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5 **Men's strategic preferences for femininity**
6 **in female faces**
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33 **MEN'S STRATEGIC PREFERENCES FOR FEMININITY IN FEMALE**

34 **FACES**

35 **ABSTRACT**

36 Several evolutionarily relevant sources of individual differences in face
37 preference have been documented for women. Here we examine three such
38 sources of individual variation in men's preference for female facial femininity:
39 term of relationship, partnership status and self-perceived attractiveness. We
40 show that men prefer more feminine female faces when rating for a short-term
41 relationship and when they have a partner (Study 1). These variables were
42 found to interact in a follow-up study (Study 2). Men who thought themselves
43 attractive also preferred more feminised female faces for short-term
44 relationships than men who thought themselves less attractive (Study 1 and
45 Study 2). In women similar findings for masculine preferences in male faces
46 have been interpreted as adaptive. In men, such preferences potentially
47 reflect that attractive males are able to compete for high quality female
48 partners in short-term contexts. When a man has secured a mate, the
49 potential cost of being discovered may increase his choosiness regarding
50 short-term partners relative to unpartnered men, who can better increase their
51 short-term mating success by relaxing their standards. Such potentially
52 strategic preferences imply that men also face trade-offs when choosing
53 relatively masculine or feminine faced partners. In line with a trade-off, women
54 with feminine faces were seen as more likely to be unfaithful and more likely
55 to pursue short-term relationships (Study 3), suggesting that risk of cuckoldry
56 is one factor that may limit men's preferences for femininity in women and
57 could additionally lead to preferences for femininity in short-term mates.

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59 **Key words:** Facial attractiveness; masculinity/femininity; mate value; partner;
60 condition-dependence; short-term/long term.

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63 **MEN'S STRATEGIC PREFERENCES FOR FEMININITY IN FEMALE**

64 **FACES**

65 Mature features in adult human faces reflect the masculinisation or
66 feminisation of secondary sexual characteristics that occurs at puberty. These
67 face shape differences in part arise because of the action of hormones such
68 as testosterone. For example, smaller jawbones and fatter cheeks are
69 features of female faces that differentiate them from male faces (e.g., Enlow,
70 1982). In terms of women's attraction to masculinity in male faces, the
71 direction of relationship varies across studies and researchers have
72 documented differences in the attractiveness of masculinity according to
73 short-term versus long-term mating contexts and various sources of individual
74 differences in preferences (Little, Jones, Penton-Voak, Burt, & Perrett, 2002;
75 Penton-Voak et al., 1999). Men's preferences for female faces are not as well
76 studied as women's preferences for male faces. This is potentially due in part
77 to the unequivocal preferences for femininity in female faces.

78 Several researchers have proposed that femininity in human female
79 faces may be a cue to heritable fitness or other benefits and therefore relate
80 to attractiveness (e.g., Perrett et al., 1998). Facial femininity is associated with
81 oestrogen levels (Law-Smith et al., 2006) and also health (Thornhill &
82 Gangestad, 2006). Femininity of face shape is also associated with youth
83 (Perrett, et al., 1998) and so preferences may also reflect male attention to
84 youth, also linked to fertility and fecundity (Buss & Barnes, 1986). Increasing
85 the femininity of female faces should therefore enhance attractiveness, and
86 indeed there is considerable evidence that feminine female faces are
87 considered attractive. Studies measuring facial features from photographs of

88 women (Cunningham, 1986; Grammer & Thornhill, 1994) and studies which
89 manipulate facial femininity using computer graphic techniques (Perrett, et al.,
90 1998) all indicate that feminine features increase the attractiveness of female
91 faces. However, despite overall preferences for feminine faces, men may also
92 display strategic preferences for femininity in the same way women show
93 strategic preferences for masculinity. Three sources of individual differences
94 in preferences are discussed here: condition, relationship context, and
95 partnership status.

96 Condition-dependent mate choice is seen in females of some fish
97 species (Bakker, Künzler, & Mazzi, 1999) and women (Little, Burt, Penton-
98 Voak, & Perrett, 2001; Little & Mannion, 2006; Penton-Voak et al., 2003). This
99 follows the logic that low-quality individuals of both sexes are expected to be
100 less choosy (Parker, 1983), whereby individuals who are of high quality, or
101 attractive, will be more discriminating of their potential partners than those of
102 lower quality. Consequently, condition-dependent effects are also seen in
103 male fish. For example, in three-spined sticklebacks (*Gasterosteus aculeatus*)
104 attractive (more ornamented) males show stronger preferences for large
105 females than do unattractive (drab-looking) males (Kraak & Bakker, 1998).
106 Likewise, in the two-spotted goby (*Gobiusculus flavescens*), large and small
107 males are equally eager to court females but only large males show
108 discrimination via their greater interest in more colourful females (Amundsen
109 & Forsgren, 2003). Attractive men may then be more discriminating than less
110 attractive men and display greater preferences for femininity. Indeed,
111 attractive men prefer more feminine female faces than their less attractive

112 counterparts, but only in short-term relationship contexts (Burriss, Welling, &
113 Puts, 2011).

114 Relationship context can impact on preferences. Humans differ in their
115 inclination to engage in short-term and long-term partnerships, often
116 measured as willingness to have sex outside of loving relationships and with
117 multiple people (Simpson & Gangestad, 1991), and there are different benefits
118 to males and females in engaging in either type of mating (Buss & Schmitt,
119 1993). While men may report being more interested in short-term mating
120 (Buss & Schmitt, 1993), there are benefits to women in engaging in short-term
121 pairings, such as acquiring good-genes from men who are unwilling to engage
122 in long-term relationships, and also benefits to men engaging in long-term
123 relationships, such as paternal investment leading to more successful
124 offspring (Buss & Schmitt, 1993). For short-term relationships women pay
125 more attention to men's physical attractiveness than to men's parenting skills
126 and cooperative nature whereas the opposite is true in long-term contexts
127 (Scheib, 2001). In face preferences, women judging for short-term
128 relationships prefer more masculinity in faces than those judging for long-term
129 relationships (Little, et al., 2002). It is possible this reflects choosing a long-
130 term partner whose less masculine appearance suggests cooperation and
131 extended paternal care and/or choosing short-term partners whose higher
132 facial masculinity may indicate better genetic quality (Little, et al., 2001; Little,
133 et al., 2002; Penton-Voak, et al., 1999). In other words, women can extract
134 potential genetic benefits from attractive men by copulating and conceiving
135 within a short-term relationship but such men may not make ideal long-term

136 partners because they are in demand and so may provide limited long-term
137 investment (Gangestad & Simpson, 2000).

138 While men appear less constrained by investment issues, men can still
139 be deserted by their partners or face possible cuckoldry and thus also face a
140 trade-off in long-term and short-term mating. Because humans have bi-
141 parental care and men often invest heavily in their children, for long-term
142 relationships we might expect men to value cues to mothering ability and a
143 cooperative personality. Not all men, however, will be able to attract and keep
144 a partner who has physical traits associated with health and who will be
145 cooperative. Attractive, feminine women, for example, may be more likely to
146 leave a relationship being confident of finding another partner and/or be more
147 likely to cheat on their partner if their partner is not of greater attractiveness
148 than themselves (Buss & Haselton, 2005; Haselton & Gangestad, 2006). Men
149 may then actually prefer less attractive/feminine women in their long-term
150 choices. As there are few costs, males may be more focussed on cues to
151 attractiveness and femininity in short-term contexts as the effects of any
152 potentially negative behavioural traits associated with physical attractiveness
153 are less relevant (Buss & Schmitt, 1993). Additionally, men may be attracted
154 to different traits for short-term relationships than those they would find
155 unattractive for long-term relationships, such as cues to interest in short-term
156 mating.

157 Having a partner has also been shown to affect women's face
158 preferences. An increased preference for traits other than parental investment
159 may be expected when a woman has already acquired a long-term partner.
160 When a woman has already secured investment within a long-term

161 partnership she may be able to pursue extra-pair relationships with more
162 attractive men from whom little or no investment is available. Because
163 physically attractive men are attractive for short-term relationships they are
164 expected to be less inclined to long-term investment (Gangestad & Simpson,
165 2000), and so physical attractiveness may be valued higher if long-term
166 investment is available from another man. Alternatively, a woman with a
167 partner may be choosier in her preferences as she looks to acquire a new
168 partner more attractive than her current partner. Such changes in preferences
169 may then reflect differences in preferences either for extra-pair copulations or
170 potential mate replacement. Little et al. (2002) have shown that women who
171 have partners prefer relatively more masculine male faces than those without
172 a partner. Further studies have shown that women without partners
173 demonstrate stronger preferences for direct gaze (indicating social interest)
174 from feminine male faces than from masculine male faces when judging
175 men's attractiveness for long-term, but not short-term relationships (Conway,
176 Jones, DeBruine, & Little, 2010) and that women's stronger preferences for
177 femininity in men's faces when assessing men as long-term partners is most
178 pronounced among women who see feminine men as trustworthy (Smith et
179 al., 2009).

180 In terms of male preferences, many of the issues influencing female
181 mating strategies may also apply. Like women, in long-term contexts, factors
182 such as cooperation are likely to be important to men whereas such factors
183 will be of decreased importance in short-term preferences. On the other hand,
184 without the need to maintain a relationship, physical attractiveness is likely to
185 be of increased importance for short-term preferences. In men, we would then

186 expect that long-term preferences may reflect a trade-off between certain
187 personality traits and physical attractiveness. In women, this trade-off may be
188 between a man's attractiveness and his willingness to invest or likelihood to
189 desert. In men, investment may be less of an issue but desertion is still a risk
190 of choosing an attractive partner. Further, men also face an additional risk:
191 cuckoldry. Because only women can be 100% certain that their children are
192 their own, if his partner cheats on him, a man risks raising a child which is not
193 his own. There is evidence that women may be more likely to cheat on less
194 attractive partners. Women with more asymmetric partners are more likely to
195 express interest in other men when during the fertile phase of the menstrual
196 cycle, suggesting that women may seek out alternative partners to father their
197 children if their current partner is less attractive (Gangestad, Thornhill, &
198 Garver, 2005). Because feminine women are more likely to pursue short-term
199 relationships (Boothroyd, Jones, Burt, DeBruine, & Perrett, 2008), men may
200 then not always be best served in preferring the most feminine woman and
201 instead choose more masculine women for long-term relationships. These
202 arguments also apply to male attractiveness influencing preferences, leading
203 to the prediction that less attractive men may prefer more masculine women
204 for long-term relationships to enhance the chances that they select someone
205 who will remain faithful. Effects of male attractiveness are also likely for short-
206 term ratings as attractive, feminine women, who may be more likely to pursue
207 short-term relationships (Boothroyd, et al., 2008), are likely to do so only with
208 attractive men (Little, et al., 2001). Indeed, attractive men report more short-
209 term partners than less attractive men (Rhodes, Simmons, & Peters, 2005).
210 Again, following similar logic applied to female preferences, those males who

211 have a current partner may also have more unconstrained preferences than
212 their unpartnered counterparts. When, a man has a current partner, he does
213 not have to consider issues of cuckoldry or cooperative behaviour in
214 preferences for other women if he pursues only a short-term relationship. Men
215 with partners may then focus more on physical traits associated with
216 attractiveness.

217 As noted earlier, there is evidence that men show potentially strategic
218 preferences. For example, men who score highly on sensation seeking, a trait
219 on which men generally score higher than women (Zuckerman, 1984), prefer
220 more feminine faced women (Jones et al., 2007), and men also prefer more
221 feminine female faces when their testosterone levels are high (Welling et al.,
222 2008). Men also appear to moderate their preferences according to context.
223 Context has been shown to moderate the effects of some variables. For
224 example, self-rated and other-rated attractiveness in men is positively
225 correlated with their preferences for feminine faced women for short-term, but
226 not long-term, relationships (Burriss, et al., 2011), an effect similar to that
227 seen in women. For more direct effects of context, preferences for more
228 feminine stimuli have been found to be greater for short-term than for long-
229 term judgements for both face (Little, Connely, Feinberg, Jones, & Roberts,
230 2011), and voice stimuli (Little, et al., 2011; Puts, Barndt, Welling, Dawood, &
231 Burriss, 2011), although one study using face stimuli did not show differences
232 in men's preferences across contexts (Burriss, et al., 2011). In the case for
233 female bodies, however, Little et al. (2011) found that men preferred more
234 masculine body shapes for short-term versus long-term relationships.
235 Whether men prefer femininity differently across context is therefore not clear

260 Seventy-five male participants (aged 17-38, mean age = 21.4, SD = 3.1) took
261 part in the study. Participants were volunteers and were selected for reporting
262 to be heterosexual (homosexual and bisexual participants were recruited but
263 their data are not analysed here). Out of the 75 participants, 40 reported
264 having a current partner and 35 reported no current partner.

265 **STIMULI**

266 Test stimuli were manufactured from sets of 90 male and 145 female
267 Caucasian (aged 18-25 years) photographs taken under standardised lighting
268 conditions and with a neutral expression. An additional set of 28 male and 28
269 female Japanese (aged 20-23 years) photographs also taken under
270 standardised lighting conditions and with a neutral expression were used.

271 For every image 174 feature points were delineated on each face
272 image. Individual images were divided into four Caucasian and one Japanese
273 group for each sex and combined to make a composite image for each (to
274 make 5 male and 5 male composite images). Composite images were
275 created by warping, and then superimposing all of the images in each group
276 into the relevant average face shape (Benson & Perrett, 1993). All images
277 were made perfectly symmetrical by combining them with their mirror image
278 prior to femininity-masculinity manipulation.

279 Each composite face was transformed along a feminine-masculine
280 dimension by using the linear difference between feature points of a
281 composite male and composite female face (Benson & Perrett, 1991; Perrett,
282 et al., 1998; Tiddeman, Burt, & Perrett, 2001). The Caucasian composites
283 were transformed using the difference between Caucasian composites (e.g.,

284 male composite 1 was transformed using the difference between male
285 composite 1 and female composite 1) and the Japanese composites were
286 transformed using the difference between the Japanese male and Japanese
287 female composite. For each composite image a sequence of 11 face shapes
288 ranging from +50% masculinized to +50% feminised was constructed (the
289 mid-point, 0% transform, represented the original image).

290 Final stimuli were ten sequences of faces (5 male and 5 female) to be
291 used to assess preferences for femininity in faces. These image sequences
292 have been used in previous studies (Penton-Voak, et al., 1999; Perrett, et al.,
293 1998). Figure 1 shows an example of a masculinised and feminised female
294 and male face (see Penton-Voak et al., 1999; Perrett et al., 1998 for further
295 example images).

296 **Figure 1 around here**

297 **PROCEDURE**

298 The study was administered in the laboratory. Participants completed a short
299 questionnaire addressing age, partnership status (yes/no), and sexuality
300 (heterosexual/bisexual/homosexual). Self-reported attractiveness was
301 measured by giving participants a seven-point scale to rate themselves upon
302 (1 = low, 4 = average, 7 = high). Participants were then presented with 5
303 interactive face sequence trials. The interactive face sequence trials were
304 presented in random order with subjects being cued to make judgements
305 based on either short or long term relationships by the message "alter the face
306 until you think it is closest to the appearance you would find attractive for a
307 short [or long] term relationship." Definitions of short-term and long-term

308 relationships were provided prior to rating for each condition following
309 previous studies (see e.g., Little, et al., 2011 for full definitions).

310 During each trial left or right (counterbalanced between trials) mouse-
311 movement instantly altered the shape of the face in the on screen image
312 making it more or less masculine. The starting frame was randomly selected.
313 Participants rated both for long- and short-term relationships and order of
314 rating by term was randomised. Participants also judged same-sex male faces
315 and did so after female face trials. The task was the same except that
316 participants were asked to “alter the face until you think it is most attractive to
317 someone of the opposite-sex”. Clicking the mouse button selected an image
318 and a score corresponding to the image, between 0 and 10, was recorded.

319 RESULTS

320 We calculated % preference for femininity separately for short- and long-term
321 judgements by averaging the recorded scores (converting to the
322 corresponding %, i.e., 0=-50%) from each of the faces to give a score in
323 percent that could range from -50% (preference for masculinity) to +50%
324 (preference for femininity). Preferences were normally distributed using one-
325 sample Kolmogorov-Smirnov tests (all $z < .85$, $p < .47$). A one-sample t-test
326 against no preference (0%) revealed preferences for femininity for both short-
327 term (mean =19.77, SD = 14.78, $t_{74} = 11.58$, $p < .001$) and long-term (mean =
328 15.12, SD = 21.05, $t_{74} = 6.22$, $p < .001$) relationships. The same test showed
329 significant preferences for masculinity in male faces (mean = -7.50, SD =
330 19.11, $t_{74} = 3.40$, $p = .001$). There was a significant positive correlation
331 between preferences for femininity in short- and long-term contexts ($r = .520$,
332 $p < .001$) while preferences in both short-term ($r = -.163$, $p = .161$) and long-

333 term ($r = -.181, p = .120$) contexts were negatively, but not significantly,
334 related to preferences for femininity in male faces. Age was not significantly
335 correlated with either short-term ($r = .012, p = .917$), long-term ($r = -.119, p =$
336 $.308$) or same-sex ($r = -.080, p = .494$) preferences. Using independent
337 samples t-tests, self-rated attractiveness (partnered mean = 4.63, SD = 0.77,
338 unpartnered mean = 4.38, SD = 1.25, $t_{73} = 1.04, p = .303$) and age (partnered
339 mean = 22.09, SD = 3.72, unpartnered mean = 20.73, SD = 2.20, $t_{73} = 1.96, p$
340 $= .054$) were not found to significantly differ between partnered and
341 unpartnered men, although the effect for age was close to significance. To
342 examine the influence of included Japanese face trials, we recalculated mean
343 preferences leaving these trials out. White-only preferences were highly
344 correlated with the original scores (long-term $r = .95$, short-term $r = .87$, same-
345 sex $r = .95$), suggesting ethnicity of face had little influence on average
346 preferences.

347 **STRATEGIC PREFERENCES**

348 A 2x2 mixed model ANOVA with femininity preference as the dependent
349 variable, *term* (short-term/long-term) as a within-participant factor, *relationship*
350 *status* (partner/no partner) as a between-participant factor, and *self-rated*
351 *attractiveness* entered as a covariate revealed a significant main effect of *term*
352 ($F_{1,72} = 4.93, p = .030$), a significant interaction between *term* and *self-rated*
353 *attractiveness* ($F_{1,72} = 7.94, p = .006$), and a significant main effect of
354 *relationship status* ($F_{1,72} = 5.83, p = .018$). There was no significant interaction
355 between *term* and *relationship status* ($F_{1,72} = 0.12, p = .735$) or main effect of
356 *self-rated attractiveness* ($F_{1,72} = 0.35, p = .557$). The significant main effects

357 indicated that men preferred femininity more for short-term relationships and
358 when they had a partner. These effects are presented in Figure 2.

359 To examine the significant interaction between *self-rated*
360 *attractiveness* and *term* we ran Pearson product moment correlations. These
361 revealed a significant positive correlation between self-rated attractiveness
362 and preference for femininity in female faces for short-term relationships ($r =$
363 $.306, p = .008$). Self-rated attractiveness was not significantly correlated with
364 long-term preferences ($r = .066, p = .576$). The interaction then indicates that
365 self-rated attractiveness mainly influenced short-term and not long-term
366 femininity preferences.

367 **Figure 2 around here**

368 **SAME-SEX FACES**

369 A univariate ANOVA with same-sex femininity preference as the dependent
370 variable, *relationship status* (partner/no partner) as a between-participant
371 factor, and *self-rated attractiveness* entered as a covariate revealed no
372 significant effect of *relationship status* ($F_{1,72} = 0.79, p = .376$) and no
373 significant effect of *self-rated attractiveness* ($F_{1,72} = 2.63, p = .109$).

374 Pearson product moment correlations confirmed that self-rated
375 attractiveness was not related to preferences for femininity in same-sex faces
376 ($r = .176, p = .131$).

377 **Sequential Bonferroni correction for correlations**

378 Alpha values were compared with sequential Bonferroni corrected levels of
379 significance (Rice, 1989). This is done by ordering significant p-values by
380 decreasing levels of significance and comparing with a Bonferroni corrected p-
381 value based on the number of tests conducted (i.e., p_1 compared to 0.05, p_2

382 compared to 0.05/2, p_3 compared to 0.05/3). All significant correlations
383 remained significant using this correction.

384 **STUDY 2**

385 Study 1 demonstrated relationship term, partnership status, and male
386 attractiveness were related to preferences for female facial femininity in a
387 student sample of young adults. In Study 2, we examined the same variables
388 and their relationship with men's preferences for female faces in a larger and
389 more representative online sample of men to address the issue of whether
390 these effects are applicable at a wider range of ages and backgrounds as well
391 as probing more detailed questions regarding partnership status in a sub-
392 sample of men. The method of assessing preference was also changed in
393 Study 2 from the interactive test used in Study 1 to a two alternative forced
394 choice (2AFC) test in Study 2. We note that online preference tests have been
395 found to produce similar patterns of results to laboratory based tests (Jones et
396 al., 2005; Little, Jones, & Burriss, 2007).

397 **PARTICIPANTS**

398 Three hundred and ninety three male participants (aged 17-45, mean age =
399 27.6, SD = 6.5) took part in the study. The study was administered over the
400 internet and participants were volunteers visiting a research website and were
401 selected for reporting to be heterosexual (homosexual and bisexual
402 participants were recruited but not analysed here) and for being between 17
403 and 45 years old. Out of the 393 participants, 207 reported having a current
404 partner and 186 reported no current partner. Of those reporting having a
405 partner, 100 men filled in additional questions concerning their relationship
406 and partner. Relationship data were available only for a sub-sample of men

407 because a revised version of test, with an expanded questionnaire including
408 these questions, replaced the original version part way through testing.

409 **STIMULI**

410 Images were manufactured from 50 young adult male and 50 female
411 photographs taken under standardised lighting conditions and with a neutral
412 expression (all were Caucasian and aged 18-25 years). Composite images
413 were used as “base” faces to which transforms were applied (10 male and 10
414 female composite images each made of 5 individual images). The composite
415 images were made by creating an average image made up of 5 randomly
416 assigned individual facial photographs using techniques outlined for Study 1.
417 Faces were transformed in masculinity +/-50% in the same way as described
418 for Study 1. Final images were 10 feminine/masculine female pairs.
419 Transforms were equivalent to those depicted in Figure 1.

420 **PROCEDURE**

421 A short questionnaire was presented which was the same as in Study 1.
422 Participants were then shown 10 pairs of masculine and feminine female
423 faces. Participants were asked to choose the face from the pair that they
424 found most attractive for either a short-term or long-term relationship using a
425 set of eight buttons indicating a preference and confidence in their choice
426 (only the binary choice was analysed below). Clicking a button moved
427 participants on to the next face trial. Image order and side of presentation was
428 randomised. Participants chose between the pairs of faces twice, once for
429 long-term and once for short-term relationships. Order of rating of term was
430 randomised. Definitions of short-term and long-term relationships were

431 provided prior to rating for each condition as in Study 1. A sub-sample of men
432 also completed questions concerning their relationship and their partner:
433 relationship length (in months), how happy they were in their current
434 relationship (1=not happy, 7= very happy), how serious they considered their
435 current relationship (1=not serious, 7=very serious), and how attractive they
436 thought their partner was (1 = low, 7 = high).

437 **RESULTS**

438 We calculated % preference for femininity separately for short- and long-term
439 judgements by taking the mean number of choices of the feminine image of
440 each of ten pairs and converting the score into a percentage ranging from 0%
441 (preference for masculinity) to 100% (preference for femininity). A one-sample
442 t-test against zero preference (50%) revealed preferences for femininity for
443 both short-term (mean = 68.47, SD =24.71, $t_{392} = 14.82$, $p < .001$) and long-
444 term (mean = 69.26, SD =24.47, $t_{392} = 15.61$, $p < .001$) relationships. There
445 was a positive correlation between preferences for femininity in short-term and
446 long-term contexts ($r = .553$, $p < .001$). Age was not significantly correlated
447 with either short-term ($r = .008$, $p = .870$) or long-term ($r = -.045$, $p = .379$)
448 preferences. Using independent samples t-tests, self-rated attractiveness
449 (partnered mean = 4.99, SD = 1.05, unpartnered mean = 4.71, SD = 1.13, t_{391}
450 = 2.56, $p = .011$) and age (partnered mean = 28.16, SD = 6.96, unpartnered
451 mean = 26.81, SD = 5.92, $t_{391} = 2.22$, $p = .017$) were found to differ between
452 partnered and unpartnered men, although the lack of correlation between age
453 and preference justifies not entering age as a covariate. Indeed, entering age
454 as an additional covariate in the ANOVA below does not change the pattern or
455 significance of the effects reported.

456 **STRATEGIC PREFERENCES**

457 A 2x2 mixed model ANOVA with femininity preference as the dependent
458 variable, *term* (short-term/long-term) as a within-participant factor, *relationship*
459 *status* (partner/no partner) as a between-participant factor, and *self-rated*
460 *attractiveness* entered as a covariate revealed a significant main effect of *term*
461 ($F_{1,390} = 4.72, p = .030$), a significant main effect of *self-rated attractiveness*
462 ($F_{1,390} = 6.03, p = .015$), a significant interaction between *term* and *self-rated*
463 *attractiveness* ($F_{1,390} = 4.17, p = .042$), and a significant interaction between
464 *term* and *relationship status* ($F_{1,390} = 5.61, p = .018$). There was no main effect
465 of *relationship status* ($F_{1,390} = 0.53, p = .466$). Mean scores from this analysis
466 can be seen in Figure 3.

467 **Figure 3 about here.**

468 To examine the significant interaction between *self-rated*
469 *attractiveness* and *term* we ran Pearson product moment correlations. These
470 revealed a significant positive correlation between self-rated attractiveness
471 and preference for femininity in female faces for short-term relationships ($r =$
472 $.169, p = .001$). Self-rated attractiveness was not significantly correlated with
473 long-term preferences ($r = .058, p = .251$). The interaction then indicates that
474 self-rated attractiveness mainly influenced short-term and not long-term
475 femininity preferences.

476 To examine the significant interaction between *term* and *relationship*
477 *status*, independent samples t-tests were conducted comparing preferences
478 of those with and without partners. This revealed no significant differences for
479 long-term preferences ($t_{391} = 0.32, p = .750$) but that those with partners had
480 significantly stronger preferences for femininity than those without partners for

481 short-term relationships ($t_{391} = 2.16, p = .031$). Splitting by partnership status,
482 paired samples t-test revealed that those with a partner did not significantly
483 differ in their preference for feminine faces for short-term versus long-term
484 relationships ($t_{206} = 1.30, p = .197$) and that those without partners preferred
485 more feminine faces for long-term versus short-term relationships ($t_{185} = 2.45,$
486 $p = .015$).

487 **Preferences and ratings of relationship partner attractiveness**

488 For a sub-sample of men with partners we had additional questions
489 concerning their opinions about their relationship and partner's. Partnership
490 length ranged from 1 to 280 months ($M = 58, SD = 69$). We additionally
491 computed a difference in attractiveness score by subtracting partner
492 attractiveness from the man's self-rated attractiveness score. Positive scores
493 then indicate a man thought he was more attractive than his partner while
494 negative scores indicated he thought he was less attractive. We used this
495 score instead of rated partner attractiveness to assess relative attractiveness.

496 We conducted partial correlations controlling for age because age was
497 related to relationship length ($r = .724, p < .001$), although we note that all
498 significant correlations remain so when not controlling for age. For short-term
499 preferences, relationship seriousness was negatively related to ($r = -.227, p =$
500 $.024$) and attractiveness difference was positively related (i.e. the more a man
501 thought he was more attractive than his partner) to ($r = .242, p = .016$)
502 preferences for femininity. Other correlations were not significant (relationship
503 length, relationship happiness, all $r .06$ to $.09, p > .360$). For long-term
504 preferences, no variable was significantly correlated with femininity preference
505 (all $r -.04$ to $.12, p > .220$).

506 **Sequential Bonferroni correction for correlations**

507 Alpha values were compared with sequential Bonferroni corrected levels of
508 significance as in Study 1. All significant correlations remained significant
509 using this correction.

510 **STUDY 3**

511 Study 1 and Study 2 demonstrate that men who think they are attractive prefer
512 more feminine female faces. Men's preferences for facial femininity also
513 change according to partnership and relationship term. These effects suggest
514 a cost to preferences for facial femininity. In Study 3 we examined one
515 potential cost to preferences for femininity in long term relationships: a lack of
516 faithfulness. Specifically, men preferring and forming relationships with more
517 feminine women may incur a cost in terms of a lower likelihood of faithfulness
518 from feminine women because feminine faced women report greater interest
519 in short-term mating than masculine faced women (Boothroyd, et al., 2008).
520 To address relationships between short-term and long-term attractiveness,
521 femininity, and faithfulness we collected ratings of each of these variables
522 using unmanipulated female faces.

523 **PARTICIPANTS**

524 Images: For photography 73 women (aged 18-26 years, mean = 21.6, S.D. =
525 1.4) came to the laboratory and were paid £5 for participation. Raters:
526 Participants were 15 men (aged 19-30 years, mean = 22.3, S.D. = 3.2) who
527 were all students participating for course credit. All participants reported to be
528 heterosexual (homosexual and bisexual participants were not excluded in
529 recruitment but their data would not have been analysed here).

530 **STIMULI**

531 For the photographs, female participants were photographed with a neutral
532 expression and under standardized lighting conditions. Images were aligned
533 on interpupillary distance to help standardize head size and images were
534 presented masked based on the outline of the face so that ears, hair, and
535 clothing were not visible in the picture. Images were taken two years prior to
536 ratings leading to a lower likelihood that stimuli images were familiar to raters.

537 **PROCEDURE**

538 Testing took place under laboratory conditions. Participants were presented
539 with a short questionnaire addressing their age. Female faces were presented
540 to participants individually and in a random order. Order of rating was blocked
541 by question, with each image appearing alongside one question within a
542 block, and block order was also randomized. Images remained on screen until
543 the face was rated, which moved the participant on to the next trial.

544 Participants rated each face on a 7-point Likert scale, 1=low, 7=high, for the
545 following traits: “How ATTRACTIVE is this face for a LONG-TERM
546 relationship?”, “How ATTRACTIVE is this face for a SHORT-TERM
547 relationship?”, “How MASCULINE is this face?”, “How FAITHFUL would this
548 person be in a relationship with you?”, and “How interested in a SHORT-
549 TERM relationship would this person be?”. Masculine ratings were reverse
550 scored to give a rating of femininity.

551 **RESULTS**

552 Long-term and short-term attractiveness ratings were highly correlated ($r =$
553 $.833, p < .001$). To address relative attractiveness for the two terms we
554 subtracted short-term ratings from long-term ratings. This created a difference

555 score for which high scores indicated the face was found more attractive for
556 long-term than short-term relationships while low scores indicated the face
557 found more attractive for short-term than long-term relationships. We term this
558 variable “relative long-term attractiveness”.

559 To address relationships with perceived femininity we ran Pearson
560 product moment correlations. These revealed significant correlations between
561 femininity and perceived faithfulness ($r = -.339, p = .003$), perceived short-
562 term inclination ($r = .338, p = .003$), and relative long-term attractiveness ($r = -$
563 $.281, p = .016$). More feminine female faces were seen as less likely to be
564 faithful, more likely to engage in short-term relationships, and were less
565 attractive for long-term relationships/more attractive for short-term
566 relationships.

567 Perceived faithfulness ($r = .370, p = .001$) and short-term inclination (r
568 $= -.332, p = .004$) were also significantly related to relative long-term
569 attractiveness, with faces that were more attractive for long-term relationships
570 being seen as more faithful and less likely to pursue short-term relationships
571 and faces more attractive for short-term relationships being seen as less
572 faithful and more likely to pursue short-term relationships. To address the
573 impact of perceived faithfulness and short-term inclination on the relationship
574 between femininity and relative long-term attractiveness we ran a partial
575 correlation controlling for perceived faithfulness and short-term inclination.
576 When controlling for these variables, a non-significant relationship between
577 femininity and relative long-term attractiveness was found ($r = -.160, p = .182$).

578 **Sequential Bonferroni correction for correlations**

579 Alpha values were compared with sequential Bonferroni corrected levels of
580 significance as in Study 1. All significant correlations remained significant
581 using this correction.

582 **GENERAL DISCUSSION**

583 The current series of studies demonstrated individual differences in men's
584 preference for female facial masculinity. Mirroring an effect seen in women's
585 preferences, men who thought themselves attractive preferred more femininity
586 in female faces when rating for short-term relationships than those who
587 thought themselves less attractive (Study 1 and Study 2). There was also an
588 effect of term and relationship status whereby men rating for short-term or
589 who had partners preferred more feminine female faces (Study 1). These
590 effects were seen somewhat differently in Study 2 in which we found an
591 interaction between term and relationship status, with men who had partners
592 generally preferring more feminine faces for short-term relationships than men
593 without partners. Relationship status and self-rated attractiveness were not
594 related to same-sex femininity preferences (Study 1) suggesting effects are
595 not to do with general preferences for masculinity and are relevant only for
596 mate-choice relevant attractiveness judgements. These effects were seen in
597 both laboratory tests (Study 1) and internet based tests (Study 2). We also
598 found perceptual relationships among perceived femininity, relative long-term
599 attractiveness, faithfulness, and inclination to short-term mating. Feminine
600 faced women were preferred for short-term relationships relative to long-term
601 relationships and were also seen as less likely to be faithful and more inclined
602 to pursue short-term relationships (Study 3).

603 Study 1 and Study 2 differed in sample (university student vs. internet
604 sample), place of testing (lab vs. web,) and method of preference
605 measurement (interactive sequence vs. forced choice). Despite such
606 differences, the results of each study are comparable. In both studies there
607 was an interaction between term and self-rated attractiveness in which self-
608 rated attractive was positively correlated with long-term but not short-term
609 femininity preferences. Both studies also suggested femininity preferences
610 were greater when rating for short-term relationships and when a man already
611 had a partner, although in Study 2 greater femininity preferences were only
612 seen in men with a partner. Similar findings across samples of students and a
613 broader sample recruited online and across web-based and laboratory-based
614 tests are unsurprising. While the percentage preferences are calculated very
615 differently across Study 1 and 2 (taking the mean % chosen from a sequence
616 ranging from -50 to +50% or calculating the % chosen from pairs transformed
617 either -50 or +50%), both measures should reflect relative preferences for
618 femininity: men who prefer more feminine faces would be expected to both
619 select more feminine images from the sequence (Study 1) and select more
620 feminine vs. masculine images in force-choice tests (Study 2). We do note,
621 however, there is no reason the mean preference for femininity would be the
622 same in the two different measures. This difference is one potential
623 explanation for why stronger preferences for femininity were seen in Study 1.

624 Little et al. (2001) found that women who thought they were physically
625 attractive preferred more masculine faces for long-term relationships than
626 those women who thought they were less attractive. The lower level of
627 preference for proposed markers of good genes was interpreted as potentially

628 adaptive for women of low mate-value in order to avoid the costs of decreased
629 parental investment/potential desertion from the owners of masculine features
630 (Little, et al., 2001). Our findings in Study 1 and 2 here suggest that an
631 equivalent mechanism may be operating in male preferences (see also
632 Burriss, et al., 2011). In men, as in women, differences in mate preferences
633 based on self-perceived attractiveness may reflect different mate-choice
634 strategies between individuals. In men, self-rated attractiveness influenced
635 preferences for short- rather than long-term partners whereas the effect of
636 self-rated attractiveness on masculinity preferences is mainly seen for long-
637 term preferences in women (Little, et al., 2001; Penton-Voak, et al., 2003). In
638 women, the specificity of effects of self-rated attractiveness to long-term face
639 preferences is in line with the notion that women face a trade-off between
640 investment and quality, which is not applicable to short-term preferences. In
641 men, specificity of effects of self-rated attractiveness to short-term face
642 preferences is more suggestive that attractiveness effects are driven by
643 factors potentially related to likely reciprocation of interest by women in short-
644 term encounters.

645 Such condition dependent preferences suggest a cost to less attractive
646 men choosing very feminine partners even in short-term relationships. The
647 results of Study 3 are indicative of a trade-off between feminine traits and
648 perceived faithfulness. More feminine women were seen as less likely to be
649 faithful and so faithfulness potentially limits men's attraction to femininity for
650 long-term relationships. Conversely, femininity may be a more desirable trait
651 in short-term partners because perceptions of low faithfulness or promiscuity
652 may indicate a greater chance that interest will be reciprocated. One study

653 has shown that a woman's rated facial femininity is positively related to their
654 ideal number of children (Law-Smith et al., 2012). While Law-Smith et al.'s
655 (2012) findings are suggestive that men should prefer feminine women for
656 both long-term and short-term relationships, as men choosing to mate with
657 such women may then produce a greater number of offspring, the perceived
658 potential cuckoldry of feminine women, as shown in Study 3, could still
659 outweigh any benefits of preferring women with an increased interest in
660 children for men's long-term preferences. Men's perceptions of faithfulness
661 may be enough to drive preferences and some studies suggest attractiveness
662 is actually linked to the pursuit of short-term relationships in women
663 (Boothroyd, et al., 2008). If men use short-term mating as a means to assess
664 potential long-term partners, factors such as faithfulness may still impact on
665 such preferences. Given we found that effects of self-perceived attractiveness
666 were relatively specific to short-term relationships, an alternative explanation
667 is that a man's attractiveness more simply limits the likelihood of reciprocal
668 sexual interest. In other words, attractive men are more able to attract
669 feminine women whereas less attractive men demonstrate preferences for
670 less feminine women which will more likely lead to mating. Men of high
671 attractiveness may then maximise their reproductive success by maximising
672 phenotypic quality (indicating fertility, fecundity or some aspect of genetic
673 quality) in short-term partners and men of low attractiveness may maximise
674 their reproductive success by pursuing females most likely to reciprocate
675 interest in short-term relationships.

676 In Study 1, we found main effects of both term and relationship status
677 but in Study 2 we found these variables interacted. The reason for this

678 difference between the two studies is unclear, and perhaps reflects
679 differences in the sensitivity of the measures of preference or the mean age of
680 the participants (who were older in Study 2). For example, in terms of sample
681 age, partnerships may be less serious to a younger versus older group
682 leading to differences in how having a partner may impact on short-term
683 preferences. Despite the difference, the effects are generally consistent,
684 suggesting greater attraction to femininity for short-term preferences and
685 when a man has a partner, although in Study 2 men without partners
686 expressed preferences for feminine female faces for long-term over short-term
687 relationships. This interaction in Study 2 might help explain mixed findings for
688 preferences for more feminine stimuli being greater for short-term than for
689 long-term judgements in men (Burriss, et al., 2011; Little, et al., 2011; Puts, et
690 al., 2011), as the partnership status of the men being studied might be an
691 important variable (the participants in Burriss et al.'s study all had partners).
692 Again, similar phenomena are seen among women, whereby those who have
693 a partner or are rating a short-term partner prefer more masculine male faces
694 (Little, et al., 2002). For women's preferences, the logic put forward to explain
695 such effects is that the possession of a partner or judging in the context of a
696 short-term relationship are both circumstances in which a woman can be less
697 concerned by the potential of low investment from masculine faced men. The
698 higher preferences for femininity in female faces by men for short-term
699 judgements when they have a partner may be shaped by both similar and
700 different pressures. Changing preferences in women may in part reflect an
701 adaptation to become pregnant by men who are not their long term partners, a
702 factor not applicable to men. Men who cheat on their partner, however, risk

703 losing this partner if the infidelity is discovered. Potentially then, partnered
704 men may be generally more choosy in terms of preferences for femininity than
705 single males to somewhat offset the costs associated with this risk. In other
706 words, because of an associated cost, the payoff must be larger for men to
707 consider cheating on or leaving their current partner. From the unpartnered
708 man's perspective, there is potentially greater pay-off in pursuing short-term
709 relationships and so unpartnered men may be most likely to compromise their
710 short-term partner preferences and relax their standards to favour more
711 masculine women. In terms of generally greater preferences for masculinity in
712 long-term partners, preferences for femininity may be relaxed because
713 femininity is ranked as less important relative to other factors (such as
714 cooperative tendencies, for example).

715 In Study 2, we additionally asked questions concerning the relationship
716 and partner attractiveness for partnered men. Our measurement of
717 relationship status in Study 1 as only a yes/no variable did not address the
718 influence of relationship length and other relationship qualities that may have
719 been important in determining how partnership affects preferences. However,
720 in Study 2, where such information was available for a sub-sample of men,
721 only limited effects of partnership length and happiness were seen.
722 Relationship length and happiness were unrelated to either long-term or short-
723 term preferences and no other variable was related to long-term preferences.
724 For short-term preferences, relationship seriousness was negatively related to
725 preferences for femininity indicating that lower levels of seriousness were
726 related to greater preferences for femininity. One explanation for this finding is
727 that some men may be prone to generally consider their relationships as less

728 serious. Such men may be inclined to take a long-term partner while
729 attempting to have extra-pair relationships with more feminine women even
730 when equivalently happy in these relationships to men who tend to consider
731 their relationships more serious. The difference in perceived attractiveness
732 between a man and his partner also predicted short-term preferences. Men
733 who thought they were more attractive than their partner preferred more
734 feminine female faces for short-term relationships. Again, this finding may
735 reflect dynamics within a relationship. A man may be happy with his partner,
736 but if he feels more attractive then he may pursue short-term relationships
737 with more feminine women.

738 In Study 3, we observed that more feminine women were seen as less
739 faithful and more likely to pursue short-term relationships. Both effects likely
740 reflect perceived opportunity, opportunities particularly important for less
741 competitive men. A male of average attractiveness may be at greater risk of
742 cuckoldry by partnering with a very feminine woman (Buss & Haselton, 2005).
743 While feminine women were also seen to be more likely to pursue short-term
744 relationships it is unlikely that they would be seen to do so with all men. As
745 noted above, some men may not direct their attention towards very feminine
746 women, even if they are seen as good short-term prospects, because of a low
747 likelihood of mating success. Indeed, attractive, feminine women may be more
748 likely to pursue short-term relationships (Boothroyd, et al., 2008) but they are
749 likely to do so only with attractive men. The findings of Study 3 may then also
750 offer another explanation for men's preference for femininity in the short-
751 term/when they have a partner: it may in fact be easier to secure a short-term

752 relationship with a woman with a more feminine than less feminine face, and
753 this may be most relevant to attractive men.

754 Overall, men, like women, might face a trade-off between attraction and
755 investment. Attractive men may be able to retain the interest of more feminine
756 women with lower risk of cuckoldry than less attractive men (Little, Cohen,
757 Jones, & Belsky, 2007). Attractive men may also be more competitive for
758 short-term partners allowing them to be choosier (Gangestad, et al., 2005).
759 Men may focus on attractive traits in short-term contexts when they have a
760 partner because they do not have to be concerned with behavioural traits that
761 are important in long-term relationships (Little, Cohen, et al., 2007; Puts, et al.,
762 2011) and because the potential costs of being discovered lead to an increase
763 in choosiness relative to unpartnered men who are more willing to relax
764 their standards to increase potential short-term mating.

765 In summary, here we show individual differences in men's preferences
766 for female facial femininity. Such differences appear somewhat similar to
767 effects seen when women judge the attractiveness of masculinity in male
768 faces, being influenced by self-perceived attractiveness, short- and long-term
769 contexts, and partnership status. The data here are suggestive that men may
770 also face trade-offs when choosing a masculine or feminine faced partner
771 and, while the exact pressures may be less clear than for women, the
772 variation observed here may serve an adaptive function in driving male mate
773 preferences.

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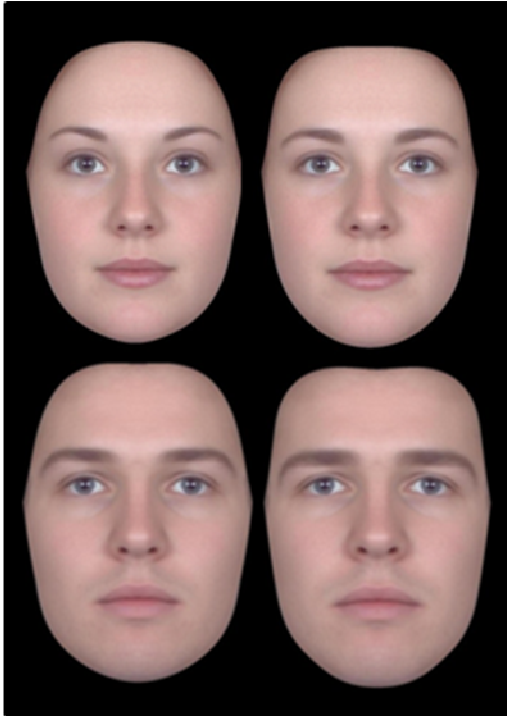
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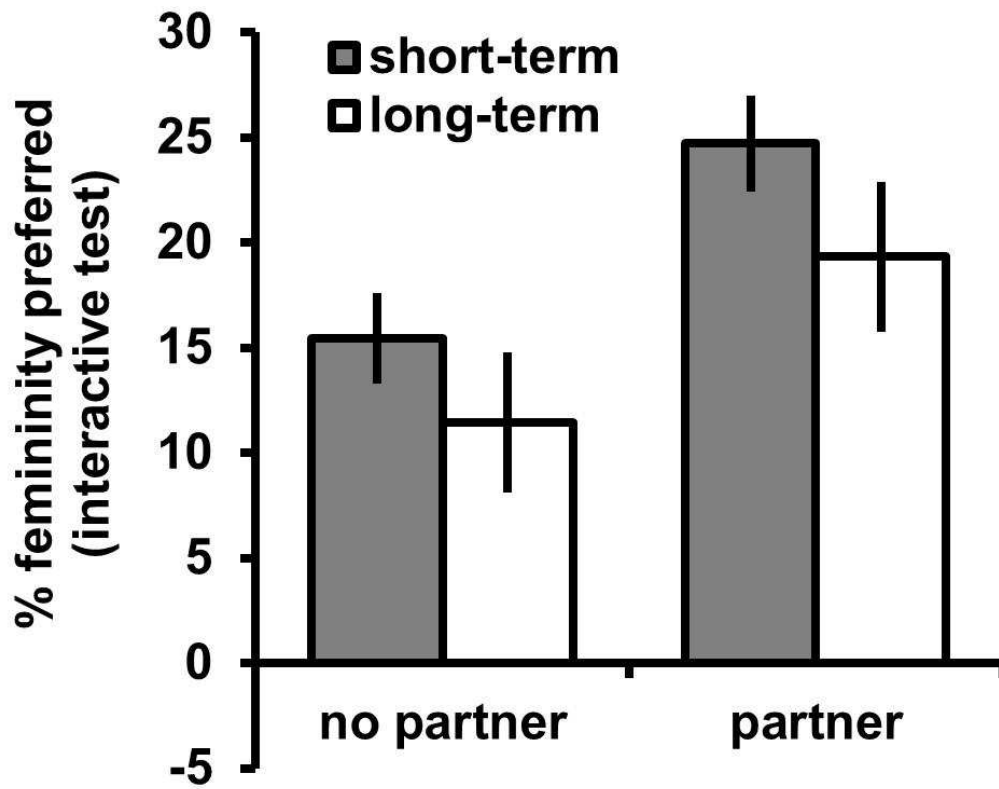
924 Figure 1: Examples of feminised (left) and masculinised (right) female and
925 male faces.

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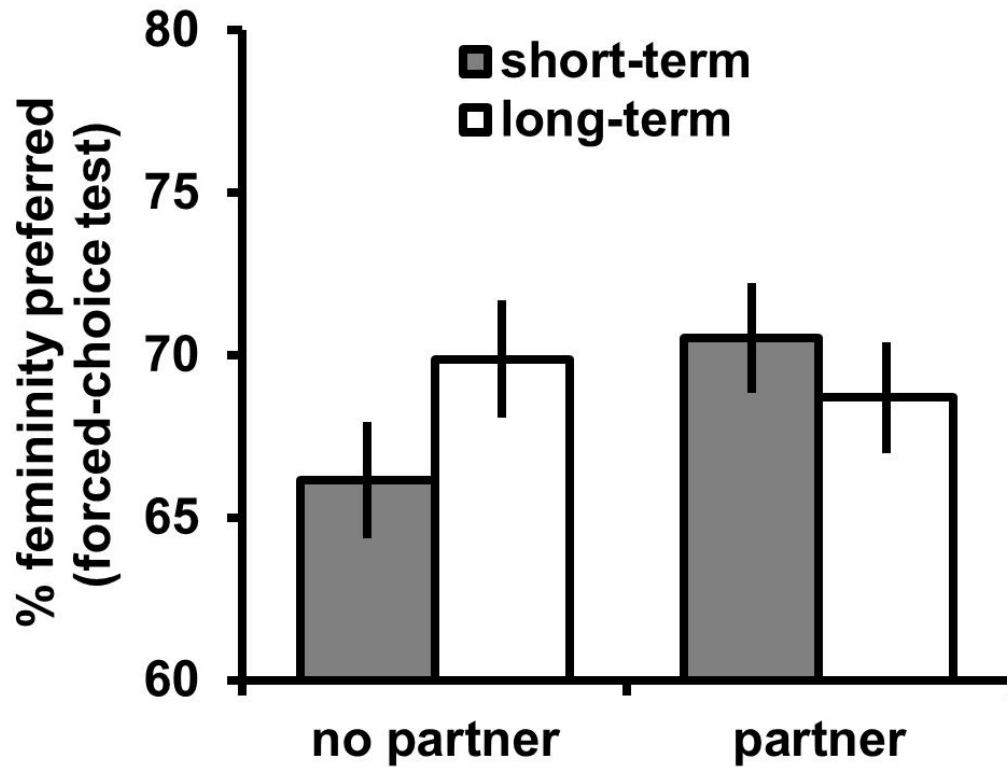
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930 Figure 2: Study 1: Preferences for femininity in female faces (mean % based
931 on choice from sequence -50% to +50%) judged by men split by partnership
932 status and long- and short-term preferences (estimated marginal means
933 controlling for self-rated attractiveness, +/- 1 SE of mean).
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937 Figure 3: Study 2: Preferences for femininity in female faces (mean % of
938 choice of feminine face in force choice trials, 0-100%, 50% = equal number of
939 masculine and feminine faces chosen) judged by men split by partnership
940 status and long- and short-term preferences (estimated marginal means
941 controlling for self-rated attractiveness, +/- 1 SE of mean).



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