

Leadership perception in candidate faces: Scotland's unionists prefer dominant leaders, and so do nationalists – but only if they are economic pessimists.

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Abstract

1 Voters rely on many cues to make decisions about who to vote for, and the appearance of a
2 potential leader can play an important part in this decision-making process. When choosing
3 leaders, it is thought that voters make “fit-to-task” voting decisions, for example, exhibiting a
4 preference for masculine-looking leaders in hypothetical wartime scenarios, when masculine
5 behavioural characteristics would be most valued. Here, we examine face preferences within a
6 sample of Scottish voters during the campaign for the 2014 Scottish independence
7 referendum. Subjects were presented with masculinised and feminised versions of faces in a
8 forced-choice experimental task to select their preferred face in a hypothetical national
9 election. No voters (those who voted to maintain the Union) chose more masculine-faced
10 hypothetical leaders than Yes voters (those who voted in favour of an independent Scotland);
11 effect sizes observed were medium. Within Yes voters, economic concern was related to a
12 preference for masculine faces, but for No voters, economic outlook did not relate to face
13 preferences. These findings underscore the importance of real-world socio-political contexts
14 in psychology research, particularly that concerning the public perception of different
15 leadership prototypes. Implications in the current Scottish context are discussed.

16

17 *Keywords:* masculinity; dominance; leadership; economic outlook; political psychology

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19

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21 do nationalists – but only if they are economic pessimists.

22

23

Introduction

24 The physical appearance of political candidates has the potential to shape the way they
25 are viewed by voters, and thus can impact their likelihood of being elected. Voters generally
26 prefer to elect leaders with physiological traits that communicate dominance, such as
27 masculine facial shape (Little, Burriss, et al. 2007; Spisak et al. 2012), height (Little and
28 Roberts 2012; Re et al. 2013) and low voice pitch (Tigue et al. 2012; Klofstad et al. 2012). It
29 is thought that dominant appearing traits are preferred in leaders because these traits convey a
30 sense of protection to the groups they represent, and that preferences for these traits are part of
31 our evolved psychology (for a review, see Knowles, 2018). However, in many modern
32 societies, leadership is won democratically, and the benefits of non-dominant, prosocial traits
33 like diplomacy and trustworthiness could outweigh any advantages conferred by dominance.

34 A modest body of research has examined contextual effects on preferences for
35 different facial shapes in leaders (see e.g. Little, Burriss, et al., 2007; Little, 2014; Spisak et
36 al., 2012). Much of this research focuses on experimentally-induced contexts such as
37 imagining one is selecting either a wartime or peacetime leader. Here we examine facial
38 leadership preferences in a population faced with a single voting decision (either for or
39 against Scottish independence from the UK), as well as examine how preferences vary with
40 other socio-political factors including economic outlook, conservatism-socialism, and Scottish
41 identity.

42

43 **General Perceptions of Leadership Ability and Competency**

44 In males, sexual dimorphism (*i.e.* masculinity) is linked to attributions of dominance
45 (Perrett et al. 1998). There is some evidence that morphological masculinity is also related to
46 leadership competency (Olivola and Todorov 2010). Indeed, when faces are presented in
47 controlled experiments in hypothetical elections, naïve voters (*i.e.* those presented with no
48 information about candidates beyond images of faces) tend to choose candidate faces which
49 are attractive, masculine and dominant (Riggio and Riggio 2010; Murray and Schmitz 2011;
50 Little 2014; Budesheim and DePaola 1994). The relationship between masculine appearance
51 and dominance is fairly clear (Mazur and Booth 1998; Tremblay 1998; Oosterhof and
52 Todorov 2008; Todorov et al. 2008). However, there is mixed evidence that masculinity
53 enhances attractiveness (Perrett et al. 1998; Little et al. 2008; Swaddle and Reiersen 2002;
54 Thornhill and Gangestad 1999). On the whole, these findings suggest that male masculinity
55 may be an important cue when voters make electoral decisions.

56 These experimental findings are also borne out in real-world elections. The more
57 attractive of two candidates (in US congressional elections) has a greater likelihood of being
58 elected (Verhulst et al. 2010; White et al. 2013). Furthermore, judgements of candidates'
59 leadership competence made by naïve viewers (those with no additional information about
60 candidates besides appearance) reflects actual results and margins: in the 2008 US
61 presidential election (Armstrong et al. 2010); in US gubernatorial races between 1995 and
62 2002 (Ballew and Todorov 2007); and in US Senate and House of Representatives elections
63 between 2000 and 2004 (Todorov et al. 2005). Showing that these competence attributions are
64 related to facial shape characteristics, Little et al. (2007) transformed a neutral "base face"
65 using the mathematical difference between winners and losers of ten presidential and prime
66 ministerial elections in several countries (between 1992 and 2004). It was found that naïve
67 viewers tended to prefer faces which had been morphed in the direction of the real-world
68 electoral victors.

69 In modern democracy, leaders are often appointed or elected by the population they
70 will represent, and qualities which are valued in a leader can vary based on social and
71 contextual factors which face the group (Little 2014; Little et al. 2012; Spisak et al. 2012).
72 Despite physical prowess no longer being overtly necessary as a requisite for leadership,
73 psychological phenomena may lead us to continue to support masculine, dominant leaders
74 (von Rueden and van Vugt 2015). Furthermore, this tendency to elect masculine leaders may
75 be exaggerated under specific socio-political conditions which constitute risk or threat, such
76 as war or resource instability.

77

78 **Fit-to-Task Voting Decisions**

79 The relative importance of these general face preferences is also dependent upon the
80 context in which voting decisions are made because different facial characteristics are thought
81 to be associated with differing interpersonal characteristics (for a review, see Little & Roberts,
82 2012 or Antonakis & Eubanks, 2017). Choosing leaders based on “fit-to-task” judgements
83 may be advantageous because it complements the strategic aims of the group, (Spisak et al.
84 2012; Van Vugt et al. 2008; Little and Roberts 2012; Little 2014). Because physical
85 appearance is often used as a heuristic to infer judgements about others’ social and
86 temperamental qualities, the physical appearance of a potential leader has the potential to
87 influence voters in making these strategic decisions. For example, Little, Burriss, et al. (2007)
88 found that facial masculinity was unrelated to perceptions of leadership ability in neutral, non-
89 cued contexts, but when participants were cued with an imagined wartime scenario,
90 masculinity acted as a cue to leadership ability. This effect has also been confirmed in studies
91 using non-manipulated, naturally-occurring facial stimuli (Spisak et al. 2012).

92 Little and Roberts (2012) suggested the term “task-congruent selection” for such
93 decisions, and masculinity may be the most salient physiological trait influencing leadership

94 selection in such circumstances. Indeed, masculinity is associated with an agentic leadership
95 style, which is competitive and assertive in nature (Eagly and Karau 2002; Koenig et al.
96 2011). This agentic type of leadership may be desirable under some conditions while more
97 diplomatic approaches may be favoured in others. Little *et al.* (2012) suggest that the effect of
98 context may be greater than that of any general facial characteristics – that the context can
99 dictate what characteristics are important for leaders to possess, and this may outweigh any
100 underlying, general face preferences.

101

102 **Environmental Harshness and Uncertainty**

103 Perceptions of environmental stability or resource richness have been shown to
104 modulate women's preference for male facial masculinity when making attractiveness
105 judgements. Little, Cohen, Jones, & Belsky (2007) found that women prefer men with
106 feminised faces as long-term partners when they are asked to imagine themselves in harsh
107 environments, and prefer more masculine men in safe environments. These context-dependent
108 attractiveness judgements are thought to result from different partner benefits which vary in
109 importance based on context, because different facial traits communicate behavioural
110 tendencies associated with cooperative child-rearing (Gangestad and Simpson 2000). Similar
111 results in favour of feminised male faces have been found using contexts related to male
112 intrasexual violence (Little et al. 2013), pathogen stress (DeBruine et al. 2010; Little et al.
113 2010) and income inequality (Brooks et al. 2011). Conversely, environmental richness and
114 male wealth (Little et al. 2013) serve to enhance preferences for masculine male features.

115 Given the above effects of resource stability on perceptions of facial attractiveness,
116 there is reason to suspect that similar effects may also be found regarding perceptions of
117 leadership ability. Nevicka, De Hoogh, Van Vianen, & Ten Velden (2013) show that in times
118 of organisational uncertainty, narcissistic leaders are preferred despite their overtly masculine

119 qualities (e.g. dominance, arrogance) because these qualities inspire confidence in uncertain
120 times. Thus, we might expect economic uncertainty to bear some relationships with
121 preferences for masculine leaders.

122

123 **The 2014 Scottish Independence Referendum: Two National Contexts**

124 A number of historical and social factors characterise a desire for Scottish
125 independence from the United Kingdom. Notably, perceptions of Scotland's economy were
126 strongly divided between those who favoured independence and those who did not (YouGov
127 2014c). Supporters of independence generally believed that Scotland's economy was rich and
128 diverse, citing abundant oil revenues (YouGov 2014b). Conversely, Unionist supporters
129 distrusted the reliability of depleting oil resources (YouGov 2014b). This difference in
130 viewpoint appears to be broadly in alignment with campaign messages from both sides. In the
131 months prior to the vote, both the Scottish and UK governments put forward opposing
132 analyses of financial projections, with the SNP-led Scottish government claiming each
133 Scottish person would be £1000 richer outside of the UK, while the Treasury (a UK-wide
134 body) published figures claiming each Scot is £1400 richer within the UK (The Scottish
135 Government 2014; HM Treasury 2014).

136 As a whole, the Scottish public was generally divided on perceptions of the impact of
137 independence on Scotland's economy, with 40% believing Scotland would be economically
138 better off if it became an independent country (80% of Yes-voters agreed), and 42% of the
139 population believing Scotland would be economically worse off if it became independent
140 (87% of No-voters agreed) (YouGov 2014c). Furthermore, when voters were asked to give
141 their most important reason affecting how they would vote, whether Yes or No, the economy
142 was the reason most cited by voters in numerous polls (e.g. TNS BMRB, 2014a, 2014b).
143 Other factors influencing voting decision included employment (13% listed as their most

144 important issue), healthcare (12%), pensions/benefits (9%), education (7%) and personal
145 finance (6%) (TNS BMRB 2014b). Notably, a number of these issues may also be considered
146 to have economic implications.

147 This divided opinion amongst Scottish voters as to the nature of the Scottish economy
148 is not new; in April 2007, seven years prior to the referendum vote, 46% of Scots believed
149 that Scotland’s economy “would face serious problems if it became independent,” versus 42%
150 who believed that Scotland would prosper if independent from the United Kingdom (YouGov
151 2007). Irrespective of voting decision, the economy was listed as the item which voters felt
152 was the most important issue facing Scotland (barring the referendum itself) (YouGov
153 2014d).

154 Ultimately, Yes voters seemed to be less risk-averse than No voters, and many cited
155 risk aversion (and particularly *economic* risk aversion) as a main contributing factor in voting
156 against independence (Ashcroft 2014; Bell et al. 2014). It is clear that estimates of economic
157 uncertainty were highly divided between the two sides, and this difference ultimately seemed
158 to drive vote choice (Bell et al. 2014; Curtice 2014).

159

160 **The Present Study**

161 Here, we examine voting preferences for masculinity in faces within the context of the
162 2014 Scottish independence referendum. Although the referendum provided voters with a
163 constitutional choice, rather than a leadership election, the setting of the referendum provided
164 a unique opportunity to examine how differing economic attitudes and voting intentions could
165 be related to preferences in leadership. The referendum scenario also provided an interesting
166 setting for a naturalistic experiment, allowing researchers to examine how leadership
167 preferences may track real variation in opinion rather than relying on experimental
168 manipulation. For example, Little *et al.* (2007) asked participants to imagine voting for a

169 leader in wartime or peacetime, whereas this setting allowed us to capture natural variation in
170 outlook without the need to create an artificial or imagined scenario.

171 During the referendum campaign, messages from the Yes campaign were clearly
172 positive (YouGov 2014a), and supporters of independence viewed Scotland as a prosperous,
173 resource-rich country with the ability to stand successfully on its own. Conversely, supporters
174 of the Union tended to view these ideas as unrealistic, giving voters uncertainty about
175 Scotland's prosperity and economic solvency outside of the United Kingdom (Beasley and
176 Kaarbo 2017). Data gathered just before the referendum showed that while Yes voters
177 believed their own personal income would increase and that their job prospects would
178 improve if Scotland became independent, No voters believed their income would decrease
179 along with their job prospects (Bell et al. 2014), revealing that these differing convictions had
180 a personal resonance to voters.

181 With differing outlooks on either increasing or decreasing national and personal
182 wealth, we may be able to conceptualise the two sides as viewing Scotland as resource-rich
183 and resource-poor – Yes voters may have viewed Scotland as a rich and stable environment,
184 and No voters may have viewed Scotland as less secure and unpredictable. It might follow,
185 then, that the two sides of the referendum vote may have seen the context of voting in
186 different lights, and these divergent views on likely future resources may lead voters to prefer
187 leaders with different facial characteristics.

188 We may expect that those with different beliefs about the economy may place
189 differing values on dominance as a leadership characteristic. For example, those with a
190 pessimistic outlook may value dominant leadership (as opposed to diplomatic leadership) to a
191 greater degree than those with a more optimistic outlook, resulting from an implicit desire for
192 strength and protection from uncertainty. Because a masculine or feminine appearance is
193 related to social judgements of characteristics including dominance and trustworthiness

194 (Olivola et al. 2014; Swaddle and Reiersen 2002; Todorov et al. 2008; Perrett et al. 1998), an
195 experimental design where individuals view and rate the faces of hypothetical candidates
196 allows us to examine whether these differing outlooks manifest in the prioritisation of
197 different associated leadership qualities. If preferences are found to vary as a function of
198 outlook, this would (a) support the idea that voters make fit-to-task leadership judgements and
199 (b) provide the first evidence that perceptions of national economic issues may influence these
200 fit-to-task judgements.

201

202

203

Methods

204 **Participants**

205 One hundred sixty-two participants (116 female [71 No; 45 Yes]; 46 male [24 No; 22
206 Yes]) took part in the study. Female No voters were aged 17-62 years ($M = 22.7$, $SD 9.5$
207 years) and female Yes voters were aged 17-68 years ($M = 29.0$, $SD 15.0$ years). Male No
208 voters were aged 17-47 years ($M = 23.2$, $SD 7.7$ years) and male Yes voters were aged 18-62
209 years ($M = 27.8$, $SD 13.9$ years). Participants included both psychology students at the
210 University of Stirling and members of the general public who were recruited opportunistically
211 via social media; these included Scottish university student groups aligned with both the Yes
212 and Better Together campaigns, and student groups aligned to major political parties. Stirling
213 University psychology students who participated received credit toward a course requirement;
214 members of the public received no compensation. All participants were of Scottish nationality
215 and were able to vote in the referendum. Ethical approval was provided by the University of
216 Stirling Ethics Committee.

217

218 **Stimuli**

219 To measure preferences for sexually dimorphic features, we used 10 pairs of
220 composite male face images. Each pair was comprised of one masculinised and one feminised
221 version of the same face. Original images were 50 young adult Caucasian male and 50
222 Caucasian female photographs taken under standard lighting conditions and with a neutral
223 expression. The composite images were made by creating an average image made up of 5
224 randomly assigned individual facial photographs (this technique has been used to create
225 composite images in previous studies, see e.g., Benson & Perrett, 1993; Tiddeman, Burt, &
226 Perrett, 2001). Composite images were made perfectly symmetric. Faces were transformed on
227 a sexual dimorphism dimension using the linear difference between a composite of all 50
228 adult males and a composite of all 50 young adult females (following Perrett et al., 1998).
229 Transforms represented +/-50% the difference between these two composites. Example
230 images can be seen in Figure 1.

231 [FIGURE 1 ABOUT HERE]

232

233 **Procedure**

234 Participants were recruited from June to September 2014, the four months prior to the
235 referendum vote on September 18th, 2014. The study was conducted online. After responding
236 to question items regarding age and gender, participants completed the voting task. Stimulus
237 pairs were presented to participants in a forced-choice design, with pairs consisting of a
238 masculinised and a feminised version of the same face. Screen location of the masculinised
239 and feminised faces (i.e. left/right) was randomised for each trial. Participants were prompted
240 to imagine they were selecting a leader to run their country, and did so across 10 trials, each
241 consisting of a new face pair. The order of face pairs was randomised for each participant.

242 Following this task, participants answered questions about their voting intention (No
243 or Yes) and the strength of that voting intention on a 1-7 Likert scale. Participants also placed

244 themselves on a scale of right-left political identity on a scale of 1-7, as well as stating how
245 much they agreed with a number of political statements (all 7-point Likert scales). To gauge
246 perceptions of economic outlook, we included the statement “Scotland would be worse-off
247 economically as an independent nation.” We also provided a scale of national identity: “I do
248 not consider myself to be British, but Scottish.” The wording of this statement places
249 Britishness and Scottishness at two ends of a continuum, with low values corresponding to a
250 more British identity, and high values being indicative of a more Scottish identity.

251 We examined differences in face preferences based on participants’ pre-existing
252 political and economic views without the need to present participants with contextualised
253 vignettes which may induce demand effects, wherein participants may guess the nature of the
254 research and attempt to produce behaviours they believe are desirable. Previous research on
255 context-dependent perceptions of leadership ability in faces has utilised experimental methods
256 which explicitly present participants with contexts which they are instructed to mentalise or
257 imagine (e.g. wartime and peacetime, Little, Burriss, et al., 2007). Here, we did not explicitly
258 manipulate experimental condition by using a cross-sectional approach.

259

260

Results

261 Both Yes- and No-voters chose masculinised faces at rates significantly above chance
262 (50%), analysed using a one-sample *t*-test, Yes-voters: 58.7%, $t(66) = 2.89$, $p = .005$; No-
263 voters: 69.8%, $t(94) = 9.02$, $p < .001$. While this shows that voters generally exhibited a
264 preference for masculinised faces, No-voters chose significantly more masculine faces than
265 Yes-voters, $t(160) = 3.06$, $p = .003$, Cohen's $d = 0.48$. Both male and female No-voters chose
266 masculine faces at similar rates (70.8% and 69.4%, respectively) and both were significantly
267 above chance, men: $t(23) = 5.16$, $p < .001$; women: $t(70) = 7.43$, $p < .001$. Within Yes voters,
268 we observed a gender difference. Male Yes-voters chose faces at chance rates, 48.2%; $t(21) =$

269 0.39, $p = .70$, while female Yes-voters selected masculinised faces at rates above chance, but
270 still to a lesser degree than No voters, 63.8%; $t(44) = 3.78$, $p < .001$, Cohen's $d = 0.66$.

271 A 2x2 ANOVA (gender [male, female]; referendum vote [Yes, No]) showed a main
272 effect of vote, $F(1,158) = 12.93$, $p < .001$, $\eta^2 p = .08$, and a non-significant main effect of
273 gender, $F(1,158) = 3.25$, $p = .07$, $\eta^2 p = .02$, on the proportion of masculine faces chosen.

274 There was a significant interaction between gender and vote, $F(1,158) = 4.66$, $p = .03$, $\eta^2 p =$
275 $.03$, such that the main effect of vote choice was stronger for male voters than for female
276 voters. Male Yes voters chose significantly fewer masculinised faces (48.2%) than male No
277 voters (70.8%), $t(44) = 3.68$, $p < .001$, Cohen's $d = 1.08$. The same was not true for female
278 voters, Yes-voters: 63.8%; No-voters: 69.4%; $t(114) = 1.29$, $p = .20$, Cohen's $d = 0.24$. See
279 Figure 2.

280 [FIGURE 2 ABOUT HERE]

281

282 **Political Values and Economic Beliefs**

283 Correlations between study variables are presented in Table 1. Age and Scottish
284 identity were both significantly negatively associated with the proportion of masculine faces
285 chosen. Belief that the economy would be worse in the case of independence was positively
286 correlated with the percentage of masculine faces chosen – that is, economic pessimism was
287 associated with choosing a greater proportion of masculine faces during the trials.

288 These significant associations may be explained by a confounding variable: intended
289 referendum vote. Yes and No voters differed on a number of these variables. In this sample,
290 Yes voters were older, $t(102) = 2.86$, $p = .005$, more socialist, $t(160) = 5.69$, $p < .001$, and
291 identified as more Scottish to the exclusion of being British, $t(160) = 4.83$, $p < .001$, relative
292 to No voters. The largest difference between Yes and No voters was their economic outlook –
293 Yes voters were significantly more optimistic than were No voters, $t(160) = 15.71$, $p < .001$,

294 an effect size nearly three times greater than self-reported conservatism/socialism and more
295 than three times greater than feelings of Scottishness. Descriptive statistics and effect sizes are
296 shown in Table 2.

297 [TABLE 1 ABOUT HERE]

298 [TABLE 2 ABOUT HERE]

299 [FIGURE 3 ABOUT HERE]

300 Because of the inter-relationships between these variables (see Table 2 for correlations
301 between these factors), linear mixed model analyses were performed to parse which of these
302 variables and/or combinations of variables best predicted the percentage of masculine faces
303 chosen (Kuznetsova et al. 2014; R Core Team 2014). Controlling for age and gender, we
304 examined the following fixed factors: intended referendum vote, conservatism-socialism,
305 economic outlook and Scottish identity. A model using vote choice alone explained some of
306 the variance in the data, $\chi^2(1) = 10.75, p = .001$, and the fixed effect was significant, $F =$
307 $10.93, p = .001$.

308 A model consisting of economic beliefs as a lone fixed factor produced similar, but
309 marginally less robust results, $\chi^2(1) = 10.58, p = .001; F = 10.84, p = .001$. The addition of
310 other fixed effects (including economic optimism-pessimism, conservatism-socialism and
311 Scottish identity) did not significantly improve the model. Adding an interaction term to the
312 model between vote choice and economic outlook produced the best-fitting model, $\chi^2(3) =$
313 $17.33, p < .001$, with a significant fixed effect of vote, $F = 6.73, p = .01$, and a significant
314 interaction between vote and economic outlook, $F = 5.26, p = .02$. The direction of the
315 interaction was such that within Yes voters, economic pessimism was associated with a
316 greater preference for masculine faces, $r(67) = .27, p = .02$. This effect was absent for No
317 voters, whose economic pessimism was not significantly related to their face preferences,
318 $r(95) = -.05, p = .63$.

319 Because we controlled for age and gender in these models, it was not possible to
320 assess any potential independent effects of these variables on preferences for masculinity. To
321 address this, we performed a linear regression with all variables included in the equation (age,
322 gender, economic optimism-pessimism, conservatism-socialism and Scottish identity) with
323 masculinity preference as the dependent variable. The model was significant, $F(5,156) = 4.44$,
324 $p < .001$; age negatively predicted masculinity preference ($\beta = -.16$, $t = -2.12$, $p = .04$) and
325 economic pessimism positively predicted masculinity preference ($\beta = .21$, $t = 2.41$, $p = .02$).
326 Masculinity preference was not significantly independently predicted by either gender ($\beta = -$
327 $.12$, $t = -1.56$, $p = .12$), conservatism ($\beta = .14$, $t = 1.67$, $p = .10$) or Scottish identity ($\beta = -$
328 1.69 , $p = .09$).

329

330

Discussion

331 We found that No voters (those who intended to vote against Scottish independence)
332 selected a larger proportion of masculinised faces than Yes voters. Because of the relationship
333 between facial masculinity and dominant behavioural characteristics (Todorov et al. 2008),
334 this suggests that No voters may have held stronger preferences for candidates with dominant
335 leadership qualities. Within Yes voters, economic pessimism was also associated with a
336 preference for more masculinised faces. It is important to note that a vote in favour of Scottish
337 independence was not associated with an explicit preference for leader femininity: amongst
338 male Yes voters, there appeared to be no clear preference for either masculinised or feminised
339 stimuli, while female Yes voters (and No voters of both genders) exhibited a general
340 preference for masculinised stimuli.

341 Other factors were also associated with a preference for leaders with masculine faces.
342 Age, gender and Scottish identity were correlated with the proportion of masculine faces
343 chosen, with older voters, women, those with a stronger British identity exhibiting stronger

344 preferences for leader masculinity. In mixed model analyses which statistically control for age
345 and gender, vote decision and economic concern were the only significant predictors of
346 masculinity preferences.

347

348 **A Vote For or Against Change**

349 Why would No voters prefer masculine faced leaders? One answer may be linked to
350 voters' attitudes for or against change. While it may be assumed that those against Scottish
351 independence were also against change, there was much attention given during this time to the
352 promise of additional devolved powers – the allocation of more governing powers to the
353 Scottish parliament from Westminster. According to then-Prime Minister David Cameron, a
354 No vote was “not for the status quo,” (BBC 2014) and ultimately, devolved powers beyond
355 those already in place were promised in a signed statement by Westminster party leaders
356 (Daily Record 2014). Nevertheless, the devolution of further powers to the Scottish
357 parliament may have rightly been considered less change than would be realised by full
358 independence. In this way, both sides could be viewed as wanting and/or expecting change,
359 but the type of change expected may have been qualitatively different. For example, Yes
360 voters might have desired a more extreme, exploratory change, while No voters may have
361 desired no change at all, or perhaps more subtle changes which better exploited current
362 resources while mediating the risks associated with large-scale political change.

363 Spisak, Grabo, Arvey, & van Vugt (2014) have shown that younger-looking leaders
364 are preferred during times of “exploratory change”, and older-looking leaders are preferred
365 during times of stability. Due to the age-related emergence of secondary sexual
366 characteristics, we may reason that men with more masculine features appear older, and men
367 with feminised features appear younger (Boothroyd et al. 2005). Although we did not
368 manipulate age directly, it may be that our masculinity transformation influenced perception

369 of candidate age because of the exaggeration of facial masculinity. Nevertheless, these results
370 add to current knowledge about leadership preferences and political change. One limitation of
371 this study is that the faces used as stimuli were young adults, who may not be viewed as
372 appropriately experienced for the leadership scenario as was posed.

373 Our results support and expand upon Spisak *et al.* (2014), showing that masculinity,
374 associated with maturity and behavioural dominance, may be preferred when stability is
375 desired by voters (*i.e.* the desire to maintain Scotland's union with the United Kingdom).
376 Moreover, amongst those who *did* desire change (*i.e.* Scottish independence), this effect was
377 qualified by the perception of economic repercussions (Yes voters who had a negative
378 economic outlook also chose more masculine faces). This suggests that these effects may be
379 more closely tied to specific perceptions of future risk rather than simply a desire for change
380 in general.

381

382 **Risk, Economic Concerns and Resource Stability**

383 Bell, Delaney, & Mcgoldrick (2014) showed that an intent to vote No was associated
384 with risk aversion. A Lord Ashcroft poll following the referendum showed that 47% of No
385 voters stated that the risks of independence, including economic risks, were the most
386 important factor in choosing to vote No (Ashcroft 2014). Our data show that perceptions of
387 economic risk were (unsurprisingly) polarised between Yes and No voters, with Yes voters
388 overwhelmingly disagreeing with our statement "Scotland would be worse-off economically
389 as an independent nation." Indeed, this question received the most polarised responses of all
390 that we asked, with Yes and No voters roughly three times more polarised on this topic than
391 their self-reported conservatism-socialism and Scottish-British identity.

392 This may reflect broad alignment with party messages throughout the long campaign
393 for independence. The Yes campaign were positive with regard to Scotland's future economic

394 prosperity, claimed continued use of the pound as the national currency, and claimed each
395 Scot would be £1000 richer if independent from the UK (The Scottish Government 2014).
396 The Better Together campaign were more negative in their outlook with regard to Scotland's
397 economic future, highlighting depleting North Sea oil resources and the unwillingness of the
398 UK government to agree to a currency union (The Economist 2014; HM Government 2014).
399 Figures were produced which claimed that contrary to the Scottish Government's figures,
400 each Scot was £1400 richer *within* the UK (HM Treasury 2014). Polling data at the time
401 showed each party broadly agreed with their respective campaign's messages (YouGov
402 2014b), and economic expectations seemed to make the biggest difference in decisions to vote
403 Yes or No (Curtice 2014).

404 It is clear that Yes and No voters believed strikingly different things regarding
405 Scotland's economy. Generally, No voters were pessimistic while Yes voters envisaged a
406 future of prosperity (Beasley and Kaarbo 2017). However, it is important to understand that
407 variation in responses was still apparent. Some Yes voters expressed concern regarding
408 Scotland's potential economic situation, and these individuals tended to prefer masculinised
409 versions of faces in our hypothetical voting task. That is, while Yes voters appeared to show
410 no clear preference for masculine or feminine faces on the whole, those who expressed
411 concerns about the economy had stronger preferences for masculinity.

412 A tendency to choose masculine-faced leaders when concern for the economy is
413 greatest may be related to perceptions of resource stability, which have been examined by
414 psychologists with respect to facial attractiveness. Women's preferences for male face shape
415 can shift based on a number of environmental factors, including environmental harshness,
416 Little, Cohen, et al. (2007). Further studies show that women's preferences for masculine-
417 faced romantic partners may be contingent upon other environmental cues, including wealth,
418 income inequality and violence (Brooks et al. 2011; Little et al. 2013; DeBruine et al. 2010).

419 Our results are consistent with these findings, and extend this body of knowledge to include
420 perceptions of leadership ability.

421 Research examining leadership choices in an organisational context has suggested that
422 masculine traits are preferred during times of uncertainty because masculine/dominant leaders
423 inspire confidence (Nevicka et al. 2013; Hoyt et al. 2009), which would be most beneficial
424 when times ahead are uncertain. Furthermore, numerous studies have demonstrated that
425 masculine-faced leaders are preferred during times of war (see e.g. Little, Burriss, et al., 2007;
426 Little et al., 2012; Little, 2014; Spisak et al., 2012), arguably a scenario that reflects
427 uncertainty in the extreme.

428 We also found that women who intended to vote Yes, like No voters of both genders,
429 tended to prefer masculinity. This may stem from sex differences in levels of risk aversion,
430 although research in this area offers mixed results (see Maxfield, Shapiro, Gupta, & Hass,
431 2010). Data collected in Scotland during the same time frame as our study showed that
432 women were more likely than men to think that Scotland's economy would be negatively
433 affected by independence (*e.g.* YouGov, 2014c), and this was borne out in our data. If women
434 are more risk averse than men, it may help to explain why they chose, on average, more
435 masculine faces than their male, Yes-voting counterparts. If this were wholly true, however,
436 we might expect to see a congruent sex difference in No voters, which is absent in this
437 dataset. An alternative explanation, then, might be that women generally prefer more
438 masculine (*i.e.* gender-typical) male leaders. Spisak et al. (2012) report a general female
439 preference for masculinity in assessing male leadership ability in the absence of contextual
440 cues in line with our observed sex difference.

441 Ultimately, this research has the potential to say something about the relationship
442 between the electorate and political leaders in Scotland, Britain and abroad. That
443 economically pessimistic voters tended toward a preference for more masculine-faced leaders

444 suggests that dominance as a leadership quality may have more traction amongst a pessimistic
445 electorate. We would like to note that although we have studied facial masculinity as an
446 indicator of behavioural dominance, we believe that voters are more likely to be influenced by
447 *explicit* behaviours, rather than attributions which are simply implicit (as those based solely
448 on appearance must be). While numerous studies show that the physical appearance of
449 candidates can impact their electoral success, particularly amongst less-informed voters
450 (Little, Burriss, et al. 2007; Lenz and Lawson 2011), dominant actions are likely to influence
451 perceptions of a leader's dominance far more than appearance alone.

452 If economic pessimism is associated with a preference for dominant behaviour, as this
453 research suggests, this may help us understand why voters in beleaguered economies (or
454 economic sectors) sometimes find dominant and/or populist candidates appealing (Agerberg
455 2017). This relationship may be further intensified if additional sources of negative sentiment
456 are present in the electorate, which could also increase the appeal of dominant leaders. It is
457 thus worth examining the current outlook in Scotland regarding independence, and identifying
458 other factors affecting a pessimistic outlook toward the economy and the governments in
459 power.

460 Current public opinion in Scotland regarding independence from the UK largely
461 appears to reflect the 2014 result (What Scotland Thinks 2019), and voters are similarly
462 optimistic/pessimistic about the national economy now as they were then (Panelbase 2019).
463 Although overall opinions about Scottish independence and the economy have not shifted
464 much, other issues currently dominate public attention and are potentially relevant when
465 considering voters' outlook on a larger scale. While economic concerns topped the list of
466 voters' most important issues in the independence polls in 2014, now there is some evidence
467 that Brexit, the NHS and the economy hold a three-way tie as voters' most important issues
468 when considering independence (Progress Scotland 2019). Furthermore, 45% of Scots believe

469 that Brexit itself will be bad for the Scottish economy, while just 13% think the economy will
470 improve as a result of Brexit. There is also the sentiment that the financial impact of Brexit
471 will be the hardest on those who are already economically disadvantaged in Scotland
472 (YouGov 2017).

473 Implications also extend logically to the way our current and future political leaders
474 are perceived and selected. At the time of writing, the Conservative party are involved in a
475 leadership contest to select the UK's next Prime Minister. Public sentiment about Brexit is
476 largely negative; a recent opinion poll reveals that a majority of the British electorate (65%),
477 including those in Scotland (68%) are pessimistic about Brexit (BritainThinks 2019).
478 Although the poll does not state the issue(s) most relevant to this pessimism, this degree of
479 negative sentiment may have implications in the leadership decision made by the
480 Conservative party members in their choice between potential leaders – with respect
481 especially to their perceived behavioural characteristics. The party's choice, and the reaction
482 of the public to that choice, will surely be of great interest to those studying political
483 leadership around the globe.

484

485 **Conclusions**

486 This study shows that economic and political beliefs have the potential to modulate
487 leadership preferences. Here, we show that both a Yes/No vote decision and perceptions of
488 economic stability/instability can prioritise the importance of different facial characteristics
489 when selecting a leader: if the economy was viewed as weak and/or in need of protection,
490 voters tended to choose more masculine-faced leaders than those who viewed the economy as
491 rich and secure. This tendency to choose archetypally masculine features relates to a “fit-to-
492 task” selection of leaders, wherein masculine or dominant leaders are preferred when those
493 characteristics suit the aims of the group.

494 This study is the first to show that economic outlook is associated with face
495 preferences in a leadership context. Furthermore, its focus on real political issues which are
496 salient to the study participants (rather than visually cued or imagined scenarios) adds another
497 facet to our understanding of how the appearance of potential leaders can affect their electoral
498 success. Ultimately we suggest that voters' perceptions of a candidate's leadership ability,
499 when made by appearance alone, may be at least partially sensitive to their economic outlook.
500 Voters who desire political stability, economic security, and are averse to the risk associated
501 with change may have preferred masculine-faced male leaders because a masculine
502 appearance is associated with dominant behavioural characteristics which inspire more
503 confidence in uncertain times. This may be particularly relevant when considering uncertainty
504 and pessimism regarding Scottish independence, exiting the European Union, and in the
505 selection of future political leaders.

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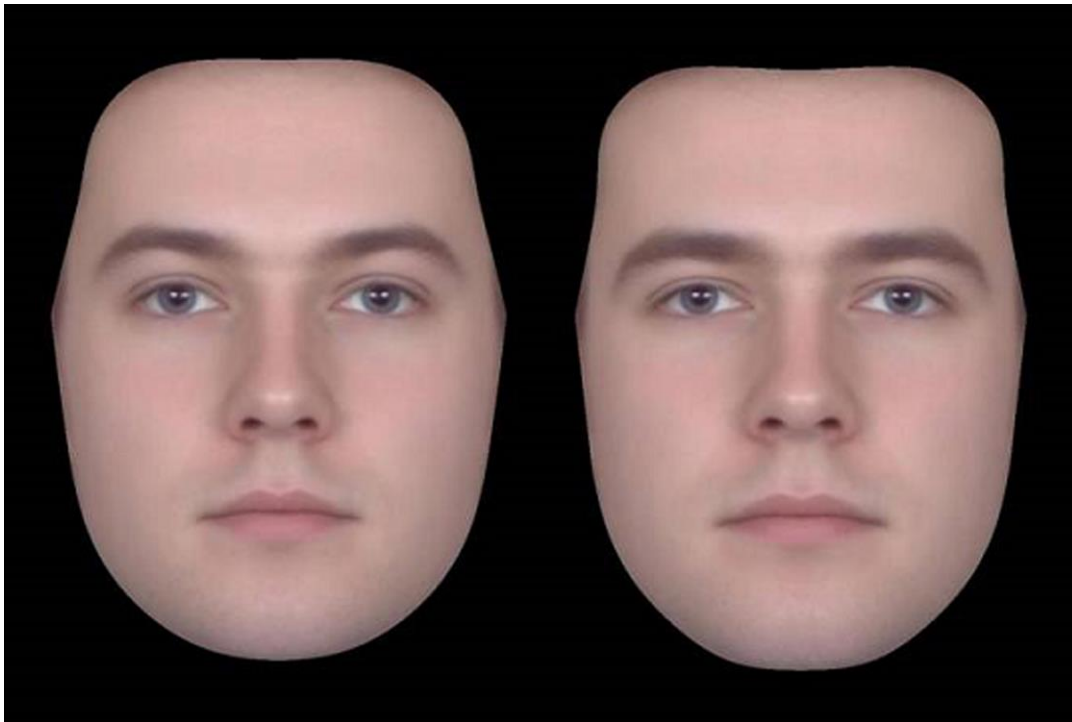


Figure1.

Examples of transformed composite images of feminised (left) and masculinised (right) face stimuli.

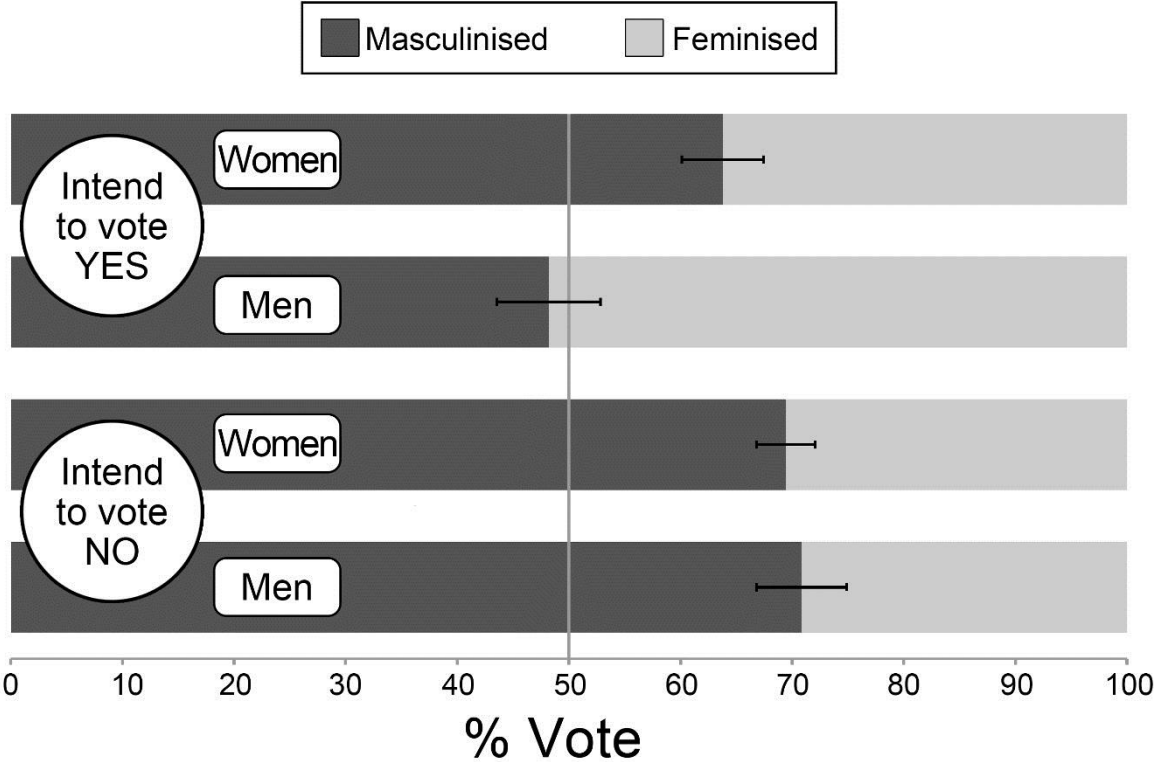


Figure 2. Percentage of masculinised faces chosen (dark grey bars) by gender and vote intention, using the participant as the unit of analysis. Light grey bars indicate the converse proportion of feminine faces chosen. Error bars represent the standard error of the mean.

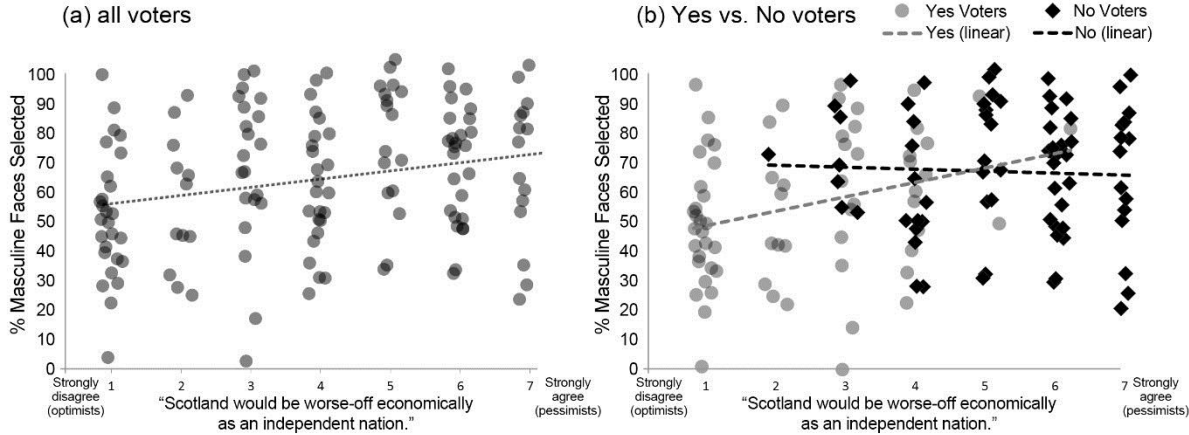


Figure 3.

Economic optimism-pessimism plotted against the proportion of masculine faces chosen, for all voters together (a) and also grouped by voting intent (b). Because both variables are captured as integers, a small amount of noise (\pm up to 5%) has been applied to both x and y values for ease of visual representation, and to reflect the density of the distribution of the data across the plane.

Table 1.

Correlations between variables of interest (Pearson r).

* $p < .05$, ** $p < .01$, *** $p < .001$.

Variables	Masculinity preference	Age	Socialism	Economic pessimism
Age	-.18*			
Socialism	.02	.05		
Economic pessimism	.24***	-.12	-.40***	
Scottishness	-.18*	-.02	.22**	-.39***

Table 2.

Descriptive statistics for political values and beliefs.

** $p < .01$, *** $p < .001$.

Variable	No		Yes		Effect size	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	Cohen's <i>d</i>
Age	22.8	9.1	28.6	14.6	2.86**	0.48
Socialism	4.4	1.3	5.6	1.1	5.69***	1.00
Economic pessimism	5.7	1.3	2.3	1.3	15.71***	2.62
Scottishness	3.8	2.3	5.5	2.1	4.83***	0.77