

Colour associations for the words *feminine* and *masculine* in nine different countries

Ivar Jung^{a*}, Yulia A. Griber^b

^a Linnaeus University, Kalmar, Sweden

^b Smolensk State University, Smolensk, Russia

* ivar.jung@lnu.se

ABSTRACT

The main goal of this study is to examine how colours with different hue, lightness and saturation are associated with the words *feminine* and *masculine*. The objectives of our investigation were three-fold: (1) to reveal colour structure of both concepts in different cultures; (2) to visualize the obtained color associations and (3) to understand their cross-cultural similarities and differences. The experiment participants were given 26 words, including the words *feminine* and *masculine*, and asked to match each word to a sample from a chart with 27 selected colours from the NCS system. 754 subjects (470 females and 284 males) aged between 16 and 70 years (mean age 24.9) took part in the research in 9 countries. The data was collected in Germany, Iran, Japan, Nepal, Russia, Saudi Arabia, Sweden, Turkey, and Uganda. In total, the final dataset included 19,604 responses, 1,508 of which represented colour associations to the words *feminine* and *masculine*.

Keywords: colour associations, cross-cultural research, experiment, *feminine*, *masculine*

INTRODUCTION

Among the leading concepts actively circulating in society, and thus being familiar to the great majority of adherents to different cultures, are *feminine* and *masculine*. Although the terms *masculine* and *feminine* have rarely been defined, they have an important empirical meaning, being used as “labels to identify specific objects, events, or qualities that in a given culture are perceived as more closely associated with males or with females” (Spence 1984). Their content reflects gender stereotypes, gender roles, actual and perceived sexual orientation and significantly differs across countries and time periods (see e.g., Paechter 2006).

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EXPERIMENTS

Design

Data were collected in the course of an experiment. The method used in this research was previously implemented during a pilot stage in Sweden and Nepal in 2016 and first presented at the AIC2016 Conference in Santiago (Jung 2016).

The experiment participants were given 26 words, including the words *feminine* and *masculine*, and asked to match each word to a sample from a chart with 27 selected colours from the NCS system. Time allocated for the experiment was not limited. Participants wrote down their responses on their own.

Subjects

754 subjects (470 females and 284 males) aged between 16 and 70 years (mean age 24.9) took part in the experiment in 9 countries. The data in the present study was collected in Germany, Iran, Japan, Nepal, Russia, Saudi Arabia, Sweden, Turkey, and Uganda (Table 1). The subjects participated in the experiment in English. Their native languages belonged to Indo-European (German, Persian, Nepali, Russian, and Swedish), Japonic (Japanese), Afro-Asiatic (Arabic), Altaic (Turkish), and Bantu (Swahili) families.

Country	Native language	Language family	Number of subjects (F/M)	Mean age (age range)	Number of responses	Data collected by/ reference
Germany	German	Indo-European	90 (53/37)	22.1 (18-60)	2,340	Ralf Weber, Yulia A. Griber
Iran	Persian	Indo-European	60 (36/24)	20.3 (17-38)	1,560	Shabnam Arbab
Japan	Japanese	Japonic	140 (112/28)	22.4 (16-67)	3,640	Kohji Yoshimura
Nepal	Nepali	Indo-European	77 (25/52)	26.7 (18-58)	2,002	Sujan Chitrakar, Ivar Jung
Russia	Russian	Indo-European	70 (51/19)	25.1 (16-60)	1,820	Yulia A. Griber
Saudi Arabia	Arabic	Afro-Asiatic	67 (38/29)	32.0 (19-70)	1,742	Ibrahim M. Elhady
Sweden	Swedish	Indo-European	70 (54/16)	27.1 (20-56)	1,820	Ivar Jung
Turkey	Turkish	Altaic	114 (68/46)	23.7 (18-42)	2,964	Begüm Ulusoy
Uganda	Swahili	Bantu	66 (33/33)	24.8 (17-44)	1,716	Jeannette Hanenburg
Total			754 (470/284)	24.9 (16-70)	19,604	

Table 1: Characteristics of the total respondents' sample and subsamples.

The sampling was random. All subjects were recruited volunteers. They had different dialectal, educational and social backgrounds. They did not have any known colour vision defects, and they were born and lived in the same country.

The number of participants from each country, their mean age and age range, as well as the number of received responses are presented in Table 1.

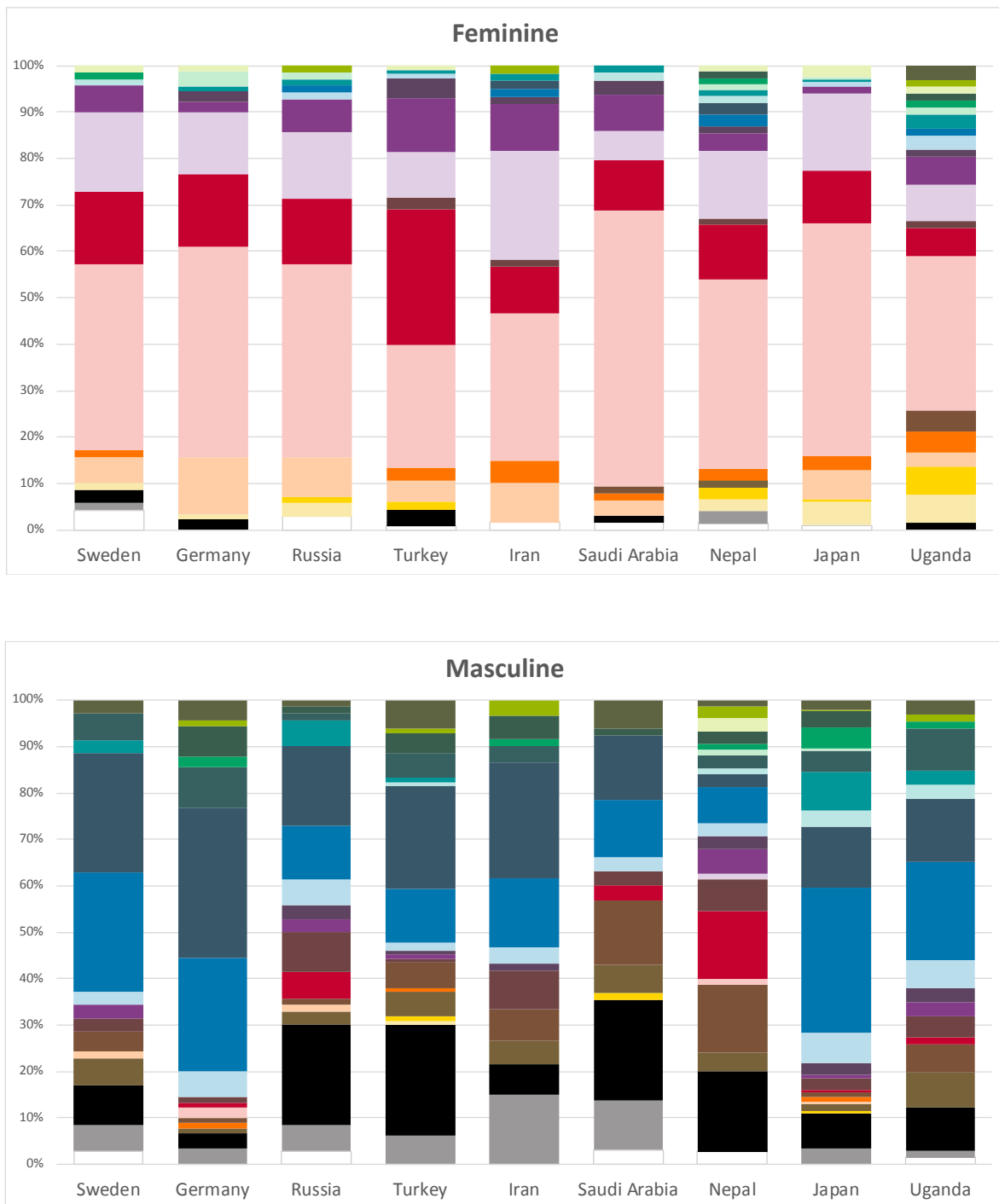


Figure 1: Colour associations to the words *feminine* (top) and *masculine* (bottom) in nine countries.

RESULTS AND DISCUSSION

Colour structure of concepts *feminine* and *masculine* in different cultures

In total, the final dataset included 19,604 responses, 1,508 of which represented colour associations to the words *feminine* and *masculine* (Figure 1).

Associations with hue

The strongest associations with hue for the term *feminine* were similar in all countries and in accord with previous findings (see e.g., Frassanito and Pettorini 2008, Pastoureau 2016) referred to the red (R) (41-70%) and purple (RB) (15-35%) parts of colour spectrum (Figure 2 top).

The most popular hue connected with the word *masculine* in Germany, Sweden, Japan, Iran, and Uganda was blue (B) (41-62%). In Russia, Turkey, and Saudi Arabia were additionally revealed strong associations with achromatic colours (N) (30-35%). In Nepal subjects often associated the term *masculine* with dark shades of red (R) (23%) (Figure 2 bottom).

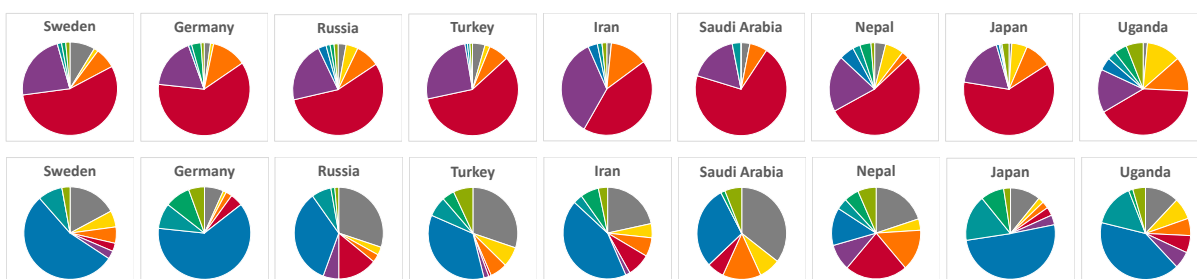


Figure 2: Associations with hue for the words *feminine* (top) and *masculine* (bottom) in nine countries.

Associations with groups of shades

The distribution of associations in groups of shades showed a curious pattern: colours of *feminine* in all countries except Turkey were predominantly formed with the use of light shades (56-83%), while among the colours of *masculine* dark shades prevailed (55-74%) in all countries except Japan (Figure 3).

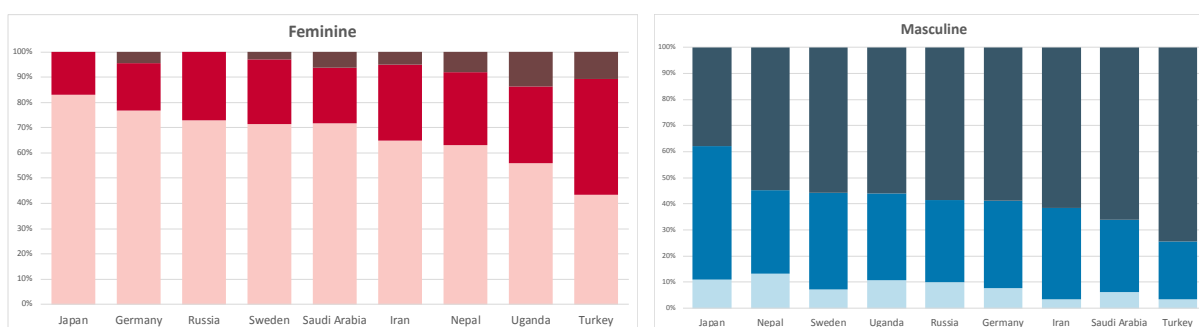


Figure 3: Associations with groups of shades for the words *feminine* (left) and *masculine* (right) in nine countries.

Cluster analysis

Two complimentary multidimensional approaches, a non-hierarchical K-means algorithm (see e.g. Hartigan and Wong 1979) and a hierarchical Ward's clustering method (Ward 1963), were implemented to identify groups of countries based on the colour associations to the concepts

feminine and *masculine*. From an application point of view, this work is based on the use of an R library (Roberts et al. 2014). The results obtained from the K-means clustering and Ward’s clustering are respectively presented in the Figures 4 and 5.

Figure 4 shows similarity in colour associations to the term *feminine* between Sweden, Germany, Russia, Japan, and Nepal, together with the specific character of these links in Iran, Turkey, Saudi Arabia, and Uganda. Regarding the colour associations to the word *masculine*, this figure shows that Russia, Turkey, and Saudi Arabia locate in one and the same cluster, Germany shares similarity with Sweden, Japan is similar to Uganda, whereas Nepal and Iran demonstrate their specific nature.

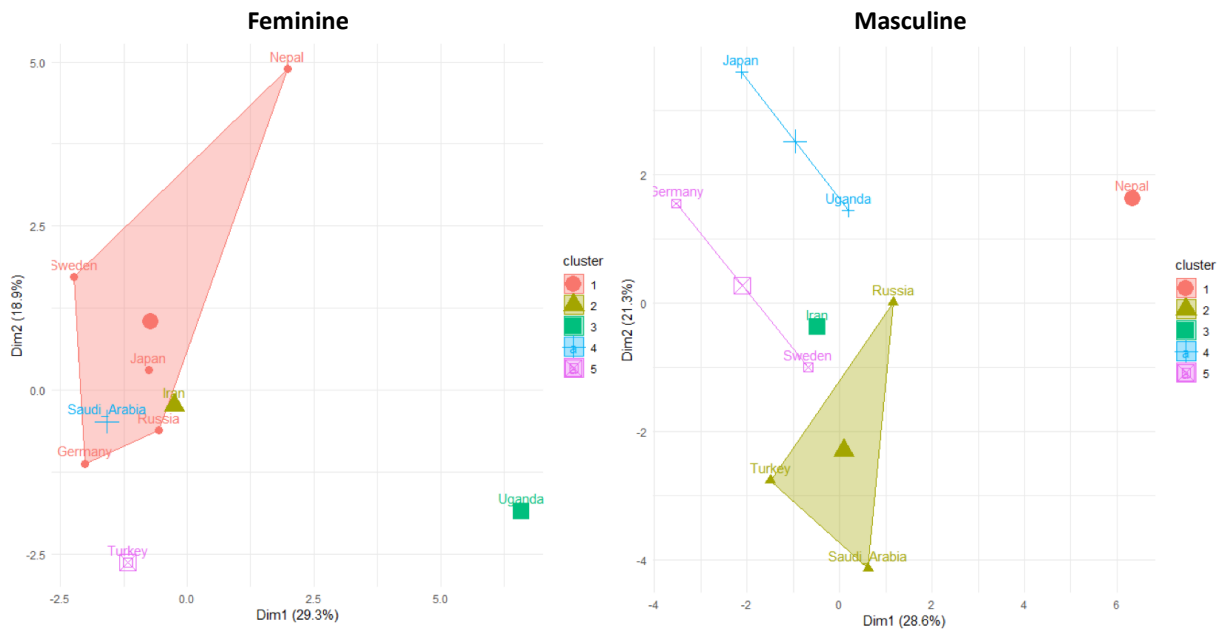


Figure 4: Inter-country adjacencies in color associations to the words *feminine* (left) and *masculine* (right) represented as K-means clusters (k = 5).

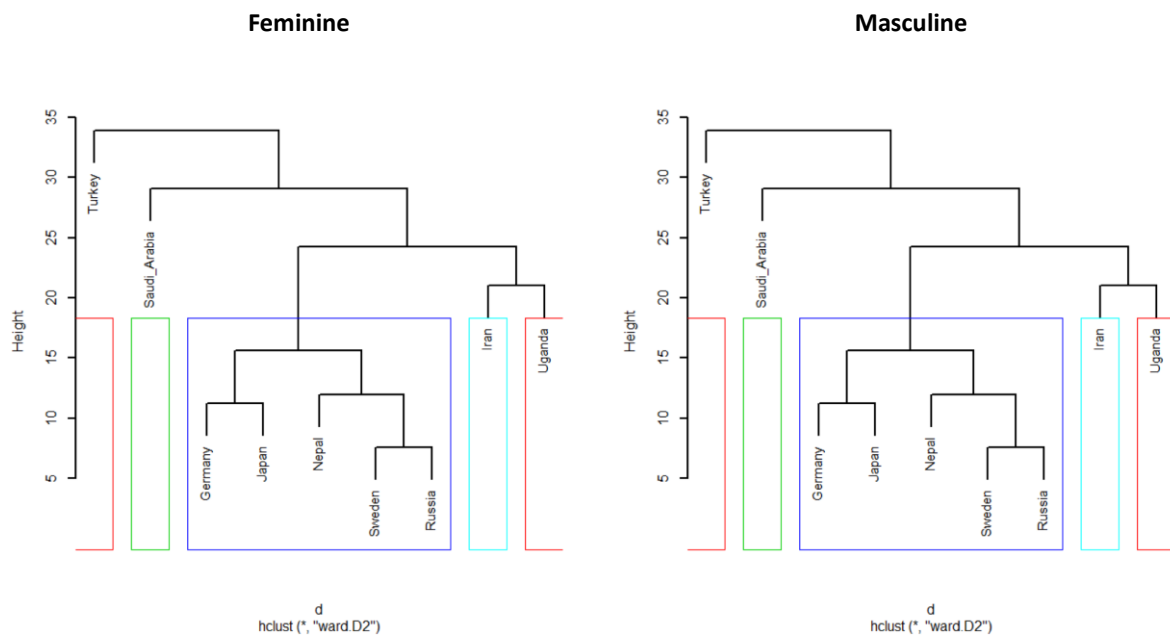


Figure 5: Inter-country adjacencies in color associations to the words *feminine* (left) and *masculine* (right) represented as dendrogram.

The outcome of Ward's algorithm plotted as a tree diagram (dendrogram) (Figure 5) confirms the previous result, but offers also a hierarchical view of the clusters. The hierarchical analysis highlights the specific character of the colour associations to the term *feminine* in Sweden and Russia that are in the same group as Germany, Japan and Nepal. With regard to the word *masculine*, Turkey and Saudi Arabia appear in a separate sub-cluster that suggests that colour associations revealed in these countries are quite different from Russia that is in the same group.

CONCLUSION

On the whole, the use of colour samples as stimuli and directed selection of associations allowed us to conduct a quantitative analysis of the chromatic structure of the concepts *feminine* and *masculine*. We were able to specify hue, lightness and saturation of shades forming colour associations and to visualize chromatic images related to these concepts in nine different cultures. The experimental method, its procedure and approved principles of colour association, could be applied for structuring the chromatic images of other anthropologically relevant concepts. The research possesses wide prospects for further development, based on the material of other cultures, together with a potential for considerable application. The obtained results could be valuable in compiling topical dictionaries and reference books, teaching activities, as well as contributing to a great spectrum of practical tasks in architecture, design and advertising communication.

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