Circadian preferences of birdwatchers in Poland: Do "owls" prefer watching night birds, and "larks" prefer daytime ones?

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Birdwatching is a very popular and increasing leisure activity, and the study and observation of birds is more popular in the morning due to the greater activity among birds at that time of day.

The aim of our study was to find out whether there was a relationship between the circadian preference of observers and their favourite bird species, and whether it was influenced by such factors as professional status, age and gender. In an e-mail survey we asked a total of 433 Polish ornithologists (professionals) or birdwatchers (non-professionals) for their morningness–eveningness preferences (four categories) and favourite (open choice) bird species, and received 143 responses. The temporal (circadian) preferences of respondents declined from early morning (35.7%) to evening / nighttime (11.4%). Circadian preference categories differed significantly by age, with early morning respondents significantly older. These preference categories did not differ significantly in terms of response time to the survey invitation or in the percentage of their favourite birds that were categorised as daytime birds. A total of 204 species were identified as favourite birds of which 34 species were mentioned by 5 or more respondents, with only two, the common crane *Grus grus* and the Eurasian pygmy owl *Glaucidium passerinum* mentioned by more than 10% of respondents. The white stork *Ciconia ciconia* was more popular with professionals than non-professionals and the swift *Apus apus* less popular. A significant gender × circadian preference interaction was detected for the percentage of favourite birds categorised as daytime birds, with fewer daytime birds among early morning female recorders. The presented results are obviously of a correlative nature, but open the door for further, more advanced study, and suggest there may be a need to investigate temporal biases when analysing citizen-based data.

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2 **and "larks" prefer daytime ones?**

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14   **Abstract**

15   Birdwatching is a very popular and increasing leisure activity, and the study and observation of

16   birds is more popular in the morning due to the greater activity among birds at that time of day.

17   The aim of our study was to find out whether there was a relationship between the circadian

18   preference of observers and their favourite bird species, and whether it was influenced by such

19   factors as professional status, age and gender. This has the potential to influence results,

20   especially those based on citizen science observations. In an e-mail survey we asked a total of

21   433 Polish ornithologists (professionals) or birdwatchers (non-professionals) for their

22   morningness–eveningness preferences (four categories) and favourite (open choice) bird species,

23   and received 143 responses. The temporal (circadian) preferences of respondents declined from

24   early morning (35.7%) to evening / nighttime (11.4%). Circadian preference categories differed

25   significantly by age, with early morning respondents significantly older. These preference

26   categories did not differ significantly in terms of response time to the survey invitation or in the

27   percentage of their favourite birds that were categorised as daytime birds. A total of 204 species

28   were identified as favourite birds of which 34 species were mentioned by 5 or more respondents,

29   with only two, the common crane *Grus grus* and the Eurasian pygmy owl *Glaucidium*

30   *passerinum* mentioned by more than 10% of respondents. The white stork *Ciconia ciconia* was

31   more popular with professionals than non-professionals and the swift *Apus apus* less popular. A

32   significant gender × circadian preference interaction was detected for the percentage of favourite

33   birds categorised as daytime birds, with fewer daytime birds among early morning female

34   recorders. The presented results are obviously of a correlative nature, but open the door for

35   further, more advanced study, and suggest there may be a need to investigate temporal biases

36   when analysing citizen-based data.

37

38 **Key words:** environmental attitudes; birdwatching; circadian preference; morningness–

39 eveningness

40 **Introduction**

41 Many factors influence human attitudes to animals, including animal traits such as colour, size,

42 rarity and popularity, and human traits such as gender, age, education level and even food

43 preferences (reviewed in: Prokop & Randler, 2018). Obviously, both animal and human

44 perception has co-evolved, and the latter changes due to life experience and education (Prokop,

45 Kubiatko & Fančovičová, 2008; Prokop & Randler, 2018). Recently, dealings with animals have

46 not necessarily been linked just to a targeted use (e.g. food source, guard role, beast of burden),

47 but simply watching animals for fun, of which birdwatching is one example, is increasing

48 worldwide (Kronenberg, 2016; Callaghan et al., 2018). Bird species differ in many ecological

49 traits and these can also affect human behaviour, for example searching for information on

50 particular species (Żmihorski, Dziarska-Pałac, Sparks, & Tryjanowski, 2013; Correia, Jepson,

51 Malhado, & Ladle, 2016, 2017) and even willingness to pay for their conservation (Raab,

52 Randler, & Bogner, 2018). However, people watching birds, and other taxa, differ in many

53 psychological and physical traits, and one very marked behavioural difference is their particular

54 morningness–eveningness spectrum of activity (Werner, Geisler, & Randler, 2015). In the case

55 of bird observation, this can affect not only intellectual and physical peak performance during

56 the day (Pica, Amato, Pierro, & Kruglanski, 2015; Randler, Faßl, & Kalb, 2017; Arrona-Palacios

57 & Díaz-Morales, 2018), but also punctuality (Werner et al., 2015) and risk-taking (Wang &

58 Chartrand, 2015), which can be useful in finding and watching rare birds, which is a particularly

59 focussed activity of some birdwatchers (Żmihorski, Sparks, & Tryjanowski, 2012; Callaghan et

60 al., 2018).

61

62 The morningness–eveningness preference may change in relation to age, gender, and even

63 seasons (Pica et al., 2015; Randler, Faßl, et al., 2017), which also makes this interesting to study

64 in terms of the potential relationship between humans and birds. Birds are a very variable

65 taxonomical group. There are more than 10,000 species, they live in different habitats, and they

66 have different seasonal and daily activities mainly related to breeding, wintering and seasonal

67 migrations (Del Hoyo, Elliott, & Sargatal, 1992-2011; Jetz, Thomas, Joy, Hartmann, & Mooers,

68 2012), all of which combine to strongly affect people who watch and study birds (Callaghan et

69 al., 2018). Because people have different financial resources, time availability, personal

70 preferences, skills, knowledge, and commitment, they may focus on different bird

71 species/taxonomic groups (Lee & Scott, 2004; Prokop et al., 2008; Yarwood, Weston, & Garnett,

72 2014). Furthermore, the psychological terminology on circadian preference and morningness–

73 eveningness has always been linked to bird behaviour, as shown by use of the classical phrase

74 "owls *vs*. larks" (Pica et al., 2015; Putilov, Donskaya, & Verevkin, 2015). Furthermore,

75 differences in daily patterns of data collection, and a focus on particular bird species may attach

76 a bias to obtained results. Given the current debate on the importance of data quality (La &

77 Somveille 2019) this is a very pertinent issue, also in the context of bird monitoring schemes

78 (Snäll et al., 2011).

79

80 However, we do not know of a single study that has linked morningness-eveningness to

81 preferences of particular bird species or groups and therefore it is difficult to specify exact

82 testable hypotheses. However, we hazard a guess that people with stronger morningness than

83 eveningness will prefer morning rather than nocturnally active bird species, and *vice versa*.

84 Therefore, based on an e-mail questionnaire to birdwatchers, we attempted to answer whether:

85 (1) there is a relationship between observer morningness-eveningness and favourite bird species;

86 (2) there are differences between amateur birdwatchers and professional ornithologists in this

87 human trait; (3) potential differences are influenced by other factors (age and gender)?

88

89 **Methods**

90 *Data collection*

91 At 00:00 hours on the 19 February 2019 the first author (MF) sent an e-mail questionnaire to 433

92 (356 male, 77 female) Polish ornithologists and advanced birdwatchers and asked for a response

93 by e-mail. Potential participants were chosen by preparing a database of e-mail addresses using

94 information provided in scientific publications, including short notes published in Polish

95 naturalists' journals dedicated to birds. We accessed 28 journals publishing even local records of

96 rare species, unusual behaviour, species lists and even notes on untypical plumage (mainly in

97 Polish. The whole list of accessed journals is available in Supplementary Material). Participants

98 were asked for up to five favourite bird species (without any suggestion as to local or exotic),

99 their year of birth, and their classical circadian general type as used in similar studies (Randler,

100 Schredl, & Göritz, 2017) as follows: (A) definitely morning type; (B) more morning than

101 evening type; (C) more evening than morning type; and (D) definitely evening and night type.

102 Measuring circadian preference in this way could be criticised because it is based on a single

103 question, but Loureiro and Garcia-Marques (2015) showed that results were rather similar,

104 whether based on only a single question or derived from the full scale. Randler, Schredl et al.

105 (2017) showed that results were comparable, irrespective whether a four-item version or a single-

106 item measurement was used; both measures of chronotype revealed identical results. This is also

107 in line with Loureiro and Garcia-Marques (2015). We closed the survey two weeks after the

108   initial e-mail posting. For each respondent we recorded when their reply was sent and used this

109   to calculate the time to respond, expressed in decimal hours.

110

111   *Statement on ethical approval*

112   Research reported in this manuscript has been conducted in an ethical and responsible manner, in

113   full compliance with all relevant codes of experimentation and legislation.

114

115   *Data analyses*

116   For further analyses we added information on gender and we divided participants, according to

117   their academic degrees and jobs, into two general categories: professional and non-professional

118   (amateurs). The suggested favourite bird species were divided into two broad categories –

119   nighttime birds (such as owls, rails etc.) and daytime birds (the majority of passerines, cranes,

120   ducks etc.) using data from handbooks (mainly Del Hoyo et al., 1992-2011). For each respondent

121   the percentage of favourite birds that were daytime birds was calculated.

122

123   Because of the rather skew nature of some of the variables it was decided to focus on

124   nonparametric tests. Kruskal Wallis tests, adjusted for ties, were used to compare scale variables

125   to categories, and chi squared tests to compare categories with one another. Where expected

126   numbers were so low as to question the validity of chi squared results, Fisher exact tests were

127   used. For testing individual species such tests were restricted to species mentioned by 10 or more

128   respondents. Spearman correlations were used to compare scale variables. Binary logistic

129   regression was used to compare the proportions of favourite birds identified as daytime birds to

130   year of birth, professional status, gender and time preference category. The model initially

131 included all main effects and two-way interactions, but nonsignificant two-way interactions were

132 dropped one-by-one until only the main effects and any significant interactions remained.

133

134 Year of birth was used in analyses, but is presented as age in results. The significance threshold

135 in all analyses was taken as P=0.05. All analysis was carried out in Minitab 18 and SPSS 24.

136

137 **Results**

138 *Description of participants*

139 Complete or near complete responses were received from 143 individuals (33.0%), with response

140 times ranging from 3 minutes to 14 days (the cut-off point). Response rates were 31.7% for

141 males and 39.0% for females with no significant difference between the two (χ^2_1=0.73, P=0.394).

142

143 Response times were positively skewed with a median of 10 hours and a mean of 44 hours.

144 Years of birth were provided by 140 individuals, indicating a mean age of 45 years (range 22-

145 85). The professional status of the 142 birders providing detail was roughly evenly split between

146 non-professionals (51.4%) and professionals (48.6%). As expected from the targeted individuals,

147 the majority of respondents (79%) were male. The circadian preferences of respondents changed

148 from early morning; 50 (35.7%) coded A, 41 (29.3%) coded B, 33 (23.6%) coded C and 16

149 (11.4%) coded D, 3 people didn't provide a response to this question.

150

151 It is worth noting that 11 complaints (mainly about the aims and methods of the study) were also

152 received, which in combination with other responses indicate a response rate of 35.6% of the

153 targeted population. Nine of the complaints came from professional birders and a chi squared test

154   indeed confirmed that professionals were significantly more likely to complain (χ^2_1=4.70,

155   P=0.030). There was no significant association between gender and complaining (χ^2_1=1.18,

156   P=0.277). Furthermore, those complaining were significantly older (H=11.91, P=0.001, medians

157   64, 42 years).

158

159   Professional birdwatchers were significantly older (H=5.89, P=0.015) than non-professionals

160   (median ages 47 and 41 years respectively), but did not differ significantly in response times to

161   the survey (H=0.72, P=0.395) or in the percentage of their favourite birds that were categorised

162   as daytime birds (H=0.29, P=0.589). There was no significant association between professional

163   status and gender (χ^2_1=0.76, P=0.384) or between professional status and circadian preference (

164   χ^2_3=5.34, P=0.149).

165

166   Female respondents were significantly younger than male respondents (H=11.91, P=0.001,

167   medians of 37 and 45 years respectively), but did not differ significantly in terms of response

168   times (H=0.04, P=0.835) or percentage of their favourite birds that were categorised as daytime

169   birds (H=0.12, P=0.726). There was a suggestion that females were less likely to be category A

170   recorders but this did not quite reach significance (Fisher exact test P=0.053).

171

172   Circadian preference categories differed significantly in age, with category A respondents

173   noticeably older (H=10.56, P=0.014, medians 48, 41, 40 and 42 years respectively for categories

174   A-D). Circadian preference categories did not differ significantly in terms of response time

175   (H=3.29, P=0.349) or percentage of their favourite birds that were categorised as daytime birds

176   (H=2.29, P=0.514).

177

178 *Favourite bird species*

179 A total of 204 species were identified as favourite birds, of which 184 (90.2%) were classified as

180 daytime birds. A full table of species indicating their daytime/nighttime category is given in

181 Supplementary Material 1. The 34 species mentioned by 5 or more respondents are listed in

182 Table 1. Only two species, the common crane *Grus Grus* and the Eurasian pygmy owl

183 *Glaucidium passerinum*, were mentioned by more than 10% of respondents. Only the 12 species

184 that were mentioned 10 or more times were subject to further analysis. This additional analysis

185 suggested that the white stork *Ciconia ciconia* was more popular with professionals than non-

186 professionals (13% cf. 3%) and the swift *Apus apus* less popular (3% cf. 12%). No significant

187 gender preferences were detected in this subset of species. There was a significant difference in

188 the circadian preference categories for swift which was not mentioned by any of the category A

189 respondents.

190

191 There were no significant Spearman correlations between age, response times and percentage of

192 favourite birds that were categorised as daytime birds (all P>0.297).

193

194 Binary logistic regression on the proportion of favourite birds categorised as daytime produced

195 an overall significant model (χ^2_9=23.47, P=0.005) with one significant main effect (gender: χ^2_1

196 =5.09, P=0.024) and one significant interaction (gender × circadian preference: χ^2_3=14.26,

197 P=0.003). In addition, circadian preference was very close to significance (χ^2_3=7.80, P=0.0503).

198 This interaction is shown in Figure 1 where female respondents in category A reported fewer

199 favourite daytime birds than their male counterparts, and in contrast to the pattern in other

200 categories.

201

202 **Discussion**

203 The number of participants may appear lower than expected in western European countries such

204 as the Netherlands, Germany and especially the UK (Cocker 2012). But in reality we asked a

205 large proportion of bird observers that usually participate in national citizen science projects in

206 Poland, such as Common Birds Monitoring Scheme, Winter Bird Counts and BirdFeeder Project.

207 These schemes usually attract only 100-180 people. We used an e-mail based questionnaire, with

208 an overall response rate of 35.6% which may appear low, but is similar to the average rate in

209 other studies using similar methods in psychology (Cook, Heath, & Thompson, 2002; Sheehan,

210 2001). We also noted with great interest the few complaining e-mails where respondents, mainly

211 professionals, expressed concerns over the aims and methodology of the study. It may seem

212 obvious that a significantly greater rate of complaint would derive from professional

213 ornithologists rather than amateur birdwatchers, because professionals focus much more on

214 science than simply gaining pleasure from watching birds (e.g. Yarwood et al., 2014; Yarwood,

215 Weston, & Symonds, 2019 and see also below).

216

217 The study also suggests that watching birds is still more popular among men than women,

218 similar to other studies in Poland, but which were based on a much smaller sample size

219 (Sklodowski & Jurkowska, 2015). However, it is interesting to note that women participating in

220 our study were significantly younger than men, which is a sign of an encouraging (probably

221 global) trend that birdwatching has recently become more popular with women (Cooper &

222 Smith, 2010). The most represented circadian preference was the "early morning type", a finding

223 similar to that found by Raab et al. (2018). Moreover, those authors even suggested that students

224 with a morningness preference were more likely to be protective of, and appreciative towards,

225 nature, including birds. Furthermore, early morning (lark type) people more often participated in

226 voluntary activities, shared information, were open to new ideas, were faster and more punctual

227 (Song & Stough, 2000; Werner et al., 2015). On the other hand, if we compare birders with the

228 general Polish population (e.g. Jankowski, 2013; Tęgowska, Sobocińska, & Maliszewska, 2014)

229 there is still apparent a visible bias to the early morning type. In a correlative-type study like ours

230 it is impossible to determine if early morning types are more likely to take up an ornithological

231 career, or indeed if they just have to get up early to watch more bird species. This can only be

232 resolved if a representative sample of Polish people was surveyed and matched for gender and

233 age, because there are significant age effects in circadian preference in the adult population (e.g.

234 Randler et al., 2016).

235

236 The 143 respondents mentioned 204 species as favourite birds with great variation between

237 respondents, but some patterns are worth noting. Only two species, the common crane and the

238 Eurasian pygmy owl, were mentioned by more than 10% of respondents. We did not ask why

239 people decided on their particular species, but Eurasian pygmy owl was a surprise to us. The

240 common crane is a more obvious choice because it is a big charismatic bird with a characteristic

241 call, an increasing population size and is also represented in Polish culture and art (e.g. Wąs,

242 2013). Interestingly, the white stork was a more popular choice with professionals than with non-

243 professionals but the swift showed an opposite pattern. The white stork is a Polish icon, well

244 recognised, easy-to-spot even by beginners, and very popular in both scientific studies and the

245 cultural life of Poland (Kronenberg, Andersson, & Tryjanowski, 2017). There are long term-data

246 on white storks that permit advanced statistical analyses and so it is often chosen as a study

247 species by ornithologists, although it is not very attractive to classical birdwatchers because it is

248 still common, but is more exciting to visitors to Poland rather than local birdwatchers

249 (Kronenberg, 2016; Kronenberg et al., 2017). In choosing study species, ornithologists follow

250 different criteria, based on the probability of obtaining a good sample size, conservation status,

251 and even size and behaviour (Yarwood et al., 2014, 2019). After some years of study, they know

252 much about the biology of the species, including its secrets, and are fascinated by the species

253 which then also becomes a favourite bird (personal experience of the authors). It is likely that

254 preferences change over time and are sensitive to mass-media information making species more

255 or less charismatic in recent years (Żmihorski et al., 2012; Correia et al., 2016, 2017). In our

256 sample, swift is perhaps an indicator of changes in recent times, because the species is an object

257 of recent debate focused on bird conservation in urban areas and information has been promoted

258 on this species biology, ecology and importance to humans (Luniak & Grzeniewski, 2011). It is

259 interesting that this species was not suggested as a favourite bird by any of the "early morning"

260 respondents, which fits especially well with the late afternoon and early evening activity of

261 swifts.

262

263 A number of other interesting patterns appear evident in Table 1 but failed to achieve either

264 significance or sufficient sample size for testing. A study based on a larger sample would be

265 needed to confirm or refute any of these apparent patterns. Probably a more advanced study

266 should compare species choice with other factors, for example how much attention she/he pays

267 to that particular bird species, how many publications are dedicated to that particular species, and

268   even a measure of emotional attachment. Similar studies could be useful for understanding the

269   choice of different outdoor activities between people, as well as a deeper understanding of the

270   variability of other groups of passionate recreationalists (e.g. anglers, hunters, mountain

271   climbers, cf. Wałęga et al., 2017). Given that much of the data used to estimate species

272   population sizes and geographical distributions, and to produce bird guides, originate from

273   recorders of which our respondents were a sample, it is important to know if their behaviour may

274   subconsciously influence their records. Furthermore, a better understanding of the reasons for the

275   popularity of species could help enormously in planning for, and funding, their conservation.

276   One important aspect that chronobiology may contribute to bird research is the influence on

277   citizen science programs. Citizen science programs, such as eBird rely heavily on the

278   submissions of many volunteer birdwatchers (Wiersma 2010). However, the reporting of given

279   species may be significantly influenced if the chronotype of the birdwatchers and the circadian

280   rhythms of specific species do not map. Early morning bird species may go underreported most

281   birdwatchers are not morning oriented themselves. In a similar manner, a higher proportion of

282   "owls" in birdwatchers may lead to a better registration of owls in these databases. Of course,

283   these assumptions need further study based on larger samples.

284

285   Conclusion

286   Although much is known about birds and the importance of citizen science, only scarce evidence

287   is available about the nature of birdwatchers, both professional and amateur. These data,

288   especially about their morning or evening preference, may severely influence data collection

289   behaviour but, in this study, we were able to show that there is only a weak influence of

290 circadian preference on leisure birdwatching, and thus, we assume a minimal or even absent

291 influence of circadian preference on birdwatching.

292

293

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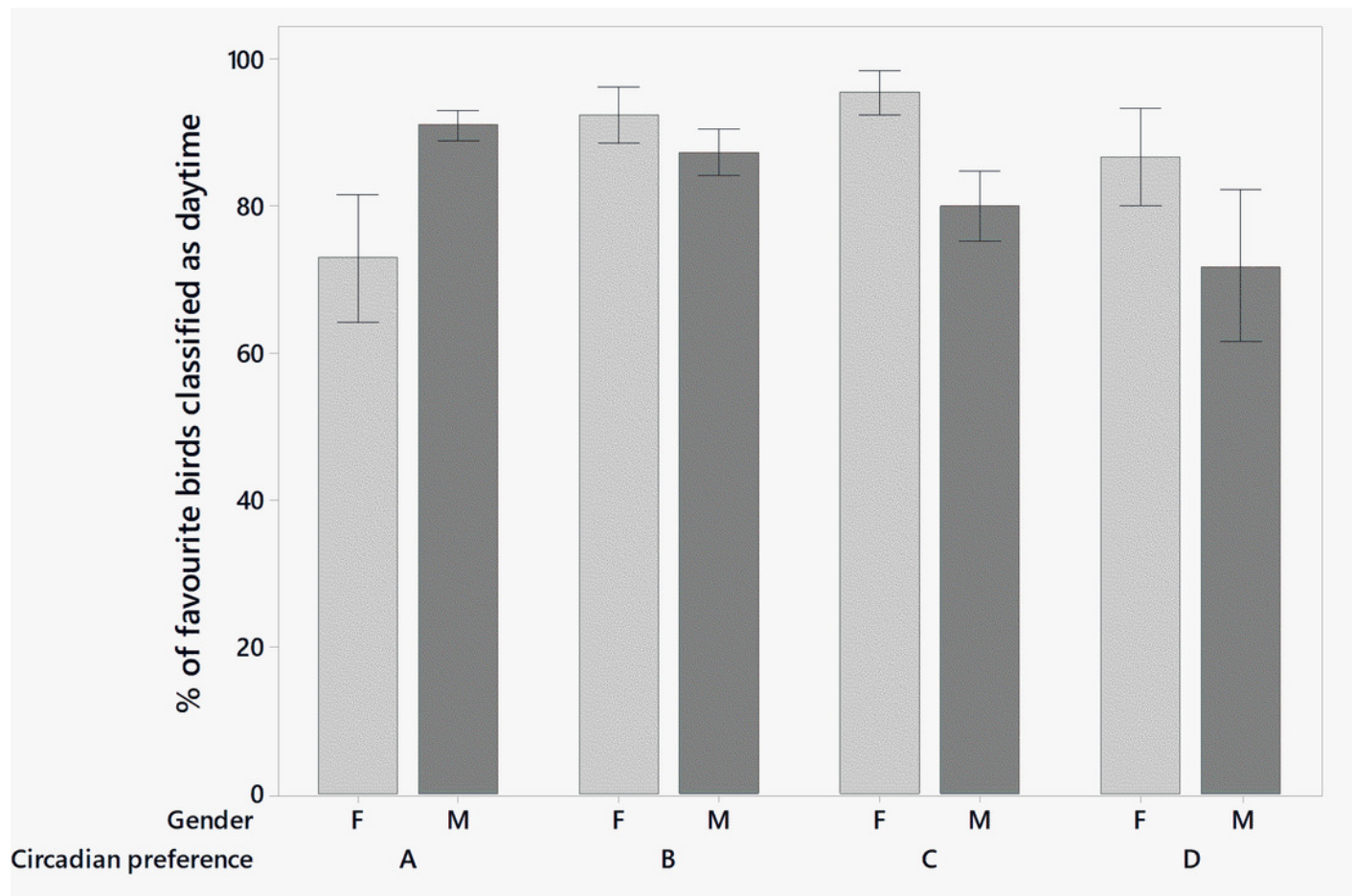
Figure 1

The mean percentage ±SE of favourite birds classified as daytime by gender and circadian preference

The 34 most popular species (those with n≥5) reported by respondents.

In addition to the overall number and percentages, percentages are also given by professional status (NP nonprofessional, P professional), gender (F female, M male), and circadian preference (categories A-D, see main text). Significance (indicated by *) tested using chi squared or Fisher exact tests for the 12 species with n≥10. Species in grey shading were categorised as nighttime; all others as daytime.

1 Table 1. The 34 most popular species (those with n≥5) reported by respondents. In addition to

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5 exact tests for the 12 species with n≥10. Species in grey shading were categorised as nighttime;

6 all others as daytime.

Species	n	%	NP%	P%		F%	M%		A%	B%	C%	D%	
Grus grus	28	19.6	23.3	15.9		23.3	18.6		20.0	29.3	15.2	6.3	
Glaucidium passerinum	16	11.2	12.3	10.1		10.0	11.5		10.0	14.6	9.1	12.5	
Alcedo atthis	14	9.8	11.0	8.7		10.0	9.7		12.0	7.3	9.1	12.5	
Upupa epops	14	9.8	11.0	8.7		10.0	9.7		8.0	12.2	12.1	6.3	
Turdus merula	13	9.1	11.0	7.2		6.7	9.7		14.0	2.4	9.1	12.5	
Aegithalos caudatus	12	8.4	8.2	8.7		16.7	6.2		8.0	9.8	9.1	6.3	
Ciconia ciconia	11	7.7	2.7	13.0	*	3.3	8.8		12.0	4.9	9.1	0.0	
Vanellus vanellus	11	7.7	8.2	7.2		6.7	8.0		2.0	9.8	9.1	18.8	
Apus apus	11	7.7	12.3	2.9	*	10.0	7.1		0.0	14.6	12.1	6.3	*
Merops apiaster	11	7.7	9.6	5.8		10.0	7.1		10.0	2.4	12.1	0.0	
Haliaetus albicilla	10	7.0	8.2	5.8		6.7	7.1		8.0	9.8	0.0	6.3	
Lanius collurio	10	7.0	5.5	8.7		6.7	7.1		10.0	2.4	9.1	6.3	
Strix aluco	9	6.3	9.6	2.9		6.7	6.2		6.0	12.2	3.0	0.0	
Circus pygargus	9	6.3	8.2	4.3		6.7	6.2		6.0	9.8	3.0	6.3	
Corvus monedula	9	6.3	2.7	10.1		10.0	5.3		8.0	7.3	6.1	0.0	
Ciconia nigra	8	5.6	8.2	2.9		6.7	5.3		6.0	7.3	3.0	6.3	
Corvus frugilegus	8	5.6	4.1	7.2		6.7	5.3		10.0	0.0	6.1	6.3	
Corus corax	8	5.6	8.2	2.9		13.3	3.5		4.0	7.3	0.0	12.5	
Galerida cristata	8	5.6	6.8	4.3		3.3	6.2		8.0	4.9	3.0	6.3	
Erithacus rubecula	7	4.9	6.8	2.9		3.3	5.3		8.0	4.9	3.0	0.0	
Bucephala clangula	7	4.9	4.1	5.8		3.3	5.3		6.0	2.4	6.1	6.3	
Sturnus vulgaris	6	4.2	5.5	2.9		3.3	4.4		8.0	0.0	6.1	0.0	
Parus major	6	4.2	1.4	7.2		3.3	4.4		6.0	0.0	6.1	6.3	
Lyrurus tetrix	6	4.2	5.5	2.9		0.0	5.3		2.0	7.3	6.1	0.0	
Athene noctua	6	4.2	4.1	4.3		10.0	2.7		0.0	0.0	9.1	18.8	
Aquila chrysaetos	6	4.2	8.2	0.0		6.7	3.5		2.0	9.8	0.0	6.3	
Limosa limosa	6	4.2	5.5	2.9		3.3	4.4		2.0	7.3	3.0	6.3	
Tyto alba	5	3.5	4.1	2.9		0.0	4.4		6.0	0.0	6.1	0.0	
Milvus milvus	5	3.5	4.1	2.9		3.3	3.5		6.0	0.0	3.0	6.3	
Tetrao urogallus	5	3.5	2.7	4.3		3.3	3.5		0.0	7.3	6.1	0.0	
Sylvia nisoria	5	3.5	2.7	4.3		0.0	4.4		2.0	4.9	6.1	0.0	
Coracias garrulus	5	3.5	2.7	4.3		3.3	3.5		4.0	2.4	0.0	12.5	
Strix nebulosa	5	3.5	2.7	4.3		6.7	2.7		4.0	0.0	3.0	12.5	
Clanga pomarina	5	3.5	6.8	0.0		3.3	3.5		4.0	2.4	0.0	12.5	