

# Further Evidence for Arabic Basic Colour Categories

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Abstract

The aim of this study was to describe the basic colour terms (BCTs) of Arabic and, in particular, clarify the relationship among the three Arabic terms for blue: *azrock, samawee, and khuhlie* that suggested a BCTs in Arabic language in Al-rasheed et al. (2013). Data were collected from adult native Arabic speakers (30 male and 27 female) age between 18 and 34 years old, with a mean age of 21.67 years (SD = 2.98). All were under and postgraduate students at King Saud University. Participants task was to group the 320 colours by similarity. Based on this result, Arabic probably has eleven basic colour terms and these correspond with Berlin and Kay's eleven universal categories. The terms are that *ahmar* "red", *akhdar* "green", *asfer*, "yellow", *azrock* "blue", *asswed* "black", *abiyadh* "white", *banafsagee* "purple", *boartoogaalee* "orange", *bonee* "brown", *wardee* "pink" and *rassasee*. In addition, the terms of particular interest—*samawee* ("light blue") had the next highest claim to being basic and may deserve further investigating.

# Keywords

Basic Colour Terms, Colour Categorisation, Universal Categories, Berlin and Kay's Theory, Arabic Language

# **1. Introduction**

This paper reports a study of the "basic colour terms" (BCTs) of Arabic conducted within the framework of Berlin & Kay's (1969) theory of universal colour categories. Previous work by Al-rasheed, Al-mohimeed & Davies, 2013 had suggested that Arabic might have more than one BCT for the blue region—*azrock* "blue", *samawee* "light blue" and *khuhlie* "dark-blue"—and thus a subsidiary aim was to investigate this possibility.

The essence of Berlin and Kay's (1969) theory<sup>1</sup> is that, although languages vary in the numbers of basic terms

<sup>&</sup>lt;sup>1</sup>See Hippisley, Davies & Corbett (2006) for a fuller account.

they have and in the location of their category boundaries, all languages draw their inventories of BCTs from a set of eleven "universal" colour categories: [black white] red [green yellow] blue brown [purple pink orange grey]. These universal categories are characterised by their best examples or category foci, and if a language expresses a version of a universal category, then its best example should be similar to the appropriate universal focus. Terms earlier in the list (hierarchy), on average, are more likely to be represented than later terms; terms conjoined in parenthesis, are equally likely to occur. The first six terms (primary terms) were thought to be fundamental, in that they were aligned with fundamental states of early colour processing (Kay & McDaniel, 1978), while the remaining terms (derived) were thought to be based on combinations of the primary terms. This conjecture turned out not to be true (e.g., see Jameson & D'Andrade, 1997). Nevertheless, the empirical observation of greater prevalence of primary than derived terms across languages holds, and there is evidence that primary terms are more salient than derived terms even in languages with a full set of eleven terms (see below). The claim that best examples of equivalent categories are very similar in all languages has also been questioned (e.g., Ratner, 1989) but Kay, Paul, Regier, Terry & Cook, (2005) show that although there may be exceptions, there is a strong statistical tendency for category foci to be very similar across languages.

# **1.1. Beyond the Eleven**

Kay and McDaniel (1978) developed the Berlin and Kay (1969) theory using a system of fuzzy logic, consistent with the prototypical properties of natural categories (Rosch, 1973, 1975). Kay and McDaniel (1978) proposed that six fundamental neural responses (FNRs) were directly responsible for the perception and linguistic structure of what they called the "primary" colours—namely, black, white, red, green, yellow, and blue. They drew a distinction between two types of non-primary colour categories: composite and derived categories. Composite categories are the fuzzy union of two FNRs. For instance, it is common to have a single term that includes both the universal categories blue and green—"grue". Derived categories are the fuzzy intersection of two FNRs; so, for example, orange is the fuzzy intersection of red and yellow.

One implication of the Kay and McDaniel (1978) theory is that there are logically possible fuzzy unions and intersections that are not included in the Berlin and Kay (1969) hierarchy. For example, Zollinger (1984) argues that the space between blue and green is wide enough to be encoded by the term turquoise, derived from the fuzzy intersection of these two FNRs. Adding a blue term appears to be the most common way that languages move beyond the eleven Berlin and Kay basic colour terms (stage seven). Russian, (Davies & Corbett, 1994), Turkish (Özgen & Davies, 1998) and Greek (Androulaki, Gômez-Pestaña, Mitsakis, Lillo, Coventry, & Davies, 2006) all have 12 BCTs, encoding the blue region with two basic terms distinguishing between light and dark blue. The extra blue term could either be the fuzzy intersection of blue and black, resulting in "dark blue", or the intersection of white and blue, resulting in "light blue". Pilot work suggested that Arabic might have three terms that designate different kinds of blue: *azrock* "blue", *samawee* "light blue" and *khuhlie* "dark-blue". The majority of our informants sorted the blue stimuli into groups that they named *samawee* "light blue" and *azrock* "blue", suggesting that a more apt gloss for *azrock* may be "dark-blue".

## **1.2. BCT's of Arabic**

Al-rasheed et al., 2013 conducted a study aimed to established the "basic colour terms" (BCTs) of Arabic within the framework of Berlin & Kay's (1969) theory of universal colour categories. Two tasks were used: a list task and a colour naming task. The list task is a simple and fast method of identifying likely BCTs (Davies & Corbett 1994). It provides two measures—frequency of use and order of occurrence—and assumes that the psychologically more salient terms will appear in more lists and in higher positions than less salient terms. Pich and Davies (1999) found that primary categories appeared more frequently than derived categories and that, in general, the 11 BCTs were used more frequently than non-BCTs. In the naming task, a representative sample of colour-stimuli (those used initially by Davies & Corbett 1994) were named. BCTs should be used frequently and with consensus across informants. Two groups of Saudi Arabic speakers were tested, children and adults, both from Riyadh. However, as the pattern of results was essentially the same for the two groups, I only report here the adult data.

#### 1.2.1. Elicited Lists

Two hundred adult informants, half were men and half were women, with an age range of 18 to 25 years (mean

= 19.83) participated in this task. They were students at King Saud University and they were all native Arabic speakers with some knowledge of English. They were asked to write down as many colour terms as they could in two minutes.

Results of this experiment has shown that the terms *ahmar*, "red", *akhdar*, "green", *asfer*, "yellow", *azrock*, "blue", *asswed*, "black", *banafsagee* "purple" *abiyadh*, "white", *boartoogaalee*, "orange", *bonee*, "brown", and *wardee*, "pink", were offered by a clear majority of the sample. *Rassasee*, "grey" was the next most frequent term offered by just under half the sample, while the two additional blue terms *samawee* "light blue" and *khuhlie* "dark blue" were offered by only about 30% of the sample.

## **1.2.2. Colour Naming**

Sixty first language Arabic speakers from King Saud University named each of a standard set of sixty-five colours that used in (Davies & Corbett, 1994 for their origin and technical specification). Al-rasheed et al. (2013), reported overall frequency of use for each term, and a measure of consensus—the dominance index. Basic terms should have high scores on both measures.

Result shows the frequency of use of each term across the colour set and sample ( $65 \times 60$  possible responses). The child and adult results for the naming task provide that Arabic might has eleven BCTs that are consistent with Berlin and Kay's universal colour categories: *asswed* "black", *abiyadh* "white", *ahmar* "red", *akhdar* "green", *asfer* "yellow", *azrock* "blue", *bonee* "brown", *banafsagee* "purple", *wardee* "pink", *boartoogaalee* "orange", and *rassasee* "grey". These are the same terms as suggested by the elicitation task. These terms have high frequency of use, are used with consensus as shown in Al-rasheed et al. (2013) by the dominance scores, and their use is relatively constricted to regions of high agreement as shown by high specificity scores. Moreover, estimates of the category foci reveal that they are similar to Berlin & Kay's universal foci.

The additional blue term, *samawee* "light blue" had the  $12^{th}$  highest frequency of use for the adults and  $13^{th}$  for children; it was the most frequent term for one tile for both samples, and was dominant for the same tile for the adult sample. However, it too had the lowest specificity index of all terms with a nonzero dominance index. *Azrock* "blue", the likely BCT for blue, had a low specificity score for the children, and it was the only primary BCT not to be dominant for at the 90% level for at least one tile for the adults. This may be due to *samawee* "light blue" sometimes being used as an alternative (See Al-rasheed et al., 2013 for more details).

## 1.3. Aims of the Current Study

The overall aims of the present study were to determine the BCTs of Arabic and to explore the status of the putative extra blue terms. Fifty seven Arabic-speaking volunteers were tested, age range between 18 and 34 years old. The original A4 grid of the world colour survey was used. The status of the three blue terms *azrock* "blue", *samawee* "light blue" and *khuhlie* "dark blue" was of particular interest.

# 2. Colour Mapping Experiment

The finding of Al-rasheed et al., 2013 suggest that there are 11 basic colour terms for Arabic that reached the criteria of Berlin and Kay's (1969) universal terms. In contrast to the terms of particular interest, *Samawee* "light blue" in Al-rasheed et al., 2013 study: in the elicited lists task it was scored by nearly the majority of the child sample (40%) and occupied position 12 of the most frequent, and mean list position, in the Adult and Child samples. For the colour naming task, it had one score in the number of tiles most frequent term across the sample (nmf) criteria in both samples also achieved dominance at the D50 criterion in the adult sample, but failed to achieve the D75 and the D90 criterion. These results in elicited lists and colour naming tasks still leave open the question of whether *Samawee* "light blue" is a basic colour term for Arabic. If it is true, it should identified as a basic term in the current study which was a colour mapping task.

In this study "colour mapping" 320 rectangle coloured representing the whole of colour space was used to allow for the more potential basic category *Samawee* "light blue" to be appeared. Two questions have been investigated, the former as the previous concerning the basic colour terms of Arabic, and the later concerning the location of the focal point of each of these basic categories. Participants were required to map the 320 chips by similarity and to give a name to each group, basic term are salient, and should be used by the high agreement of a language-sample.

## 2.1. Method

## 2.1.1. Participants

A total of 57 Arabic-speaking volunteers took part in this study (30 male and 27 female) age between 18 and 34 years old, with a mean age of 21.67 years (SD = 2.98). All were under and postgraduate students at King Saud University and none of them had taken part in any of the two experiments in Al-rasheed et al. study (2013). All were first language Arabic speakers and knew a little English.

## 2.1.2. Stimuli

Stimuli were the original A4 grid used for the world colour survey (WCS) which consisted of a series of 320 coloured rectangles ( $7 \times 5$  mm) formed in a rectangular grid shape. The columns represent 40 equally spaced Munsell hues, and the rows correspond to 8 levels of Munsell value (lightness) ranging from light to dark. Appendix 1 shows the array of the stimuli in Figure A1 and the location of the chips in the CIE (u'v') uniform chromaticity diagram in Figure A2 along with the CIE Yxy chromaticity coordinates in Table A1 in Appendix 2.

# 2.1.3. Procedure

Participants carried out the task in a lab and stimuli were illuminated from above by a general electric standard daylight fluorescent lamp (PHILIBS, E006, TLD 36 W/64 CA, Made in Holland, LS). Participants were tested individually male informants were tested by the author and female informants by female lecturer from King Saud University. None of the participants had taken part in any of the two experiments in the previous study of Al-rasheed et al., 2013.

All of the participants were firstly screened for normal colour vision with *Ishihara's Test for Colour-Blindness* (Ishihara, 1987) which took about five minutes. Then they were seated by a disk covered with a neutral grey cloth. The stimuli array was covered with a transparency and was presented on the table in front of participants. The participants were asked to group the 320 colours by similarity, so that they drew a line around those chips looked similar and members of a family. Participants then were asked to name each group using the simplest colour term that first came to their mind. Participants also were asked to indicate which chip in each grouped was the best example for the group.

#### 2.2. Results

A name for each of the 320 Munsell chips in the WCS colour chart was obtained for each participant. Then a modal colour category obtained for each chip (the most frequent term associated to that particular chip). A visual representation map of the most frequent category used for each colour chip has been constructed. The Criteria in this study was used by Eleanor Rosch (1973 & 1975), in her study of the Dani and as used in other studies (Heider, 1972, Heider & Olivier, 1972; Davies & Corbett, 1994; Pich, Jodi., & Davies, 1999; Davidoff, Davies, & Roberson, 1999; Regier, Kay, & khetarpal, 2007; Uusküla, 2008). The distribution of categories and their focal points over the 320 Munsell chips in the WCS colour chart were shown in Figure 1(a) and Figure 1(b). Number in each chip in the array represents the name most frequently given to that chip.

Inspection of the result reveals a large area in green (91 chips out of 230) and blue (68 chips out of 230) regions, that Arabic sample performed similarly in this task as other languages (e.g., Berlin & Kay, 1969; Davies & Corbett, 1994; Kay, Berlin, Maffi, & Merrifield, 1997 & 2005; Kay & Regier, 2003; Regier, Kay, & Cook, 2005). Figure 1(b) shows the agreement percentage over 10 % that a chip was given as a best example of each of the nine colour categories. The chip with the highest agreement was focal brown, it was chosen by 73%, yellow 48%, of the participants. Figure 2 shows the location of the best examples of the nine basic terms in the CIE uniform chromaticity space (u'v'). Summaries of the average coordinates of the 9 categories were shown in Table A2 in Appendix 2.

Fifteen colour terms were produced to group the 320 rectangle coloured array by our participants. Nine terms appear to be basic Arabic colour categories. Thos terms are: *ahmar* "red", *akhdar* "green", *asfer* "yellow", *azrock* "blue", *banafsagee* "purple", *boartoogaalee* "orange", *bonee* "brown", *wardee* "pink" and *abiyadh* "white". Summaries of the most frequent terms (over 10%) used to name the 320 stimuli are shown in **Table A3** in **Appendix 2**.

Table 1 summarises the results further. Column 3 shows the percentage frequency of each of the categories collapsed across all chips and all participants. The table is ordered by the frequency of occurrence of the term

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
9	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1
8	5	5	5	5	5	5	5	5	5	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	6	7	7	7	7	7	7
7	8	8	8	8	8	8	5	5	5	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	6	6	7	7	7	7	7	7
6	8	8	8	8	8	8	5	5	5	5	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	6	6	7	7	7	8	8	8
5	8	8	8	8	8	8	5	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	6	6	6	7	7	8	8	8
4	8	8	8	8	8	8	9	9	9	9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	6	6	6	6	7	7	8	8	8
3	8	8	8	8	8	9	9	9	9	9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	6	6	6	6	6	6	8	8	8
2	9	9	9	9	9	9	9	9	9	9	9	9	9	9	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	9	9	9	9	9	9	9	9
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9	1	1	1							2	2	2																						1	1			1	1	1
8								5																													7			
7							5	5																												7	7			
6																													4											
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4		8	8	8																										4				6	6				8	8
3							9	9																																
2																																								9

(b)

(1) abiyadh "white"; (2) asfer "yellow"; (3) akhdar "green"; (4) azrock "blue"; (5) boartoogaalee "orange"; (6) banafsagee "purple"; (7) wardee "pink"; (8) ahmar "red"; (9) bonee "brown".

Figure 1. (a) The distribution of colour categories for Arabic speakers for the 320 coloured array; (b) The numbers represent the focal points for each colour category offered by 10% of the sample and above.



Abiyadh "white" ahmar "red", akhdar "green", asfer "yellow", azrock "blue", bonee "brown", banafsagee "purple", wardee "pink" and boartoogaalee "orange".

Figure 2. Location of Arabic chromatic highest percentage of best example of the colour mapping in the CIE (1976) chromaticity diagram (u'v').

**Table 1.** Arabic mapping summary (N = 57), term used more than once in each chip in the WCS, English glosses, the percentage of total usage (over 0.10), the number of chips for which a term was the most frequent, and the dominance and specificity indices.

Term	Gloss	%	No. of Tile Most Frequent	No. of Chips Dominant D 0.50	No. of Chips Dominant D 0.75	No. of Chips Dominant D 0.90	Specificity Index S
Akhdar	Green	22.9	91	12	10	49	0.87
Azrock	Blue	16.7	68	09	21	23	0.85
Ahmar	Red	12.9	41	12	11	16	0.79
Banafsagee	Purple	5.80	20	05	10	02	0.72
Wardee	Pink	5.56	18	11	06	00	0.67
Bonee	Brown	5.00	31	11	00	00	0.29
Abiyadh	White	4.76	19	18	00	00	0.74
Boartoogaalee	Orange	4.58	19	08	06	00	0.69
Asfer	Yellow	3.91	13	04	03	04	0.65
Asswed	Black	1.98	01	00	00	00	0.00
Samawee	Light blue	1.44	00	00	00	00	0.00
Zeatee	Oil-green	1.40	00	00	00	00	0.00
Rassasee	Grey	1.04	00	00	00	00	0.00
Khuhlie	Dark blue	0.45	00	00	00	00	0.00
Ashbee	Light green	0.33	00	00	00	00	0.00
Beige	Beige	0.26	00	00	00	00	0.00
Sukaree	Sugar	0.14	00	00	00	00	0.00
Fosforee	Phosphoric	0.12	00	00	00	00	0.00
	Fosia	0.12	00	00	00	00	0.00

starting with the most frequent term. For example, *akhdar* "green" was the most frequent term 91. As can be seen the eight chromatic Arabic colour terms: *ahmar* "red", *akhdar* "green", *asfer* "yellow", *azrock* "blue", *bonee* "brown", *banafsagee* "purple", *wardee* "pink", *boartoogaalee* "orange" as well as, *abiyadh* "white" were only had a high frequent scores (over 3%) in the frequency column for the sample. The second summary measure is the number of tiles for which a given term was the most frequent term across the sample (nmf). For instance, *akhdar* "green" was the most frequent term for 91 out of the 320 chips for the participants. It can be seen that there are 10 terms that have nmf scores of one or greater; these are the Arabic chromatic versions of the Berlin and Kay universals plus the achromatic colours *abiyadh* "white" and *asswed* "black". The nmf is an index of consensus of use, but a relatively weak one. For example, a term can be the most frequent term even though it is not used by the majority of the respondents. Also, one chip can be represented by two terms if they have the same high frequent.

Columns 5 - 7 show more stringent indices of consensus: the "Dominance" indices. A term is dominant for a particular chip if the proportion of the sample using it exceeds the given threshold. For instance, 71 chips were name *akhdar* "green" by at least 50% of the sample and the D50 score for *akhdar* "green" is 71. Of these 71 tiles, 59 were named *akhdar* by at least 75% of the sample, and its D75 score is 59; finally of these 59 tiles, 49 were named *akhdar* "green" by 90% or more of the sample, and its D90 score is thus 49. It can be seen from column 5 there were nine terms that achieved dominance in both samples at the D50 criterion: *ahmar* "red", *akhdar* "green", *asfer* "yellow", *azrock* "blue", *banafsagee* "purple", *boartoogaalee* "orange", *bonee* "brown", *wardee* "pink" and *abiyadh* "white". All of these nine terms each had at least one chips except *bonee* "brown", and *abiyadh* "white" that achieved the D75 threshold. Only five terms met the D90 criterion.

The final column (8) shows a further measure of agreement: the specificity index. This score reaches its maximum of 1 if the term is only used to name tiles with high consensus and reaches its minimum (0) if it is never used with high consensus. The version used here is the same as that one used in experiment 2 in Al-rasheed et al., 2013 study. It can be seen that the terms that had non-zero scores are nine terms that achieved

the D50 score the chromatic Arabic tokens of the "universals" and abiyadh "white".

## 2.3. Discussion

The modal grouping data for Arabic basic categories in this study supported the findings of Al-rasheed et al. (2013). For the two terms *Samawee* ("light blue") and *khuhlie* ("dark blue") there was no evidence that they have basic states.

# **3. General Discussions**

The result from the current study suggested that *ahmar* "red", *akhdar* "green", *asfer*, "yellow", *azrock* "blue", *asswed* "black", *abiyadh* "white", *banafsagee* "purple", *boartoogaalee* "orange", *bonee* "brown", *wardee* "pink" and *rassasee*, "grey" have the strongest claim to basic status. Arabic therefore corresponds perfectly with Berlin and Kay's stage VII of colour term evolution, "colour categorisation is a perceptual phenomen". These 11 terms were the most frequently offered terms in the elicitation task with scores of almost 70% or more for both samples except for *rassasee*, "grey" which scored about 50% in both samples. The terms rank orders on both main measures were very similar with just minor variations in their positions. The tokens of the Kay and McDaniel's primary categories—*ahmar*, *akhdar*, *asfer*, *azrock*, *asswed*, and *abiyadh* were the six most frequent terms and they were offered by over 80% of the samples. *Banafsagee*, *boartoogaalee*, *bonee*, *wardee*, *and rassasee* were the next frequent terms and they are the Arabic derived categories.

All of the measures from the naming task also suggest that the eleven terms just given are probably BCTs in Arabic. They had high frequency of use, high dominance scores and high specificity indices. Although, *zeatee* "oil green", in the child results, and *samawee* "light blue", in the adult data were dominant at 50% for one tile, most other possible BCTs achieved higher dominance scores, the specificity scores (~0.30) were low. The same pattern of results was found in grouping task in this study. The basic eight chromatic Arabic terms were the same as those that claimed in this experiment. *Samawee* ("light blue") and *khuhlie* ("dark blue") may merit further investigation. For the current samples, they are probably not basic; exploring their status in older Arabic samples and in Arabic speakers from other regions could be interesting.

# 4. Conclusion

Arabic probably has eleven basic colour terms and these correspond with Berlin and Kay's eleven universal categories. The terms are that *ahmar* "red", *akhdar* "green, *asfer*, "yellow", *azrock* "blue", *asswed* "black", *abiyadh* "white", *banafsagee* "purple", *boartoogaalee* "orange", *bonee* "brown", *wardee* "pink" and *rassasee*. Two probable secondary terms: samawee "light blue", zeatee "oil green" had the next highest claim to being basic and may deserve further investigating.

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# Appendix

# Appendix 1. The Stimuli of the Experiment.

## The World Colour Survey

The world colour survey (WCS) is a large-scale of cross-cultural research into colour and language (Kay, Berlin, Maffi, & Merrifield, 1997 & 2005; Kay & Regier, 2003; Regier, Kay, & Cook, 2005). The WCS aimed to check and expand Berlin and Kay's original work, and in particular to address the shortcomings of their work. 2616 participants took part in this study, 24 male and female speakers from each of 110 unwritten languages in pre-industrialised societies. The materials used in the WCS consisted of 330 chromatic and achromatic chips of Munsell Colour System, as shown in Figure A1 each participants was asked to name in his or her language each of the 330 stimuli which presented in a stable order to all the participants. Each participant was also asked to select the best example(s) of each colour term his or her named. Result of this study which analysed the location of colour categories centroids by showing the centre of each colour category given by the sample revealed that most of these languages fall the centres of colour categories in approximately the same positions. These positions were the same as the industrialised languages known by the basic colour terms.



Figure A1. The (WCS) stimulus array.



Figure A2. Location of the 230 stimuli used in the current experiment in CIE (1976) colour space (u'v').

# Appendix 2. The CIE Yxy Chromaticity Coordinates for the Stimuli of the Experiment

 Table A1. The CIE Yxy chromaticity coordinates for the 320 rectangle coloured chip in the stimulus array. Measured by

 MINOLTA cs-100 in the same lab that participants were tested under.

Colour-Chip		CII	E Co-Ordina	ates		Colour-Chip		CI	E Co-Ordi	nates	
Number	Y	х	У	u'	v'	Number	Y	х	у	u'	v'
001	32.5	0.429	0.412	0.242	0.523	161	14.1	0.500	0.378	0.306	0.521
002	30.8	0.430	0.415	0.242	0.525	162	14.2	0.507	0.374	0.313	0.520
003	30.0	0.430	0.413	0.242	0.524	163	13.9	0.509	0.379	0.312	0.522
004	31.5	0.430	0.415	0.242	0.525	164	13.8	0.507	0.380	0.310	0.522
005	30.7	0.435	0.419	0.243	0.527	165	13.2	0.498	0.385	0.301	0.523
006	34.0	0.437	0.426	0.242	0.530	166	12.0	0.490	0.392	0.292	0.525
007	33.2	0.441	0.432	0.242	0.532	167	11.9	0.466	0.394	0.274	0.522
008	33.8	0.447	0.436	0.244	0.535	168	11.9	0.463	0.404	0.268	0.525
009	31.0	0.459	0.452	0.245	0.542	169	11.2	0.454	0.413	0.258	0.527
010	32.8	0.467	0.464	0.245	0.547	170	11.6	0.445	0.420	0.249	0.529
011	33.8	0.465	0.463	0.244	0.546	171	12.2	0.434	0.426	0.240	0.529
012	32.6	0.462	0.464	0.242	0.546	172	11.7	0.427	0.435	0.232	0.532
013	28.8	0.456	0.460	0.240	0.544	173	11.2	0.413	0.435	0.223	0.530
014	23.2	0.443	0.451	0.235	0.539	174	11.5	0.406	0.435	0.219	0.529
015	24.0	0.431	0.435	0.234	0.532	175	11.1	0.395	0.436	0.212	0.527
016	26.3	0.426	0.430	0.233	0.530	176	10.7	0.387	0.437	0.207	0.527
017	24.7	0.420	0.425	0.231	0.527	177	11.1	0.384	0.432	0.207	0.524
018	22.1	0.414	0.418	0.230	0.523	178	11.2	0.384	0.416	0.213	0.518
019	23.9	0.410	0.413	0.230	0.521	179	10.6	0.373	0.418	0.205	0.518
020	26.0	0.407	0.409	0.230	0.519	180	10.7	0.369	0.407	0.207	0.513
021	24.1	0.402	0.408	0.227	0.518	181	10.6	0.366	0.405	0.205	0.511
022	25.1	0.402	0.405	0.228	0.517	182	10.2	0.365	0.398	0.207	0.508
023	26.2	0.396	0.398	0.227	0.513	183	10.2	0.358	0.390	0.206	0.504
024	28.9	0.396	0.396	0.228	0.512	184	10.2	0.349	0.372	0.206	0.495
025	29.7	0.393	0.395	0.226	0.511	185	10.8	0.347	0.360	0.210	0.489
026	28.9	0.388	0.387	0.226	0.507	186	11.2	0.342	0.351	0.210	0.484
027	28.9	0.390	0.387	0.227	0.507	187	10.9	0.340	0.348	0.209	0.482
028	28.5	0.390	0.386	0.228	0.507	188	10.6	0.332	0.330	0.211	0.472
029	29.1	0.387	0.381	0.228	0.504	189	11.1	0.333	0.324	0.214	0.469
030	32.3	0.395	0.387	0.231	0.508	190	10.0	0.336	0.328	0.215	0.471
031	33.1	0.391	0.384	0.229	0.506	191	9.31	0.355	0.336	0.225	0.478
032	33.6	0.393	0.385	0.230	0.507	192	9.20	0.367	0.340	0.231	0.482
033	34.1	0.398	0.387	0.233	0.509	193	9.41	0.378	0.347	0.236	0.487
034	36.3	0.405	0.391	0.235	0.511	194	10.5	0.397	0.352	0.247	0.493
035	37.4	0.414	0.399	0.238	0.516	195	11.2	0.412	0.361	0.253	0.499
036	37.0	0.417	0.403	0.238	0.518	196	11.6	0.449	0.357	0.281	0.503
037	37.7	0.418	0.407	0.237	0.520	197	14.0	0.472	0.364	0.294	0.510
038	38.1	0.418	0.404	0.238	0.519	198	13.9	0.486	0.364	0.304	0.512
039	38.3	0.419	0.407	0.238	0.520	199	14.1	0.489	0.363	0.307	0.512

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Continued											
040	36.4	0.419	0.405	0.239	0.519	200	14.0	0.489	0.372	0.302	0.516
041	24.2	0.461	0.404	0.266	0.525	201	13.1	0.499	0.379	0.305	0.521
042	23.5	0.466	0.403	0.270	0.525	202	13.5	0.501	0.378	0.307	0.521
043	23.4	0.467	0.402	0.271	0.525	203	12.5	0.505	0.377	0.310	0.521
044	25.2	0.469	0.407	0.270	0.527	204	12.9	0.507	0.380	0.310	0.523
045	25.3	0.470	0.413	0.268	0.530	205	12.2	0.476	0.387	0.285	0.521
046	25.3	0.474	0.415	0.270	0.531	206	10.9	0.460	0.392	0.271	0.520
047	23.3	0.482	0.421	0.272	0.535	207	10.2	0.448	0.394	0.262	0.519
048	23.4	0.491	0.428	0.275	0.538	208	9.17	0.446	0.397	0.260	0.520
049	27.5	0.484	0.436	0.267	0.540	209	9.31	0.438	0.398	0.254	0.519
050	32.4	0.474	0.459	0.251	0.546	210	8.58	0.430	0.401	0.247	0.519
051	33.0	0.464	0.463	0.243	0.546	211	9.80	0.423	0.412	0.238	0.522
052	31.1	0.458	0.466	0.239	0.546	212	9.58	0.420	0.418	0.234	0.524
053	25.3	0.445	0.461	0.233	0.543	213	10.1	0.417	0.414	0.234	0.522
054	23.2	0.440	0.460	0.230	0.542	214	10.2	0.410	0.421	0.227	0.524
055	17.9	0.420	0.452	0.222	0.536	215	11.0	0.401	0.425	0.220	0.524
056	18.0	0.408	0.432	0.221	0.528	216	11.4	0.399	0.423	0.219	0.523
057	18.1	0.398	0.423	0.219	0.523	217	11.5	0.389	0.425	0.213	0.522
058	18.0	0.392	0.414	0.218	0.519	218	11.1	0.389	0.424	0.213	0.522
059	17.9	0.383	0.407	0.215	0.515	219	10.8	0.386	0.422	0.212	0.521
060	16.4	0.377	0.403	0.213	0.512	220	11.1	0.387	0.409	0.217	0.516
061	16.5	0.376	0.396	0.215	0.509	221	11.1	0.381	0.404	0.215	0.513
062	19.0	0.378	0.391	0.218	0.507	222	10.4	0.381	0.400	0.217	0.512
063	20.1	0.374	0.384	0.218	0.504	223	10.9	0.373	0.393	0.214	0.508
064	20.7	0.370	0.378	0.218	0.501	224	10.1	0.380	0.392	0.219	0.508
065	20.4	0.365	0.372	0.217	0.497	225	10.6	0.371	0.383	0.217	0.503
066	20.2	0.361	0.368	0.216	0.495	226	10.6	0.351	0.362	0.211	0.491
067	21.3	0.366	0.369	0.219	0.496	227	9.91	0.356	0.354	0.218	0.488
068	20.2	0.356	0.356	0.217	0.488	228	10.0	0.346	0.342	0.216	0.480
069	17.7	0.341	0.340	0.213	0.478	229	9.09	0.349	0.343	0.218	0.481
070	18.3	0.345	0.342	0.215	0.480	230	8.58	0.349	0.334	0.221	0.476
071	21.3	0.371	0.363	0.224	0.494	231	9.04	0.364	0.339	0.230	0.481
072	20.6	0.368	0.358	0.224	0.491	232	8.14	0.372	0.348	0.231	0.487
073	22.4	0.386	0.373	0.230	0.501	233	9.61	0.388	0.362	0.236	0.496
074	25.0	0.406	0.376	0.242	0.505	234	9.64	0.399	0.360	0.245	0.497
075	24.5	0.424	0.375	0.255	0.507	235	9.94	0.412	0.370	0.249	0.503
076	26.1	0.438	0.383	0.261	0.513	236	10.2	0.426	0.366	0.261	0.504
077	27.8	0.437	0.386	0.259	0.514	237	10.9	0.457	0.364	0.283	0.508
078	27.6	0.441	0.388	0.260	0.516	238	12.3	0.472	0.369	0.291	0.512
079	28.4	0.443	0.389	0.261	0.516	239	12.6	0.490	0.365	0.306	0.513
080	25.2	0.448	0.392	0.263	0.518	240	12.6	0.484	0.369	0.300	0.514
081	19.1	0.478	0.389	0.285	0.522	241	10.9	0.485	0.384	0.292	0.521
082	16.4	0.486	0.384	0.293	0.521	242	11.4	0.481	0.384	0.290	0.520

Continue	d										
083	15.3	0.497	0.380	0.303	0.521	243	10.7	0.484	0.380	0.294	0.519
084	17.1	0.494	0.393	0.294	0.526	244	10.7	0.473	0.386	0.283	0.520
085	18.0	0.494	0.359	0.313	0.511	245	10.7	0.454	0.389	0.269	0.518
086	16.5	0.505	0.394	0.301	0.528	246	9.16	0.439	0.392	0.257	0.517
087	18.7	0.498	0.407	0.289	0.532	247	8.64	0.432	0.397	0.250	0.518
088	21.0	0.491	0.417	0.280	0.534	248	8.61	0.425	0.401	0.244	0.518
089	22.4	0.474	0.428	0.264	0.536	249	8.49	0.423	0.398	0.244	0.517
090	22.2	0.462	0.439	0.252	0.538	250	7.97	0.422	0.401	0.242	0.518
091	21.8	0.454	0.445	0.244	0.539	251	8.16	0.419	0.402	0.240	0.518
092	20.1	0.445	0.453	0.236	0.540	252	8.51	0.415	0.404	0.237	0.518
093	19.6	0.427	0.454	0.225	0.538	253	9.50	0.413	0.403	0.236	0.517
094	17.1	0.413	0.446	0.220	0.533	254	8.94	0.414	0.404	0.236	0.518
095	15.6	0.405	0.437	0.218	0.529	255	10.4	0.407	0.411	0.229	0.520
096	14.4	0.396	0.434	0.214	0.527	256	10.7	0.404	0.414	0.226	0.520
097	14.0	0.380	0.421	0.208	0.520	257	10.5	0.394	0.421	0.217	0.522
098	15.0	0.378	0.409	0.211	0.515	258	11.0	0.399	0.413	0.223	0.519
099	14.3	0.377	0.402	0.213	0.512	259	9.99	0.401	0.410	0.225	0.518
100	14.0	0.368	0.394	0.211	0.507	260	10.8	0.396	0.408	0.223	0.517
101	14.2	0.366	0.393	0.210	0.506	261	10.1	0.393	0.406	0.222	0.516
102	13.8	0.361	0.384	0.210	0.502	262	9.80	0.395	0.397	0.227	0.512
103	15.3	0.360	0.379	0.211	0.500	263	10.0	0.392	0.392	0.227	0.510
104	15.0	0.348	0.364	0.209	0.491	264	9.19	0.384	0.387	0.223	0.507
105	15.1	0.347	0.360	0.210	0.489	265	9.93	0.385	0.382	0.226	0.505
106	15.5	0.345	0.354	0.210	0.486	266	9.69	0.378	0.376	0.224	0.501
107	15.6	0.341	0.351	0.209	0.484	267	8.82	0.377	0.370	0.226	0.498
108	13.9	0.326	0.331	0.206	0.471	268	9.11	0.368	0.359	0.224	0.492
109	14.1	0.331	0.329	0.211	0.471	269	9.72	0.372	0.352	0.230	0.489
110	13.5	0.333	0.326	0.213	0.470	270	9.02	0.371	0.353	0.229	0.489
111	13.4	0.356	0.345	0.222	0.483	271	9.39	0.378	0.356	0.232	0.492
112	14.2	0.369	0.347	0.230	0.486	272	9.45	0.387	0.362	0.236	0.496
113	15.7	0.389	0.354	0.241	0.492	273	8.72	0.394	0.368	0.238	0.500
114	16.4	0.403	0.359	0.248	0.497	274	9.33	0.400	0.372	0.240	0.502
115	18.7	0.429	0.365	0.263	0.504	275	9.41	0.405	0.377	0.241	0.505
116	19.7	0.454	0.369	0.279	0.509	276	9.26	0.410	0.377	0.245	0.506
117	19.6	0.456	0.369	0.280	0.510	277	9.18	0.421	0.374	0.253	0.506
118	18.7	0.460	0.372	0.281	0.512	278	10.8	0.459	0.369	0.282	0.510
119	19.8	0.463	0.375	0.282	0.513	279	11.0	0.462	0.370	0.284	0.511
120	20.2	0.462	0.377	0.280	0.514	280	11.7	0.458	0.377	0.277	0.513
121	14.1	0.497	0.380	0.303	0.521	281	9.37	0.432	0.389	0.254	0.515

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Continued											
122	13.7	0.503	0.380	0.307	0.522	282	9.72	0.443	0.388	0.262	0.516
123	14.8	0.505	0.381	0.308	0.523	283	9.12	0.442	0.390	0.260	0.517
124	14.3	0.507	0.379	0.310	0.522	284	9.70	0.435	0.390	0.256	0.515
125	15.5	0.507	0.387	0.306	0.525	285	9.37	0.425	0.393	0.248	0.515
126	15.7	0.505	0.392	0.302	0.527	286	7.91	0.427	0.393	0.249	0.515
127	15.5	0.490	0.403	0.286	0.529	287	9.21	0.422	0.396	0.244	0.516
128	14.7	0.478	0.407	0.276	0.529	288	8.83	0.419	0.399	0.241	0.517
129	16.0	0.463	0.421	0.260	0.532	289	8.19	0.417	0.401	0.239	0.517
130	16.5	0.448	0.425	0.249	0.531	290	8.79	0.417	0.400	0.239	0.517
131	16.9	0.438	0.435	0.239	0.533	291	8.69	0.415	0.403	0.237	0.518
132	16.2	0.429	0.440	0.231	0.534	292	8.67	0.416	0.402	0.238	0.517
133	14.5	0.423	0.440	0.228	0.533	293	8.81	0.417	0.400	0.239	0.517
134	13.0	0.404	0.437	0.217	0.529	294	9.84	0.414	0.401	0.237	0.517
135	12.1	0.398	0.436	0.214	0.528	295	9.63	0.414	0.396	0.239	0.515
136	11.6	0.389	0.434	0.209	0.526	296	8.98	0.415	0.395	0.240	0.515
137	11.9	0.384	0.426	0.209	0.522	297	8.79	0.412	0.397	0.238	0.515
138	11.6	0.376	0.414	0.208	0.516	298	9.34	0.407	0.403	0.232	0.517
139	12.2	0.368	0.402	0.208	0.510	299	9.83	0.409	0.399	0.235	0.515
140	11.8	0.369	0.401	0.209	0.510	300	9.62	0.412	0.397	0.238	0.515
141	12.1	0.365	0.392	0.209	0.506	301	8.97	0.414	0.399	0.238	0.516
142	11.5	0.357	0.383	0.208	0.501	302	8.67	0.413	0.398	0.238	0.515
143	11.4	0.352	0.377	0.207	0.498	303	8.88	0.407	0.396	0.235	0.514
144	12.0	0.344	0.367	0.205	0.492	304	9.91	0.410	0.389	0.240	0.511
145	11.7	0.338	0.350	0.207	0.483	305	9.34	0.409	0.390	0.238	0.512
146	11.8	0.330	0.344	0.204	0.479	306	9.13	0.408	0.393	0.237	0.513
147	12.3	0.338	0.340	0.211	0.478	307	9.20	0.399	0.383	0.235	0.507
148	12.4	0.327	0.324	0.210	0.468	308	9.77	0.403	0.381	0.238	0.507
149	11.2	0.324	0.323	0.208	0.467	309	9.81	0.403	0.379	0.239	0.506
150	10.3	0.334	0.324	0.215	0.469	310	10.0	0.399	0.374	0.239	0.503
151	10.0	0.358	0.344	0.223	0.483	311	9.87	0.397	0.372	0.238	0.502
152	10.5	0.365	0.340	0.230	0.482	312	8.58	0.400	0.375	0.239	0.504
153	12.2	0.386	0.351	0.240	0.491	313	9.91	0.404	0.380	0.239	0.507
154	12.6	0.398	0.353	0.247	0.493	314	8.92	0.410	0.386	0.241	0.510
155	12.1	0.419	0.355	0.261	0.498	315	8.40	0.414	0.390	0.242	0.512
156	15.2	0.462	0.363	0.287	0.508	316	8.13	0.409	0.392	0.238	0.512
157	16.1	0.469	0.366	0.291	0.510	317	8.36	0.410	0.389	0.240	0.511
158	15.6	0.474	0.368	0.293	0.512	318	8.47	0.416	0.387	0.244	0.511
159	14.8	0.486	0.367	0.302	0.514	319	8.23	0.418	0.387	0.246	0.512
160	15.8	0.478	0.377	0.291	0.517	320	8.79	0.420	0.383	0.249	0.510

Table A2. Highest percentage of tile-naming in the colour mapping: Colour-Chip number, terms used, their English glosses, the percentage of highest total usage, and the average CIE co-ordinates along with the loci of the 11 universal colour foci (Heider, 1971).

					Average CIE C	o-Ordinates	
Colour-Chip	Term	Gloss	%	!		Unive	ersals
				u	v	u'	v'
C 001	Abiyadh	White	41	0.24	0.52	0.20	0.47
C 011	Asfer	Yellow	48	0.24	0.55	0.24	0.55
C 048	Boartoogaalee	Orange	32	0.28	0.54	0.34	0.52
C 117	Wardee	Pink	22	0.28	0.51	0.21	0.47
C 177	Akhdar	Green	17	0.21	0.52	0.13	0.48
C 189	Azrock	Blue	25	0.21	0.47	0.16	0.32
C 194	Banafsagee	Purple	23	0.25	0.49	0.23	0.34
C 239	Ahmar	Red	30	0.31	0.51	0.40	0.51
C 320	Bonee	Brown	73	0.25	0.51	0.23	0.48

Table A3. Detailed results of the colour mapping task (N = 57), the most frequent responses given to each "colour chip" and the percentage (over 10 %) with which they were given (Code = WCS, % = percentage of respondents who used a term for a given tile).

Code	Terms	%															
C1	White	50.9	C2	White	63.2	C3	White	61.4	C4	White	70.2	C5	White	66.7	C6	White	66.7
C7	White	59.6	C8	White	43.9	C9	Yellow	94.7	C10	Yellow	82.5	C11	Yellow	59.6	C12	Yellow	84.2
	Yellow	14.0		Yellow	28.1												
C13	Yellow	98.2	C14	Yellow	93.0	C15	Yellow	36.8	C16	Green	33.3	C17	Green	36.8	C18	Green	29.8
							Green	26.3		White	15.8		White	17.5		White	24.6
										Yellow	14.0						
C19	Green	29.8	C20	Green	26.3	C21	Blue	29.8	C22	Blue	31	C23	Blue	31.6	C24	Blue	29.8
	White	24.6															
							L blue	15.8		L blue	17.5		L blue	12.3		L blue	17.5
C25	Blue	29.8	C26	Blue	29.8	C27	Blue	29.8	C28	Blue	29.8	C29	Blue	29.8	C30	White	50.9
	White	26.3		White	28.1		White	24.6		White	26.3		White	28.1		Blue	17.5
	L blue	15.8		L blue	15.8		L blue	17.5		L blue	17.5		L blue	17.5			
C31	White	52.6	C32	White	57.9	C33	White	66.7	C34	White	57.9	C35	White	68.4	C36	White	73.7
	Blue	17.5		Blue	14.0												
C37	White	71.9	C38	White	68.4	C39	White	63.2	C40	White	61.4	C41	Orange	40.4	C42	Orange	40.4
													Red	19.3		Pink	25.0
													Pink	15.8		Red	19.3
C43	Orange	45.6	C44	Orange	70.2	C45	Orange	84.2	C46	Orange	82.5	C47	Orange	84.2	C48	Orange	63.2
	Red	19.3															
	Pink	17.5															
C49	Orange	80.7	C50	Yellow	63.2	C51	Yellow	89.5	C52	Yellow	94.6	C53	Green	56.1	C54	Green	64.9
				Orange	15.8								Yellow	24.6		Yellow	19.3
C55	Green	91.2	C56	Green	93.0	C57	Green	94.7	C58	Green	93.0	C59	Green	91.2	C60	Green	86.0
C61	Blue	73.7	C62	Blue	80.7	C63	Blue	80.7	C64	Blue	78.9	C65	Blue	78.9	C66	Blue	78.9
				L blue	14.0		L blue	12.3		L blue	11.0		L blue	14.0		L blue	15.8

Contin	ued																
C67	Blue	78.9	C68	Blue	77.2	C69	Blue	89.5	C70	Blue	89.5	C71	Blue	80.7	C72	Blue	80.7
	L blue	15.8		L blue	15.8								L blue	14.0		L blue	14.0
C73	Blue	71.9	C74	Purple	47.4	C75	Pink	80.7	C76	Pink	86.0	C77	Pink	80.7	C78	Pink	84.2
				Pink	36.8												
C79	Pink	82.5	C80	Pink	78.9	C81	Red	77.2	C82	Red	77.2	C83	Red	86.0	C84	Red	75.4
																Orange	14.0
C85	Red	73.7	C86	Red	84.2	C87	Orange	59.6	C88	Orange	70.2	C89	Orange	77.2	C90	Yellow	36.8
	Orange	15.8		Orange	12.3		Red	26.3		Red	14.0					Orange	31.6
C91	Yellow	56.1	C92	Yellow	49.1	C93	Green	82.5	C94	Green	93.0	C95	Green	93.0	C96	Green	96.5
	Green	12.3		Green	35.1												
C97	Green	98.2	C98	Green	98.2	C99	Green	98.2	C100	Green	96.5	C101	Green	89.5	C102	Blue	71.9
C103	Blue	80.7	C104	Blue	94.7	C105	Blue	94.7	C106	Blue	93.0	C107	Blue	91.2	C108	Blue	96.5
C109	Blue	93.0	C110	Blue	94.7	C111	Blue	89.5	C112	Blue	87.7	C113	Purple	87.7	C114	Purple	93.0
C115	Pink	64.9	C116	Pink	68.4	C117	Pink	59.6	C118	Pink	71.9	C119	Pink	66.7	C120	Pink	64.9
	Purple	19.3					Red	17.5		Red	19.3		Red	28.1		Red	29.8
C121	Red	96.5	C122	Red	98.2	C123	Red	96.5	C124	Red	93.0	C125	Red	93.0	C126	Red	89.5
C127	Orange	63.2	C128	Orange	71.9	C129	Orange	80.7	C130	Orange	40.4	C131	Green	49.1	C132	Green	71.9
	Red	24.6		Red	14.0					Yellow	28.1		Yellow	29.8		Yellow	12.3
C133	Green	86.0	C134	Green	96.5	C135	Green	96.5	C136	Green	96.5	C137	Green	94.7	C138	Green	94.7
C139	Green	98.2	C140	Green	98.2	C141	Green	96.5	C142	Blue	54.4	C143	Blue	70.2	C144	Blue	93.0
										Green	35.1		Green	19.3			
C145	Blue	94.7	C146	Blue	94.7	C147	Blue	89.5	C148	Blue	94.7	C149	Blue	80.7	C150	Blue	93.0
C151	Blue	96.5	C152	Blue	82.5	C153	Purple	91.2	C154	Purple	89.5	C155	Purple	80.7	C156	Pink	71.9
																Red	19.3
C157	Pink	68.4	C158	Pink	43.9	C159	Red	64.9	C160	Red	63.2	C161	Red	96.5	C162	Red	96.5
	Red	24.6		Red	42.1					Pink	33.3						
C163	Red	86.0	C164	Red	93.0	C165	Red	96.5	C166	Red	91.2	C167	Red	54.4	C168	Orange	66.7
													Orange	33.3		Red	17.5
C169	Orange	56.1	C170	Orange	40.4	C171	Green	70.2	C172	Green	70.2	C173	Green	93.0	C174	Green	94.7
	Brown	17.5		Yellow	14.0												
C175	Green	100.00	C176	Green	100.0	C177	Green	84.2	C178	Green	89.5	C179	Green	93.0	C180	Green	91.2
C181	Green	94.7	C182	Green	96.5	C183	Green	89.5	C184	Blue	82.5	C185	Blue	91.2	C186	Blue	91.2
C187	Blue	94.7	C188	Blue	96.5	C189	Blue	78.9	C190	Blue	100.0	C191	Blue	91.2	C192	Blue	47.4
																Purple	38.6
C193	Purple	54.4	C194	Purple	77.2	C195	Purple	89.5	C196	Pink	59.6	C197	Pink	52.6	C198	Red	54.4
	Blue	29.8								Red	24.6		Red	33.3		Pink	35.1
C199	Red	59.6	C200	Red	68.4	C201	Red	96.5	C202	Red	89.5	C203	Red	86.0	C204	Red	84.2
	Pink	28.1		Pink	29.8												
C205	Red	96.5	C206	Red	49.1	C207	Brown	56.1	C208	Brown	59.6	C209	Brown	56.1	C210	Brown	49.1
				Brown	38.6		Red	22.8		Red	15.8						
C211	Green	68.4	C212	Green	68.4	C213	Green	77.2	C214	Green	86.0	C215	Green	100	C216	Green	100
C217	Graan	08 2	C212	Graan	06.5	C210	Graan	017	C220	Graan	06.5	C2213	Graan	100	C2210	Graan	080
C217	Green	90.Z	C218	Green	70.3	C219	Green	74./	0220	D	70.5	C221	Dieen	100	0222	Dieen	70.2
C223	Green	100	C224	Green	94.7	C225	Green	89.5	C226	Blue	93.0	C227	Blue	94.7	C228	Blue	98.2

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Contin	ued																
C229	Blue	98.2	C230	Blue	78.9	C231	Blue	71.9	C232	Purple	47.4	C233	Purple	64.9	C234	Purple	86.0
										Blue	45.6		Blue	24.6			
C235	Purple	86.0	C236	Purple	59.6	C237	Pink	54.4	C238	Red	66.7	C239	Red	56.1	C240	Red	66.7
				Pink	21.1		Red	38.6		Pink	33.3		Pink	33.3		Pink	33.3
C241	Red	94.7	C242	Red	98.2	C243	Red	98.2	C244	Red	96.5	C245	Red	84.2	C246	Brown	49.1
																Red	33.3
C247	Brown	59.6	C248	Brown	49.1	C249	Brown	64.9	C250	Brown	50.9	C251	Green	28.1	C252	Green	33.3
													Brown	24.6		Brown	15.8
C253	Green	35.1	C254	Green	38.6	C255	Green	98.2	C256	Green	100	C257	Green	93.0	C258	Green	100
	Brown	15.8		Brown	12.3												
C259	Green	100	C260	Green	100.	C261	Green	100	C262	Green	100	C263	Green	100	C264	Green	96.5
C265	Green	91.2	C266	Green	70.2	C267	Green	64.9	C268	Blue	89.5	C269	Blue	73.7	C270	Blue	70.2
				Blue	19.3		Blue	28.1					Purple	17.5		Purple	21.1
C271	Blue	64.9	C272	Purple	43.9	C273	Purple	70.2	C274	Purple	86.0	C275	Purple	84.2	C276	Purple	75.4
	Purple	24.6		Blue	42.1		Blue	19.3									
C277	Purple	66.7	C278	Red	70.2	C279	Red	66.7	C280	Red	66.7	C281	Brown	47.8	C282	Brown	47.4
				Pink	29.8		Pink	29.8		Pink	29.8		Red	22.8		Red	28.1
C283	Brown	45.6	C284	Brown	42.1	C285	brown	56.1	C286	brown	54.4	C287	brown	47.8	C288	brown	40.4
	Red	28.1		Red	28.1		black	12.3		black	12.3		black	22.8		black	28.1
C289	brown	35.1	C290	brown	35.1	C291	Brown	29.8	C292	brown	28.9	C293	brown	28.9	C294	brown	28.9
	black	29.8		black	31.6		Black	26.3		black	22.8		black	24.6		black	24.6
C295	Green	29.8	C296	Green	31.6	C297	Green	36.8	C298	Green	64.9	C299	Green	64.9	C300	Green	64.9
	Black	15.8		Black	15.8		Black	12.3									
C301	Green	36.8	C302	Green	45.7	C303	Green	36.8	C304	Green	35.1	C205	Green	35.1	C306	Green	26.3
							Black	12.3		Black	12.3		Black	12.3			
C307	Green	17.5	C308	Blue	19.3	C309	Blue	22.8	C310	Blue	35.1	C311	Blue	35.1	C312	Blue	17.5
	Blue	14.0		Green	14.0					Purple	17.5		Purple	19.3		Brown	15.8
																Black	15.8
																purple	12.3
C313	Brown	19.3	C314	Brown	22.8	C315	Brown	24.6	C316	Brown	24.6	C317	Brown	24.6	C318	Brown	28.1
	Black	19.3		Purple	17.5		Black	19.3		Black	17.5		Black	17.5		Black	15.8
	purple	14.0		Black	15.8		purple	17.5		purple	15.8		purple	15.8		purple	15.8
				grey	12.3					grey	12.3		grey	12.3			
C319	Brown	29.8	C320	Brown	15.8												
	purple	15.8		purple	15.8												
	Black	14.0		Black	14.0												



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