Color Terms in Pama-Nyungan Languages

Claire Wallace

Advisor: Claire Bowern

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Abstract

The acquisition of color terms in the world's languages, and the possibility of a universal order of acquisition, has been studied for at almost 200 years. Berlin and Kay's landmark 1969 study argued that color terms are universal and that languages acquire them in a fixed order, so that the color terms found in a language can be predicted based on the number of color terms in that language. Subsequent studies have modified their proposed order, and have argued against their Eurocentric view of color as the most salient visual property in every language.

This paper presents a study of color terms found in the Pama-Nyungan languages, which are spoken throughout most of mainland Australia. I present the languages in groups based on how many color terms are found in each language, and discuss the most typical patterns of color terms for each group of languages. The results concur in general with the most recent proposed orders of color term acquisition, but with some important differences. The results are discussed in relation to the various orders that have been proposed. I also discuss the etymologies of color terms, and patterns in the additional translations provided for certain groups of terms. The patterns indicate that the visual world can sometimes be described using color in conjunction with other unrelated methods, such as measures of brightness.

1. Introduction to Color Term Research

The earliest studies on the linguistics of color, and specifically the order in which color terms present themselves in languages, were undertaken in the 19th century by scholars and naturalists such as Gladstone, Geiger and Magnus (Gladstone 1958, Geiger 1880, Magnus 1877). These inquiries into the potential universality of color terms were brought to the attention of a wider audience of linguists and scientists by Berlin and Kay's 1969 study on the linguistic patterns of color term acquisition in languages around the world. Berlin and Kay posited a set of 11 'basic color terms', determined that all languages have between 2 and 11 basic color terms, and found that color terms are added to languages in a fixed sequence; specific color terms found in a language are therefore predictable based on the number of color terms in the language. Languages were classified as "stages" I-VII according to the number of color terms found. Subsequent revisions (Kay & McDaniel 1978; Kay, Berlin, Maffi & Merrifield 1997; Kay & Maffi 1999) concluded that the stages conceived by Berlin and Kay did not apply to all languages, and various modifications were proposed regarding the order of color term acquisition and methods of conceptualizing the visual space.

1.1 *Research before Berlin and Kay*

The earliest systematic work on the language of color appeared in the mid-19th century, when Gladstone compared color terms in Homeric Greek to those in modern-day English. Gladstone (1877) posited that humans were physically unable to see the full spectrum of colors in the era of Homeric Greek, and that people were only able to distinguish between light and dark; he believed that the physiological development of the eye over time coincided with the ability to perceive more colors. Geiger (1871) proposed the first basic theory that color term acquisition in languages occurs in stages, and that specific color terms are added sequentially as a language evolves, comparing modern-day color terms with those found in ancient literature to defend his argument. Following the work of Gladstone, Geiger claimed that if a society had no term for a specific color, it meant that the speakers of that language were physiologically unable to see that color (p.57); however, this theory was discredited by studies on color vision in the 1870s. Allen (1978, 1979) argued against Geiger and Gladstone's ideas that primitive cultures were unable to

see certain colors, though his studies confirmed that languages of primitive tribes often had fewer color terms than the languages of more industrialized societies. Magnus (1877a), an ophthalmologist, argued against the equation of color perception in modern-day primitive societies with color perception in ancient societies. He determined that color terms did appear to be added to languages in a set order, but that color terminology in a language was not linked to speakers' ability to see specific colors. Magnus posited an evolutionary order of acquisition of color categories based on level of brightness/intensity, believing that languages first acquired terms for the brightest or most luminous colors, and acquired terms for darker and less luminous colors after that (p.41-42). This focus on brightness as a way to describe the evolution of color terms is important for revisions to Berlin and Kay's 1969 study, in which the relationship between brightness and color as methods of describing the visual world is considered.

The Sapir-Whorf hypothesis of linguistic relativity (Kay & Kempton 1984), which claims that language influences how people perceive the world and that speakers of different languages see the world in different ways, was applied to the study of color terms by a number of scholars in the mid-20th century. The general argument was that since there is a single color spectrum, and different languages partition it differently (accounting for the different numbers of color terms found in each language), color terms cannot be universal, and instead have to be based on the way individual cultures see the world. Brown and Lenneberg (1954) and Burnham and Clark (1955) conducted experiments using saturated and unsaturated Munsell color chips[1] to attempt to draw a relationship between color naming and recognition. Lenneberg and Brown (1956) used a 320-chip Munsell color array, the same array Berlin and Kay would use in their 1969 study, in their experiment on English and Zuni to try to determine the similarity of the color categories of the two languages. A number of other studies leading up to Berlin and Kay supported the Sapir-Whorf hypothesis as it related to color terms, arguing that the color terms found in a language determine how the speakers of that language perceive color. The most extreme extensions of the hypothesis, namely that if a language has no term for a color the speakers of that language do not

[1] The Munsell color system divides the color space into discrete colors based on hue, lightness, and chroma (purity or saturation). The color chips in these studies come from the Munsell Color Company. The sets of color chips are intended to divide the color space into discrete segments such that a participant in a color experiment can pinpoint both the focal point and outer boundaries of a color.

perceive that color, were quickly discarded, but the more general question of whether or not color terms affect the perception of color is still relevant.

1.2 *Berlin and Kay*

Berlin and Kay's 1969 study is iconic because of the breadth of their research, and because it formalized many of the theories that had been circulating about color term acquisition in languages. They hypothesized that the Sapir-Whorf hypothesis of linguistic relativity was incorrect, that the lexical coding of color is not arbitrary, and that color terms are universal and added into languages in a specific and predictable order. Berlin and Kay used a Munsell color array that had been used in previous studies on color perception (Lenneberg and Roberts 1956), made up of 320 chips of colors at maximum saturation, comprising 40 hues and 8 levels of brightness, and 9 additional achromatic tones. Using this color array, they surveyed participants from speakers of 20 languages from different language families and regions of the world, to determine what color terms were found in their languages and which colors from the array were included in each of their color categories. The participants were first asked to name the basic color terms found in their language, and then were asked to map out on the board of color chips the focal point and outer boundaries of each basic color term. The participants were asked to mark the most typical examples of each color (to determine the focal points of the color categories) and every chip that they would consider to be an example of each color (to determine the range of the color categories). Each participant repeated this task three times, over the course of three weeks (p.7). Berlin and Kay included data from previous studies in their account, for a total of 98 languages.

Berlin and Kay found an inventory of 11 universal 'basic color terms', or basic perceptual color categories, across languages: BLACK, WHITE, RED, GREEN, YELLOW, BLUE, BROWN, PURPLE, PINK and ORANGE[2]. They found that the foci of color categories were very uniform; almost all of the participants chose chips within one or two places of each other as the

[2] Color terms in capital letters refer to color categories, which are not necessarily equivalent to the colors denoted by the English word. Color categories will be explained further in chapter 2.

focal point of a color. The boundaries of color categories were less reliable; participants spent much longer determining the boundaries of a color, and there was considerable disagreement between participants (p.13). Berlin and Kay therefore did not focus on the boundaries of colors, and used the term 'color category' to refer to the focal point of a color category. They determined that a 'basic color term', or BCT, must be monolexemic; must not be a version of another color (e.g. "aqua" is a type of blue); must not be applicable only to certain classes of objects (e.g. "brunette" applies only to hair); and must be agreed upon by speakers and frequently occurring, eliminating colors like "fuchsia" or "chestnut". Additional parameters apply in uncertain cases: for instance, foreign loan words are suspect, as are color terms that are polysemous with objects of those colors, which eliminates "gold" (but not "orange", because it is not doubtful based on the primary criteria).

Berlin and Kay also found that the specific color terms in a language were wholly predictable based on the number of color terms in the language—for example, if a language had four color terms, one would in theory know exactly which colors they represented. Berlin and Kay grouped languages into "stages" according to how many color terms were present, and each stage contained predictable colors. Stage I languages contain only terms for BLACK and WHITE; Stage II languages add a term for RED; Stage III languages add a term for either GREEN or YELLOW; Stage IV languages have terms for both GREEN and YELLOW; Stage V languages add a term for BLUE; Stage VI languages add a term for BROWN; and Stage VII languages, which have between 8 and 11 BCTs, add terms for one or more of the final four colors, PURPLE, PINK, ORANGE and GREY. Berlin and Kay do not attempt to provide an explanation for the specific ordering of the eleven basic color terms; they merely present the order as a logical conclusion based on their observations. Each of the color category labels represents a slightly different range of colors in each stage: for instance, BLACK in Stage I can be comprised of all dark colors, while BLACK in Stage VII corresponds to a much narrower region of the color space, namely, only the color denoted by the English word 'black'. A chart of the color term stages is shown in Figure 1, and a figure of the evolutionary sequence of color terms is shown in Figure 2.

Number of basic color terms	Evolutionary stage of language	Colors
2	I	BLACK, WHITE
3	II	BLACK, WHITE, RED
4	III	BLACK, WHITE, RED, [GREEN or YELLOW]
5	IV	BLACK, WHITE, RED, GREEN, YELLOW
6	V	BLACK, WHITE RED, GREEN, YELLOW, BLUE
7	VI	BLACK, WHITE, RED, GREEN, YELLOW, BLUE, BROWN
8+	VII	BLACK, WHITE, RED, GREEN, YELLOW, BLUE, BROWN, [PURPLE and/or PINK and/or ORANGE and/or GREY]

Figure 1: evolutionary color stages of languages according to number of basic color terms and corresponding colors

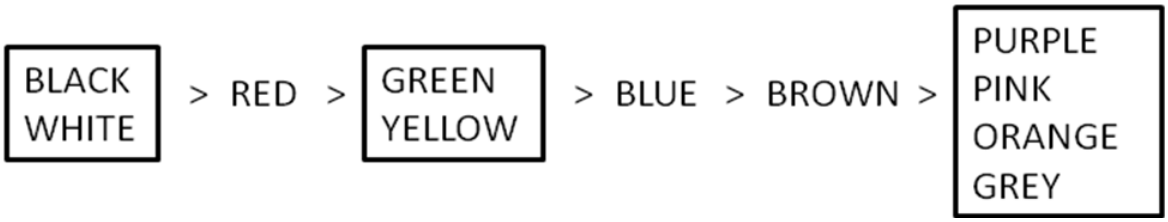

Figure 2: diagram of the evolutionary stages of color terms, from Stage I to Stage VII; a box around a group of colors indicates that there is no order preference between those colors.

Berlin and Kay did not claim that a difference in the color term vocabularies of languages indicated a difference in the perceptions of the speakers, as some of the earlier researchers had suggested, but they did argue that the evolutionary color stage of a language can be equated with the complexity of a language and of the culture of its speakers. They claimed that there is a "positive correlation between general cultural complexity (and/or level of technological development) and complexity of color vocabulary" (p.16), based on the fact that the vast majority of the languages of industrialized societies were stage VII, while languages of small, unindustrialized societies in isolated regions were predominantly stages I, II and III. They concluded that, while the variables they used (complexity of culture, level of technological development) are vague, "the sequence of elaboration of color lexicon is an evolutionary one accompanying, and perhaps a reflex of, increasing technological and cultural advancement"

(p.16). Berlin and Kay further posit that basic color terms may not be as useful to more primitive societies, those living "close to nature", because these societies lack the manufactured goods that necessitate the full number of color distinctions.

1.3 *Research after Berlin and Kay*

Following the 1969 study there have been numerous revisions and rebuttals of Berlin and Kay's methods and findings, including a number of revisions by the authors themselves (Kay and McDaniel 1978; Kay, Berlin, Maffi and Merrifield 1997; Kay and Maffi 1999). The most important revisions involved reordering the stages of color term acquisition and rethinking the original partitions of the color space. Instead of 11 basic color terms, the later revisions posited that the color space can be broken up into six main perceptual categories (BLACK, WHITE, RED, YELLOW, GREEN, BLUE) plus secondary categories created from combinations of the main categories, which form the rest of the original 11 basic color terms. These secondary categories are divided into derived colors and composite colors—derived colors come from the intersection of two basic colors (e.g. RED + BLUE yields PURPLE), and composite colors come from the union of two or more basic colors (e.g. a category labeled 'warm' could include WHITE, RED and YELLOW). The derived colors represent the other five basic color terms—BROWN, PINK, PURPLE, ORANGE and GREY—and they are considered to appear in languages only after the six primary perceptual categories. Instead of the idea of a strict evolutionary sequence of color acquisition that determines the stage of a language, stages involve partitioning the color space into progressively narrower categories. Figure 3, taken from Kay and McDaniel (1978), shows a proposed order of basic, derived and composite color terms. The basic, or primary, colors start appearing in stage II and are all present in stage V; the composite colors appear only up to stage V; and the derived colors (BROWN, PINK, PURPLE, ORANGE and GREY) start appearing only after stage V. Figure 4, taken from Berlin, Kay, Maffi and Merrifield (1997), highlights a proposed five-stage order of basic color term acquisition, leaving out the secondary colors. In this model, stage V includes only the six main perceptual color categories: BLACK, WHITE, RED, YELLOW, GREEN and BLUE.

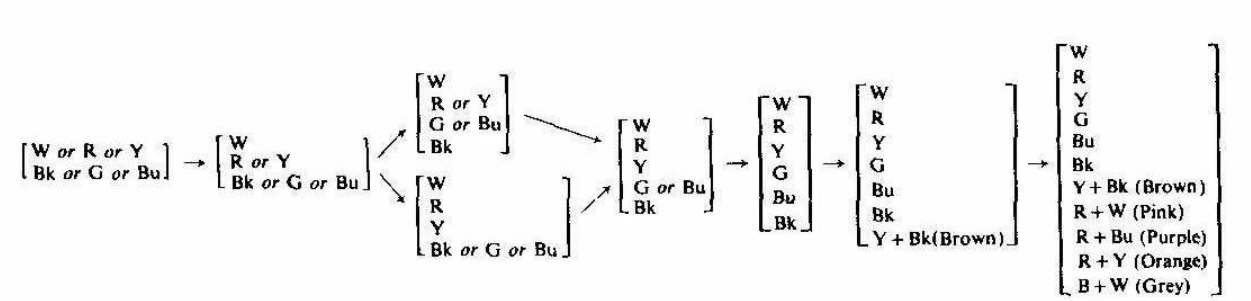

Figure 3 (from Kay and McDaniel (1978), p.639)
Key: W=white, R=red, Y=yellow, Bk=black, G=green, Bu=blue

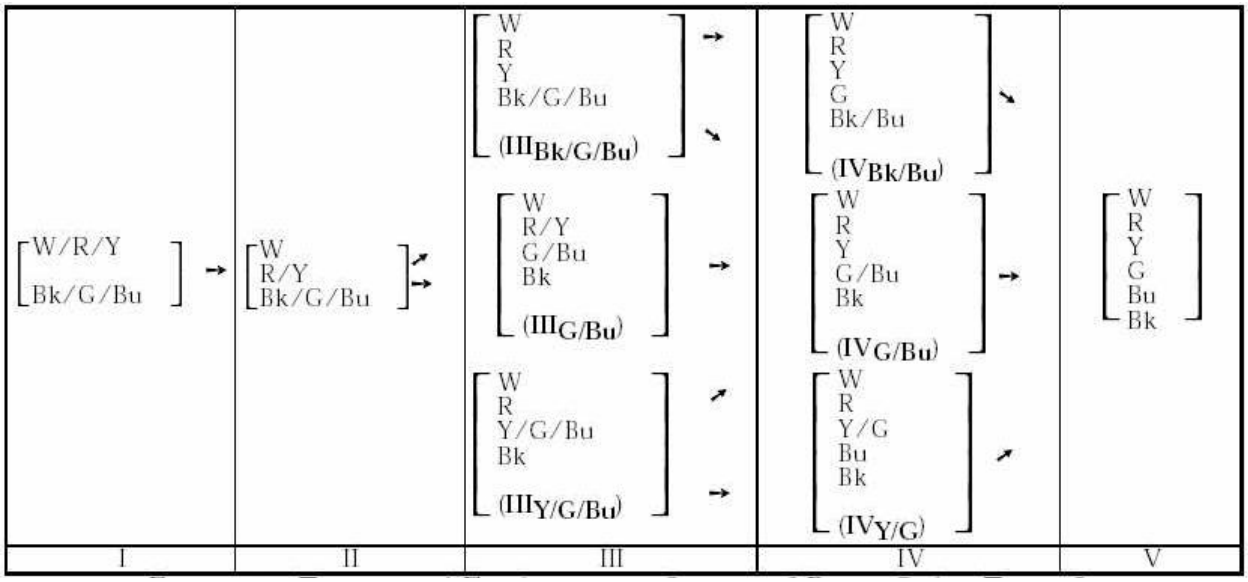

Figure 4 (from Berlin, Kay, Maffi and Merrifield (1997), Figure 2.4, p.33)
Key: W=white, R=red, Y=yellow, Bk=black, G=green, Bu=blue

Figure 4 provides a theory of how the color space is divided at each stage. The first partition divides the color space into warm colors (WHITE/RED/YELLOW) and cool colors (BLACK/GREEN/BLUE); these are composite categories, or unions of more than one basic color terms. The second partition divides WHITE from RED/YELLOW, leaving the cool colors as one unit. The third stage can involve three different divisions: RED and YELLOW can split, leaving the cool colors as one unit; or BLACK can split from GREEN/BLUE, leaving RED/YELLOW as one unit; or BLACK can split from the other cool colors and YELLOW can split from RED to combine with GREEN/BLUE. The fourth stage similarly allows for three options, leaving as one unit BLACK/BLUE, GREEN/BLUE or YELLOW/GREEN. By the fifth stage, all six of the basic color categories are present. The secondary colors (BROWN, GREY,

ORANGE, PINK, PURPLE) are not accounted for in this model; they are thought to appear only after the six primary perceptual categories. The five stages here are temporally ordered, just as in Berlin and Kay's original proposal; they represent an evolutionary ordering of how color terms are added into languages.

Following those revisions have come further objections and inconsistencies, including the problem of overlapping color terms, and the different impressions and perceptions of individual speakers within a language (MacLaury, 1997). One problem that has been raised with many of the color term theories is that they fail to take into account languages for which the visual world is described not exclusively by color but also by other measures, such as brightness, as will be discussed later in this section. Color term studies have mainly focused on measuring the color lexicons of languages in terms of hue, and have for the most part tried to fit the results from brightness-based languages into a hue-based system, which does not allow for entirely accurate comparison.

Anna Wierzbicka objects to the fundamental concept of using color as a means of comparing languages; in an argument against the premise of Berlin and Kay's 1969 study and its revisions, she says: "…the theory has survived more than three decades without ever examining its fundamental assumption that "color" is a valid analytical tool for describing and comparing languages of the world" (Wierzbicka 2005). One of the examples she provides is the two 'color' terms found in the languages of the Dani people, a tribe in Western New Guinea. The two terms, *mili* and *mola*, represent light/warm colors (WHITE, RED, YELLOW) and dark/cool colors (BLACK, GREEN, BLUE), respectively (Rosch 1972). Wierzbicka's argument is that given that *mili* can represent any warm color or light shade, and *mola* any cool color or dark shade, these two terms do not distinguish between the properties of hue and lightness, and thus cannot be thought of as color terms. Rather, they should be treated as "global visual descriptors" that take into account, but do not refer specifically to, color. Wierzbicka also mentions the objection of Saunders and van Brakel (1995) to Berlin and Kay's use of English color terms as the standard by which the color terms of all other languages are considered, pointing out that if English color terms are used to "gloss universal categories" that cannot be glossed in other languages, the categories cannot in fact be universal, but are instead dependent on the standard set by English.

She follows Dimmendaal (1995) in concluding that "an approach that assigns to English words such a privileged status is blatantly Anglocentric. Accordingly, the whole Berlin and Kay paradigm, which takes this approach for granted, is deeply Anglocentric." Her analysis of the shortcomings of the Berlin and Kay paradigm brings up important questions about how we can compare languages accurately and without bias, and raises questions about the validity of using color as the sole method of explaining how the visual world is described in the world's languages. However, Wierzbicka does not consider the fact that the color categories must be described somehow, and that English terms were a logical way for Berlin and Kay to describe the color space given that English was language in which the analysis was undertaken. Researchers should take care not to confuse the name for a color category with the color that is denoted by that English term (e.g. BLACK does not necessarily refer exclusively to the color denoted by the English world 'black'), but as long as that distinction is recognized, and as long as methods of describing the visual world other than color are considered, the use of English terms as category labels does not pose a problem.

1.4 *Color Term Research in Australian languages*

The Pama-Nyungan family is the largest language family in Australia, comprised of roughly 250 of Australia's 392 indigenous languages (Bowern, 2012). Pama-Nyungan languages are spoken in most of Australia, excluding parts of the Northern Territory and Western Australia, where predominantly non-Pama-Nyungan languages are spoken. Pama-Nyungan is considered a single language family for a variety of reasons, such as shared lexical items and sound correspondences (Bowern and Koch 2004; Alpher 2004).

Very little research has been done on color terms in Pama-Nyungan languages or Australian languages in general. Berlin and Kay mentioned five indigenous Australian languages (Kuku-Yalanji, Murrinh-Patha, Martu Wangka, Warlpiri and Kriol) in their study, and classified them according to their original theory of evolutionary stages of color terms. In 1978, the Summer Institute of Linguistics (SIL) conducted a color research project involving over 100 languages around the world, including the five aboriginal languages from Berlin and Kay's study, and the

SIL researchers reevaluated Berlin and Kay's proposed stages in light of the data from those five languages. The researchers came across a number of problems in drawing conclusions, due to internal inconsistencies in groups of speakers (speakers would label the same colors with different terms, or the use the same terms for different colors), and the fact that some terms did not appear to be true color terms but were instead measures of brightness (a phenomenon discussed in 1.3 and chapter 3).

Kuku-Yalanji was labeled a Stage II language, with three color terms: BLACK is *bingaji* (also translated as "dirty"), WHITE is *ngumba* (also translated as "light"), and RED is *ngala-ngala*. The three terms were considered [macro-black], [macro-white] and [macro-red][3]; these were the only three terms that all 20 participants named as colors. In addition, 14 participants named as a color term the word *burrkul*, translated as "dirty", providing varying accounts of what color it represented; and 11 mentioned the word *kayal* as a term for GREEN. *Kayal* was also translated as "unripe" and was thus not counted as a color term, on the theory that it refers exclusively to green vegetation[4]. Murrinh-Patha was also labeled a Stage II language, with the terms *bamam*, *thipmam* and *bukmantharr* for BLACK, WHITE and [macro-red], respectively; there were several other terms mentioned by speakers, but they were not counted as color terms because of internal inconsistencies among speakers (different speakers chose very different foci for the terms, which made it impossible to assign English color glosses to the terms, or to assign them broad color categories). Martu Wangka was deemed to have terms for BLACK, RED, GREEN and YELLOW; since it had no term for WHITE (a total of 12 different terms were used by various participants to describe the WHITE color space, but none of them appeared to be true color terms, and they were not agreed on by a majority of the 25 speakers), it could not be

[3] [macro-white], [macro-black] and [macro-red] are categories used to encompass a wider range of colors than the colors suggested by the terms "white", "black" and "red"; [macro-white] could include all warm colors, e.g. RED and YELLOW; [macro-black] could include all cool colors, e.g. GREEN and BLUE; [macro-red] could include all bright colors, e.g. YELLOW and ORANGE. The range of possible colors covered by each macro term varies according to language.

[4] A distinction is drawn in this paper between terms for the color GREEN that are polysemous with terms for vegetation and terms that are defined as "green" only in respect to living things. A term for vegetation or plants that is polysemous with a color term for GREEN is counted as a true color term; a term that is defined as "green" only in respect to living things is not counted as a true color term, because it cannot be used to refer to generic objects of the color GREEN. This will be discussed further in chapter 3.

assigned a stage according to Berlin and Kay's model. Warlpiri was difficult to classify in terms of number of color terms, because none of the terms were used by all 23 of the participants, and all of the terms used had some overlap (meaning that some participants used the same terms to describe different colors, while other participants described the same colors using different terms). It was decided by researchers that the language has terms for BLACK, RED, GRUE, WHITE and YELLOW, though the support for their choices in not overwhelming and other conclusions could be drawn; Warlpiri is discussed again in 2.8. The fifth language, Kriol, is not a good example of color terms in an Aboriginal language because it is a creole with an English lexicon, and thus all of its 11 color terms come directly from English. The SIL researchers involved in this project decided that of the five languages they studied, the first two (Kuku-Yalanji and Murrinh-Patha) supported Berlin and Kay's color stage hypothesis, while the second two (Martu Wangka and Warlpiri) did not. (The fifth, Kriol, was neutral because of its English lexicon.)

Apart from Berlin and Kay's mention of those five languages and the subsequent study undertaken by SIL researchers, Anna Wierzbicka is one of the only researchers who has mentioned Australian languages in her discussion of color terms. As discussed in 1.3, she rejects the "universal color terms" theory, and claims that color lexicon is an unhelpful way of comparing languages because the primary or sole visual descriptors in some languages are based on brightness and not on color. She suggests that perhaps some indigenous tribes, such as those found in Australia, never developed words for colors because color terms are unnecessary for their lifestyles—they have words for 'light' and 'dark' and some sort of RED ("blood-like" or "fire-like"), because those concepts are present and useful in their cultures. She argues that, while the absence of a word for 'color' in many languages does not prove that the concept of color does not exist, it makes more sense to discuss the concept of 'seeing', because a word for 'seeing' is present in every language. Wierzbicka takes an extreme view of the argument that cultures lexicalize things that are important to them, and that if there is no word for something in a language, it implies that the speakers of the language do not think about that thing. As she says, "…in many languages one cannot ask the question 'What color is it?' and so it must be assumed that this question does not arise in the speakers' minds. They simply do not think in

these terms." She argues that studies should reflect the universality of descriptors of what is seen, allowing for all mechanisms of describing the visual world instead of just color terms.

1.5 *Research question and hypothesis*

This project will focus on color terms in Australian languages, specifically in Pama-Nyungan, a language family for which little color research has been done. I will attempt to determine how many color terms and which specific color terms are found in Pama-Nyungan languages; what general statements can be made about color term stages of Pama-Nyungan languages; how well the data accords with what Berlin and Kay and subsequent researchers have hypothesized; any patterns in the additional or alternate translations of color terms; how the visual world is described apart from color; and how salient the property of color is in this language family.

My overall hypothesis is that Pama-Nyungan languages will be found to have few of what Berlin and Kay would deem 'basic color terms', and will instead use other properties that are more applicable to their cultures to describe the visual world. I predict also that many of their color terms will be found to be derived from other things, such as objects of the color in question or degree of lightness, reflectability, visibility, etc. The prediction then is that the languages fall into relatively low stages according to Berlin and Kay's model of color stages. If color is not the most salient property for describing the visual world in these languages, it would perhaps indicate that Berlin and Kay's definition of what constitutes a basic color term should be expanded or revised to reflect the properties of more of the world's languages, taking into account terms of other methods of visual description, or that the concept of the basic color term is not sufficiently universal as a way to compare languages.

2. Color Term Trends in Pama-Nyungan Languages

There are 31 subgroups in the Pama-Nyungan language family: Arandic, Bandjaliangic, Central NSW, Djirbalic, Durubalic, E. Vic, Gumbaynggirr, Kalka'c, Kanyara, Karnic, Kartu, Kulin, Mantharta, Maric, Mayi, L. Murray, Muruwari, Ngayarta, Ngumpin-Yapa, Nyungar, Paakintyi, Paman, Thura-Yura, Waka-Kabi, Warlu'c, Warumungu, Wati, WTS, Yardli, Yolngu and Yuin-Kuri. A map of these subgroups is shown in Figure 5.

Figure 5: map of Pama-Nyungan subgroups

2.1 Problems with determining range/focal point

One of the main difficulties in determining the type and number of color terms in the languages in this family is that all the definitions provided in word lists and dictionaries are translations; and as with all translations, there is room for error. This problem is especially important when dealing with color terms, because everyone describes and perceives colors slightly differently, and the range or scope of each color term varies between languages and among speakers of the same languages. There is no focal point data available for the colors denoted by the color terms in these languages, and so it is impossible to say exactly how broad a range of colors is encompassed by a color term, or how closely related the colors are to the colors denoted by their English words.

For the purposes of this paper, color categories are in capital letters; this is done to avoid confusion with the English color words. Color categories cannot be assumed to correspond to the English color terms; they are broad categories, which include but may not be limited to the colors represented by the English words. As stated above, because we are using translations, we can never be sure of the scope of a color category, or of its focal point.

In this paper, a word that is translated as a color in its word list is taken to refer to that color category. For example, if a term is translated as “blue” in its word list, it is considered a term for the color category BLUE. A word that is translated as more than one color in its word list is counted as a term for the color category that takes precedence in the order of acquisition of color terms, but is understood to refer to both color categories. Therefore, a language that has a term defined as both “black” and “blue”, a term defined as “white” and a term defined as “red” is taken to have terms for the color categories BLACK, WHITE and RED, but the term for BLACK is indicated as also covering the color category BLUE.

2.2 Languages with one or fewer color terms

Out of the 207 Pama-Nyungan languages examined, 46 languages have zero recorded color terms. Languages that were found to have zero color terms can be assumed to be lacking recorded color term data, as opposed to lacking color terms. It is very unlikely that color terms are absent altogether in these languages, and much more likely that color terms were simply not recorded. Many of these languages have very limited word lists, with few total words recorded, and thus it is not surprising that the word lists include few or no terms for colors.

Ten languages were found to have one color term. Out of those ten languages, six had a term for BLACK: Gumbaynggir, Kaanju, Pintupi, Yabula-Yabula, Yinwum and Western Arrarnte. This pattern is consistent with the normal order of color term acquisition, namely that if a language were to have only one color term that color term would denote the color category BLACK. It is generally assumed that languages do not have fewer than two color terms, BLACK and WHITE, which, in a two-color-term language, would correspond to [macro-black] and [macro-white] (where [macro-black] refers to cool colors and [macro-white] refers to warm colors). It is unusual, therefore, to find a language with only one color term. As stated previously, from the information available there is no means of ascertaining whether these languages have other color terms that were simply not recorded, and we should assume that they do. The fact that a term for BLACK is most commonly found in languages with only one color term could either be a result of the language having only one true color term, in which case it would logically be a term for BLACK, or a result of BLACK being the most basic and universal of the colors and therefore the most likely color to appear in a limited collection of words. It is worth noting the possibility that there exist languages with a single color term, but it is much more likely to assume that these languages have at least one other color term that was not recorded.

The other four languages, Ngadjuri, Kuuk Thaayorre, Margany and Gunya, each had a single term for WHITE: *wenda*, *mu:l*, *bunduny* and *budhabudha*, respectively. In the predicted order of color term acquisition WHITE immediately follows BLACK, so it makes sense for a language with only one color term that is not BLACK to have a term for WHITE. However, given that it is so unusual for a language not to have a word for BLACK, and for a language to have only one

color term, it is much more likely that these languages have at least two color terms, one for WHITE and one for BLACK, the latter of which was not recorded. These languages all have dictionaries with relatively few total words, which could explain the missing terms for BLACK.

Three of these ten one-color-term languages, Western Arrarnte, Margany and Gunya, have one additional word that at first glance appears to be a term for GREEN. The term in Western Arrarnte, *anke*, is glossed as "raw, green, unripe"; the term in Margany, *gurn.ga*, is glossed as "raw, green (of fruit)"; and the term in Gunya, also *gurn.ga*, is glossed as "green, raw, of fruit". Words for GREEN in languages with more color terms are also sometimes defined as "alive" or "unripe", or as something related to vegetation, and it is likely, as will be discussed later, that in this language family many of the words for GREEN are derived from words related to plants and growth. In the case of languages with very few color terms, however, given that GREEN is unlikely to appear before BLACK, WHITE and RED, and given that in these cases the terms for GREEN appear to mean 'green only in respect to unripe/living things', it is unlikely that they are true color terms. In the remainder of this paper, a term for GREEN will be discussed but not counted as a true color term if it is the only term in the language for GREEN and if the translation provided makes it clear that the term applies mainly if not exclusively to living things, i.e. plants and other vegetation. Therefore Western Arrarnte, Margany and Gunya can be said to have only one recorded color term.

2.3 Languages with two color terms

Out of the 24 Pama-Nyungan languages with two recorded color terms, 14 have terms only for BLACK and WHITE, the first two color terms predicted to be found in any given language. A map of the languages with the most common pattern of terms (BLACK and WHITE) is shown in Figure 6. The languages with this pattern are spread out across the continent, although there is a significant group clustered in the northeastern tip (the area of the Paman subgroup). Two of these 14 languages also have terms for GREEN, but given that their definitions make it very likely that they refer exclusively to plants, they are not considered true color terms. An example of a typical two-color-term language is Darkinyung, from the Yuin-Kuri subgroup. It has two

terms for BLACK, *naru* and *mining*, the latter of which is also translated as “night/dark”; and a term for WHITE, *barag*, which is also translated as “white paint”. These 24 two-color-term languages have at most two different terms for a color, and predominantly have only one term for each color (3 colors out of 46 have two different terms for a color). As in Darkinyung, several of the terms for BLACK have additional meanings of “dark” or “night”, a trend that appears throughout the language family and will be discussed further in chapter 3. Two of the terms for WHITE are also translated as “white paint/ochre”, another trend that will be discussed in chapter 3. There were other secondary meanings for some of the color terms, but they have no relation to one another or any apparent connection to the color, and can be assumed to be homographs or isolated instances of one term being derived from the other.

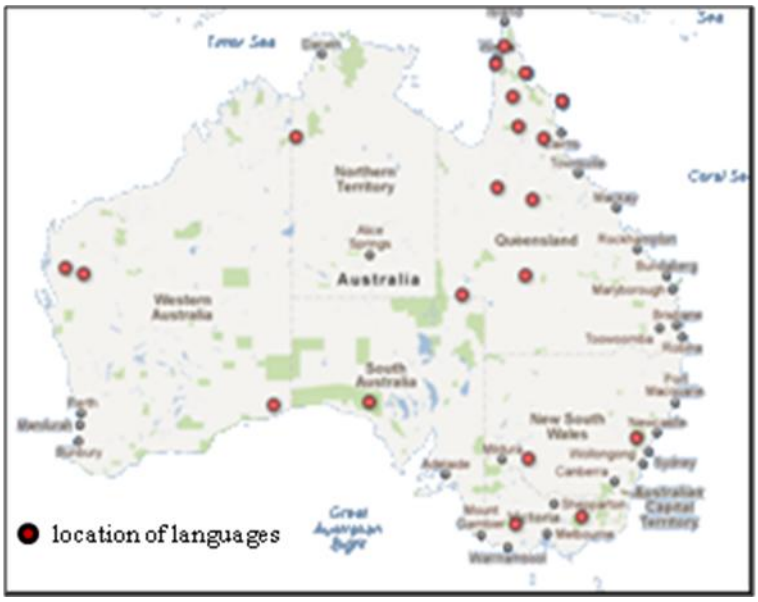

Figure 6: map of two-color-term languages with the pattern BLACK, WHITE

Of the other 10 languages with two color terms, six have terms for BLACK and RED. In Dhudhuroa, a Gippsland language, BLACK is *dhayugilu* and RED is *ngaya*. RED is the color predicted to appear third in the sequence of color terms, following BLACK and WHITE, and it is thus logical that of the possible color terms that could appear in a language with only two color terms, BLACK and RED is the second most frequent combination after BLACK and WHITE. However, given the relatively short wordlists for these languages, and the fact that it is unlikely that a term for RED would appear before a term for WHITE, it is likely that these languages

actually have three (or more) color terms, and that terms for WHITE exist but were not recorded in these languages. Two of the remaining four languages have terms for WHITE and RED. Given that a term for BLACK almost always appears before a term for any other color, these languages probably have a term for BLACK that was not recorded, meaning that they are probably languages with three or more color terms. The two most unusual combinations occur in Tjapwurrung, a Kulin language, which has terms for BLACK and BLUE; and in Pirriya, a Karnic language, which has terms for RED and GREY. The pattern in Tjapwurrung is unusual in that BLUE is generally found only if a number of other colors are also found, including WHITE, RED, GREEN and YELLOW, as will be seen later in this chapter. BLUE in languages in this family is also sometimes included in the scope of the term for BLACK, especially if a language has few color terms, and it is thus unusual that there are separate terms for BLUE and BLACK and that they are the only two color terms recorded in the language. The pattern in Pirriya is also unusual in that neither BLACK nor WHITE is found, and because a term for GREY is generally found only in languages that contain at least four or five color terms. Neither Tjapwurrung nor Pirriya is a particular well-recorded language, so the odd patterns are probably a result of gaps in the data rather than truly unusual orders of acquisition of color terms. These two languages most likely have several other color terms that were not recorded, and are probably examples of languages with four or five color terms as opposed to two.

A chart of the distribution of languages according to color term pattern is shown in Figure 7, and a chart of the number of occurrences of each color term in the two-color-term languages is shown in Figure 8.

Color term pattern	Number of languages
BLACK, WHITE	14
BLACK, RED	6
WHITE, RED	2
BLACK, BLUE	1
RED, GREY	1

Figure 7: distribution of languages according to color term pattern

Color term	Number of occurrences
Black	21
White	16
Red	9
Grey	1
Blue	1

Figure 8: number of occurrences of color terms in two-color-term languages

2.4 Languages with three color terms

The most common pattern found in languages with three color terms is terms for BLACK, WHITE and RED. Out of the 34 Pama-Nyungan languages with three color terms, 28 have terms for BLACK, WHITE and RED. It appears from these data that BLACK, WHITE and RED are the first three color terms to appear in the languages in this family. A map of the 28 languages with the most common pattern of color terms (BLACK, WHITE and RED) is show in Figure 9. The languages are spread out over the continent, but there are several clusters, most notably the cluster on the Eastern coast of the continent in the area of the Waka-Kabi subgroup. Duuŋidjawu, a Waka-Kabi language, is a typical example of this pattern of color terms: the term for BLACK is *miyarr*, which is also translated as “charcoal”; the term for WHITE is *muranjŋa*, related to the term for “white ochre”; and the term for RED is *guyiŋ*, which is identical to the term for “red ochre”.

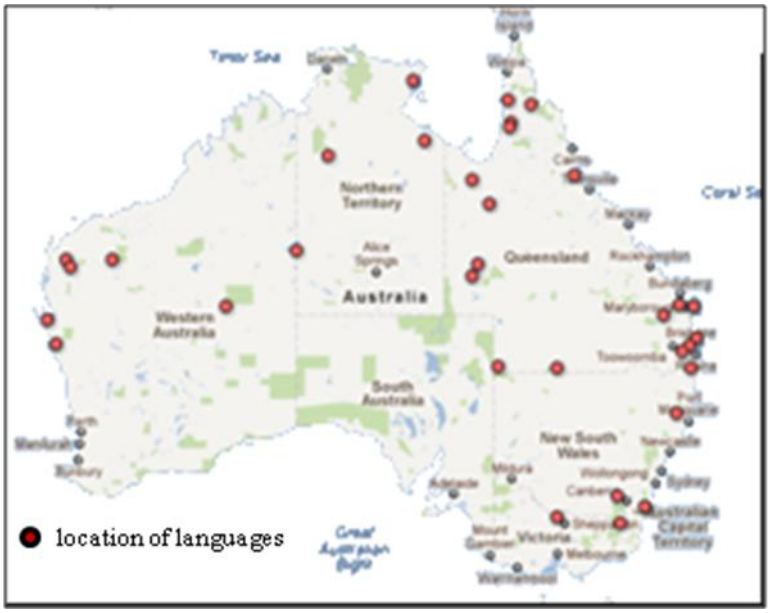

Figure 9: distribution of three-color-term languages of the pattern BLACK, WHITE, RED

Out of the six remaining three-color-term languages, Pitta-Pitta and Bilinarra have terms for BLACK, WHITE and GREEN; Iyora and Nhirrpi have terms for BLACK, RED and GREEN; Batyala has terms for BLACK, RED and GREY; and Warrgamay has terms for BLACK, WHITE and GREY. The fact that four out of the seven three-color-term languages with deviant patterns have a term for GREEN as their third color term suggests that GREEN should be considered as a candidate for the fourth-appearing color term, after BLACK, WHITE and RED. In these cases, the terms for GREEN are glossed simply as "green" and are not on the surface derived from words for plants or living, unripe things. Three other languages in this group had a fourth term for GREEN, but in each case the term was glossed as a combination of "alive", "unripe" and "raw", and the terms were thus discounted as true color terms, as they presumably refer only to green vegetation. Ngaanyatjarra, a Wati language, had two terms for GREEN, of which *kana* was glossed as "green, alive, unripe" and *yukiri* was simply "green"; therefore this language was counted as having a term for GREEN. Ngaanyatjarra also had a fourth possible color term, a word for WHITE (*pirntalpa*), but it also defined as "non-Aboriginal", and so was assumed to refer exclusively to skin color and was not counted as a generic color term.

It is hard to know what the scope of each color term is in each language, and it can vary substantially between languages, as will be seen later in this chapter. In Pitta-Pitta, a Karnic

language, the term for BLACK is glossed as “black, blue”. It is counted here as BLACK, but it is important to note that the term encompasses a wider range of colors than does the English world ‘black’—the color category should be thought of as [macro black], which in this case includes BLUE. In Ritharrngu, a Yolŋu language, the term counted as RED is glossed as “brownish, dull red”, indicating that the scope of RED here is broader than the color denoted by the English word ‘red’, or that the color has a different focal point than the color referred to by the English word ‘red’.

It is perhaps worth noting at this point that in languages with up to three color terms, the only colors that have appeared are BLACK, WHITE, RED, GREEN and GREY, in descending order of frequency. Terms for YELLOW, BLUE, BROWN, PINK, PURPLE and ORANGE, therefore, do not occur in this family in languages with three or fewer color terms. A chart of the distribution of languages with various patterns of color terms is shown in Figure 10, and a chart of the number occurrences of each color term in this group of languages is shown in Figure 11.

Color term pattern	Number of languages
BLACK, WHITE, RED	28
BLACK, RED, GREEN	2
BLACK, WHITE, GREEN	2
BLACK, RED, GREY	1
BLACK, WHITE, GREY	1

Figure 10: distribution of languages according to color term pattern

Color term	Number of occurrences
Black	34
White	31
Red	31
Green	4
Grey	2

Figure 11: number of occurrences of color terms in three-color-term languages

2.5 Languages with four color terms

There are 22 languages with four color terms, of which 11 have terms for BLACK, WHITE, RED and GREEN; five have terms for BLACK, WHITE, RED and YELLOW; and two have terms for BLACK, WHITE, RED and BROWN. A map of the languages with the most common pattern of color terms (BLACK, WHITE, RED and GREEN) is shown in Figure 12; the languages are spread out over the continent, and there are no real clusters. Of the remaining four languages with this pattern, Yir-Yoront, a Paman language, has terms for BLACK, WHITE, RED and GREY*;* Kurrama, a Ngayarta language, has terms for BLACK, WHITE, GREEN and GREY; Ngatjumaya, a Mirniny language, has terms for BLACK, RED, GREEN and BLUE*;* and Yawarrawarrka, a Karnic language, has terms for WHITE, RED, YELLOW and GREEN. A chart of the most common patterns is shown in Figure 13, and a chart of the number of occurrences of each color term in this group of languages is shown in Figure 14. Based on these data, a very preliminary order of color term acquisition could be proposed to be the following: BLACK, WHITE, RED, GREEN, YELLOW. (Given that only one or two languages have terms for GREY and BLUE, they cannot yet be counted in the order.) This order corresponds to the basic order proposed in Berlin and Kay (1969): BLACK, WHITE, RED, GREEN and YELLOW were the first five color terms they predicted would appear in the world's languages, and subsequent revisions allow those color terms as a possibility for the first five color terms to appear. One difference is that GREEN seems to precede YELLOW here, while in Berlin and Kay's order GREEN and YELLOW appear at the same time (meaning that either one could appear with equal probability as the fourth term in a four-color-term language).

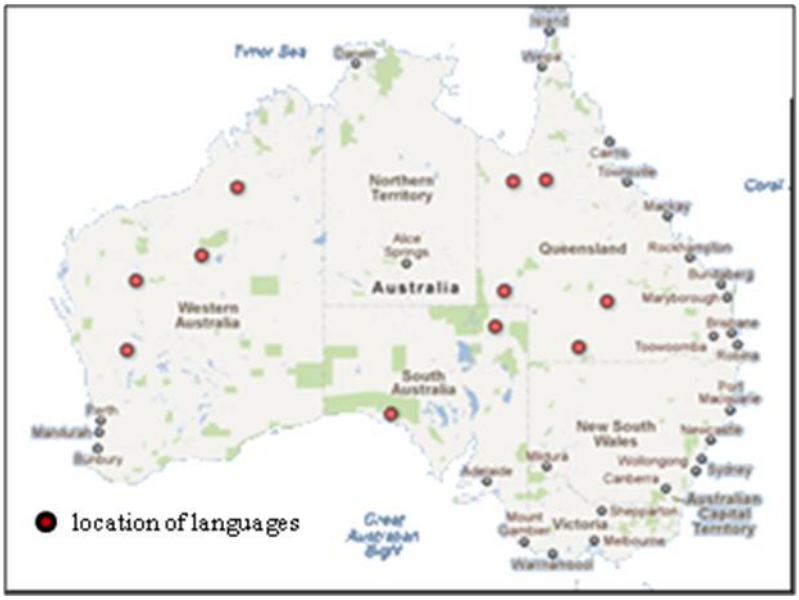

Figure 12: distribution of four-color-term languages of the pattern BLACK, WHITE, RED, GREEN

Color term pattern	Number of languages
BLACK, WHITE, RED, GREEN	11
BLACK, WHITE, RED, YELLOW	5
BLACK, WHITE, RED, BROWN	2

Figure 13: distribution of languages according to most common color term patterns

Color term	Number of occurrences
Black	21
White	21
Red	20
Green	14
Yellow	6
Brown	2
Grey	2
Blue	1

Figure 14: number of occurrences of color terms in four-color term languages

A typical example of a four-color-term language is Mayi-Kulan, of the Mayi subgroup, which has terms for the most common pattern, BLACK, WHITE, RED and GREEN: *marrtjin*, *punamu*, *paRul* and *kiltjan*, respectively. None of these terms have alternate translations or are related on the surface to other words in the language.

Dharawal and Warungu had fifth terms for GREEN, *gudya* and *gun.ga*, but they were not counted as color terms because of their definitions of "raw" and "unripe". Two of the terms for GREEN that were counted as color terms had alternate meanings of "grass" and "foliage"; one had an alternate meaning of "wild bean"; one was noted as possibly being derived from "growing thing"; and one was glossed as "green, as colour of deep sea". The last of these, in Dhangu, was counted as a color term even though it involved a comparison to another entity because it does not refer exclusively to the sea, and can be used to describe unrelated objects of the same color as the sea. Similarly, in Wangkajunga (a Wati language), the term for BROWN is defined as "earth coloured", but was counted as a generic color term because it can refer to items that are the color of earth but are unrelated to the entity of earth. A further example of this phenomenon is the term for BLUE in Ngatjumaya, which is glossed "blue as sky", and is counted as BLUE despite the comparison to something else because the term can be used to refer to blue entities other than the sky. These definitions can be assumed to be the result of the dictionary writers attempting to provide more information about a color, and to give an idea of the focal point of the color by comparing it to an object of a known color.

The range of colors varies quite a bit in this group. In most of the languages it is impossible to know the range of a color term, but in several cases a range is indicated by the definition given. A number of the terms for BLACK are also translated as "dark", just as a number of the terms for WHITE are also translated as "light" or "bright", a phenomenon that will be discussed further in chapter 3. In Dhangu, the term for BLACK has a number of definitions, one of which was "black, brown", indicating that the color extends further than the English boundaries of the color 'black', or that the term refers to a color of a different focal point than that of the term 'black' in English. Yir-Yoront has two terms for WHITE, *larrl* and *partl*, and a separate term for RED, *kolvlh*, the translation of which is "reddish, whitish red". The translation provided indicates that the color represented is probably lighter or pinker than the color denoted by the English word 'red'. The word for RED in Wangkajunga, *yarralypa*, is defined as "red, orange colour" (and also means "wine"). Dharawal, from the Yuin-Kuri subgroup, has two words for RED, *ŋuruŋ-ŋuruŋ* and *gubar*, the latter of which is also translated as "yellow". In that case, it is unclear exactly what colors are represented by each term, but it can be assumed that the two terms represent two distinct colors or ranges of colors. Thus the terms are counted as referring to colors in two distinct color categories, namely, RED and YELLOW. Similarly, Warungu, a Maric language, has three different terms for YELLOW, one of which is also translated as "red" (*jalngarri*). *Jalngarri* was counted as RED, because there are two other terms that are defined only as "yellow", but the color probably encompasses a wider range of colors than does the English word 'red', and should be considered [macro-red]. Dhangu also has a term, *rduŋgul*, that is defined as "light tan, reddish, yellowish" and also means "dusty area"; the term was counted as RED, but appears to have a much broader scope than does the English word 'red', and can also be thought of as [macro-red]. The word for BROWN in the Kanyara-Mantharta language Thalanyji, *pintha-bintha*, is also defined as "tan", which probably means that the term refers either to a light shade of BROWN or a range of colors.

It should be noted that the term for YELLOW in Gunggari, a Maric language, is *yala*, which appears to be a loan from English. It is counted as a color term, because its origin as a foreign word is less important than the fact that it was incorporated into Gunggari as the word for YELLOW, but it is worth mentioning that it is a loan word (especially in light of the fact that Berlin and Kay generally discounted loan words in their study of color terms).

2.6 Languages with five color terms

There are a total of 26 languages with five color terms, the most common pattern being BLACK, WHITE, RED, GREEN and YELLOW; 14 out of the 26 languages follow that pattern (though for two of the language, the word for GREEN is also translated as “blue”). A map of the languages with the most common pattern of color terms is shown in Figure 15; they are spread throughout the continent, except for two pairs of closely grouped languages that belong to the same subgroups. An example of a language of this pattern is Kariyarra, from the Ngayarta subgroup: there are two terms for BLACK, *warru* and *warruwarru*, the latter of which is a reduplication of the former and which is also translated as “dark”; there are two terms for WHITE, *jilpajilpa* and *mirtamirta*, the former of which is a reduplicated form of the term for “white paint”; RED is *martamarta*, a reduplicated form of the term for “red ochre”; GREEN is *barlarra*; and YELLOW is *bilyarrbilyarr*.

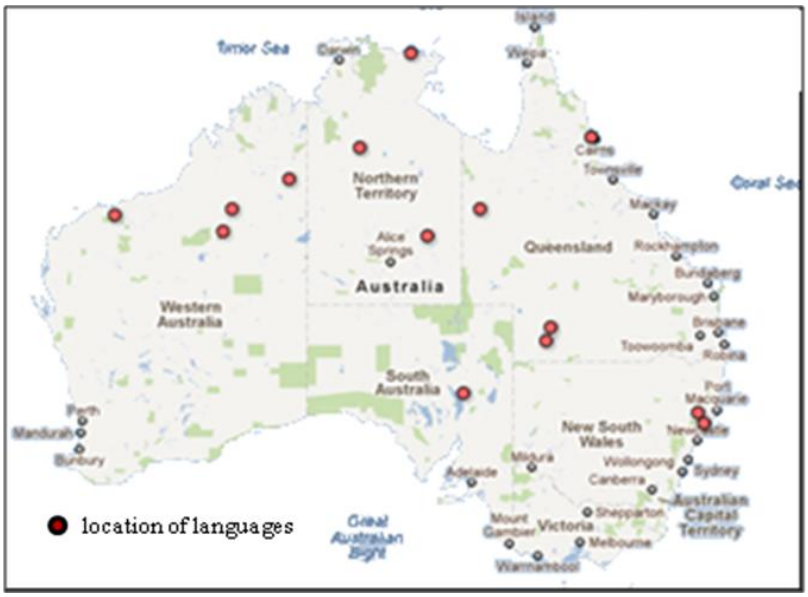

Figure 15: distribution of five-color-term languages of the pattern BLACK, WHITE, RED, GREEN, YELLOW

The other 12 languages have very little overlap in terms of the exact five color terms found. Out of the 26 languages, all 26 have a term for BLACK; 25 have a term for WHITE; 22 have a term for RED; 21 have a term for GREEN (four of which are also translated as “blue”); 21 have a term for YELLOW (one of which is also translated as “orange”); seven have a term for GREY

(one of which is also translated as “brown” one as “pink”); six have a term for BLUE (in addition to the four terms that are also translated as “green”); and three have a term for BROWN (in addition to the term that is also translated as “grey”). A chart of the number of occurrences of each color term in this group of languages is shown in Figure 16. From this data in combination with the data from the four-color-term languages, we could posit an order of the appearance of color terms as follows: BLACK, WHITE, RED, GREEN, YELLOW, GREY, BLUE, BROWN. (Given that ORANGE and PINK only appear once, they cannot yet be included.) This order deviates from the order proposed in Berlin and Kay and their revisions in that GREY and BROWN are thought to be secondary color categories, appearing significantly after BLUE. In this case, GREY appears roughly the same number of times as BLUE, and several more times than BROWN, indicating that GREY should come at roughly the same time as BLUE and before BROWN in an evolutionary order of acquisition.

Color term	Number of occurrences
Black	26
White	25
Red	22
Green	21
Yellow	21
Grey	7
Blue	6
Brown	3

Figure 16: number of occurrences of color terms in five-color-term languages

There are a number of interesting points to be made about the scope of color terms in this group of languages. *Punther*, the term for BLACK in Kukatj (a Paman language) is also translated as “brown” and “dark grey”, indicating that the word has a broader range than the English word ‘black’. In two of the languages, the word for WHITE is also translated as “grey”, which indicates that terms for WHITE in these languages may include other light colors that are not included in the scope of the English word ‘white’. As mentioned previously, three of these languages have a term that is translated as both “green” and “blue”, suggesting either that these

languages have a term for a blue-green color, or, more likely, that they have one term that can refer to both BLUE and GREEN. Berlin and Kay called this color category GRUE, because the languages they studied so often had terms that could mean both "green" and "blue". The pattern is less prevalent in this language family than would be suggested by Berlin and Kay's data, and given how many more appearances of terms for GREEN there are in this family than terms for BLUE, these terms are considered here to be terms for GREEN, with the understanding that a few of them also cover BLUE. Djinang is counted as having a term for BLUE, although the term is technically a phrase, *marri dyayarl mulŋi*. BLUE is included in the count of color terms in Djinang even though the phrase is not technically a term, because it is still a specific way of expressing the concept of BLUE and thus fills the same role as a color term.

An interesting example of the range of a color term is found in Payungu, a Kanyara-Mantharta language, which has a word (*piyarlji*) that is translated as "grey and pink". It is not clear what kinds of colors the term refers to—on the one hand, there are a number of colors in between GREY and PINK, making it unlikely that the term refers to any color on the spectrum between GREY and PINK; on the other hand, it would be unusual to have one term to describe two distinct colors, especially colors as dissimilar as GREY and PINK. Bidjara-Gungabula, a Maric language, has two different terms are translated as both "grey" and "brown"; the languages is counted as having a term for GREY, but the term also covers BROWN. Djinang, a Yolŋu language, has a term is translated as both "yellow" and "orange", indicating a wider range than either color term in English would suggest, perhaps encompassing all bright hues. Yan-nhangu, also a Yolŋu language, has what could potentially be considered a sixth color term: *bulay*, which is defined as "golden". It is not counted here as a true color term because GOLD is not one of the 11 color categories that Berlin and Kay and subsequent researchers deemed 'basic'. As noted earlier, one of the problems with using translations is that there is no way of knowing what focal point a term denotes; while the term was translated as "golden", it might in fact refer to a bright yellow or other similar color, in which case it should be treated as a term for YELLOW. It is impossible to know one way or the other, however, and for these purposes it is not counted as a color term.

2.7 Languages with six color terms

There are 25 languages in this family with six color terms, the most common pattern of which is terms for the following: BLACK, WHITE, RED, GREEN, YELLOW and GREY, a pattern shared by nine out of the 25 languages. A map of the languages that follow the most common pattern of color terms is shown in Figure 17; there are no clusters of interest. A typical example of a language in this family is Bularnu, a Warluwaric language, which has the following color terms: there are two terms for BLACK, *bupugabupuga* and *wanmayini*; WHITE is *burna*; RED is *yalathalatha*; GREEN is *yuwaliwali*; YELLOW is *gudhuludhulu*, which is a reduplicated form of the word for "yellow ochre"; and GREY is *nyudurru*.

Figure 17: distribution of six-color-term languages with BLACK, WHITE, RED, GREEN, YELLOW, GREY

The other six-color-term languages fall into a variety of other patterns involving those six colors along with BROWN, BLUE and, in two cases, ORANGE. After the pattern above, none of the other patterns were shared by more than three languages, and so do not represent meaningful combinations of color terms. Out of the 25 languages, 25 have a term for BLACK (one of which is also translated as "blue" and one as "brown"), WHITE and RED; 23 have a term for GREEN (one of which is also translated as "blue"); 18 have a term for YELLOW (one of which is also

translated as “purple”); 15 have a term for GREY; eight have a term for BLUE (in addition to the terms that are also translated as “black” and “green”); nine have a term for BROWN (in addition to the term that is also translated as “black”); two have a term for ORANGE; and one has a term for PURPLE (which is also translated as “yellow”). A chart of the number of occurrences of each color term in this group of languages is given in Figure 18. The order of color term acquisition proposed in 2.5 is supported by the data found for six-color-term languages, and is as follows: BLACK, WHITE, RED, GREEN, YELLOW, GREY, BLUE, BROWN. In this set of languages, GREY appears almost twice as many times as both BLUE and BROWN, indicating that it should come before BLUE and BROWN in the order of acquisition of color terms, contrary to the orders proposed in Berlin and Kay and subsequent revisions. Given that PURPLE and ORANGE appear only once and twice respectively, they should not yet be included in the proposed order, though it is clear that they appear after the eight color terms mentioned above.

Color term	Number of occurrences
Black	25
White	25
Red	25
Green	23
Yellow	18
Grey	15
Brown	9
Blue	8
Orange	2
Purple	1

Figure 18: number of occurrences of color terms in six-color-term languages

There are a number of points to be made about the scope of color terms in this set of languages. Biri, a Maric language, has two terms for BLACK, both of which also cover BLUE. Gangulu, a Maric language, has two terms for BLACK, one of which also covers BLUE; Gangulu is counted as having terms for both BLACK and BLUE, because the two terms clearly refer to different

colors, one of which is BLACK and one of which encompasses both colors. Yandruwandha, a Karnic language, has one term that covers both BLACK and BROWN, indicating that the term can refer to either of those two colors, and possibly any dark color. Terms that cover both BLACK and BLUE, or BLACK and BROWN, can be thought of as [macro-black] because they encompass cool colors.

Kurtjar, a Paman language, has at least five different terms for WHITE, and one for GREY, and another word that is glossed as "whitish, greyish". Kurtjar is counted as having terms for both WHITE and GREY, but there is no way within the confines of a list of color terms to capture either the fact that the language has so many terms for WHITE, or that there is an additional word that covers both WHITE and GREY (possibly a [macro-white] color).

Ngarrindjeri, a Lower Murray language, has three terms for RED, one of which is glossed as "orange shade of red". Ngarrindjeri is counted as having a term for RED and a term for ORANGE, even though the latter term is translated as a type of red, because it appears to refer to a more orange color than is denoted by the other terms for RED. Githabul, a Bandjalangic language, has a term for RED that is glossed as "orange-red", and another term for ORANGE that is glossed as "light orange colour". The two terms clearly refer to different colors (the first referring to the category RED and the second to the category ORANGE), though the focal points of these colors may not correspond to the focal points of the colors denoted by the English terms "red" and "orange".

Diyari, a Karnic language, has three terms for GREEN, one of which is also translated as "yellow". Diyari was counted as having terms for both GREEN and YELLOW, because presumably the term that is translated as both "green" and "yellow" refers to a different color or range or colors than the terms that are translated simply as "green". Similarly, Yalarnnga, a Kalkatungic language, has two terms for YELLOW, one of which is glossed as "yellow, green", and Yalarnnga is thus counted as having terms for both YELLOW and GREEN. Wathawurrung, a Kulin language, has one term for GREEN and two for BLUE, in addition to one that is translated as both "green" and "blue". Arabana-Wangkangurru, a Karnic language, has quite a bit of overlap in its terms: there is one term for YELLOW, one term for RED, and

one term that is translated as both “yellow” and “red”; and one term for BLUE, one for GREEN, and one that is translated as both “blue” and “green”. Ngayawang, another Lower Murray language, has one term that is translated as both “green” and “blue”, as does Golpa, a Yolŋu language; in both of these cases, the color is counted as GREEN, because GREEN takes precedence over BLUE in the sequence of colors, but it would fall into the category of GRUE if that category were being used. As mentioned previously, Warluwarra, of the Warluwaric subgroup, has a term for YELLOW that was translated once as “purple”, a phenomenon that seems counterintuitive, at least from the perspective of how English speakers think about color, given how far from each other YELLOW and PURPLE are on the color spectrum, and given that the former is a warm color and the latter a cool color. Kaurna, a Thura-Yura language, has three terms for RED, *karrokarro*, *purnkipurnki* and *taltarni*, of which the second is translated “reddish” and the third is translated “yellow-red”; Kaurna also has a separate term for YELLOW, *wirranniranna*. Kaurna clearly has one term for each RED and YELLOW, but it is less clear what colors the terms translated as “reddish” and “yellow-red” refer to, and whether *taltarni* could be counted as a third color term for ORANGE (a mixture of RED and YELLOW).

Ngayawang has a term for BROWN, *kaintyarru*, which is glossed as “a beautiful shade of brown”. The term clearly refers to a specific kind of BROWN, but is counted as the generic term for BROWN because the language does not have any other recorded terms for the color. Two other languages, Golpa and Walmajarri, also have unusual definitions for BROWN: the former is glossed as “brown as something that’s dead”, and the latter is glossed as “colour of earth”. They were both included as terms for BROWN, even though they involve comparisons to other entities, because it appears that they can be used to refer to any object of the color BROWN, and not just the things they are compared to. In Karajarri, a Marrngu language, the term for GREY is glossed as “blueish-grey”. In this case, given the specificity of the description, it seems likely that the term refers to, if not one specific color, a relatively narrow range of colors. Kaurna has two terms for BROWN, *purnkipurnki* and *wirranniranna*, the first of which is defined as “reddish, brownish, not quite black” and the second of which is defined as “yellow brown”. Given that Kaurna has other terms for both RED and YELLOW, these two terms are counted as BROWN, though that classification is not perfect because the two terms seem to refer to two different colors, which have elements of RED, BLACK, and YELLOW.

Two of the languages in this group, Githabul and Arabana-Wangkangurru, have terms for GOLD in addition to the six recorded color terms. As mentioned in 2.6 for Yan-nhangu, terms for GOLD are not counted as 'basic color terms', according to the accepted criteria. In these cases, too, there is no way of knowing whether the definition "gold" refers to the color or to the substance, and thus even if we were to accept GOLD as a basic color category these terms would still be questionable as color terms.

2.8 Languages with more than six color terms

There is a significant drop-off after six color terms: nine languages have seven color terms; nine languages have eight color terms; and two languages appear to have nine (or, in the case of one, possibly ten) color terms. A map of all the languages with more than six color terms is shown in Figure 19.

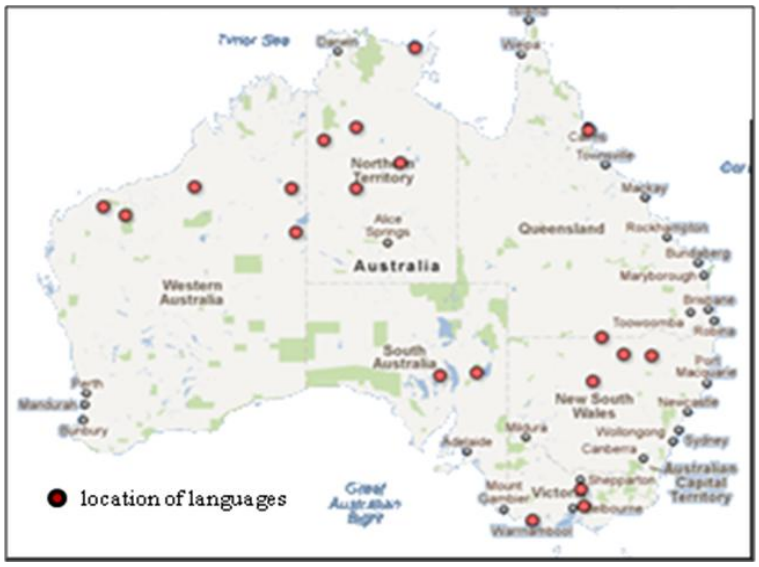

Figure 19: distribution of languages with more than six color terms

The languages with seven color terms do not fall into one overwhelming pattern of terms. Three have terms for BLACK, WHITE, RED, GREEN, YELLOW, BLUE and BROWN; three have terms for BLACK, WHITE, RED, GREEN, YELLOW, BROWN and GREY; two have terms for BLACK, WHITE, RED, GREEN, YELLOW, BLUE and GREY; and one has terms for BLACK,

WHITE, RED, GREEN, BLUE, BROWN and GREY. All nine languages have terms for BLACK, WHITE, RED and GREEN; eight have terms for YELLOW; seven have terms for BROWN (though several of them also cover BLACK); six have terms for BLUE (though most of them also cover GREEN); and six have terms for GREY. No other colors appear in this set of languages. A chart of the number of occurrences of each color is shown in Figure 20. The order of color terms from previous sections is roughly supported by these data, except that GREY, which occurred almost twice as many times as either BLUE or BROWN in the six-color-term languages, now appears with roughly the same frequency as the other two. It is thus not clear in what order GREY, BLUE and BROWN should be placed, but they should certainly be considered as a group of colors that appear at roughly the same place in an evolutionary order, contrary to the order posited in Berlin and Kay and revisions, which places BLUE before BROWN in the hierarchy and places both BLUE and BROWN before GREY.

Color term	Number of occurrences
Black	9
White	9
Red	9
Green	9
Yellow	8
Brown	7
Blue	7
Grey	6

Figure 20: number of occurrences of color terms in seven-color-term languages

A typical example of a seven-color-term language is Warrnambool, a Kulin language, in which *miyn* is a term for BLACK*; ngapkuyitj* and *tanditj* are terms for WHITE; *kiri-kiri*, *kiri-kiri-kanditj*, *lipitj*, *patkotj*, *tiritj* and *wuruwitj* are terms for RED; *kumakun ngur* and *kumang* are terms for GREEN; *punda* is a term for YELLOW; *miynkaa*, *ngumpritj* and *wulok* are terms for BLUE; and napipi and *napkuyitj* are terms for GREY.

There is a significant amount of overlap in the color terms in this group of languages. Yindjibarndi and Ngarluma, both from the Ngayarta subgroup, have more than one term for BLACK, one of which also covers BROWN (in the case of Ngarluma, the term is glossed as "black-brown"). Ngarluma also has one term that is translated as "red", "brown" and "gold", *martamarta*. Given that Ngarluma already has a term for BROWN, *purlpurl* (glossed as "black-brown"), *martamarta* is counted as a term for RED, but it can clearly refer to a fairly wide range of colors. In Ngarluma, *mirdamirda* is glossed as "white, light grey", and *barragura* is glossed as "grey, tan". These two terms are counted as terms for WHITE and GREY, respectively, but the former seems to refer to a light color in the white-grey family, or maybe just [macro white], while the latter seems to refer either to both GREY and TAN, or possibly any color in the range of either of those colors.

Ngiyambaa has a term for YELLOW and a term for RED, and a term that is translated as both "red" and "yellow". Yidiny has four terms for YELLOW, one of which is also translated as "brown, smoky colour", and thus is counted as a term for BROWN, though the term clearly has a wider scope than the color denoted by the world 'brown' in English.

Several of the languages have more than one term for GREEN, one of which also covers BLUE. Yidiny has two different terms that cover both GREEN and BLUE, probably indicating, as in other instances of this phenomenon, that both terms refer to one particular color or group of colors, be it a specific color that combines GREEN and BLUE or the range of colors in between (the GRUE category). Ngiyambaa, a Central NSW language, has one term for GREEN and one for BLUE, and one term that covers both GREEN and BLUE.

Three of these languages also have terms for GOLD, none of which are counted as color terms for these purposes. In all three of these cases, the terms definitely refer to the color, as opposed to the substance, because one of the terms is also translated as "yellow" and two are also translated as "red". The fact that these terms are also translated as "gold" indicates that the scope of the colors denoted by these terms extends beyond the scope of the colors denoted by the terms 'yellow' and 'red' in English, to include the color GOLD.

Of the languages with eight color terms, all nine have terms for BLACK, WHITE, RED, GREEN and YELLOW; eight have terms for GREY and BLUE; six have terms for BROWN; two have terms for ORANGE; two have terms for PINK; and one has a term for PURPLE. A chart of the occurrences of the color terms in this group of languages is shown in Figure 21.

Color term	Number of occurrences
Black	9
White	9
Red	9
Green	9
Yellow	9
Blue	8
Grey	8
Brown	6
Orange	2
Pink	2
Purple	1

Figure 21: number of occurrences of color terms in eight-color-term languages

There is a great deal of overlap among the color terms of this set of languages, significantly more than in any other group of languages discussed so far. In three of the languages with more than one term for BLACK, one of the terms also covers BROWN: in the Marrngu language Nyangumarta, *kalarru*, one of four terms for BLACK, is also translated "dark colour (black or brown)"; in the Warumungic language Warumungu, *maru*, one of the two terms for BLACK, is also translated as "dark brown"; and in the Yolŋu language Dhuwal, *gurrŋan*, one of four terms for BLACK, is glossed, "black, brown, dark".

There is also a significant amount of overlap and expansive range in the terms for WHITE, a phenomenon that hasn't appeared in most of the languages examined so far. Gurindji, a Ngumpin-Yapa language, has four terms for WHITE, one of which (*tiyatiya*) is glossed as "white, white or red". The fact that the term is defined this way suggests that there may be one

color that corresponds to the color denoted by the English word ‘white’, WHITE, and one color that is more of a grouping of warm colors, or [macro-white]. Wemba-Wemba, a Kulin language, appears to have three terms for WHITE, one of which, *pilerrmatang*, is also defined as “light colored, yellowish”, also representing a broader range of colors than what is encompassed by the English term ‘white’, and possibly also suggesting that it refers to [macro-white]. This definition also points to the tendency for these languages to use brightness, alongside color, as a way of describing the visual world, as will be discussed in chapter 3.

Several of the terms for RED in this set of languages have interesting definitions and broader ranges than the English word ‘red’. In the Wati language Kukatja, one of four words for RED is defined as “bright red”, pointing to the idea of using brightness as an alternative to color to describe objects. Gurindji has one term for RED and one term that means “any colour, including red”, which sounds like a term to describe anything that has a particular color. Dhuwal has a term (*ratjpa*) that is glossed as “reddish, purple”; the term is counted as a term for RED, but it also covers PURPLE. The term may refer to a very specific color in the red/purple family, or may simply refer to [macro-red]. Parnkala, a Thura-Yura language, has two terms for RED, one of which is glossed as “reddish”.

Parnkala also has two terms for YELLOW, one of which (*palkurru*) is glossed as “yellowish”. Gurindji has two terms for YELLOW, one of which (*kuntarrikuntarri*) is glossed as “bright yellow” and is also translated as “orange”. In Dhuwal, *rduŋgul* is defined as “light tan, reddish, yellowish”; given that Dhuwal already has a term for RED (*ratjpa*, glossed as “reddish, purplish”) and that TAN is not a basic color term, the term is counted as YELLOW, though it clearly applies to a much broader range of colors that the term ‘yellow’ does in English, or maybe to [macro-red], which could encompass YELLOW and TAN in addition to RED. In Wemba-Wemba, *tharrətang* is translated as “white, shiny white”, which again uses the quality of brightness to help describe a color. Adnyamathanha, a Thura-Yura language, has two terms for YELLOW, one of which also covers BROWN.

Terms for BLUE and GREEN overlap in a few of the languages in this set, as they do in previous sets, again pointing to the utility of the GRUE category. Wemba-Wemba has one term for

BLUE and one term that is glossed as "blue, green", and the language is thus counted as having terms both for BLUE and for GREEN (the latter term could be considered GRUE if we consider that a real color category, though the category of GRUE is generally used to describe languages that do not have separate terms for either GREEN or BLUE.) Gurindji and Dhuwal each have more than one term for GREEN, one of which also covers BLUE, and both languages are thus counted as having terms for both GREEN and BLUE. One of the other terms for GREEN in Dhuwal, *dhulmu*, is glossed as "as the colour of deep sea", another instance of using comparison to an entity of a known color to form a color term. In Parnkala, the term for BLUE, *karrenyerenye*, is also translated as "purple", indicating that the term has a broader range of meaning than either BLUE or PURPLE individually.

Several of the terms for BROWN and GREY have already been mentioned in the context of other colors, but two other languages have terms with interesting overlaps. One of two terms for BROWN in the Marrngu language Nyangumarta, *karntawarra*, is translated as "light brown or orange", indicating that the two terms for BROWN probably represent distinct colors. Wemba-Wemba has two terms for GREY, *pulətayil* and *puny-puny-warra-wil*, the latter of which also covers BROWN. Given that GREY and BROWN are not particularly closely related, *puny-puny-warra-wil* probably refers to cool colors, while *pulətayil* just means GREY. In Nyangumarta, there are two terms for GREY, one of which (*mirta*) is related to the term for WHITE and the other of which (*papakuna*) is defined as "blueish grey". The former probably indicates a lighter shade of GREY, or maybe [macro-white], while the latter probably indicates a specific bluish shade of GREY. Parnkala also has two terms for GREY, *paruparu* and *palkanyala*, of which the latter is also translated as "whitish", which probably means it should be thought of as [macro-white]. One of Dhuwal's two terms for GREY, *guray*, appears to be a loan word from English.

The terms for PURPLE and ORANGE have already been discussed, but two languages have terms for PINK that stand on their own. Muruwari has a term, *puthal*, which is glossed simply as "pink" and does not appear to be related to any other color. Kukatja has two different terms for PINK, *tili-tili* and *tjiilytjiily*(*pa*), the first of which is a reduplication of the word for RED (which makes sense given that PINK is in essence a lighter shade of RED), and the second of which is

glossed as “pinkish grey”. Given that Kukatja has the first term for PINK and has a separate term for GREY, it is likely that *tjiilytjiily*(*pa*) is simply a shade of pink/grey that has been assigned a specific name, similar to the many specific shades of colors named in English.

The two languages that appear to have nine (or ten) color terms are Warlpiri and Ngarinyman, both from the Ngumpin-Yapa subgroup. Both of these languages have a number of terms that are translated as more than one color, making it difficult to say exactly how many distinct basic color terms they have (it is possible that Warlpiri has ten different basic color terms).

Ngarinyman has terms for BLACK, WHITE, RED, GREEN, YELLOW, BLUE, BROWN, ORANGE and PINK. In Ngarinyman, one of the two terms for RED, *win.gilyang*, is also translated as “hot pink” or “orange”, which seems to indicate that the two terms refer to different colors, one of which can be classified as RED and one of which is a little bit warmer, closer to PINK or ORANGE, or maybe just [macro-red]. The term for BLUE, *ngawa-marraj*, is glossed as “bright blue color”, which again brings in the concept of brightness to help describe a color.

Warlpiri was found here to have terms for BLACK, WHITE, RED, GREEN, YELLOW, BLUE, BROWN, GREY, ORANGE and PURPLE. Warlpiri was classified in the SIL project as having terms for BLACK, RED, GRUE, WHITE and YELLOW, but there is evidence in the word list for separate terms for GREEN and BLUE, as well as for additional terms for BROWN, GREY, ORANGE and PURPLE. Warlpiri has roughly six distinct terms for WHITE, one of which (*kardirri*) is also translated as “pale green”, which seems to represent a different color or a broader range of colors than the other terms for WHITE do. Warlpiri has five different terms for RED, one of which (*tiri-tiri*) is also defined as “scarlet”, indicating that it is not a basic color term but rather a specific named shade of RED, such as we have in English. One of the other terms for RED, *mirntil-pari*, is defined as “brilliant, colour like red”, pointing yet again to the prevalence of using brightness and shininess alongside color terms to describe the visual world. Warlpiri has two terms for YELLOW, of which *pirarr-pirarrpa* is also glossed as “bright colour, orange” and *karntawarra-karntawarra* is also glossed as “golden”; the first is counted as ORANGE and the second is counted as YELLOW. There are three terms for GREEN, one of which (*wikirri-wikirri*) is also translated as “dark blue”, and another term for BLUE (*kunjuru-*

kunjuru) that is defined as "dark blue, smokey grey, purple". The overlap between the two color categories could indicate a color category of GRUE, as posited in the previous study, but given that the terms are translated with such different English colors, it can be assumed that they represent discrete colors in Warlpiri. There are two terms for BROWN: *walya-walya*, defined as "earth colour, tan, reddish", and *ngarrngarr-pari*, also defined as "bronze, tan". Warlpiri also has two terms for GREY, one of which (*piirn-piirnpa*) is translated as "light grey, whitish" and one of which (*yulyurduyulyurdu*) is also translated as "light purple". If those two terms are counted as referring to different basic colors, GREY and PURPLE, then Warlpiri has ten distinct color terms.

3. Etymologies and patterns of additional definitions

Data has already been presented as to the precise definitions of color terms in this language family, and how much overlap occurs between various pairs of colors. There is, in addition, a great deal of information regarding the etymologies of color terms in this family, as well as patterns in terms of what kinds of words terms for specific colors are derived from. There is also some potential for reconstruction of color terms; a future project could perhaps consider how easy or possible it would be reconstruct color terms in this family.

3.1 Etymological comments on terms for BLACK

There are 154 languages in this family with terms for BLACK, a number of which can also cover BROWN or BLUE. As mentioned at various points in chapter 2, this pattern indicates that terms for BLACK can often be thought umbrella terms for other cool colors, or [macro-black]. In languages with no range data provided, it is impossible to say the exact scope of a term for BLACK, but it is reasonable to assume that a term for BLACK can sometimes be used to refer to a fairly wide range of non-bright colors. This interpretation is supported by the fact that so many of the terms for BLACK in these languages are also translated as words like "dark" and "night". 34 of these languages have a term for BLACK that is also translated as "dark", "dark colour(ed)" or "darkness"; 13 have a term for BLACK that is also translated as "night" or "sky"; and nine have a term for BLACK that is also translated as "charcoal(ed)" or "coal". The fact that so many

of the terms for BLACK share these alternate translations could potentially point to a shared proto-term for BLACK across the family, or in some of the subgroups. It could also point to the ways in which these languages developed—terms for BLACK may be derived from words for darkness and the night because those were clear and universal natural examples of the color BLACK. However, this is merely speculation—reconstruction data would be needed to ascertain the validity of these conjectures and, as stated earlier, no reconstruction was attempted for this project.[5]

There are some related definitions that are shared by some of the terms for BLACK: three languages have terms for BLACK that are also translated as "black ashes"; three have terms that are also translated as "black paint" or "black ochre"; two have terms that are also translated as "dirty"; and two have terms that are also translated as "dull". Then there are a number of terms that have alternate definitions that are not shared by terms in any of the other languages, among them the following: "somber", "dark cave", "black tea", "charred/burnt", "black snake", "black swan", "black ants", "eyeball", "penny" and "wide, spacious". Apart from "eyeball" and "wide, spacious", it is not hard to see the connection between these terms and BLACK, because all of the alternate meanings listed above are visibly related to the color. One term also refers to the color of people's skin, but the definition makes it clear that the term is also a generic word for the color; there are numerous other words for BLACK as it applies to skin color, but they are not counted as color terms because they refer exclusively to skin.

3.2 Etymological comments on terms for WHITE

143 languages in this family have terms for WHITE, most of which do not overlap with any other color terms. A few, as mentioned previously, also cover GREY, and one each also covers YELLOW, RED and GREEN, but for the most part terms for WHITE are simply glossed as

[5] There is some definite possibility for reconstruction here; at least 20 languages have terms for BLACK that are related to *maru* (*maru, marru, muru, murru, murrumurru, maru maru*, etc.), and quite a few have terms for BLACK that are related to *warru*. There are other patterns to be found throughout the family, for BLACK and for other colors. There are certainly enough patterns that a reconstruction project could be attempted for color terms in the subgroups or in proto-Pama-Nyungan.

“white”. Out of the languages with terms for WHITE, 12 have terms that are also translated as “shiny” and “bright”, as well as one that is also translated as “dazzling” and one as “gleaming”; eight have terms that are also translated as “light” or “light-colored”; six have terms that are also translated as “clean” or “pure”; and Nyangumarta, from the Marrngu subgroup, has a term that is glossed as “very white”. These definitions point to an interesting notion about how the visual world is described in this group of languages, namely, that in some cases ‘color’ or ‘hue’ appears to be a less important or salient concept than degree of brightness or shininess. This idea is apparent more in the terms for WHITE than in the terms for other colors, but it is clearly significant that so many of the words are translated in terms of brightness and shininess. The terms can still be counted as referring to the color category WHITE, but they appear also to be used to refer to objects for which the most salient property is brightness. Color is an important way of describing the visual world in this language family, as evidenced by the many color terms found in the languages of this family, but it appears that the terms sometimes operate in conjunction with other methods of description.

Two terms are glossed as “clear”, which seems to indicate a very light and essentially hue-less color. Four terms are defined as “white as paper”, applying the color of an entity known to be WHITE to any entity of that color. Three of the terms are also translated as “ashes” or “ashen”. Various other words appear only once as alternate definitions for terms for WHITE: “flour”, “dry”, “clear alcohol”, “silver”, “silver coin”, “moonlit”, “frost”, “old” and “pale”. All of these words are related to WHITE, in that the color of what they represent is WHITE or close to WHITE. Wajarri has two terms for WHITE, one of which is also defined as “shiny, bright, European man”. In general, terms for WHITE and BLACK that are also defined as groups of people of those skin colors are not counted as generic color terms; in this case, however, given that the term is also defined as “shiny” and “bright”, two very common alternate translations of terms for WHITE, the term is counted as a true color term (though even if it were not, there is another term for WHITE in Wajarri, and would thus the language would still be counted as having a term for WHITE.)

The other pattern of alternate translations is words for white paint: 11 of the terms for WHITE either also mean or are related to terms for “white paint” or “white ochre”. In one case, the term

for WHITE is a reduplicated version of the term for “white paint”; in all the other cases the terms for WHITE are identical to the terms for “white paint/ochre”. This pattern is slightly different from the pattern exhibited in terms for RED, as will be discussed in 3.3, which are more often reduplicated versions of terms for “red paint/ochre”.

3.3 Etymological comments on terms for RED and YELLOW

There are 128 terms for RED in the family, a number of which also cover other colors, mostly YELLOW and occasionally ORANGE, PURPLE, PINK and BROWN. The most common patterns of alternate translations for terms for RED are “red ochre/paint” and “blood”: 26 of the languages have terms that are related or identical to terms for “red ochre” or “red paint”, and 11 of the languages have terms that are also translated as “blood”, “blood-like” or “colour of blood”. Of the 26 languages with terms for RED that are related to “red ochre/paint”, seven of them are reduplications of the word for “red ochre” and seven of them are identical to the word for “red ochre”, while the rest are similar to the form of the word for “red ochre”. It appears that many of the languages acquired words for RED based on the term for the paint of that color, or possibly the other way around, which makes sense given that red paint was important as body paint in the religious/tribal practices of many of the groups of people that spoke these languages. It is understandable that a number of the words for RED are also translated as “blood”, because blood is one of the most universal and natural red substances, one that was certainly important in the communities where these languages were spoken.

The rest of the alternate translations of terms for RED do not fall into patterns, but are mostly closely related to the color RED. They include: “red sand” (which appears twice), “wine” (which appears twice), “ripe”, “to wake up”, “sore, unhealed”, “red kangaroo” and “reddish like the sunset”. With the exceptions of “ripe” and “to wake up”, these definitions are all related to RED in that they represent things of that color. The word for RED in Warumungu also means “dollar bill” or “European person”, the latter of which probably refers to a light reddish skin color. This term is not counted as a true color term, following the practice of excluding color terms that appear to refer exclusively to skin colors; Warumunguis still counted as having a term for RED, however, because a reduplicated form of the term is translated solely as “red”.

65 languages have terms for YELLOW, out of which several also cover RED, ORANGE, BROWN, GOLD and, once, PURPLE Out of these languages, 21 have terms for YELLOW that are related to or the same as the term for "yellow paint/ochre". Just as in the case of terms for RED, a number of the terms for YELLOW are reduplicated forms of the terms for "yellow ochre"—five of the terms for YELLOW are clear reduplications of the terms for "yellow ochre", two are closely related to "yellow ochre", and the rest share the exact form. The phenomenon of a color term being a reduplication of the term for the paint of that color is clearly a pattern, as it occurs in different languages and for different colors (mostly RED and YELLOW); only one language forms its terms for both RED and YELLOW by reduplicating the terms for the paints of those colors. Reconstruction data would also be useful here, to determine whether there is any underlying similarity between color terms that are reduplications of terms for colored paint.

Two of the terms for YELLOW are also translated as "dusty area", but there is no overlap among the rest of the terms that have alternate translations. They include: "yellow sandhill plant", "pollen", "egg yolk", "curry-powder-like" and "yellow as paper", the last of which is found in Yulparija, a language that uses the same construction in its definition of WHITE, namely, "white as paper" (a construction that was found in the translations of WHITE in three other languages). As with the alternate translations for color terms earlier in this chapter, all of these definitions have clear connections to the color YELLOW, as they all refer objects of that color.

3.4 Etymological comments on terms for GREEN and BLUE

There are 99 languages that have terms for GREEN, but 14 of those languages have terms that appear only to apply to living vegetation, and thus only 85 of the languages can be said to have true color terms for GREEN. The 14 languages that are discounted each have only one term for GREEN, and in each case either the term is also defined as "unripe" and/or "raw" and/or "alive", or the definition specifies that the term applies only to fruit, meat or trees/plants. Of the 85 remaining languages, quite a few have terms that are also translated as "alive", "unripe" or "raw", but in all cases the languages have more than one term for GREEN, at least one of which does not have that additional translation. It is of course possible that the terms with these alternate translations are actually also true color terms, and that they have a connection to

vegetation because they originated as terms describing plants and were then extended to become generic color terms. There is no way of knowing with the data available whether or not these terms should be interpreted as true color terms, but given that so many other languages have terms for GREEN that are not related to rawness or aliveness, for the purposes of this paper they are not counted as true color terms.

As mentioned in chapter 2, several of the terms for GREEN also cover YELLOW, and quite a few of the terms also cover BLUE. There is more overlap between GREEN and BLUE than between any other pairs of languages, which is perhaps an indication that the category GRUE should be used, for languages that have terms that encompass both GREEN and BLUE. In some cases, a language will have more than one term for GREEN, one of which also covers BLUE, and have no separate term for BLUE. In those cases, the term that covers both GREEN and BLUE is counted as BLUE, with the understanding that the focal point of the color that the term refers to is unknown.

13 of the terms for GREEN that are counted as true color terms are also translated as specific types of growing things and vegetation, specifically “grass”, “new growth”, “green plant”, “tree”, “foliage” and “reeds in the river”. These are counted as true color terms, even though they refer to vegetation, because the terms are taken to be polysemous; they are terms for both specific growing things and for the color GREEN. It is very likely that the color terms developed from the terms for plants and grass, an example of the phenomenon in which a term for an object of a certain color eventually comes to mean the generic color. It is possible that these terms are not true color terms, but given that they are glossed separately as “green”, and given that the derivation of color terms for GREEN from terms for plants and grass, which are the most important and widespread examples of the color GREEN in nature, is logical and understandable, for the purposes of this paper these terms are counted as true color terms.

Additional translations for some of the terms for GREEN are: “moccasin”, “green ant”, “wild bean”, “smoke”, “as of a leaf” and “as colour of deep sea” (which appears twice). The last two are comparisons to GREEN entities, but are counted as color terms because it seems that they can refer to any object of the color GREEN, and not just the entities in the comparisons. Some

of the other translations of terms that were discounted as color terms were: “living, wet, underdeveloped”, “young”, “not roasted”, “tender” and “child”.

There are 41 languages in this family that have terms for BLUE, seventeen of which have terms for BLUE that also cover GREEN, three of which have terms that also cover BLACK, and two of which have terms that also cover PURPLE; one of the terms that covers PURPLE is also translated as “smokey grey”. One of the terms for BLUE is defined as “bright blue colour”, and one is defined as “blue as sky”. There are no additional translations for any of the terms for BLUE. The fact that there are no alternate translations, and in particular no patterns of alternate translations, such as the terms for ochres/paints or “grass” for GREEN or “blood” for RED, perhaps indicates that BLUE is a more recent addition to the list of color terms, and thus has no traceable pattern of etymology. Again, reconstruction data would be helpful in exploring this theory.

3.4 Etymological comments on terms for GREY and BROWN

There are 43 languages in this family with terms for GREY, a number of which also cover various other colors: five also cover WHITE; three also cover BROWN (one is translated as “tan”); one also covers PURPLE (translated as “light purple”); and one also covers PINK. In addition to these, two of the terms were translated as “bluish grey” and one was also translated as “silver”, both of which seem to indicate a specific shade or type of GREY. There were very few additional translations for terms for GREY: “grey-haired”, “grey hair on an old person”, “dirty”, “old man”, “knee” and “to burn”, all of which appeared only once.

There are 32 languages with terms for BROWN, several of which also cover BLACK, RED, YELLOW, GREY and, in one case, ORANGE. Two of the terms for BROWN are glossed as “tan”, one is glossed as “bronze”, and one is glossed as “of a beautiful brown colour”, all of which probably indicate that specific shades of brown are intended by the terms. There are fewer terms for BROWN than for any of the other languages discussed so far in this chapter, but there are some terms that appear to be derived from terms for specific BROWN things, particularly the earth. There only alternate translation that occurs in more than one of these

languages is “earth color”, which occurs for terms in three languages. The other translations found are the following: “funeral-like”, “something that’s dead”, “to crawl”, “shady, brackish colour of water” and “sunburnt, dark”. Most of those terms are easily relatable to BROWN, because they describe things that are of that color.

3.4 Etymological comments on terms for PINK, PURPLE, ORANGE and GOLD

There are a total of seven terms for the color ORANGE in this language family. There are many other words that are defined in the dictionaries as “orange”, but unless they are specified as the color, they are assumed to be the fruit (some of them are also translated as “bush orange”). Of these seven terms, two are also defined as “yellow”; one is also defined as “pink”, “red” and “wine”; one is defined as “orange shade of red”; one is defined as “light orange or brown”; one is defined as “light orange colour”; and one is defined as “literally, colour like inside figs”.
Four languages have terms for PINK, of which only one is defined solely as “pink”. Of the other three languages, one has a term that is defined as “hot pink”, and also covers RED and ORANGE; one has a term that is defined as “pink and grey”; and one has two terms for PINK, one of which is a reduplication of the term for RED and one of which is defined as “pinkish grey”. Three languages have terms for PURPLE; one also covers BLUE, one GREY and one YELLOW. None of them have any additional meanings or are on the surface derived from other words. Three languages have terms for the color GOLD, which is not counted as a basic color term. There are several other words that are defined as “gold”, but they are not specified as the color and are thus assumed to be the substance. The translations of the three terms that are thought to be colors are: “golden”, “yellow, golden” and “red, gold”.

4. Summary of data and conclusions

Out of the 207 Pama-Nyungan languages examined, 161 were found to have one or more recorded color term. The distribution of languages according to number of recorded color terms is shown in Figure 22:

Number of recorded color terms	Number of languages
0	46
1	10
2	24
3	34
4	22
5	26
6	25
7	9
8	9
9	1
10	1

Figure 22: distribution of languages according to number of recorded color terms

The number of occurrences of each color term in all the languages in the family is shown in Figure 23. It should be noted that as the number of color terms increases, the average number of individual terms for each color also increases, as does the level of description for each color term. A diagram of the most common pattern for each group of languages in terms of number of color terms (from 1-8) is shown in Figure 24.

Color term	Number of occurrences
Black	154
White	143
Red	128
Green	99
Yellow	65
Grey	43
Blue	41
Brown	32
Orange	7
Pink	4
Purple	3

Figure 23: number of occurrences of each color term in the Pama-Nyungan family

Number of color terms	Number of languages	Most common pattern of color terms	Number of languages with most common pattern of color terms
1	10	BLACK	6
2	24	BLACK, WHITE	14
3	34	BLACK, WHITE, RED	28
4	22	BLACK, WHITE, RED, GREEN	11
5	26	BLACK, WHITE, RED, GREEN, YELLOW	14
6	25	BLACK, WHITE, RED, GREEN, YELLOW, GREY	9
7	9	BLACK, WHITE, RED, GREEN, YELLOW, [2 of GREY, BLUE, BROWN]	8
8	9	BLACK, WHITE, RED, GREEN, YELLOW, GREY, BLUE, BROWN	5

Figure 24: summary of number of languages with most common patterns of color terms for each group of languages according to number of color terms

Based on these data, the order of acquisition of color terms in the Pama-Nyungan languages can be posited as the following:

Figure 25: proposed order of acquisition of color terms in Pama-Nyungan

This proposal differs slightly from Berlin and Kay's proposed order of stages of color acquisition, and from the subsequent revisions, in two ways: first, GREEN appears before YELLOW, as opposed to appearing concurrently with YELLOW; and GREY, BLUE and BROWN appear at roughly the same time, preceding PUPRLE, PINK and ORANGE, as opposed to GREY appearing concurrently with PURPLE, PINK and ORANGE, following BROWN and BLUE.

Previous orders have grouped YELLOW and GREEN together, as appearing in either order after RED. However, in this language family, GREEN appears significantly more often than YELLOW (terms for the colors appear 99 times and 65 times, respectively), and GREEN consistently appears before YELLOW in every group of languages. YELLOW does not appear at all in languages with fewer than four recorded color terms, while GREEN appears in four languages with three color terms. In languages with four color terms, the most common pattern is BLACK, WHITE, RED, GREEN, a pattern that appears 11 times out of the 22 languages, and terms for GREEN appear in 14 of the languages; terms for YELLOW appear in only six of these languages. In languages with five color terms, both GREEN and YELLOW appear in 21 out of 22 languages, and the most common pattern includes both GREEN and YELLOW, as is expected. The important point, then, is that GREEN clearly seems to appear before YELLOW in languages with fewer than five color terms, a trend that is not accounted for in previous proposed orders of color-term acquisition.

There is also a question of whether or not GRUE is a useful category to consider when discussing these languages. There are terms that cover both BLUE and GREEN in fourteen of

the languages, so there is some reason to think that GRUE is a useful category; however, terms for GREEN appears on its own overwhelmingly more often than terms GRUE or BLUE, and it seems to be more useful to consider them as separate categories. Terms for BLUE that are not related to GREEN tend to appear closer to the coast than to the mainland, and primarily in the southeastern part of the continent. A map of the languages that have terms for BLUE that do not also cover GREEN is shown in Figure 26.

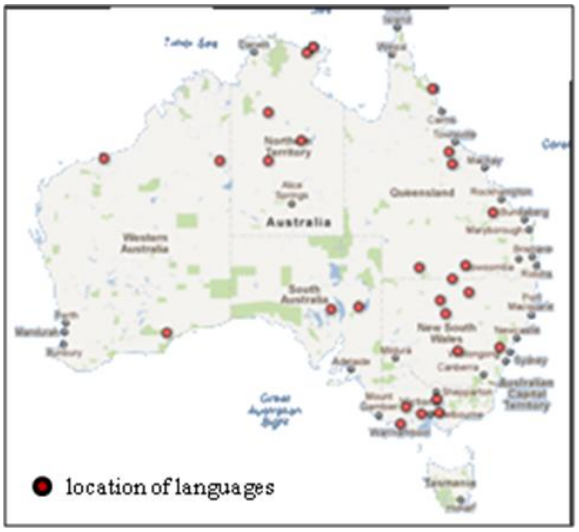

Figure 26: distribution of languages with terms for BLUE

The second difference in the order is the grouping of GREY with BLUE and BROWN as opposed to with PUPRLE, PINK and ORANGE. In Berlin and Kay's 1969 proposal, BLUE was thought to appear in stage V languages; BROWN was thought to appear next, in stage VI languages; and GREY was thought to appear at the same time as PUPRLE, PINK and ORANGE, in stage VII languages. In later revisions, BLUE was considered to appear either in stage IV or V, as the fourth- or fifth-appearing color term; BROWN, if considered at all, appeared after BLUE; and GREY appeared only after both BLUE and BROWN, at the same time as PINK, PURPLE and ORANGE, with no order of preference for the final four. None of these orders are observed in this language family. BLACK, WHITE, RED, GREEN and YELLOW are clearly the first five color terms to appear; this is evident from the number of occurrences of each term among all the languages of the family and from the most common patterns of color terms in the languages fewer than six color terms. After those five colors, there

is a fairly steep drop-off in terms of number of occurrences of color terms; terms for YELLOW appear in 65 languages, while terms for GREY, BLUE and BROWN appear in 43, 41 and 32 languages, respectively. In languages with fewer than six color terms, GREY, BLUE and BROWN appear with roughly the same frequency: in four-color-term languages, BROWN and GREY appear twice and BLUE appears once, and in five-color-term languages GREY appears seven times, BLUE appears six times and BROWN appears three times. In languages with six color terms, the most common pattern of color terms is BLACK, WHITE, RED, GREEN, YELLOW and GREY; this pattern is shared by nine of the 25 six-color-term languages. In the set of six-color-term languages, terms for GREY appear in 15 languages, while terms for BROWN and BLUE appear in nine and eight languages, respectively. Given that GREY is the most common sixth color term in the set of six-color-term languages, GREY could be considered as a candidate for the sixth color term to appear in this language family. In the languages with seven color terms, the number of occurrences of GREY, BLUE and BROWN are roughly equivalent: no one pattern takes precedence over another, and the sixth and seventh color terms are almost evenly split between BROWN, BLUE and GREY. BROWN and BLUE appear in seven out of nine languages, and GREY appears in six. Similarly, in languages with eight and more color terms the three colors appear with roughly the same frequency: BLUE appears in all ten of the languages, GREY appears in nine, and BROWN appears in eight. The most common pattern in eight-color-term languages is BLACK, WHITE, RED, GREEN, YELLOW, GREY, BLUE, BROWN, which includes all three of these colors, as predicted. In light of all the data, it seems that GREY, BLUE and BROWN should be considered to appear at roughly the same time in the evolutionary sequence of color-term acquisition; GREY did appear significantly more often as the sixth color term in six-color-term languages than did BROWN or BLUE, but given that frequency of occurrence of the three color terms evens out after that set of languages, GREY cannot conclusively be said to precede the other two.

Following GREY, BLUE and BROWN, there is again a steep drop-off in the number of occurrences of the remaining three colors: ORANGE, PINK and PURPLE occur only seven, four and three times, respectively, in all the languages in the family. It appears that they should also be grouped together, as occurring with roughly the same frequency and in any order after the previous eight color terms.

There were a number of patterns of alternate translations of color terms found in the languages in this family. A chart of the most common alternate translations of color terms is shown in Figure 27.

Color term	Common alternate translations
BLACK	“dark”, “night”, “charcoal”
WHITE	“light”, “bright”, “shiny”; “white ochre”
RED	“blood”, “red ochre”
GREEN	“grass”, “plant”, “tree”; “unripe”, “alive”, “raw”
YELLOW	“yellow ochre”
BROWN	“earth”
GREY	“old”, “hair of old person”

Figure 27: most common alternate translations of color terms

Terms for BLUE, PINK and PURPLE did not have any patterns of alternate translations. Terms for ORANGE were generally excluded as they were assumed to be the fruit unless otherwise indicated in the dictionary entry. Terms for GOLD were also excluded, because GOLD is not considered a basic color category.

Some of the alternate definitions for WHITE indicated that brightness is used alongside color as a means of describing the visual world. The idea of brightness as an alternative or additional way of describing the world in these languages is also supported in the amount of overlap or crossover between color terms. The fact that color terms were often translated as more than one color, and the fact that so many colors were described as [macro-black] for collections of cool colors, [macro-white] for collections of warm colors, and [macro-red] for collections of bright colors, indicates that brightness is perhaps just as salient a property as color in this language family, and can sometimes be used in conjunction with color to describe the world. Contrary to my hypothesis, however, color appears to be a very salient property in this language family, and, while some of the languages have low color-term “stages” according to the Berlin and Kay model, many others have five or more color terms. The belief espoused by Berlin and Kay and

many subsequent researchers, that tribal or hunter-gatherer societies do not have many color terms because color is not a useful property in their languages, is clearly misguided.

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