

# A comparative study of lipstick shades preferences by geographical areas

Hélène de Clermont-Gallerande<sup>1</sup>, Emmanuelle Mauger<sup>1</sup>, Nicolas Rolland<sup>1</sup>

<sup>1</sup> Chanel Parfum Beauté, Innovation, Research & Development, 8 rue du Cheval Blanc, Pantin, France.

*helene.declermontgallerande@chanel.com, emmanuelle.mauger@chanel.com, nicolas.rolland@chanel.com*

*Corresponding author: Hélène de Clermont-Gallerande (helene.declermontgallerande@chanel.com)*

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## ABSTRACT

International cosmetics companies manufacture make-up products that are then sold in all countries where the brand is distributed. Lipstick ranges today each include about 30 shades and each brand offers several ranges with different effects of the make-up result. A couple of years ago, Chanel lipsticks provide 142 shades divided into several ranges: 34 classic lipsticks, 48 shiny lipsticks, 39 intense lipsticks and 21 matt lipsticks. It seemed to us worth looking too, at the 20 best-selling lipsticks by specific geographical area. So, the areas studied are not of comparable size because they are those where detailed sales figures are available. These areas are France, Italy, the UK, the USA, Asia and South America. The best sales per area are statistically analyzed to establish shade preferences in each of these areas. A Principal Components Analysis then made it possible to establish the geographical areas whose lipstick color choices are closest. A red saturated, middle lightness was unanimously preferred internationally. Italy and France were the two markets most representative in terms of lipstick shades.

**KEYWORDS** Shades, Preference, Lipsticks, Color, Geographical area

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## 1. Introduction

Before the health crisis induced by COVID-19, lipstick was the best-selling make-up product. Although wearing a mask has drastically reduced lipstick sales, it remains the quintessential feminine attribute. CHANEL is one of the world's leading sellers of lipsticks. Like all international cosmetics companies, its products are sold in every country where the brand is distributed. However, where cosmetics are concerned, the success of a product is linked to the whole marketing mix (advertising, media communication, packaging, brand impact, texture and performance complaints) but, above all, to the color on offer. Therefore, CHANEL exhibits to its customers a wide range of shades with the aim of appealing to women from all cultures, in all age ranges and of every style. Like all CHANEL's make-up ranges, the lipstick lines are divided into two parts: firstly, a core range including iconic shades that are found all over the world, and secondly the freedom to use colors that respond to the needs and specific characteristics of the markets. We thought it would be interesting to study which were the 20 best-selling shades in each part of the world where CHANEL's products are distributed. A couple of years ago, CHANEL offered 142 lipstick shades splitted over five ranges: 34 classic moisturizing lipsticks (Rouge Coco), 48 shiny, transparent lipsticks (Rouge Coco Shine and Rouge Coco Stylo), 39 intense lipsticks (Rouge Allure) and 21 matt lipsticks (Rouge Allure Velvet). There are six regions of the world studied: France, Italy, United Kingdom, USA and Asia (Korea, Japan, Singapore, China and Taiwan). The geographical areas studied are not of identical size because Maison CHANEL compiles its figures by continent. In this article, the best-selling lipsticks were analyzed to determine color preferences by geographical area through PCA methodology, to establish specificities of each market of the world and to understand similarities between the markets. The most similar geographical areas will thus be distinguished from the most dissimilar ones.

## 2. Materials and Methods

### 2.1. Color measurement

The color of the products was measured using an Xrite VS450 contactless spectrophotometer in the CIEL\*a\*b\* color space. The color measurements were done in specular included mode, with a 45/0 geometry and a D65 illuminant.

### 2.2. Statistical analysis

A first mapping of the 142 shades available on all the markets was produced using a Principal Components Analysis (PCA) performed on the L\*, a\* and b\* parameters (Everitt, Landau, Leese and Stahl, 2011). Based on this

summarised information, groups of shades were identified (figures 2 a, b and c). Afterward, to regroup products with similar shades, a clustering method was applied on the previous PCA components (Jobson, 1992). A 2nd PCA was carried out to determine the geographical similarities and regional benchmarks of the markets.

A response surface model using standard least squares was used to analyse the ranking in a specific market. The main effects of the model are the lipstick rank and the second order the geographical area.

The ranking of the 20 best-selling shades per country or continent at the end of the studied year was supplied by the company's marketing division (Chanel, 2016). These results are based on sell-in figures, except for Asia where only sell-out figures were available. The product classified as number 1, the most frequently sold, will then have 20 points. The points assigned will then decrease to 1. A shade which is not present in the 20 best-selling shades in a given region will, therefore, have a mark of 0 as shown in figure 1. The color classification previously built was used to determine the shades unanimously liked all over the world and those which are more favoured or even specific in a geographical area.

Pays	ROUGE ALLURE 104 PASSION	ROUGE ALLURE 109 ROUGE NOIR	ROUGE ALLURE 136 MELODIEUSE	ROUGE ALLURE 138 FOUGUEUSE	ROUGE ALLURE 149 ELEGANTE	ROUGE ALLURE 152 INSATISSABLE
France	15	9	0	0	3	0
Italie	18	0	0	0	0	0
UK	14	0	0	0	0	0
Amérique Sud	7	0	0	0	0	0
Asie	0	0	13	2	0	10
USA	0	0	0	0	0	0

Fig. 1. Extract of scoring matrix for lipsticks based on their classification out of the 20 best-sellers in each region. 20 = 1st in the classification. 0 = not mentioned in the classification.

## 3. Results

The lipstick color analysis is resumed on the figure 2.a. The first axis represents the a\* and b\* parameters. The lipsticks on the bottom left are darker. The one on the right are redder and yellower. The classification led to obtain 8 clusters. To visualise the classification, the previous graph was rebuilt using color of the lipstick and the shape corresponding to the classification. The figure 2.c is a focus on the 20 best-selling shades in the six regions. They are not always the same from one region of the world to another. Therefore, 50 lipstick shades of the 142 offered by Chanel are represented.

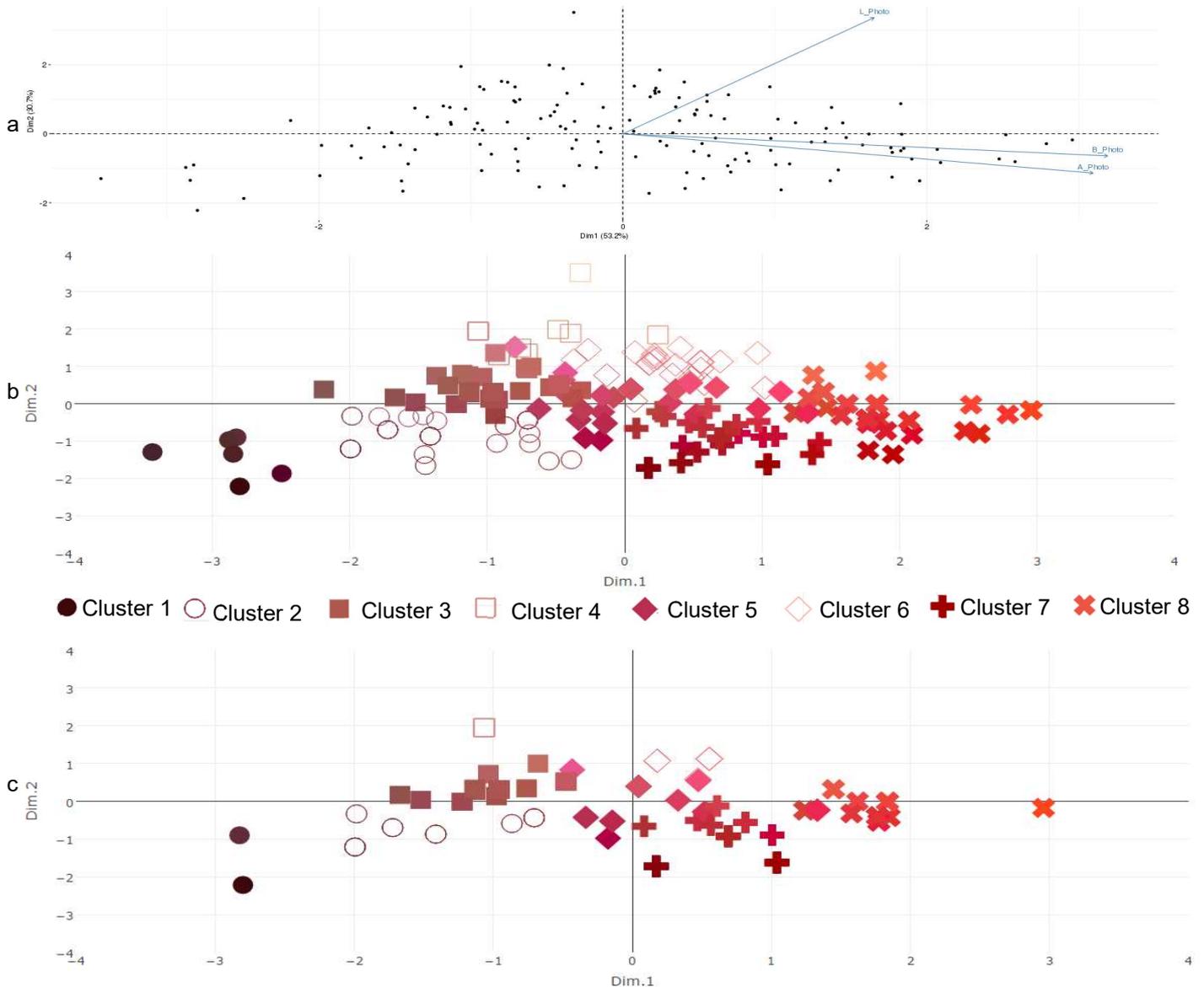


Fig. 2. Lipstick color classification analysis

- a. Simultaneous representation of the first factorial map of the PCA on the 142 lipsticks color parameters.
- b. Graphic representation in the colorimetric space of the 142 shades offered by Chanel. The shape corresponds to the lipstick colors classification.
- c. Graphic representation of the 50 shades mentioned in the rankings of the six regions studied.

Figure 3 shows the distribution of the 50 lipstick shades mentioned at least once in the top 20 best-sellers in the 6 markets studied and in the different lipstick ranges.

The color measurements established that these 50 shades represented the 8 clusters already established with the 142 lipsticks on sale worldwide. For these 50 shades we can see that all the measurements reported in the  $L^*a^*b^*c^*h^*$  color space are in the first quadrant for hue  $h^*$  between 0 and  $45^\circ$ , which logically corresponds to the space for reds.

For lightness  $L^*$ , they are between 5 and 70, with most lipsticks between 40 and 50, so with medium lightness figures.

The greatest variability observed is in chroma  $c^*$ . The range varies between 7 and 90 and is of course linked to the lightness of each shade. For both light and dark shades, we see lower chroma due to the geometry of the color space. The 8 clusters can be described as detailed. The 8 statistically defined groups are sometimes very close on one of the parameters  $L^*a^*b^*c^*h^*$  and overlap.



Fig. 3. The 50 shades of the five ranges classified in the rankings of the six regions studied.

The algorithm model chosen makes each shade appear in a given cluster, but it would have been possible for the shades on the borderline to be attached to a neighbouring cluster. Cluster 1 corresponds to the darkest shades, also known as 'nearly black'. Only 2 shades out of the 50 mentioned among the Top 20s for the various markets are in this cluster. The L\* value is below 30. The chroma is low. Cluster 2 includes 6 dark shades: dark, burnished or purplish reds, or burgundies. Cluster 3 is the most represented with 11 shades. They all have medium lightness, around 50, and are unsaturated. These shades include antique pinks, faded reds and browns. There is only one shade in cluster 4. This shade is very light, saturated and has a red tinge. It is a light pink. Cluster 5 contains 9 shades with medium lightness, slightly lower than cluster 3. They are quite saturated. Cluster 6 includes 3 shades. They are light, with lightness above 50 and are quite saturated. Cluster 7 is made up of 9 shades, like cluster 5. The lightness is medium, the shades are saturated and the chroma is red. This is the bright red group, ranging from true reds to reds with a bluish undertone. Cluster 8 also includes 9 shades. They are of medium lightness, with high saturation and a red-yellow tone. They include salmon and orange shades.

#### 4. Discussion

The spectroradiometer measurements of the range are positioned in a limited space as the Chanel lipstick range does not include atypical shades (yellow, green, blue) but is concentrated in the reds area (de Clermont-Gallerande et al., 2018). It is interesting to note that while numerous

studies have been conducted on global color preferences, they have never focused on a color space as limited as a lipstick range (Sakamoto, 2014).

All the shades are relatively classic, even though some might seem extravagant, such as the very dark shades in cluster 1, as shown figure 4. The shades in cluster 3 are the most represented among the Top 20 shades for each market, because they are number 11 out of the 50 shades listed in the classification. They, therefore, correspond to 22% of the shades classified in the various Top 20s. Clusters 5, 7 and 8 are of equal size among the 50 shades studied and each composed of 9 shades. It should be noted that these 3 clusters group together the saturated shades.

Two shades are classified among the Top 20 of the six regions studied: *Rouge Allure Pirate* and *Rouge Coco Gabrielle*. However, the rankings of sales of *Rouge Allure Pirate* are systematically better than those of *Rouge Coco Gabrielle*, making *Rouge Allure Pirate* Chanel's best international seller. *Rouge Allure Pirate* was launched by Chanel in 2005 and *Rouge Coco Gabrielle* in 2015. The two shades are saturated dark reds with a hint of yellow. They are both in cluster 7, which gives the impression that this cluster represents lipstick shades which are appreciated whatever the culture and geographical area (Premium Beauty News, 2017). Considering both the presence of the six regions in the ranking and their positioning within that ranking, the most frequently sold shades are *Rouge Allure Pirate*, *Rouge Coco Stylo Message* and *Rouge Coco Gabrielle*. *Rouge Coco Stylo Message* is in cluster 2.



Fig. 4. Classification of the 50 shades mentioned in the Top 20 for the 6 studied regions in the 8 clusters.

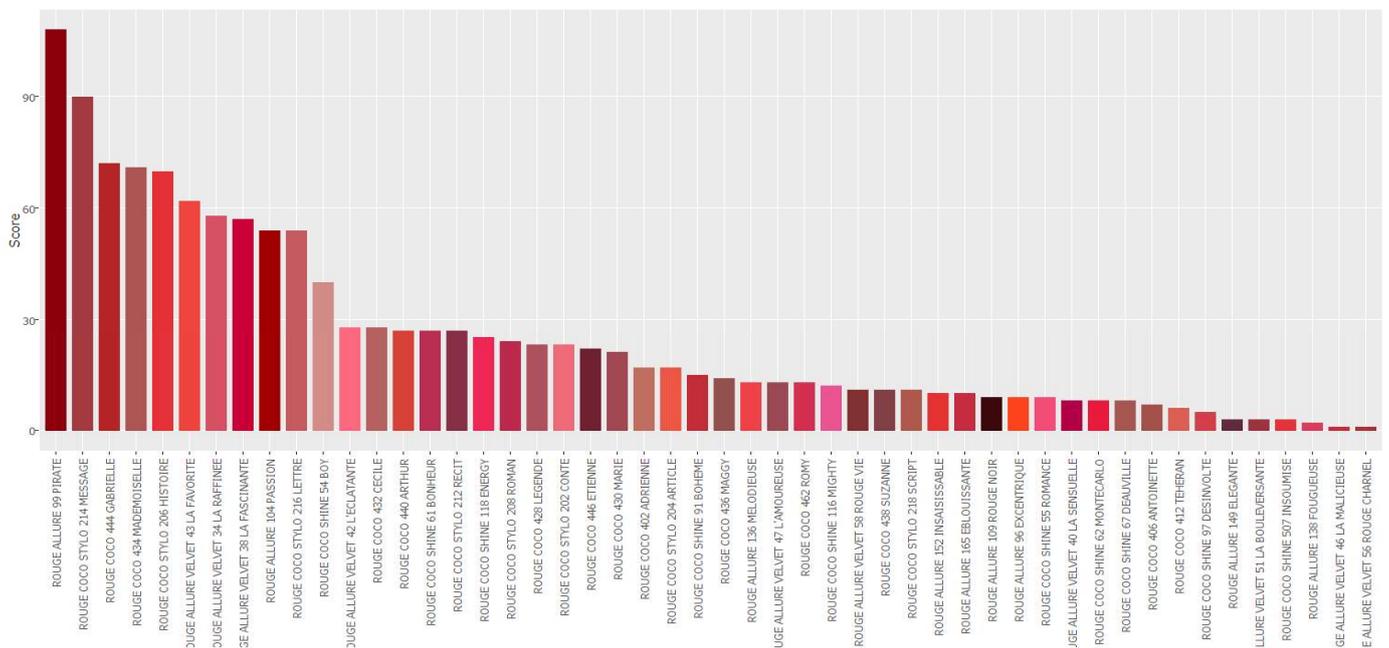


Fig. 5. The score of the 50 shades most frequently represented of the Top 20 in the six geographical regions, comparing their presence and ranking within that classification.

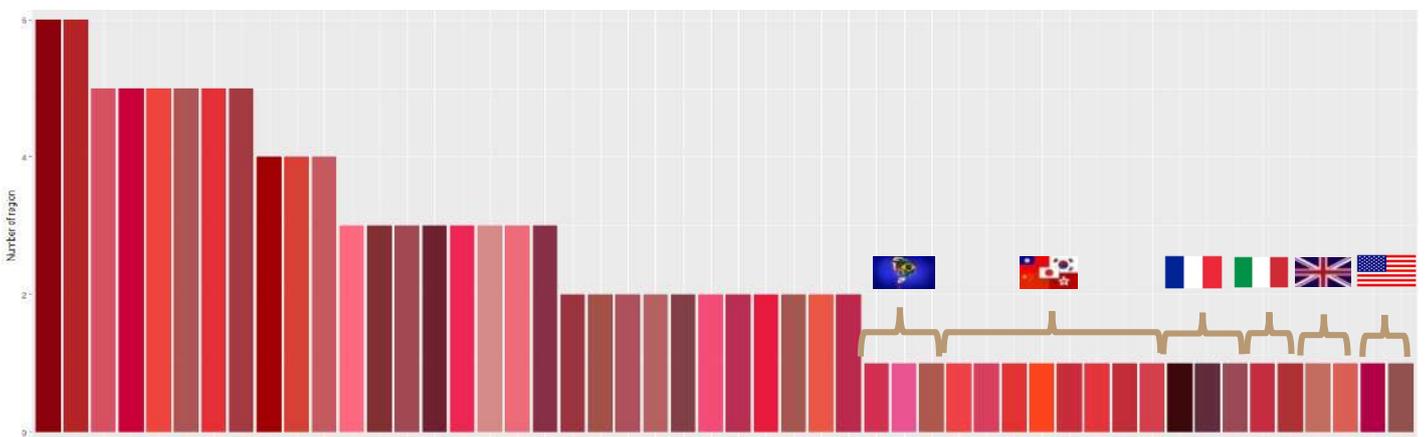


Fig. 6. Presence number in the rankings of the Top 20 in the six geographical regions.

Six shades are present in five of the six regions studied: *Rouge Allure Velvet La Favorite* (cluster 8), *Rouge Allure Velvet La Fascinante* (cluster 7), *Rouge Allure Velvet La Raffinée* (cluster 5), *Rouge Coco Stylo Message* (cluster 2), *Rouge Coco Stylo Histoire* (cluster 8) and *Rouge Coco Mademoiselle* (cluster 3). It is interesting to note that among those excellent sales, three are matt lipsticks. Three shades are among the 20 best sellers in four regions: *Rouge Allure Passion* (cluster 7), *Rouge Coco Arthur* (cluster 8) and *Rouge Coco Stylo Lettre* (cluster 3). Eight shades are represented in this ranking in three geographical regions: *Rouge Allure Velvet l'Eclatante* (cluster 6), *Rouge Allure Velvet Rouge Vie* (cluster 2), *Rouge Coco Etienne* (cluster 2), *Rouge Coco Marie* (cluster 3), *Rouge Coco Shine Boy* (cluster 4), *Rouge Coco Stylo Energie* (cluster 5), *Rouge Coco Style Récit* (cluster 2) and *Rouge Coco Stylo Conte* (cluster 6). Eleven shades are present only twice in the Top 20 ranking: *Rouge Allure Velvet La Bouleversante* (cluster 2), *Rouge Coco Cécile* (cluster 3), *Rouge Coco Légende* (cluster 3), *Rouge Coco Suzanne* (cluster 2), *Rouge Coco Antoinette* (cluster 3), *Rouge Coco Shine Bonheur* (cluster 5), *Rouge Coco Shine Romance* (cluster 5), *Rouge Coco Shine Deauville* (cluster 3), *Rouge Coco Shine Monte-Carlo* (cluster 8), *Rouge Coco Stylo Roman* (cluster 5) and *Rouge Coco Stylo Article* (cluster 8). Lastly, 16 shades are specific to one region:

Three shades are specific to France: *Rouge Allure Velvet L'Amoureuse* (cluster 3), *Rouge Allure Rouge Noir* and *Rouge Allure Élégante* (both cluster 1). France is the only market that ranks shades from cluster 1 in its Top 20. French women therefore show a specific preference for very dark, almost black, desaturated shades and deep purplish browns.

In the case of Italy, two shades: *Rouge Allure Velvet Rouge Charnel* (cluster 7) and *Rouge Allure Velvet La Bouleversante* (cluster 2). Even though the 2 shades are very different, it is interesting to note that Italian women differ in preferring matt make-up results, as the 2 lipsticks that are specific to this market are matt formulas. Italy also shows a preference for shades in cluster 7, with 6 of them ranked among the 20 best-sellers. Cluster 7 includes red and bluish-red shades with medium lightness and high saturation.

As for the United Kingdom, two shades are noticed: *Rouge Coco Téhéran* (cluster 6) and *Rouge Coco Adrienne* (cluster 3). As the other European countries, UK is centrally positioned in the PCA but its inclination is for American preferences. The 2 specific shades are of medium lightness and have reddish-yellow hints, with one orangey and one brown shade.

The United States have a single specific shade: *Rouge Coco Maggy* (cluster 3). The United States indicate their preference with an antique pink shade. The United States have a real preference for the shades in cluster 3, as they represent 7 of the 20 best-selling shades. Cluster 3 includes somewhat darker shades, with medium saturation. More generally, the Anglo-Saxon countries prefer rosewood and nude shades.

There are three specific shades to South America: *Rouge Coco Romy* (cluster 5), *Rouge Coco Shine Mighty* (cluster 5) and *Rouge Coco Stylo Script* (cluster 3). This market appreciates shades with bluish tinges. There are, therefore, obviously 3 pink shades among their specific selection. However, while the 2 pinks in cluster 5 are very bright, the one in cluster 3 is desaturated. It is cluster 5, with its medium lightness, high saturation and pink and bluish red hue that is most widely represented among the 20 shades sold most on the market. Fuchsia shades are appreciated in this region.

Interestingly, the Asian market shows a real preference for the shades in clusters 7 and 8, which they are often the only market to prefer (Saito, 1996). This is the geographical area where we find the largest number of specific shades, as 8 shades in the Top 20 only appear in this market. All the shades in cluster 8 are present among the 20 best-sellers, i.e., 9 shades out of 20. Cluster 8 includes the light to very light, highly saturated shades, with very bright colors. Thus, Asia is the most differentiated part of the world compared with the other geographical areas. It is distinguished by different color choices from those of the other markets studied.

Asians tend to prefer pinkish shades, while other parts of the world tend to prefer redder shades. However, although the preferences of France, Italy and the United Kingdom are relatively similar compared with other countries, differences can nevertheless be discerned between South America and the United States. South Americans are inclined to prefer brown shades like *Rouge Allure Rouge Vie* while North Americans tend to prefer reds. Thus, similarities and countries whose choice of shades is very close can be observed (Choungourian, 1968), (Urien and Divard, 2000).

For example, Italy and France share a preference for 13 of the 20 best-selling shades. There are mainly issued from clusters 2 and 3, which shows similar preferences for desaturated, brownish, intermediate lightness shades.

Asia and USA are the most distant with only 4 out of 20 shades in common.

Areas	Italia	UK	South America	Asia	USA
France	13	11	11	8	10
Italia		12	12	9	8
UK			10	8	11
South America				6	10
Asia					4

Table 1. Number of shades shared by two regions of the 20 shades present in the ranking.

The first criterion of similarity in the choices seems to be linked to geographical proximity. Europeans share a preference for certain shades. As an illustration, Italy and France share 13 of the 20 best-selling shades. The United Kingdom shares 12 shades with Italy and 11 with France mainly from clusters 3 and 5.

Similarly, countries whose culture is Latin make similar choices in their shades and South Americans and Italians

share 12 out of 20 shades, while France and South America share 11.

Lastly, there seem to be certain affinities between English-speaking countries, although they are somewhat less marked. Ten shades are shared by the United Kingdom and the United States but also by South America, the United Kingdom and the United States, a 50% similarity in all those cases.

The part of the world which is really very different from the others is Asia with a maximum of nine shades in common with another region, Italy, sharing only four shades out of 20 with the United States. Those two continents are the most distant in their shade preferences.

The countries which best represent world preferences are those of Europe, with France and Italy in the lead, closely followed by the United Kingdom.

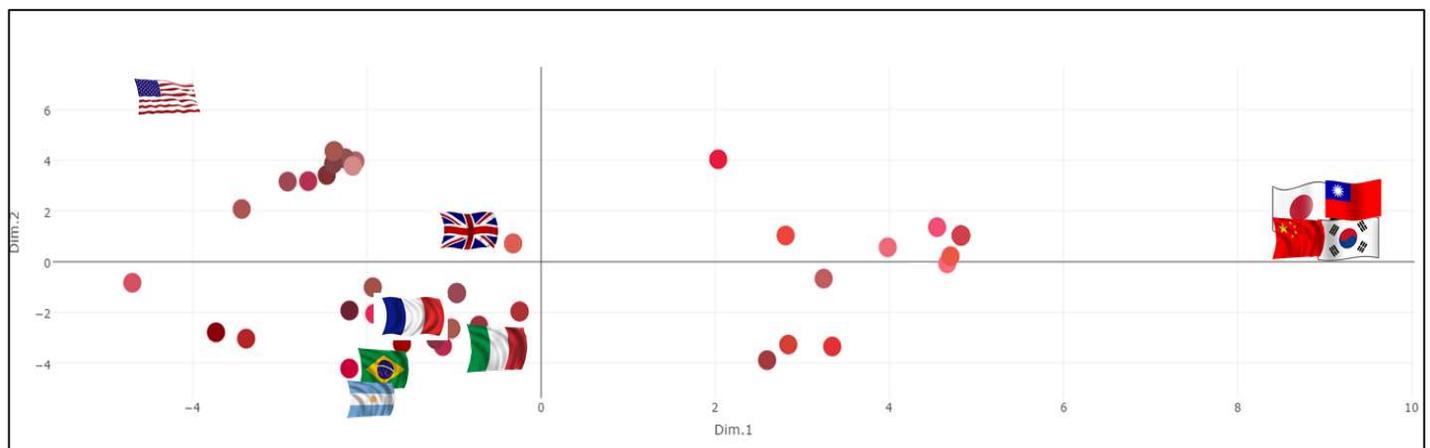


Fig. 7. Graphic representation of the 50 shades classified in the Top 20 sells of the 6 markets. Each point represents a shade. Market information is superimposed on shade information.

To study the color preferences in each region, the link between the ranking and the lipstick color classification was studied. The figure 5 is a cluster representation in the Top 20 ranking according to geographical region. France is the only region which presents shades in cluster 1 in its 20 best-selling shades. Italy shows a preference for cluster 7. Despite the United Kingdom is centrally positioned, like all European countries, its inclination is for American preferences. For the United Kingdom and the United States, cluster 3 is most frequently represented in the survey of their best sellers. Although South America shows a preference for cluster 5, a taste for saturated pinks suggests a degree of Latin proximity to France and Italy. Lastly, Asia is the most differentiated part of the world with a nearly 50% preference for light saturated shades (cluster 8). The specific shades which appear in a country's ranking but not in the five other regions are shades characteristic of the country's color preference. Although the results of this study make it possible to highlight differences in colorimetric preferences according to the regions of the world, it should

be borne in mind that CHANEL's customers may have a specific appetite for the shades offered by this brand. Indeed, each company has a colorimetric "signature", related to the choices of the make-up artist of the House, the pigments referenced internally, the habits of the colorists of the research and development department, the marketing positioning of the brand etc (de Clermont-Gallerande, 2021).

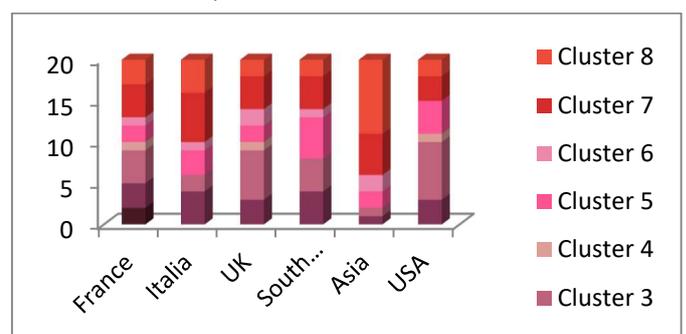


Fig. 8. Cluster representation in the Top 20 ranking according to geographical region.

## 5. Conclusion

The 50 best-selling lipstick shades in six regions of the world showed that the shade called *Rouge Allure Pirate*, a saturated red with medium lightness was unanimously preferred internationally.

The two most representative markets in terms of lipstick shades were Italy and France. The markets of Europe, France, Italy and the United Kingdom, were close in their choices while Asia was the geographical region where the best-sellers were the most different from the rest of the world. Lastly, a proximity in the choices of the Latin countries and a tendency towards proximity for the English-speaking countries was apparent. The best-selling lipstick colors differ from one area to another. Americans prefer pink or rosewood shades as do the British, while Asians opt for very fresh, light and saturated shades. In South America, bluish and saturated shades account for good sales figures. Each region shows its cultural difference through these color preferences. It would be interesting to repeat this analysis in few years on the same geographical regions to see if preferences remain stable or if they change over time.

## 6. Conflict of interest declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sector.

## 7. Conflict of interest declaration

The authors declare that there is no conflict of interest with other people or organizations.

## 8. Short biography

**Hélène de Clermont-Gallerande** - Technological Innovation Manager at CHANEL. She has an experience of 30 years in color and make-up formulation and is inventor of more than 20 cosmetics patents. She published a collaborative book on Sensorial cosmetic raw materials.

**Emmanuelle Mauger** - Data Scientist at CHANEL Fragrance & Beauty's research center, in charge of data and their analyses to create insights. She achieved the statistical analysis of the study.

**Nicolas Rolland** - Colorist in CHANEL Color Development Laboratory for 8 years. Previously, he worked at L'Oréal also as colorist and has an expertise in color data management.

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