Kashmiri *wā̃gun* 'id.' etc., which have produced derived adjectives such as Hindi *baiṅganī* lit. 'eggplant-colored' for purple. As in many other Indic languages, Hindi presents both

baiṅganī and *jāmunī* for purple. Kashmiri reinforces the name of the eggplant with *rang* 'color', which indicates the transparent and recent word formation.

(30) Name of the aubergine > basic color terms for purple, cf. Hindi *baiṅganī*, Nepali *baijanī*, Bengali *beguni*, Sindhi *wānganī*, Kashmiri *wā̃gun rang*, etc.

Although purple or violet hues are also found in **precious stones** (e.g., the amethyst), names of gems only rarely represent the lexical sources of basic color terms for this color in my data. An example of this may be seen in Kashmiri *lājward* 'purple', which goes back to the name of the lapis lazuli. The latter, however, is more commonly used as a source of terms for blue, as we have seen in Section 2.6.

Alternatively, basic color terms for purple may be derived or compounded from terms used for other colors, such as **red or blue**, the components of this color category. From terms of red, in particular, we have Portuguese *roxo* 'purple', for example, derived from Latin *russeus* 'reddish'. Similarly, Latvian *purpursarkana* 'purple' remotivates the name of purple with that of red (*sar̂kans*), although *purpursarkana* is not as frequent as *violets* in this language. From terms of blue, we can mention Sardinian *biaittu* (meaning 'violet' or 'blue' in different varieties of this language), which is borrowed from Old Italian *biadetto* 'blueish', itself borrowed from Germanic (cf. Section 2.6). Dutch *paars* 'purple', Afrikaans *pers* 'id.', and Frisian *pears* 'id.' are borrowed from Middle French minor denominations of blue such as *pers* / *perse* (ultimately going back to a Vulgar Latin form *persus* 'related to Persia', since purple as well as blue pigments came from the East). Sometimes both denominations of red and blue, or similar colors, co-occur in a compound to denote the color purple. Modern Icelandic *fjólublár* 'purple, violet' is a transparent compound from *fjóla* 'violet' and *blár* 'blue'. Modern Breton *glasruz* 'purple' is a compound from *glas* 'blue-green, blue' and *ruz* 'red'. Such compounds recall the pattern attested for pink in forms such as Modern Irish *bándearg*, as we have seen in (27). As in that case, these compounds as well especially emerge in the Northern IE languages of Europe.

(31) Expressions such as 'reddish', 'blueish', 'blue-red' > basic color term for purple, cf. Portuguese *roxo*, Sardinian *biaittu*; Dutch *paars*, Modern Icelandic *fjólublár*; Modern Breton *glasruz*, etc.

As we have seen in Section 2.10 in the case of pink, for purple and violet as well basic color terms are mainly derived from the name of an object characterized by this color, as in (28)–(30). In my data, this occurs in 55 out of 70 cases (=79 %). In eight out of 70 cases (=11 %) we have derivations from other color denominations, such as red or blue, as in (31). In the remaining seven cases (=10 %), the languages analyzed do not present any color term for purple or violet. This occurs in most ancient IE languages (in Hittite, in Avestan, in Old Persian, in Vedic, in the Sabellic languages, in Old Norse, in Tocharian in my database) – but not in all of them. In Ancient Greek, for example,

porphúreos can certainly be considered to be a basic color term, as it is very frequent since the stage of Homeric Greek, where it is even more common than *erythrós* 'red'.[30]

Moreover, among the basic color terms for purple with denominal formations, those derived from the name of a plant or plant product are definitely more frequent than those derived from the name of an animal or product such as the purple fish.[31] The former pattern has 42 out of 55 occurrences (=76 %), the latter pattern has 11 out of 55 occurrences (=20 %). In the remaining two out of 55 occurrences (=4 %), the lexical source is the name of an inanimate object such as the lapis lazuli. I consider it significant that the name of the purple fish is a minor lexical source for the purple color in IE despite the influence of English, which has such a semantic pattern. This result can be understood if compared to the lexical sources of other color terms, such as pink, orange, etc. in which names of plants and plant products also predominate.

3 Word formation and borrowability

In the literature, it is assumed that color terms may derive from names of objects in the same way as names of objects may derive from color terms, and that denominal formations may be equally common for different color categories. According to Buck (1949: 1053), for example, we can establish an association between terms for white and names of snow or milk in the same way as an association between terms

30 In addition to Ancient Greek *porphúreos* and to Latin *purpureus*, expressions of purple are attested in old borrowings such as Old Irish *corcair*, Middle Welsh *porphor*, Gothic *paurpaura*, Old English *purpul*, *purpure*, *purpuren*, Old High German *purpura*, Old Prussian *pūrpurns*, Old Church Slavonic *praprǫdĭnŭ*, etc. However, in none of these languages does the color purple play such a prominent role in the color lexicon as in Ancient Greek. This may be due to the fact that the latter is more exposed to the influence of Phoenicia and of the East in general, from where the techniques of elaborating the murex into purple pigments originated. On the other hand, the relevance of purple in the Greek color lexicon may explain why purple is more frequently documented in the ancient languages with respect to other colors such as pink or orange, as the Greek Gospel was translated into Gothic, Old Church Slavonic, Classical Armenian, etc. From different sources, Classical Sanskrit attests marginal expressions for purple derived from the name of smoke (*dhūmra-* 'smoke-coloured, smoky, dark-coloured, gray, dark-red, purple', *dhūmala-* 'smoke-colored, purple') or compounded from other color denominations (*nīla-lohitá-* 'dark blue and red, purple, dark red'). As we have seen in Section 2.7, these terms are not specific for purple and can be used for other dark colors as well.
31 In addition to the purple fish, another animal name is the ultimate source of the Welsh basic color term *piws* 'purple', borrowed from English *puce*, a marginal denomination of a dark red or purple-brown color, which is further borrowed from French *puce* 'flea; rouge brun'. It originally described the color of fleas that have been crushed or the color of flea droppings on sheets.

for blue and the name of the sky. In case of denominal formations, it is also assumed that color terms have the same correlations with names of animals, plants, and various concrete objects (cf. Villalva 2019: 284). These assumptions are not corroborated by my data, where denominal formations are much more common for some color categories than for others, and where different types of animal, vegetal, and mineral substances also have different possibilities to be lexical sources of color terms.

In particular, we have seen that the IE basic color terms for black and white do not usually derive from denominations of white or black objects, but rather from roots originally expressing brightness or darkness, among other things. On the contrary, IE basic color terms for pink, purple, and orange usually do not derive from color roots, but rather have nominal sources denoting pink, purple or orange referents, mainly plants or plant products. A striking difference emerges in my database between the situation of basic color terms having no denominal formations, in the case of black,[32] or only 3 % of denominal formations, in the case of white, on the one hand, and the situation of basic color terms with more than 70 % of denominal formations in the case of pink, purple, and orange on the other (cf. Table 1). A color expression derived from a noun is clearly a secondary formation as compared to a color expression directly derived from an adjectival color root (e.g., *h_1rewd^h- 'red') or from a verbal root related to color (e.g., *$\acute{k}wit$- 'shine') – recall that IE mainly has verbal roots. Moreover, when pink, purple, and orange do not have a nominal source, it is often because the IE language at issue does not lexicalize these color categories. In both cases – when they have a nominal source and when they are not lexicalized – pink, purple, and orange occupy a marginal position in the IE color lexicon. Deviant cases do exist, e.g., the Modern Icelandic basic color term *bleikur* 'pink' (originally 'pale') is not denominal, cf. (27), while the Konkani basic color term *dhavo* 'white' is denominal (from the name of a tree), cf. Section 2.1. This shows that both denominal formations and primary color roots are possible in principle for all these color categories. The fact that they have been proven to occur with very different frequencies for different color categories is therefore theoretically interesting, as it confirms some of Berlin and Kay's (1969) claims concerning the asymmetric status of these color categories in the color lexicon. In their universal evolutionary sequence reported in (1), black and white occupy the left extremity, representing the color categories that are most commonly lexicalized by basic color terms. Purple, pink, and orange, instead, are placed on the extreme right, among the most marked color categories (for gray, see below).

32 As this result only refers to my IE data, it does not imply that basic color terms of black derived from a noun cannot be found in other language families. It implies, however, that they should be rarer than basic terms of other color categories having a denominal formation.

Table 1: Word formation of major color expressions in a sample of IE languages (cf. Section 1).

	Denominal formation	Non-denominal formation	The color term is not used/not attested	Total	Potentiality of denominal formation
Black	0 (0 %)	69 (99 %)	1 (1 %)	70 (100 %)	Low
White	2 (3 %)	67 (96 %)	1 (1 %)	70 (100 %)	
Green	5 (7 %)	58 (83 %)	7 (10 %)	70 (100 %)	
Yellow	11 (16 %)	52 (74 %)	7 (10 %)	70 (100 %)	
Gray	16 (23 %)	46 (66 %)	8 (11 %)	70 (100 %)	Middle
Red	22 (32 %)	47 (67 %)	1 (1 %)	70 (100 %)	
Blue	23 (33 %)	43 (61 %)	4 (6 %)	70 (100 %)	
Brown	29 (42 %)	31 (44 %)	10 (14 %)	70 (100 %)	
Pink	51 (73 %)	4 (6 %)	15 (21 %)	70 (100 %)	High
Purple, violet	55 (79 %)	8 (11 %)	7 (10 %)	70 (100 %)	
Orange	55 (79 %)	0 (0 %)	15 (21 %)	70 (100 %)	

Our data also agree with Berlin and Kay's (1969) theory as regard the low potentiality of secondary, denominal formations for green and yellow, which also rank high in the sequence in (1), as well as the higher number of denominal formations (and of no attested lexicalization) of blue and especially brown, which rank lower in the sequence in (1).

In Table 1, the lexicalization patterns of red and gray are the only deviant cases with respect to Berlin and Kay's (1969) theory, although they can be also explained. Firstly, the fact that gray may be lexicalized by basic color terms earlier than expected, as in IE, was already admitted by Berlin and Kay (1969: 45), who considered this color category to be a "wild card". They do not give an explanation for this phenomenon. In the texts of the early IE languages, I could observe that expressions of gray are mainly used to refer to the hair color of old people (and as such they often overlap with expressions of white), rather than to describe gray referents. Vedic *palitá-* and Ancient Greek *poliós*, for example, mean 'hoary, grizzled', rather than properly gray. The connotations of old age prevail over their chromatic denotations. I therefore explain the central status of expressions of gray in the IE color lexicon with the importance of old age in the literature of the ancient IE languages. The prevalence of metaphoric connotations on color meanings does not necessarily impinge upon the validity of color theory – it implies that further factors must be taken into account besides chromatic aspects. Being incomplete, however, does not mean being incorrect. On the contrary, it is understandable that tendencies established on large and cross-linguistically varied language samples, as in Berlin and Kay (1969) and in the subsequent universalist studies, must be complemented by more detailed information drawn from specific languages. Secondly, the fact that basic color terms

for red have a higher number of secondary, denominal formations than expected in the IE color lexicon can be explained by their widespread use of lexical sources denoting worms or grains to produce red pigments, e.g., New Persian *qermez* in (10). This is, however, an innovation, due to an influence from Iranian on the surrounding area of Armenian, Slavic, etc. (and, outside IE, on some Western Turkic languages, such as Turkish and Azeri *qırmızı* 'red'). In the early IE languages, the non-denominal root *h_1rewd^h- was rather the privileged expression of the color red (cf. Section 2.3). The original situation of the red color category in IE was therefore consistent with Berlin and Kay's (1969) sequence in (1).

Moreover, I could also observe an interesting relationship between the level of denominal formations on the one hand and the level of borrowings on the other.[33] My results are illustrated in Table 2.

Table 2: Native vs. borrowed color expressions in a sample of IE languages.

Color terms	Native material	Borrowed material	Not used/not attested color expression	Total	Lexical retention
Black	67 (96 %)	2 (3 %)	1 (1 %)	70 (100 %)	High
Yellow	62 (89 %)	1 (1 %)	7 (10 %)	70 (100 %)	
Red	60 (86 %)	9 (13 %)	1 (1 %)	70 (100 %)	
Green	58 (83 %)	5 (7 %)	7 (10 %)	70 (100 %)	
White	56 (80 %)	13 (19 %)	1 (1 %)	70 (100 %)	
Blue	54 (77 %)	12 (17 %)	4 (6 %)	70 (100 %)	Middle
Gray	51 (73 %)	11 (16 %)	8 (11 %)	70 (100 %)	
Brown	47 (67 %)	13 (19 %)	10 (14 %)	70 (100 %)	
Purple, violet	25 (36 %)	38 (54 %)	7 (10 %)	70 (100 %)	Low
Pink	18 (26 %)	37 (53 %)	15 (21 %)	70 (100 %)	
Orange	7 (10 %)	48 (69 %)	15 (21 %)	70 (100 %)	

33 For simplicity's sake, I focused on the most typical cases of borrowings – with the following criteria. 1) I considered borrowing as the adoption of a foreign lexeme in both form and meaning, that is, as borrowed matter rather than just as borrowed pattern (e.g., Persian *ābī* 'blue' is not counted here as a borrowing, since it is a semantic calque of Arabic *māwiyy* 'watery' by means of inherited lexical material, cf. Section 2.6). 2) Cultivated borrowing was not included in the number of borrowings, as it replicates material that already belongs to the language. (This, however, does not change the argumentation significantly, as cultivated borrowings usually represent minor color denominations rather than basic color terms.) 3) When a borrowed form is continued in subsequent stages of the language, borrowing was considered just once, as the recent stages of the language inherit it (e.g., Sanskrit *kāla-* 'black, dark' is borrowed from Dravidian, but Hindi, Kashmiri etc. *kālā-* is not borrowed since it continues the Sanskrit form – and is taken into consideration as such by Turner [1962–1966: 3083]). 4) I did not distinguish whether the term is borrowed directly or indirectly, e.g., whether Germanic languages borrow expressions of pink directly from Latin *rosa* or through a Romance language.

As can be seen in Table 2, basic color terms for black, white, red, yellow, and green have a high retention of native lexical material (in 80 % of the cases or more), and therefore a low level of borrowability. By contrast, the color categories of blue, gray, brown, purple, pink, and orange – in this order – have a middle to low number of inherited structures and therefore a higher borrowability (in case they are lexicalized at all). Considering the cross-linguistic instability of gray, the latter results match quite consistently with Berlin and Kay's (1969) sequence in (1). For orange, consider the frequent borrowings based on the name of the orange fruit, as in English *orange* or Slovak *oranžový* (24a), and on the name of Portugal, as in Albanian *portokalli* (24b). For pink, consider the borrowings more or less directly derived from Latin *rosa* 'rose' in Germanic (e.g., Norwegian *rosa*), in Baltic (e.g., Latvian *rozā*), in Slavic (e.g., Ukrainian *rožévyj*), in Modern Greek (*roz*), etc. (26a). For purple, consider the spread of Latin *purpura*, borrowed in its turn from Ancient Greek, into Germanic (e.g., English *purple*), or of Latin *viola* in Baltic (e.g., Lithuanian *violètinis*), in Slavic (e.g., Russian *fiolétovyj*), etc. (28). Moreover, these results match quite well with the data concerning (non-)denominal formations in Table 1, in that the basic color terms having the highest degree of denominal – and therefore secondary – formations (in case they are lexicalized at all) are also the ones that are more frequently borrowed: they are again the basic color terms for pink, purple, and orange. In principle, this can be explained by the fact that borrowings are more common for nouns than for other parts of speech. It is therefore understandable that basic color terms based on a noun are more frequently borrowed than basic color terms based on verbal or adjectival roots. It is not the case, however, that borrowed basic color terms and denominal basic color terms always coincide. For example, the denominal formations of orange based on the pattern 'as yellow as the Chinese apple' (e.g., Faroese *appelsingult*) are inherited. The denominal formations of pink based on Latin *rosa* are inherited in Romance (e.g., Italian *rosa*). English *pink* is also inherited from Germanic, although it is denominal, derived from the name of a flower. The denominal formations of purple based on the names of the plum or of the aubergine are inherited in most New Indic languages. Thus, I consider the level of borrowability and the level of denominal formations of basic color terms not as the epiphenomenon of one another, but rather as two tendencies that go in the same direction, whereby some color categories are more prominent than others in the color lexicon.

At first sight, Table 2 may present a problem in the relative position of some basic color terms, such as yellow and red, with respect to each other, but they can be easily explained with the specific history of the IE color lexicon. The fact that basic color terms for red are more frequently borrowed than basic color terms for

yellow simply depends on the fact that the inherited PIE root *$\acute{g}^h$*elh*$_3$-/**$\acute{g}^h$*leh*$_3$- expressing yellow (as well as green) has better survived in IE basic color terms than the inherited PIE root **h*$_1$*rewd*^{h}- expressing red. In many IE languages, the old PIE root **h*$_1$*rewd*^{h}- has only remained for minor color denominations (e.g., Modern Greek *erythrós* 'red', which is found in fixed expressions such as *eriθró emosfério* 'blood cell'), while basic color terms for red have been renewed with forms derived from names of grains or larvae (as Modern Greek *kókinos*) or with forms expressing 'colored', 'beautiful', or 'dear' (as the originally Persian form *lāl* in Indic). I therefore consider the borrowability of basic color terms to be correlated with their more general renewability. The same holds for basic color terms for white. Consider borrowings such as Germanic **blanka* in Romance or Persian *saphed* in Indic. Why are basic color terms for red and white borrowed more often than basic color terms for yellow-green in IE? Probably because of their non-chromatic values. Basic color terms for white typically express images of cleanness, pureness, and innocence in IE and beyond. There is often the need to emphasize that something is really bright or dazzling white in order to stress its absolutely immaculate nature. As black is often represented in opposition to white, it is also common to stress that something is pitch-black – this may provide an explanation for the replacement of Old English *sweart* by *blæc*. There is not such a need to emphasize that something is really yellow or green. For basic color terms of red, lexical replacement and borrowability are probably due to the fact that the color red is often object of taboo in IE as well as in many other cultures, owing to its association with blood. Taboo words are often renewed in languages, and a borrowed form can be used for that as it is especially different from the daily lexicon. In general, a basic color term can be replaced by a new and often borrowed form if its corresponding color category expresses special connotative values (intensive meaning, taboo, association with experiences that are particularly valued, etc.). Accordingly, the explanation for the use of color terms often resides *outside* the color domain itself.

4 Conclusions

In this paper, we have discussed semantic variation and semantic change in the lexicalization patterns of the main IE color expressions. On the basis of a sample of 70 ancient and modern IE languages (cf. Section 1), we have investigated the lexical sources of color terms. We have seen, for example, that basic color terms for white usually go back to forms expressing not only brightness, as in the case of English

white, but also paleness (e.g., Marathi *pā̃ḍhrā*) and simplicity (e.g., Bengali *śādā*), cf. Section 2.1. Basic color terms for black typically derive from roots expressing not only darkness, as in the case of Yaghnobi *šōw*, but also dirt (e.g., German *schwarz*) and burning (e.g., Latin *āter*), cf. Section 2.2. We have also identified common semantic changes leading to basic color terms, for example a change from a meaning of 'colored' to a meaning of 'red', from 'beautiful' to 'red', or from 'dear' to 'red', cf. Section 2.3. These findings can be used in semantic reconstruction – an especially challenging topic, on which there is a limited body of literature. In our case, if a language X has a form meaning 'beautiful', for example, and another language Y has a cognate form meaning 'red', we can hypothesize that 'beautiful' is the original meaning and 'red' is derived from that by a common metaphor whereby red is described as the beautiful color par excellence, as in Russian *krásnyj*. My extensive coverage of different ancient and modern IE languages may provide a convincing picture of such origins and developments, which may suggest more general hypotheses of semantic change and semantic reconstruction to be tested in the color lexicon of other language families.

The lexical sources of color terms typically denote referents that are particularly important in the experiential domain of a speech community. Plants and plant products, for example, play a central role in the substantially rural cultures of antiquity. It is therefore understandable that their names represent common lexical sources of color terms. This holds true not only for terms of green, which in IE and beyond have a special association with the plant world (cf. Section 2.4), but also for terms of other color categories, such as yellow (e.g., Dhivehi *reen'dhookula* from the name of turmeric, cf. Section 2.5), blue (e.g., Czech *modrý*, cognate with English *madder*, cf. Section 2.6), brown (e.g., Bengali *bādāmī* from the name of the almond, cf. Section 2.7), etc. Different lexicalization patterns, based on the name of animal or mineral referents, are also attested, and we have identified various examples of them, e.g., Konkani *patsvo* 'green' from the name of the emerald, or Welsh *piws* 'purple' from the name of the flea. My data clearly indicate, however, that basic color terms derived from names of plants or plant products are much more frequent than basic color terms derived from names of animals / animal products or from names of minerals. I explain these results with the fact that natural dyes are much more commonly derived from vegetal sources, such as flowers, leaves, herbs, berries, roots, bark, wood, fungi, and lichens, than from animal sources, such as insects, or from minerals. Purple dyes, extracted from a kind of sea snail, were so expensive and prestigious in antiquity precisely because they were difficult to produce and rare to find. Names of animals and minerals may be the sources of marginal color denominations, that is, of rare denominations expressing specific chromatic nuances, such as English *salmon* for a light pink color tending to orange, or French *chamois* for a light brown or dark yellow color, used

especially in technical contexts. But they are not often the source of genuine basic color terms. Moreover, among the names of the various vegetal sources, basic color terms tend to select the ones that are especially salient in a culture. The Sinhala basic color term for orange, *tembili*, is formed on the basis of the name of the king coconut, which is characteristic of the natural landscape of Sri Lanka (cf. Section 2.9). All this indicates that experience, history, and culture have a crucial importance in the lexicalization of color terms – especially in the context of dyes and textiles. This is consistent with relativist assumptions. I have tried to provide several succinct studies of the economic and cultural background to the development of certain basic colour terms, for example the study of coffee as the origin of some basic color terms for brown.

On the other hand, we have also seen that basic color terms are more prominent for certain color categories than for others in the IE color lexicon. Firstly, color categories such as blue, gray, brown, and especially pink, purple, and orange are often not lexicalized in the ancient IE languages. Secondly, when they are available, the basic color terms for these color categories are often transparently derived from a noun, and therefore have a secondary word formation with respect to basic color terms directly built on color roots. The latter situation is especially typical for terms of black and white, and is also common for terms of red, yellow, and green in the IE languages. Thirdly, terms of black, white, red, yellow, and green are also more frequently expressed by native lexical material, while terms of purple, pink, and orange show the highest level of borrowability. The remaining basic color terms have an intermediate status on this scale of borrowability (cf. Section 3). As a consequence, I could observe that basic color terms for white, black, and red, and to a lesser extent basic color terms for yellow and green, are much more frequently inflected according to gender and number than basic color terms for blue, brown, gray, pink, purple, and orange in IE. In French, for example, all color adjectives describing the color categories in (1) can inflect, at least in number, except *orange* 'orange' and *marron* 'brown', which are morphologically invariable. Italian does not inflect basic color terms for blue (*blu*), pink (*rosa*), and purple (*viola*). Albanian presents invariable basic color terms for blue (*blu*), gray (*gri*), purple (*lejla*, *vjollcë*), orange (*portokalli*), and pink (*rozë*), while color terms for white, black, red, yellow, and green can inflect in this language. Color terms that are transparently derived from nouns usually do not inflect as nominal inflection is originally more limited than adjectival inflection in IE – nouns usually do not inflect in gender. Moreover, as color terms for blue, brown, gray, pink, purple, and orange are more frequently borrowed, it is understandable that they are less integrated in the morphological system of a language. All this matches with the universalist assumptions that color terms for the categories of black, white, red, yellow, and green are more basic in a language's color

lexicon than color terms for the categories of blue, brown, gray, pink, purple, and orange. However, Berlin and Kay's (1969) theory does not rely on etymological material and does not explain exceptions (e.g., they say that gray may be a "wild card" but don't say why). My analysis, which is grounded on etymology and which considers more specific cultural factors (e.g., the association between gray and old age) may therefore complement Berlin and Kay's (1969) theory with novel arguments.

The tendencies here observed may be explained on both physiological and historical grounds. Some colors, such as red, are more salient than others, such as blue, for human perception (this is the reason why red signs express stop or danger in many cultures). At the same time, it is also true that red coloring agents are easier to find, and have been used and produced earlier in history, than blue coloring agents. There is no reason why one should choose only a single explanation for the use of color expressions. In historical linguistics, and in history in general, an explanation is more satisfactory if it takes a number of factors into consideration. I have therefore adopted a compromise approach to the universalist-relativist controversy – with a relativist inclination. That is, my analysis shows that color categories are lexicalized according to specific semantic patterns motivated by the availability and cultural significance of coloring agents, as well as by non-chromatic, symbolic values. However, some universal tendencies concerning the primary status of certain color categories are undeniable in the IE color lexicon.

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Appendix

Data of Table 1: (Non-)denominal formations of color expressions

(Cf. Section 1 and Note 7 for analysis criteria)

White. A color expression for white is not attested in 1 language of the database: Old Persian (but see Note 8).

A color expression for white has a denominal formation in 2 languages of the database: Modern Greek *áspros* (from the name of a Roman silvery coin); Konkani *dhavo* (from Old Indic *dhavá-* m. 'a kind of axlewood').

A color expression for white has a non-denominal formation from roots of brightness (more rarely of paleness or plainness) in all other 67 languages of the database: Hittite *ḫarki-* (derived from PIE *h_2rĝ-* 'shine'); Avestan *spaēta-*, Sogdian *'sp'yt*, Farsi *sefīd*, Tajik *safed*, Dari *sefīd*, Pashto *spīn* (these Iranian forms derive from PIE **ḱwit-* 'shine'); Vedic *śvetá-* (derived from PIE **ḱwit-* 'shine'), *árjuna-* (derived from PIE **h_2rĝ-* 'shine'), Classical Sanskrit *śvetá-*, *árjuna-*, Kashmiri *saphed*, Gujarati *safed*, Hindi *safed* (these Indic forms are borrowed from Iranian), Panjabi *ciṭṭā* (derived from Old Indic *śvitrá-* 'whitish, white < PIE **ḱwit-* 'shine'), Nepali *seto* (derived from Old Indic *śvaitra-* n. 'white leprosy, vitiligo' < PIE **ḱwit-* 'shine'), Bengali *śādā* (borrowed from Persian *sāde* 'simple'), Marathi *pā̃ḍhrā* (derived from Old Indic *pā́ṇḍara-* 'pale, whitish-yellow, white'), Sindhi *accho* (derived from Old Indic *accha-* 'not shaded, clear'), Sinhala *sudu* and Dhivehi *hudhu* (derived from Old Indic *śuddhá-* 'cleansed, clear' < PIE **ḱud^h-* 'shine'); Ancient Greek *leukós* (derived from PIE **lewk-* 'shine'); Latin *albus* (derived from PIE **alb^{h}o-*, ultimately from a prefixed form of the root **b^{h}eh$_2$-* 'shine' [cf. Pinault 2022], in addition to *candidus* < PIE **(s)kend-* 'burn, shine'), Umbrian **alfu** (acc.n.pl), Italian *bianco*, Spanish *blanco*, Catalan *blanc*, Portuguese *branco*, French *blanc*, Occitan *blanc*, Sardinian *biánku* (these Romance forms are borrowed from Germanic), Romansh *alf / alv* and Romanian *alb* (derived from Latin *albus*); Gothic *ƕeits*, Old English *hwīt*, English *white*, Old High German *(h)wīz*, German *weiß*, Dutch *wit*, Frisian *wyt*, Old Norse *hvítr*, Icelandic *hvítur*, Faroese *hvítur*, Danish *hvid*, Norwegian *hvit*, Swedish *vit*, Yiddish *vays*, Afrikaans *wit* (the Germanic forms derive from PIE **ḱwit-* 'shine'); Old Irish *bán* (derived from PIE **b^{h}eh$_2$-* 'shine'), *find / finn* (from Proto-Celtic **windo-* 'white', possibly < PIE **weyd-* 'see'), and *gel* (derived from PIE **ǵ^{h}elh$_3$-* 'yellow-green'), Irish *bán*, Welsh *gwyn*, Breton *gwenn*; Old Prussian *gaylis* (derived from PIE **g^{wh}h$_2$eyd-/*g^{wh}eh$_2$id-* 'clear, bright'), Lithuanian *báltas* and Latvian *bal̃ts* (derived from PIE **b^{h}elH-* 'shine'); Old Church Slavonic *bělŭ*, Bulgarian *bjal*, Macedonian *bel*, Serbo-Croatian *bȉjel*, Czech *bílý*, Slovak *biely*, Polish *biały*, Slovenian *bel*, Russian *bélyj*, Ukrainian *bilyy* (the Slavic forms derive from PIE **b^{h}elH-* 'shine'); Albanian *bardhë* (derived from PIE **b^{h}reh$_1$ǵ-* 'shine'); Classical Armenian *spitak* (borrowed from Iranian and ultimately < **ḱwit-* 'shine'), Modern Eastern Armenian *spitak*; Tocharian B *ārkwi* (derived from PIE **h_2rĝ-* 'shine').

Black. A color expression for black is not attested in 1 language of the database: Old Persian (but see Note 10).

No color expression for black has a denominal formation in the languages of the database.

A color expression for black has a non-denominal formation (from roots of darkness, dirtiness, smoking/burning/shining) in all other 69 languages of the database: Hittite *dankui-* (cognate of German *dunkel*, from a PIE root meaning 'dark'), *ḫanzana-* (derived from PIE *$*h_2m̥s$-* 'dark, black'); Avestan *siiāuua-*, Sogdian *šʾw* / *šw*, Farsi *siyāh*, Tajik *siyoh*, Dari *siyāh* (these Iranian forms derive from PIE *$*ḱi(H)$-* 'dark, obscure'), Pashto *tūr* (derived from PIE **temH-* 'dark'); Vedic and Classical Sanskrit *kr̥ṣṇá-* (derived from PIE **kers-* 'black, dark, dirty'), Kashmiri *kālā* / *kôlu*, Nepali *kālo*, Panjabi *kālā*, Gujarati *kāḷo*, Hindi *kālā*, Bengali *kālō*, Marathi *kāḷā*, Konkani *kāḷo*, Sindhi *kāru*, Sinhala *kaḷu*, Dhivehi *kalhu* (these Indic forms derive from Old Indic *kāla-* 'black, dark', ultimately borrowed from Dravidian); Ancient Greek *mélas* (derived from PIE *$*melh_2$-* 'dark, dirty'), Modern Greek *mávros* (derived from Ancient Greek *maurós* 'dark'); Latin *niger* (unknown etymology but not nominal), *āter* (derived from PIE *$*h_2eh_1$-* 'burn'), Umbrian **atru** (acc.n.pl), Italian *nero*, Spanish *negro*, Catalan *negre*, French *noir*, Occitan *negre*, Romansh *nair*, Romanian *negru*, Sardinian *ni(gh)éḍḍu* (these Romance forms derive from Latin *niger*), Portuguese *preto* (probably from Vulgar Latin *adpectorāre* 'to press against the breast', on the basis of a synaesthesia between compressed/thick and dark); English *black* (derived from PIE *$*b^helg$-* / *$*b^hleg$-* 'burn, shine'), Gothic *swarts*, Old English *sweart*, Old High German *swarz*, German *schwarz*, Dutch *zwart*, Frisian *swart*, Old Norse *swartr*, Icelandic *svartur*, Faroese *svartur*, Danish *sort*, Norwegian *svart*, Swedish *svart*, Yiddish *shvarts*, Afrikaans *swart* (these Germanic forms derive from PIE **sword-* 'dark, dirty'); Old Irish *dub*, Irish *dubh*, Welsh *du*, Breton *du* (the Celtic forms derive from PIE *$*d^hub^h$-* 'dark, obscure'); Old Prussian *kirsnan* (derived from PIE **kers-* 'dark, obscure'), Lithuanian *júodas* (unknown etymology but not nominal), Latvian *mę̃lns* (derived from PIE *$*melh_2$-* 'dark, dirty'); Old Church Slavonic *črŭnŭ*, Bulgarian *čéren*, Macedonian *crn*, Serbo-Croatian *crȋn*, Czech *černý*, Slovak *čierny*, Polish *czarny*, Slovenian *črn*, Russian *čërnyj*, Ukrainian *čórnyj* (the Slavic forms derive from PIE **kers-* 'dark, obscure'); Albanian *zi* (derived from PIE *$*g^wed^h$-* 'dirty'); Classical Armenian *seaw* (borrowed from Iranian, see above), Modern Eastern Armenian *sev*; Tocharian B *kwele* (derived from PIE *$*ḱi(H)$-* 'dark, obscure'), *erkent-* (derived from PIE *$*h_1reg^w$-* 'dark, obscure').

Red. A color expression for red is not attested in 1 language of the database: Old Persian (but see Note 13).

A color expression for red has a denominal formation in 22 languages of the database: Hittite *mit(t)a-* / *miti-* (derived from the name of a red substance,

although the substance at issue is not clear; it may be a dyed tissue or a metal, cf. Section 2.3 for discussion); Modern Greek *kókinos* (derived from the name of a grain, Ancient Greek *kókkos*); Welsh *coch* (borrowed from Latin *coccum* n. 'berry growing upon the scarlet oak'); Albanian *kuq* (borrowed from Vulgar Latin **cocceus*, a derivate of the name of a grain); Romansh *cotschen* (derived from Latin *coccinus* 'scarlet-colored', itself a derivate from the name of a grain), Portuguese *vermelho* and Catalan *vermell* (both from a derivate of Latin *vermis* 'worm', ultimately from PIE **wr̥mi-* 'worm'); Old Prussian *wormyan* (derived from PIE **wr̥mi-* 'worm'); Old Church Slavonic *črŭmĭnŭ* / *črĭvljenŭ*, Serbo-Croatian *cr̀ven*, Bulgarian *červén*, Macedonian *crven*, Czech *červený*, Polish *czerwony*, Slovak *červený*, Ukrainian *červónyj* (these Slavic forms derive from PIE **k*^{w}*r̥mi-* 'worm'); Sogdian *krm'yr*, Farsi *qermez* (more common than *surx*), Dari *qermez* (these Iranian forms derive from PIE **k*^{w}*r̥mi-* 'worm'); Classical Armenian *karmir* (borrowed from Iranian, from the PIE same source), Modern Eastern Armenian *karmir*; Konkani *tāmbḍo* (from a derivate of Old Indic *tāmrá* 'made of copper; copper-colored'; n. 'copper').

A color expression for red has a non-denominal formation in the 47 remaining languages of the database: Ancient Greek *erythrós* (derived from PIE **h*$_1$*rewd*^{h}- 'red'); Latin *ruber*, Umbrian **rufru** (acc.m.pl.), Italian *rosso*, Spanish *rojo*, French *rouge*, Occitan *roge*, Sardinian *ruju* (these Italic forms derive from PIE **h*$_1$*rewd*^{h}- 'red'), Romanian *roșu* (derived from Latin *roseus* 'pink, rosy'); Gothic *rauþs*, Old English *rēad*, English *red*, Old High German *rōt*, German *rot*, Dutch *rood*, Frisian *read*, Old Norse *rauðr*, Icelandic *rauður*, Faroese *reytt*, Danish *rød*, Norwegian *rød*, Swedish *röd*, Yiddish *royt*, Afrikaans *rooi* (the Germanic forms derive from PIE **h*$_1$*rewd*^{h}- 'red'); Old Irish *rúad* (derived from PIE **h*$_1$*rewd*^{h}- 'red'), *derg* (derived from PIE **d*^{h}*erg-* 'dark, colored'), Irish *dearg*, Breton *ruz* (derived from PIE **h*$_1$*rewd*^{h}- 'red'); Lithuanian *raudónas* (derived from PIE **h*$_1$*rewd*^{h}- 'red'), Latvian *sar̂kans* (derived from PIE **ser-* / *sor-* 'reddish'); Russian *krásnyj* (originally meaning 'beautiful', cf. Old Church Slavonic *krasĭnŭ* 'beautiful'), Slovenian *rdeč* (derived from PIE **h*$_1$*rewd*^{h}- 'red'); Avestan *raoδita-* (derived from PIE **h*$_1$*rewd*^{h}- 'red'), *suxra-* (derived from PIE **ḱuk-* 'burn, shine'), Tajik *surx* and Pashto *sūr* (both derived from PIE **ḱuk-* 'burn, shine'); Vedic *aruṇá-* and *aruṣá-* (both derived from PIE **h*$_1$*el-* 'red, brown'), Classical Sanskrit *rudhirá-* (derived from PIE **h*$_1$*rewd*^{h}- 'red'), *rakta-* (derived from PIE **(s)reg-* 'to color, immerse in the dye'), *lóhita-* (a variant of *róhita-*, derived from PIE **h*$_1$*rewd*^{h}- 'red'), Kashmiri *wŏzul*^{u} (derived from Old Indic *ujjvala-* 'burning, bright'), *surakh* / *surkh* (borrowed from Iranian, ultimately < PIE **ḱuk-* 'burn, shine'), Bengali *lāl*, Gujarati *lāl*, Hindi *lāl*, Marathi *lāl*, Panjabi *lāl* (borrowed from Persian *lāl* 'dear; red'), Nepali *rāto*, Sinhala *ratu*,

Dhivehi *raiy* (these Indic forms derive from Old Indic *rakta-* 'painted; red; lovely, pleasant'), Sindhi *gāṛho* (derived from Old Indic *gāḍha-* 'dived into the dye'); Tocharian B *ratre* (derived from PIE *h_1rewd^h- 'red').

Green. A color expression for green is not attested in 7 languages of the database: Hittite (where *ḫaḫli-*, from $^{(GIŠ)}$*ḫāḫḫall-* n. 'plant, vegetable', rather means 'yellow-green'); Avestan, Old Persian; Vedic and Classical Sanskrit (where *hári-* rather means 'tawny, reddish brown, yellow-green'); Sabellic; Gothic (cf. Note 16).

A color expression for green has a denominal formation in 5 languages of the database: Modern Greek *prásinos* (from *práson* n. 'leek'); Sinhala *koḷa* (also meaning 'leaf', from Old Indic *kuvala-* n. 'jujube fruit'), Dhivehi *fehikula* (lit. 'leaf-colored', from *kula* 'color' and *faiy* 'leaf'), Konkani *patsvo* (from the name of the emerald); Tocharian B *motartstse* (< PIE *mod^hro-, the name of a coloring plant, cf. English *madder*).

A color expression for green has a non-denominal formation in the remaining 58 languages of the database: Ancient Greek *klōrós* (meaning 'green' at the stage of Classical Greek, derived from PIE *$ǵ^helh_3$- / *$ǵ^hleh_3$- 'yellow-green'); Latin *viridis* (possibly derived from PIE **weys-* 'to sprout', or with unknown but not nominal etymology), Italian *verde*, Spanish *verde*, Catalan *verd*, Portuguese *verde*, French *vert*, Occitan *verd*, Romansh *verd*, Romanian *verde*, Sardinian *bírde* (the Romance forms derive from Latin *viridis* 'green'); Old English *grēne*, English *green*, Old High German *gruoni*, German *grün*, Dutch *groen*, Frisian *grien*, Old Norse *grœnn*, Icelandic *grœnn*, Faroese *grønt*, Danish *grøn*, Norwegian *grønn*, Swedish *grön*, Yiddish *grin*, Afrikaans *groen* (the Germanic forms derive from PIE *g^hreh_1- 'grow, turn green'); Old Irish *úaine* 'green, verdant' (unknown etymology but not nominal), *úr* 'fresh, fair, bright, green' (derived from PIE **puH-* 'be pure, purify'; instead, *glas*, derived from PIE *$ǵ^helh_3$-/*$ǵ^hleh_3$- 'yellow-green', properly means 'blue-green, grayish' at this stage), Irish *glas*, Welsh *gwyrdd* and Breton *gwer* (borrowed from Latin *viridis*); Old Prussian *saligan*, Lithuanian *žãlias*, Latvian *zaļš* (the Baltic forms derive from PIE *$ǵ^helh_3$- / *$ǵ^hleh_3$- 'yellow-green'); Old Church Slavonic *zelenŭ*, Bulgarian *zelen*, Macedonian *zelen*, Serbo-Croatian *zèlen*, Czech *zelený*, Slovak *zelený*, Polish *zielony*, Slovenian *zelen*, Russian *zelënyj*, Ukrainian *zelenyy* (the Slavic forms derive from PIE *$ǵ^helh_3$- / *$ǵ^hleh_3$- 'yellow-green'); Albanian *jeshil* (borrowed from Turkish *yeşil* 'green'), *gjelbër* (borrowed from Latin *galbinus* 'yellow-green', in addition to *blertë*, derived from PIE *b^hleH- 'to bloom'); Classical Armenian *dalar* 'fresh, green' (derived from PIE *d^helh_1- 'to sprout, grow'), Modern Eastern Armenian *kanač'* (unknown etymology but not nominal); Sogdian *zrγwny* and Pashto *zarghun* (derived from PIE *$ǵ^helh_3$- / *$ǵ^hleh_3$- 'yellow-green'), Farsi *sabz*,

Tajik *sabz*, Dari *sabz* (unknown etymology); Kashmiri *sabaz* and Bengali *śobuj* (borrowed from Persian), Gujarati *līlo* (derived from Old Indic *nīla-* 'dark, black, blue'), Hindi *harā*, Panjabi *harā*, Nepali *hariyo*, Marathi *hirvā* (these Indic forms derive from PIE **ǵʰelh₃-*/**ǵʰleh₃-* 'yellow-green'), Sindhi *sāo* (derived from Old Indic *śyāma-* 'dark').

Yellow. A color expression for yellow is not attested in 7 languages of the database: Hittite (for *ḫaḫli-* 'yellow-green' see above under 'green'); Old Persian, Sogdian; Vedic and Classical Sanskrit (for *hári-*, see above under 'green'); Sabellic; Gothic (cf. Note 16).

A color expression for yellow has a denominal formation in 11 languages of the database: Modern Greek *kítrinos* (from *kítron* n. 'lemon'); Catalan *groc* and Sardinian *gròg*u (from Latin *crocum* n. / *crocus* m. 'saffron'), Romansh *mellen* / *melen* (from Latin **mellinus* 'honey-colored'); Welsh *melyn* and Breton *melen* (from Celtic *mel* n. 'honey'); Kashmiri *lĕdur*^{u}, Bengali *holud*, Konkani *haḷduvo*, Dhivehi *reen'dhookula* (the latter from *reen'dhoo* 'turmeric' and *kula* 'color'; these Indic forms derive from Old Indic *haridrā-* f. '*Curcuma longa*, turmeric'), Sinhala *kaha* (also meaning 'turmeric', from Old Indic *kaṣāya-* m. n., the name of a yellowish plant and of its astringent juice).

A color expression for yellow has a non-denominal formation in the remaining 52 languages of the database: Ancient Greek *xanthós* (meaning 'yellow' at the Classical stage; its etymology is unknown but not nominal); Latin *flāvus* 'blond, yellow' (derived from PIE **bʰleH-* 'to bloom'), Italian *giallo*, French *jaune*, Occitan *jaune*, Romanian *galben* (these Romance forms derive from Latin *galbinus* 'yellow-green'), Spanish *amarillo* and Portuguese *amarelo* (derived from Latin *amārus* 'bitter, sour'); Old English *geolo*, English *yellow*, Old High German *gelo*, German *gelb*, Dutch *geel*, Frisian *giel*, Old Norse *gulr*, Icelandic *gulur*, Faroese *gult*, Danish *gul*, Norwegian *gul*, Swedish *gul*, Yiddish *gel*, Afrikaans *geel* (the Germanic forms derive from PIE **ǵʰelh₃-* / **ǵʰleh₃-* 'yellow-green'); Old Irish *buide* and Irish *buí* (derived from Proto-Celtic **bodyo-* 'yellow-brown'); Old Prussian *gelatynan*, Lithuanian *geltónas*, Latvian *dzęltęns* (the Baltic forms derive from PIE **ǵʰelh₃-* / **ǵʰleh₃-* 'yellow-green'); Old Church Slavonic *žĭltŭ*, Serbo-Croatian *žût*, Bulgarian *zhŭlt*, Macedonian *žolt*, Czech *žlutý*, Polish *żółty*, Slovak *žltý*, Russian *žëltyj*, Ukrainian *zhovtyy* (these Slavic forms derive from **ǵʰelh₃-* / **ǵʰleh₃-* 'yellow-green'), Slovenian *rumen* (derived from PIE **h₁rewdʰ-* 'red'); Albanian *verdhë* (borrowed from Latin *viridis* 'green'); Avestan *zairi-* / *zaray-* (with the variants *zairita-* and *zairi-gaona-*), Farsi *zard*, Tajik *zard*, Dari *zard*, Pashto *zyaṛ*, *zhyaṛ* (these Iranian forms derive from PIE **ǵʰelh₃-* / **ǵʰleh₃-* 'yellow-green'); Gujarati *pīḷo*, Hindi *pīlā*, Marathi *pivḷā*, Nepali *pahẽlo*, Panjabi *pīlā*, Sindhi *pīlu* (these Indic forms probably derive from a root *pi* or *pyai* [intr.] 'swell, abound';

[tr.] 'fatten, cause to swell'); Classical Armenian *deł-in* and Modern Eastern Armenian *deghin* (derived from PIE *$*d^helh_1$-* / *$*d^hl̥h_1$-* 'to sprout'); Tocharian B *tute* (derived from PIE *$*d^huH$-* 'dark').

Blue. A color expression for blue is not attested in 4 languages of the database: Avestan; Vedic (where *nī́la-* means 'dark, black, black-blue' at this stage, unlike in Classical Sanskrit, see below); Sabellic; Gothic.

A color expression for blue has a denominal formation in 23 languages of the database: Ancient Greek *kuáneos* (meaning 'blue' at the classical stage, from *kúanos* m., the name of a metal); Latin *caeruleus* (denoting a kind of blue at the classical stage, from **caeluleus* < *caelum* n. 'sky'), Spanish *azul* and Portuguese *azul* (from the Arabic name of lapis lazuli), Romanian *albastru* (from the Latin name of a kind of marble); Old Prussian *golimban* (from the Balto-Slavic name of the pigeon/dove); Hittite *antara-* (from the PIE name of a coloring plant, see the following entry); Old Church Slavonic *modrŭ*, Czech *modrý*, Slovak *modrý*, Slovenian *moder* (these Slavic forms derive from PIE *$*mod^h$-ro-*, the PIE name of a coloring plant, cf. English *madder*), Polish *niebieski* (from the Polish name of the sky), Russian *golubój* (meaning 'light blue', from the Balto-Slavic name of the pigeon/dove, in addition to *sínij* 'dark blue'); Albanian *kaltër* (in addition to *blu*; although both *blu* and *kaltër* are borrowings, *kaltër* is more ancient); Old Persian *kapautaka-*, Sogdian *kp'wt*, *kp'wtk*, Tajik *kabud* (these Iranian forms derive from the name of the pigeon/dove, cf. Vedic *kapóta-* 'pigeon, dove'), Farsi *ābī* (derived from the Persian name of water), Dari *asmānī* (derived from the Dari name of the sky), Pashto *shīn* (derived from the Iranian name of a blue mineral); Classical Armenian *kapoyt* (meaning '(dark) blue', borrowed from Iranian), Modern Eastern Armenian *kapowyt*; Gujarati *vādaḷī* (derived from the Gujarati name of the cloud/sky).

A color expression for blue has a non-denominal formation in the remaining 43 languages of the database: Modern Greek *ble* (borrowed from French and more prominent than Modern Greek *yalázjos* 'light blue'); Old English *hæwe(n)* (derived from PIE *$*ḱi(H)$-* 'dark, obscure', in addition to *blæwen*), English *blue*, Old High German *blāo*, German *blau*, Dutch *blauw*, Frisian *blau*, Old Norse *blár*, Icelandic *blár*, Faroese *blátt*, Danish *blå*, Norwegian *blå*, Swedish *blå*, Yiddish *bloy*, Afrikaans *blou* (all from Proto-Germanic **blēwa-* 'blue'); Romansh *blau / blo*, French *bleu*, Catalan *blau*, Occitan *blau*, Italian *blu*, Sardinian *blau* / *brau* / *blo*, *biaittu* (these Romance forms are more or less directly borrowed from Germanic); Old Irish *gorm* (meaning 'blue, dark', derived from PIE *$*wr̥mi$-* 'worm'), *glas* ('blue-green', derived from PIE *$*ǵ^helh_3$-* / *$*ǵ^hleh_3$-* 'yellow-green'), Irish *gorm*, *glas*, Welsh *glas*, Breton *glas*; Lithuanian *mélynas* (derived from PIE *$*melh_2$-* 'dark, dirty'), Latvian *zils* (derived from PIE *$*ǵ^helh_3$-* / *$*ǵ^hleh_3$-* 'yellow-green'); Serbo-Croatian *plâv* (derived from PIE **pel(H)-*

'gray'), Bulgarian *sin*, Macedonian *sin*, Ukrainian *syniy* (cf. also Russian *sínij* 'dark blue', possibly derived from PIE **kí(H)-* 'dark, obscure'); Classical Sanskrit *nílа-* (possibly from PIE **niH-* 'shine' or with unknown etymology but not nominal), Kashmiri *nīlā*, *nyūl*^{u}, Nepali *nīlo*, Panjabi *nīlā*, Hindi *nīlā*, Bengali *nīl*, Marathi *niḷā*, Sindhi *nīru*, Sinhala *nil*, Konkani *niḷo*, Dhivehi *nū*; Tocharian B *tseṃ* (borrowed from a Chinese expression of blue-green).

Brown. A color expression for brown is not attested in 10 languages of the database: Hittite; Avestan, Old Persian; Ancient Greek; Latin, Sabellic; Gothic; Old Church Slavonic; Classical Armenian; Tocharian.

A color expression for brown has a denominal formation in 29 languages of the database: Modern Greek *kafé*; Albanian *kafe*; Bulgarian *kafjáv*, Macedonian *kafeav* (all from the name of coffee), Russian *koríčnevyj* and Ukrainian *korýčnevyj* (from the Slavic name of the bark), Polish *brązowy* (from the Polish name of bronze), Slovenian *rjav* (from the Proto-Slavic name of rust); Old Prussian *cucan* (possibly from the PIE name of a wasp [cf. Adams 2013: 235], but etymology is uncertain); Italian *marrone*, Spanish *marron*, Catalan *marró*, Portuguese *castanho* (Portugal) / *marrom* (Brazil), French *marron* (more prominent than French *brun*), Romanian *maro*, Sardinian *castanzu* (these Romance forms derive from the name of the chestnut); Modern Eastern Armenian *shaganakagowyn* (lit. 'chestnut-colored'); Sogdian *cnt'n β'm'k* (lit. 'with the color of the sandalwood'), Pashto *naswārī* (from the name of a kind of tobacco), Dari *naswārī*, *qahve'ī*, Farsi *qahve'ī*, Tajik *qahvarang* (lit. 'coffee-colored'); Bengali *bādāmī* (from the Indic name of the almond), Marathi *tapkirī* (from the Marathi name of a kind of tobacco), Konkani *puditso* (from the Konkani name of powder), Sindhi *nāsī* (from an Indic name of snuff), Nepali *khairo* (from the Indic name of the *Acacia catechu*), Kashmiri *kātsur*^{u} (from Old Indic *karcūra-* m. 'turmeric'; n. 'orpiment'), Dhivehi *mushi kula* (lit. 'with the color of the horse mackerel', a kind of fish).

A color expression for brown has a non-denominal formation in the remaining 31 languages of the database: Old English *brūn*, English *brown*, Old High German *brūn*, German *braun*, Dutch *bruin*, Frisian *brún*, Old Norse *brúnn*, Icelandic *brúnn*, Faroese *brúnt*, Danish *brun*, Norwegian *brun*, Swedish *brun*, Yiddish *broyn*, Afrikaans *bruin* (the Germanic forms derive from PIE **b^{h}er(H)-* 'brown, tawny'); Occitan *brun*, *burèl*, Romansh *brün* / *brin* (these Romance forms are borrowed from Germanic); Vedic *babhrú-*, Classical Sanskrit *babhrú-*, Hindi *bhūrā*, Panjabi *bhūrā*, Gujarati *bhuro* (these Indic forms derive from PIE **b^{h}er(H)-* 'brown, tawny'), Sinhala *dumburu* (derived from Old Indic *dhūmrá-* 'smoke-colored, dark'); Old Irish *donn* (derived from PIE **d^{h}us-no-* 'dark, black', in addition to *cíar* and *odar*), Irish *donn*, Welsh *brown* (borrowed from English), Breton *gell* (derived from PIE **ǵ^{h}elh$_{3}$-* 'yellow-green', in addition to *ruzdu* and *rous*); Lithuanian *rùdas* (derived from PIE **h$_{1}$rewd^{h}-* 'red'),

Latvian *brūns* (borrowed from Germanic); Serbo-Croatian *smeđ*, Czech *hnědý*, Slovak *hnedý* (these Slavic forms have a controversial but non-nominal etymology).

Gray. A color expression for gray is not attested in 8 languages of the database: Hittite; Old Persian, Sogdian; Latin, Sabellic; Gothic; Classical Armenian; Tocharian.

A color expression for gray has a denominal formation in 16 languages of the database: Portuguese *cinzento* (Portugal) / *cinza* (Brazil) (from the Latin name of ashes), Sardinian *murinu*, *murru* (the latter probably derives from Latin *mūrīnus* 'mouse-colored', with a phonetic influence of Vulgar Latin **mōrinus* 'having the color of the blackberry'); Latvian *pelēks* (from the Latvian name of the mouse); Modern Eastern Armenian *moxragowyn* (lit. 'ashes-colored'); Farsi *xākestarī*, Dari *xākestarī*, Tajik *xokistarang* (these Iranian forms derive from the Iranian name of ashes); Nepali *kharānī*, Kashmiri *sūr*$^{\ddot{u}}$, Gujarati *bhūkhro*, *rākhōḍī*, Marathi *rākhāḍī*, Konkani *rākhāḍī*, Sinhala *aḷu*, Dhivehi *alhikula* (these Indic forms derive from different Indic names of ashes, cf. Section 2.8), Hindi *saleTī* and Panjabi *saleTī* (borrowed from English *slate*).

A color expression for gray has a non-denominal formation in the remaining 46 languages of the database: Ancient Greek *poliós* (derived from PIE **pel(H)-* 'gray, hoary'), Modern Greek *gri* (borrowed from French); Old English *grǣw*, *grǣg*, English *gray*, Old High German *grāo*, *grā*, German *grau*, Dutch *grijs*, Frisian *griis*, Old Norse *grár*, Icelandic *grár*, Faroese *gráur*, Danish *grå*, Norwegian *grå*, Swedish *grå*, Yiddish *groy*, Afrikaans *grys* (the Germanic forms derive from PIE **ǵ^{h}er(h_1)-* 'gray'); Italian *grigio*, Spanish *gris*, Catalan *gris*, French *gris*, Occitan *gris*, Romansh *grischun*, Romanian *gri* (these Romance forms are borrowed from Germanic more or less directly); Old Irish *líath*, Irish *liath*, Welsh *llwyd*, Breton *louet* (the Celtic forms derive from PIE **pel(H)-* 'gray, hoary'); Old Prussian *sywan* (derived from PIE **ḱi(H)-* 'dark, black'), Lithuanian *pìlkas* (probably derived from PIE **pel(H)-* 'gray, hoary'); Old Church Slavonic *pelesŭ* (derived from PIE **pel(H)-* 'gray, hoary'), Serbo-Croatian *sìv*, Bulgarian *siv*, Macedonian *siv*, Slovenian *siv*, Slovak *sivý* (these Slavic forms derive from PIE **ḱi(H)-* 'dark, black'), Czech *šedý*, Polish *szary*, Russian *séryj*, Ukrainian *siryy* (these Slavic forms are etymologically unclear, cf. Note 20, but not nominal in origin); Albanian *gri* (borrowed from French); Avestan *pouruša-* (derived from PIE **pel(H)-* 'gray, hoary'), Pashto *kharr* (from an Iranian name of ashes); Vedic *palitá-* (derived from PIE **pel(H)-* 'gray, hoary'), Classical Sanskrit *dhūsara-* (derived from the Indic root *dhvas* 'fall to pieces or to dust'), Bengali *dhūśor*, Sindhi *pūru* (derived from Vulgar Old Indic **bhulla-/*bhōla-* 'simple' [cf. Turner 1962–1966: s.v.]).

Orange. A color expression for orange is not attested in 15 languages of the database: Hittite; Avestan, Old Persian, Sogdian; Vedic; Sabellic; Gothic, Old English, Old

High German, Old Norse; Old Irish; Old Prussian; Old Church Slavonic; Classical Armenian; Tocharian.

A color expression for orange has a denominal formation in 55 languages of the database: Ancient Greek *krókeos*, *krokóeis* (meaning 'orange', among other things, at the classical stage, from the Ancient Greek name of saffron, *krókos* m.), Modern Greek *portokalís* (from the name of the orange fruit); English *orange*, German *orange*, Dutch *oranje*, Frisian *oranje*, Danish *orange*, Norwegian *oransje*, Swedish *orange*, Yiddish *marants* (a shortening of *pomerants*, a variety of the orange fruit), Afrikaans *oranje*, Icelandic *appelsínugulur* and Faroese *appelsingult* (lit. 'yellow as the orange fruit'); Latin *flammeus* (from the name of the flame), Italian *arancione*, Spanish *naranja*, Catalan *taronja* (from Arabic *turunj* 'citron'), Portuguese *laranja* / *cor-de-laranja* (lit. 'color of the orange fruit'), French *orange*, Occitan *orange*, Romansh *orange*, Romanian *oranj* / *portocaliu*, Sardinian *in colore de s'arantzu*; Irish *oráiste*, Welsh *oren*, Breton *orañjez*, *orañj*; Lithuanian *oránžinis*, Latvian *oranžs*; Serbo-Croatian *narančast*, Bulgarian *oranzhev*, *portokalov*, Macedonian *portokalov*, Czech *oranžový*, Polish *pomarańczowy*, Slovak *oranžový*, Slovenian *oranžen*, Russian *oránževyj*, Ukrainian *pomaranchevyy*; Albanian *portokalli*; Modern Eastern Armenian *narnǰagowyn*; Farsi *nārenjī*, *portakalī*, Dari *nārenjī*, Pashto *nārenjī*, Tajik *naranjī*; Classical Sanskrit *kausumbha-* (from the name of the safflower), Hindi *nāraṅgī*, *santarī* (the latter also derives from the name of the orange fruit), Panjabi *santarī*, *nāraṅgī*, Nepali *suntale*, Kashmiri *sangtar* (*rang*), Gujarati *nāraṅgī*, *kesarī*, Marathi *nāriṅgī*, *keśrī* (the latter derives from the name of saffron), Sindhi *nāraṅgī*, Dhivehi *orenju kula*, Konkani *kesrī*, Sinhala *tembili* (from the name of the king coconut), Bengali *komolā* (from the name of the lotus flower). For the different kinds of lexicalization of the orange fruit, cf. Section 2.9.

No language of the database has a non-denominal formation for a color expression of orange.

Pink. A color expression for pink is not attested in 15 languages of the database: Hittite; Avestan, Old Persian, Sogdian; Vedic; Sabellic; Gothic, Old English, Old High German, Old Norse; Old Irish; Old Prussian; Old Church Slavonic; Classical Armenian; Tocharian.

A color expression for pink has a denominal formation in 51 languages of the database: Ancient Greek *hrodóeis*, *hródeos*, *hródinos* (meaning 'pink' at the classical stage, derived from *hródon* n. 'rose'), Modern Greek *roz* (borrowed from French); Latin *roseus* (from Latin *rosa* 'rose'), Italian *rosa*, Romansh *rosa*, Spanish *rosa*, Catalan *rosa*, Portuguese *rosa* / *cor-de-rosa* (lit. 'color of the rose'), French *rose*, Occitan *ròse*, Romanian *roz*, Sardinian *in colori de arrosa*; English *pink* (originally the name of a flower, a kind of *Dianthus*), German *pink*, *rosa*, Norwegian *rosa*, Swedish *rosa*, Dutch *roze*, Frisian *rôze*, Yiddish *rozeve*, Afrikaans *pienk*; Welsh *pinc*, Breton

roz; Lithuanian *rõžinis* and Latvian *rozā*; Serbo-Croatian *roz*, Bulgarian *rozov*, Macedonian *rozov*, Czech *růžový*, Slovak *ružový*, Polish *różowy*, Slovenian *roza*, Russian *rózovyj*, Ukrainian *rožévyj*; Albanian *rozë*; Modern Eastern Armenian *vardagowyn* (lit. 'rose-colored'); Farsi *Suratī* (from the name of the face), Tajik *gulobī* (from an Iranian form originally meaning 'of the rose water' > 'of the rose flower'), Pashto *gulābī*, Dari *gulābī*; Classical Sanskrit *pāṭala-* (originally the name of a kind of rose), Hindi *gulābī*, Panjabi *gulābī*, Gujarati *gulābī*, Marathi *gulābī*, Konkani *gulābī*, Sindhi *golābī*, Kashmiri *gŏlöbī*, Nepali *gulāphī*, Bengali *golāpī* (these Indic forms, borrowed from Iranian, are originally based on the name of the rose), Dhivehi *fiyaathoshi kula* (lit. 'with the color of onion peel'), Sinhala *rosa* (borrowed from Portuguese).

A color expression for pink has a non-denominal formation in the remaining 4 languages of the database: Icelandic *bleikur* (lit. 'pale'), Danish *lyserød* and Faroese *ljósareyður* (lit. 'light red'); Irish *bándearg* (lit. 'white-red').

Purple/violet. A color expression for purple/violet is not attested in 7 languages of the database: Hittite; Avestan, Old Persian; Vedic; Sabellic; Old Norse; Tocharian.

A color expression for purple/violet has a denominal formation in 55 languages of the database: Ancient Greek *porphúreos* (from the name of the purple fish, *Murex trunculus*), Modern Greek *mōv*, *mov* (borrowed from the French name of the mallow flower/color); Latin *purpureus* (borrowed from Ancient Greek *porphúreos*, in addition to *violaceus* from the name of violet), Italian *viola*, Spanish *lila* (from the name of lilac, in addition to *morado*, from the name of the blackberry, and *violeta*), Catalan *lila* (in addition to *morat* and *violeta*), French *violet*, Occitan *violet*, *malve*, Romansh *violet*, *malve*, Romanian *violet* / *mov*; Gothic *paurpaura*, *paurpuron*, Old English *purpul*, *purpure*, *purpuren*, English *purple*, Old High German *purpura*, German *lila*, Faroese *lilla*, Danish *lilla*, Norwegian *lilla*, Swedish *lila*, Yiddish *lila*; Old Irish *corcair* (borrowed from the Latin name of purple), Irish *corcra*, Welsh *piws* (borrowed from English *puce*, the color of fleas [< French *puce* 'flea'], in addition to *porffor*); Old Prussian *pūrpurns*, Lithuanian *violètinis*, Latvian *violets*; Old Church Slavonic *praprǫdĭnŭ* (from *praprǫda* f. 'purple color, purple garment'), Bulgarian *lilav* (in addition to *violetov*), Macedonian *violetov*, Czech *fialový*, Polish *fioletowy*, Slovak *fialový*, Slovenian *vijóličen*, *vijóličast*, Russian *fiolétovyj*, Ukrainian *fiolétovyj*; Albanian *vjollcë* (in addition to *lejla*); Classical Armenian *cirani* (from the Classical Armenian name of the apricot), Modern Eastern Armenian *manowšakagowyn* (lit. 'violet-colored'); Farsi *banafš* (from the Persian name of the violet flower), Sogdian *'ryw'n*, Tajik *arġuvon*, Dari *arghawānī*, Pashto *arghawānī* (these Iranian forms derive from the name of the mauve flower); Classical Sanskrit *dhūmra-* (from the Indic name of smoke), Kashmiri *lājward* / *lājvayr* (from the Indo-Iranian name of lapis lazuli, in addition to *wãgun rang* from the Indic name of the aubergine), Nepali

baijanī (from the Indic name of the aubergine, in addition to *pyājī* from the Indic name of the onion and *jāmunī* from the Indic name of the plum), Panjabi *jāmunī*, Gujarati *jāmbalī*, Hindi *baiṅganī*, *jāmunī*, Bengali *beguni*, Marathi *zāmbhaḷā*, Konkani *zāmbḷo*, Dhivehi *dhan'bu kula* (lit. 'with the color of the Java plum'), Sindhi *wānganī* (again from the Indic name of the aubergine), Sinhala *dam* (from the Sinhala name of a kind of plum).

A color expression for purple/violet has a non-denominal formation in the remaining 8 languages of the database: Dutch *paars*, Afrikaans *pers*, Frisian *pears* (these Germanic forms are borrowed from Vulgar Latin denominations of blue), Icelandic *fjólublár* (lit. 'violet-blue'); Portuguese *roxo* (from Latin *russeus* 'reddish'), Sardinian *biaittu* (lit. 'blueish'); Breton *glasruz* (lit. 'blue-red'); Serbo-Croatian *ljubičast* (describing purple as the 'loved' color, from Serbo-Croatian *ljúbiti*).

Data of Table 2: borrowability of color expressions

(Cf. Note 33 for analysis criteria)

Black. A color expression for black is not attested in 1 language of the database: Old Persian (but see Note 10).

Color expressions for black are borrowed in 2 languages of the database: Old Indic *kāla-* 'black, dark' (borrowed from Dravidian, cf. Tamil *karu* 'black'); Classical Armenian *seaw* (borrowed from Iranian, cf. Persian *siyāh*).

Color expressions for black are formed with native material in the remaining 67 languages of the database (for the specific roots, see Data of Table 1): Hittite *dankui-*, *ḫanzana-*; Avestan *siiāuua-*, Sogdian *šʾw* / *šw*, Farsi *siyāh*, Tajik *siyoh*, Dari *siyāh*, Pashto *tūr*; Vedic *kr̥ṣṇá-*, Kashmiri *kālā* / *kôlu*, Nepali *kālo*, Panjabi *kālā*, Gujarati *kāḷo*, Hindi *kālā*, Bengali *kālō*, Marathi *kāḷā*, Konkani *kāḷo*, Sindhi *kāru*, Sinhala *kaḷu*, Dhivehi *kalhu* (all derived from Old Indic *kāla-* above); Ancient Greek *mélas*, Modern Greek *mávros*; Latin *niger*, *āter*, Umbrian **atru** (acc.n.pl), Italian *nero*, Spanish *negro*, Catalan *negre*, French *noir*, Occitan *negre*, Romansh *nair*, Romanian negru, Sardinian *ni(gh)éḍḍu*, Portuguese *preto*; English *black*, Gothic *swarts*, Old English *sweart*, Old High German *swarz*, German *schwarz*, Dutch *zwart*, Frisian *swart*, Old Norse *swartr*, Icelandic *svartur*, Faroese *svartur*, Danish *sort*, Norwegian *svart*, Swedish *svart*, Yiddish *shvarts*, Afrikaans *swart*; Old Irish *dub*, Irish *dubh*, Welsh *du*, Breton *du*; Old Prussian *kirsnan*, Lithuanian *júodas*, Latvian *mę̃lns*; Old Church Slavonic *črŭnŭ*, Bulgarian *čéren*, Macedonian *crn*, Serbo-Croatian *cr̂n*, Czech *černý*, Slovak *čierny*, Polish *czarny*, Slovenian *čŕn*, Russian *čërnyj*, Ukrainian *čórnyj*; Albanian *zi*; Modern Eastern Armenian *sev* (derived from Classical Armenian *seaw* above); Tocharian B *kwele*, *erkent-*.

Yellow. A color expression for yellow is not attested in 7 languages of the database (see Data of Table 1).

Color expressions for yellow are borrowed in 1 language of the database: Albanian *verdhë* (borrowed from Latin *viridis* 'green').

Color expressions for yellow are formed with native material in the remaining 62 languages of the database (for the specific roots, see Data of Table 1): Ancient Greek *xanthós* (already in Mycenaean), Modern Greek *kítrinos*; Latin *flāvus* (meaning 'blond, yellow' at the classical stage), Italian *giallo*, French *jaune*, Occitan *jaune*, Romanian *galben*, Catalan *groc* and Sardinian *gròg*u, Romansh *mellen* / *melen*, Spanish *amarillo* and Portuguese *amarelo*; Old English *geolo*, English *yellow*, Old High German *gelo*, German *gelb*, Dutch *geel*, Frisian *giel*, Old Norse *gulr*, Icelandic *gulur*, Faroese *gult*, Danish *gul*, Norwegian *gul*, Swedish *gul*, Yiddish *gel*, Afrikaans *geel*; Old Irish *buide* and Irish *buí*, Welsh *melyn* and Breton *melen*; Old Prussian *gelatynan*, Lithuanian *geltónas*, Latvian *dzeļtęns*; Old Church Slavonic *žĭltŭ*, Serbo-Croatian *žût*, Bulgarian *zhŭlt*, Macedonian *žolt*, Czech *žlutý*, Polish *żółty*, Slovak *žltý*, Russian *žëltyj*, Ukrainian *zhovtyy*, Slovenian *rumen*; Avestan *zairi-* / *zaray-* (with the variants *zairita-* and *zairi-gaona-*), Farsi *zard*, Tajik *zard*, Dari *zard*, Pashto *zyaṛ*, *zhyaṛ*; Kashmiri *lḛ̈dur*$^{\mu}$, Bengali *holud*, Konkani *haḷduvo*, Dhivehi *reen'dhookula*, Sinhala *kaha*, Gujarati *pīḷo*, Hindi *pīlā*, Marathi *pivḷā*, Nepali *pahẽlo*, Panjabi *pīlā*, Sindhi *pīlu*; Classical Armenian *deł̈in* and Modern Eastern Armenian *deghin*; Tocharian B *tute*.

Red. A color expression for red is not attested in 1 language of the database: Old Persian (but see Note 13).

Color expressions for red are borrowed in 9 languages of the database: Hittite *mit(t)a-/miti-* (borrowed from a Mediterranean source); Bengali *lāl*, Gujarati *lāl*, Hindi *lāl*, Marathi *lāl*, Panjabi *lāl* (borrowed from Persian *lāl* 'dear; red'); Welsh *coch* (borrowed from Latin *coccum* n. 'berry growing upon the scarlet oak'); Albanian *kuq* (borrowed from Vulgar Latin **cocceus*, a derivate of the name of a grain); Classical Armenian *karmir* (borrowed from Iranian, cf. Persian *qermez*).

Color expressions for red are formed with native material in the remaining 60 languages of the database (for the specific roots, see Data of Table 1): Ancient Greek *erythrós*, Modern Greek *kókinos*; Latin *ruber*, Umbrian **rufru** (acc.m.pl.), Italian *rosso*, Spanish *rojo*, French *rouge*, Occitan *roge*, Sardinian *ruju*, Romansh *cotschen*, Portuguese *vermelho* and Catalan *vermell*, Romanian *roșu*; Gothic *rauþs*, Old English *rēad*, English *red*, Old High German *rōt*, German *rot*, Dutch *rood*, Frisian *read*, Old Norse *rauðr*, Icelandic *rauður*, Faroese *reytt*, Danish *rød*, Norwegian *rød*, Swedish *röd*, Yiddish *royt*, Afrikaans *rooi*; Old Irish *rúad*, *derg*, Irish *dearg*, Breton *ruz*; Old Prussian *wormyan*, Lithuanian *raudónas*, Latvian *sar̂kans*; Old Church Slavonic *črŭmĭnŭ* / *črĭvljenŭ*, Serbo-Croatian *cr̀ven*, Bulgarian *červén*, Macedonian *crven*, Czech *červený*, Polish *czerwony*, Slovak *červený*, Ukrainian *červónyj*, Russian *krásnyj*,

Slovenian *rdeč*; Avestan *raoδita-*, *suxra-*, Sogdian *krm'yr*, Farsi *qermez*, Dari *qermez*, Tajik *surx* and Pashto *sūr*; Vedic *aruṇá-* and *aruṣá-*, Classical Sanskrit *rudhirá-*, *rakta-*, *lóhita-*, Kashmiri *wŏzul*^{u}, Nepali *rāto*, Sinhala *ratu*, Dhivehi *raiy*, Sindhi *gāṛho*, Konkani *tāmbḍo*; Modern Eastern Armenian *karmir* (derived from Classical Armenian *karmir* above); Tocharian B *ratre*.

Green. A color expression for green is not attested in 7 languages of the database (see Data of Table 1).

Color expressions for green are borrowed in 5 languages of the database: Kashmiri *sabaz* and Bengali *śobuj* (borrowed from Persian *sabz* 'green, fresh'); Welsh *gwyrdd* and Breton *gwer* (borrowed from Latin *viridis* "green"); Albanian *jeshil* (borrowed from Turkish *yeşil* 'green'), *gjelbër* (borrowed from Latin *galbinus* 'yellow-green').

Color expressions for green are formed with native material in the remaining 58 languages of the database (for the specific roots, see Data of Table 1): Ancient Greek *klōrós* (meaning 'green' at the stage of Classical Greek), Modern Greek *prásinos*; Latin *viridis*, Italian *verde*, Spanish *verde*, Catalan *verd*, Portuguese *verde*, French *vert*, Occitan *verd*, Romansh *verd*, Romanian *verde*, Sardinian *bírde*; Old English *grēne*, English *green*, Old High German *gruoni*, German *grün*, Dutch *groen*, Frisian *grien*, Old Norse *grœnn*, Icelandic *grœnn*, Faroese *grønt*, Danish *grøn*, Norwegian *grønn*, Swedish *grön*, Yiddish *grin*, Afrikaans *groen*; Old Irish *úaine*, *úr*, Irish *glas*; Old Prussian *saligan*, Lithuanian *žãlias*, Latvian *zaļš*; Old Church Slavonic *zelenŭ*, Bulgarian *zelen*, Macedonian *zelen*, Serbo-Croatian *zèlen*, Czech *zelený*, Slovak *zelený*, Polish *zielony*, Slovenian *zelen*, Russian *zelënyj*, Ukrainian *zelenyy*; Classical Armenian *dalar*, Modern Eastern Armenian *kanač'*; Sogdian *zrywny* and Pashto *zarghun*, Farsi *sabz*, Tajik *sabz*, Dari *sabz*; Gujarati *līlo*, Hindi *harā*, Panjabi *harā*, Nepali *hariyo*, Marathi *hirvā*, Sindhi *sāo*, Sinhala *koḷa*, Dhivehi *fehikula*, Konkani *patsvo*; Tocharian B *motartstse*.

White. A color expression for white is not attested in 1 language of the database: Old Persian (but see Note 8).

Color expressions for white are borrowed in 13 languages of the database: Kashmiri *saphed*, Gujarati *safed*, Hindi *safed* (borrowed from Iranian, cf. Persian *sefīd*), Bengali *śādā* (borrowed from Persian *sāde* 'simple'); Modern Greek *áspros* (from the name of a Roman silvery coin, the *nummus asper*); Italian *bianco*, Spanish *blanco*, Catalan *blanc*, Portuguese *branco*, French *blanc*, Occitan *blanc*, Sardinian *biánku* (borrowed more or less directly from Germanic, e.g. Sardinian through Italian); Classical Armenian *spitak* (borrowed from Iranian).

Color expressions for white are formed with native material in the remaining 56 languages of the database (for the specific roots, see Data of Table 1): Hittite *ḫarki-*;

Avestan *spaēta-*, Sogdian *'sp'yt*, Farsi *sefīd*, Tajik *safed*, Dari *sefīd*, Pashto *spīn*; Vedic *śvetá-*, *árjuna-*; Classical Sanskrit *śvetá-*, *árjuna-*; Panjabi *ciṭṭā*, Nepali *seto*, Marathi *pā̃ḍhrā*, Sindhi *accho*, Sinhala *sudu* and Dhivehi *hudhu*, Konkani *dhavo*; Ancient Greek *leukós*; Latin *albus*, *candidus*, Umbrian **alfu** (acc.n.pl), Romansh *alf* / *alv*, Romanian alb; Gothic *hveits*, Old English *hwīt*, English *white*, Old High German *(h)wīz*, German *weiß*, Dutch *wit*, Frisian *wyt*, Old Norse *hvítr*, Icelandic *hvítur*, Faroese *hvítur*, Danish *hvid*, Norwegian *hvit*, Swedish *vit*, Yiddish *vays*, Afrikaans *wit*; Old Irish *bán*, *find* / *finn*, *gel*, Modern Irish *bán*, Welsh *gwyn*, Breton *gwenn*; Old Prussian *gaylis*, Lithuanian *báltas* and Latvian *baĩts*; Old Church Slavonic *bělŭ*, Bulgarian *bjal*, Macedonian *bel*, Serbo-Croatian *bȉjel*, Czech *bílý*, Slovak *biely*, Polish *biały*, Slovenian *bel*, Russian *bélyj*, Ukrainian *bilyy*; Albanian *bardhë*; Modern Eastern Armenian *spitak* (derived from Classical Armenian *spitak* above); Tocharian B *ārkwi*.

Blue. A color expression for blue is not attested in 4 languages of the database (see Data of Table 1).

Color expressions for blue are borrowed in 12 languages of the database: Modern Greek *ble* (borrowed from French); Romansh *blau* / *blo*, French *bleu*, Catalan *blau*, Occitan *blau*, Italian *blu*, Sardinian *blau* / *brau* / *blo*, *biaittu* (more or less directly borrowed from Germanic), Spanish *azul* and Portuguese *azul* (borrowed from Arabic); Albanian *kaltër* (borrowed from Vulgar Latin **calthinus*, from the name of a kind of *Calendula officinalis*); Classical Armenian *kapoyt* (borrowed from Iranian); Tocharian B *tseṃ* (borrowed from a Chinese expression of blue-green).

Color expressions for blue are formed with native material in the remaining 54 languages of the database (for the specific roots, see Data of Table 1): Hittite *antara-*; Ancient Greek *kuáneos* (its base *kúanos* is already in Mycenaean); Latin *caeruleus*, Romanian *albastru*; Old English *hæwe(n)*, *blæwen*, English *blue* (properly a reborrowing from Old French, which is ultimately borrowed from Germanic), Old High German *blāo*, German *blau*, Dutch *blauw*, Frisian *blau*, Old Norse *blár*, Icelandic *blár*, Faroese *blátt*, Danish *blå*, Norwegian *blå*, Swedish *blå*, Yiddish *bloy*, Afrikaans *blou*; Old Irish *gorm*, *glas*, Irish *gorm*, *glas*, Welsh *glas*, Breton *glas*; Old Prussian *golimban*, Lithuanian *mélynas*, Latvian *zils*; Old Church Slavonic *modrŭ*, Czech *modrý*, Slovak *modrý*, Slovenian *moder*, Polish *niebieski*, Russian *golubój*, Serbo-Croatian *plâv*, Bulgarian *sin*, Macedonian *sin*, Ukrainian *syniy*; Old Persian *kapautaka-*, Sogdian *kp'wt*, *kp'wtk*, Tajik *kabud*, Farsi *ābī*, Dari *asmānī*, Pashto *shīn*; Classical Sanskrit *nílа-*, Kashmiri *nīlā*, *nyūl*^{u}, Nepali *nīlo*, Panjabi *nīlā*, Hindi *nīlā*, Bengali *nīl*, Marathi *niḷā*, Sindhi *nīru*, Sinhala *nil*, Konkani *niḷo*, Dhivehi *nū*, Gujarati *vādaḷī*; Modern Eastern Armenian *kapowyt* (derived from Classical Armenian *kapoyt* above).

Gray. A color expression for gray is not attested in 8 languages of the database (see Data of Table 1).

Color expressions for gray are borrowed in 11 languages of the database: Modern Greek *gri* (borrowed from French); Italian *grigio*, Spanish *gris*, Catalan *gris*, French *gris*, Occitan *gris*, Romansh *grischun*, Romanian *gri* (borrowed from Germanic more or less directly, e.g., Romanian *gri* through a French mediation); Albanian *gri* (borrowed from French); Hindi *saleTī* and Panjabi *saleTī* (borrowed from English *slate*).

Color expressions for gray are formed with native material in the remaining 51 languages of the database (for the specific roots, see Data of Table 1): Ancient Greek *poliós*; Portuguese *cinzento* (Portugal) / *cinza* (Brazil), Sardinian *murinu*, *murru*; Old English *grǣw*, *grǣg*, English *gray*, Old High German *grāo*, *grā*, German *grau*, Dutch *grijs*, Frisian *griis*, Old Norse *grár*, Icelandic *grár*, Faroese *gráur*, Danish *grå*, Norwegian *grå*, Swedish *grå*, Yiddish *groy*, Afrikaans *grys*; Old Irish *líath*, Irish *liath*, Welsh *llwyd*, Breton *louet*; Old Prussian *sywan*, Lithuanian *pìlkas*, Latvian *pelēks*; Old Church Slavonic *pelesŭ*, Serbo-Croatian *sȉv*, Bulgarian *siv*, Macedonian *siv*, Slovenian *siv*, Slovak *sivý*, Czech *šedý*, Polish *szary*, Russian *séryj*, Ukrainian *siryy*; Avestan *pouruša-*, Pashto *kharr*, Farsi *xākestarī*, Dari *xākestarī*, Tajik *xokistarang*; Vedic *palitá-*, Classical Sanskrit *dhūsara-*, Bengali *dhūśor*, Sindhi *pūru*, Nepali *kharānī*, Kashmiri *sūr*^{ü}, Gujarati *bhūkhro*, *rākhōḍī*, Marathi *rākhāḍī*, Konkani *rākhāḍī*, Sinhala *aḷu*, Dhivehi *alhikula*; Modern Eastern Armenian *moxragowyn*.

Brown. A color expression for brown is not attested in 10 languages of the database (see Data of Table 1).

Color expressions for brown (or their base) are borrowed in 13 languages of the data: Occitan *brun*, *burèl*, Romansh *brün* / *brin* (borrowed from Germanic); Latvian *brūns* (borrowed from Germanic); Welsh *brown* (borrowed from English); Polish *brązowy* (its base *brąz* is borrowed from French *bronze*); Modern Greek *kafé*; Albanian *kafe*; Bulgarian *kafjáv*, Macedonian *kafeav*; Dari *qahve'ī*, Farsi *qahve'ī*, Tajik *qahvarang* – all more or less directly borrowed from the Arabic name of coffee (sometimes through Persian or French); Bengali *bādāmī* (where the radical is borrowed from Persian *bādām* 'almond').

Color expressions for brown are formed with native material in the remaining 47 languages of the database (for the specific roots, see Data of Table 1): Italian *marrone* (already in Vulgar Latin **marro*, cf. REW 5375), Spanish *marron*, Catalan *marró*, Portuguese *castanho* (Portugal) / *marrom* (Brazil), French *marron*, Romanian *maro*, Sardinian *castanzu*; Old English *brūn*, English *brown*, Old High German *brūn*, German *braun*, Dutch *bruin*, Frisian *brún*, Old Norse *brúnn*, Icelandic *brúnn*, Faroese *brúnt*, Danish *brun*, Norwegian *brun*, Swedish *brun*, Yiddish *broyn*, Afrikaans *bruin*; Old Irish *donn*, Irish *donn*, Breton *gell*; Old Prussian *cucan*, Lithuanian *rùdas*; Serbo-Croatian *smeđ*, Czech *hnědý*, Slovak *hnedý*, Russian *koríčnevyj* and Ukrainian *korýčnevyj*, Slovenian *rjav*; Sogdian *cnt'n β'm'k*, Pashto *naswārī*; Vedic *babhrú-*, Classical Sanskrit *babhrú-*, Hindi *bhūrā*, Panjabi *bhūrā*, Gujarati *bhuro*, Sinhala *dumburu*;

Marathi *tapkirī*, Konkani *puditso*, Sindhi *nāsī*, Nepali *khairo*, Kashmiri *kātsur*^{ll}, Dhivehi *mushi kula*; Modern Eastern Armenian *shaganakagowyn* (where the name of the chestnut, *šaganak*, already belongs to Classical Armenian).

Violet/purple. A color expression for violet/purple is not attested in 7 languages of the database (see Data of Table 1).

Color expressions for violet/purple (or their base) are borrowed in 38 languages of the data: Ancient Greek *porphúreos* (the base *porphúra* f. is not IE and probably a borrowing from a Mediterranean source); Modern Greek *mōv*, *mov* (borrowed from the French name of the mallow flower/color); Latin *violāceus* (the base *viola* f. is borrowed from a Mediterranean source, like Ancient Greek *(F)íon* n. 'violet'); Sardinian *biaittu* (borrowed from Old Italian *biadetto* 'blueish', itself a borrowing from Germanic); Gothic *paurpaura*, *paurpuron*, Old English *purpul*, *purpure*, *purpuren*, Old High German *purpura* (these Germanic forms are borrowed from Ancient Greek *porphúreos* 'purple'), Dutch *paars*, Afrikaans *pers*, Frisian *pears* (these Germanic forms are borrowed from Middle French denominations of blue), German *lila*, Faroese *lilla*, Danish *lilla*, Norwegian *lilla*, Swedish *lila*, Yiddish *lila* (borrowed from French, from an Arabic source *līlak*, itself a borrowing, through Persian, originally going back to Old Indic *nīla-* 'blue, blueish'); Old Irish *corcair* (borrowed from the Latin name of purple), Irish *corcra*, Welsh *piws* (borrowed from English *puce*, the color of fleas); Old Prussian *pūrpurns*, Lithuanian *violètinis*, Latvian *violets*; Old Church Slavonic *praprǫdĭnŭ*, Bulgarian *lilav*, Macedonian *violetov*, Czech *fialový*, Polish *fioletowy*, Slovak *fialový*, Slovenian *vijóličen*, *vijóličast*, Russian *fiolétovyj*, Ukrainian *fiolétovyj*; Albanian *vjollcë*; Modern Eastern Armenian *manowšakagowyn*; Sogdian *'ryw'n*, Dari *arghawānī*, Pashto *arghawānī*, Tajik *arġuvon* (borrowed from a Semitic source, cf. Akkadian *argamannu*, the name of a red-purple dye and of a cloth of this color); Kashmiri *lājward* / *lājvayr* (borrowed from Persian).

Color expressions for violet/purple are formed with native material in the remaining 25 languages of the database (for the specific roots, see Data of Table 1): Italian *viola*, French *violet*, Occitan *violet*, *malve*, Spanish *morado*, *violeta*, Catalan *morat*, *violeta*, Romansh *violet*, *malve*, Romanian *violet* (derived from Latin *viola*, *malva*, *mōra* [PL] above), Portuguese *roxo*; English *purple* (derived from the Old English source above), Icelandic *fjólublár*; Breton *glasruz*; Serbo-Croatian *ljubičast*; Classical Armenian *cirani*; Farsi *banafš*; Classical Sanskrit *dhūmra-*, Nepali *baijanī* (from Old Indic *vātiṅgaṇa-* 'aubergine', cf. Turner [1962–1966: 11,503]), Panjabi *jāmunī*, Gujarati *jāmbalī*, Hindi *baiṅganī*, *jāmunī*, Bengali *beguni*, Marathi *zāmbhaḷā*, Konkani *zāmbḷo*, Dhivehi *dhan'bu kula*, Sindhi *wānganī*, Sinhala *dam*.

Pink. A color expression for pink is not attested in 15 languages of the database (see Data of Table 1).

Color expressions for pink (or their base) are borrowed in 37 languages of the data: Ancient Greek *hrodóeis*, *hródeos*, *hródinos* (meaning 'pink' at the classical stage. Its base *hródon* n. is a borrowing from a Mediterranean source), Modern Greek *roz* (borrowed from French); Latin *roseus* (its base *rosa* is a borrowing from a Mediterranean source, like Ancient Greek *hródon* above); German *pink*, *rosa*, Dutch *roze*, Frisian *rôze*, Norwegian *rosa*, Swedish *rosa*, Yiddish *rozeve*, Afrikaans *pienk*; Welsh *pinc*, Breton *roz*; Lithuanian *rõžinis* and Latvian *rozā*; Serbo-Croatian *roz*, Slovenian *roza*, Bulgarian *rozov*, Macedonian *rozov*, Czech *růžový*, Slovak *ružový*, Polish *różowy*, Russian *rózovyj*, Ukrainian *rožévyj*; Albanian *rozë*; Classical Sanskrit *pāṭala-* (uncertain etymology but certainly not IE), Hindi *gulābī*, Panjabi *gulābī*, Gujarati *gulābī*, Marathi *gulābī*, Konkani *gulābī*, Sindhi *golābī*, Kashmiri *gŏlöbī*, Nepali *gulāphī*, Bengali *golāpī* (borrowed from Iranian), Sinhala *rosa* (borrowed from Portuguese), Dhivehi *fiyāthoshi kula* (its base *fiyā* is borrowed from Persian *piyāz* 'onion, bulb'); Modern Eastern Armenian *vardagowyn*.

Color expressions for pink are formed with native material in the remaining 18 languages of the database (for the specific roots, see Data of Table 1): Farsi *Suratī*, Tajik *gulobī*, Pashto *gulābī*, Dari *gulābī*; Italian *rosa*, Romansh *rosa*, Spanish *rosa*, Catalan *rosa*, Portuguese *rosa* / *cor-de-rosa*, French *rose*, Occitan *ròse*, Romanian *roz*, Sardinian *in colori de arrosa* (all derived from Latin *rosa* above); English *pink*, Icelandic *bleikur*, Danish *lyserød* and Faroese *ljósareyður*; Irish *bándearg*.

Orange. A color expression for orange is not attested in 15 languages of the database (see Data of Table 1).

Color expressions for orange (or their base) are borrowed in 48 languages of the data: Ancient Greek *krókeos*, *krokóeis* (denoting orange colors at the classical stage, from an originally Semitic base, cf. Akkadian *kurkanū* 'saffron', or from another Mediterranean source from which the Semitic base itself could have been borrowed), Modern Greek *portokalís* (from the name of the orange fruit); Albanian *portokalli*; English *orange*, German *orange*, Dutch *oranje*, Frisian *oranje*, Danish *orange*, Norwegian *oransje*, Swedish *orange*, Yiddish *marants* (a shortening of *pomerants*, a variety of the orange fruit), Afrikaans *oranje*; Italian *arancione*, Spanish *naranja*, Catalan *taronja* (from Arabic *turunj* 'citron'), Portuguese *laranja* / *cor-de-laranja* (lit. 'color of the orange fruit'), French *orange*, Occitan *orange*, Romansh *orange*, Romanian *oranj* / *portocaliu*, Sardinian *in colore de s'arantzu*; Irish *oráiste*, Welsh *oren*, Breton *orañjez*, *oranj*; Lithuanian *oránžinis*, Latvian *oranžs*; Bulgarian *oranzhev*, *portokalov*, Macedonian *portokalov*, Serbo-Croatian *narančast*, Czech *oranžový*, Polish *pomarańczowy*, Slovak *oranžový*, Slovenian *oranžen*, Russian *oránževyj*, Ukrainian *pomaranchevyy*; Modern Eastern Armenian *narnǰagowyn*; Farsi *nārenjī*, *portakalī*, Dari *nārenjī*, Pashto *nārenjī*, Tajik *naranjī*; Kashmiri *sangtar* (*rang*), Nepali

suntale, Panjabi *santarī*, *nāraṅgī*, Hindi *nāraṅgī*, *santarī*, Gujarati *nāraṅgī*, Marathi *nāriṅgī*, Sindhi *nāraṅgī*, Dhivehi *orenju kula*.

Color expressions for orange are formed with native material in the remaining 7 languages of the database (for the specific roots, see Data of Table 1): Latin *flammeus*; Icelandic *appelsínugulur*, Faroese *appelsingult*; Classical Sanskrit *kausumbha-*, Konkani *kesrī*, Sinhala *tembili*, Bengali *komolā*.

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