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Title: Formal-informal musical learning, gender and musicians' personalities.

Abstract:

Research has suggested that differences in personality traits among western musicians, in comparison to the general population, may be related to gender. For example, studies suggest male classical musicians are more introverted than popular musicians, though female musicians may be more extroverted than population norms. Contemporary musical learning can be formal and/or informal, and changes in music education may have impacted upon traditional gender-based stereotypes. This study investigated similarities and differences between formal/informal musical learning, gender and musicians' personalities. The sample included 275 musicians (87 female, mean age 40.2 years, range 19-81, learning duration > 6 years). The participants were either self-taught (n = 74), formally taught (n = 62), or a mixture of the two (n = 139). A comparison of two brief inventories (TIPI and BFI-10) provided reliability and validity. Contrary to previous research, no gender differences were found for the trait of Extraversion. Group differences according to formal/informal learning styles were apparent. Higher levels of Conscientiousness were associated with formal music learning. Overall musicians had higher levels of Openness to Experience than population norms. Further research will be required to understand whether this is an artifact of access and provision to music education, or a systematic personality difference among musicians.

In the 1990's, expert musical ability was attributed to thousands of hours of practice by some, but not others (e.g. Ericsson, Krampe & Tesch-Römer, 1993; Howe, Davidson & Sloboda, 1998). Twenty years later, meta-analytic research suggested that only 20-30% of musical ability could be accounted for by deliberate practice (Hambrick et al., 2014; Macnamara, Hambrick & Oswald, 2014). Interest in explaining the remaining variance has included studies of phenotype/genotype expressions, intelligence and personality (see e.g. Gardner, 1983; Gregerson et al., 2013; Honing & Ploeger, 2012; Ukkola-Vuoti et al., 2013).

In terms of the Big Five personality traits, research has generally reported higher levels of Openness to Experience in western musicians in comparison to population norms (Kemp, 1981; Gillespie & Myors, 2000; Corrigall, Schellenberg & Misura, 2013; Vaag, Sung and Bjerkeset, 2017). However, some differences in personality traits such as Extraversion have been associated with either musical genre (classical/popular), and/or the gender of the musician. These differences may be accounted for sampling biases due to established structures and the social dynamics of musical learning which may have supported stereotypical patterns of findings in earlier work (e.g. Davies, 1978; Lipton, 1986). Here we provide an overview of previous findings relating to this notion of genre, and the gender of the musicians in terms of personality traits.

In general, classical musicians have been associated with higher levels of Introversion, but also Pathemia (associated with imagination and tender-mindedness) and traits such as imagination, creativity and interest in change (Kemp, 1981, 1996; Marchant-Haycox & Wilson, 1992). In contrast, higher levels of Extraversion have been observed in popular musicians, in comparison to university students (Dyce & O'Connor, 1994). However, the picture is far from clear as Gillespie and Myors (2000) also found high levels of Neuroticism and Openness to Experience in rock musicians, though these personality factors were not mediated by duration of playing, level of musical ability or commercial success.

According to these data, it may appear that musicians' personalities differ according to the nature of their performance styles. However, many of the studies cited so far have relied upon mostly male samples. Where studies have included comparisons by gender,

findings have been in line with stereotypical associations. For example, Davies (1978) and Builione and Lipton (1983) found that (mostly male) brass players were typically seen as loud, brash and extroverted, whereas (mostly female) strings players were seen as feminine, and timid in orchestras. Kemp (1982) reported statistically significant differences between male and female musicians (in comparison to the general population) on the dimension of Extraversion/Introversion, leading to his 'sexual androgyny hypothesis' where male musicians are predicted to exhibit more female characteristics and vice versa. More recently, in both children and adults, Corrigall, Schellenberg and Misura (2013) found a link between musicianship and Conscientiousness in females only. Bogunovič (2012) also found female musicians were generally more open, agreeable and conscientious than their male counterparts in a sample of musicians from different backgrounds.

However, the cultural associations embedded in music education mean that we cannot simply discuss 'innate sex differences' in musicians without understanding how the personality traits of musicians may develop within cultural contexts in which gender stereotypes shape those traits (Green, 2017:, Klimstra et al., 2009). It is important not to assume sex differences (as often described in psychology) relate to gender differences per se, as Cribb and Gregory (2010) have suggested that musicians' roles are determined by associations historically rather than the instruments themselves. Recently, Hallam and colleagues (2017) considered how stereotyping associated with musical instrument 'choice' tends to occur early. Their study of nine to sixteen year olds showed that music was seen as a feminine subject, that girls tended to play more high-pitched instruments, and boys were more engaged when music learning is linked to technology

Certainly, the notion of what constitutes musicality has developed in recent years. This has been reflected in research with the development of the concept of 'musical sophistication', a term chosen by Müllensiefen and colleagues (2014) to reflect changes in the population regarding musical expertise through enculturation and informal musical learning and practice (Rideout, Foehr & Roberts, 2010; Rentfrow, 2012). In a large-scale online study Müllensiefen and colleagues (2014; and Greenberg, Müllensiefen, Lamb & Rentfrow, 2015)

found a moderately sized relationship between a general factor of musical abilities, Extraversion and Openness to Experience, and found no gender differences for their data.

If the concept of musicality has evolved, then so too must our understanding of the route to, and notion of 'professional musicianship'. Sloboda (1991) challenged the conventional notion of expertise in musicians. Though he agreed that formal tuition may provide structured information supporting skill acquisition (which accelerates learners' progress), he also asserted that there are key elements that underpin the success of self-taught musicians (such as Louis Armstrong (jazz vocalist and trumpet player), and more recently Banks (and award winning singer-songwriter and Dave Grohl (a mutli-instrumentalist and singer with rick band, Foo Fighters). These include immersion in a rich musical environment, early exploration (without negative consequences), and an enduring motivation to play that does not distinguish between practice and performance.

Green (2002) agrees that changes in music education and musical learning present difficulties for existing views of professional musicianship. For example, she explains the process of informal musical learning through enculturation relies on extended immersion in (purposive) listening to, watching and imitating music rather than learning through music notation (with less than 40% of popular musicians reading). Green describes this as profound departure from formal music learning as it puts the onus of learning in the hands of the young people themselves, outside any formal networks or structures, and largely without adult guidance.

The changing nature of professional musicianship may also be associated with personality traits in musicians. There is evidence suggesting the (often precarious) nature of employment as a musician now requires extra-musical abilities and this may be associated with personality differences such as Openness to Experience and Agreeableness (see Dyce & O'Connor, 1994). A report commissioned by the Musician's Union showed that, in the UK, working musicians' portfolio careers demanded the creative development of a variety of non-musical skills including marketing, teaching, social network and community engagement work. Two thirds reported that they were using and developing web-based musical resources

and another third had to supplement their income with jobs completely unrelated to music or their musical skills (van der Maas, Hallam & Harris, 2012).

Unlike the uniform approach of formal music education, the popular musicians' learning is not necessarily systematized, and it may be these differences (of formal/informal musical learning, rather than classical/popular genre), that are important in terms of understanding personality and individual differences in western musicians. We have provided some background here illustrating that there is a need for further research regarding associations between personality traits in classical and popular western musicians, and that this requires appropriate sampling with regard to contemporary notions of gender identification.

Aims of the Study and Hypotheses

This study aimed to investigate personality traits amongst contemporary musicians according to whether their musical learning was formal or informal, and whether any associations were related to gender.

Based on previous research, we predicted that all musicians would score more highly on Openness to Experience in comparison to the general population regardless of musical learning style. Type of instrument and gender were considered in order to establish whether the sample contained stereotypical associations. In accordance with previous research, we predicted that, in formally taught musicians, males would be more introverted and female musicians would be more extraverted than population norms. With informally taught musicians, we have an open hypothesis based on the lack of previous evidence. We also included age as a variable in order to explore whether personality differences were associated with age of onset of musical learning and therefore could be attributed to social change.

Materials and Methods

Participants and Procedure

Data was gathered via an online survey recruiting via social media (Qualtrics, Provo, UT). Recruitment specifically targeted students from contemporary popular music performing arts colleges as well as traditional conservatoires in the UK and North America who were 18 years or older, and who defined themselves as musicians. An a priori power analysis suggested that N = 179 would be adequate to provide .8 power. Participants (N = 275 completed 100% of the survey) were asked to leave contact details if they wished to be entered for a draw to win one of two £50 vouchers. See Table 1 for demographic information.

Table 1. Sample demographics

	A self-taught musician	A partially self-taught/partially formally taught musician	A formally taught musician
Sex	n(%)	n(%)	n(%)
Female	13 (17.6)	37(26.6)	37(59.7)
Male	42(56.8)	79(56.8)	15(24.2)
Another description	0	3(2.2)	0
Rather not say	19(25.7)	20(14.4)	10(16.1)
	n(missing)	n(missing)	n(missing)
Age	55(19)	120(19)	50(12)
Mean (SD)	42.49(10.17)	38.93(12.36)	40.74(13.21)
Range (Min-Max)	22-69	19-81	20-72
Primary Instrument	n(%)	n(%)	n(%)
Voice	17 (23)	28 (20.1)	6 (9.7)
Piano	2 (2.7)	15 (10.8)	10 (16.1)
Flute	1 (1.4)	2 (1.4)	1 (1.6)
Trumpet	-	-	1 (1.6)
Violin	-	-	10 (16.1)
French Horn	-	-	2 (3.2)
Double Bass	-	2 (1.4)	2 (3.2)
Guitar	27 (36.5)	39 (28.1)	10 (16.1)
Electric Bass	6 (8.1)	14 (10.1)	-
Saxophone	1 (1.4)	3 (2.2)	2 (3.2)
Cello	-	2 (1.4)	6 (9.7)
Drums	11 (14.9)	12 (8.6)	4 (6.5)
Percussion	-	2 (1.4)	1 (1.6)
Clarinet	-	2 (1.4)	3 (4.8)
Keyboard/Synths	1 (1.4)	5 (3.6)	-

Viola	-	1 (0.7)	2 (3.2)
Tuba	-	-	1 (1.6)
Oboe	-	1 (0.7)	-
Dual Primary Instruments	3 (4.1)	8 (5.8)	1 (1.6)
Ukulele	2 (2.7)	-	-
Digital Instruments/Programmes	2 (2.7)	1 (0.7)	-
Other Alternative Instruments	1 (1.4)	2 (1.4)	-
	Mean (SD)	Mean (SD)	Mean (SD)
Time Learning Primary Instrument	6.54(1.4)	6.85 (0.7)	6.95(0.4)
Secondary Instrument	n(%)	n(%)	n(%)
Voice	9 (12.2)	17 (12.2)	18 (29)
Piano	7 (9.5)	32 (23)	3 (4.8)
Flute	-	2 (1.4)	4 (6.5)
Violin	1 (1.4)	3 (2.2)	-
French Horn	-	2 (1.4)	-
Guitar	14 (18.9)	32 (23)	2 (3.2)
Electric Bass	10 (13.5)	2 (1.4)	1 (1.6)
Saxophone	-	1 (0.7)	1 (1.6)
Cello	-	1 (0.7)	-
Drums/DrumKit	5 (6.8)	4 (2.9)	-
Percussion	1 (1.4)	1 (0.7)	-
Viola	-	-	1 (1.6)
Oboe	-	-	1 (1.6)
Clarinet	1 (1.4)	-	2 (3.2)
Keyboards/Synths	2 (2.7)	7 (5.0)	-
Ukulele	1 (1.4)	1 (0.7)	-
Digital Instruments	1 (1.4)	3 (2.2)	1 (1.6)
Alternative Other	2 (2.7)	2 (1.4)	1 (1.6)
Banjo	1 (1.4)	1 (0.7)	-
Organ	-	1 (0.7)	-
Mandolin	-	2 (1.4)	-
Concertina	-	1 (0.7)	-
Harmonica	-	1 (0.7)	-
Multiple Other	-	4 (2.9)	1 (1.6)
Viola da gamba	-	-	1 (1.6)
Autoharp	-	-	1 (1.6)
Weissenborn guitar/Lap Steel	-	-	1 (1.6)
Recorder	-	-	1 (1.6)
None	18 (24.3)	17 (12.2)	14 (22.6)
Style of Learning Secondary Instrument	n(%)	n(%)	n(%)
Self-taught	45 (60.8)	63 (45.3)	11 (17.7)
Taught for a few months (less than a year), but regular lessons	3 (4.1)	19 (13.7)	7 (11.3)

I was formally taught, but for less than one year	5 (6.8)	31 (22.3)	29 (46.7)
I was taught but only as part of a group (such as in a choir for example)	-	2 (1.4)	3 (4.8)

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150

151 **Design**

152 This was a within-subjects design. Independent variables included gender and group
153 (musical learning style). For gender, participants were given the option of choosing male,
154 female, not answering, or using another description. The musicians were asked to describe
155 how they learned their primary and secondary instruments. These data sorted participants into
156 groups based on musical learning styles that were either self-taught (ST, i.e. informal),
157 formally taught (FT) and partially self/partially formally taught (PT) musicians. The
158 dependent variables were the Big Five traits from the brief personality inventories. The
159 University of Hertfordshire Health, Sciences, Engineering and Technology Ethics Committee
160 provided ethical approval for this study.

161

162 **Measures**

163 A comparison of the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow &
164 Swann, 2003) and the 10-item version of the Big Five Inventory (BFI-10; Rammstedt and
165 John, 2007) provided reliability and validity in this survey.

166 The TIPI draws upon adjectives used in the Big Five framework, such as Goldberg's
167 (1992) uni- and bi-polar list and the Adjective Checklist developed by John and Srivastava
168 (1999). Test-retest reliability (r = .72) is described as "substantial" (p. 518, Gosling, Rentfrow
169 & Swann, 2003). Correlation with the TIPI and BFI-44 are reported as: Extraversion r = .87,
170 Agreeableness r = .70, Conscientiousness r = .75, Emotional Stability r = .81, Openness to
171 experience = .65. Population norms for the whole sample are provided in Table 2.

172 The BFI-10 was developed in English and German and compared directly to the BFI-
173 44 using large test samples (N = 233 US, N = 184 Germany). Results showed that the BFI-10
174 captures 70% of the full BFI-44 variance and retains 85% of the BFI-44 test-retest reliability.

Whilst population norms do not appear to be available for a UK sample using the BFI-10, Schmitt et al. (2007) carried out a large-scale study obtaining data from 56 countries using the BFI-44 (Benet-Martìnez & John, 1998). For the UK the sample included 138 males and 345 females gathered from the general community as well as college students. The norms calculated for the UK (transformed to T scores as reported) are provided in Table 2.

Results

Demographics

The mean age of the participants (N = 275) was 40.2 years (SD 12.10, range 19-81 years). The mean number of years playing their primary instrument was 6.79 (SD .90). Participants' chosen gender descriptions were coded as male (n = 136), female (n = 87), did not answer (n = 49), or used another description (n = 3). Figure 1 illustrates group by gender. For parsimony in statistical analysis, and for comparison with previous studies, only participants who described themselves as either male or female were included in further analysis.

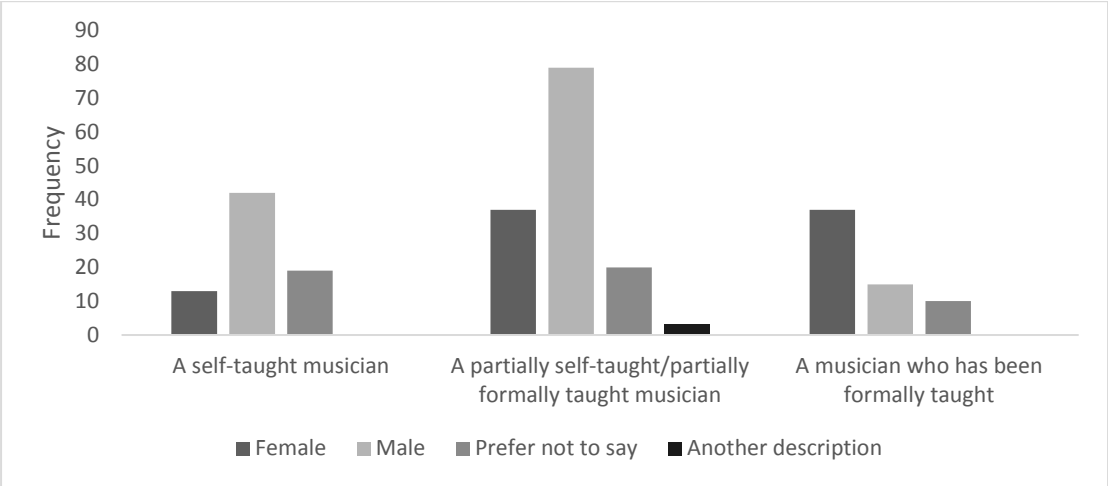

Figure 1. Musical learning group by gender

In a forced-choice question about their musical learning 74 musicians described themselves as self-taught (ST), 139 as partially self and partially formally taught (PT) and 62 as formally taught (FT). There were no significant differences between ages in the groups. To corroborate

self-report of musical learning style and strengthen group identification, participants learning of music theory was evaluated. Overall, 47 (17.1%) of participants stated that they had not learned music theory. There was a significant difference by group X^2 (2, N = 275) = 37.47, p < .001 whereby 45.9% of ST musicians, 8.6% of PT musicians, and 1.6% of the FT musicians had not learned music theory.

Participants reported on 30 types of musical instruments (including voice). The most common primary instrument was the guitar for the ST and PT groups, and the guitar, violin and piano for the FT group. Playing a second instrument was reported by 227 (82.5%) participants: 55(74.3%) in the ST group, 122 (87.8%) in the FT group, and 50 (80.6%) in the FT group.

Statistical Analyses

A significant effect of gender by group was revealed X^2 (2, N=223) = 30.51, p < .001 (Female ST n = 13, PT n = 37, FT n = 37). There were fewer females in the self-taught group than in both other groups and more males in the partially and self-taught groups than were formally taught. There was no statistically significant effect of age on musical learning style or choice of primary instrument.

Primary instrument choice was significantly gendered X^2 (6, N = 223) = 45.94, p < .001. The females tended to have learned Voice, Piano and Violin, whilst males mostly played Guitar and Drums.

Table 2. Whole sample (musicians) and groups in comparison to population norms

	t	df	p vale	Mean	95% Confidence	Sample	Norm

TIPI				Difference	Interval of the Difference		Mean (SD)	(SD)
					Lower	Upper		
Extraversion[a]	-	-	p > .58	-	-	-	4.55 (1.69)	4.44 (1.45)
ST[b]	-	-	ns	-	-	-	4.56 (1.65)	-
PT[c]	-	-	ns	-	-	-	4.53 (1.67)	-
FT[d]	-	-	ns	-	-	-	4.58 (1.80)	-
Agreeableness[a]	-3.48	218	p = .001	-0.25	-0.40	-0.11	4.97 (1.07)	5.23 (1.11)
ST[b]	-2.15	53	p = .036	-0.32	-0.62	-0.02	4.91 (1.10)	-
PT[c]	-2.61	113	p = .010	-0.27	-0.47	-0.06	4.96 (1.08)	-
FT[d]	-	-	ns (p = .30)	-	-	-	5.08 (1.04)	-
Conscientiousness[a]	-3.55	222	p < .001	-0.34	-0.52	-0.15	5.07 (1.41)	5.40 (1.32)
ST[b]	-4.07	54	p < .001	-0.75	-1.11	-0.38	4.65 (1.36)	-
PT[c]	-2.74	115	p = .007	-0.36	-0.62	0.10	5.04 (1.42)	-
FT[d]	-	-	ns (p = .39)	-	-	-	5.55 (1.27)	-
Emotional Stability[a]	-5.26	220	p < .001	-0.54	-0.75	-0.34	4.29 (1.53)	4.83 (1.45)
ST[b]	-2.20	53	p = .032	-0.52	-0.99	-0.05	4.31 (1.72)	-
PT[c]	-4.13	114	p < .001	-0.56	-0.84	-0.29	4.27 (1.47)	-
FT[d]	-2.50	51	p = .016	-0.52	-0.94	-0.10	4.31 (1.51)	-
Openness to Experience[a]	9.95	220	p < .001	0.63	0.51	0.76	6.01 (0.94)	5.38 (1.07)
ST[b]	8.01	54	p < .001	0.83	0.62	1.04	6.21 (0.77)	-

PT[c]	7.33	113	p < .001	0.65	0.47	0.83	6.03 (0.95)	-
FT[d]	2.60	51	p = .012	0.38	0.09	0.67	5.76 (1.05)	-
BFI-10								
Extraversion[a]	-	-	p > .33	-	-	-	50.03 (10.07)	49.79 (9.68)
ST[b]	-	-	ns	-	-	-	51.10 (9.65)	-
PT[c]	-	-	ns	-	-	-	49.22 (10.15)	-
FT[d]	-	-	ns	-	-	-	50.75 (10.35)	-
Agreeableness[a]	4.02	220	p < .001	2.70	1.38	4.03	50.01 (10.00)	47.31 (9.44)
ST[b]	-	-	ns (p = .19)	-	-	-	49.22 (10.66)	-
PT[c]	3.41	114	p = .001	3.15	1.32	4.99	50.46 (9.91)	-
FT[d]	-	-	ns (p = .07)	-	-	-	49.86 (9.65)	-
Conscientiousness[a]	4.79	219	p < .001	3.27	1.92	4.61	50.16 (10.12)	46.89 (10.66)
ST[b]	-	-	ns (p > .4)	-	-	-	48.06 (10.19)	-
PT[c]	3.45	114	p = .001	3.28	1.40	5.16	50.17 (10.19)	-
FT[d]	4.08	50	p < .001	5.46	2.77	8.15	52.35 (9.57)	-
Neuroticism[a]	-2.37	216	p = .019	-1.19	-3.02	-0.28	49.74 (10.24)	51.39 (9.57)
ST[b]	-	-	ns p > .18	-	-	-	49.23 (11.62)	-
PT[c]	-	-	ns p > .26	-	-	-	50.37 (9.51)	-
FT[d]	-	-	ns p > .10	-	-	-	48.89 (10.37)	-
Openness to Experience[a]	6.19	219	p < .001	4.18	2.85	5.51	50.45 (10.01)	45.97 (9.71)
ST[b]	2.28	53	p = .027	3.12	.38	5.86	49.09	-

							(10.06)	
PT[c]	4.09	113	p < .001	4.02	2.07	5.98	50.00 (10.52)	-
FT[d]	4.62	51	p < .001	5.62	3.18	8.06	51.59 (8.77)	-

[a] - whole sample of musicians, [b] - Musicians who are Self-Taught (ST), [c] - Partially self/partially formally Taught musicians (PT), [d] - Formally Taught musicians (FT)

For group comparisons by inventory, as the TIPI is scored on a 7-point Likert scale but the BFI-10 on a 5-point Likert scale, and they have different positive and negative items, scores were transformed into Z scores to enable direct comparison.

Student t-tests were used to compare the sample as a whole, by gender and by group with the population norms for the TIPI and the BFI-10 (Table 2).

Bivariate correlations were one-tailed for associations between the TIPI and the BFI-10. All scores for personality factors were correlated significantly for the whole sample: Extraversion $r = .74$, $p < .001$, Agreeableness $r = .19$, $p = .002$, Conscientiousness $r = .63$, $p < .001$, Emotional Stability/Neuroticism $r = -.69$, $p < .001$, Openness to Experience $r = .24$, $p < .001$.

As can be seen in Table 2., the whole sample differed significantly from population norms for four of the big five traits of personality (Agreeableness, Conscientiousness, Openness to Experience and Emotional Stability/Neuroticism), except for Extraversion with both inventories.

Gender was also compared to population norms for Extraversion for both inventories, and neither male nor female differed significantly from the population norms.[1]

[1] The TIPI provided a female norm for Extraversion (Mean = 4.54) in Appendix B, so this was used in this anlysis (Gosling, Rentfrow & Swann, 2003).

When considering musical learning by group, a one way ANOVA revealed a significant difference between three groups for TIPI Conscientiousness $F(2, 222) = 5.78$, $p = .004$ and for TIPI Openness to Experience $F(2, 220) = 3.15$, $p = .045$ (equal variances assumed, though the latter does not remain significant when adjusted for multiple comparisons). Post hoc Tukey's HSD analysis revealed the difference for TIPI Conscientiousness was between the self-taught and formally taught groups (*Mean Diff* = ± .64, $p = .001$, *CI* 0.19 – 1.09). The difference between the formally taught and partially self/partially formally taught groups was not significant ($p = .07$), nor was the difference between the self-taught and partially self/partially formally taught groups ($p = .21$).

Discussion

This study provides information relating the nature of formal/informal musical learning styles to traits of personality and individual differences in musicians, whilst accounting for systematic bias (in terms of sexual stereotyping).

The study comprises data from an online survey of 275 musicians in the UK and North America. Though a dichotomous variable of formal/informal musical learning was theorized, data analysis revealed a more nuanced operationalization of this notion in that musicians described themselves as either self-taught (ST), formally taught (FT), or partially self/partially formally taught (PT). Two brief personality inventories, the TIPI and BFI-10, were used to increase the validity of the online survey and investigate their reliability as comparable measures. To the best of our knowledge, these brief inventories have not been directly compared before, although both are reported to capture over 65% of all variance in the BFI-44 (Gosling, Rentfrow & Swann, 2003; Rammstedt and John, 2007). Here we showed that the inventories were significantly correlated when transformed to Z-scores.

Overall, the results support general findings regarding the high levels of Openness to Experience as a personality trait in musicians in comparison to the general population (e.g. Corrigall, Schellenberg & Misura, 2013; Kemp 1981).

No statistically significant differences were found in relation to participants who described themselves as either Male or Female in comparison to the population norms in either direction for the continuum trait of Extraversion/Introversion in this contemporary sample of musicians. In relation to our hypotheses, Males were not significantly more introverted, and Females were not significantly more Extroverted than population norms. As we had established that there was no effect of age, but that our sample conformed to stereotypical primary instrument choices overall (i.e. Females tended to study Voice, Piano and Violin, whereas Males tended to study Guitar and Drums), this finding therefore suggests Kemp's (1982, 1996) musical androgyny theory is not applicable in this contemporary context.

However, in terms of formal/informal styles of musical learning, for this sample of musicians, statistically significant differences were reported for the trait of Conscientiousness whereby the formally-taught musicians scored more highly than self-taught musicians. This may be important in terms of understanding personality and individual differences with regard to the nature of musical learning. For example, the structured nature of classical western musical learning may appeal more to people who are more conscientious by nature. According to Witt et al., (2002), people who score highly on the trait of Conscientiousness tend to not only be more "disciplined, diligent and dependable" (p. 164), they also tend to correctly perform work tasks and are seen as more hirable (all good attributes for classical orchestral musicians). In contrast, low Conscientiousness has not only been associated with creativity (King, Walker & Broyles, 1996), but a recent study found significant negative associations between Conscientiousness and career success in pop music in the Netherlands (Zwaan et al., 2009). Green (2008) explains that in her research, many young people who became successful musicians described the musical tuition they received as either unhelpful, detrimental and/or a negative and short-lived experience, resulting in dropping out of formal music education. Perhaps this is in part due to the imposition of goals and structures of achievement unrelated to the creative process, as seen in formal musical learning (Sloboda, 1991, McPherson, Davidson & Faulkner, 2012). One further conflict between

Conscientiousness and an informal musical learning style is that Green (2002, 2008) suggests musical practice tends to be based on enjoyment and mood, and as such varies periodically ranging from many hours per day, to very little at all. Amabile (1983) suggests that one of the consequences of such a prescribed system (in formal music learning) may be that it stifle intrinsic motivation and originality. In this case, individual differences in Conscientiousness might be related to creativity.

George and Zhou (2001) consider that there may be an interactional relationship between Openness to Experience and Conscientiousness in relation to creativity when the right conditions are available. Although their research did not focus on musicians, the ideal conditions in their study included a heuristic task with positive feedback provided. Furthermore, Judge, Higgins, Thoresen and Barrick (1999) suggest that unconventionality (being non-conformative, imaginative and autonomous) and 'intellectance' (intellectual and philosophical) are key components of the Openness to Experience trait, which in their longitudinal study is a predictor for artistic jobs. This early differentiation may be seen later reflected in the career development of musicians, and further helps us understand these nuanced similarities and differences in individual differences in personality in musicians.

Limitations

Whilst norms are not currently available for the BFI-10, the data from the large Schmitt et al., (2007) study provided UK average T scores for the BFI-44 (Benet-Martìnez & John, 1998). Whilst this is not therefore a direct comparison, Rammstedt and John (2007) present evidence that the two inventories correlate at between r = .74 and .79. Though the musicians who participated did self-define their identities as musicians, the sample was recruited via networks the authors know well as musicians themselves. One final point with regard to the dual use of brief inventories is that in the TIPI, all musicians scored less than population norms for trait of Emotional Stability. This was negatively correlated with the BFI-10 Neuroticism scale, suggesting the scales measure inversions of the same construct. Judge, Higgins, Thoresen and Barrick (1999) found Neuroticism was positively correlated

with gravitation to realistic jobs. This may be a subtle but important difference for consideration for the use of the two inventories in future studies.

Conclusion

This study provides new evidence that formally taught musicians score higher than informally taught musicians and population norms for the personality trait of Conscientiousness. In contrast to previous findings, no male/female differences were found the trait of Extraversion in relation to musical learning style. In line with other studies, the musicians scored higher than population norms for Openness to Experience. Therefore, in terms of personality and individual differences, these findings suggest the trait of Conscientiousness may predict whether formal or informal musical learning is best suited to a person.

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