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## Physical and Psychosocial Correlates of Facial Attractiveness

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This research aimed to investigate whether and how facial attractiveness relates to physical (height and weight), social (relationship status), and psychological characteristics (personality traits, self-esteem, locus of control, self-evaluated social status, trait anxiety, and time perspective) in a sample of college students. In the first study, 231 participants (males and females) provided a standardized photo of their faces, self-rated their attractiveness, answered some anthropometric and demographic questions, and completed some psychological questionnaires. In a second study, the faces were evaluated for attractiveness by an external group of same-aged judges (N = 236). Attractiveness was negatively correlated with body mass index and with height (only in males). Attractive individuals reported being in a long-term romantic relationship more than others. Self-rated and/or other-rated attractiveness were positively correlated with self-reported social status, self-esteem, and past-positive time perspective, and negatively correlated with trait anxiety, neuroticism, and past-negative time perspective. The findings of this study suggest that more attractive individuals possess characteristics that favor psychological wellbeing and good mental health and that make them desirable and successful as social or romantic partners. Attractiveness may also be associated with adaptive cognitive biases that promote self-enhancement.

Keywords: attractiveness, self-esteem, trait anxiety, personality, time perspective

Facial attractiveness is universally recognized and highly valued, especially in a potential sexual partner, friend, or ally (e.g., Langlois et al., 2000; Little et al., 2011; Rhodes, 2006). A large body of research has shown that attractive individuals are treated more favorably by others in a variety of contexts and, as a result, enjoy a wide range of social and financial benefits (Hamermesch, 2011;

Maestriperi et al., 2017; but see Agthe et al., 2010, 2011). To account for this preferential treatment, many studies have explored whether attractive individuals are different also in other characteristics, for example, in other physical, physiological, or psychological/behavioral traits, or whether are perceived by others to be different.

It has been suggested that attractive individuals, on average, have better health than others, possibly because they have good genes and/or have been exposed to a lesser extent to stressful perturbations of their early development and growth (e.g., Kanazawa, 2011; Kanazawa & Kovar, 2004). Consistent with this suggestion, there is some evidence for an association, especially for women in Western societies, between physical attractiveness, health, fertility, and reproductive success both across and within individuals (Jokela, 2009; Langlois et al., 2000; Maestriperi et al., 2014; Pawlowski et al., 2008; Rhodes et al., 2005; Weeden & Sabini, 2005).

Early on in research on attractiveness, social psychologists suggested that attractive people are often perceived as friendlier, more intelligent, more competent, more generous, and more trustworthy (the “beautiful is good” stereotype; Dion et al., 1972), whereas unattractive people are perceived as dull, introverted, and less generous or trustworthy (e.g., Adams, 1977; Dion et al., 1972; Eagly et al., 1991; Feingold, 1992; Gillen, 1981; Hosoda et al., 2003; Jackson et al., 1995; Langlois et al., 2000; Lewis & Bierly, 1990; Webster & Driskell, 1983). The stereotypes about some specific personality traits (e.g., extraversion or agreeableness) or prosocial behavior (e.g., friendliness or generosity), or competence of attractive individuals generally do not correspond to reality (Dermer & Thiel, 1975; Eagly et al., 1991; Jackson et al., 1995; Langlois et al., 2000; Segal-Caspi et al., 2012; but see Bourdage et al., 2007; Lukaszewski & Roney, 2011; Mathes & Kahn, 1975).

The association between physical attractiveness and intelligence is weak, though slightly positive (Kanazawa & Kovar, 2004; Langlois et al., 2000, but see Feingold, 1992). With regard to prosocial behavior, studies conducted with experimental economic games have found either no significant differences in behavior between attractive and unattractive people (see Solnick & Schweitzer, 1999; Takahashi et al., 2006), or differences in the opposite direction to that expected based on the “beautiful is good” stereotype: Attractive people are generally less cooperative, less generous, less trusting, and less trustworthy (Andreoni & Petrie, 2008; Eckel, 2007; Mulford et al., 1998; Muñoz-Reyes et al., 2015; Sanchez-Pages & Turiegano, 2010; Shinada & Yamagishi, 2014; Takahashi et al., 2006; Zaatari & Trivers, 2007).

Two meta-analyses have examined the relation between attractiveness and psychological/personality traits, which were generally assessed with questionnaires (Feingold, 1992; Langlois et al., 2000). These meta-analyses found that attractive adults had higher self-confidence and self-esteem (but in Feingold's 1992 study, self-confidence and self-esteem were correlated only with self-rated attractiveness, not with other-related attractiveness) and lower anxiety; they were also slightly more extroverted than unattractive adults. The direction of causation in the correlation between higher attractiveness, higher self-confidence and self-esteem, and lower anxiety remains unclear. On the one hand, it is possible that attractive people receive mainly positive feedback from others (i.e., they are treated more favorably), and this leads them to have higher self-esteem and lower anxiety. On the other hand, it is possible that individuals with higher self-esteem and lower anxiety view themselves as more attractive (self-rated attractiveness and other-rated attractiveness are generally positively correlated, e.g., Feingold, 1992) and make more of an effort to look attractive to others (with self-grooming, healthy lifestyle, and makeup). These two possibilities are not mutually exclusive.

A few other studies have reported an association between attractiveness and other psychological traits or behaviors. Anderson (1978) explored attractiveness in relation to internal versus external locus of control (internal: The individual feels that he or she is fully in control of his/her own behavior and life; external: The individual feels that his/her own behavior and life are controlled by outside forces, such as other people, luck, or chance) in a small sample of undergraduate students using the Rotter's Locus of Control Scale (LCS; Rotter, 1966). Moderate attractiveness was associated with an internal locus of control, whereas moderate unattractiveness was associated with an external locus of control. Both extreme attractiveness and extreme unattractiveness, however, were associated with external locus of control.

In this study, we aimed to re-examine the association between facial attractiveness and some physical and psycho-social traits in a relatively large sample of college students; we investigated both self- and other-evaluated attractiveness as well as any discrepancy between the two. While the hypothesis that individuals with some psychological traits (e.g., high self-esteem) make themselves more attractive to others is plausible, we believe that this effect is probably weak and there is little evidence in support of it (Barkhoff & Heiby, 2010). There is much stronger evidence that attractive individuals are treated preferentially by others, virtually from birth and throughout their entire lives (Maestri et al., 2017). Therefore, our predictions were derived from the hypothesis that consistent preferential treatment and positive experiences should shape psychological/personality traits in a particular way. This hypothesis is consistent with the evolutionary notion that psychological/personality traits can be calibrated to the environment and to one's own condition, via

feedback from the environment and others (Tooby & Cosmides, 2015). Specifically, physical attractiveness is a marker of high embodied capital and therefore expected to be associated with the development of psychological traits and beliefs that anticipate safety and success in life.

We tested the following main predictions regarding the psychological traits of more attractive individuals (compared to less attractive ones): (a) higher self-esteem, (b) lower trait anxiety, (c) higher extraversion, (d) lower neuroticism, (e) internal locus of control, (f) higher self-perceived social status, and (g) in general, a less pessimistic, less fatalistic outlook on life, including the past, the present, and the future. We predicted that these effects would be stronger for self-evaluated attractiveness than for other-evaluated attractiveness (we expect these to be significantly positively correlated) and be stronger for women than for men, as the evidence for preferential treatment of attractive people, particularly by opposite-sex individuals, suggests that this effect is stronger for women than for men (Maestriperi et al., 2017).

## Method

### Study 1

#### Participants

Participants were 231 students at the University of Bologna: 145 females ( $M_{\text{age}} = 22.46$ ,  $SD = 2.66$ ) and 86 males ( $M_{\text{age}} = 22.15$ ,  $SD = 2.51$ ). They were recruited mainly through word of mouth and participation was on a voluntary basis. The students were told that this was a study investigating the relationship between facial characteristics and personality traits.

#### Procedure

Data were collected using the Qualtrics online platform. After signing the consent form, participants were asked to upload to Qualtrics a digital photograph of their face that met these requirements: (a) face upright to the shoulder axis; (b) neutral expression; (c) homogeneous background; and (d) no hat, sunglasses, or makeup.

Participants were asked to answer some questions about their sex, age, height, weight, occupation, and status in a romantic relationship (single, in a relationship for less than 3 months, in a relationship for more than 3 months), to provide a self-rating of their facial attractiveness and to fill out the following questionnaires in a randomized order.

The Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999) is a 56-item questionnaire that measures individual differences in time orientation, or tendency to focus on different aspects of the past, present, and future. The questionnaire consists of five subscales: (1) pastnegative, including items such as, "I think about the bad things that have happened to me in the

past," (2) present-hedonistic, including items such as, "taking risks keeps my life from becoming boring," (3) future, including 13 items such as, "I complete projects on time by making steady progress," (4) past-positive, including nine items such as, "it gives me pleasure to think about the past," and (5) present-fatalistic, including nine items such as, "often luck pays off better than hard work." Answers to the questions can range from 1 (very uncharacteristic) to 5 (very characteristic).

The Rotter's LCS (Rotter, 1966) is a 29-item questionnaire that measures an individual's level of internal-external control. Locus of control is a psychological construct referring to the degree to which an individual perceives that a reward follows from, or is contingent upon, their own behavior or attributes, versus the degree to which they feel the reward is controlled by forces outside of him/herself, and occurring independently of his/her actions.

The State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983) is a widely used questionnaire for assessing trait and state anxiety. In our study, only the section for trait anxiety was used. It consists of 20 items rated on a 4-point scale (e.g., from almost never to almost always). Higher scores indicate greater anxiety. The Big Five Inventory (BFI; John et al., 1991) is a personality questionnaire including 44 items that assess extraversion, agreeableness, conscientiousness, neuroticism, and openness. Participants had to rate each BFI item on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a 10-item scale that measures global self-worth by measuring both positive and negative feelings about the self. All items are answered using a 4-point Likert scale ranging from strongly agree to strongly disagree.

The McArthur Scale of Subjective Social Status (Adler & Steward, 2007) is composed by one item representing a stepladder image. The respondent has to place an X next to a rung in the ladder to indicate his/her perceived rank relative to his/her group of friends. The scores vary from a minimum of one to a maximum of 10.

## Study 2

### Participants

Participants were 236 students (149 females  $M_{age} = 23.08$ ,  $SD = 5.37$ ; 87 males,  $M_{age} = 26.74$ ,  $SD = 10.03$ ) recruited at the University of Bologna–Cesena campus (recruitment occurred on a different campus, in a different town, to minimize the probability that Studies 1 and 2 participants were acquainted with each other). Participation was on a voluntary basis.

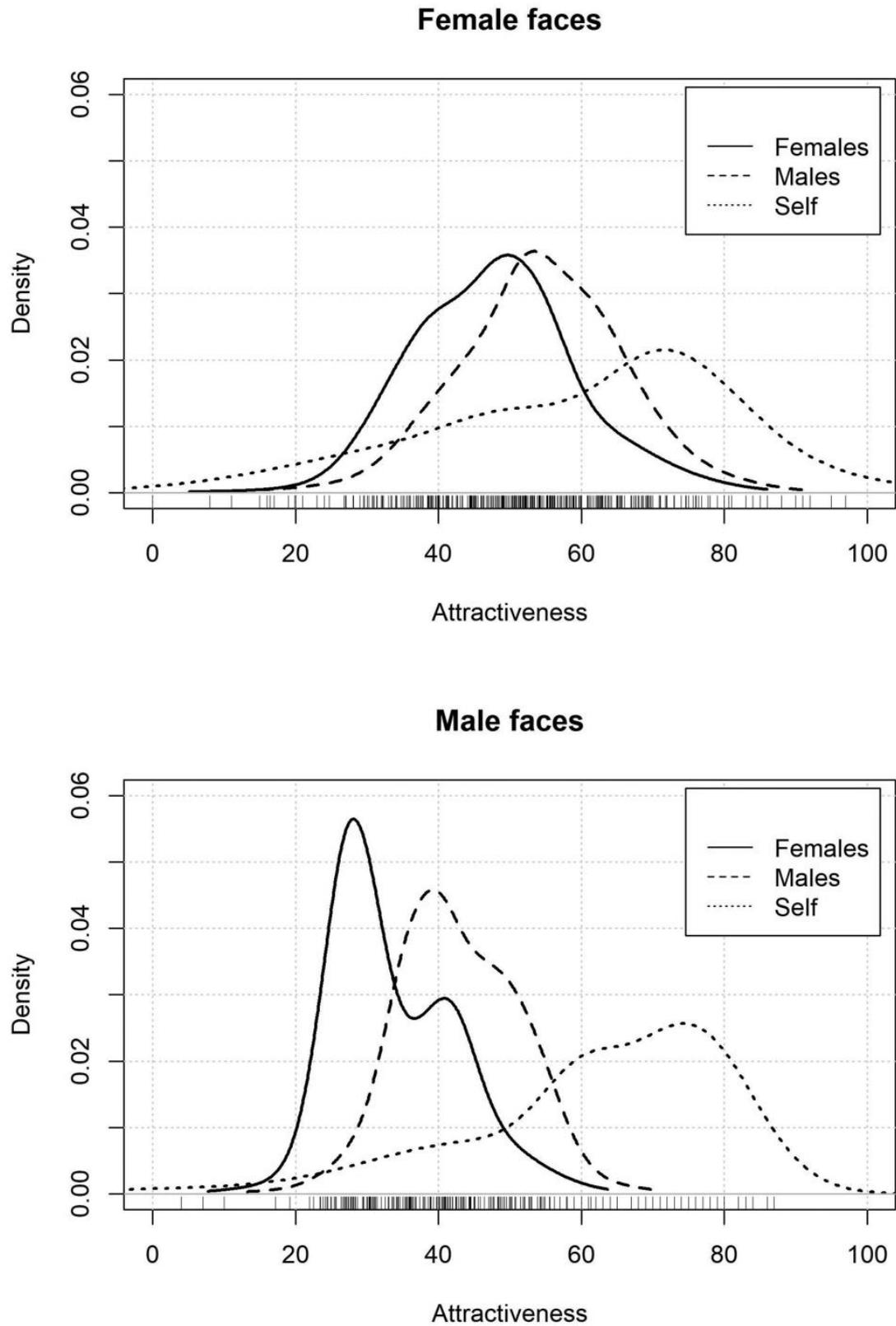
### Procedure

The 231 face images collected in Study 1 served as visual stimuli for Study 2. All procedures were conducted online using Qualtrics. Participants were asked to enter information about their sex and age. Then, the visual stimuli were presented to them in a randomized order, and participants were asked to evaluate the attractiveness of each face using a horizontal slider ranging to 0 (far left) to 100 (far right).

For both studies, all procedures were approved by the Ethics Committee of the University of Bologna and all participants had to digitally sign an informed consent form prior to participation. We complied with APA ethical standards in the treatment of our subjects.

**Figure 1**

Distribution Density for Attractiveness Ratings of Female (Top) and Male (Bottom) Faces as a Function of the Rater



## Results

### Which Faces Were Rated as More Attractive and by Whom

An analysis of variance (ANOVA) assessed attractiveness ratings as a function of sex (male and female faces) and rater (self, other males, and other females) (Figure 1). Mean effect for sex was significant,  $F(1, 229) = 27.81, p < .001, \eta^2 = .11$ . Overall, female faces were evaluated as more attractive ( $M = 53.95, SE = 0.90$ ) than male faces ( $M = 46.11, SE = 1.17$ ). Rater main effect was also significant,  $F(1.067, 244.28) = 160.58, p < .001, \eta^2 = .41$ . Paired comparisons showed that attractiveness was rated highest in the self-rating condition ( $M = 60.84, SE = 1.39$ ), intermediate by males ( $M = 48.52, SE = 0.71$ ), and lowest by female raters ( $M = 40.74, SE = 0.71$ ). Pairwise comparisons showed that all the differences between other-male-, other-female-, and self-rater were significant with a  $p, .001$ . The interaction between sex and rater was also significant,  $F(1.067, 244.28) = 28.93, p < .001, \eta^2 = .11$ . Paired comparisons showed that the comparison between male and female attractiveness was significantly different when considering both other-male raters ( $p < .001$ ) and other-female raters ( $p < .001$ ) but not when considering self-rated attractiveness ( $p = .48$ ). For male faces, attractiveness was highest in the self-rating condition ( $M = 61.82, SE = 2.20$ ), followed by ratings by males ( $M = 42.81, SE = 1.126$ ), and by females ( $M = 33.70, SE = 1.11$ ). For female faces, attractiveness was highest in the self-rating condition ( $M = 59.85, SE = 1.69$ ), followed by ratings by males ( $M = 54.23, SE = 0.86$ ), and by females ( $M = 47.78, SE = 0.86$ ).

The correlation between self-rated and other-rated attractiveness was positive and significant ( $r = .16, p < .001$ ). The Pearson's correlation coefficient was  $r = .29 (p < .001)$  for females and  $r = .24 (p = .02)$  for males. The discrepancy between self- and other-evaluated attractiveness was significantly higher for male ( $M = 28.11, SD = 18.52$ ) than for female ( $M = 5.62, SD = 21.18$ ) participants,  $F(1, 229) = 66.71, p < .001, \eta^2 = .23$ .

### Facial Attractiveness in Relation to Physical and Social Variables

Height and BMI were not significantly correlated ( $p = .08$ ). For female study participants, BMI (but not height) was a significant negative predictor of other-rated attractiveness; therefore, women with higher BMI were perceived to have less attractive faces than those with lower BMI,  $F(2, 140) = 5.41, p = .005, R^2 = .07, \beta = -.26$ .

For male study participants, both BMI and height were negatively correlated with other-rated attractiveness,  $F(2, 83) = 7.83$ ,  $p < .001$ ,  $R^2 = .14$ . Beta coefficients were  $-.30$  for height ( $t = -2.98$ ,  $p = .004$ ), and  $-.30$  for BMI ( $t = -2.95$ ,  $p = .004$ ). Self-rated attractiveness was not related to height or BMI in males or females.

Other-rated attractiveness was significantly associated with status in a romantic relationship,  $F(1, 229) = 10.54$ ,  $p = .001$ ,  $\beta = .22$ ,  $R^2 = .04$ . Attractiveness ratings were lower for singles ( $M = 43.59$ ,  $SD = 14.18$ ) and for those engaged in a romantic relationship for less than 3 months ( $M = 43.92$ ,  $SD = 15.63$ ) than for those engaged in a romantic relationship for more than 3 months ( $M = 50.26$ ,  $SD = 13.72$ ). Thus, the most attractive individuals were likely to be in long-term relationships. Similar results were found with self-rated attractiveness.

### Facial Attractiveness and Psychological Functioning

The relationship between self-rated and other-rated attractiveness and the psychological variables considered in this study was examined in two distinct multivariate linear regression analyses in which self-rated or other-rated attractiveness was included as the dependent variable. Independent variables were the following questionnaire measures: Big-Five Inventory, Rosenberg Self-Esteem Scale, STAI, Rotter's LCS, and ZTPI. Sex was also included in the model as a covariate to control for sex-differences (see Table 1).

Self-rated attractiveness was positively related to social status ( $\beta = 0.009$ ), self-esteem ( $\beta = 2.96$ ), and past-positive time perspective ( $\beta = 0.18$ ), and negatively related to trait anxiety ( $\beta = -4.50$ ), neuroticism ( $\beta = -0.46$ ), and past-negative time perspective ( $\beta = -0.17$ ). Other-rated attractiveness was positively related to self-esteem ( $\beta = 2.53$ ) and negatively related to trait anxiety ( $\beta = -4.50$ ) and past-negative time perspective ( $\beta = -0.24$ ).

Significant sex differences were found for conscientiousness, with females having a higher score ( $M = 30.89$ ,  $SD = 6.54$ ) than males ( $M = 28.33$ ,  $SD = 6.67$ ), and for past-positive time perspective with females having a higher score ( $M = 3.37$ ,  $SD = 0.67$ ) than males ( $M = 3.11$ ,  $SD = 0.66$ ) (Table 1).

The possibility that the data would better fit with a quadratic trend was tested with multivariate quadratic regressions. These regressions were performed separately for other-rated and self-rated attractiveness. None of these regressions showed significant quadratic trends.

A multivariate linear regression analysis explored the possible association between the discrepancy between self- and other-rated attractiveness and the psychological variables examined in this study. The results of the multivariate regression are reported in Table 1, last column. A significant positive relationship was found for social status ( $\beta = 0.08$ ) and self-esteem ( $\beta = 2.24$ ),

whereas a significant negative relationship was found for trait anxiety ( $\beta=-3.19$ ) and neuroticism ( $\beta=-0.44$ ). A test with quadratic multivariate regressions led to nonsignificant results for both males and females.

### Discussion

Our study provides new information on the sources of variation in facial attractiveness among young adults. Although self-rated and other-rated attractiveness were positively correlated, ratings of one's own facial attractiveness were higher, especially among men, than those made by other people. This effect, which was very robust, may be interpreted through the framework of positive biases that have been demonstrated for a wide range of dispositional and cognitive activities (e.g., self-esteem, intelligence, perception of control, and optimism) and which presumably enhance, in an adaptive way, an individual's mental health, motivation, and resilience under stress (e.g., Snyder, 1989;

Taylor & Brown, 1988; Wolfe & Grosch, 1990). Interestingly, Gabriel et al. (1994) reported that males, but not females, overestimated their attractiveness, that positive illusions for intelligence and attractiveness were correlated, and that males showed greater positive illusions than females. These positive illusions are enhanced during romantic relationships (Bale & Archer, 2013; Barelds et al., 2011; Cai et al., 2018), when individuals are extremely biased when assessing their own versus their partner's physical attractiveness.

In our study population, female faces were rated as more attractive than male ones, by both males and females. Males generally rated male and female faces as more attractive than females

**Table 1**  
*Results of the Multivariate Linear Regression Analyses Testing the Effects of Sex, Self-Rated Attractiveness, Other-Rated Attractiveness, and the Disagreement of Self-Other Attractiveness Ratings Over the Psychological Variables Listed in the First Column*

Psychological variable	Sex	Self-rated	Other-rated	Disagreement self-other
Locus of control (Rotter Scale)	<i>ns</i>	<i>ns</i>	<i>ns</i>	
Social status (McArthur)	<i>ns</i>	$t = 3.76, p < .001, \beta = 0.09$	<i>ns</i>	$t = 3.66, p < .001, \beta = 0.08$
Self-esteem (Rosenberg)	<i>ns</i>	$t = 4.97, p < .001, \beta = 2.96$	$t = 3.04, p = .002, \beta = 2.53$	$t = 4.46, p < .001, \beta = 2.24$
Trait anxiety (STAI)	<i>ns</i>	$t = -3.29, p = .001, \beta = -4.50$	$t = -2.32, p = .02, \beta = -4.29$	$t = -2.92, p = .003, \beta = -3.19$
Extraversion (BFI)	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Agreeableness (BFI)	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Conscientiousness (BFI)	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
		$t = -2.42, p = .01, \beta = -0.08$		
	Males: 28.33 (6.67)			
	Females: 30.89 (6.54)			
Neuroticism (BFI)	<i>ns</i>	$t = -2.33, p = .02, \beta = -0.46$	<i>ns</i>	$t = -1.93, p = .05, \beta = -0.44$
Openness (BFI)	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Past-negative (ZTPI)	<i>ns</i>	$t = -2.27, p = .02, \beta = -0.17$	$t = -2.41, p = .01, \beta = -0.24$	<i>ns</i>
Past-positive (ZTPI)	<i>ns</i>	$t = 3.36, p < .001, \beta = -0.18$	<i>ns</i>	<i>ns</i>
	Males: 3.11 (0.66)			
	Females: 3.37 (0.67)			
Present-hedonistic (ZTPI)	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Present-fatalistic (ZTPI)	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>
Future time perspective (ZTPI)	<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>

*Note.* STAI = State-Trait Anxiety Inventory; BFI = Big Five Inventory; ZTPI = Zimbardo Time Perspective Inventory; *ns* = not significant.

did. The extent to which these patterns are specific and idiosyncratic to our study population or can be extended also to other populations remains unclear.

Our study also revealed some significant associations between facial attractiveness and the study participants' self-reported physical, social, and psychological characteristics. Among the physical characteristics, BMI was a significant predictor of facial attractiveness such that males and females with lower BMI were rated as more attractive. Height was negatively associated with attractiveness in males. Since body weight can be inferred from faces, the association between low BMI and attractiveness confirms the well-established relationship between weight, BMI, and a person's overall attractiveness (e.g., Tovée & Cornelissen, 2001). Previous studies of the association between attractiveness and height have produced mixed results (e.g., Beigel, 1954; Gillis & Avis, 1980; Graziano et al., 1978; Shepperd & Strathman, 1989), suggesting that more research on this issue with a larger sample size is needed.

In addition to the participants' physical characteristics, we also found a significant association between their self-reported relationship status and their facial attractiveness. More attractive males and females reported being in long-term (more than 3-month long) romantic relationships (as opposed to being single or in short-term relationships) when compared to less attractive individuals. There are potentially many nonmutually exclusive explanations for this finding. It is possible that more attractive individuals are more desirable partners for long-term relationships due to their attractiveness in itself, or other characteristics associated with it. It is also possible that attractive individuals have psychological or behavioral characteristics that make it easier to maintain a relationship (i.e., make it more stable), independent of their desirability as partners. Or it is possible that attractive individuals are more likely to want and choose to be in long-term relationships. While all of these (and other) explanations are plausible, there is more evidence in favor of the high desirability explanation than for the others (e.g., Maestriperi et al., 2017). Regardless of the explanation, since being in stable long-term romantic relationships has been associated with psychological well-being and other health-related benefits (e.g., Loving & Slatcher, 2013), our results suggest that more attractive individuals are more likely to enjoy the benefits of stable relationships than less attractive individuals.

Facial attractiveness, both self-rated and other-rated, was positively associated with self-esteem, and negatively associated with trait anxiety and with past negative time perspective. The finding that more attractive individuals have higher self-esteem and are less anxious (in some cases, also less neurotic) has been reported in previous metaanalyses of the literature (Feingold, 1992; Langlois et al., 2000). Taken together, these associations suggest that attractive individuals are generally well-

adjusted and less likely to exhibit a lack of self-confidence, or anxiety and depression. An association between attractiveness and eudaimonic well-being (i.e., positive psychological functioning centered on self-realization) has also been reported (Ryan & Deci, 2001).

Attractiveness had a significant association with past time perspective, but not with present and future perspective. A past-negative perspective reflects an aversive attitude toward the past while a past-positive perspective reflects a warm, sentimental, and nostalgic attitude toward the past (Zimbardo & Boyd, 1999). The negative association between attractiveness and pastnegative time perspective could simply reflect the fact that attractive individuals are less likely to have negative experiences in their lives. For example, attractive individuals are treated better by others and receive social and financial benefits from others throughout their lives (Langlois et al., 2000; Maestripieri et al., 2017). It is also possible that attractive individuals have a greater positive bias in their memories so that negative events in their lives are more easily forgotten or weakened for their aversive effects.

Psychological functioning, particularly in terms of positive well-being, was predicted not only by self- and other-rated attractiveness, but also by the discrepancy between these measures. The more participants expressed subjective and enhanced perceptions of their own facial attractiveness (and thus deviated from the more objective ratings made by other individuals) the more they reported high social status and self-esteem, and low neuroticism and trait anxiety. As mentioned in the first paragraph, we believe that the associations between attractiveness and psychological functioning result from the consistent preferential treatment and repeated positive experiences that shape the psychological/personality traits of attractive individuals in a positive way.

Our prediction that the association between facial attractiveness and certain psychological characteristics would be stronger in women than in men was not supported by our results. We did, however, find some significant sex differences in psychological variables, which are mostly consistent with the findings of previous research, namely that both conscientiousness and past-positive time perspective were higher in females than in males (see Keiser et al., 2016; Kling et al., 2013; Mac Giolla & Kajonius, 2019; Nguyen et al., 2005; Vianello et al., 2013).

Overall, our interpretation of the results is consistent with the notion that facial attractiveness is largely biologically and genetically determined (e.g., Little et al., 2011), while personality traits can be calibrated to the environment and to one's own condition, via feedback from others and their behavior (Lukaszewski & Roney, 2011; Tooby & Cosmides, 2015). Specifically, physical attractiveness is a marker of high embodied capital and therefore expected to be associated with the development of psychological traits and beliefs that anticipate safety and success in life such as good self-regulation, mental health, optimism, and openness to the environment (see Lukaszewski &

Roney, 2011). Therefore, attractive people may be equipped with a range of physical, physiological, and psychological characteristics that guarantee not only an enhanced probability of survival, but especially enhanced social and reproductive success, including high desirability as mating partners and high fertility.

We hypothesized that attractiveness would be associated with a greater internal locus of control, but this hypothesis was not supported by our data. Our results, however, suggest that investigating attractive people's cognitive biases and positive illusions about the self and the world may be a profitable and productive avenue for future research, which will likely further enhance our understanding of how evolution by natural and sexual selection has shaped our mind-body connections in adaptive ways.

### **Limitations of This Study**

The lack of experimental measures of psychological and other variables is one important limitation of this study. Due to the COVID-19 pandemic, no study participant could be tested in the laboratory and all data had to be collected online. Related to this, all data analyses were correlational and therefore cause-effect relationships between variables could not be demonstrated. Therefore, the conclusions of the study are necessarily tentative. The smaller sample size for the male faces and the low heterogeneity in the attractiveness ratings of these faces are among the limitations of this study. Finally, the use of college students both for the face stimuli and as raters for the stimuli may limit the generalizability of our findings to nonstudent populations.

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