

Exploratory investigation on the characteristics of Mexican Women's skin



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Introduction:

Mexico population stems from a rich mosaic of various ethnic background and ancestries. In skin research, its population has been captured under several terms, some of them not always adequate. "Hispanics" for instance, rather define people of Spanish descendant. "Latin Americans" applies to persons or communities of Latin American geographic origin, which have a heterogeneous ancestry [1]. "Latino", a shortened term from Spanish "Latino Americano" is applied for both people living in the U.S. who are of Latin American origin and their U.S.-born descendant. To date, there has been a couple of investigation that have been conducted on Mexican skin. Nonetheless, many investigations have also been conducted outside Mexico, notably descendants of immigrants [2-4], sometimes with a broad label (e.g. "Latino") that prevents to track the country of origin [5]. While insightful findings were reported, caution needs to be taken when extrapolating directly to Mexican people, especially in light of a change of culture due to emigration and adaptation of a population to a new environment, a phenomenon known as acculturation [6]. Facial features can affect the age we are perceived by our peers, a topic extensively documented for Caucasian [7], Chinese [8] and Indian skin [9]. Some facial features can signal a skin health information rather than an age one, as seen on Caucasian and Chinese cohorts [19,20]. To describe the facial skin attributes of Mexican women, we undertook a large-scale study in Mexico and aimed at uncovering several aspects of Mexican skin with regards to ageing, perception of skin age and health, prevalence of certain skin types but also cosmetic preferences and factors believed to be essential for a beautiful skin.

Materials & Methods:

Panel description
286 healthy Mexican female volunteers aged 20-78 years old were recruited in a large base study conducted in Mexico City (n=160) and Santiago de Queretaro (n=126), Mexico. Volunteers went through a 20-minute period of acclimatization under a controlled temperature and relative hygrometry prior to the measurements. All procedures involved in the study were explained in detail and written informed consent was obtained from all volunteers. This study was carried out in conformity with the most recent recommendations of the World Medical Association (Declaration of Helsinki 1964, amended in Fortaleza, Brazil, 2013).

Measurements and questionnaire outputs
Photographs were captured using a standard imaging device based on a high-resolution digital camera. Topographic and colour measurements were collected using the with the Antera 3D (Miravex, Dublin, Ireland) and image analysis on photographs using Image-Pro plus 7 (Media Cybernetics Inc., Rockville, MD, USA). Biophysics measurements were collected by the mean of various probes: biomechanical properties with the Cutometer MPA580, skin hydration with the Corneometer CM825 (CK Electronic GmbH, Cologne, Germany), skin oiliness with the Sebumeter SM815 (CK Electronic GmbH, Cologne, Germany) and skin barrier with the Vapometer (Delfin Technologies Ltd, Kuopio, Finland). Antioxidant status was measured through the carotenoid content of the skin using the Biozoom (Biozoom services GmbH, Kassel, Germany). The photographs were graded by a dermatologist to collect information in relation to skin imperfections (inflammatory and non-inflammatory lesions, scars etc.) and photo-damage using the Glogau scale. Lastly, volunteers answered a questionnaire in relation to their skin types and lifestyle.

Perceived age and perceived health assessment by naive graders
The front view full face photographs of volunteers previously captured under general white light were viewed by a total of 1000 female participants of Mexican nationality aged from 20 to 69 years old (Recruited from the north, south, east, west and central regions of the country). The participants were asked to estimate the "age of the face" referred to as "perceived age" and rate how healthy the face displayed on the photographs is, on a scale of 1 to 5, 1 being "very unhealthy" and 5 being "very healthy". These female participants who did the assessment are referred to as naive graders and had no particular skincare or skin ageing/age perception knowledge. Each individual photograph was assessed 100 times on average by the same age distribution profile. In order to get further knowledge on the skin concerns of Mexican women, the naive graders were also asked to rank from 1 to 14 (1 being the most important) their skin concerns, from a provided list. Lastly, the naive graders were asked to state their perceived skin types and which factors they believe to be key for a beautiful skin.

Machine learning analysis
The independent variables consisted of skin features measured using techniques described in the previous paragraphs. The two dependent variables were perceived age and perceived health. Framework for the development and training of the predictive models are the same as described previously [20].

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Results & Discussion:

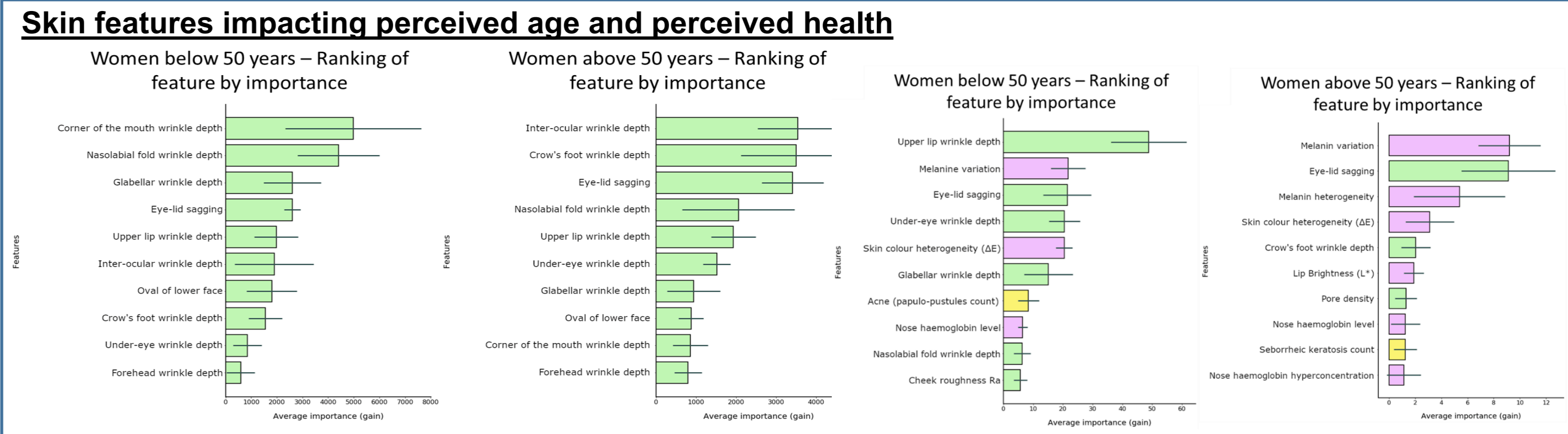


Figure 1: Skin features having the highest impact on the perceived age model, for the subset below 50 years old (left) and the subset above 50 years old (right). The error bar represents the standard deviation of the importance over 5 rounds of training/testing/validating on different splits of the data. Bars were coloured according to the category of the feature: green for topographic features, pink for colour features, blue for biophysical features and yellow for others.

Figure 2: Skin features having the highest impact on the perceived health model, for the subset below 50 years old (a) and the subset above 50 years old (b). The error bar represents the standard deviation of the importance over 5 rounds of training/testing on different splits of the data. Bars were coloured according to the category of the feature: green for topographic features, pink for colour features, blue for biophysical features and yellow for others.

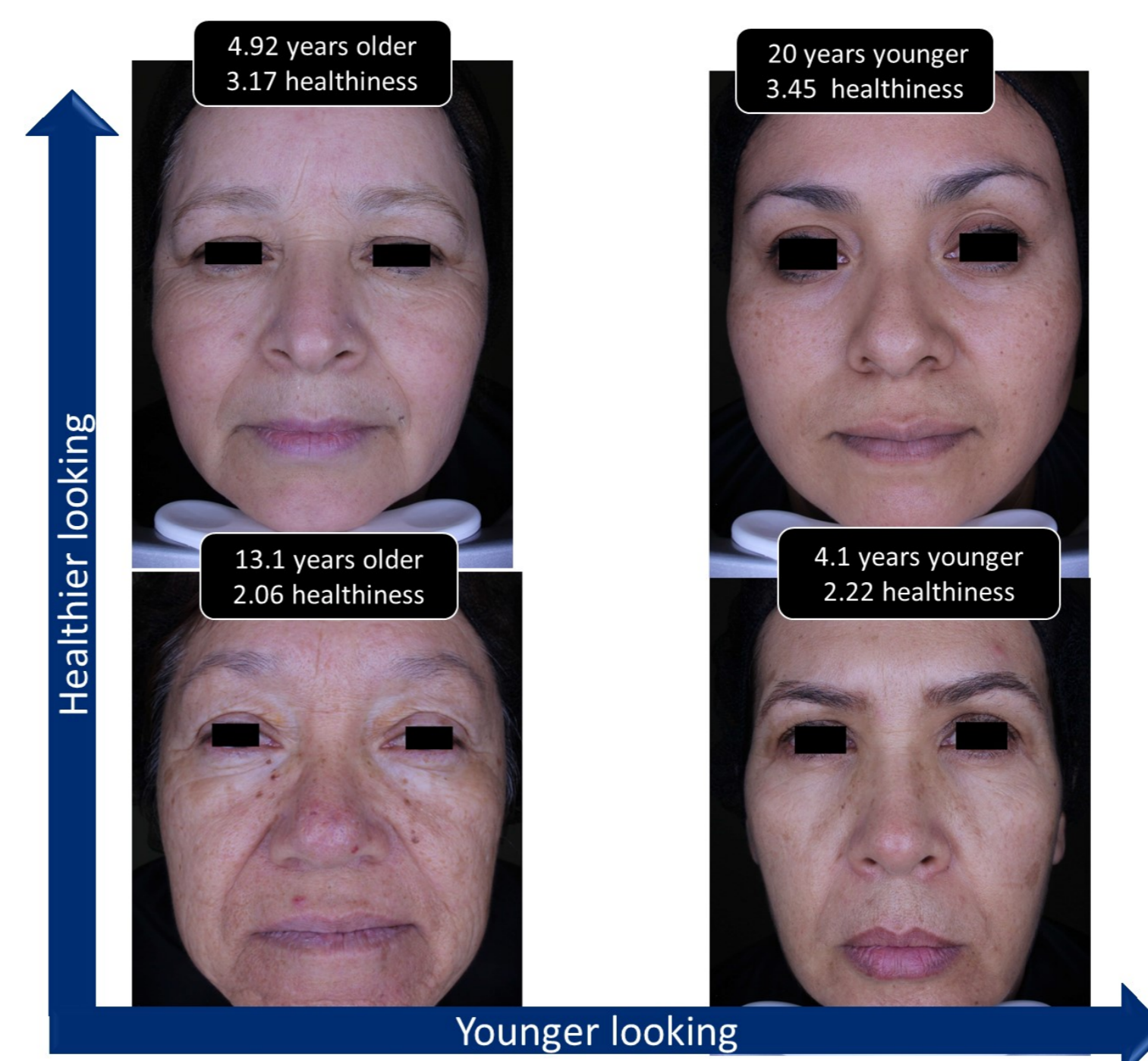


Figure 3: Examples of 4 Volunteers from the same age range (55 ± 1 year), with distinct profiles of age and health perception.

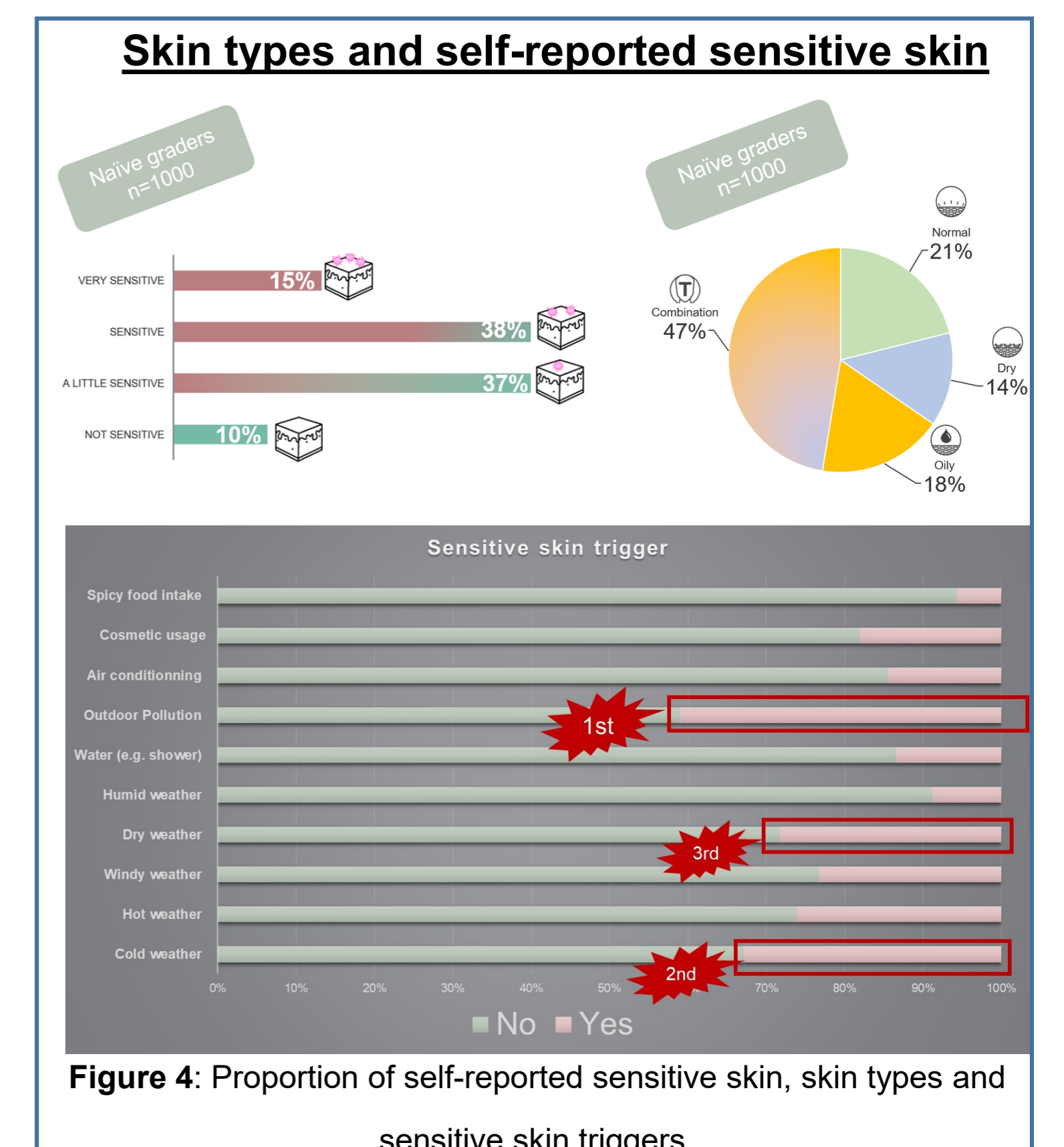


Figure 4: Proportion of self-reported sensitive skin, skin types and sensitive skin triggers.

Self-reported skin concerns & factors deemed important for a beautiful skin

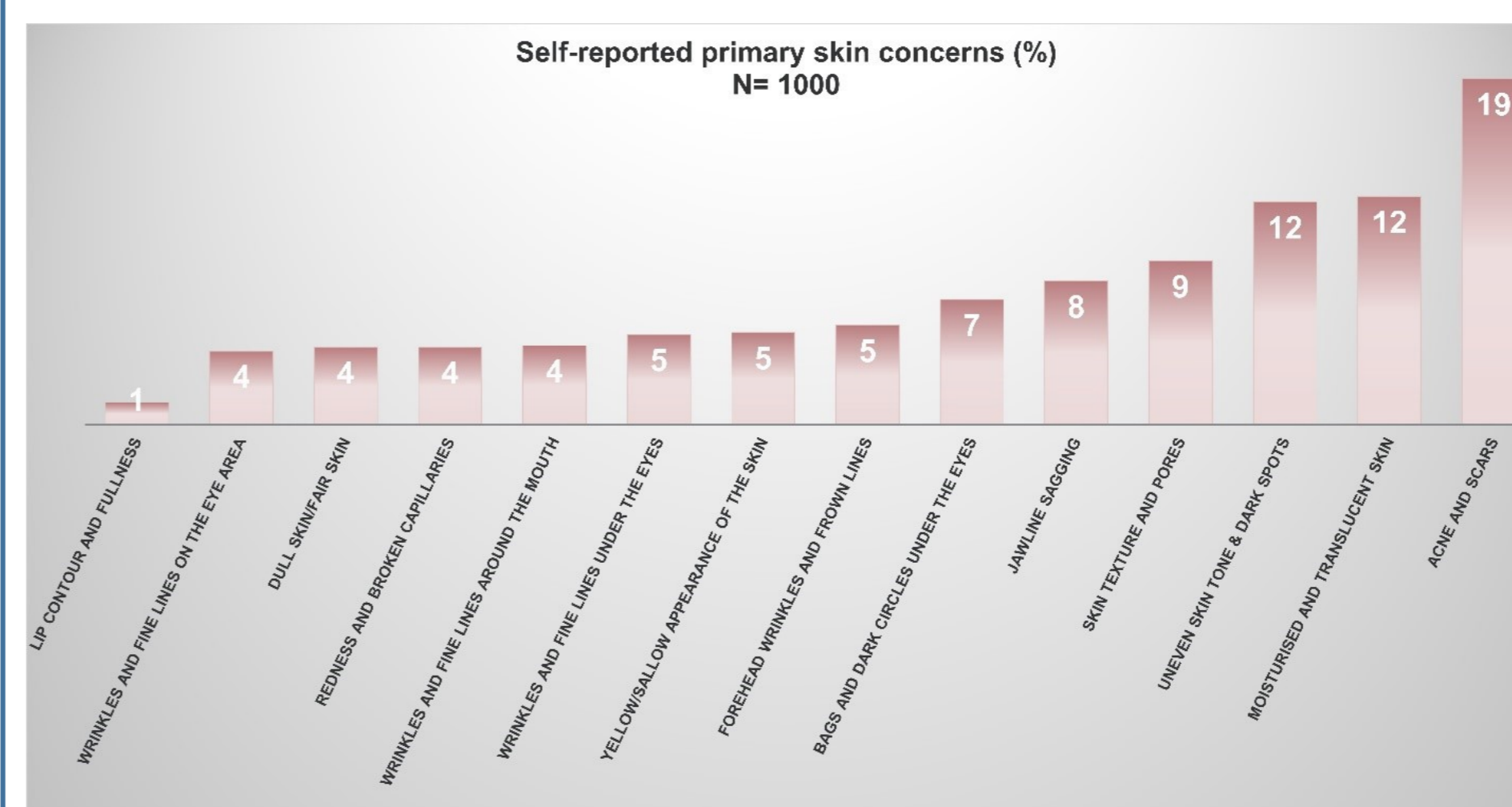


Figure 5: Self-reported primary skin concerns from the naive graders (n=1000)

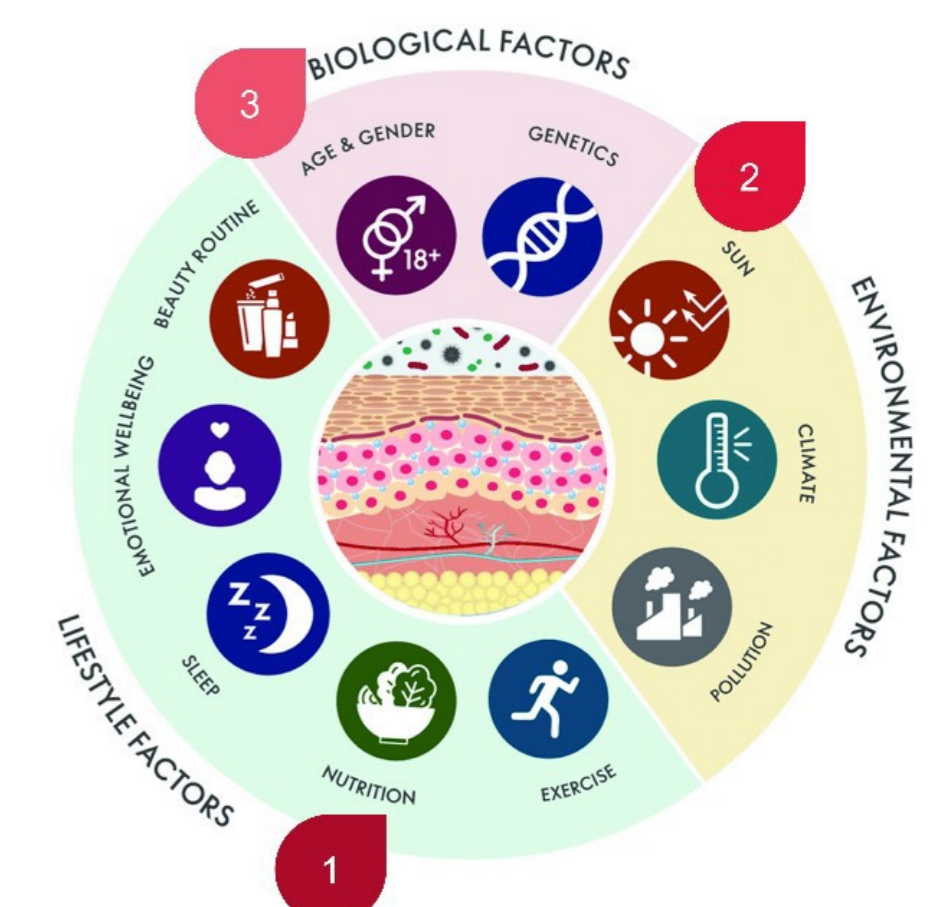


Figure 6: Factors deemed to be the most important for a beautiful skin, according to the Mexican naive graders (n=1000)

Conclusions:

Mexican women share some characteristics of facial skin with other groups but also have their very own specificities, which warranted the need for a dedicated investigation on local residents. Insights generated can be leveraged for more targeted solutions, notably for products with anti-ageing and "healthy-looking skin" claims.

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