

1 **Priming concerns about pathogen threat versus resource scarcity:**
2 **Dissociable effects on women's perceptions of men's attractiveness and**
3 **dominance**

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28

29 **Abstract.** Previous experimental work suggests flexibility in women's mate
30 preferences that appears to reflect the advantages of choosing healthy mates
31 under conditions of pathogen threat and of choosing prosocial mates under
32 conditions of resource scarcity. Following this work, we used an established
33 priming paradigm to examine the effects of priming women's concerns about
34 pathogen threat versus resource scarcity on their judgments of men's facial
35 attractiveness and dominance. We found that women reported stronger
36 attraction to masculine men when their concerns about pathogens were
37 activated than when their concerns about resource scarcity were activated. In
38 contrast, we found that women were more likely to ascribe high dominance to
39 masculine men when their concerns about resource scarcity were activated
40 than when their concerns about pathogens were activated. This latter result
41 may reflect the greater importance of identifying men who pose a substantial
42 threat to women's resources and personal safety when resources are scarce
43 and violence towards women is particularly common. Together, these findings
44 suggest a double dissociation between the effects of pathogen threat and
45 resource scarcity on women's perceptions of the attractiveness and
46 dominance of masculine men, potentially revealing considerably greater
47 specialization (i.e., context-specificity) in the effects of environmental threats
48 on women's perceptions of men than was apparent in previous research.

49 **Introduction**

50 In many non-human species, masculine physical characteristics in males are
51 positively correlated with a wide range of traits that are important for sexual
52 selection (see, e.g., Emlen 2008 and Santos et al. 2011 for reviews), including
53 dominance rank (e.g., Pelletier and Festa-Biancetti 2006; Marty et al. 2009),
54 fighting ability (e.g., Bergeron et al. 2010), physical strength (e.g., Malo et al.
55 2009), and reproductive fitness (e.g., Preston et al. 2003). In human males,
56 masculine physical characteristics are also correlated with a similarly wide
57 range of traits. For example, masculine physical characteristics in men are
58 positively correlated with measures of their reproductive potential (Puts 2005;
59 Rhodes et al. 2005), reproductive success in a natural fertility population
60 (Apicella et al. 2007), strength of preference for uncommitted sexual
61 relationships (Rhodes et al. 2005; Boothroyd et al. 2008, 2011), partner's
62 sexual satisfaction (Puts et al. 2012a), and the likelihood of being unfaithful to
63 a romantic partner (e.g., Hughes and Gallup 2003). Moreover, research on
64 women's perceptions of masculine men suggest that women are, to some
65 extent, aware of masculine men's unwillingness to commit to their romantic
66 partners (e.g., O'Connor et al. 2011) and tendency to infidelity (e.g., O'Connor
67 et al. 2012). Masculine physical characteristics in men are also positively
68 correlated with several indices of good health, such as those derived from
69 analyses of medical records (Rhodes et al. 2003), self-reported frequency and
70 duration of respiratory diseases (Thornhill and Gangestad 2006), and urinary
71 biomarkers of low oxidative stress (Gangestad et al. 2010). These findings
72 linking masculinity to measures of men's health are consistent with recent
73 work reporting a positive correlation between salivary testosterone and men's

74 antibody response to a hepatitis B vaccine, which is an index of their immune
75 function (Rantala et al. 2012). In addition to measures of health, masculine
76 physical characteristics in men are positively correlated with indices of their
77 dominance, such as measures of physical strength (Fink et al. 2007) and
78 aggressiveness (Puts et al. 2012b). Indeed, masculine men are generally
79 perceived to be more dominant than feminine men (see Puts 2010 for a
80 review) and masculine physical characteristics are negatively correlated with
81 men's willingness to distribute resources equally within groups (Price et al.
82 2011). Collectively, these findings suggest that masculinity may be a valid cue
83 to aspects of men's mate quality, dominance, and personality.

84

85 A large body of research has focused on the trade-offs between the potential
86 costs to women who choose masculine mates (e.g., low commitment and
87 investment) and the possible benefits of these choices (e.g., healthy
88 offspring). This research has generally proposed that factors altering how
89 women resolve this trade-off may lead to variation in women's preferences for
90 masculine men (for reviews, see Gangestad and Simpson 2000 and Little et
91 al. 2011a). For example, all other things being equal, women may prioritize
92 the health-related advantages associated with choosing a masculine mate in
93 environments that are characterized by high pathogen loads (Little et al.
94 2011b; Tybur and Gangestad 2011), but prioritize the prosocial-related
95 advantages associated with choosing a relatively feminine mate in
96 environments characterized by scarcity of resources (Little et al. 2007).
97 Consistent with this proposal, a recent priming experiment demonstrated that
98 women whose concerns about pathogens had been recently activated by

99 completing a questionnaire about their vulnerability to disease subsequently
100 demonstrated stronger preferences for masculine characteristics in potential
101 mates than did women whose concerns about resource scarcity had been
102 activated by completing a questionnaire about their financial worries (Lee and
103 Zietsch 2011). This effect is consistent with other work suggesting that
104 priming women with pictorial cues of potential sources of pathogens increases
105 their preference for masculine men (Little et al. 2011b), although Park et al.
106 (2012) recently found that priming women's concerns about pathogens did not
107 alter their judgments of either attractive or unattractive men's faces. Lee and
108 Zeitsch's (2011) finding is also consistent with work demonstrating that having
109 women imagine themselves in environments in which resources are scarce
110 tends to increase their preferences for feminine men (Little et al. 2007).
111 Correlational studies linking concerns about pathogens (Welling et al. 2007a;
112 DeBruine et al. 2010a, 2010b, 2011a; Feinberg et al. 2012; Park et al. 2012)
113 and resources (Moore et al. 2006; Moore and Cassidy 2007) to individual and
114 regional differences in women's mate preferences also appear to implicate
115 pathogen threat and resource scarcity in women's masculinity preferences.

116

117 While the findings described above suggest that women's preferences for
118 masculine men are greater when their concerns about pathogens are
119 activated than when their concerns about resource scarcity are activated, one
120 would not necessarily expect this pattern of results to extend to other
121 potentially important social judgments of masculine men. For example,
122 dominance perceptions, which are thought to function to minimize the
123 possible costs of aggressive conflict and reflect perceptions of men's resource

124 holding potential (reviewed in Puts 2010), may respond very differently to
125 these environmental factors. The costs of losing resources will be particularly
126 great under conditions of resource scarcity. Moreover, dominant men are both
127 particularly well placed to take others' resources (Sell et al. 2009a, 2009b)
128 and less likely to share resources equally with others (Stirrat and Perrett
129 2010; Price et al. 2011). Consequently, women's need to discriminate
130 between dominant, aggressive men and less dominant, more cooperative
131 men may be greatest under conditions that increase competition for
132 resources. This line of reasoning leads to the prediction that the likelihood of
133 women ascribing high dominance to masculine men (i.e., what has previously
134 been termed 'dominance sensitivity', Watkins and Jones 2012) will be greater
135 when women's concerns about resource scarcity are activated than when
136 their concerns about other types of threat, such as pathogens, are activated.
137 Indeed, some recent work suggests that men's perceptions of the dominance
138 of masculine men are modulated by competition-related factors in ways that
139 are consistent with precisely the type of compensatory response to increased
140 vulnerability and/or increased costs of loss of resources (e.g., Watkins and
141 Jones 2012). Given that violence towards women tends to be more common
142 in environments where resources are scarce (Jewkes 2002), increased
143 sensitivity to cues of men's dominance under conditions of resource scarcity
144 might also be important as a means of identifying men who pose particularly
145 serious threats to women's personal safety.

146

147 In the current work, we used a priming paradigm to directly compare the
148 effects of activating women's concerns about pathogens and resource

149 scarcity on their judgments of the attractiveness and dominance of masculine
150 versus feminine men. While we expected preferences for masculine men to
151 be greater after we activated women's concerns about pathogens than after
152 we had activated women's concerns about resource scarcity (see, e.g., Lee
153 and Zietsch 2011), we also anticipated that women would be more likely to
154 ascribe dominance to masculine men after we activated their concerns about
155 resource scarcity than after we activated their concerns about pathogens. In
156 other words, we tested explicitly for a possible double dissociation (Shallice
157 1988) between the effects of different environmental threats on women's
158 perceptions of the attractiveness and dominance of masculine men. Evidence
159 for this double dissociation would be noteworthy given that it would
160 demonstrate considerably greater specialization in the effects of
161 environmental factors on women's responses to masculine men than has
162 previously been demonstrated and would, therefore, evince complex (i.e.,
163 context-specific) adaptive design in the cognitive architecture underpinning
164 women's perceptions of masculine men. Previous research has highlighted
165 the importance of investigating the context-specificity of potentially adaptive
166 social judgments, since context-specific facultative responses to cues are
167 difficult to explain as functionless by-products of general perceptual processes
168 (e.g., Johnston et al. 2001; Little and Jones 2003; DeBruine et al. 2011b;
169 Feinberg et al. 2012).

170

171 **Methods**

172 ***Participants***

173 Ninety heterosexual women (mean age=21.6 years, SD=5.05 years)
174 completed this online experiment. Participants were recruited from links on
175 social bookmarking websites, such as stumbleupon. Previous research on
176 individual differences in responses to masculinized versus feminized faces
177 has demonstrated that laboratory and online studies produce equivalent
178 results (e.g., Jones et al. 2007; Welling et al. 2008a). Responses from
179 duplicate IP addresses were not recorded.

180

181 ***Face stimuli***

182 Following previous studies of perceptions of masculinized versus feminized
183 faces (e.g., DeBruine et al. 2006, 2010a; Jones et al. 2010; Watkins et al.
184 2010a, 2010b), we used prototype-based image transformations to objectively
185 and systematically manipulate sexually dimorphic aspects of 2D shape in
186 digital face images. Following these studies, 50% of the linear differences in
187 2D shape between symmetrized versions of a male and a female prototype
188 were added to or subtracted from digital face images of 10 young White adult
189 men (see Tiddeman et al. 2001 for technical details). The resultant
190 masculinized and feminized versions of the individual face images differ in
191 sexually dimorphic aspects of 2D shape, but are matched in other regards
192 (e.g., identity, symmetry, skin color and texture, Rowland and Perrett 1995).
193 Examples of masculinized and feminized face images are shown in Figure 1.
194 This process created 10 pairs of male face images in total, each pair
195 consisting of a masculinized and a feminized version of the same individual.
196 Previous studies have demonstrated that this method for manipulating
197 masculinity of 2D face shape affects perceptions of facial masculinity in the

198 predicted manner (e.g., DeBruine et al. 2006, 2010a; Welling et al. 2007b,
199 2008b; Jones et al., 2010).

200

201 ***Procedure***

202 Following Lee and Zietsch (2011), we used an independent samples design to
203 test the effects of priming women's concerns about environmental threats on
204 their perceptions of men (see also, e.g., Little et al. 2007). The experiment
205 consisted of two parts: an initial priming phase and a face perception test.

206

207 In the initial priming phase of the experiment, participants were randomly
208 assigned to complete one of two questionnaires designed to prime concerns
209 about a specific type of environmental threat (resource scarcity or pathogens).

210 The questionnaires were matched so that each contained 15 statements to
211 which participants rated their agreement on a 7-point scale (1=strongly
212 disagree, 7=strongly agree) and have been used by Lee and Zietsch (2011) to
213 prime pathogen and resource threat in their recent work on women's mate
214 preferences. Duncan et al.'s (2009) Perceived Vulnerability to Disease
215 Questionnaire was used to prime pathogen threat and included items such as
216 'In general, I am very susceptible to colds, flu and other infectious diseases'.

217 Lee and Zietsch's (2011) Financial Concerns Questionnaire was used to
218 prime resource scarcity and included items such as 'I worry about the rising
219 cost of food'.

220

221 Immediately after the initial priming phase of the experiment, participants
222 completed a face perception test in which they were shown the 10 pairs of

223 faces (each pair consisting of a masculinized and feminized version of a male
224 face image) and were instructed to indicate either which face in each pair they
225 thought was the more attractive or which face in each pair they thought looked
226 more dominant. The order in which the pairs of face images were shown was
227 fully randomized, as was the side of the screen on which the masculinized
228 and feminized versions were presented. This method for assessing
229 perceptions of the attractiveness or dominance of masculinized versus
230 feminized versions of men's faces has been used in many previous studies
231 (e.g., DeBruine et al. 2006, 2010a, 2010b; Little et al. 2011b; Watkins and
232 Jones 2012) and masculinity preferences assessed using this method have
233 previously been shown to predict women's actual partner choices (DeBruine
234 et al. 2006; Burriss et al. 2011). Participants were randomly allocated to either
235 the attractiveness judgment condition or dominance judgment condition.

236

237 ***Statistical analyses***

238 For each woman, we calculated the proportion of trials on which she chose
239 the masculinized face in the face perception test. These scores are
240 summarized in Figure 2 and were initially analyzed using a univariate ANOVA
241 in which *judgment type* (attractiveness, dominance) and *priming condition*
242 (resource threat, pathogen threat) were included as between-subjects factors.

243

244 Next, we used independent samples t-tests to interpret the interaction
245 between *judgment type* and *priming condition*.

246

247 Finally, we used one-sample t-tests comparing scores with the chance value
248 of 0.5 to test whether or not women chose masculinized versions of men's
249 faces significantly more often than feminized versions in each condition.

250

251 **Results**

252 There was an effect of *judgment type* ($F(1,86)=35.25$, $p<0.001$, partial
253 $\eta^2=0.29$), whereby women generally selected masculine faces more often
254 when judging men's dominance than when judging men's attractiveness
255 (Figure 2). However, this main effect was qualified by the significant
256 interaction between *judgment type* and *priming condition* ($F(1,86)=9.19$,
257 $p=0.003$, partial $\eta^2=0.10$, Figure 2). The main effect of *priming condition* was
258 not significant ($F(1,86)=0.09$, $p=0.77$, partial $\eta^2<0.01$). Repeating this
259 analysis with an additional between-subjects factor (*questionnaire score*;
260 whether or not the participant scored above or below the median score on the
261 questionnaire they completed in the priming phase of the experiment) showed
262 the same pattern of significant results; the interaction between *judgment type*
263 and *priming condition* was significant ($F(1,82)=8.90$, $p=0.004$, partial
264 $\eta^2=0.10$) and was not qualified by a three-way interaction among *judgment*
265 *type*, *priming condition*, and *questionnaire score* ($F(1,82)=0.20$, $p=0.66$, partial
266 $\eta^2=0.002$). This latter (null) result indicates that the priming effects observed
267 in our analyses were not moderated by women's responses on the
268 questionnaires.

269

270 Women chose the masculinized faces as the more *attractive* significantly
271 more often in the pathogen threat condition than in the resource threat

272 condition ($t(44)=2.20$, $p=0.033$, $d=0.65$), but chose masculinized men as the
273 more *dominant* significantly more often in the resource threat condition than in
274 the pathogen threat condition ($t(42)=2.10$, $p=0.042$, $d=0.64$). These results
275 indicate the predicted double dissociation between the effects of priming
276 women's concerns about pathogens and resource scarcity on their
277 perceptions of the attractiveness and dominance of masculine men.

278

279 Additional independent samples t-tests showed that women were significantly
280 more likely to choose masculinized faces when judging men's dominance
281 than when judging men's attractiveness in the resource scarcity conditions
282 ($t(40)=7.21$, $p<0.001$, $d=2.22$). Although women also tended to be more likely
283 to choose masculinized faces when judging men's dominance than when
284 judging men's attractiveness in the pathogen threat conditions, this difference
285 was not significant ($t(46)=1.91$, $p=0.062$, $d=0.55$). Note that the interaction in
286 our initial analysis indicated that the difference between dominance and
287 attractiveness judgments in the resource scarcity condition was significantly
288 greater than it was in the pathogen threat condition (Figure 2). These results
289 indicate that the extent to which masculinising men's faces increases
290 women's perceptions of men's dominance more than attractiveness is
291 sensitive to current environmental threats.

292

293 Women judged masculinized versions of men's faces to be more attractive
294 than feminized versions in the pathogen threat condition ($t(24)=3.02$, $p=0.006$,
295 $d=0.60$), but not in the resource threat condition ($t(20)=-0.19$, $p=0.85$, $d=0.04$).

296 One-sample t-tests also showed that women generally perceived

297 masculinized versions of men's faces to be more dominant than feminized
298 versions in both the resource threat ($t(20)=14.91$, $p<0.001$, $d=3.25$) and
299 pathogen threat ($t(22)=5.37$, $p<0.001$, $d=1.12$) conditions.

300

301 **Discussion**

302 Women randomly allocated to the pathogen threat priming condition showed
303 stronger preferences for masculinized versions of men's faces than did
304 women randomly allocated to the resource scarcity priming condition.
305 Additionally, women in the pathogen threat priming condition chose
306 masculinized faces as the more attractive significantly more often than they
307 chose feminized faces, but this was not true of women in the resource scarcity
308 priming condition. These findings are consistent with other recent work in
309 which women whose concerns about pathogens were activated reported
310 stronger attraction to masculine men than did women whose concerns about
311 resource scarcity were activated (Lee and Zietsch 2011). Our findings are
312 also consistent with other priming experiments suggesting that pathogen
313 threat and resource scarcity influence women's preferences for masculinity in
314 men's faces (Little et al. 2007, 2011b) and correlational studies in which these
315 factors predicted variation in women's mate preferences (Moore et al. 2006;
316 Moore and Cassidy 2007; Welling et al. 2007a; DeBruine et al. 2010a, 2010b,
317 2011a; Feinberg et al. 2012; Park et al. 2012). Thus, our findings for
318 environmental threat and women's preferences for masculine men are
319 consistent with the proposal that trade offs in the costs and benefits of
320 choosing masculine mates cause women to prefer relatively masculine men

321 when pathogens are prevalent and prefer relatively feminine men when
322 resources are scarce (reviewed in Little et al. 2011a).
323
324 Women perceived masculinized versions of men's faces to be more dominant
325 than feminized versions in both the resource scarcity and pathogen priming
326 conditions. However, we also found that the likelihood of women ascribing
327 high dominance to masculine men (i.e., their dominance sensitivity, Watkins
328 and Jones 2012) was modulated by the priming condition that they were
329 randomly allocated to. As we had predicted, women in the resource scarcity
330 priming condition were more likely to ascribe high dominance to masculine
331 men than were women in the pathogen threat priming condition. This effect of
332 activating concerns about resource scarcity versus concerns about pathogens
333 on women's dominance sensitivity may reflect the greater importance of
334 identifying dominant men under conditions where resources are scarce and
335 violence towards women is more common (Jewkes 2002). Indeed, our
336 findings for environmental threats and dominance perception complement
337 other recent work suggesting that men's perceptions of other men's
338 dominance are also modulated by factors that alter the costs of incorrectly
339 judging other men's dominance (e.g., the outcome of recent intrasexual
340 conflict, Watkins and Jones 2012). A different, but not necessarily mutually
341 exclusive explanation, for the priming effect observed on dominance
342 perceptions is that activating women's concerns about resources increases
343 their tendency to associate male dominance with cues of physical strength
344 (rather than, say, social status), rather than increasing the salience of
345 dominance cues, *per se*. While our current data do not distinguish between

346 these two explanations, experiments in which women's perceptions of men's
347 social and physical dominance were assessed in separate blocks of trials
348 would, potentially, allow these two explanations to be tested. Despite this
349 limitation of the current work, we note that our experiment is the first to show
350 that activating women's concerns about environmental threats can modulate
351 their perceptions of masculine versus feminine men's dominance,
352 complementing other recent experiments that have demonstrated that
353 activating women's concerns about environmental threats can modulate their
354 perceptions of the attractiveness of masculine versus feminine men (Little et
355 al. 2007, 2011b; Lee and Zietsch 2011). Moreover, the size of the priming
356 effects for attractiveness ($d=0.65$) and dominance ($d=0.64$) judgments were
357 virtually identical, suggesting that concerns about environmental threats may
358 influence attractiveness and dominance judgments to similar extents.

359

360 Together, our findings of stronger preferences for masculine men when
361 concerns about pathogens were activated and greater likelihood of ascribing
362 high dominance to masculine men when concerns about resources were
363 activated presents evidence for a double dissociation between the effects of
364 environmental threats on women's perceptions of men's attractiveness and
365 dominance. This double dissociation is noteworthy since it reveals a higher
366 degree of specialization in the effects that concerns about environmental
367 threats have on women's social judgments of men's faces than was apparent
368 in previous work. Demonstrating this type of context-specific effect on
369 women's facultative responses to men's facial characteristics is potentially
370 important for our understanding of adaptive design in face processing abilities,

371 since context-specific facultative responses to facial cues are particularly
372 difficult to explain as functionless by-products of general perceptual
373 processes, such as changes in the ability to detect simple physical properties
374 of the stimulus (e.g., Johnston et al. 2001; Little and Jones 2003; DeBruine et
375 al. 2011b). Indeed, the context-specific effects that we observed here
376 complement Little et al. (2011b), who recently found that priming women's
377 concerns about pathogens modulated their preferences for sexually dimorphic
378 characteristics in men's, but not women's faces. Thus, our findings add to a
379 growing literature suggesting that evolutionary pressures relating to mate
380 choice and aggressive conflict have shaped the cognitive architecture that
381 underpins women's perceptions of men's faces.

382

383 The main effect of *judgment type* in our experiment replicates a well-
384 established effect, whereby masculine characteristics appear to have a
385 greater overall effect on women's perceptions of men's dominance than they
386 do on women's perceptions of men's attractiveness (reviewed in Puts 2010).
387 This pattern of results suggests that masculine characteristics in men are
388 more closely associated with perceptions of dominance than attractiveness
389 and is consistent with the proposal that masculine characteristics function
390 primarily to advertise information about men's ability to compete for resources
391 with other men (Puts 2010; Scott et al. 2012). However, this pattern of results
392 is also consistent with trade off theories of women's masculinity preferences,
393 which propose that the costs of choosing masculine mates, such as those
394 associated with the antisocial personality traits that they possess, can detract
395 considerably from the appeal of masculine men as romantic partners (e.g.,

396 Little et al. 2011a). Indeed, Puts (2010) acknowledged that systematic
397 variation in women's masculinity preferences will lead to variability in the
398 extent to which masculine characteristics in men are more closely associated
399 with perceptions of dominance than attractiveness. The interaction between
400 *judgment type* (attractiveness versus dominance) and *priming condition*
401 (pathogen threat versus resource scarcity) in our experiment presents the first
402 direct empirical evidence that this is indeed the case; the extent to which
403 masculine facial cues had a greater effect on women's perceptions of men's
404 dominance than attractiveness varied according to the priming condition
405 women had been randomly allocated to. Indeed, the effect size for the
406 difference between the effect of masculinity on dominance and attractiveness
407 judgments was over four times greater in the resource scarcity priming
408 condition ($d=2.22$) than in the pathogen threat priming condition ($d=0.55$).
409 Notably, while Puts (2010) suggested that variability in the extent to which
410 masculine characteristics in men are more closely associated with
411 perceptions of dominance than attractiveness would be driven by changes in
412 women's masculinity preferences, here we show that changes in women's
413 perceptions of masculine men's dominance according to recent concerns
414 about environmental threats can also contribute to this variability. Thus, while
415 our findings present further evidence that masculine characteristics have
416 greater overall effects on perceptions of men's dominance than
417 attractiveness, they also show that environmental factors can modulate the
418 extent to which this is the case. Given this flexibility in the extent to which
419 masculinity is, on average, associated more strongly with women's judgments
420 of men's dominance than attractiveness, the theoretical importance of the

421 difference in the size of the effects of masculinity on dominance and
422 attractiveness judgments should, perhaps, be treated with some caution.
423 Nonetheless, we acknowledge here that our experiment compares women's
424 preferences for masculine versus feminine men with women's, rather than
425 men's, perceptions of the dominance of masculine versus feminine men. We
426 also acknowledge that, although the magnitude of the difference varies
427 between conditions, our data do show greater effects of masculinity on
428 perceptions of men's dominance in both priming conditions. Although the
429 priming effects in the current experiment were moderate, the effect sizes
430 elicited by this 'minimal manipulation' suggest that the corresponding effect in
431 the real world could well be substantial (see Prentice and Miller 1992 for
432 discussion).

433

434 In summary, we found that (1) women's masculinity preferences were
435 stronger after we had activated their concerns about pathogens than after we
436 had activated their concerns about resource scarcity and (2) women were
437 more likely to ascribe high dominance to masculine men after we had
438 activated their concerns about resource scarcity than after we had activated
439 their concerns about pathogens. These facultative responses to concerns
440 about environmental threats are consistent with trade off theories of women's
441 mate preferences (e.g., Little et al. 2011a) and the proposal that dominance
442 sensitivity increases under conditions where there is a greater likelihood of
443 aggressive conflict occurring and/or the costs of losing resources are likely to
444 be particularly pronounced (Watkins and Jones 2012). Importantly, our results
445 suggest a double dissociation between the effects of environmental threats on

446 women's judgments of men's attractiveness and dominance, potentially
447 revealing considerably greater specialization in the effects of concerns about
448 environmental threats on women's perceptions of men's qualities than has
449 previously been demonstrated. Indeed, the context-specific effects of
450 environmental threats observed in our priming experiment cannot
451 straightforwardly be explained as a simple, functionless byproduct of the
452 perceptual system and, thus, suggest adaptive design in women's face
453 processing abilities. The ability to rapidly recalibrate potentially critical social
454 perceptions, such as dominance and attractiveness judgments, in response to
455 the specific nature of the environmental threats encountered may have been
456 particularly important for ancestral women, since female dispersal was
457 particularly common (Seielestad et al. 1998) and may have required women
458 to recalibrate their preferences and behaviors according to these new
459 conditions, groups, and environments in order to maximize their reproductive
460 fitness.

461

462 **Ethical standards**

463 These experiments comply with the current laws of the country in which they
464 were performed.

465

466 **Conflict of interest**

467 The authors declare that they have no conflict of interest.

468

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646 **Figure Captions**

647 **Figure 1.** Examples of masculinized (left) and feminized (right) versions of
648 men's faces used in our experiments.

649 **Figure 2.** The significant interaction between *judgment type* and *priming*
650 *condition* (see the text for details). Bars show means and SEM.

651 **Figure 1.**



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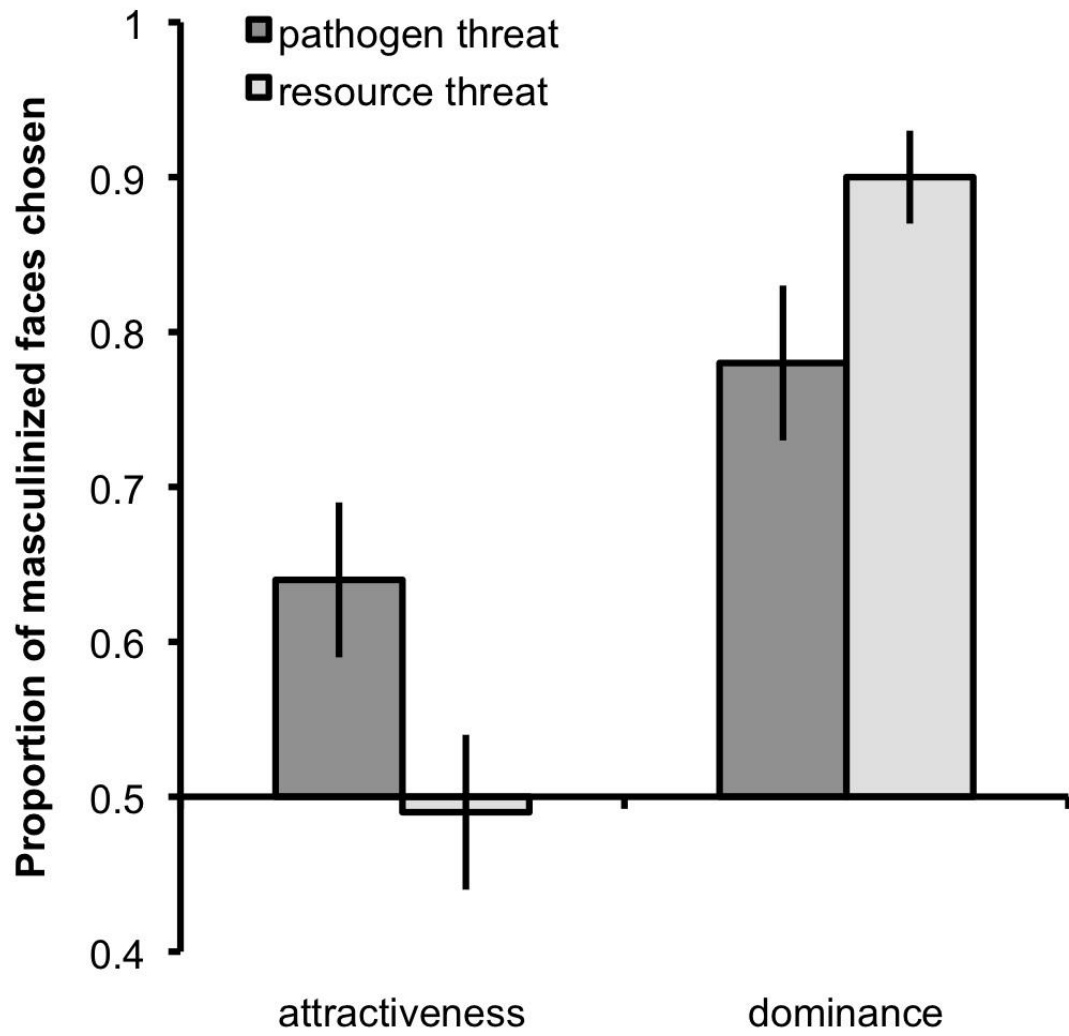
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667 **Figure 2.**

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