

THE RELATIONSHIP BETWEEN COLOUR AND PRODUCT PERSONALITY

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Abstract

The author designed and carried out an experiment designed to test two null hypotheses: *H01*: All colours favour the amplification of each dimension of product personality. *H02*: Colours favour the amplification of product personality dimensions regardless of the product on which they are displayed. The OCEAN ("Big Five") personality model was applied in experiment and also it was considered that the personality congruence theory is true. The experiment was run with 232 students, using as products a watering can and a vacuum cleaner, and as colours – the six classic colours of the colour wheel, three achromatic colours and three outstanding focal colours. Hypothesis *H01* was rejected and hypothesis *H02* could not be rejected. Apart from scientific conclusions, experimental results can be used by designers to identify colours that favour a certain product personality dimension.

Keywords: product personality; colour psychology; Big Five (OCEAN).

INTRODUCTION

In today's extremely competitive economic world, all available "arsenal" is used to increase sales, including consumer psychology. Thus, the consumer's personality is appealed during the persuasion process. It has been theorized that products are much more valued and produce attachment if their personality is similar to the personality of the owner or user. More precisely, the product personality should be similar to the image that person has of her/himself. This theory with practical applications was called personality congruence (Govers, Mugge, 2004).

The truth is that the product is a lifeless object, with a strictly determined function and an invariant appearance. The product is objectively an entity without personality. But, because of the emotional connection between the person and the product she/he owns, uses, or contemplates, the person gives the product a personality similar to that of a human. Product personality is defined as follows: "Product personality is the set of strongly defined features of the human personality used by people to distinguish a product from others and to justify the sentimental relationship with it" (Dumitrescu, 2013).

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Over time, several models of product personality have been proposed. The first model ever used was by Patrick Jordan (1997) and it was the classic Briggs-Myers model, but it proved difficult to be applied in the product field. Later, Jordan (2002) returned with a new model of product personality with a high granularity, given by the proposals of no less than 20 personality dimensions.

Lately, a new model is being used more and more, both in terms of human personality and in that of product personality. It has five dimensions and that is why it is also known as the “Big Five”, but the term OCEAN is also used, based to the initials of the dimensions (Grahame, 2020). The dimensions are (with the indication of the extreme values): i) *openness to experience* (inventive / curious vs. consistent / cautious); ii) *conscientiousness* (efficient / organized vs. extravagant / careless); iii) *extraversion* (outgoing / energetic vs. solitary / reserved); iv) *agreeableness* (friendly / compassionate vs. critical / judgmental); and v) *neuroticism* (sensitive / nervous vs. resilient / confident).

Some researchers have used novel dimensions of product personality in their studies, such as “business-like” personality (Mugge, 2011). In fact, Ruth Mugge’s research was the first direct attempt to establish a correlation between product personality and colour. She discovered that business-like product personality is associated with black and grey colours. This finding was confirmed for shades of grey by the experiments of Hung, Chen & Chen (2016).

Given that no extensive research has been identified to study the relationship between product personality and colour, some findings related to the relationship between human personality and colour will be presented below. In this regard, the first seminal work was that authored by Birren (1950, republished in 2016). According to Birren, extraverts prefer warm colours (red, orange, and yellow), and introverts – cold colours (green, blue, purple), which seems more like a logical conclusion than an experimental one. Taking up the same topic, Choungourian (1967) conducted an experiment with a medium sample of participants and ascertain that all participants prefer cool colours, regardless of their personality. Moreover, a detailed analysis of the results reveals subtle conclusions, i.e. extraverts prefer cold colours, but closer to the “warm” limit, and introverts – eminently cold colours. These conclusions appear to be a dim reflection of Birren’s findings.

Another research that focused on the correlation between human personality and the world of colours was that of Pazda and Thorstenson (2018). The “Big Five” (OCEAN) model was used, and attention was focused on colour saturation and not on hue. None of the five personality dimensions could be associated with a specific colour or a specific colour parameter, with the exception of extraversion. The experimental results indicated that extraverts prefer saturated colours. In a work in the process of publication, researchers Watten and Fostervold (2021) discovered significant correlations between the blue colour and the traits of agreeableness and extraversion, respectively a weak correlation between the red colour and agreeableness.

In comparison to product personality, the brand personality was far more researched. Calderón-Fajardo *et al.* (2023) identified no less than 1051 scientific articles related to brand personality. But only a few have addressed the correlation between brand personality and colour. Labrecque and Milne (2012) studied the relationship between colour and brand personality using Jennifer Aaker's (1997) famous model and found relationships, some expected and some less expected. For example, red was associated with excitement, blue with competence, and black and purple with sophistication. In another research, Gupta, Rao, and Rakhi (2025) discovered that certain colour associations with brand characteristics remain consistent, like blue with trust, red with excitement, while other are influenced by product category.

In general, the relationship between personality and colour was studied rarely and abstractly, as if, in her/his daily activities, a person would be in a uniformly coloured environment. Experimental studies should focus on pragmatic aspects, namely how a person reacts from the perspective of her/his personality to colour when it is generated by a light source (theatre spotlight or distant lighthouse), when it is associated with an interior (being the colour of the wall, draperies or carpet) or when it is the colour of the product that the person uses or just observes.

DESIGN AND STUDY METHODOLOGY

After the inference of information from scientific literature dedicated to the topic, there were synthesised the following two conclusions:

- The experiments carried out so far have studied the correlation between human personality dimensions and abstract colour, not the practical one, i.e. the colour of a product, for example.
- The relationship between product personality (described by several dimensions) and product colour has not been the subject of any experiment so far.

Considering the above conclusions, the following research objectives were established:

- Identification of correlations between the personality dimensions of the product and its colour. (This objective can be deployed into the following two sub-objectives, which would be much more pragmatic in nature:)
 - Identification of colours that favour the amplification of a certain dimension of product personality.
 - Identification of colours that favour the diminishing of a certain dimension of product personality.
- Study of the influence of product type on colour preference for the same personality dimension.

The following **generic null hypotheses** were formulated for achieving the research objectives:

H01: All colours favour the amplification of the X dimension of product personality.

H02: Colour Y favours the amplification of dimension X of the product personality regardless of the product on which it is displayed.

METHODOLOGY

Before the actual design of the experiment, the validity of the personality congruence theory was evaluated, a theory with a cardinal role in confirming the future experiment results. Personality congruence theory states that people prefer products with a personality similar to their own (or the personality they think they have). Considering the numerous confirmations in the scientific literature (Govers, & Mugge, 2004; Govers, & Schoormans, 2005; Mugge, Schifferstein, Schoormans, 2006; Dumitrescu, 2007; Wu, Tsai, & Lo, 2011; Baheel, 2024), this theory was considered true.

The colours chosen for the experiment were the six classic colours of the colour wheel, three achromatic colours and three outstanding focal colours (Dumitrescu, Ulmeanu, 2015). The list of colours used in the experiment is: white; grey (medium); black; red; pink; orange; yellow; green; blue; blue; violet; brown.

The image of the two products used in the experiment (watering can and vacuum cleaner) were generated with the help of a computer programme and then given in turn the mentioned colours. Figures 1–4 show the watering can coloured in azure and violet, and respectively the vacuum cleaner coloured in orange and grey.

Among all the personality models, the OCEAN (Big Five) model was chosen for this experiment, because it is used lately by most researchers and because it is easy to understand by common people, like the participants in this experiment.

Given that the product personality had to be studied, the classes of products to be subjected to the experiment had to be chosen. The following constraints were taken into account: a) The products should not belong to the category of personal use, because the strong meaning of a personal object would have diminished the influence of colour in experiment. b) The shape complexity of products should be average, so that the product shape would not capture the attention of experiment participants. c) The product shape should not allow the formation of strong shadows on large surfaces.

Considering the structure of the experimental programme, the participant to experiment would have to perform the following tasks: answer two demographic questions, read five character descriptions, and perform 90 assessments per product. Due to the considerable number of tasks, it was decided that only two products would be used in the experiment. The products chosen were: the watering can (as a low-tech product) and the vacuum cleaner (as a high-tech product).

In order to achieve the objectives of this research, applying the direct method would have meant that each participant would have been assessed from the point of view of personality, a situation that would have produced the following disadvantages: a) complicating the associated bureaucratic process (obtaining the consent of the university's ethics committee for conducting the experiment and obtaining the individual consent of each participant, etc.); b) the participant's reluctance to indicate exactly her/his preferences, knowing that she/he is being analysed; c) the

relativity of the results on personality dimensions, because each person (participant) is a unique combination of the values of the personality dimensions. Therefore, the indirect method was applied, namely a vignette situation (Finch, 1987).



Figure 1. Azure watering can



Figure 2. Orange vacuum cleaner



Figure 3. Violet watering can



Figure 4. Grey vacuum cleaner

Five characters were named and designed, each representing the extreme value of each personality dimension. The characters were named: Miruna, Smaranda, Robert, Iulius, and Darius. Their description was passed to experiment participants before each session. Miruna (representing openness to experience) is an enthusiastic person. She is quite investigative. Her interests are in several fields, from the professional area to general culture. She paints in her spare time and creates mainly fantasy paintings. Smaranda (conscientiousness) is highly organized, both at work and at home. She self-imposes deadlines in everything she does and always complies with them. Also, she is very punctual, even when it comes to extended family reunions. Concludingly, Smaranda is a person animated by clear goals in her professional and personal life. Robert (extraversion) is very sociable and easily starts conversations with strangers. He almost always speaks loudly, even if he notices that this disturbs others. Likes to be the centre of attention and is an energetic person. Iulius (agreeableness) is a friendly person. Everyone finds him likable. He likes to help everyone and easily forgets small inconveniences. He is a modest man, even if he has major achievements. Darius (neuroticism) is a dissatisfied person most of the time and is very shy. Sometimes he is incredibly

stressed, exaggerating the possible negative consequences of events. Occasionally, he has fits of impulsivity.

It was decided that the participants' answers will be recorded using an online questionnaire. After introducing the character, the image of the coloured product is shown, then a question is asked: "How much do you think [name of the character] would like the product?" and the answer is on a Likert scale (1 – Not at all ... 7 – Very much).

PARTICIPANTS

The experiment was performed with 232 participants (118 women and 114 men). The mean age was 23.98 years ($SD = 5.23$). All participants in experiment were students enrolled at a large technical university in Romania. The participants were not financially rewarded for their participation in this research. The participants had basic training in product aesthetics. The participants were screened for visual deficiencies. The product images were presented on computer screens where they appeared with a height of 9 cm. All computer monitors were of the same model and were properly calibrated. The accuracy of results was tested using *Z-score*. All *Z-scores* were in the interval $[-3; +3]$, so no data sets were eliminated. The *Z-score* values ranged between -2.73 and 2.61. The reliability of data was tested using the Cronbach's alpha coefficient. The calculated value for the complete set of data was $\alpha = 0.964$, value which stands for a particularly good reliability.

EXPERIMENTAL RESULTS

After performing the calculations related to descriptive statistics, a first evaluation of results was carried out to check if there were differences between the scores obtained by colours depending on the product and the personality dimension. The mean values obtained by different colours, as well as the mean values per colour type (achromatic, warm, and cold), are presented in Table 1. The mean values obtained by product and personality dimension are displayed in Table 2. Notable differences were recorded in the case of colours, which became even more evident when calculations were performed for colour types. And in the case of the product type, respectively personality dimension, remarkable differences resulted, so there was a certainty that the following statistical calculations will be relevant for the research objectives.

Table 1

Mean values for colours

<i>Colour</i>	<i>White</i>	<i>Grey</i>	<i>Black</i>	<i>Red</i>	<i>Pink</i>	<i>Orange</i>
Mean	4.4	4.2	4.6	4	3.8	3.9
<i>Colour</i>	<i>Yellow</i>	<i>Green</i>	<i>Blue</i>	<i>Azure</i>	<i>Violet</i>	<i>Brown</i>
Mean	4.1	4.3	4.1	4.5	4	4.7
<i>Colours</i>	<i>Achromatic</i>		<i>Warm</i>		<i>Cold</i>	
Mean	4.4		3.95		4.23	

Table 2

Mean values for products against personality dimensions

	<i>Watering Can</i>	<i>Vacuum Cleaner</i>	<i>Mean</i>
Openness to experience	4.52	4.27	4.38
Conscientiousness	3.71	3.78	3.74
Extraversion	4.25	4.21	4.23
Agreeableness	3.96	4.14	4.05
Neuroticism	3.51	3.57	3.54

Table 3 allows the direct observation of mean values deployed on colours and personality dimensions, leading to the identification of colours that favour the amplification of the product personality traits, and respectively those favouring the diminishing. Since the Likert scale was a 7-point one, it results that the mean value is 4. The general scientific literature indicates two options for the neutral interval: a) narrow neutral interval (3.5–4.5), and b) moderate neutral interval (3.33–4.76). The first option was chosen as being more precise, so it was considered that the values placed in the interval (3.5–4.5) are neutral, favouring neither the amplification nor the diminishing of the product personality traits. Obviously, values above 4.5 favour amplification, and those below 3.5 – diminishing.

Summarizing the data in Table 3, it can be stated that:

- *Openness to experience* is amplified by warm, and cold colours in general, and azure, and purple colours in particular, and is diminished by achromatic colours.
- *Conscientiousness* is amplified by achromatic colours and brown and is diminished by the rest of the colours.
- *Extraversion* is amplified by chromatic colours (less pink and brown) and is diminished by achromatic colours.
- *Agreeableness* is amplified by white and grey and is diminished by pink and purple.
- *Neuroticism* is amplified by black and is diminished by chromatic colours (less red and brown).

Table 3

Mean values deployed on colours and personality dimension

	<i>Openness</i>	<i>Conscientiousness</i>	<i>Extraversion</i>	<i>Agreeableness</i>	<i>Neuroticism</i>
White	3.33	5.11	3.03	5.23	4.18
Grey	3.06	4.86	3.03	5.04	4.27
Black	2.76	4.92	2.94	4.11	5.31
Red	5.06	3.75	4.84	3.78	3.68
Pink	4.86	2.92	4.01	2.89	2.88
Orange	4.77	3.34	4.80	3.89	3.22

Table 3 (continued)

Yellow	4.87	<i>2.95</i>	4.61	3.52	<i>2.95</i>
Green	4.75	<i>3.06</i>	4.81	3.91	<i>3.05</i>
Blue	4.97	<i>3.16</i>	5.33	4.39	<i>2.82</i>
Azure	5.18	<i>3.13</i>	4.98	4.08	<i>3.06</i>
Violet	4.83	<i>2.99</i>	4.70	3.23	<i>3.12</i>
Brown	4.18	<i>4.72</i>	3.68	4.54	3.96

Note: Values in bold indicate the colours that favour the amplification of dimensions of the product personality, and those in italics – the colours that favour the diminishing. The values in grey cells indicate a neutral effect.

As mentioned above, there is an amplification and, respectively, a diminishing of each personality dimension exercised by certain colours. A question naturally arises: Is there really an objective determination, or are high or low scores a result of chance?

To confirm the identified relationships between colours and personality dimensions, the hypothesis *H01* ("All colours favour the amplification of the X dimension of product personality") is verified through the ANOVA method with a single factor. The method was applied for all OCEAN dimensions.

In the case of watering can, the $F_{calculated}$ values ranged from 33.71 to 89.89 ($F_{critic} = 1.792$). The p -value ranged from 5.9×10^{-173} to 4.9×10^{-68} . In order to determine the size effects, the *Eta-Squared* (η^2) was calculated and values were between 0.16 and 0.27, so the size effects were large. Regarding the vacuum cleaner, the $F_{calculated}$ values ranged from 43.76 to 71.47 ($F_{critic} = 1.792$). The p -value ranged from 1.5×10^{-141} to 2.1×10^{-88} . Also, the *Eta-Squared* (η^2) was calculated obtaining values between 0.15 and 0.19, so the size effects were large. Obviously, the *H01* hypothesis was rejected.

In relation to the influence of the product type on the relationship between colours and personality dimensions, hypothesis *H02* was formulated: *Colour Y favours the amplification of dimension X of the product personality regardless of the product on which it is displayed.*

Since there are only two sets of data (one for watering cans and another for vacuum cleaners), the ANOVA method cannot be applied to test hypothesis *H02*. Recommended in this case is the *Z test* method ("two-tail" variant) because there is no interest in the direction of variation. The *Z-test* would have had to be applied 60 times (12 colours times 5 personality dimensions), and the presentation of the results would have unnecessarily taken up a lot of space in the paper. Therefore, Table 4 shows the results of only three *Z-tests*. In the all three cases, both conditions were not met (p -value < 0.05 and $Z_{critic} < Z_{calculated}$), so the hypothesis *H02* could not be rejected. The size effects (even if not relevant in this situation) were calculated using Cohen's *d*.

Table 4

Z-test results (alpha = 0,05)

	<i>Z_{critic}</i>	<i>Z_{calculated}</i>	<i>p-value</i>	<i>d</i>	<i>Decision</i>
Openness to experience – white	1.959	1.49	0.68	0.09	Null hypothesis could not be rejected.
Conscientiousness –green	1.959	1.64	0.09	0.01	Null hypothesis could not be rejected.
Neuroticism – azure	1.959	0.29	0.97	0.10	Null hypothesis could not be rejected.

DISCUSSION

From the very beginning, the author considered the personality congruence theory to be valid, i.e. it is true that people prefer products with a personality similar to their own. The author designed an experiment to test two null hypotheses:

H01: All colours favour the amplification of the X dimension of product personality.

H02: Colour Y favours the amplification of dimension X of the product personality regardless of the product on which it is displayed.

Two types of products were chosen for conducting the experiment: the watering can (low-tech product) and the vacuum cleaner (high-tech product). The colours chosen for experiment were the six classic colours of the colour wheel, three achromatic colours and three outstanding focal colours respectively: white; grey (medium); black; red; pink; orange; yellow; green; blue; blue; violet; and brown. The OCEAN (“Big Five”) personality model was used in experiment, a model characterized by five personality dimensions: *Openness to experience*, *Conscientiousness*, *Extraversion*, *Agreeableness*, and *Neuroticism*. The study in a vignette situation was preferred to the direct approach (measuring the personality of the participants in the experiment, etc.) for reasons of efficiency and objectivity. Descriptions were elaborated for the five characters, each character representing at the highest level only one personality dimension. Essentially, the participants were asked in a lab via a questionnaire how much each character would like the two products presented in turn in all the chosen colours.

The experiment was carried out with the help of 232 student participants (fact which indicates a limitation of the present research), respectively the results are valid for young intellectuals. The accuracy of the results was confirmed by *Z-score*, and the reliability by Cronbach alpha. Since the mean scores were obtained from a questionnaire with 7-point Likert scales, it was considered that the means between 3.5 and 4.5 reflect a null influence of the colour. The mean above the value of 4.5 indicates an influence of colour in the sense of amplifying the corresponding dimension of product personality, and the mean below the value of 3.5 indicates an influence of colour in the sense of diminishing the corresponding dimension of product personality.

Thus, it was discovered that: a) Openness to experience is amplified by warm, and cold colours in general, and azure, and purple colours in particular, and is diminished by achromatic colours. b) Conscientiousness is amplified by achromatic colours, and brown, and is diminished by the rest of colours. c) Extraversion is amplified by chromatic colours (less pink, and brown) and is diminished by achromatic colours. d) Agreeableness is amplified by white, and grey, and is diminished by pink, and purple. e) Neuroticism is amplified by black and is diminished by chromatic colours (less red and brown). These findings are confirming in a certain manner those of Watten, & Fostervold (2021). Also, the correlation between conscientiousness and achromatic colours is in agreement with the conclusions of Mugge (2011), being obvious that a business-like personality can be included in the dimension of conscientiousness.

Some of the results were the expected ones. Chromatic colours amplify openness to experience, and extraversion and, respectively, diminish conscientiousness, and neuroticism. Achromatic colours amplify conscientiousness, and, respectively, diminish openness to experience, and extraversion. Black amplifies neuroticism. Unexpected results were those associated with agreeableness and colour brown.

The null hypotheses were tested using ANOVA, *Z-test*, and by direct comparison of values, and the conclusions were:

H01: All colours favour the amplification of the X dimension of product personality. - rejected

H02: Colour Y favours the amplification of dimension X of the product personality regardless of the product on which it is displayed. - could not be rejected

The limitations of the present research are given by the sample dimension, age of participants and their education level. Future research should concentrate on samples of different age and level of education. Also, other product categories should be used in research. Regarding the participants' race and ethnicity, the OCEAN model has proven to be valid across cultures during decades of studies.

FINAL CONCLUSIONS AND RECOMMENDATIONS

The experiment designed to study the relationship between product personality and colour revealed that some colours enhance certain personality traits, while others diminish them and others have a neutral influence. These results are in line with the findings of other researchers. There were also unexpected results, including the correlation between agreeableness and colour brown, a finding that merits focused research in the future.

The direct practical value of experiment results is that the designers have at their disposal a mini-guide that allows them to precisely choose the colours they can use to give a product the personality they want. Although the hypothesis *H02*

could not be rejected, which means that product type does not matter in the relationship between colour and personality dimension, it is recommended that the designer should test the relationship between colour and product personality (for products other than those used in the experiment) with a sample of the targeted market segment.

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