1   **Watch-wearing as a marker of conscientiousness**

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15   **Abstract**

16   Several aspects of an individual's appearance have been shown to predict personality

17   and related behaviour. While some of these cues are grounded in biology (e.g. the

18   human face), other aspects of a person's appearance can be actively controlled (e.g.

19   clothing). In this paper, we consider a common fashion accessory, the wristwatch. In

20   an exploratory sample (N>100) and a confirmatory sample (N>600), we compared

21   big-five personality traits between individuals who *do* or *do not* regularly wear a

22   standard wristwatch. Significantly higher levels of conscientiousness were observed

23   in participants who wore a watch. In a third study (N=85), watch wearers arrived

24   significantly earlier to appointments in comparison to controls. These results are

25   discussed in relation to enclothed cognition and the rise of wearable technology

26   including smartwatches.

1. Introduction

The ability to perceive, and generalize from variations in behaviour or appearance helps provide a sense of order and predictability in social interactions (Ambady & Skowronski 2008). and observers routinely make rapid inferences about personality based on aspects of personal appearance across a variety of contexts (Wall, Taylor, Dixon, Conchie & Ellis 2013). Inferences are often based on information revealed through cues from the face, body, or voice. For example, aspects of personality extracted from brief snippets of novel voices are remarkably consistent between participants (McAleer, Todorov & Belin 2014). Similarly, people with broad faces are rated as more aggressive (Carré & McCormick 2008). For some traits, there appears to be a strong biological basis that explains any behavioural correlate - testosterone affects facial appearance and aggression for example (Verdonch, Gaethofs, Carels & de Zegher 1999). However, a second related branch of research concerns other aspects of an individuals' appearance that can actively be controlled and a variety of specific inferential links have been observed between particular 'features' of clothing and components of character. Participants who wear glasses were rated as less extraverted and less open to experience (Borkenau 1991; Hellstorm & Tekle 2006) while the presence of tattoos are associated with lower levels of conscientious and higher levels of extraversion (Swami 2012).

This line of research also raises the question of how reliable these inferences are in terms of predicting behaviour. The fact that these facets of appearance are chosen by the individual rather than being biologically endowed may suggest a weaker link between appearance and behaviour, but a growing body of research on the phenomenon of 'enclothed cognition', where changes in clothing can also effect

behaviour challenge this assumption. Adam & Galinsky (2012) recently demonstrated that wearing a lab coat described as a 'doctor's coat' increased sustained attention when compared to wearing a lab coat that was labeled as a 'painter's coat'. They argue that 'enclothed cognition' depends on both the symbolic meaning and the physical experience of wearing clothes. In addition, effects running in the opposite direction (from personality to appearance) may be more plausible for non-biological factors. An aggressive person for instance cannot chose to have a broader face, but he could choose to wear black clothes and make themselves appear more aggressive (Vrij 1997). Here we focus on one particular clothing accessory, the wristwatch. Watches are an interesting case because they are designed to perform a very specific function – to tell the time. This specificity of function lends itself to experimentation because it suggests very targeted predictions about personality and behaviour.

Despite the rise in mobile devices with built-in clocks, the number of standard watch owners has remained static in recent years (Hoffman 2009; Mintel 2010). On the other hand, while many people continue to regularly wear a wristwatch, many chose to avoid them completely. Their prominence or absence in everyday life again makes them an ideal candidate when considering external markers of personality.

While research concerning the relationship between personality and an individual's outward appearance appears to be flourishing (e.g. Hellstrom & Tekle 2006; Gillath, Bahns, Ge & Crandall 2012; Swami 2012), a number of limitations continue to affect this literature. First, there remains an over-reliance on university student samples. These samples may not be representative of the wider population (Swami 2012). Secondly, previous research often fails to go beyond self-report (e.g. Gillath etl al

77 2012), with many papers failing to include an additional behavioural measure that

78 may help explain or confirm differences observed in personality scores alone.

79 In order to overcome these limitations, and based on the premise that a core

80 component of Conscientiousness is good timekeeping, planning (Back, Schmukle &

81 Egloff 2006), and organisation (Lee & Ashton 2004), we predicted that watch wearers

82 would score consistently higher on a simple measure of conscientiousness in

83 comparison to non-watch wearers. Accordingly, timekeeping can be operationalised

84 as punctuality and if watch wearers really are more conscientious then they will, in

85 turn, be more punctual in a real-life setting.

86

87 **2. Study 1**

88

89 *Ethics Statement*

90 The University of Glasgow, College of Science & Engineering Ethics Committee

91 approved all research (2013-4641). Participants were informed about procedures in

92 detail and provided written informed consent.

93

94 *2.1. Method*

95 *2.1.1. Measures*

96 We assessed personality using The Ten-Item Personality Inventory (TIPI). The TIPI

97 was developed by Gosling, Rentfrow and Swann (2003) to meet the need for a very

98 brief measure of the Big-Five personality dimensions (extraversion, agreeableness,

99 conscientiousness, emotional stability and openness to experience). This measure was

4

100   chosen due to its short nature, which allowed us to collect comparable data from both

101   members of the public and students who had a limited amount of time to take part.

102   *2.1.2 Participants*

103   One hundred and twelve participants were recruited and included members of the

104   public attending The British Science Festival in 2010 and students studying

105   psychology at Glasgow or Lincoln Universities in the United Kingdom (62.5%

106   female) who were waiting to take part in experiments. Their ages ranged from 17-54.

107   *2.1.3 Procedure*

108   Individuals approaching a psychology stand were asked if they wished to take part in

109   a short study related to personality. If written consent was obtained, participants were

110   required to fill out the TIPI. They were then asked whether or not they regularly wore

111   a wristwatch. A regular watch wearer was defined as someone who wore a standard

112   wristwatch, most of the time, for at least a year. Finally, all participants were thanked

113   for their time and fully debriefed as to the true nature of the study.

114   *2.1.4. Results*

115   As expected, participants who identified themselves as regular watch wearers rated

116   themselves as significantly more conscientious when compared with controls (Table

117   I). We also observed that watch wearers scored lower in extraversion, agreeableness

118   and openness, but higher on emotional stability. However, before conducting a further

119   multivariate analysis, we next sought to replicate this finding in a larger confirmatory

120   sample.

121   ---Insert Table I about here---

122

123

3. Study 2

We attempted to replicate the results from Study 1 in a large online sample who, after completing the TIPI were asked:

'Do you regularly wear a watch?'

Participants were recruited via numerous email shots and twitter advertisements. They also provided information about their age, gender, location, working habits and mobile phone ownership. In total, 638 participants took part (48.6% female). Modal age bands were 35-54 (36.4%) and 18-24 (30.5%); modal locations UK (60.8%), North America (13%). Regarding working habits, 49.7% confirmed that they worked a traditional Monday-Friday dayshift with the remainder working alternative hours (e.g. shifts, unemployed or students). Finally, 46% percent (N=290) identified themselves as being regular watch wearers.

3.1 Preliminary Analysis

A primary analysis revealed no significant difference in the distribution of genders between the watch and non-watch groups [X^2 (1, N=632) = 2.36, p = .124]. While 97.48% of our sample owned a mobile phone, we also observed that there was no significant difference in this distribution of phone ownership between watch and non-watch wearers [X^2 (1, N=635) = .803, p = .370]. Finally, there was no significant difference in the distribution of those who worked traditional or shift based work between watch and non-watch groups [X^2 (1, N=637) = .680, p = .410].

3.2 Replication of Study 1

An independent sample t-test again revealed significant differences in mean conscientiousness scores between watch and non-watch wearers (Table II). Further t-tests revealed no other significant personality differences between watch and non-

6

148 watch wearers across the other four factors of personality [p's > .05]. As observed in

149 Study 1 however, we again observed similar trends whereby watch wearers scored

150 lower in extraversion and openness in comparison to controls.

151

152   ---Insert Table II about here---

153

154 *3.3 Regression Model*

155 In order to confirm that the personality differences reported above hold after

156 controlling for additional factors, we entered age, gender and all five personality

157 factors into a binary logistic model. This model confirms that wearing a watch

158 remains a visible indicator for conscientiousness even after controlling for gender and

159 age (Table III). In other words, the odds of wearing a watch is significantly larger for

160 a person who reports higher levels of conscientiousness (odds ratio = 1.147).

161

162   ---Insert Table III about here---

163

164 **4. Multivariate analysis**

165 Personality is a multidimensional construct and effect sizes should also be considered

166 in relation to the overall magnitude of differences observed between two groups.

167 When groups differ along several variables at once, the overall between-group

168 difference is not always accurately represented by *univariate* effect sizes in isolation.

169 Therefore, Del Giudice, Booth & Irwing (2012) have argued that in order to aggregate

170 differences across variables while also taking correlation patterns into account, it is

171 necessary to computer a *multivariate* effect size. The Mahalanobis distance *D* metric

172 allows for these comparisons and is given by the formula:

173

$$D = \sqrt{d'S^{-1}d}$$

174

175 where **d** is the vector of univariate standardised differences (Cohen's *d*) and **S** is the

176 correlation matrix.

177

178 We calculated the multivariate generalisation (*D* measure) of personality differences

179 in both samples, factoring in changes between the groups across all five factors of

180 personality. When evaluated in this way, personality differences observed in both

181 samples are considerably larger than some of the Cohen's *d* effect sizes in isolation.

182 The resulting multivariate effect sizes were calculated as *D* = .69 in the exploratory

183 sample and *D* = .23 in the confirmatory sample. While significant differences were

184 observed in levels of conscientiousness between the two groups, the overall

185 differences in personality are not limited to a single personality factor. For example,

186 in both samples watch wearers consistently produce lower extraversion and openness

187 to experience scores.

188

189 **5. Study 3**

190 The previous results lend strong support to the notion that people who choose to wear

191 a watch also tend to rate themselves as more conscientious. While organisation is

192 often considered as a lower-order facet score in many personality measures (e.g. as

part of the HEXACO Personality Inventory; Lee & Ashton 2004), higher levels of conscientiousness alone correlate with improved punctuality (Back et al 2006). Ashton (1998) also observed that conscientiousness was negatively associated with self-reported lateness in the workplace. Our final study therefore sought to investigate if punctuality is also related to watch wearing.

5.1. Method

5.1.1 Participants

Ninety participants (29% male) who arrived to complete a separate experiment in the School of Psychology took part in this study. Their ages ranged from 17 to 48. All participants had previously visited the department on at least one previous occasion. This ensured that participant's were unlikely to become lost before an experiment was scheduled to start.

5.1.2 Procedure

Participants arriving at the School of Psychology for an unrelated experiment had their exact time of arrival recorded by the experimenter. Time of arrival was recorded as time-lag in minutes between the experiment appointment time and time of each participant's arrival. It was also noted whether they were a regular watch wearer.

5.1.3. Results

Participants who exceeded an early or late arrival time of +- 15 minutes were removed from the analysis (N=5) to ensure that data were normally distributed. On average, the remaining participants arrived 2.19 minutes before the appointed time (*SD* = 5.95). Mean punctuality scores (minutes late or early) were calculated for watch and non-watch wearers. A total of 34 watch wearers and 51 non-watch wearers arrival times were analysed (Fig I).

217

218   ---Insert Figure I about here---

219

220   An independent sample t-test demonstrated a reliable difference in punctuality with

221   participants in the watch-wearing group arriving significantly earlier [$M = 4.12$, $SD =$

222   5.45] in comparison to those who were not wearing a watch [$M = .90$, $SD = 5.96$], [t

223    $(83) = 2.52$, $p = .01$; $d = .55$].

224

225   **6. General Discussion**

226   Choosing to wear a watch appears to act as a social marker for an individual who is

227   likely to be more conscientious. A further replication across a larger sample supports

228   this conclusion. We also observed consistent multivariate differences in personality

229   between the two groups with watch wearers showing lower levels of extraversion and

230   openness. Finally, watch wearers behave in way that is consistent with higher levels

231   of conscientiousness by arriving at an appointment earlier than non-watch wearers.

232

233   While personality has previously been linked to time perception (e.g. Rammsayer

234   1997), this is the first study to link personality with the absence or presence of an

235   everyday time cue. Higher levels of conscientiousness have previously been

236   associated with increased levels of self-organisation in a variety of contexts and watch

237   wearing may be an additional purchase decision that interacts with other related

238   individual differences (Aaker 1997). Conscientiousness alone is made up of many

239   sub-facets of personality and one of these may play a more important role in watch

240 wearing than others (e.g. organisation, diligence and perfectionism; Lee & Ashton

241 2004).

242

243 These results could also be considered in the context of enclothed cognition, that is,

244 the influence clothes or fashion accessories can have on a wearer's psychological

245 processes. Adam & Galinsky (2012) propose that changes in cognition depend on

246 both the symbolic meaning and physical experience of wearing different types of

247 clothes, but this could also apply to wristwatches. As a fashion accessory, or

248 expression of social status the act of wearing a watch may provide an additional,

249 albeit implicit cognitive impact on wearers, which makes them more conscientious

250 and better planners. In terms of punctuality specifically, appointment type may be an

251 important factor to consider in future research, but these results are consistent with

252 research demonstrating that personality is likely to be important when considering

253 punctuality in isolation (Back et al 2006). Even if conscientious individuals are

254 delayed, they will be dutiful enough to try to limit their lateness. In addition, our

255 effect size relating to punctuality is far higher than previous correlations observed

256 between conscientiousness and punctuality in a comparable sample by Back and

257 colleagues (2006).

258

259 The standard watch remains technologically simple, but this simplicity explains why

260 countless manufactures of smartwatches are attempting to capitalize on this specific

261 form factor (Fogg 2009). Such devices typically measure and provide additional

262 feedback related to physical and physiological activity (e.g. heart rate). Interestingly,

263 these devices are more likely to be purchased by those who already lead a healthy

264 lifestyle (Swan 2009). The desire to own or wear a standard wristwatch may therefore

265 be driven by higher levels of conscientiousness in the first instance. Alternatively, the

266 decision to purchase a watch may simply be motivated by a desire to know the time,

267 become more organised and in turn attempt to become more conscientious.

268

269 Could the act of wearing a watch make an individual healthier or more conscientious?

270 At present, this line of enquiry only extends to more simplistic devices like

271 pedometers, where feedback correlates with an increase in physical activity, but not

272 beyond the duration of the original intervention (Bravata et al 2007). While watch

273 wearing and smartwatch ownership correlate with increased levels of

274 conscientiousness and health promoting behaviours, the direction of these

275 relationships remains unclear, but worthy of further investigation. This is particularly

276 relevant given existing links between the accuracy of clocks and long-term health

277 outcomes (Levine & Bartlett 1984; Levine & Norenzayan 1999).

278

279 Another future direction for this research would be to explore the effect that watch

280 wearing can have on first impressions and consider the relationship between self and

281 others' perceptions of watch wearing. How such a time cue could influence other

282 evaluative judgments by prompting attributions remains unclear. One might predict

283 that the presence of a watch would serve to help improve an individual's first

284 impression in a specific social context for example, at a job interview (Chapplin,

285 Phillips, Brown, Clanton & Stein 2000; Dougherty, Turban & Callender 1994).

286

287   One limitation which could be levelled at this study is that some participants may own

288   a mobile phone, but not a standard watch, which may act as a confounder because

289   they still have rapid access to the time. However, 100% of our exploratory sample and

290   97.48% in our second sample also owned a mobile phone so this is unlikely to have

291   been an influencing factor. It is worth noting however, that the effect size relating to

292   differences in conscientiousness reduced considerably between our exploratory and

293   confirmatory samples. While the effect size is reduced in our larger sample, small

294   effects could have larger aggregated consequences. For example, the short nature of

295   the personality measure chosen suggests that a larger effect may be observed if a

296   more in-depth measure of personality was deployed, but this may have limited our

297   sample size. For now, we simply wanted to demonstrate that our exploratory findings

298   could be replicated in a further independent sample using an identical measure of

299   personality.

300

301   A second limitation concerns the reasons behind watch ownership. While an

302   alternative explanation might conclude that choosing to wear a watch is related to

303   social status and not a desire to know the time, this argument does not chime with the

304   consistency of our results reported here. This is particularly pertinent when

305   considered alongside our behavioural measure however, we cannot rule this additional

306   explanation out completely.

307

308   In sum, wearing a device that tells the time on the wrist is likely to remain an

309   important tool for the foreseeable future and to our knowledge this is the first study to

310   demonstrate a link between watch wearing, personality and related behaviour (Anwar

311 2012). Specifically, watch wearers from a variety of backgrounds elicit significantly

312 higher levels of conscientiousness and lower levels of extraversion and openness.

313 They also arrive earlier for appointments. From the present data, it is not clear

314 whether being conscientious inclines a person to wear a watch, or whether wearing a

315 watch makes a person more conscientious. Whichever the direction of the

316 relationship, watch wearing is a valid external marker of both personality and

317 associated behaviour.

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