



## Research article

# Influence of social media on the esthetic perception of the lip profile of orthodontic patients

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## ABSTRACT

**Objective:** To identify the use of social media as an influencing factor of the orthodontic patient's preferences regarding the lip profile protrusion.**Methods:** A two-part cross-sectional questionnaire was distributed to orthodontic patients in Spain and The Netherlands. The first part collected general data and frequency of use of different social media. The second part consisted of a series of modified female and male silhouettes presenting different lip profile positions. Each participant was required to choose both the (male and female) most attractive silhouette and the least attractive one.

Student t-test, one-way ANOVA and Chi-square test were performed. Effect sizes were calculated to express the magnitude of differences between samples.

**Results:** The Spanish sample resulted in a moderate higher tendency ( $R^2 = 0.060$ ) to choose protrusive lips as the most attractive lip profile for females, on subjects with more frequent use of social media. A medium tendency ( $R^2 = 0.26$ ) was observed as result of low users of social media choosing and ideal lip profile for men.The Dutch sample showed that high users of social media tended to choose as attractive a more protrusive female lip profile versus low users ( $p < .01$ ). This was also observed ( $p < .05$ ) on male attractive lip profiles.**Conclusions:** Results suggest that frequent users of social media platforms tend to prefer more protruded lips than their less frequent counterparts. This information is valuable to be considered when formulating a treatment plan to satisfy the patient's expectations.

## 1. Introduction

The phenomenon of digital social networks has experienced a significant increase in their daily use [1–3]. 45% of the global population uses them [4]. Although certain platforms are preferred by the younger generations, an increasing number of adults are emerging as frequent users of the same social media applications [5]. In other medical specialties, a change has been identified in terms of patients' tastes and preferences coinciding with the trends set by these social networks [6,7]. Hence, there is a need to review whether this phenomenon is also affecting the expectations of esthetic results in orthodontics [8]. As orthodontists, we are duty-bound to meet the expectations of the patients who come to us, and to take them into consideration in the treatment plan; if it is not possible to

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achieve, the patient must be informed about this from the very beginning. Given that there are no other previous investigations about this subject, a questionnaire was designed in order to get a first screening of our patient's population.

### 1.1. Use of social media in Spain and The Netherlands

According to the 2019 digital report published by the agency We are social and Hootsuite [9], there were 28 million active social platforms users in Spain (60% of the Spanish population), which increased to 62% in 2020. The most active social platforms are YouTube®, WhatsApp®, Facebook®, Instagram®, Twitter®, and Snapchat®. If we consider the population between 16 and 65 years old, as suggested by the agency Elogia [10], 87% are social media users.

Regarding The Netherlands, We Are Social and Hootsuite reported that there were 11 million active users of social platforms (64% of the population) in 2019(11). This data remained stable during 2020 [12], with WhatsApp®, YouTube®, Facebook®, Instagram®, and LinkedIn® being the most popular social platforms. The Dutch national statistics center (CBS) reports that 87% of the Dutch population aged 12 and older are social media users [13].

In our study, the less visually oriented platforms (WhatsApp®, Twitter®, LinkedIn®) have been discarded, but TikTok® has been added as an emerging visual one.

### 1.2. Relationship between the use of social networks and patient self-perception

A very important aspect of orthodontic treatment is esthetics. Nowadays, the demand for esthetic improvement as the main reason for consultation is becoming increasingly frequent [14–17]. In other medical specialties, greater use of digital platforms has been observed in patients who were dissatisfied with their physical appearance [18]. Notably, a greater acceptance of surgical esthetic procedures has been found not only in users of digital platforms and viewers of television programs related to these treatments [18–20] but also in active users of selfies [21,22]. All this underscores the importance of analyzing the possible influence of the use of the most visual digital platforms on the esthetic expectations of patients who come to the orthodontic practice.

The patient's concept of beauty does not have to coincide per se with the practitioner's concept. It may also be influenced by external factors such as the opinion of other dental professionals, the views of friends and family, and how beauty is defined in the media [23].

Therefore the orthodontist should not ignore these media as a tool for gathering information about their (potential) patient population. The more we know about their preferences and expectations, the better we will be able to offer treatment alternatives that have, among other things, the ultimate goal of improving the quality of life and satisfaction of our patients.

## 2. Aim

To determine if the frequent use of digital platforms increases the choice of silhouettes with more protrusive labial profiles in orthodontic patients.

## 3. Materials and method

The investigation protocol of this cross-sectional study was approved by the Bioethical Committee of the University before patient recruitment (Spain, Madrid, Bioethical Committee of Alfonso X el Sabio University approval reference number 2021\_03/092).

Patients were recruited while attending orthodontic consultation at the orthodontic department at the University Alfonso X el Sabio in Madrid (UAX), Spain, and Mondzorg Kanaalweg at Capelle a/d IJssel, The Netherlands. Inclusion criteria were: aged above 12, attending orthodontic consultation, no visual or cognitive impairment, informed consent given by the patient or his/her caretakers.

The sample size was 227 patients: 115 in Madrid, 112 in Capelle. This was determined using the GRANMO calculator population determination tool from the IMIM in Barcelona, Spain to reflect the mean social network usage in each participating country. According to the different statistical agencies [10–13] in Spain there are between 62% and 87% of active social media users (median of 74.5%) and in The Netherlands between 64% and 87% (median of 75.5%). The population estimation for each country was calculated with a confidence level of 95% ( $p = .05$ ) and a desired precision with the selected confidence level of 8% (0.08) plus a 10% of reposition calculations resulting on a needed sample of 115 subjects in Spain and 112 in The Netherlands to reflect the general population use of the social media platforms.

A two-part questionnaire was distributed among the selected patients.

The first part comprised a questionnaire based on the one validated by the agency ELOGIA in its 2019 *Annual Social Media Study* [24] adapted for our research (appendix A). It gathers personal data (age, gender, race), questions about the use of certain visual social networks (Facebook®, YouTube®, Snapchat®, Instagram®, Tik-Tok®), and their frequency of use.

The second part of the survey followed the psychometric method wherein a series of modified silhouettes are presented to allow the user to choose the most pleasant and the most unpleasant one (appendix B). This method has been successfully used in previous orthodontic studies to assess treatment outcome preferences [15–17,25–29].

The photographs on which the silhouettes are based were obtained from records of the orthodontic department of the UAX. Two patients (one male and one female) who had completed their treatment with the following characteristics were chosen:

- Adult patient (O'Reilly's stage CV6 of vertebral maturation), with permanent dentition, without dentoskeletal discrepancy.

- Orthognathic profile, defined by the following clinical characteristics: skeletal Class I according to Steiner [30,31]; Angle's canine Class I [32], class I incisal relationship, with a horizontal overjet of 2–3 mm; relation of the lips to the correct Steiner's S-plane [30, 31] and to the true vertical according to Arnett [33]; a correct upper sulcus depth according to Holdaway [34].

All values were analyzed by T.R.P. with the NemoStudio® software (version 2020; Software Nemotec S.L. Leganés, Madrid).

### 3.1. Two series of silhouettes were made based on

- Male resting profile (figure A).
- Female resting profile (figure B).

Steiner's esthetic plane was used as reference to modify the profile of the silhouettes. The original position is position 0. With the NemoStudio® program, the first author modified the position of the LS and LI points of the original tracing as follows: the labial protrusion is modified in intervals of 1 mm up to  $\pm 4$  mm, obtaining a series of 9 silhouettes for each subject. Each image was then modified into a black silhouette with the software program Adobe CS Photoshop© (version 19.0; ADOBE systems, San Jose, California). The silhouettes were randomized (per gender) using the online open-source software WinEpi (Working in Epidemiology) (appendix B).

Statistical analysis of the collected data was performed with IBM-SPSS Statistics version 25 (IBM Corp. Released 2017. IBM SPSS Statistics v 25. for Windows; Armonk. NY.USA®).

Independent variables with a normal distribution were analyzed with the Student t and the one-factor ANOVA tests. The non-parametric Mann-Whitney and Kruskal-Wallis tests were performed to determine whether the distribution was abnormal. To determine the relationship between two independent variables, Chi square independence test was conducted. Effect size ( $R^2$  with a 0:1 scale) was calculated to compare different sample sizes. To simplify the statistical analysis of the collected data we considered high frequency users the ones that engaged on a daily or weekly basis and low frequency users the ones that did it sporadically (monthly or no engagement).

The obtained silhouettes were merged into three categories:

- Neutral or ideal profile (reference silhouette at 0 mm)
- Protrusion (from +1 to +4 mm included)
- Retrusion (from -1 to -4 mm included)

Both absolute preference (cephalometric protrusion/neutral/retrusion) and relative preference (tendency of protrusion as choosing a more protrusive or retrusive lip profile independently of the cephalometric position) were analyzed.

## 4. Results

### 4.1. General findings

In both countries we found out that:

- There was a symmetrical distribution of the sample regarding age and gender.
- The participants' median age was younger than the national one but was consistent with the age of patients attending for orthodontic procedures ( $25.0 \pm 14,6$ ).
- Data were insufficient to properly relate the ethnic origin with the use of social media (SM) or lip profile preferences. (Table A). The numbers reflected the different ethnical distribution of each country.
- No statistical difference was found between countries regarding the general use of SM. A percentage of 86% (Spain) and 86.6% (Netherlands) were frequent users (daily or weekly use). This was consistent with the results obtained by the Elovia agency in Spain [10] and the CBS in The Netherlands [13].
- The use of the different SM was not equally distributed in both countries: while YouTube® is more used in Spain, the Dutch use more Facebook® and Snapchat®. There were no significant differences regarding Instagram® and Tik-Tok®. ( $p > .05$ ). (Table B).
- No statistical difference was found related to the general use of SM between sexes, although females tend to use Instagram®, Tik-Tok®, and Snapchat® more than males. (Table C).
- A high statistical difference ( $p < .01$ ) was found regarding the use of SM and the age of the user. The frequency of use was high in 97.1% of patients between 12 and 17 years old, followed by 88.1% of users between 18 and 34 years old. 74.1% of users older than 35 years old logged in on a daily or weekly basis. This last group fashioned the use of Facebook® while the younger chose YouTube®, Instagram®, Tik-Tok®, and Snapchat®. (Table D).
- Not specifically related to the use of SM, the most attractive male lip profile was a retrusive one (39.8%). Regarding the most attractive woman, 49.8% chose a protrusive lip profile. (Table E).
- No gender or age statistical differences were found behalf in the Dutch group aged between 18 and 34 years old: 80% chose a protrusive lip profile as the most attractive for a woman. (Table F).

#### 4.2. The influence of use of SM and preference of lip profile

No statistically significant differences were found whenever the frequent use of SM platforms as a whole group regarding the preference of lip profiles was analyzed. However, when the results per country and platform were analyzed individually, some differences were found.

Spain (table G).

- The high frequency SM users preferred generally a protrusive female lip profile as the most attractive one (50%) in comparison with low frequency users (41.2%)
- The high frequency users chose evenly between neutral/protrusive/retrusive male profiles as the most attractive one, while the low frequency users preferred the neutral one.
- There were no statistically significant differences ( $p > .05$ ) regarding users of YouTube®, Tik-Tok®, or Snapchat®. However, a moderate effect size ( $R^2 = 0.030$ ) was found for the variable most attractive female lip profile in YouTube® users. While both high and low users preferred protrusive lips (49% and 48.1%), the high users chose more frequently the retrusive ones (36% vs 22.2%) versus the low users that donned the ideal ones (29.6% vs 15%).
- Instagram® users clearly opted for a protrusive female lip profile as the most attractive one (52.7% vs. 38.2% of low users) although this finding was not statistically significant.
- A moderate  $R^2$  effect value (0.034) was observed on Facebook® users, with preference to choose the protrusive lip profile for females compared to non-users (62.2% vs. 42.7%).

The Netherlands (table H).

- There is a high significance ( $p < .01$ ) with moderate effect ( $R^2 = 0.089$ ) on the variable created for relative preferences towards the female profile. The data indicates that those with a high/medium use of the networks tend towards a more protrusive preference (76.5% vs. 37.5%) while those with a lower use of the networks tend more towards a retrusive preference (62.5% vs. 23.5%).
- Patients with high use of SM preferred a more protrusive lip profile in women (54.1% vs. 31.3%), with a medium size effect ( $R^2 = 0.026$ )
- This same relationship, although with less significance ( $p < .05$ ) and magnitude (effect:  $R^2 = 0.035$ ), is observed in the variable of relative preference towards the male silhouette: towards protrusive those who use nets more (52%) and towards retrusive those who use them less (75%).
- We can speak of a near significance ( $p < .10$ ) with a moderate effect ( $R^2 = 0.052$ ) in the absolute preference of the least attractive woman, where the results point to a greater preference for the protrusive profile among those who use the nets little/not at all (50%) and towards the retrusive profile among those who use them medium/high (67.3%).
- There is also a near significance ( $p < .10$  with moderate effect:  $R^2 = 0.051$ ) in the absolute preference for the profile of the most attractive man; which may be due to the tendency towards the retrusive profile among those who hardly use the social networks (75%) and towards the ideal (19.4%) and above all towards the protrusive (37.8%) among those who do use them.
- Regarding the use of YouTube®: a Significance ( $p < .05$ ) with moderate effect ( $R^2 = 0.055$ ) appears in the absolute preference of the most attractive man with a protrusive profile among those who do use this network (43.2% vs. 20%) compared to the preference towards the retrusive among those who do not use it (60% vs. 40.5). We could add a near significance ( $p < .10$ ) with moderate effect ( $R^2 = 0.044$ ) in the preference of the least attractive woman, due to the tendency towards the protrusive profile of those who do not use YouTube® (32.5% vs. 21.6%), while those who do use it seem to tend more towards the ideal profile (14.9% vs. 2.5%).
- Instagram®; several significances and effects appear:
  - A high significant statistical difference appears in the relative preference towards the female silhouette ( $p < .001$ ), with moderate-high effect: ( $R^2 = 0.108$ ). This is explained by a clear greater protrusive preference among those who do use this network (82.2%) compared to the retrusive preference of those who do not use it (48.8%).
  - A significant statistical difference appears in the absolute preference of the most attractive woman ( $p < .05$ ) with a moderate effect ( $R^2 = 0.078$ ) which is due to the greater tendency towards the protrusive profile among users of this network (58.9% vs. 36.6%) against the preference for the retrusive profile of those who do not use it (39% vs. 15.1%).
  - A significant statistical difference appears in the absolute preference of the least attractive woman ( $p < .05$ ), with moderate effect:  $R^2 = 0.056$  where the opposite judgement to the previous one appears as is logical: retrusive profile among users (71.2% vs 51.2%) and protrusive profile among non-users (39% vs 17.8%).
- Tik-Tok®: although not statistically significant, in the variable of absolute preference for the most attractive man, the effect size ( $R^2 = 0.030$ ; moderate-low) could be pointing towards a greater choice of users of this network for protrusive profiles (45.5% vs. 28.6%); while non-users would be more inclined towards retrusive ones (52.9% vs. 38.6%).
- Facebook®: Statistical significance ( $p < .05$ ) with moderate effect ( $R^2 = 0.059$ ) was found in the variable of absolute preference for the most attractive man, where the results indicate a greater choice among users of the ideal profile (28% vs. 9.4%), while non-users opt more for the retrusive one (51.6% vs. 42%). Very close to significance ( $p < .10$ ) with a moderate effect ( $R^2 = 0.050$ ) was the absolute preference variable of the less attractive woman, which can be explained by a greater tendency of Facebook users towards the retrusive profile (76% vs. 54.7%).
- SnapChat®: Statistical significance ( $p < .05$ ) with a moderate effect ( $R^2 = 0.042$ ) was found in the relative preference for the female silhouette, which is due to the greater choice of users of this network for the protrusive profile (81.1%). We can also mention the

near significance ( $p < .10$ ) observed in the absolute preference for the most attractive man (with a moderate effect:  $R^2 = 0.040$ ), which would be determined by the tendency of the users of this network to choose the protrusive profile (45.3% vs. 26.2%). Finally, it is worth mentioning that there is a moderate-slight effect ( $R^2 = 0.038$ ), although not significant, on the absolute preference of less attractive women, which can be explained by a greater tendency of users of this network towards retrusive profiles (73.6% vs. 55.7%).

## 5. Discussion

The main advantages of this study were:

- The novelty of its character, being one of the first investigations that would try to relate the use of social media with the patient's treatment esthetic expectations in orthodontics.
- The fact that the survey was conducted in two different countries so local cultural differences might be observed and taken into consideration.

The differences in the percentage of users of the different social networks included could be explained, by the age distribution of the sample, with the present sample being younger than that of the 2020 Elogia IAB Spain agency and the CBS.

Al-Gunaid et al. [35] studied the use of social media in orthodontic patients. They observed that females use Instagram® and Snapchat® more than males, while males use YouTube® more. These results match those of our sample. In terms of age, Al-Gunaid found that patients aged between 13 and 20 used Instagram® more, while those aged between 21 and 30 preferred Snapchat® and YouTube®. In our sample, we see a significant difference in the use of social networks in the younger group, preferring YouTube®, Instagram®, Tik-Tok®, and Snapchat®. Users aged 18–34 prefer Instagram®, YouTube®, and Facebook®, whereas those aged 35+ prefer Facebook®, YouTube®, and Instagram®. These results indicate differences in the choice of social network type according to age and gender. This might be a factor to be taken into account concerning their possible influence on patients' personal tastes. Knowing the content of social networks would help us to get a better idea of the expectations of each type of orthodontic patient. However, more studies are needed for that to happen. In addition to expanding the sample, also it is also necessary to include the type of content observed in each type of social network.

Zarif Najari et al. [16,17] found that there was no significant gender difference regarding the less favored profiles. These results are consistent with those found in our survey.

Naini et al. [29] analyzed the differences on preference of lip protrusion related to the E-line in patients, clinicians and lay people. They found out that prominent lips were most preferred, but excessive protrusion and excessive retrusion were demeaned as less attractive and prone to be treated. This results are consistent with ours.

The studies by Park et al. [27] and by Shimomura et al. [8] reflected that middle-aged or older subjects (40 years and older) preferred more retrusive profiles in comparison to younger adults. There were no differences in gender. These results are consistent with our study in the case of the choice of the most attractive female profile. Spanish patients younger than 35 years old clearly preferred protrusive profiles while those over 35 years chose equally retrusive or protrusive. This tendency to choose the more protrusive profile in females is repeated in the Dutch 18–34 age group, this time with clear statistical significance (80%,  $p < .01$ ). Radwan et al. [7] found that younger respondents of their survey preferred fuller lips. These results were consistent with ours.

Regarding the use of social networks and their influence on the choice of lip profile, although the differences found in Spain are not statistically significant, we did observe a preference for protrusive profiles in the female silhouette in frequent Instagram® users (52.7%) compared to 38.2% of infrequent users. This could have a clinical relevance whenever planning for an orthodontic treatment. The same happens with Facebook® and Youtube®, with active users choosing the protrusive female profile as the most attractive one.

As for male lip profiles, frequent Spanish social network users prefer protrusive profiles (50%) compared to non-frequent users, 52.9% of whom chose the ideal profile cephalometrically speaking. The analysis of each SM platform reveals that, although not statistically significant, frequent users of YouTube®, Tik-Tok® and Snapchat® prefer retrusive male profiles.

In The Netherlands, the results are statistically significant regarding the preference of frequent users of SM that chose the protrusive profile as the most attractive male, in contrast to infrequent users of SM who chose a retrusive male profile as attractive. This general trend is repeated in the specific use of YouTube®, Instagram®, Tik-Tok®, and Snapchat® when analyzed individually. Instagram® and Facebook® high frequency users tend to choose retrusive male profiles (although not statistically significant).

Dutch patients who are frequent users generally chose protrusive profiles as their preference for the most attractive female profile compared to infrequent users who preferred retrusive profiles and found protrusive female lips unattractive. This trend is repeated in the following networks analyzed individually: Instagram®, Tik-Tok®, Facebook®, and Snapchat®.

These statistical differences between countries could be explained by the different ethnic backgrounds of the population and possibly by factors not analyzed in this study, such as peer pressure, the cultural and/or social-economic level of the participants and the use of specific features inside the same social media application (subscribed channels, following certain influencers or not, use of tools as reels, etcetera). Another possible co-factor could be the frequent use of non-visual social media application (the likely of Twitter® or WhatsApp®). Undoubtedly race related cultural and personal preferences might be important, but as previously appointed, there were not enough statistical data to be able to analyze it correctly in our investigation.

The following limitations were observed:

- Not enough data were collected to analyze the ethnical origin factor.

- The percentage of non-SM users is decreasing.
- Other possible co factors like peer pressure, the opinion of the general dental practitioner of the patient, type of orthodontic appliance (braces/aligners), the specific contents or tools reached while using the SM, social-economy background, or use of other types of applications (Twitter®, WhastApp@) were not included.
- A deeper knowledge regarding the number of hours of SM engagement would probably add value to the recollected information. A bigger sample would be needed.

As there is currently no other published research in orthodontics or dentistry that relates social media use to profile preferences, further studies are recommended because this could have considerable clinical significance. An attempt must be made to ascertain whether patients that use these types of networks often prefer more protruding lips, as this information is to be considered in our treatment plan, especially when deciding on extractions in border-line treatments on patients with thin lips, or patients with orthognathic surgery needed [29]. Patient's preferences and concerns regarding the end results of their treatment are a relevant subject in our and other health professions. Given that society is a "living" entity that doesn't stay still, but on the contrary, it develops and changes constantly, is no surprise that new influence factors may appear within time (the film industry, different fashions in the past or most recently, the social media platforms) [36–38]. As orthodontists we aim not only to obtain what we consider as a good functional occlusion but also harmony in the proportions of the face and smile. The concept of beauty is subtle and subjective. It is our responsibility to make sure we understand what the patient's expectations regarding this part of their treatment are.

The aim of this study was to identify a new influence factor on the patient's preferences that might give us a glimpse of the expectations of a certain sector of our patients' population.

However, more studies are needed for that to happen. In addition to expanding the sample, it is also necessary to include the already mentioned possible co-factors. Other qualitative research methods like interviews and focus groups would help to explore more deeply the phenomenon of this first study.

## 6. Conclusion

The null hypothesis was rejected when use of Social Media was analyzed as a whole entity. However, when use of SM was individually analyzed, there are certain platforms, like Instagram® and Facebook®, that were found to have a (almost) statistically significance influence on the preference showed by the respondents. Further studies are needed in order to clarify the influence of this and other co-factors on greater populations.

### 6.1. Take home message

- It seems to be a correlation between the high frequent use of social media and the preference to choose certain lip profiles (i.e., protrusive lip profiles for females and males)
- The preference of certain group of social media users regarding lip profiles might not correlate with the ideal cephalometric measures we use in orthodontics
- It is our duty to understand the patients' preferences and expectations before we decide the treatment plan in order to fulfil them whenever possible
- Further studies are necessary to confirm similar results in larger samples and other countries.

### Data availability statement

Raw/processed data is available upon request.

### Authors contributions

Author 1: Tamara Rebaque Pistoni. Conceived and designed the analysis. Collected the data. Contributed data or analysis tools. Performed the analysis. Wrote the paper.

Author 2: Javier de la Cruz Pérez. Conceived and designed the analysis. Contributed data or analysis tools. Other contribution (review and supervision of processes).

Author 3: Iván Nieto Sánchez. Contributed data or analysis tools. Other contribution (review, and supervision of processes, edition of article).

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

### Appendix A. First part of the questionnaire (English version)

**SURVEY PART 1**

1- How old are you?

2- Sex (check the correct answer)

Male

Female

3- Origin to which parents/grandparents belong (mark the correct answer(s)):

White: Caucasian/Anglo-Saxon/Mediterranean

Central African/Caribbean/other

Asian: Bangladeshi/Chinese/Indian/Pakistani/Other

Amerindian (Native American)

Mixed: .....

Other: Arab/Gypsy/.....

4- Do you use Social Networks? (tick the correct answer)

Yes

No. In this case please go to the second part of the survey.

5-How often do you use Social Networks? (please tick the correct answer)

Daily. Please indicate the approximate number of hours:

Several times a week, not daily, indicate how many days/week approximately:

Several times a month, not weekly, indicate how many days/month approximately:

6- Which social networks do you use? (You can tick several options):

Facebook®

Youtube®

Instagram®

Snapchat®

Tik Tok®

**Appendix B. Second part of the questionnaire (English version)**

Choose from the following sample of silhouettes the one that you visually like most (by ticking the box corresponding to that silhouette in the first row of boxes) and also the one you dislike most (by ticking the box corresponding to that silhouette in the second row of boxes).



Choose from the following sample of silhouettes the one that you visually like most (by ticking the box corresponding to that silhouette in the first row of boxes) and also the one you dislike most (by ticking the box corresponding to that silhouette in the second row of boxes).



Thank you for your cooperation.

**Table A**  
Descriptive and comparative analysis: sample characteristics.

Factor/Category	Total sample (N = 241)	COUNTRY		Contrast test	
		Spain (n = 127)	Netherlands (n = 114)	Value	P value
<b>SEX</b>				Chi <sup>2</sup> = 0.35 <sup>NS</sup>	.552
Female	57.3% (138)	59.1%	55.3%		
Male	42.7% (103)	40.9%	44.7%		
<b>AGE</b>				U = 0.14 <sup>NS</sup>	.887
Media (S.D)	25.0 (±14.6)	23.7 (±12.7)	26.3 (±16.4)		
Range	12/76	12/66	12/76		
<b>ETHNICAL ORIGIN</b>				Chi <sup>2</sup> = 35.71**	.000
Caucasian	66.0% (159)	75.6%	55.3%		
Amerindian	11.6% (28)	16.5%	6.1%		
Black	9.5% (23)	4.7%	14.9%		
Asian	5.0% (12)	1.6%	8.8%		
Mixed	4.6% (11)	0.8%	8.8%		
Other	3.3% (8)	0.8%	6.1%		

N.S. = Not significant \*\* = Highly significant

**Table B**  
Descriptive and comparative analysis: sample characteristics.

FACTOR/Category	Total sample (N = 241)	COUNTRY		Chi-Square Test	
		Spain (n = 127)	Netherlands (n = 114)	Value	P value
<b>FREQUENCY OF USE</b>				0.02 <sup>NS</sup>	.884
High/Average	86.3% (208)	86.6%	86.0%		
Low/None	13.7% (33)	13.4%	14.0%		
<b>S.M.</b>					
<b>YOUTUBE</b>	72.2% (174)	78.7%	64.9%	5.72 *	.017
<b>INSTAGRAM</b>	68.9% (166)	73.2%	64.0%	2.37 <sup>NS</sup>	.124

(continued on next page)



**Table B** (continued)

FACTOR/Category	Total sample (N = 241)	COUNTRY		Chi-Square Test	
		Spain (n = 127)	Netherlands (n = 114)	Value	P value
<b>TIK TOK</b>	43.6% (105)	48.0%	38.6%	2.18 <sup>NS</sup>	.140
<b>FACEBOOK</b>	36.3% (87)	29.4%	43.9%	5.44 *	.020
<b>SNAPCHAT</b>	29.9% (72)	15.0%	46.5%	28.51**	.000

N.S. = Not significant \*\* = Highly significant

**Table C**

Inferential comparative analysis: use of Social Media according to the Gender of the participant observer. Complete sample.

Variable/Category	Total sample (N = 241)	Sex (%)		Chi-Square Test		Size of R <sup>2</sup> effect
		Female (n = 138)	Male (n = 103)	Value	P value	
<b>FREQUENCY OF USE</b>				2.18 <sup>NS</sup>	.140	.009
High/Average	86.3%	89.1%	82.5%			
Low/None	13.7%	17.5%	10.9%			
<b>SOCIAL MEDIA</b>						
<b>YOUTUBE</b>	72.2%	70.3%	74.8%	0.59 <sup>NS</sup>	.444	.002
<b>INSTAGRAM</b>	68.9%	<b>75.4%</b>	60.2%	6.33 *	.012	.026
<b>TIK TOK</b>	43.6%	<b>50.7%</b>	34.0%	6.73 *	.010	.028
<b>FACEBOOK</b>	36.3%	39.9%	31.4%	1.83 <sup>NS</sup>	.177	.008
<b>SNAPCHAT</b>	29.9%	<b>36.2%</b>	21.4%	6.23 *	.013	.026

N.S. = Not significant \* = Significant  
In bold, categories where significance is detected.

**Table D**

Inferential comparative analysis: use of Social Media according to the Age of the participant observer. Complete sample.

Variable/Category	Total sample (N = 241)	AGE (%)			Chi-Square Test		Size of R <sup>2</sup> effect
		12-17 y.o. (n = 124)	18-34 y.o. (n = 59)	≥35 y.o. (n = 58)	Value	P value	
<b>FREQUENCY OF USE</b>					9.87**	.007	.041
High/Average	86.3%	<b>91.1%</b>	<b>88.1%</b>	74.1%			
Low/None	13.7%	8.9%	11.9%	25.9%			
<b>SOCIAL MEDIA</b>							
<b>YOUTUBE</b>	72.2%	<b>83.1%</b>	71.2%	50.0%	21.56**	.000	.090
<b>INSTAGRAM</b>	68.9%	<b>76.6%</b>	<b>76.3%</b>	44.8%	20.62**	.000	.085
<b>TIK TOK</b>	43.6%	<b>69.4%</b>	20.3%	12.1%	69.89**	.000	.291
<b>FACEBOOK</b>	36.3%	14.6%	<b>54.2%</b>	<b>63.8%</b>	52.17**	.000	.217
<b>SNAPCHAT</b>	29.9%	<b>45.2%</b>	18.6%	8.6%	29.89**	.000	.124

\*\* = Highly significant  
In bold, categories where significance is detected.

**Table E**

Exploratory and descriptive analysis: lip preference variables.

	Percentage response distribution for each lip preference value.								
	-4	-3	-2	-1	0	+1	+2	+3	+4
<b>Most attractive male</b>	12.4	15.4	7.1	5.0	26.6%	4.1	11.6	12.4	5.4
	Retrusive: 39.8%					Protrusive: 33.6%			
<b>Most attractive female</b>	2.1	5.4	5.0	16.2	21.6%	12.9	14.1	12.9	10.0
	Retrusive: 28.6%					Protrusive: 49.8%			
<b>Less attractive male</b>	12.4	10.4	7.5	22.4	2.1%	9.5	5.4	7.1	23.2
	Retrusive: 52.7%					Protrusive: 45.2%			
<b>Less attractive female</b>	20.7	17.0	21.2	4.6	9.1%	7.9	2.9	8.3	8.3
	Retrusive: 63.5%					Protrusive: 27.4%			

**Table F**

Inferential comparative analysis: lip preferences according to the Age of the participant observer. Dutch sample.

Variable/Category	Total sample (N = 114)	AGE (%)			Chi-Square test		Size of R <sup>2</sup> effect
		12-17 y.o. (n = 124)	18-34 y.o. (n = 59)	≥35 y.o. (n = 58)	Value	P value	
<b>Most attractive male</b>					4.22 <sup>NS</sup>	.377	.018
Retrusive	47.4%	40.4%	56.0%	53.1%			
Neutral	17.5%	15.8%	16.0%	21.9%			
Protrusive	35.1%	43.9%	28.0%	25.0%			
<b>Most attractive female</b>					13.43**	.009	.059
Retrusive	23.7%	<b>24.6%</b>	16.0%	<b>28.1%</b>			
Neutral	25.4%	<b>28.1%</b>	4.0%	<b>37.5%</b>			

(continued on next page)

Table F (continued)

Variable/Category	Total sample (N = 114)	AGE (%)			Chi-Square test		Size of R <sup>2</sup> effect
		12-17 y.o. (n = 124)	18-34 y.o. (n = 59)	≥35 y.o. (n = 58)	Value	P value	
<i>Protrusive</i>	50.9%	47.4%	<b>80.0%</b>	34.4%	0.96 <sup>NS</sup>	.915	.004
<i>Less attractive male</i>							
<i>Retrusive</i>	53.5%	57.9%	48.0%	50.0%			
<i>Neutral</i>	3.5%	3.5%	4.0%	3.1%	4.60 <sup>NS</sup>	.331	.020
<i>Protrusive</i>	43.0%	38.6%	48.0%	46.9%			
<i>Less attractive female</i>							
<i>Retrusive</i>	64.0%	61.4%	72.0%	62.5%			
<i>Neutral</i>	10.5%	14.0%	12.0%	3.1%			
<i>Protrusive</i>	25.4%	24.6%	16.0%	34.4%			

Table G

Inferential comparative analysis: lip preferences according to the general and specific use of SM of the participant observer. Spanish sample.

Variable/Category	Total sample (N = 127)	GENERAL S.M. USE (%)		YOUTUBE (%)		INSTAGRAM (%)		TIKTOK (%)		FACEBOOK (%)		SNAPCHAT (%)	
		Low/None (n = 17)	High/Aver. (n = 110)	NO (n = 27)	YES (n = 100)	NO (n = 34)	YES (n = 93)	NO (n = 66)	YES (n = 61)	NO (n = 89)	YES (n = 37)	NO (n = 108)	SÍ (n = 19)
<i>Most attractive male</i>													
<i>Retrusive</i>	33.1%	29.4%	33.6%	22.2%	36.0%	26.5%	35.5%	30.3%	36.1%	33.7%	29.7%	30.6%	47.4%
<i>Neutral</i>	34.6%	52.9%	31.8%	44.4%	32.0%	38.2%	33.3%	31.8%	37.7%	34.8%	35.1%	35.2%	31.6%
<i>Protrusive</i>	32.3%	17.6%	34.5%	33.3%	32.0%	35.3%	31.2%	37.9%	26.2%	31.5%	35.1%	34.3%	21.1%
<i>Most attractive female</i>													
<i>Retrusive</i>	33.1%	17.6%	<b>35.5%</b>	22.2%	<b>36.0%</b>	38.2%	31.2%	36.4%	29.5%	38.2%	21.6%	34.3%	26.3%
<i>Neutral</i>	18.1%	<b>41.2%</b>	14.5%	29.6%	<b>15.0%</b>	23.5%	16.1%	18.2%	18.0%	19.1%	16.2%	16.7%	26.3%
<i>Protrusive</i>	48.8%	41.2%	<b>50.0%</b>	48.1%	49.0%	38.2%	52.7%	45.5%	52.5%	42.7%	<b>62.2%</b>	49.1%	47.4%
<i>Less attractive male</i>													
<i>Retrusive</i>	52.0%	47.1%	52.7%	55.6%	51.0%	52.9%	51.6%	56.1%	47.5%	48.3%	59.5%	53.7%	42.1%
<i>Neutral</i>	0.8%	0.0%	0.9%	0.0%	1.0%	0.0%	1.1%	0.0%	1.6%	1.1%	0.0%	0.0%	5.3%
<i>Protrusive</i>	47.2%	52.9%	46.4%	44.4%	48.0%	47.1%	47.3%	43.9%	50.8%	50.6%	40.5%	46.3%	52.6%
<i>Less attractive female</i>													
<i>Retrusive</i>	63.0%	47.1%	65.5%	63.0%	63.0%	61.8%	63.4%	57.6%	68.9%	65.2%	56.8%	62.0%	68.4%
<i>Neutral</i>	7.9%	5.9%	8.2%	3.7%	9.0%	11.8%	6.5%	9.1%	6.6%	7.9%	8.1%	7.4%	10.5%
<i>Protrusive</i>	29.1%	47.1%	26.4%	33.3%	28.0%	26.5%	30.1%	33.3%	24.6%	27.0%	35.1%	30.6%	21.1%

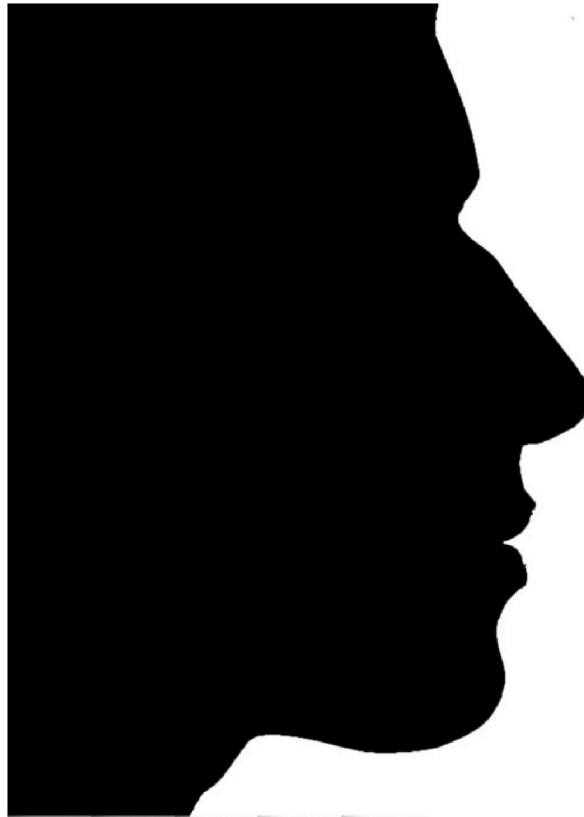
In **bold** significant p values and **bold cursive** significant R<sup>2</sup> effect values

Table H

Inferential comparative analysis: lip preferences according to the general and specific use of SM of the participant observer. Dutch sample.

Variable/Category	Total sample (N = 114)	GENERAL S.M. USE (%)		YOUTUBE (%)		INSTAGRAM (%)		TIKTOK (%)		FACEBOOK (%)		SNAPCHAT (%)	
		Low/None (n = 16)	High/Aver. (n = 98)	NO (n = 40)	YES (n = 74)	NO (n = 41)	YES (n = 73)	NO (n = 70)	YES (n = 44)	NO (n = 64)	YES (n = 50)	NO (n = 61)	SÍ (n = 53)
<i>Most attractive male</i>													
<i>Retrusive</i>	47.4%	<b>75.0%</b>	42.9%	<b>60.0%</b>	40.5%	56.1%	42.5%	<b>52.9%</b>	38.6%	<b>51.6%</b>	42.0%	52.5%	41.5%
<i>Neutral</i>	17.5%	<b>6.3%</b>	19.4%	20.0%	16.2%	17.1%	17.8%	18.6%	15.9%	9.4%	<b>28.0%</b>	21.3%	13.2%
<i>Protrusive</i>	35.1%	<b>18.8%</b>	37.8%	20.0%	<b>43.2%</b>	26.8%	39.7%	28.6%	<b>45.5%</b>	39.1%	30.0%	<b>26.2%</b>	<b>45.3%</b>
<i>Most attractive female</i>													
<i>Retrusive</i>	23.7%	<b>31.3%</b>	22.4%	27.5%	21.6%	<b>39.0%</b>	15.1%	24.3%	22.7%	23.4%	24.0%	29.5%	17.0%
<i>Neutral</i>	25.4%	<b>37.5%</b>	23.5%	30.0%	23.0%	24.4%	26.0%	21.4%	31.8%	32.8%	16.0%	24.6%	26.4%
<i>Protrusive</i>	50.9%	<b>31.3%</b>	54.1%	42.5%	55.4%	36.6%	<b>58.9%</b>	54.3%	45.5%	43.8%	60.0%	45.9%	56.6%
<i>Less attractive male</i>													
<i>Retrusive</i>	53.5%	43.8%	55.1%	55.0%	52.7%	46.3%	57.5%	51.4%	56.8%	48.4%	60.0%	52.5%	54.7%
<i>Neutral</i>	3.5%	6.3%	3.1%	0.0%	5.4%	4.9%	2.7%	2.9%	4.5%	4.7%	2.0%	3.3%	3.8%
<i>Protrusive</i>	43.0%	<b>50.0%</b>	41.8%	45.0%	41.9%	48.8%	39.7%	45.7%	38.6%	46.9%	38.0%	44.3%	41.5%
<i>Less attractive female</i>													
<i>Retrusive</i>	64.0%	43.8%	67.3%	65.0%	63.5%	51.2%	<b>71.2%</b>	58.6%	72.7%	54.7%	<b>76.0%</b>	<b>55.7%</b>	<b>73.6%</b>
<i>Neutral</i>	10.5%	6.3%	11.2%	<b>2.5%</b>	<b>14.9%</b>	9.8%	11.0%	12.9%	6.8%	12.5%	8.0%	11.5%	9.4%
<i>Protrusive</i>	25.4%	50.0%	21.4%	<b>32.5%</b>	21.6%	<b>39.0%</b>	17.8%	28.6%	20.5%	32.8%	16.0%	32.8%	17.0%

In **bold** significant p values and **bold cursive** significant R<sup>2</sup> effect values



**Figure A.** Silhouette of the male resting profile.



**Figure B.** Silhouette of the female resting profile.

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