Personality differences in dental professionals: A cross-sectional survey

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Introduction: Despite its influence on occupational performance and team dynamics, there has been little research into the personality of dental professionals. Existing research does not typically use the prevailing five-factor model of personality. We aimed to measure the personality of dental professionals in the United Kingdom and investigate differences among groups. **Methods:** The sample (n = 906) comprised dental nurses (n = 475), general dental practitioners (GDPs) (n = 182), orthodontists (n = 201), and oral and maxillofacial surgeons (OMFSs) (n = 48). Recruitment was via email and social media. The questionnaire collected data on demographic variables and contained the Big Five Inventory, a validated self-report personality test. Participants scored on extraversion, conscientiousness, agreeableness neuroticism, and openness. A one-way analysis of variance and post-hoc tests with Bonferroni correction were used to identify significant differences in personality between occupations. Hierarchical multiple regression determined the influence of occupation over and above demographic variables. **Results:** On a 5-point scale, orthodontists had a mean conscientiousness score 0.23 points higher than GDPs (95% confidence interval [CI], 0.10-0.36). Dental nurses had a mean conscientiousness score 0.28 points higher than GDPs (95% CI, 0.17-0.39). Dental nurses had a mean agreeableness score 0.16 points higher than orthodontists (95% CI, 0.05-0.27) and 0.30 points higher than OMFSs (95% CI, 0.10-0.50). For neuroticism, orthodontists had a mean score 0.21 points lower than dental nurses (95% CI, 0.06-0.36), and OMFSs had a mean score 0.43 points lower than dental nurses (95% CI, 0.16-0.70). GDPs had a mean neuroticism score 0.43 points higher than OMFSs (95% CI, 0.14-0.71; $P = 0.001$). Differences were small to moderate in size ($d = 0.35$-0.45) and occupation was associated with personality after accounting for demographic variables. **Conclusions:** The personalities of dental nurses, GDPs, orthodontists, and OMFSs differed. Occupation was associated with differences in personality after accounting for demographic characteristics. (Am J Orthod Dentofacial Orthop 2023;164:868-78)

Personality is "a dynamic organisation, inside the person, of psychophysical systems that create characteristic patterns of behaviour, thoughts and feelings."[1] It correlates with measures of health, professional performance, and the quality of interpersonal relationships.[2] It has also been found to influence mortality, divorce, and occupational attainment to an extent comparable to socioeconomic status and cognitive ability.[3] Specific personality traits are associated with individual occupational performance and the effectiveness of teams.[4] In dentistry, where team-working is an integral part of delivering care, the importance of recruiting and retaining team members with suitable personalities is self-evident. The relationship among different personalities may be a source of friction, cohesion, or even inspiration, and such dynamics require careful consideration in the recruitment and appraisal process.

General dental practitioners (GDPs), orthodontists, dental nurses, and oral and maxillofacial surgeons (OMFSs) work closely through referrals, interdisciplinary teams, or day-to-day team-working. In the United Kingdom (UK), dental nurses provide clinical support to other dental professionals and assist in delivering patient care as defined in the Scope of Practice guidance

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from the General Dental Council, the statutory regulator for dental professionals.[5] Their role frequently entails preparing and maintaining the clinical environment, carrying out infection prevention and control procedures, and providing chairside support to the operator during treatment. Irrespective of the specialty the dental nurse works in, the same scope of practice applies and so the role would be similar. Each occupation is not homogenous, and many personalities can be found in each. However, knowledge of their personality differences may be used in characterizing each occupation and facilitating team-working among them. Such information may also be useful for candidates who wish to join these occupations and the recruiters responsible for selecting among them, as matching an individual's personality to their occupation appears to reduce occupational attrition rates.[6] Despite this, there is a paucity of research investigating personality in dental professionals, and how personality may vary among dental occupations remains understudied.

Research has frequently used psychometric tests based on models less robust than the prevailing 5-factor model (FFM). This was developed by reducing and categorizing all the linguistic terms in the English language used to describe personality. In parallel, statistical analyses of personality self-reports also resulted in personality being best represented by 5 broad personality factors.[7,8] In the FFM, the major personality domains are extraversion, conscientiousness, agreeableness, neuroticism, and openness. These are termed the Big Five. Extraversion refers to the predisposition to seek out activity and the company of others and a more general predilection for positive affect.[7] Those high in extraversion tend to be characterized by positivity and gregariousness. Neuroticism describes the tendency to experience negative affect, such as anxiety, depression, and anger.[7] Those high in this trait respond poorly to stress, may interpret ordinary situations as threatening, and can experience minor frustrations as hopelessly overwhelming. Conscientiousness refers to differences in self-control and how this is applied in completing tasks and meeting standards. Individuals high in this trait will invest greater time and effort in completing work, upholding commitments, and maintaining order.[9] Agreeableness refers to a disposition toward getting along with others. Individuals high in this trait are described as kind, appreciative, and altruistic, whereas those on the lower pole are considered skeptical, competitive, and antagonistic.[7] Openness refers to the richness and complexity of an individual's intellectual and emotional life.[9] High openness subjects tend to seek out novel and intellectually enriching experiences.

A study investigating differences among medical professionals found surgical residents scored higher on extraversion and conscientiousness and lower on neuroticism than their peers. The surgical residents also demonstrated higher conscientiousness compared to medical students and pediatric residents, although all groups had conscientiousness scores higher than population norms.[10] Subsequent research by Woods et al[11] found greater agreeableness to be associated with working in specialties with a larger social element, and neuroticism was negatively associated with working in surgery and obstetrics.

This study examined differences in personality traits among orthodontists, GDPs, dental nurses, and OMFSs and how individual demographics may influence these. The null hypothesis was that there was no difference in personality among these 4 occupations when described using the FFM. The objectives were (1) to identify personality differences between the occupations, (2) to identify any associations between personality and demographic variables, and (3) to determine whether personality was associated with occupation after accounting for the influence of demographic variables.

MATERIAL AND METHODS

Ethical approval was granted by The University of Leeds Dental Research Ethics Committee (180620/NA/300). The 4 respondent groups of interest were GDPs, orthodontists, dental nurses, and OMFSs. The eligibility criteria are given in Table I. Respondents were recruited via dental associations, UK dental schools, and professional Facebook groups. These groups were exclusive to registered dental professionals. The administrators were contacted, given information about the study, and asked to disseminate a link to the survey. In-person recruitment was not feasible because of coronavirus restrictions.

For analysis with analysis of variance (ANOVA), Cohen's $f = 0.2$ (equivalent to Cohen's $d = 0.4$) would be considered a small to medium effect size.[12] The effect size of $f = 0.2$ was selected on the basis of 2 factors. First, effects of this size would be similar to the typical effect size seen in the personality literature.[13] Second, Roberts et al[3] found personality to correlate with important life outcomes such as mortality, divorce, and occupational success. The effect sizes quantifying the association between personality and these life outcomes ranged from 0.10 to 0.24 if measured with Cohen's f. Consequently, a difference of this magnitude among occupations was considered important as it is sufficient to influence parameters which affect occupational success and would interest recruiters and applicants. To have

Table I. Eligibility criteria for participation

Inclusion	*Exclusion*
GDP, orthodontist, dental nurse, or OMFS	Insufficient information technology proficiency to fill out necessary documents
Access to and adequate proficiency in using the internet	Lack of capacity to provide valid consent
Registered with the General Dental Council or General Medical Council in 1 of the 4 registrant groups being investigated	
Aged ≥18 years	

Table II. A summary of the online questionnaire

Section	*Contents*
Background	Information about the study, consent, and outline of the survey
Section 1: About You	Demographic data: age, gender, ethnicity, partner status, and geographic location
Section 2: Your education and work	Qualifications, occupations, time spent in role, and job satisfaction
Section 3: Your Personality	The 44-item BFI: 8-10 items corresponding to the 5 factors. Each item is scored on a 5-point Likert scale ranging from strongly agree to strongly disagree

power = 0.8 with an $\alpha = 0.05$, the study required a sample of 46 per group. Given that 4 groups were being compared, a minimum sample size of 184 was required. This would also satisfy the sample size required for multiple regression analysis.[14]

After providing consent, participants completed an online questionnaire (Table II) that collected demographic data and contained the Big Five Inventory (BFI).[8] This is a validated psychometric personality test consisting of 44 items in which the respondent is asked to rate the extent to which they believe a short descriptive statement applies to them using a 5-point Likert scale. It is based on the FFM, which describes personality in terms of extraversion, conscientiousness, agreeableness, conscientiousness, neuroticism, and openness. The BFI measures the extent to which an individual demonstrates each of these 5 factors based on their responses to items in the inventory. The full inventory can be found in the Supplementary Material. Data were collected via the Online Surveys platform (Jisc, Bristol, UK) and stored on secure servers in the UK. All responses were anonymous.

Data analysis

Data were analyzed to meet the objectives of the research:

1. Personality differences among the occupations were calculated by deriving a mean factor score (1-5) for each of the 5 factors from the average of Likert scores for all questions related to that personality factor. A low score signified lower levels of a given trait and vice versa. Differences among the occupations were then identified using one-way ANOVA with a Bonferroni adjusted P value of 0.008 to account for multiple pairwise comparisons among groups in the post-hoc analysis.
2. Associations between personality and demographic variables were examined using the appropriate test for the data type: Pearson's correlation for age, independent samples t test for gender, and ANOVA for ethnicity and relationship status.
3. Hierarchical multiple regression was used to determine whether personality was associated with occupation after accounting for the influence of demographic variables.

RESULTS

Data were collected from October 2020 to January 2021 and entered and analyzed using SPSS (version 26, IBM, Armonk, NY). The sample comprised 475 dental nurses, 182 GDPs, 201 orthodontists, and 48 OMFSs (Table III). One participant was excluded for facetious responding, an age of >100 years, and contradictory but equally strong responses to reverse keyed items giving the impression of straight-lining.

The General Dental Council publishes data on the gender breakdown of registrant groups in the UK.[15] This data, combined with a recent survey of OMFSs, confirmed the proportion of males and females in our sample of dental nurses and orthodontists to reflect that in the general population.[16] However, females were overrepresented in our GDP and OMFS samples, when they comprise only 52% of the total GDP population and 12% of the OMFS.

Table IV shows the mean scores for each Big Five for the 4 occupations, whether any group differences were significant, and norms for the UK population from a survey of nearly 400,000 participants.[17] Differences were found in 3 out of the 5 factors (ie, conscientiousness, agreeableness, and neuroticism) (Fig). There were no differences between the occupations in extraversion and openness.

On a 5-point Likert scale, orthodontists had a mean conscientiousness score 0.23 points higher than GDPs (95% confidence interval [CI], 0.10-0.36; P <0.001).

Table III. Description of the sample, grouped by occupation

Variables	*Dental nurses (n = 475)*	*GDPs (n = 182)*	*Orthodontists (n = 201)*	*OMFSs (n = 48)*	*Test statistic*	P *value*
Age, y	38.63 ± 10.44	38.65 ± 11.27	47.11 ± 12.04	43.92 ± 8.41	$F(3, 902) = 32.506$	<0.001
Gender					χ^2 significant difference in the proportion of males and females across all 4 groups	
Male	4 (0.8)	53 (29.1)	92 (45.8)	35 (72.9)		<0.001
Female	471 (99.2)	127 (69.8)	108 (53.7)	13 (27.1)		
Rather not say	–	2 (1.1)	1 (0.5)	–		
Relationship status					χ^2 no significant difference between dental nurses and GDPs, and separately orthodontists and OMF surgeons	
Partner	272 (57.3)	102 (56.0)	151 (75.1)	36 (75.0)		<0.001
No Partner	203 (42.7)	80 (44.0)	50 (24.9)	12 (25.0)		

Note. Data presented as mean ± standard deviation and n (%). Mean ± SD was used when data were normally distributed.

Table IV. Mean scores for each Big Five factor across 4 occupations and group differences among occupations

Personality factors	*Dental nurses (n = 475)*	*GDPs (n = 182)*	*Orthodontists (n = 201)*	*OMFSs (n = 48)*	P *value*	*UK population norms*[†,‡]
Extraversion	3.46 ± 0.06	3.39 ± 0.11	3.41 ± 0.10	3.57 ± 0.18	0.319	$3.24 \pm 2.59 \times 10^{-03}$
Agreeableness	4.07 ± 0.04	3.94 ± 0.09	3.91 ± 0.07	3.77 ± 0.16	<0.001*	$3.74 \pm 1.95 \times 10^{-03}$
Conscientiousness	4.23 ± 0.04	3.95 ± 0.08	4.18 ± 0.07	4.02 ± 0.15	<0.001*	$3.65 \pm 2.21 \times 10^{-03}$
Neuroticism	2.76 ± 0.06	2.76 ± 0.11	2.55 ± 0.09	2.33 ± 0.18	<0.001*	$2.97 \pm 2.55 \times 10^{-03}$
Openness	3.47 ± 0.04	3.51 ± 0.08	3.56 ± 0.07	3.61 ± 0.16	0.08	$3.67 \pm 2.02 \times 10^{-03}$

Note. Values are presented as mean (95% CI).
[†]N = 386,375; [‡]Normative values from Rentfrow et al.[17]; *Statistically significant using Bonferroni adjusted *P* value ($P < 0.008$).

Dental nurses had a mean conscientiousness score 0.28 points higher than GDPs (95% CI, 0.17-0.39; $P < 0.001$). Dental nurses had a mean agreeableness score 0.16 points higher than orthodontists (95% CI, 0.05-0.27; $P = 0.002$) and 0.30 points higher than OMFSs (95% CI, 0.10-0.50; $P = 0.001$). Dental nurses had a mean neuroticism score 0.21 points higher than orthodontists (95% CI, 0.06-0.36; $P = 0.002$) and 0.43 points higher than OMFSs (95% CI, 0.16-0.70; $P < 0.001$). GDPs had a mean neuroticism score 0.43 points higher than OMFSs (95% CI, 0.14-0.71; $P = 0.001$).

The effect sizes for the differences in conscientiousness, agreeableness, and neuroticism among occupations were d = 0.45, 0.39, and 0.35, respectively.

Significant differences were also found when comparing the occupations to the general population. Dental nurses had an extraversion score 0.22 points higher than the UK population (95% CI, 0.32-0.11; $P < 0.001$) and an agreeableness score 0.33 points higher than the UK population (95% CI, 0.43-0.23; $P < 0.001$).

All 4 occupations had conscientiousness scores significantly higher than the UK population ($P < 0.005$ for all comparisons): dental nurses were 0.58 higher (95% CI, 0.67-0.49), GDPs were 0.29 higher (95% CI, 0.43-0.15), orthodontists were 0.53 higher (95% CI, 0.66-0.40), and OMF surgeons were 0.37 higher (95% CI, 0.65-0.09).

Mean neuroticism scores for the 4 occupations were all significantly lower than for the UK population ($P < 0.005$ for all comparisons): dental nurses were 0.21 points lower (95% CI, −0.11 to −0.31), GDPs were 0.21 points lower (95% CI, −0.05 to −0.37), orthodontists were 0.42 points lower (95% CI, −0.26 to −0.58), and OMF surgeons were 0.64 points lower (95% CI, −0.32 to −0.96).

Finally, relative to the UK population, dental nurses had a mean openness score 0.20 points lower (95% CI, −0.12 to −0.28; $P < 0.001$), and GDPs had a mean openness score 0.16 points lower (95% CI, −0.03 to −0.29; $P = 0.007$).

Age was positively correlated with conscientiousness ($r = 0.11$, $P < 0.001$) and openness ($r = 0.08$, $P < 0.016$), whereas neuroticism showed a negative correlation ($r = -0.18$, $P < 0.001$).

A significant difference was found in the proportion of males and females in each occupation, so mean scores

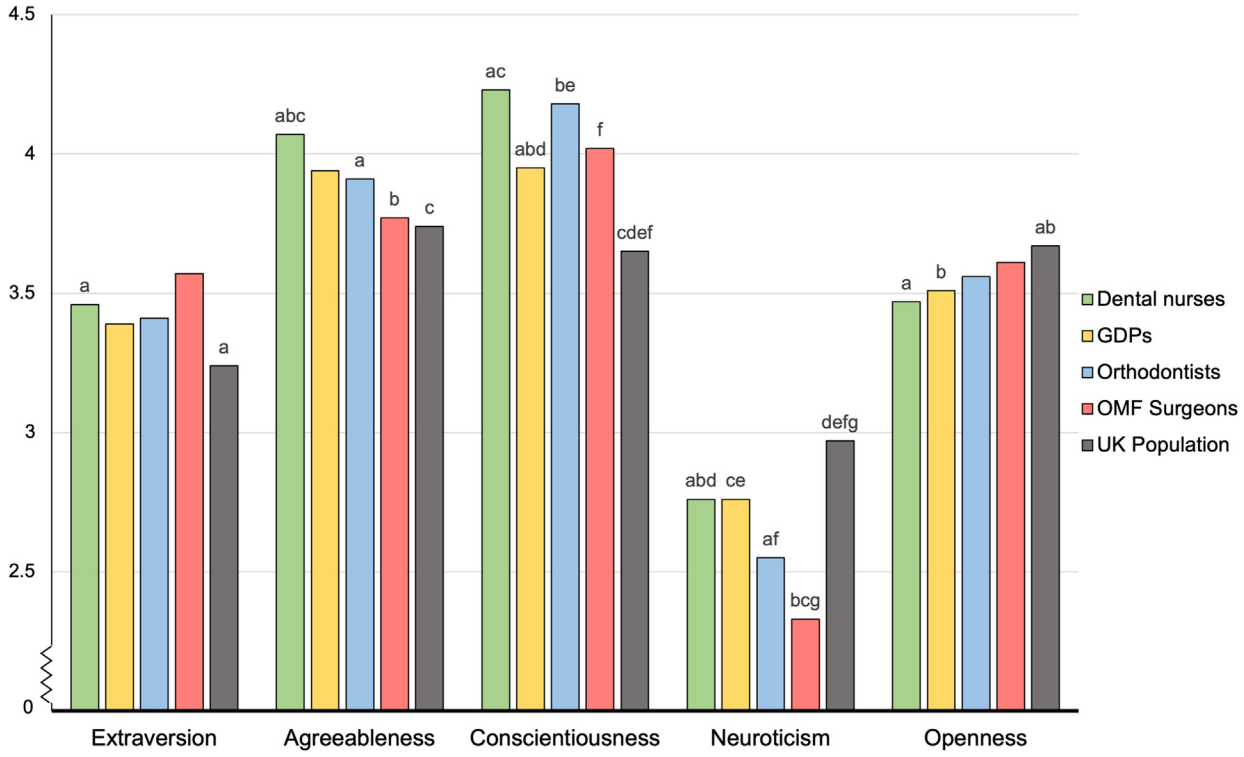

Fig. The personality of GDPs, dental nurses, orthodontists, OMF surgeons, and the UK population. For each personality factor, the same letter above multiple bars denotes a significant difference between those groups (all $P < 0.008$).

were examined for each Big Five factor when the participants were split by gender (Table V). Significant differences in conscientiousness, agreeableness, neuroticism, and openness were found: females had higher conscientiousness (mean difference [MD] = 0.16; 95% CI, 0.07-0.25; $P < 0.001$; d = 0.25), agreeableness (MD = 0.2; 95% CI, 0.11-0.29; $P < 0.001$; d = 0.27), and neuroticism (MD = 0.20; 95% CI, 0.09-0.32; $P = 0.001$; d = 0.48) scores higher than males. Males had higher openness scores than females (MD = 0.19; 95% CI, 0.10-0.28; $P < 0.001$; d = 0.26).

Statistically significant differences among participants based on relationship status were seen for the traits of conscientiousness ($P = 0.004$, d = 0.24) and neuroticism ($P < 0.005$, d = 0.34). The size of d here denotes a small effect size.[18] For conscientiousness, participants in relationships scored 0.14 points higher than single participants (95% CI, 0.04-0.25; $P = 0.004$). For neuroticism, the mean difference was 0.25 (95% CI, 0.10-0.39; $P = 0.002$), with those in relationships having lower scores on average.

No significant differences were found among subjects living in different geographic areas. Personality differences based on ethnicity were not possible to assess because of the small subgroups of ethnic minorities. When grouped by their highest level of education, most participants fell into their occupational grouping, so no further analysis of personality differences by education was performed.

For each of the Big Five factors where significant differences were found, the demographic variables associated with personality were added to a hierarchical multiple regression model in a stepwise fashion. The aim was to control for the significant differences in attributes such as age and gender among the 4 occupations and to determine the proportion of variation in each personality factor that could be explained by demographic variables and occupation.

The r^2 value represents the variation in a personality factor explained by any independent variables. As independent variables are added to the model, the r^2 value changes. As age, gender, and relationship status were seen to correlate with personality, each was added to separate regression models for conscientiousness, agreeableness, and neuroticism in a stepwise fashion.

First, age was added as the only independent variable, and this model was statistically significant for each of the 3 personality factors, confirming that age

Table V. Mean scores for the Big Five factors for males and females

Gender	*Mean ± 95% CI*	P *value*
Extraversion		
Male	3.44 ± 0.11	NS
Female	3.44 ± 0.05	
Agreeableness		<0.001*
Male	3.84 ± 0.08	
Female	4.04 ± 0.04	
Conscientiousness		<0.001*
Male	4.02 ± 0.08	
Female	4.19 ± 0.04	
Neuroticism		0.001*
Male	2.53 ± 0.10	
Female	2.73 ± 0.05	
Openness		<0.001*
Male	3.66 ± 0.08	
Female	3.47 ± 0.04	

NS, Not significant.
*Statistically significant (P <0.05).

was associated with personality. Then gender was added as a dichotomous variable. This led to a statistically significant increase in r^2, demonstrating that gender was associated with personality over and above age alone. The further addition of relationship status did not significantly increase r^2 for any of the 3 factors, so this variable was removed. Finally, when occupation was added, a further significant increase in r^2 was seen, confirming occupation to be associated with each personality factor over and above the influence of age and gender.

The final regression models included age, gender, and occupation (Tables VI). Binary variables must have 1 group as a reference category, and variables with more than 2 groups must be recoded into binary groups. Therefore, males and orthodontists are the reference groups for each model presented. The models can then be interpreted with these reference categories in mind. For example, for conscientiousness, the standardized coefficient β for age implies each yearly increase in age is associated with a marginal increase in conscientiousness. With males as the reference category, we can see being female was associated with greater levels of conscientiousness. Finally, relative to the reference category of orthodontists, being a GDP was associated with lower levels of conscientiousness beyond any associations with age and gender.

Regarding r^2, the final model for conscientiousness explained 7% of the difference in this trait among participants, with occupation explaining 3% of the difference over and above age and gender alone. For agreeableness and neuroticism, the final models explained 4% and 6% of the difference among participants respectively, and for these 2 traits, occupation explained 1% of the total difference.

DISCUSSION

This study identified significant differences among the different groups of dental professionals for conscientiousness, agreeableness, and neuroticism. The typical effect size uncovered in research investigating personality is d = 0.40.[13] For context, effects of this magnitude are sufficient to influence an individual's occupational attainment to a greater extent than childhood socioeconomic status or parental income.[3] The size of differences among groups in this study ranged from d = 0.35-0.45.

Demographic variables were associated with personality in ways largely consistent with the personality literature. There were significant correlations among age and conscientiousness, neuroticism, and openness. Conscientiousness and neuroticism have been shown to increase and decrease with age, respectively, which is consistent with the findings in our sample.[19] Agreeableness has been shown to increase over the lifespan.[19] However, this was not seen in this study sample.

Previous research has found females, at the population level, tend to be higher in neuroticism and agreeableness. This was mirrored by the findings of this study.[20] Females in our sample also showed higher levels of conscientiousness, which is not a consistent finding in other studies.[21] This may be because the females were recruited from 4 specific occupations and are unlikely to be representative of the population.

Significant differences in conscientiousness and neuroticism were found between participants with a partner and those without. This is also consistent with previous research in the area.[3] Despite these associations, relationship status was not significantly associated with personality in multivariate analysis. The addition of occupation to hierarchical regression models containing age and gender resulted in a significant increase in r^2, demonstrating that occupation was associated with personality after accounting for the influence of these demographic variables.

The effect sizes for the significant differences in conscientiousness, agreeableness, and neuroticism among occupations were d = 0.45, 0.39, and 0.35, respectively. To contextualize the size of these differences, one may first consider effect sizes for more intuitive, commonly encountered relationships. For example, the analgesic effect of nonsteroidal anti-inflammatory drugs on pain is d = 0.24, and the tendency for men to weigh more than women is d = 0.52.[22]

To add further context to the size of the personality differences seen among occupations, one could also

Table VI. Hierarchical multiple regressions models for conscientiousness, agreeableness, and neuroticism

	Conscientiousness		*Agreeableness*		*Neuroticism*	
Variable	*B*	*β*	*B*	*β*	*B*	*β*
Constant	3.81***		3.69***		3.02***	
Age	0.007***	0.15	0.003*	0.07	−0.011***	0.17
Gender	0.13*	0.10	0.12*	0.09	0.064	0.04
Occupation						
Dental nurse	0.04	0.04	0.14*	0.13	0.093	0.066
GDP	−0.19***	−0.15	0.06	0.14	0.092	0.052
OMFS surgeon	−0.11	−0.05	−0.1	−0.04	−0.239*	−0.077
r^2	0.072		0.038		0.058	
F	13.82***		7.09***		10.99***	
Δr^2	0.029		0.012		0.01	
ΔF	9.23***		3.74*		3.16*	

Note. The male group was the reference for gender, and the orthodontist group was the reference for occupation.
*P <0.05; ***P <0.001.

consider existing findings for each of these personality factors. A meta-analysis investigating associations between conscientiousness, the tendency to be hard-working and tenacious, and academic performance found the strength of this association to be d = 0.22, with more conscientious individuals performing better.[23] Other meta-analytic research has found the strength of association between low agreeableness, the proclivity toward being antagonistic and demonstrating little empathy, and divorce is d = 0.32.[3] Finally, the strength of association between neuroticism, a predilection for negative affect, and occupational burnout is particularly strong being d = 0.88 for the emotional exhaustion component of burnout.[24]

Orthodontists and dental nurses had greater levels of conscientiousness relative to GDPs. The higher level of this trait among orthodontists may reflect the lengthier orthodontic training pathway, as previous research suggests occupational attainment correlates with conscientiousness beyond factors such as socioeconomic status and cognitive ability.[3,25] Given the extensive OMFS training pathway, one would expect higher conscientiousness among these professionals; however, the difference between surgeons and GDPs did not reach significance.

Dental nurses are responsible for many aspects of care delivery, including surgery preparation, disinfection of instruments, and assisting with procedures, which could be described as conventional work according to Holland's (1997) model of occupational types. Gottfredson et al[26] found subjects higher in conscientiousness preferred conventional work, which may explain the higher levels of this trait among this group.

Both orthodontists and OMFSs had lower agreeableness scores relative to dental nurses. The clinician typically takes the leadership role in the dental team, and the dental nurse supports them. Dental nurses may require higher levels of agreeableness to work with a wide variety of clinicians effectively, and dental nurses who remain in the role long-term may enjoy such working dynamics.

Both orthodontists and OMFSs had lower levels of neuroticism relative to dental nurses, with OMFSs having the lowest levels of any of the occupations studied. A surgical error has the potential to be catastrophic, so those who are higher in neuroticism are unlikely to feel at ease working in a role with such ready attribution between operator error and a severely negative patient outcome. This could explain the lower neuroticism among surgeons, and the finding is consistent with research investigating specialty choice among medical professionals.[11]

GDPs frequently report high levels of occupational stress resulting from the unpredictable threat of litigation and substantial time pressures.[27] The latter has been shown to promote higher trait neuroticism.[28] The equally high levels of neuroticism among dental nurses may be explained by the shared working environment of the general dental practice.

Previous research has found certain healthcare professionals to exhibit different personalities to the general population.[29] Several differences were seen between the occupations studied and the UK population. First, dental nurses were the only group with extraversion scores higher than population norms. There is a paucity of research examining the personality of dental nurses using the FFM, but studies on medical nurses have found them to exhibit higher levels of extraversion.[30,31] The higher extraversion in our sample may be explained by a phenomenon seen in other research in which

extraversion appears to buffer against occupational stress.[24] Multiple dental professional surveys report the high-stress levels they experience, so higher levels of extraversion may be necessary to work in such an environment.[27,32] In addition, interaction with many patients in a single day may potentiate further extraversion. Finally, social media users appear to have higher levels of extraversion. Most dental nurse recruitment for this study was via social media, so the higher extraversion in this group may reflect some sampling bias.[33]

One of the largest differences between the occupations studied and the UK population was the higher agreeableness seen in dental nurses. This lends further credence to the notion that dental nurses may require higher than average levels of agreeableness to work in a supportive role with a variety of clinicians.

All 4 occupations had higher conscientiousness compared to the UK population. First, those subjects with a proclivity to participate in research have been shown to have higher levels of conscientiousness.[34] This may be related to an underlying facet of conscientiousness termed "sense of duty." Higher levels of this trait may explain why one would consent to being a research participant for little or no external reward. As the population norms were also derived from a research study, this is unlikely to explain the difference. Conscientiousness would also predict a subject's ability to complete a lengthy and demanding program of training, and this trait is strongly correlated with occupational prestige.[3] Surgery and dentistry are widely considered prestigious occupations, so the association seen in this study corroborates previous findings.

The largest divergence in personality from the UK population average was the lower neuroticism seen among the OMFSs. Lower levels of this trait in surgeons have been consistently reported in multiple cross-sectional investigations and are seen both in qualified surgeons and those in training.[35-37] Subjects with high neuroticism are unlikely to be drawn to an occupation in which the consequences of error may be catastrophic, as such a role is likely to exacerbate any propensity for anxiety, self-doubt, and rumination. It is unknown whether being a surgeon results in an adaptive reduction in neuroticism over time, as the studies have been largely cross-sectional. Sier et al[37] investigated personality among 3 cohorts of surgically inclined subjects: students, surgical residents, and qualified surgeons. Although not a longitudinal investigation, the authors found the surgery-interested students to have higher levels of neuroticism than the surgical residents and surgeons, but all 3 groups had far lower levels of neuroticism than the general population. This lends some support to the notion that surgery attracts those lower in neuroticism, and the role may further attenuate this trait.

The capacity for personality to change over the life course has been well documented, and the literature finds genetic and environmental factors to exert roughly equivalent influence.[38,39] Occupation has been considered a chronic environmental pressure that can mold personality. From our cross-sectional survey results, it is not possible to deduce whether differences between occupations result from subjects self-selecting into roles that fit their attributes or whether their personality has been molded by working in that occupation over time. However, previous longitudinal research has found occupation to cause changes in personality,[28,40] and our data may reflect this effect in the participants. The relationship between personality and occupation is likely bidirectional. Subjects intuitively select occupations that suit their personality, which strengthens and reinforces those personality attributes which led to the occupation being chosen in the first place.[41]

We cannot assume that the same environment will precipitate identical changes in all individuals. Different employees may see their personalities change in differing directions because of working in the same role. Employees who see both these pressures to change personality as positive and welcome any changes they perceive their occupation to have caused may report greater job satisfaction.[41] It would be valuable for future research to identify personality profiles that are most likely to see the greatest positive temporal change in personality by working in a given occupation for a prolonged period.

Longitudinal research following cohorts of subjects as they progress through their careers in the 4 occupations studied may elucidate how these jobs influence personality development through the life course and whether specific personality profiles are associated with success in these occupations over time. If those with certain personality traits attain the greatest job satisfaction and professional success, attempts could be made to recruit a more homogenous workforce with similar attributes. However, fully quantifying success in such roles may prove difficult.

Previous research consistently demonstrates greater conscientiousness correlates with occupational performance markers.[25] It is likely that higher levels of this trait would confer advantages in any of the 4 occupations studied. Given the relatively high levels of conscientiousness seen among orthodontists and dental nurses, it may be an attribute of particular importance for these 2 occupations.

General dentists had lower levels of conscientiousness relative to orthodontists. With the more widespread

use of psychometric data in recruitment, it may be appropriate for postgraduate recruiters for orthodontic specialty training to select more conscientious applicants to their programs. This may already be occurring indirectly, as presenting an adequate portfolio of extracurricular achievements is frequently part of the recruitment process for orthodontic training, and this demonstrates a degree of conscientiousness itself.

All 4 occupations had higher mean extraversion scores than the population average, suggesting these occupations require greater than average levels of extraversion or at least attract such individuals. Recruiters and employers may wish to consider the extraversion of applicants when considering how they may meld with existing teams. High extraversion candidates have been shown to improve team performance.[42] However, extroverts may be drawn to teamwork because of the associated socializing opportunities, which may distract from task completion. Meta-analytic synthesis of the literature has failed to find any significant association between extraversion and team performance, so recruiters should consider the specific nature of the position they are recruiting for and whether an applicant's extraversion is likely to influence performance.[4]

Higher agreeableness is positively related to team performance. However, large variation in agreeableness among members within a team is associated with poorer performance.[4] There may be deleterious effects on team cohesion should a low agreeableness employee be introduced, and identifying such employees in the recruitment process may be of value. Our data showed orthodontists and OMFSs have lower levels of agreeableness than dental nurses. This difference could manifest as interpersonal friction, especially as dental nurses work mainly in a supportive role and may feel unable to voice their concerns about working practices they perceive as unfair or inappropriate. Higher average levels of neuroticism among this group may mean the less agreeable proclivities of orthodontists and OMFSs may be met with particularly negative affect. This may result in deterioration in teamwork and ultimately negatively impact patient care.

Volitional personality change is controversial, but research does suggest individuals can temper attributes such as low agreeableness and high neuroticism over time.[43] Encouraging dental team members to acknowledge their personalities, proclivities, and unconscious behaviors may prevent unnecessary confrontation and resentment. This is effective in the teamwork training literature, and greater application in the dental setting may generate more satisfied, cohesive, and collaborative interactions among colleagues.[44]

This study benefits from the large sample, making it the largest personality survey among dental professionals to date. The number of participants recruited lends validity to the contemporary personality profile of the 4 occupations developed from the data collected.

The BFI has demonstrated validity, reliability, and convergence with other personality assessment methods. It is based on the prevailing and empirically supported FFM, which sets our work apart from previous research using less empirically robust psychometric tests.[8,29] The BFI is a self-report psychometric test that may be at risk from socially desirable responding, but to attenuate this, the anonymity of responses was stressed, the survey was completed without direct involvement from the research team, and the participants stood to gain nothing from presenting themselves in a socially desirable way.[45]

Prior research on personality differences in healthcare occupations has been inconsistent in its attempts to account for associations with demographic variables.[29,46-48] In this study, hierarchical multiple regression was applied to control for the confounders of age and gender and better elucidate associations between occupation and personality.

Logistical constraints may have led to some sampling bias despite using multiple avenues for recruitment. Our sample may not completely represent each of the 4 occupations so generalizability may be limited. It is virtually impossible to get an accurate response rate estimate or to identify any systematic way in which participants may have differed from nonresponders because of the use of social media to recruit participants.

Research has found users of social media exhibit more openness and extraversion.[33] This may have contributed to the finding of relative similarity in extraversion and openness among participants. However, different proportions of each occupational sample were recruited via social media. Most dental nurse and GDP participants came from social media, but OMF surgeons and orthodontists were recruited through memberships of professional organizations, so the extent of selection bias for more open and extroverted social media users may not be generalizable to participants from all occupations. Furthermore, as none of the 4 occupations require exceedingly high levels of openness, perhaps in the manner that purely artistic professions would, one would not expect any of the 4 occupations to exhibit particularly high levels of this trait relative to others. In addition, as all 4 occupations are patient-facing and necessitate interpersonal interaction, relative homogeneity in extraversion would also be anticipated and was found.

An additional source of response bias may stem from those not satisfied with their occupation, perhaps having a lower proclivity to respond to surveys about their work. The personality of these dissatisfied nonresponders may differ in some systemic way from the participants surveyed. However, as proposed in Holland's theory of occupational choice, those who perceive an occupation as unsuited to their personality or who find this mismatch on entering the specialty are likely not to enter said occupation or leave its ranks rapidly.[26] Such personalities, so divergent from the occupational norm, are unlikely to be encountered often, and for these reasons, we anticipate they would not have been captured in large numbers by a study of this kind.

CONCLUSIONS

Orthodontists and dental nurses had greater conscientiousness relative to GDPs. Dental nurses had higher agreeableness relative to orthodontists and OMFSs. Orthodontists and OMFSs had lower neuroticism than dental nurses, and GDPs had higher neuroticism than OMFSs. The magnitude of these differences is likely to have a meaningful impact when viewed in the context of effect sizes reported in the personality literature.

Occupational differences in personality could be partly explained by differences in demographic variables among groups. However, occupation was associated with personality even after accounting for demographic differences.

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SUPPLEMENTARY DATA

Supplementary data associated with this article can be found, in the online version, at https://dx.doi.org/10.1016/j.ajodo.2023.06.021.

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SUPPLEMENTARY DATA

The BFI

The following statements concern your perception of yourself in a variety of situations. Your task is to indicate the strength of your agreement with each statement using a scale in which 1 denotes strong disagreement, 5 denotes strong agreement, and 2, 3, and 4 represent intermediate judgments.

There are no "right" or "wrong" answers, so select the number that most closely reflects you on each statement. Take your time and consider each statement carefully.

1. Is talkative
2. Tends to find fault with others
3. Does a thorough job
4. Is depressed, blue
5. Is original, comes up with new ideas
6. Is reserved
7. Is helpful and unselfish with others
8. Can be somewhat careless
9. Is relaxed, handles stress well
10. Is curious about many different things
11. Is full of energy
12. Starts quarrels with others
13. Is a reliable worker
14. Can be tense
15. Is ingenious, deep thinker
16. Generates a lot of enthusiasm
17. Has a forgiving nature
18. Tends to be disorganized
19. Worries a lot
20. Have an active imagination
21. Tends to be quiet
22. Is generally trusting
23. Tends to be lazy
24. Is emotionally stable, not easily upset
25. Is inventive
26. Has an assertive personality
27. Can be cold and aloof
28. Perseveres until the task is finished
29. Can be moody
30. Values artistic, esthetic experiences
31. Is sometimes shy, inhibited
32. Is considerate and kind to almost everyone
33. Does things efficiently
34. Remains calm in tense situations
35. Prefers work that is routine
36. Is outgoing, sociable
37. Is sometimes rude to others
38. Makes plans and follows through with them
39. Get nervous easily
40. Likes to reflect, play with ideas
41. Has few artistic interests
42. Likes to cooperate with others
43. Is easily distracted
44. Is sophisticated in art, music, or literature