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What does your favourite colour say about your personality? Not much

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Abstract

The claim that favourite colours reveal individuals' personalities is popular in the media yet lacks scientific support. We assessed this claim in two stages. First, we catalogued claims from six popular websites, and matched them to key Big Six/HEXACO trait terms, ultimately identifying 11 specific, systematic, testable predictions (e.g., higher Extraversion among those who prefer red, orange, yellow, pink, or turquoise). Next, we tested these predictions in terms of Big Six trait scores and reports of favourite and least favourite colours from 323 French-speaking participants. For every prediction (e.g., red-extraversion), we compared trait scores between participants who chose or did not choose the predicted colour using Welch's *t*-tests. We failed to confirm any of the 11 predictions. Further exploratory analyses (MANOVA) revealed no associations between colour preferences and personality trait. Favourite colours appear unrelated to personality, failing to support the practical utility of colour-based personality assessment.

Keywords: colour preference, 30QB6 Big Six, beliefs, individual differences, personality correlates, HEXACO

Highlights

- Popular media and projective tests claim that favourite colours reveal one's personality
- We were able to identify 11 testable personality-colour predictions
- We tested these predictions against Big Six questionnaire data
- Favourite colours did not predict Big Six personality traits

Relevance Statement

Popular channels and professionally used personality tests convey claims that favourite colours reveal personality. This study uses lexical and empirical methods to identify and test such claims and show that they do not. We provide a model for testing other popular claims about personality.

1. Introduction

History includes many creative attempts to reveal hidden character and personality traits. These can range from the analysis of handwriting, to the shape and ridges of the skull, to the arrangement of stars and planets at a person's time of birth. While some of these approaches have been discredited and fallen into disuse, others are billion-dollar industries¹, providing a parallel to the scientific work of personality psychology, and are often better known to the public. While personality scientists have other scientific and applied priorities, we believe that applying creative empirical methods to addressing this parallel domain of personality assessment could contribute to society. It provides concrete evidence for the utility or the lack thereof for popular 'parallel' models. Thus, the current study uses lexical and empirical methods to identify and test such claims with regard to colour preferences. This domain is of interest due to its prevalence on popular media, its financial profile, and because the question is also of relevance to colour psychologists, who study how colour contributes to social interactions and human behaviour (Elliot & Maier, 2014; Palmer et al., 2013).

The sensory experience of colour seems so convincing that corporations pay for colour-based personality tests to select future employees². Colour is assumed to convey comprehensive messages about oneself and others. For example, one can read that those who love red are "extroverted and optimistic, confident and courageous" while those who love blue are "conservative, reliable and trustworthy" (Scott-Kemmis, 2018). Another example reads that those who prefer red are "fiery and energetic" and have a "strong personality" while those who prefer blue are the "meditative type, ... good at keeping calm and level-headed" (McArthur, 2017). These examples demonstrate that such colour-personality claims are presented as facts, although scientific validation is missing.

In the scientific literature, we can distinguish between two major types of commercially available colour-based personality tests. In the first type of tests (e.g., Lüscher, 1969), participants rank pre-selected colours by preference and this ranking supposedly describes personality traits and people's motivations. If darker colours are ranked more highly, participants should have more psychological issues. However, the test by Lüscher showed low construct validity (e.g., French & Alexander, 1972). The second type of tests (e.g., Hartman, 1987) uses participants' responses to a particular personality questionnaire to attribute them to one of usually four colour groups. The groups represent different personalities and motivational styles. For instance, people in the "red" group are motivated by power and "generally are responsible, decisive, proactive and assertive". Those in the "blue" group are motivated by intimacy and "are generally loyal, sincere, and thoughtful" (Color Code LCC, 2021). Hartman's test weakly correlated with scientifically validated objective personality tests, showing low construct validity (Ault & Barney, 2007). Both types of tests belong to so-called projective personality tests requiring a substantial degree of interpretation. Unfortunately, while rarely reliable, such tests are popular among non-scientific communities (Sartori, 2010), and in applied domains, often generating high profits.

Beyond such tests, a few prior studies have tested the associations between colours and more established personality trait measures (Bakker et al., 2013; Bimler et al., 2014; Cigić & Bugarski, 2010; He et al., 2011; Lange & Rentfrow, 2007; Pazda & Thorstenson, 2018; Rosenbloom, 2006).

¹ <https://www.newyorker.com/magazine/2019/10/28/astrology-in-the-age-of-uncertainty>

² See some examples here: <https://www.testgroup.nl/en/4-colour-test-the-bridge-personality-colour/>
<https://www.colorcode.com/>

Only two of these, however, directly tested the validity of colour-personality relationships (Bimler et al., 2014; He et al., 2011). Bimler and colleagues (2014) had participants complete a validated Big Five personality questionnaire (International Personality Item Pool) and assessed their colour preferences with a forced-choice paradigm, meaning, in each trial, participants chose their favourite colour patch from three alternatives. They found that higher Openness scores correlated with lower preference for blue and higher preference for red and pink. Higher Neuroticism scores correlated with lower preference for blue and higher preference for red and purple. Finally, higher Agreeableness scores correlated with higher preference for green and lower preference for pink and purple. In another study, participants completed Zuckerman and Kuhlman's Alternative Five questionnaire and ranked their preferences for 11 colour patches, corresponding to the 11 basic colour terms (He et al., 2011). Here, higher Sociability, Neuroticism-Anxiety, and Aggression-Hostility scores correlated, respectively, with lower preference for yellow, higher preference for grey, and lower preference for orange.

It is challenging to link such empirical findings to claims in the popular media and projective tests for at least three reasons. First, such claims are numerous and diverse, and not based on the outcomes of the scarce empirical studies. Second, such claims deal mainly with favourite colours (i.e., absolute colour preferences). In contrast, the empirical studies assessed only relative preferences on pre-selected colours, rather than absolute preferences. Third, "personality" descriptions in such claims are often vivid but hard to operationalize. For example, one website describes red lovers as "action oriented with a deep need for physical fulfilment and to experience life through the five senses" (Scott-Kemmis, 2018). The same website described purple lovers as "gentle and free spirit, [whose] feelings run deep and [who] can be quite sensitive to hurtful comments from others, although [they] would never show it." Trying to identify relevant personality traits in these descriptions and relate them to validated personality models like the Big Five and the Big Six is challenging and somewhat subjective.

In the current study, we tested the validity of claims that colour preferences predict one's personality in two stages. In the first stage, we catalogued specific favourite colour/personality claims made on six websites in three languages. We focused on websites because of their widespread availability. Using a lexical approach, we then linked these claims to specific Big Six/HEXACO traits using published lists of the key traits in these models (Ashton et al., 2004; Ashton & Lee, 2007; Saucier, 2009). Finally, we selected claims that systematically appeared on the majority of the websites. In the second stage, a sample of French-speaking participants named their favourite and least favourite colours and categorised their spontaneous choices into 13 predefined categories. Participants also completed the 30QB6 Big Six personality inventory (Thalmayer & Saucier, 2014). We used these empirical data to statistically test the validity of the determined claims, and to explore for potential other colour-personality-trait relationships.

2. Stage 1: Determination of Website's Claims

2.1. Compilation of Websites

We selected psychology websites in four steps. In the first step, we profited from our multilingual research team by selecting sites in English, French, and German that described how favourite colour indicates personality traits. In Google, we used the search terms "personality" and "colour". We retained a website for analysis if it explicitly 1) used favourite colours as categories, 2) included many of our pre-defined colour categories (see *Colour preferences*) as opposed to only four colours (e.g., red, yellow, green, blue), 3) linked colours to personality

characteristics, 4) provided reasonably detailed personality descriptions, and 5) did not use highly similar wording as another website we had already selected.

We did not aim to compile all possible colour-personality websites but aimed for a representative selection of independent websites to determine common colour-personality claims circulating the Internet. We captured the information at the moment of data extraction in March 2020 using screenshots (available in Supplemental material; <https://osf.io/ucrxd/>). Our search strategy and criteria led us to choose the following six websites:

1. Empower yourself (in English, <https://www.empower-yourself-with-color-psychology.com/personality-color.html>, henceforth referred to as EN1)
2. Sweetly high (EN2, in English, <https://www.sweetlyhigh.com/read/favorite-color-personality-052917>)
3. Louise M (EN3, in English, <https://louisem.com/60206/favorite-color-say-infographic>)
4. Santé plus (FR1, in French, <https://www.santeplusmag.com/votre-couleur-preferee-en-dit-long-sur-votre-personnalite/>)
5. Terra Femina (FR2, in French, <https://www.terrafemina.com/forme/bien-etre-beaute/articles/54484-ce-que-votre-couleur-preferee-revele-de-votre-personnalite.html>)
6. Idee Für Mich (DE1, in German, <https://www.idee-fuer-mich.de/bekennen-sie-farbe-was-ihre-liebblingsfarbe-ueber-ihre-persoenlichkeit-aussagt-980.html>)

2.2. Lexical Analysis of Personality Descriptors

In the second step, we extracted the terms used to describe personality expression from each website, separately for each colour (see Table S 1 for English terms and Table S 2 for French and German terms). For the French and German websites, we extracted terms in the original language and then translated them into English, using the relevant Cambridge Dictionary (e.g., <https://dictionary.cambridge.org/dictionary/german-english/>). When a dictionary translation was unavailable or the phrase contained more than two words, we instead relied on DeepL translator (<https://www.deepl.com/en/translator>). Our research team included native-speakers of all three languages, and bilingual speakers of every pair of languages, allowing for ample cross-checking and discussion of the formally derived translations.

In the third step, we matched the personality terms extracted from these websites with the lists of adjectives that define the cross-cultural core of each Big Six personality trait as determined from previous lexical studies. We used three sources: i) The relatively narrow selection of adjectives used to define the HEXACO model (Ashton et al., 2004); ii) the broader selection of adjectives that led to the Questionnaire Big Six inventories (Saucier, 2009); and iii) the list of key terms for the HEXACO inventory (Ashton & Lee, 2007). We counted the instances that personality terms from the websites matched to this combined list of Big Six personality terms (Table S 3). The counts of matches for each website appear in Table S 1 and Table S 2.

2.3. Systematic Website Predictions

In the fourth step, we assessed for convergence of claims across the websites to define testable predictions. We counted the number of websites that associated each colour with each Big Six personality dimension. A website was counted irrespective of how many personality terms matched the terms in the combined list (i.e., one match was enough). We deemed an association convergent across sites if the majority of the websites made the same association (i.e., associated the same colour with the same Big Six trait).

Accordingly, we formulated testable predictions for red, orange, yellow, green, blue, purple, white, and black. Here, four out of six websites endorsed the same colour-personality associations. In the cases of pink, brown, and grey, we had information from only five websites. Accordingly, we formulated testable predictions when three out of five websites endorsed the same colour-personality associations. For turquoise, we had information from only two websites and kept testable predictions when one out two endorsed a colour-personality association. We were unable to formulate testable predictions for yellow-green because this colour was never mentioned in the websites. The count of websites making each prediction is presented in Table S 4 and the initial lists of predictions is presented in Table 1.

When then eliminated six predictions for practical reasons (see Table 1, column Included/Excluded). Three predictions, relating to brown or grey were removed from further analyses, because fewer than 10 participants chose these as their favourite colour, leading to sample sizes too low to test the hypotheses. We eliminated three other predictions because the websites hypothesised opposite relationships for the same personality trait and colour. For example, four websites hypothesised a link between blue and Openness/Originality. But two of these predicted lower Openness/Originality (i.e., “conservative”), one higher (“wise”), and one both (“conservative”, “intellectual”, “talented”) for people who love blue. After this exclusion procedure, we arrived at 11 testable predictions, summarised in Table 1.

Table 1. Systematic predictions extracted from the websites.

Colour	Big Six personality trait	Matching terms	Direction	Included/Excluded
Red	Extraversion	active (2), extraverted (2) and outgoing	Positive	Included
Orange	Extraversion	cheerful, sociable (4), extraverted (2), friendly (2), and lively	Positive	Included
Yellow	Extraversion	cheerful (3), sociable, shy, and talkative	Positive	Included
Yellow-green	No prediction	No systematic matches	None	Excluded, no prediction
Green	Agreeableness	kind, calm, generous, understanding, anxious, peaceful, patient, and gentle	Positive	Included
Turquoise	Agreeableness	flexible	Positive	Included
Turquoise	Resilience	emotional and stable	Contradictory	Excluded, contradictory predictions
Turquoise	Extraversion	friendly	Positive	Included
Turquoise	Openness/Originality	creative	Positive	Included
Blue	Openness/Originality	intellectual, conservative (3), talented, and wise	Contradictory	Excluded, contradictory predictions
Purple	No prediction	No systematic matches		Excluded, no prediction
Pink	Agreeableness	kind, generous, gentle, and easy-going	Positive	Included
Pink	Extraversion	Sociable, outgoing, and friendly (2)	Positive	Included
Brown	Conscientiousness	industrious, diligent, responsible (2), dutiful, thorough, and conscientious	Positive	Excluded, count too small
Brown	Extraversion	quiet and friendly (3)	Positive	Excluded, count too small
White	Conscientiousness	careful, neat, organised (2), and frivolous	Positive	Included
White	Openness/Originality	clever, wise (2), not shallow, and original	Positive	Included
Grey	Resilience	stable (3) and unemotional	Positive	Excluded, count too small
Black	Openness/Originality	important, conservative, conventional (2), and creative	Contradictory	Excluded, contradictory predictions

Note. In the column “matching terms”, numbers refer to the number of websites that used each term in their descriptions; no number means a single mention. We analysed the systematic predictions marked as “Included” in the “Included/Excluded” column. Predictions marked as “Excluded, count too small” would be testable with a larger sample size.

3. Stage 2: Validation of Website's Claims

3.1. Participants

Our sample included 341 (56 men) first-year psychology students with a mean age of 20.19 years (range 17-30, $SD = 2.06$). All participants lived in Switzerland and the majority (82%) were native speakers of French. All participants, irrespective of their native language, reported being fluent in French on a 1-8 Likert-type scale, where eight indicated complete fluency ($M = 6.26$, $SD = 0.81$).

We aimed to include at least 84 participants for the MANOVA tests to achieve a power of 0.80 (*WebPower* R package, Zhang & Mai, 2018), assuming a medium effect size ($r = .40$), based on an earlier study (Bimler et al., 2014). We recruited participants taking part in the introductory course on Methods in Experimental Psychology. All volunteers were remunerated with course credit. Having fixed a recruitment period (October 2019), we tested every volunteer, surpassing our minimum sample size. Our sample size was larger than in most (Bimler et al., 2014; Jeon et al., 2020; Palmer & Schloss, 2010) and comparable to a couple of other colour preference studies (He et al., 2011; Pazda & Thorstenson, 2019). The study was conducted in accordance with the ethical principles expressed in the Declaration of Helsinki. No explicit ethical approval was obtained as it was not required by local law (Canton of Vaud).

3.2. Colour Preferences

Participants named their favourite and least favourite colours in randomised order, each time in two steps. In the first step, participants typed the term for the colour they like the most or the least in an open answer format. In the second step, participants chose one of 13 predefined colour categories that best matched the colour they had written in: *red, orange, yellow, yellow-green, green, turquoise, blue, purple, pink, brown, white, grey, and black*³ (always appearing in this order). These categories included the 11 basic colour terms in French (Berlin & Kay, 1969; Morgan, 1993). We added two additional colour categories, *yellow-green* and *turquoise*, as they have been found to be important in previous studies on colour preferences (Jonaskaite et al., 2016, 2019; Palmer & Schloss, 2010). Throughout, we exclusively worked with colour terms; we did not show actual colours. This methodological choice is justified considering high similarity in colour-affect associations between terms and patches (Jonaskaite, Parraga, et al., 2020).

3.3. Self-Report Personality Questionnaire

The 30-item cross-cultural QB6 assesses six broad personality traits: Conscientiousness, Honesty, Agreeableness, Resilience, Extraversion, and Openness/Originality (Thalmayer & Saucier, 2014). Each of the 30 items presents a statement (e.g., "I rarely worry") for which participants rate the degree of accuracy it describes themselves on a 5-point Likert-type scale. Fourteen items are reversely coded. Average scores and internal consistency values for our sample are presented in Table S 5. This model has close correspondences with the Big Five traits and the HEXACO model (Thalmayer et al., 2011), in addition to high cross-cultural applicability

³ In French, *rouge, orange, jaune, jaune-vert, vert, turquoise, bleu, violet, rose, brun, blanc, gris, noir*.

(Thalmayer & Saucier, 2014). We obtained the French-language version from <https://psychometriglossia.uoregon.edu/>

3.4. Procedure

We used the LimeSurvey platform (LimeSurvey Project Team, 2020) to collect data online in French. Participants started by reading information about the study and providing their informed consent to participate. We asked their age and gender, and their names for the purpose of providing course credit. (The names were deleted before any data treatment or analysis.) Participants then completed a colour-emotion association task, reported elsewhere. Relevant to this study, participants reported their favourite and least favourite colours in randomised order and completed the Big Six questionnaire. At the end of the study, participants reported further demographic information (colour blindness, country of origin, country of residence, French fluency). Afterwards, they were thanked and debriefed. The entire study took about 15-20 minutes to complete.

3.5. Data Preparation

We excluded 12 potentially colour-blind participants. Three participants (one man) reported being colour-blind and nine participants (two men) were not sure if they were colour-blind. Furthermore, we excluded six participants (one man) who did not correctly categorise their favourite or least favourite colour (e.g., categorised “red” as “white”, or “white” as “turquoise”). For analysis, we retained a final sample of 323 participants (52 men).

3.6. Design and Statistical Analyses

3.6.1. Confirmatory Analysis

Welch's t-tests were used to test each prediction (Table 1). We chose Welch's t-test instead of Student's due to our uneven sample sizes and confirmed normality by visual inspection. In every test, we compared scores of the relevant personality trait (e.g., Extraversion) between participants who indicated that the relevant colour (e.g., yellow) was their favourite colour and all participants who indicated that any other colour was their favourite (e.g., any but yellow). We used one-tailed tests since the predictions were directional. We controlled for multiple comparisons with False Discover Rate (FDR) correction for the p -values (Benjamini & Hochberg, 1995).

3.6.2. Exploratory Analysis

We devised two analogous MANCOVA tests to assess whether colour preferences predicted any personality traits, irrespective of the predictions made on websites. We entered favourite colour in the first MANCOVA model as an independent variable, and least favourite colour in the second MANCOVA model. In these analyses, colour choices selected by fewer than 10 participants were grouped together into the category “other”. For favourite colours, the category “other” included yellow-green, brown and grey while for least favourite colours the category “other” included red, turquoise, blue, and white (see Table 2). As dependent variables, we included the six personality traits – Conscientiousness, Honesty, Agreeableness, Resilience, Extraversion, and Openness/Originality. As a covariate, we included sex (Bimler et al., 2014; He et al., 2011). We used deviation planned comparisons to interpret which favourite or least favourite colour, if any, predicted higher scores on any personality trait. These tests were two-tailed.

3.6.3. Common to Both Analyses

We supplemented both types of analyses with the calculation of the Bayes factor (Jarosz & Wiley, 2014; Wagenmakers, 2007), using the Bayes Factor R package (Morey & Rouder, 2018) and default priors of 0.707. The Bayes factor compared the fit of the data under the null hypothesis with the fit of the data under the alternative hypothesis. In case of the null results, the Bayes factor (BF_{01}) provided the likelihood that our data occurred under the null hypothesis relative to the likelihood under the alternative hypothesis. The BF_{10} (i.e., $1/BF_{01}$) provided the likelihood that our data occurred under the alternative hypothesis relative to the likelihood under the null hypothesis.

All statistical analyses were conducted in SPSS Version 26 or R Studio Version 1.3.1073 (R Version 4.0.2., R Core Team, 2020). Alpha level was set to .05.

3.7. Transparency, Openness, and Reproducibility

We did not pre-register hypotheses or any other methods because we only extracted our hypotheses in Stage 1. Materials, data, and analysis scripts are available online (<https://osf.io/ucrxq/>). Note that we also collected colour associations with emotion concepts in the same testing session, which were not analysed here.

4. Results

4.1. Colour Preferences

Participants named 104 specific shades of colours as their favourite and 82 as their least favourite in the open answer format (Table S 6). The colour terms named were quite varied, including *dark raspberry*, *lime green*, and *indigo* for favourite colours, and *goose poop green*, *mouse grey*, and *aubergine* for least favourite colours. A few shades, like *lilac*, *bright green*, *mustard yellow*, *khaki*, and *fuchsia*, were named as favourite by some participants but least favourite by others, showing the diversity in individual colour preferences. These examples are all non-basic colour terms, each of which can be more or less easily categorised into the 11 basic colour terms (for further reading on non-basic colour terms, see Biggam, 2012). Around half of the participants instead provided a basic colour term (e.g., *red*, *green*) in the open answer format, slightly more often for least favourite (66.2%) as compared to favourite (46.7%) colours (see frequencies for each colour category in Table S 6).

Next, participants self-categorised the colour terms they had named into 13 predefined categories. For instance, *dark raspberry* was self-categorised as “red”, *fuchsia* as “pink”, *goose poop green* as “yellow-green” or “green”, *khaki* as “brown”, “green” or “yellow-green”, and so on (see Table S 6).

Chi-square tests on predefined colour categories showed that favourite colours, $\chi^2(12) = 186.5$, $p < .001$, and least favourite colours, $\chi^2(12) = 220.1$, $p < .001$, were not evenly distributed. Based on standardised residuals, favourite colours chosen more often than expected by chance were blue ($p < .001$), red ($p < .001$), and black ($p < .010$) while favourite colours chosen less often than expected by chance were grey ($p < .001$), yellow-green ($p < .001$), brown ($p < .001$), white ($p < .010$), and orange ($p < .050$; see Table 2). The least favourite colours chosen more often than expected by chance were brown ($p < .001$), green ($p < .001$), and pink ($p < .001$) while least favourite colours chosen less often than expected by chance were turquoise ($p < .001$), white

($p < .001$), red ($p < .001$), blue ($p < .001$), black ($p < .010$), and yellow-green ($p < .050$; see Table 2).

Table 2. Frequencies in counts and percentages from total reported favourite and least favourite colours.

Colour	Favourite		Least Favourite	
	Count	%	Count	%
Red	49	15.2	8	2.5
Orange	14	4.3	31	9.6
Yellow	28	8.7	29	9.0
Yellow-green	3	0.9	14	4.3
Green	28	8.7	44	13.6
Turquoise	22	6.8	1	0.3
Blue	71	22.0	7	2.2
Purple	31	9.6	33	10.2
Pink	20	6.2	43	13.3
Brown	5	1.6	77	23.8
White	11	3.4	4	1.2
Grey	3	0.9	21	6.5
Black	38	11.8	11	3.4
Total	323	100	323	100

Note. In bold, over- or under-represented colour choices for each predefined colour category.

4.2. Confirmatory Analysis of Personality Traits and Colour Preferences

Welsch's t -tests compared the link between colour preferences and personality traits for each testable website prediction (Table 3). The tests supported none of the predictions, whether looking directly at the FDR corrected p -values (.396 - .988) or the Bayes factors. All but one of the predicted associations were more likely to occur under the null hypothesis relative to the alternative hypothesis, at a likelihood between 1.6 and 13.1 times (see BF_{01} in Table 3). The Bayes factors provided strong evidence in favour of the null hypothesis for two predictions ($BF'_{s_{01}} = [12.0 - 13.1]$), substantial evidence in favour of the null hypothesis for six predictions ($BF'_{s_{01}} = [4.4 - 8.7]$), and anecdotal evidence in favour of the null hypothesis for the remaining three predictions ($BF'_{s_{01}} = [0.7-2.1]$; see Table 3).

Table 3. Confirmatory results for the testable website predictions on the link between colour preferences and personality traits.

Colour	Big Six trait	Direction	Favourite			Not favourite			<i>t</i>	Cohen's <i>d</i>		<i>p</i>	<i>p</i> (FDR)	Bayes factor	
			<i>n</i>	<i>M</i>	95% <i>CI</i>	<i>n</i>	<i>M</i>	95% <i>CI</i>		value	95% <i>CI</i>			BF ₁₀	BF ₀₁
Red	Extraversion	Positive	49	18.18	[17.27, 19.10]	274	18.45	[18.03, 18.87]	-0.53	-0.08	[-0.38, 0.23]	.700	.988	0.12	8.38
Orange	Extraversion	Positive	14	18.14	[16.29, 19.99]	309	18.42	[18.03, 18.81]	-0.32	-0.08	[-0.62, 0.46]	.622	.988	0.23	4.43
Yellow	Extraversion	Positive	28	18.25	[16.74, 19.76]	295	18.42	[18.03, 18.82]	-0.23	-0.05	[-0.44, 0.34]	.589	.988	0.17	5.73
Green	Agreeableness	Positive	28	15.68	[14.00, 17.35]	295	16.21	[15.72, 16.71]	-0.63	-0.12	[-0.51, 0.26]	.732	.988	0.14	7.25
Turquoise	Agreeableness	Positive	22	15.14	[13.38, 16.90]	301	16.24	[15.75, 16.73]	-1.25	-0.26	[-0.69, 0.18]	.889	.988	0.12	8.66
Turquoise	Extraversion	Positive	22	19.18	[17.84, 20.53]	301	18.35	[17.96, 18.75]	1.22	0.24	[-0.20, 0.67]	.116	.638	0.64	1.55
Turquoise	Openness/Originality	Positive	22	15.59	[14.32, 16.86]	301	16.83	[16.50, 17.15]	-1.96	-0.43	[-0.87, 0.00]	.969	.988	0.08	11.97
Pink	Agreeableness	Positive	20	14.00	[12.09, 15.91]	303	16.31	[15.83, 16.79]	-2.44	-0.54	[-1.00, -0.09]	.988	.988	0.08	13.09
Pink	Extraversion	Positive	20	17.85	[16.50, 19.20]	303	18.45	[18.05, 18.84]	-0.88	-0.17	[-0.63, 0.28]	.806	.988	0.15	6.70
White	Conscientiousness	Positive	11	17.73	[15.56, 19.90]	312	15.73	[15.26, 16.21]	1.99	0.47	[-0.13, 1.07]	.036*	.396	1.40	0.71
White	Openness/Originality	Positive	11	17.18	[15.38, 18.98]	312	16.73	[16.41, 17.05]	0.55	0.16	[-0.45, 0.76]	.296	.988	0.45	2.21

Note. The column “Direction” indicates the predicted direction of the association between a colour and a personality trait. The subsequent column under “Favourite” presents 95% confidence intervals (95% *CI*) of the means calculated for the relevant personality trait averaged across all participants who chose the relevant colour as their favourite. The subsequent columns under “Not Favourite” are analogous to the previous columns but were calculated for participants who did not choose the relevant colour as their favourite. Columns *t*-value and Cohen’s *d* value present the relevant statistics obtained with Welch’s *t*-tests. The column *p* (FDR) presents one-tailed *p*-values after the FDR correction (Benjamini & Hochberg, 1995), and codes for significance (* = $p < .050$). Column Bayes factor presents one-tailed Bayes factors in favour of the alternative hypothesis (BF₁₀) and in favour of the null hypothesis (BF₀₁). BF₀₁ is simply 1/ BF₁₀.

4.3. Exploratory Analysis of Personality Traits and Colour Preferences

The MANCOVA with favourite colour category as a predictor of the Big Six personality traits and sex as a covariate showed a main effect for sex, Pillai's Trace value = .10, $F(6, 306) = 5.37$, $p < .001$, $\eta_p^2 = .095$. After controlling for sex, favourite colour was not a significant predictor of personality traits (all traits combined), Pillai's Trace value = .21, $F(60, 1866) = 1.14$, $p = .216$, $\eta_p^2 = .035$. When inspecting each personality trait separately, sex was a significant predictor of Resilience scores, $F(1, 311) = 20.39$, $p < .001$, $\eta_p^2 = .062$, and marginally significant of Agreeableness scores, $F(1, 311) = 3.70$, $p = .055$, $\eta_p^2 = .012$, but not of the other four trait scores, $F's(1, 311) \leq 3.14$, $p's \geq .077$, $\eta_p^2's \leq .010$. On average, men had higher Resilience scores ($M = 14.3$, $SEM = 0.44$) than women ($M = 11.7$, $SEM = 0.23$). Men had also higher Agreeableness scores ($M = 17.4$, $SEM = 0.52$) than women ($M = 15.9$, $SEM = 0.27$). After controlling for sex, favourite colour was not a significant predictor of any of the individual personality traits, $F's(10, 311) \geq 1.65$, $p's \geq .093$, $\eta_p^2's \leq .050$.

The analogous MANCOVA with least favourite colour category as a predictor variable of the Big Six personality traits and sex as a covariate again showed a main effect of sex, Pillai's Trace value = .09, $F(6, 307) = 5.01$, $p < .001$, $\eta_p^2 = .089$. After controlling for sex, least favourite colour was not a significant predictor of personality traits (all traits combined), Pillai's Trace value = .14, $F(54, 1872) = 0.83$, $p = .806$, $\eta_p^2 = .023$. When inspecting each personality trait separately, sex was a significant predictor of Resilience scores, $F(1, 312) = 21.10$, $p < .001$, $\eta_p^2 = .063$, and Agreeableness scores, $F(1, 312) = 4.64$, $p = .032$, $\eta_p^2 = .015$, but not the other four personality trait scores, $F's(1, 312) \leq 2.35$, $p's \geq .127$, $\eta_p^2's \leq .007$. The sex differences were analogue to those for most favourite colour. After controlling for sex, least favourite colour was not a significant predictor of any of the individual personality traits, $F's(9, 312) \leq 1.53$, $p's \geq .135$, $\eta_p^2's \leq .042$.

Given the non-significant results, we calculated the non-directional Bayes factors on simplified models. We ran six analogous ANOVA models with favourite colour as a predictor and six ANOVA models with least favourite colour as a predictor. In each model, one of the Big Six personality traits was an outcome variable. In all models, the data were more likely to occur under the null hypothesis than the alternative hypothesis between 5.8 and 371 times ($BF's_{01}$). We took this result as evidence against the alternative hypothesis and concluded that colour preferences and personality traits were not related.

5. Discussion

The current study used lexical and empirical methods to identify and test a popular claim about personality inference, specifically based on colour preferences. Among many popular claims about what might reveal our true natures, this domain is of interest due to its prevalence on popular media and relevance to colour psychologists. According to claims in the popular media and widely used colour-based personality tests (Hartman, 1987; Lüscher, 1969; McArthur, 2017; Scott-Kemmis, 2018), one's favourite colours should reveal their personalities. While some prior studies have tested how colour preferences predict personality traits (Bimler et al., 2014; He et al., 2011), they were limited in matching the spontaneous popular claims with psychometrically defined traits. A translation between popular expressions and scientifically testable hypotheses is no doubt challenging.

Therefore, to bring evidence to such claims, we selected six representative websites. We extracted from them 11 specific and testable colour-personality predictions by matching popular expressions of personality to Big Six personality traits. We tested whether the predictions held true among participants' who reported their colour preferences and

completed the Big Six personality questionnaire. Participants reported nearly 200 different shades of colour as their favourite or least favourite. After self-categorising these shades into 13 predefined colour categories and comparing colour preferences with personality traits, our results did not support any of the 11 testable predictions. The Bayes factors provided substantial to strong evidence in favour of the null hypothesis for the majority of the testable predictions. Overall, we conclude that our results speak against the notion that colour preferences reveal anything consistent about personality traits.

We have reasons to be convinced by this conclusion, thanks to a rigorous methodological approach. First, we asked participants to provide their favourite and least favourite colours, assessing their absolute colour preferences (see also, Jonauskaite et al., 2016) and not relative preferences, as in prior studies in this area (Bimler et al., 2014; He et al., 2011). The six popular media websites that we assessed specifically made references to absolute colour preferences. Second, we used a systematic method to match the descriptions from six representative websites to specific terms associated with personality traits across cultural contexts (Ashton et al., 2004; Ashton & Lee, 2007; Saucier, 2009). Third, we included only coherent and consistent predictions drawn from the majority of the websites. Finally, we directly evaluated the predictions in behavioural data and using a cross-culturally validated Big Six personality trait questionnaire (Thalmayer et al., 2011; Thalmayer & Saucier, 2014).

5.1. Challenges and Limitations

We encountered some challenges in defining systematic predictions from popular media sources. First, colour-personality associations from such sources are almost always framed positively – liking a particular colour indicates good qualities, rarely are negative interpretations offered. These consistently positive descriptions suggest an unrealistic portrayal of a group of people, because personality trait scores generally follow a normal distribution (e.g., Funder, 2019). Roughly a similar number of people are expected to score high and low on each trait. But popular media sources restrict their predictions to only half of the dimension. If such websites would also consider the opposite side of a personality trait such as high Neuroticism, we might be able to find more meaningful colour-personality relationships. For instance, we might observe that high scores on Neuroticism are associated with preferences for darker colours, because such colours have been associated with negative emotions (Adams & Osgood, 1973; Jonauskaite, Abu-Akel, et al., 2020) and negative moods (Carruthers et al., 2010; Jonauskaite et al., 2019). In fact, participants who preferred the concepts of darkness over lightness scored higher on Neuroticism and also reported more depressive and anxious symptoms (Persich et al., 2019). In such and other cases, relationships likely go well beyond perceivable colour features (hue, saturation, lightness), but are mediated through the metaphorical meanings of these features (see similar reasoning in Fetterman et al., 2015). Lightness and darkness are here most evident, because they denote positivity and negativity in very general terms.

Second, popular media descriptions seem narrow and vague when it comes to personality description. We found that these websites mainly mentioned qualities related to the traits of Extraversion, Agreeableness, and Openness/Originality. Furthermore, these traits were each linked to preferences for several colours. For instance, our websites predicted that anyone whose favourite colour was red, orange, yellow, pink, or turquoise should score high on Extraversion-related qualities. But if a large number of people should be extraverted, it is impossible to identify personality traits as a function of specific favourite colours. Put differently, personality descriptions on popular media are so general that they are likely to apply to everybody (Snyder et al., 1977).

Third, inferential statistics cannot be used to prove that a true effect is non-existent (Lakens et al., 2020). Inferential statistics (p -values) can be used to reject the null hypothesis or demonstrate there is not enough evidence to reject the null hypothesis. Yet, in this study, we wanted to be able to accept the null hypothesis when needed. To this end, we calculated the Bayes factor which provided the strength of evidence in favour of the null hypothesis as well as in favour of the alternative hypothesis. The Bayes factor demonstrated with a substantial degree of certainty that most of the hypothesised associations between colour preferences and personality were unlikely to exist.

5.2. Future Directions

While our results indicated a lack of systematic association for favourite colours in predicting Big Six personality traits, future work might discover other ways that colour choices indicate individual differences. Colour preferences in specific contexts, especially for clothing, might be driven by factors such as aesthetic preferences, hope to increase one's attractiveness, or perhaps motivations and identity (Lehmann et al., 2018; Yu et al., 2018). Future studies might also find that colour-personality associations exist for impressions of others, regardless of their actual traits. For example, a recent study demonstrated the implicit belief that one's clothing colours signal their personality (Pazda & Thorstenson, 2019). These authors observed that unfamiliar individuals wearing more chromatic colours were judged as more extraverted and open to new experiences than individuals wearing less chromatic (i.e., greyish) colours.

Furthermore, our study offers an empirical approach to testing popular claims in the realm of personality. We provide a practical example on how popular claims can be extracted and systematised. We also showed how a lexical approach can be used to link popular and scientific terminologies. Such links are crucial to operationalize tests of the validity of personality claims. Considering that popular projective personality tests occupy an important niche in the corporate world, including both a significant financial outlay and influencing consequential decisions⁴, bringing scientific evidence to such claims is a meaningful benefit to society that personality psychologists are uniquely positioned to provide.

5.3. Concluding thoughts

Popular media includes many bold claims about what might reveal our inner natures, one of which is the supposed link between colour preferences and personality characteristics. The consistency of such claims across the websites leaves an impression that colour-personality associations are well-established. However, after a systematic investigation into these claims and their validity, we found that colour preferences were unrelated to our participants' self-reported personality traits. We conclude that asking someone about their favourite colour is unlikely to provide much insight into their personality, contrary to popular beliefs, and thus lacks utility for wider application.

⁴ "Some experts estimate that as many as 60 percent of workers are now asked to take workplace assessments. The \$500-million-a-year industry has grown by about 10 percent annually in recent years. While many organizations use personality testing for career development, about 22 percent use it to evaluate job candidates, according to the results of a 2014 survey of 344 Society for Human Resource Management members." <https://www.shrm.org/hr-today/news/hr-magazine/pages/0615-personality-tests.aspx>

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Appendix

Table S 1. Personality claims (predictions) regarding the link between favourite colours and the Big 6 personality dimensions, extracted from three popular psychology websites in English. The numbers in the columns of personality dimensions note a count of words from the personality claims matching the words of our list. Personality dimensions are coded as such: C = Conscientiousness, H = Honesty, A = Agreeableness, R = Resilience, E = Extraversion, O = Openness. See Table 1 for summarised predictions.

Colour	Website	Personality claim	C	H	A	R	E	O
Red	EN1	extraverted , optimistic, courageous , confident, physically active , vitality, exciting, stimulating, energy, ambitious, competitive, achievement oriented	0	0	0	1	2	0
Orange	EN1	warm, optimistic, extraverted , flamboyant, friendly , good natured , agreeable , assertive, determined, not aggressive , social , uninhibited, loud talker, charming, sociable , show off, inspiring, vitality, positive energy	0	0	2	0	4	0
Yellow	EN1	happy, cheerful , fun, creative , ideas, critical, perfectionist, analyse, methodical, impulsive, independent , selective	0	0	0	1	1	1
Yellow-Green	EN1	-	0	0	0	0	0	0
Green	EN1	practical, down to earth, stable , balanced, unsettled, anxious , kind , generous , compassionate, calm , take control, caring, nurturing, intelligent , love to learn, quick to understand , open	0	0	4	2	0	1
Turquoise	EN1	friendly , approachable, easy to communicate, compassionate, empathetic, caring, creativity , sensitivity, intuitive, swing emotionally , stable , balanced, chaos	0	0	0	2	1	1
Blue	EN1	conservative , reliable, trustworthy, trusting, worry, not impulsive, not spontaneous, take time, genuine, sincere , responsible	1	1	0	0	0	1
Purple	EN1	sensitive, compassionate, understanding , supportive, gentle , free spirit, peaceful , tranquil, dignity, charismatic, alluring, introverted, shy	0	0	3	0	1	0
Pink	EN1	loving, kind , sensitive, generous , friendly , approachable, warmth, softness, nurturing, maternal, need to protect, take care of others, caring, femininity, romantic, sensual, sensitive	0	0	2	0	1	0
Brown	EN1	honest , down to earth, wholesome, steady, reliable, confident, friendly , approachable, genuine, sincere , sense of duty and responsibility , take obligations seriously, loyal , trustworthy, supportive, dependable, sensitive	2	3	0	0	1	0
White	EN1	neat , immaculate, far sighted, positive, optimistic, cleanliness, well-balanced, sensible, discrete, wise , cautious, practical, careful , not impulsive, self-control	2	0	0	0	0	1

Grey	EN1	neutral, indifferent, isolating yourself, practical, calm , cool, conservative , composed, reliable	0	0	1	0	0	1
Black	EN1	independent , strong willed, determined, in control, conservative , conventional , serious, authoritarian , demanding, dictatorial	0	0	1	2	0	2
Red	EN2	fiery , energetic, centre of attention, excitable, alert, ready to react, passionate	0	0	1	0	0	0
Orange	EN2	happy go lucky, joyful, energy, enthusiasm, creative	0	0	0	0	0	1
Yellow	EN2	vibrant, warm, energy, love attention	0	0	0	0	0	0
Yellow-Green	EN2	-	0	0	0	0	0	0
Green	EN2	kind and sympathetic, help people, steward	0	0	1	0	0	0
Turquoise	EN2	quiet, meek, ferocious, flexible , adaptable	0	0	1	0	0	0
Blue	EN2	meditative, calm , level-headed	0	0	1	0	0	0
Purple	EN2	regal, wisdom , ambition, romantic	0	0	0	0	0	1
Pink	EN2	playful, sweet, out-going , happy	0	0	0	0	1	0
Brown	EN2	wholesome, down to earth, friendly , approachable, open	0	0	0	0	1	0
White	EN2	bright and sunny disposition, positive, perfectionist	0	0	0	0	0	0
Grey	EN2	cool, unbiased, reserved , hard time making decision	0	0	0	0	1	0
Black	EN2	rebellious, adventurous, snarky, gloom and doom	0	0	0	0	0	0
Red	EN3	drive, determination, risk taking, action, physical fulfilment, outgoing , assertive, vigorous, impulsive, sympathy, optimist, voice complaints, aware, centre of attention, leader, easily gain respect	0	0	0	0	1	0
Orange	EN3	love to socialize , good natured, swayed by opinions, good work, strong loyalties , good will, solicitous, optimist, social , problem solver, mediator, even-keeled positivity, zest for life	0	1	1	1	1	0
Yellow	EN3	vivid imagination , nervous energy, need to help, neatly formed thoughts, aloof, shy , sunny, fun, optimism, impulsiveness, spontaneity, positive, happy, imaginative , intellectual	1	0	0	0	1	2
Yellow-Green	EN3	-	0	0	0	0	0	0
Green	EN3	loyal , frank, good citizen, pillar of a community, frank, moral, reputable, sensitive, clarity, objective and fair	0	2	0	0	0	0
Turquoise	EN3	-	0	0	0	0	0	0
Blue	EN3	deliberate, introspective, conservative , sensitive, loyal , sober, grace and composure, trustworthy, good with details, warm, friendly , engaging, ability to recall	0	1	0	0	1	1
Purple	EN3	perfectionist, humanitarian, helps, good mind, ready wit, vanity, observant, fine art creativity , intuition, charisma, visionary, unique, never care about fitting in	0	0	0	0	0	1

Pink	EN3	easy-going , approachable, witty, smart, sparkle socially , caring, nurtures, compassionate	0	0	1	0	1	0
Brown	EN3	great friend , shrewd with money, obstinate, parsimonious, dependable, steady, disdain impulsiveness, simplicity, genuine, transparent, dependable, punctual, truth, slow, steady	0	0	0	0	1	0
White	EN3	organized, independent , logic, refined, high expectations, aloof, self-confidence, reserved , mindfulness, wisdom	1	0	0	1	1	1
Grey	EN3	cool, composed, reliable, tends to conform, cautious, compromise, balanced, stable , trustworthy, fair , objective	0	1	0	1	0	0
Black	EN3	artistic, intuitive, does not share well, worldly, conventional , proper, polite, regal, dignity, private, articulate, dramatic, not unrestrained, conviction, authority , self-control, serious, intimidating, focusing on the details, getting things right, insecurity, conventional, unconventional	0	0	1	0	0	1

Table S 2. Personality claims (predictions) regarding the link between favourite colours and the Big 6 personality dimensions, extracted from two popular psychology websites in French and one in German. We present both the original claims and translated claims. The numbers in the columns of personality dimensions note a count of words from the personality claims matching the words of our list. Personality dimensions are coded as such: C = Conscientiousness, H = Honesty, A = Agreeableness, R = Resilience, E = Extraversion, O = Openness. See Table 1 for summarised predictions.

Colour	Website	Personality claim (original)	Personality claim (translated)	C	H	A	R	E	O
Red	FR1	passionné, sage, connaissez vraiment votre valeur, bonne vivante, perfection, déterminé	passionate, heated, torrid, hot-blooded, keen, tempestuous; wise , good, sage, well-behaved; you really know your worth; bon viveur; perfectionist; determined, predetermined;	0	0	0	0	0	1
Orange	FR1	vif, brillant, plein de vie, aimez relever des défis, travaille beaucoup, productive, aimez faire la fête, sortir, sans regrets	lively , intense, abrupt, sharp ; bright, brilliant , rosy; full of life, lively ; love a challenge, address challenges; hard worker , work hard; productive; like to party; go out; without regret	1	0	0	0	1	2
Yellow	FR1	aimable, aimez plaire, faites de nouveaux amis, sympathique, généreux, adapter	amiable, genial, sweet-tempered; like to please; social ; likeable, nice, congenial; generous , liberal; to adapt	0	0	1	0	1	0
Yellow-Green	FR1	-	-	0	0	0	0	0	0
Green	FR1	paix, évite toutes les situations de conflits, Vous vous faites rarement des amis, gardez toute votre vie, envie de voyager, d'explorer	peace ; avoids all situations of conflict; rarely make friends ; loyal ; traveller, wanderlust; to explore	0	1	1	0	1	0
Turquoise	FR1	-	-	0	0	0	0	0	0
Blue	FR1	séduisante, élégante, pleine de grâce, fait facilement confiance aux gens, mal à prendre des décisions, acharnement au travail, ponctualité, honnêteté	attractive, beguiling, seductive; elegant, smart, sophisticated, stylish; graceful; trusting, easily trusts people; indecisive, have trouble making decisions, poor decision-making, decision-making problems, decision-making difficulties; relentlessness at work, relentless work, hard work ; punctual; honest , decent	1	1	0	0	0	0
Purple	FR1	charmeur, hypnotisez, audacieux, confiant, arrogance	charmer; to hypnotize; bold , audacious, daring; trusting, confident, self-confident, reliant; arrogant, lordly, overbearing	0	0	0	0	1	0
Pink	FR1	douces, dignes de confiance, centre d'attention, tout le monde peut être ami	gentle , meek; trustworthy, reliable; centre of attention, limelight; everyone can be friends with	0	0	1	0	1	0
Brown	FR1	-	-	0	0	0	0	0	0

White	FR1	chic, sophistiqué, organisé, conseils, fiable, stables, non frivoles	chic, elegance, nice, style; sophisticated; organized ; adviser; reliable, accurate, safe; stable ; not frivolous , not shallow , not flighty, not trivial	2	0	0	1	0	1
Grey	FR1	-	-	0	0	0	0	0	0
Black	FR1	créatives, non ennuyeuses, ne parlent pas beaucoup, confiante, consciente, prenez bien les critiques, ne se mêle jamais de la vie des autres	creative ; not boring, not bothersome, not problematic, not dreary, not tiresome; not talkative ; self-confident, trusting, confident, confiding, reliant; aware, conscious; take criticism well, take criticism seriously; never interferes in the lives of others;	0	0	0	0	1	1
Red	FR2	extraverties, passionnées, optimiste, ambitieux, impulsif, détestent la solitude et la routine, ne vivent que pour les changements, relever les défis	extroverted ; passionate, heated, torrid, hot-blooded, keen, tempestuous; optimistic; ambitious; impulsive; hate loneliness and routine; like change, live only for the changes; rise to a challenge, address challenges	0	0	0	0	1	0
Orange	FR2	créatifs, extravertis, énergie, indépendants, s'amuser, vie sociale riche, beaucoup d'amis, agréable, superficiels, inconstants	creative ; extroverted ; energetic; independent ; have fun, to amuse oneself, amuse, enjoy oneself, toy; rich social life; lots of friends ; pleasant, agreeable , nice, comfortable, enjoyable, gratifying, likeable; superficial, flighty, shallow ; inconstant, fickle	0	0	1	1	3	2
Yellow	FR2	Joie de vivre, sagesse, imagination, rayonnantes, drôles, visionnaires, aventureux, perpétuelle de renouveau, visionnaires, sens aigu des affaires, inspirer, motiver, bonne opinion de leurs propres capacités mentales, idéal élevé, éluder leurs responsabilités, liberté de pensée et d'action	cheerful disposition, pleasure of life, joy of life; wisdom , good behaviour, discretion; imagination , fancy, fantasy; radiant; funny, comic; visionary; adventurous, risky; perpetual quest for renewal; visionary; business acumen, strong business acumen; to inspire; to motivate; good opinion of their own mental abilities; high ideal; shirk their responsibilities ; freedom of thought and action	1	0	0	1	1	2
Yellow-Green	FR2	-	-	0	0	0	0	0	0
Green	FR2	douces, sincères, compassion, franches, sociables, solitude ne les dérange pas, modestes, patientes, s'effacer, peuvent être exploitées, raffinées, polies, dignes de confiance, rassurant	gentle , meek; sincere , candid, genuine, guileless, heartfelt; sympathetic, compassion; frank, hearty, open, above board, candid, direct, outspoken, plain, plain-spoken, straight, truthful; social , gregarious , outgoing ; loneliness doesn't bother them, they don't mind being alone; modest , humble; patient , forbearing; to move aside, to fade away, to disappear, efface; can be exploited, can be used, can be operated; refined, courtly,	0	2	2	0	3	0

			sophisticated; polite, civil, courteous; trustworthy, reliable; reassuring							
Turquoise	FR2	-	-		0	0	0	0	0	0
Blue	FR2	doux, apaisant, bienveillant, persévérant, consciencieux, sensibles, empathie, confiance à leur intuition, stabilité, sagesse, responsabilités, inflexibles, anxieuses, trop prudentes	gentle , meek; calming ; kind , benevolent; perseverant; conscientious, thorough ; sensitive, significant, noticeable, tender, tender-hearted; empathy; trust their intuition; stability ; wisdom , good behaviour, discretion; responsibility , onus, accountability, blame, concern, liability, mantle; inflexible , adamant, grim, rigid; anxious ; too much: cautious, careful , wise , chary, guarded, prudent, wary		4	0	4	2	0	2
Purple	FR2	rêveurs, spirituelles, altruistes, généreuses, dotées d'un sixième sens, distantes, non-conventionnelles, vivre dans un monde imaginaire	dreamer; spiritual, witty; altruistic; generous , liberal; sixth sense; distant, aloof; non-conventional ; dreamy, live in a fantasy world		0	0	1	0	0	1
Pink	FR2	perspicaces, émotives, détestent les conflits, sont à l'écoute des autres, affection, entourées, aimées	perceptive; emotional ; hate conflict, conflict averse; attentive to others, listen to others; want affection; supported; beloved		0	0	0	1	0	0
Brown	FR2	murir, endurente, patiente, solide, consciencieuse, fiable, conservateur, sympathique, généreux, obstinée, inflexible	mature; tough ; patient , forbearing; strong , healthy; conscientious, thorough ; reliable, accurate, safe; conservative ; likeable, nice, congenial; generous , liberal; obstinate, stubborn , determined; inflexible , adamant, grim, rigid		2	0	4	2	0	1
White	FR2	originale, attentive, rêveuse, perfection, idéaux impossibles, fraîcheur perdues, simplicité	original , novel; attentive, alert, intent; dreamer; impossible perfection; impossible ideal; regain lost freshness; simple, mere, straightforward		0	0	0	0	0	1
Grey	FR2	logiques, peu émotives, objectives, maîtresses d'elles-mêmes, succès, stable, sans surprise, masquant leur véritables personnalités ou objectifs	logic; unemotional ; objective; self-controlled; successful, hit; stable ; without surprise; hiding their true personalities or goals		0	0	0	2	0	0
Black	FR2	dignes, disciplinées, impressionnantes, sans être ostentatoires, mystérieuse, impressionner	dignified, worthy, decorous, matronly; disciplined, orderly ; impressive , awe-inspiring, awesome; openly, unobtrusively; mysterious, uncanny; impress		2	0	0	0	0	1

Red	DE1	Energie, begeisterungsfähig, tatkräftig, Ziel, kompromisslos, Direkt, ungeschönt, verletzend, Stillstand, ausrasten	energy, vigour/vigor; enthusiasm, ardour/ardor; energetic, active ; single-minded, purposeful; uncompromising; direct, forthright, straight, right, square, immediate; unembellished, unvarnished, unadorned; barbed, offensive; standstill; to go postal / freaked out;	0	0	0	0	1	0
Orange	DE1	Kraft, Freude, Geselligkeit, Geselligkeit, heitert, seelischer Erschöpfung, positive, Energie, reißen andere mit, Genussfreude, optimistischen, laut, aufdringlich, angeberisch	by virtue of, strength , power, force, employee; joy, pleasure, delight, gladness, rejoicing; sociability , conviviality; cheerful, fair , fine, light, hilarious, humorous, jovial, serene; mental exhaustion, emotional exhaustion, mental fatigue; positive, plus; energy, vigour/vigor; to tear, to rip, to pull, to make, to kill, to fight over sb/sth, crack, yank, split, wear; joy of enjoyment, delightfulness, pleasure; optimistic; sound, loud, sth is made known, noisy, aloud, beep; pushy, obtrusive, overpowering, meddlesome, officious; swanky, showy, flashy, boastfully	0	2	0	2	2	0
Yellow	DE1	Heiterkeit, Reife, Fröhlichkeit, Vielseitigkeit, Vielseitigkeit, Großzügigkeit, Toleranz, Unabhängigkeit, keineswegs egoistisch, keineswegs leichtfertig, Gesprächspartner, Positives, kein Grübeleien, kein Unentschlossenheit, vorschnellen	cheerfulness , merriment, hilarity, joviality, sereneness; ripeness, maturity, matureness, mellowness; cheerfulness , happiness, merriment, gaiety, glee, jolliness, jollity, joyfulness, mirth; versatility; generosity, magnanimity; tolerance, allowance; independence , self-sufficiency; not egoistic; not careless , not rash, not flippantly, not airy, not glib; talkative , communicative, conversational, expansive, voluble; positive, plus; not to ponder, not to brood; not indecision; rash	2	0	0	1	2	0
Yellow-Green	DE1	-	-	0	0	0	0	0	0
Green	DE1	Zuverlässigkeit, Ausdauer, Leben, Hoffnung, Hoffnung, Optimismus, praktisch, Wesentliche, kein Träumereien, kein gefühlskalt, mitfühlend, Freunde, zuhören, Sicherheit bedacht, materielle	reliability, trustiness, staunchness; stamina, endurance, staying power, hardiness; to live, to be alive, life; hope, promise; optimism; practical, convenient; essential, fundamental, important , considerably, substantially; no dream, no reverie; not cold; sympathetic, empathetic; friend ; to listen; concerned about security, concerned about safety; material, financial	0	0	0	0	1	1
Turquoise	DE1	-	-	0	0	0	0	0	0

Blue	DE1	Entspannung, Sachlichkeit, geistige Stärke, geistige Stärke, talentierte Geschäftsleute, Erfolg, konservativ, Bewährte, innerer Stärke, Offenheit, verunsichert, können Sie damit sehr gut umgehen	relaxation; objective, matter-of-fact, factual, functional; mental strength , spiritual strength , intellectual strength , mental power; talented ; success; conservative ; to prove yourself; intrinsic strength , inner strength , internal strength , inherent strength ; frankness, openness; to make uncertain, to unnerve; controlled	0	0	0	1	0	3
Purple	DE1	Idealismus, Sensibilität, hohe Ansprüche an sich selbst, hohe Ansprüche an sich selbst, glauben an das Gute im Menschen, Empfindsamkeit, empfänglich, mystisch, geheimnisvoll, Durchhaltevermögen, überzeugt, sensible, Geltungsbedürfnis, ernst genommen	idealism; sensitivity; high expectations of oneself, high demands on oneself, high standards for oneself; believe in the good in people; sensitive; receptive, responsive, susceptible; mystic, mysterious; mysterious, cryptic; stamina, staying power; confident; sensitive; craving (for) recognition; to be taken seriously	0	0	0	0	0	0
Pink	DE1	-	-	0	0	0	0	0	0
Brown	DE1	Bodenständigkeit, Fleiß, Freigebigkeit, erdverbundene, erdverbundene, sympathisch, zuverlässige, Halt, Ruhe, Nützliche, handwerklichen, Geistige Höhenflüge, kein Aufgeregtheit, kein hektische, Veränderung	down-home, homespun, long-established; diligence , application, industry , studiousness; generosity, bounty, generousness ; earth-connected, grounded, earthbound; likable, nice; reliable, trusty, responsible , staunch; hold, support, footing, stop, just , simply; quiet , rest, peace , calm , placidness, repose, tranquillity; useful, beneficial, functional, utilitarian; technical, artisanal; intellectual flights of fancy, spiritual flights of fancy, spiritual high flights, mental flights of fancy, mental high flights; not excited, not nervous, not agitated; no frantic, no hectic, no frenetic; change, shift, transformation, variation	3	1	3	0	1	1
White	DE1	Klugheit, Bescheidenheit, Reinheit, Reinheit, Gute, neutral, korrekt, planen sorgfältig, keine Überraschungen, weniger Spontane, zurückhaltend, freundlich, ohne Vorurteile, ausgenutzt	cleverness , cunning, judiciousness, prudence, smartness; modesty , humbleness, humility; purity, pureness, cleanness, chasteness, clarity; good; neutral; correct, above board; plan carefully ; don't like surprise; not really spontaneous; reserved , unobtrusive, restrained, polite, muted, cautiously, with restraint, aloof, distant, guarded, reticent, retiring, shy ; friendly , nicely, genial, neighbourly, kind , pally; without prejudice, without bias; exploited	1	1	1	0	3	1

Grey	DE1	Sachlichkeit, Zurückhaltung, Ernsthaftigkeit, Eleganz, Wertbeständigkeit, neutralisierende, Seriosität, Gleichmut, überlegt	objective, matter-of-fact, factual, functional; reserve , caution, restraint, aloofness, reticence; serious; elegance, stylishness; stability of value, Value retention; neutralize; seriousness, reliability, integrity; serenity, equanimity; methodical	0	0	0	1	1	0
Black	DE1	Würde, Bedeutung, unergründlich, faszinierend, bedrohlich, schwer, Wesentliche, Wesentliche, ernst genommen, seriös, Respekt, Erfolg, loyal, Treue, Verlässlichkeit, Selbstzweifel, Pflichterfüllung, Erfolgsstreben	dignity, lordliness; meaning, importance , significance, noteworthiness, greatness, magnitude, weightiness; impenetrable; fascinating; threatening, menacing; heavy, grievous, hard; essential, fundamental, important , considerably, substantially; to be taken seriously, gravely; serious, reliable; respected; success; loyal ; faithfulness , fidelity, loyalty , allegiance; reliability; self-doubt; performance of duties , fulfilment of duties ; striving for success, aspiration for success	1	2	0	0	0	1

Table S 3. Personality adjectives making the cross-cultural core of each Big Six personality dimension. The adjectives were extracted from three sources (Ashton et al., 2004; Ashton & Lee, 2007; Saucier, 2009).

Conscientiousness	Honesty	Agreeableness	Resilience	Extraversion	Openness/Originality
Absent-minded	Awful	Aggressive	Anxious	Active	Admirable
Careless	Bad	Agreeable	Brave	Boldness	Aesthetic appreciation
Conscientious	Beastly	Authoritarian	Courageous	Cheerful	Average
Consistent	Boastful	Brawling	Cowardly	Extraverted	Brilliant
Diligent	Calculating	Calm	Dependence	Friendly	Clever
Dutiful	Conceited	Choleric	Depressed	Gregarious	Conservative
Frivolous	Corrupt	Easy-going	Emotional	Introverted	Conventional
Hard-working	Cruel	Fiery	Fearful	Lively	Creative
Irresponsible	Dangerous	Flexibility	Fragile	Outgoing	Gifted
Lazy	Deceitful	Forgiving	Frustrated	Passive	Important
Moderate	Disgusting	Generous	Gloomy	Quiet	Impressive
Neat	Evil	Gentle	Imperturbable	Reserved	Innovative
Precise	Fairness	Good-natured	Oversensitive	Shy	Inquisitiveness
Rash	Faithful	Hot-headed	Resolute	Silent	Intellectual
Reckless	Greedy	Ill-tempered	Sad	Smiling	Intelligent
Responsible	Honest	Impatient	Self-assured	Sociable	Ironic
Systematic	Hypocritical	Irascible	Sentimental	Solitary	Knowledgeable
Thorough	Inhuman	Irritable	Stable	Taciturn	Ordinary
Tidy	Insane	Kind	Strength	Talkative	Original
	Just	Lenient	Strong	Vivacious	Outstanding
	Loyal	Mild	Tough	Withdrawn	Shallow
	Modest	Patient	Vulnerable		Sharp

Pompous	Peaceful	Talented
Pretentious	Quarrelsome	Traditional
Sincere	Quick-tempered	Unimaginative
Unassuming	Stubborn	Unusual
Vicious	Tolerant	Wise
Wicked	Understanding	

Table S 4. The count of websites making a prediction between each favourite colour and each personality trait. C = Conscientiousness, H = Honesty, A = Agreeableness, R = Resilience, E = Extraversion, O = Openness.

Favourite colour	C	H	A	R	E	O
Red	0	0	1	1	4	1
Orange	1	2	3	3	5	3
Yellow	3	0	1	3	5	3
Yellow-Green	0	0	0	0	0	0
Green	0	3	4	1	3	2
Turquoise	0	0	1	1	1	1
Blue	3	3	2	2	1	4
Purple	0	0	2	0	2	3
Pink	0	0	3	1	4	0
Brown	3	2	2	1	4	2
White	4	1	1	2	2	5
Grey	0	1	1	3	2	1
Black	2	1	2	1	1	5

Table S 5. Descriptive statistics for the Big Six personality traits in our sample of participants.

Personality trait	<i>M</i>	95% <i>CI</i>	<i>SD</i>	Range	α
Conscientiousness	15.8	[15.34, 16.27]	4.25	5-25	.73
Honesty	17.87	[17.48, 18.26]	3.57	5-25	.65
Agreeableness	16.17	[15.70, 16.64]	4.29	5-25	.76
Resilience	12.08	[11.66, 12.50]	3.82	5-25	.73
Extraversion	18.41	[18.03, 18.79]	3.47	7-25	.60
Openness/Originality	16.74	[16.43, 17.06]	2.87	7-25	.51

M = mean, 95% *CI* = 95% confidence interval, *SD* = standard deviation, range = range of all observed values (min-max), and α = Cronbach's alpha. Possible scores for each trait are between 5 to 25.

Table S 6. Colour terms that participants listed as their favourite or least favourite in an open answer format. The terms are presented by pre-defined colour categories, to which participants categorised the terms themselves.

Colour category	Favourite colour				Colour category	Least favourite colour			
	Open answer					Open answer			
	French version)	(original)	English (translations)	n (%)		French version)	(original)	English (translations)	n (%)
Red	Rouge		Red	26 (53)	Red	Rouge		Red	6 (76)
	Bordeaux		Bordeaux	10 (20)		Bordeaux		Bordeaux	1 (13)
	Rouge-orange/rouge-orangé/Une teinte entre le rouge et l'orange		Red-orange/ red-orange/a shade between red and orange	3 (6)		Rouge vif		bright-red	1 (13)
	Rouge vif		Bright-red	2 (4)					
	Rouge foncé		Deep red	2 (4)					
	Rouge cerise		Cherry red	1 (2)					
	Framboise foncé, bordeaux avec du fuchsia		Dark raspberry, burgundy with fuchsia	1 (2)					
	Rouge feu		Fire red	1 (2)					
	Rouge coquelicot, corail		Poppy red, coral	1 (2)					
	Le rouge no. 031 des Pastels de Sennelier		Ruby red no. 031 of Sennelier oil pastels	1 (2)					
	Rouge fraise		Strawberry red	1 (2)					
Orange	Orange		Orange	9 (64)	Orange	Orange		Orange	24 (77)
	Orange-brique		Brick orange	1 (7)		Orange fluo		Bright orange	2 (6)
	Orange crépuscule		Dusk orange	1 (7)		Orange vif		Bright orange	1 (3)

	Ocre	Ochre	1 (7)		Orange brun/orange ou brun	Orange- brown/orange or brown	2 (6)
	Rouge-orangé	Red-orange	1 (7)		Brun	Brown	1 (3)
	Orange doux et profond virant sur le rouge	Soft, deep orange turning to red	1 (7)		Les couleurs telles que le jaune ou l'orange	Colours like orange or yellow	1 (3)
Yellow	Jaune	Yellow	20 (71)	Yellow	Jaune	Yellow	23 (79)
	Doré/or	Golden/gold	2 (7)		Jaune canard	Duck yellow	1 (3)
	Châtain doré	Golden brown	1 (4)		Jaune fade	Dull yellow	1 (3)
	Jaune moutarde ou jaune orange	Mustard yellow or orange yellow	1 (4)		Le jaune citron	Lemon yellow	1 (3)
	Jaune pâle	Pale yellow	1 (4)		Jaune moutarde	Mustard yellow	1 (3)
	Jaune tournesol	Sunflower yellow	1 (4)		Orange	Orange	1 (3)
	Jaune foncé chaud ou alors clair	Warm dark yellow or light yellow	1 (4)		Jaune pâle	Pale yellow	1 (3)
	Jaune ocre	Yellow ochre	1 (4)				
Yellow-Green	Vert lime	Lime green	2 (67)	Yellow-Green	Jaune vert	Yellow-green	4 (29)
	Kaki	Khaki	1 (33)		Vert	Green	2 (14)
					Kaki	Khaki	2 (14)
					Vert caca d'oie	Goose poop green	1 (7)
					Vert clair	Light green	1 (7)
					Vert clair ou jaune-vert	Light green or yellow-green	1 (7)
					Jaune vert pâle	Pale yellow-green	1 (7)
					Vert jaune	Yellow green	1 (7)
					Jaune pisser vert brun	Yellow pee green brown	1 (7)
Green	Vert	Green	12 (43)	Green	Vert	Green	28 (62)
	Vert pomme	Apple green	4 (14)		Vert clair	Light green	4 (10)

	Vert foncé	Dark green	2 (7)		Vert foncé/très foncé	Dark green/very dark green	3 (7)
	Vert émeraude	Emerald green	2 (7)		Kaki	Khaki	3 (7)
	Vert clair	Light green	2 (7)		Vert fluo	Bright green	1 (2)
	Vert vif	Bright Green	1 (4)		Vert pétant	Bright green	1 (2)
	Vert sapin	Fir green	1 (4)		Vert flash	Flashy green	1 (2)
	Vert feuillage	Foliage green	1 (4)		Vert caca d'oie	Goose poop green	1 (2)
	Vert forêt	Forest green	1 (4)		Vert-brun, kaki	Green-brown, khaki	1 (2)
	Vert herbe	Grass Green	1 (4)		Vert olive	Olive Green	1 (2)
	Vert clair ou rouge	Light green or red	1 (4)		Vert pistache	Pistachio Green	1 (2)
Turquoise	Turquoise	Turquoise	8 (36)	Turquoise	Turquoise	Turquoise	1 (100)
	Bleu-turquoise/	Turquoise-blue/Turquoise	7 (32)				
	Turquoise qui tend plus vers le bleu	which tends more towards the blue					
	Bleu	Blue	3 (14)				
	Toutes les teintes de bleu	All shades of blue	1 (4)				
	Cyan	Cyan	1 (4)				
	Vert	Green	1 (4)				
	Vert-bleu	Green-blue	1 (4)				
Blue	Bleu	Blue	27 (38)	Blue	Bleu	Blue	4 (57)
	Bleu clair	Light blue	7 (10)		Bleu foncé	Dark blue	1 (14)
	Bleu roi	Royal blue	6 (8)		Bleu ciel	Light blue	1 (14)
	Bleu foncé	Dark blue	5 (7)		Bleu océan	Ocean blue	1 (14)
	Bleu-turquoise/bleu-vert	blue-turquoise/blue-green	3 (4)				
	Bleu marine	Navy blue	3 (4)				
	Bleu pastel	Pastel blue	3 (4)				

	Bleu cyan	Cyan blue	2 (3)				
	Indigo	Indigo	2 (3)				
	Bleu ciel	Sky blue	2 (3)				
	Bleu électrique	Electric blue	1 (1)				
	Bleu galaxie	Galaxy blue	1 (1)				
	Bleu klein	[Calvin] Klein blue	1 (1)				
	Bleu ciel, bleu canard, bleu cobalt	Light blue, duck blue, cobalt blue	1 (1)				
	Bleu clair pastel	Light pastel blue	1 (1)				
	Bleu océan	Ocean blue	1 (1)				
	Bleu pâle	Pale blue	1 (1)				
	Bleu pétrol, noir	Petrol blue, black	1 (1)				
	Bleu de prusse	Prussian blue	1 (1)				
	Bleu tendre	Soft blue	1 (1)				
	Bleu outremer	Ultramarine blue	1 (1)				
Purple	Violet	Purple	11 (35)	Purple	Violet	Purple	20 (61)
	Lila	Lilac	4 (13)		Violet foncé	Dark purple	3 (9)
	Bordeaux	Bordeaux	3 (9)		Violet clair	Light purple	3 (9)
	Violet clair	Light purple	2 (6)		Aubergine	Aubergine	2 (6)
	Bleu-violet foncé	Dark blue-purple	1 (3)		Violet pétant	Electric purple	1 (3)
	Violet foncé/très foncé (aubergine)	Dark violet/ very dark (aubergine)	1 (3)		Fuchsia	Fuchsia	1 (3)
	Lavande	Lavender	1 (3)		Lila	Lilac	1 (3)
	Mauve	Mauve	1 (3)		Violet pâle, rosé	Pale purple, pinkish	1 (3)
	Violet mystérieux	Mysterious purple	1 (3)		Violet, mauve	Purple, mauve	1 (3)
	Lila pastel	Pastel lilac	1 (3)				
	Violet pastel	Pastel purple	1 (3)				
	Violet un peu plus clair que le raisin	Purple a little lighter than grape	1 (3)				
	Violet orchidée	Purple orchid	1 (3)				

	Violet couché de soleil	Purple sunset	1 (3)				
	Violet royal	Royal purple	1 (3)				
Pink	Rose	Pink	9 (45)	Pink	Rose	Pink	26 (60)
	Rose pale	Pale pink	3 (15)		Fuchsia	Fuchsia	3 (7)
	Fuchsia	Fuchsia	2 (10)		Rose vif	Bright pink	2 (5)
	Rose pastel	Pastel pink	2 (10)		Le rose "Deep pink"	Deep pink	2 (5)
	Rose antique	Antique pink	1 (5)		Rose fluo	Fluorescent pink	2 (5)
	Rose clair	Light pink	1 (5)		Rose pétant	Hot pink	2 (5)
	Rose orangé	Orangy pink	1 (5)		Rose bonbon	Candy pink	1 (2)
	Saumon	Salmon	1 (5)		Rose clair	Light pink	1 (2)
					Magenta	Magenta	1 (2)
					Rose pale	Pale pink	1 (2)
					Violet	Purple	1 (2)
					Rose saumon	Salmon pink	1 (2)
Brown	Brun	Brown	2 (40)	Brown	Brun	Brown	59 (77)
	Brun clair avec tendance au doré "Peru"	Light brown with gold "Peru"	1 (20)		Marron	Brown	6 (8)
	Brun boisé	Woody brown	1 (20)		Brun foncé	Dark brown	3 (4)
					Kaki	Khaki	3 (4)
					Beige	Beige	1 (1)
					Bitume	Bitumen	1 (1)
					Brun vert	Brown green	1 (1)
					Vert caca d'oie	Goose poop green	1 (1)
					Vert qui tire sur le brun	Green pulling brown	1 (1)
					Brun clair	Light brown	1 (1)
White	Blanc	White	7 (70)	White	Blanc	White	3 (75)
	Blanc brillant	Bright white	1 (10)		Blanc-gris	White-grey	1 (25)
	Blanc cassé	Off-white	1 (10)				

	Blanc beige	White beige	1 (10)				
Grey	Gris	Grey	2 (67)	Grey	Gris	Grey	17 (81)
	Taupe	Taupe grey	1 (33)		Brun-gris-vert foncé, vomis	Dark brown-grey-green, vomit	1 (5)
					Gris foncé	Dark grey	1 (5)
					Gris-brun	Grey-brown	1 (5)
					Gris souris	Mouse grey	1 (5)
Black	Noir	Black	36 (95)	Black	Noir	Black	9 (82)
	Vantablack	Vantablack	1 (3)		Noir sombre	Dark black	1 (9)
	Violet, noir	Violet, black	1 (3)		Noir de la nuit	Night black	1 (9)