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2 **Self-rated female facial appearance and the role of visible skin**
3 **features in five ethnic groups**

4 **Variations in standards of self-rated and other-rated women's faces**

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20 **Key Points**

- 21 • The human face communicates visual information that affects social perception.
- 22 • Self-assessments of facial appearance can differ from external assessments.
- 23 • This article presents findings from self-rated female facial appearance across five
- 24 ethnic groups.

- 25 • Implications are discussed regarding beliefs across ethnic groups about the role
26 of specific skin features in female facial appearance.

27 **Perceived facial appearance**

28 The human face communicates visual information that affects social
29 communication and interaction [1,2]. Within a fraction of a second, people form initial
30 impressions of others [3,4] and use this information in social decisions [5], including
31 assessments of attractiveness [6] and trustworthiness [7].

32 According to evolutionary scientists, humans have evolved preferences for
33 specific physical features, which reflect adaptations to mating-related decisions [8,9].
34 In this view, healthy individuals are viewed as attractive because they display good
35 physical condition [10]. Particularly in women, a youthful appearance suggests high
36 fecundity and thus reproductive potential [11,12]. It is not surprising, therefore, that
37 face research has focussed on assessments of age, health, and attractiveness to
38 quantify female “beauty.”

39 Recent research on face assessments within and between ethnic groups [13]
40 documented cross-cultural variation (in addition to consistency) in assessments of
41 female facial appearance. Female and male naïve assessors identifying with one of
42 five ethnicities (Chinese, Japanese, French, Indian, and South African) judged digital
43 portraits of women using web-based software within and across ethnicities for age,
44 attractiveness, and health. Facial attractiveness and health assessments were more
45 varied across assessor ethnicities than were age assessments. These findings indicate
46 variation in facial judgments, especially in assessments of attractiveness and health
47 [13], corroborating reports of differential effects of skin features on ratings of age,
48 health, and attractiveness, within and between ethnic groups [14-16].

49 Self-reported facial attractiveness and self-esteem

50 Previous studies on facial attractiveness from an evolutionary perspective have
51 utilized third-party ratings, typically a representative sample of naïve assessors who
52 judged facial images for several attributes. Self-assessments are less commonly
53 utilized, perhaps because of concerns regarding the accuracy of self-assessments.
54 Research that compared self-ratings with third-party ratings of facial photographs
55 reported a sex difference in the accuracy of self-perceived attractiveness [17]. Self-
56 ratings and third-party assessments of attractiveness correlated positively and strongly
57 for women but not for men - a finding interpreted with reference to the differential
58 importance of physical appearance for women and men. In another study [18], women
59 typically overestimated their attractiveness, and the most attractive women were most
60 likely to self-deceive (Figure 1) (defined by the authors as self-rating minus third-party
61 rating). Women with less attractive faces were more realistic when rating their own
62 appearance.

63 --- Insert Figure 1 here ---



64
65 *Figure 1.* Sample images of female participants from five ethnic groups for presentation
66 in the rating study. The mean differences between self-rated attractiveness and third-
67 party ratings of attractiveness were the largest for these women, respectively. From
68 left to right: Chinese, Japanese, French, Indian, and South African.

69

70 Deception (including self-deception) about traits and abilities may facilitate self-
71 enhancement. People rate their own faces as more physically attractive than is
72 reported by third-party raters [19]. Research on deception about one's own facial
73 attractiveness in the context of prospective dating showed that the willingness to lie
74 about one's attractiveness was greater for more attractive potential dates [20].
75 Evolutionary psychologists have documented that women, in particular, enhance and
76 exaggerate desirable physical traits (e.g., via cosmetics) in intra-sexual selection to
77 advertise high reproductive quality to men [21].

78 Self-rated attractiveness correlates positively with self-esteem [22,23], perhaps
79 because individuals who perceive themselves to be attractive also perceive
80 themselves to be socially valued. Researchers have contended that self-esteem
81 reflects the integrated sum of self-efficacy and self-respect, i.e. the subjective sense of
82 personal worth [24]; indeed, self-esteem is strongly correlated with self-assessments
83 of quality of life [25]. Self-esteem may have several facets and, therefore,
84 disagreement persists over its conceptualization and measurement. In a study of sex
85 differences in self-rated attractiveness and self-esteem, Wade [26] hypothesized that
86 self-perception in young adults reflects experiences in intersexual and intrasexual
87 selection [27]. Hence, our self-perceptions reflect how others perceive us, and self-
88 awareness has evolved to facilitate successful competition for mates. Wade found that
89 women and men use the same reproductively-relevant criteria in self-assessments that
90 observers use [26]. This suggests that self-assessed attractiveness is not based
91 exclusively on the feedback people receive from others. Research on self-perceived
92 attractiveness and self-esteem in the mating context supports the suggestion that self-
93 esteem evolved to regulate interpersonal relationships, including mating relationships

94 [28]. For example, women who regard themselves as highly attractive have a greater
95 preference for markers of mating-related quality in a prospective partner (i.e.,
96 masculinity and symmetry [29]). Collectively, these studies on self-assessed
97 attractiveness suggest an impact on self-esteem mediated by mate value.

98 **Ethnic differences in self-assessments**

99 A recent multi-ethnic and multi-center study of female facial appearance across
100 five societies secured ratings from age and sex-matched naïve assessors of women's
101 digital portraits, both within and between five ethnic groups [13,16,30]. Age-matched
102 women ($n = 180$) 20-65 years were imaged in five locations (Guangzhou, Tokyo, Lyon,
103 New Delhi, and Cape Town), with identical equipment and following the same research
104 protocol. Assessors identifying with one of five ethnicities (Chinese, Japanese, French,
105 Indian, and South African; $n = 36$ each) judged the women's faces for age,
106 attractiveness, and health. Each image was rated ~300 times, producing ~155,000
107 judgments.

108 In addition to ratings from third-party assessors, we secured self-assessments
109 from the women contributing the images. At the time of their lab visit for facial imaging,
110 the women were asked to self-assess their perceived age (in years), attractiveness,

111 --- Insert Figure 2 a, b, c here ---

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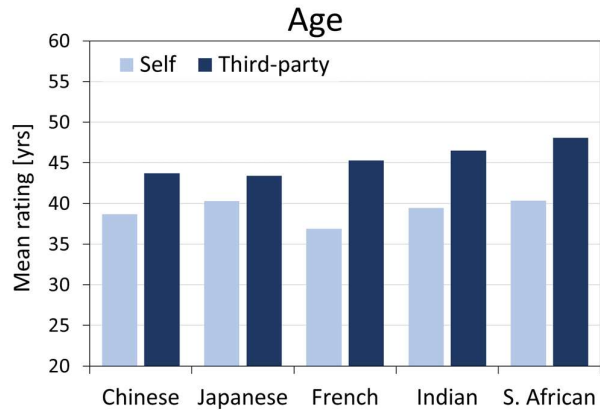
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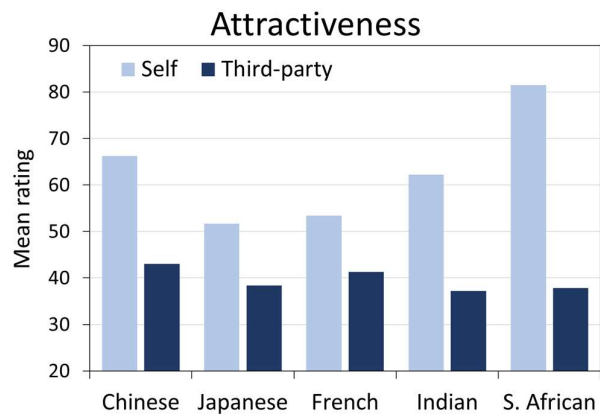
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119 a)



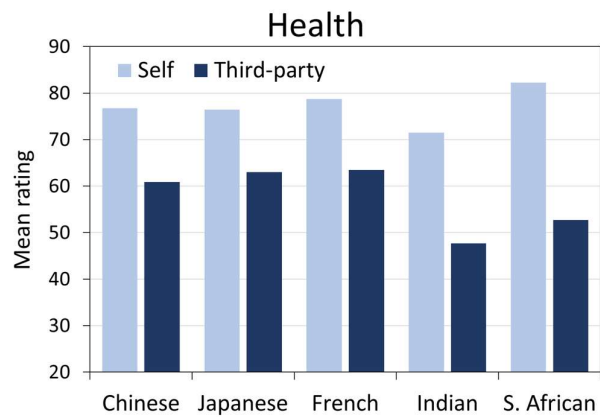
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121 b)



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123 c)



124

125 *Figure 2.* Self-ratings and third-party ratings of women's facial images for age (a),
126 attractiveness (b), and health (c) by female and male assessors of five ethnic groups.

127

128 and health, on scales ranging 0 to 100, anchored by "not attractive" or "not healthy"
129 and "attractive" or "healthy". These scores were recorded using web-based software
130 (as were third-party ratings). In the present article, we focus on the self-ratings and
131 comparison with (combined) ratings of female and male assessors from the same
132 ethnicity as the photographed women. The third-party ratings within and across ethnic
133 groups have been presented and discussed elsewhere [13].

134 Across ethnic groups, self-reported age was lower than the assessors'
135 estimated age, and the opposite pattern was found for attractiveness and health
136 (Figure 1). Kruskal-Wallis ANOVAs by ranks indicated ethnic differences for self-
137 reported attractiveness ($H = 51.32, p < .0001$) and health ($H = 15.98, p < .01$) but not
138 for age ($H = 1.27, p = .87$). South African women rated themselves highest for
139 attractiveness, followed by Chinese, French, and Japanese women. Self-rated health
140 did not differ between ethnic groups, with the exception of Indian women scoring lower
141 than other ethnic groups.

142 To assess discrepancies between self-ratings and third-party ratings, we
143 calculated the difference between the mean ratings for age, attractiveness, and health
144 for each ethnic group. Self-rated attractiveness and health were higher than third-party
145 ratings for each ethnic group. The Kruskal-Wallis test revealed an effect for age ($H =$
146 $16.01, p < .01$), attractiveness ($H = 67.09, p < .0001$), and health ($H = 20.30, p < .001$),
147 indicating differences across ethnic groups in the discrepancies between self-ratings
148 and third-party ratings. French women showed the largest difference in age perception.
149 The largest difference between self-rated and other-rated attractiveness was observed

150 for South African women, followed by Chinese and Indian women; French and
151 Japanese women showed the smallest differences. Differences in health assessments
152 also were largest for South African women, and no significant differences were
153 detected for other ethnic groups.

154 These findings suggest larger divergences between self-assessments of facial
155 appearance and third-party assessments for some ethnic groups. Considering the
156 three attributes together, there was no coherent pattern of discrepancies between self-
157 ratings and assessor ratings. However, the largest difference for age assessments in
158 French women, for attractiveness in South African women, and the smallest difference
159 for health in Indian women may be noteworthy with reference to previous reports of
160 third-party ratings [13] and their prediction from skin image analysis [16]. Previous
161 reports of age assessments of French women showed French female assessors
162 provided the youngest age estimations (compared to assessors from other ethnic
163 groups). This suggests that French women may be particularly concerned about aging.
164 Skin image analysis indicated the largest number of predictors for the (third-party) age
165 ratings of French women. Thus, French women may be more sensitive than women of
166 other ethnic groups to skin features that change with age – a speculation that would,
167 however, fit French history and expertise in cosmetics [31]. South African women rated
168 themselves more attractive than did other members of their ethnic group, and Indian
169 women were less positive about themselves regarding health than were other
170 members of their ethnic group.

171 The apparent discrepancy with self-ratings is difficult to interpret but may be
172 grounded in ethnic differences in perceptions of facial signs of aging. Skin image
173 analysis showed that wrinkles and color (b^*) contribute to the prediction of third-party
174 ratings of facial attractiveness in South African women; however, compared with other

175 ethnic groups, South African women may be less self-critical about signs of aging.
176 Similarly, the finding of the smallest discrepancy between self-rated and assessor-
177 rated health of Indian women may originate from cultural variation in standards of self-
178 criticism [32], in addition to ethnic differences in concerns about age-related skin
179 changes [33].

180 **Assessors' beliefs about the role of facial skin features**

181 Voegeli et al. [16] reported differences between ethnic groups in the relative
182 predictive utility of skin features in accounting for third-party ratings of female facial
183 age, attractiveness, and health. Facial wrinkling and sagging were the best predictors
184 of facial age and attractiveness ratings, although differences between ethnic groups
185 were observed in their relative contributions. Skin tone and gloss had an additional role
186 in facial health ratings [16]. In addition to ethnic differences in age-related skin changes
187 due to variations in extrinsic and intrinsic factors, differences in the predictive utility of
188 skin features may also be attributable to population-specific perceptions of specific skin
189 features.

190 The multi-ethnic and multi-center study [13,16] asked female and male
191 assessors of the female portraits to rate the importance of specific skin features for the
192 perception of facial age, attractiveness, and health. Thus, 120 assessors of five ethnic
193 groups were asked to indicate on a scale from 0 ("not important") to 100 ("very
194 important") the significance of facial wrinkles, sagging, skin roughness & dullness,
195 pores, patchy skin tone, dark spots, dark eye circles & eye bags. The individual scores
196 were averaged for each skin feature and ethnicity and rank-ordered (1 = very
197 important, 7 = not important).

198

--- Insert Figure 2 here ---

Age	Wrinkles	Sagging	Roughness & dullness	Pores	Patchy skin tone	Dark spots	Dark eye circles & eye bags
Chinese	2	1	3	7	6	4	5
Japanese	2	1	5	7	6	3	4
French	2	1	5	7	6	4	3
Indian	2	1	6	5	4	7	3
South African	1	5	3	4	2	6	7
Grand Total	1	2	3	7	6	5	4

Attractiveness	Wrinkles	Sagging	Roughness & dullness	Pores	Patchy skin tone	Dark spots	Dark eye circles & eye bags
Chinese	3	1	2	7	6	5	4
Japanese	4	2	5	6	7	3	1
French	4	1	3	7	5	6	2
Indian	3	1	7	6	4	5	2
South African	1	6	5	2	3	7	4
Grand Total	3	1	4	6	7	5	2

Health	Wrinkles	Sagging	Roughness & dullness	Pores	Patchy skin tone	Dark spots	Dark eye circles & eye bags
Chinese	6	3	2	7	4	5	1
Japanese	6	4	2	7	3	5	1
French	6	4	2	7	3	5	1
Indian	3	1	6	7	5	4	2
South African	1	7	5	2	3	6	4
Grand Total	6	4	2	7	3	5	1

199

200 *Figure 3.* Rankings of assessors' reports about the significance of skin features in
 201 perceptions of facial appearance.

202 Assessors' ratings indicated that facial wrinkles and sagging are particularly
 203 important predictors of perceptions of age and attractiveness. The significance of these
 204 features is observed across ethnic groups, with the exception of South African
 205 assessors, who scored age-related changes in skin topography lower than assessors
 206 of other ethnicities. These findings are consistent with previous reports from the multi-
 207 ethnic and multi-center study [13,16,30] indicating less concern with wrinkles and
 208 sagging reported by South African women, and with evidence on the relative
 209 importance of skin topography vs. skin coloration in lightly-pigmented women [34,35].
 210 South African assessors report more concern about visible facial pores than assessors
 211 of other ethnic groups. According to assessors' reports across ethnic groups, a patchy
 212 skin tone and dark spots play an additional role in health perception (see also [16]),
 213 especially dark eye circles, and eye bags. The latter feature affects perceptions of
 214 health across ethnic groups, with South African assessors again expressing less

215 concern. Skin roughness and dullness were ranked high in significance for health
216 perception by Chinese, French, and Japanese assessors, but less so by Indian and
217 South African assessors.

218 Collectively, the multi-ethnic, multi-center findings suggest that female and male
219 assessors across ethnic groups are not equally concerned about the role of specific
220 skin features in perceptions of female age, health, and attractiveness. The finding of a
221 strong role for wrinkles and sagging on perceptions of age and attractiveness
222 corresponds with recent reports on the predictive role of these features by third-party
223 ratings [16]. From a cosmetics industry perspective, the variation across ethnic groups
224 in perceptions suggests the importance of population-specific attention to assessors'
225 beliefs about the role of facial skin features in order to provide desired cosmetic
226 products.

227 **Conclusions**

228 Third-party assessments of female facial appearance within and between ethnic
229 groups [13] documented cross-cultural variation (in addition to consistency), and this
230 is also found in women's self-ratings. A general finding is that independent of the type
231 of rating, age assessments vary less than facial attractiveness and health judgments.
232 In the multi-ethnic and multi-center study [13,16,30], there were positive correlations
233 between self-assessments and third-party assessments of age but not of health or
234 attractiveness. The latter finding is consistent with previous reports documenting low
235 correlations between self-rated and other-rated attractiveness [18,23]. Self-ratings
236 show stronger relationships with self-esteem and self-confidence than do other-ratings.
237 Although self-assessments are likely influenced by mating-related motives, they may
238 provide less "accurate" information about an individual given the bias for positive self-
239 appraisal and exaggeration of desirable physical traits.

240 This bias is independent of ethnicity. Together with ethnic diversity in face
241 assessments due to variations in skin biology and environmental and sociocultural
242 factors, cosmetic science is challenged by different standards of assessing physical
243 appearance in addition to ethnic variation in the attention to beliefs about the role of
244 facial skin features in female perceptions. The use of self-ratings or third-party ratings,
245 in addition to skin measurements and expert grading, may depend on the focus of a
246 study. From the perspective of cosmetic science, an integrated approach to
247 understanding consumer needs is particularly promising given the population-specific
248 and rater-specific assessments of facial appearance.

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250 **References**

- 251 1. Bruce V., Young A. (1998). *In the eye of the beholder: the science of face*
252 *perception*. Oxford, UK: Oxford University Press.
- 253 2. Little A. C., Jones B. C., DeBruine L. M. 2011. Facial attractiveness: evolutionary
254 based research. *Phil Trans R Soc B* 366, 1638–1659.
- 255 3. Jaeger, B., Jones, A. L. (2022). Which facial features are central in impression
256 formation? *Soc Psychol Personal Sci* 13(2) 553–561.
- 257 4. Willis J., Todorov, A. (2006). First impressions: making up your mind after a 100-
258 ms exposure to a face. *Psychol Sci* 17 592–598.
- 259 5. Zebrowitz, L. A. (2017). First impressions from faces. *Curr Dir Psychol Sci* 26 237-
260 242.
- 261 6. Dion, K., Berscheid, E., Walster, E. (1972). What is beautiful is good. *J Pers Soc*
262 *Psychol* 24(3) 285–290.
- 263 7. Todorov, A. (2008). Evaluating faces on trustworthiness. *Ann NY Acad Sci* 1124(1)
264 208–224.

- 265 8. Rhodes, G. (2006). The Evolutionary Psychology of Facial Beauty. *Annu Rev*
266 *Psychol* 57(1) 199-226.
- 267 9. Thornhill, R., Gangestad, S. W. (1999) Facial attractiveness. *Trends Cogn Sci* 3
268 452-460.
- 269 10. Shackelford, T. K., Larsen, R. J. (1999). Facial attractiveness and physical health.
270 *Evol Hum Behav* 20 71-76.
- 271 11. Grammer, K., Fink, B., Moller, A. P., Thornhill R. (2003). Darwinian aesthetics:
272 sexual selection and the biology of beauty. *Biol Rev Camb Philos Soc* 78 385-407.
- 273 12. Symons, D. (1995). Beauty is in the adaptations of the beholder: the evolutionary
274 psychology of human female sexual attractiveness. *Sexual nature, sexual culture.*
275 *Chicago series on sexuality, history, and society.* Chicago, IL, US: The University
276 of Chicago Press 80–119.
- 277 13. Voegeli, R., Schoop, R., Prestat-Marquis, E., Rawlings, A. V., Shackelford, T. K.,
278 Fink, B. (2021a). Cross-cultural perception of female facial appearance: A multi-
279 ethnic and multi-centre study. *PLOS ONE* 16 e0245998.
- 280 14. Flament, F., Abric, A., Adam A. S. (2021). Evaluating the respective weights of
281 some facial signs on perceived ages in differently aged women of five ethnic origins.
282 *J Cosmet Dermatol* 20 842-853.
- 283 15. Vierkötter, A., Hüls, A., Yamamoto, A., Stolz, S., Krämer, U., Matsui, M.S., Morita,
284 A., Wang, S., Li, Z., Jin, L., Krutmann, J., Schikowski, T. (2016). Extrinsic skin
285 ageing in German, Chinese and Japanese women manifests differently in all three
286 groups depending on ethnic background, age and anatomical site. *J Dermatol Sci*
287 83 219–25.
- 288 16. Voegeli, R., Campiche, R., Biassin, R., Rawlings, A. V., Shackelford, T. K., Fink, B.
289 (2023). Predictors of female age, health and attractiveness perception from skin
290 feature analysis of digital portraits in five ethnic groups. *Int J Cosmet Sci.* 00: 1–16.

- 291 17. Rand, C. S., Hall, J. A. (1983). Sex differences in the accuracy of self-perceived
292 attractiveness. *Soc Psychol Quart* 46(4) 359-363.
- 293 18. Brewer, G., Archer J., Manning, J. T. (2007). Physical attractiveness: The objective
294 ornament and subjective self-ratings? *J Evol Psychol* 5(1-4) 29-38.
- 295 19. Epley, N., Whitchurch, E. (2008). Mirror, mirror on the wall: Enhancement in self-
296 recognition. *Pers Soc Psychol Bull* 34 1159.
- 297 20. Rowatt, W. C., Cunningham, M. R., Druen, P. B. (1999). Lying to get a date: The
298 effect of facial physical attractiveness on the willingness to deceive prospective
299 dating partners. *J Soc Pers Relat* 16(2) 209-223.
- 300 21. Davis, A., Arnocky, S. (2022). An evolutionary perspective on appearance
301 enhancement behavior. *Arch Sex Behav* 51 3-37.
- 302 22. Steward, R. J., Sobczak, J. (1989). An examination of the relationship between self-
303 perceived physical attractiveness and social competence. University of Kansas,
304 Technical Report 143, <https://eric.ed.gov/?id=ED318935>.
- 305 23. Keneally, P., Gleeson, K., Frude, N., Shaw, W. (1991). The importance of the
306 individual in the 'causal' relationship between attractiveness and self-esteem. *J*
307 *Comm Appl Soc Psychol* 1 45-56.
- 308 24. Jordan, C. H., Zeigler-Hill, V., Cameron, J. (2015). Self-Esteem. In: J. D. Wright
309 (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (Second
310 Edition), PP. 522-528. Amsterdam: Elsevier.
- 311 25. Lachman, M. E., Weaver, S. L. (1998). The sense of control as a moderator of
312 social class differences in health and well-being. *J Pers Soc Psychol* 74(3) 763-
313 773.
- 314 26. Wade, T. J. (2000). Evolutionary theory and self-perception: Sex differences in
315 body esteem predictors of self-perceived physical and sexual attractiveness and
316 self-esteem. *Int J Psychol* 3 36-45.

- 317 27. Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: A contextual
318 evolutionary analysis of human mating. *Psych Rev* 100 204-232.
- 319 28. Bale, C., Archer, J. (2013). Self-perceived attractiveness, romantic desirability and
320 self-esteem: A mating sociometer perspective. *Evol Psychol* 11(1)
321 <https://doi.org/10.1177/147470491301100107>
- 322 29. Little, A. C., Burt, D. M., Penton-Voak, I. S., Perrett, D. I. (2001). Self-perceived
323 attractiveness influences human female preferences for sexual dimorphism and
324 symmetry in male faces. *Proc Biol Sci* 268(1462) 39-44.
- 325 30. Voegeli, R., Schoop, R., Prestat-Marquis, E., Rawlings, A. V., Shackelford, T. K.,
326 Fink, B. (2021b). Differences between perceived age and chronological age in
327 women: A multi-ethnic and multi-centre study. *Int J Cosmet Sci* 43 547-460.
- 328 31. Grout, H. (2015). *The force of beauty: Transforming French ideas of femininity in*
329 *the Third Republic*. Baton Rouge: Louisiana State University Press.
- 330 32. Heine, S. J., Takemoto, T., Moskaleiko, S., Lasaleta, J., Henrich, J. (2008). Mirrors
331 in the head: cultural variation in objective self-awareness. *Pers Soc Psychol Bull*
332 34(7) 879-887.
- 333 33. Fink, B., Voegeli, R., Schoop, R., Campiche, R., & Shackelford, T.K. (2022).
334 Boundless beauty: Perception of female facial appearance across ethnicities and
335 targeted solutions. *Cosmetics & Toiletries* 137 36-45.
- 336 34. Matts, P.J., Fink, B. (2010). Chronic sun damage and the perception of age, health
337 and attractiveness. *Photochemi Photobiol Sci* 9(4) 421-431.
- 338 35. Samson, N., Fink, B., Matts, P.J. (2011). Interaction of skin colour homogeneity and
339 topography in the perception of female facial age and health. *J Cosmet Dermatol*
340 10(1) 78-84