Relating personality to interview results and performance in the first year of the dental course

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The aim of this paper is to relate personality measures of Year 1 undergraduate dental students to their performance at admissions interview and during the first year of their course. The personality profiles of 58 first year dental students, were statistically related to results of the first year examinations and to the results of 54 of the students' structured admissions interviews. A relationship was found to exist which related personality to interview results and performance in the first year of their dental course

When selecting students for admission to dental schools, admissions tutors attempt to select candidates who will achieve the required entry grades and succeed on the course. As A-level requirements have increased during the past few years, admission's officers acknowledge that many, less academic students might make very suitable dentists since the characteristics of a good dentist include empathy, communication skills, time management and manual dexterity — factors not measured by the UCAS form or easily assessed at interview.[1]

Dentistry is becoming an increasingly diverse career. It is clear that characteristics required of a general practitioner running their own practice are not identical to those needed by a community dental officer, a dentist in the armed forces, a university researcher or hospital consultant. Admissions Officers have to balance the diversity of individuals to suit the pro-

fession and yet find students who will respond to the course provided. Those chosen must also be suited for the rigours of life after qualification.

Dentistry has long been acknowledged a stressful profession.[2] Reports from many different areas all suggest concern about stress-related factors. Humphris et al. surveyed staff working for three hospital specialties and reported 10% of respondents suffering burnout.[3] Blinkhorn investigated stress and the dental team; Osborne and Croucher[5] and Wilson et al.[6] assessed GDPs; and Humphris and Peacock[7] the Community Dental Service.

Burke, Maine and Freeman noted that stress-related illnesses, together with musculo-skeletal disorders, were the main factors influencing dentists to retire early.[8] In addition, Osborne and Croucher sug-

gested that interaction between the dentist and patient could precipitate a syndrome of emotional exhaustion — burnout — which could lead to depersonalisation and reduced personal accomplishment in affected individuals.[5]

In 1987 Cooper, Watts and Kelly discussed the problems most likely to cause stress in dentists suggesting that many factors led to dentistry being particularly stressful — the combination of time pressure, frightened patients, financial problems and staff supervision allied to what they considered to be a routine and boring work regime.[9] Burke, Maine and Freeman also suggested that occupational hazards related to the practice environment could further exacerbate the problem — posture, materials used and intra-surgery risks including aerosols, particulate debris and noise.[8]

Assessing the perceived health and well-being of dentists, Kay and Scarrott sampled randomly from the British *Dentists' Register,* dentists who had qualified after 1958.[10] Their study included 427 replies with a response rate of 72% and showed that dentists believe themselves to be happy and healthy but, in general, they consider that they live stressed lives; Kay and Scarrott suggest this stress level may be no greater than in other professions.

It is clear that candidates for admission to dental schools are faced not just with a stressful course but also a stressful career. Drummond and Duguid addressed the problem of student drop-out from UK dental schools and were fearful that it had reached such a high level that it would affect future manpower levels.[11] In a previous article, Hoad-Reddick and Macfarlane showed that students who performed well at interview were more likely to succeed in the first year of the course.[12]

Aims and objectives

The aims of this study were to relate personality measures of dental students to success at interview and performance on

In brief
- Admissions officers aim to select students who will succeed on the course and be suited to a stressful career.
- Ralationships between admission criteria, interview results, Year 1 results and personality scores are explored.
- At interview good communicators and those with leadership skills show particular personality traits.

the first year of the course and also, to predict factors leading to success. This would allow re-assessment of the admissions process to affect procedures in the future and might reduce drop-out rates. It would also allow selection of those most suited in terms of their personality.

Method

Of the 1270 students who applied for entry in the academic year 1996/7, 650 fulfilled the minimum entry requirements and were interviewed between November 1995 and March 1996. The interviews were structured, selective and carefully marked. They were conducted by three people: a chairman and two interviewers. Criteria covered: professionalism, communication skills, team/leadership experience, non-academic interests, manual dexterity and awareness of the need for Hepatitis B immunisation. The interview marking scheme has been described in detail elsewhere as part of an analysis of the admissions system, relating interview results to performance at A-level and during year 1 of the course.[12] The minimum overall average of those offered a place was 15, range 12–20. For the analysis those scoring overall 16 and above were rated high and <16 low.

Eventually 117 students were admitted to the first year of the course in late September 1996. Toward the end of Semester 1 (December 1996–January 1997) 70 (61%) students recruited from the Year 1 cohort completed a written personality inventory/questionnaire in a separate study comparing first and final year students. The availability of the results from a recognised personality questionnaire presented an opportunity for us to widen the scope of our own study.[12] The Orpheus personality profile has undergone extensive validation processes for all types of individual and is only available under licence therefore it was considered unnecessary for further validation to be undertaken for this study.

Numbers were reliant on volunteers with the minimum target number for the comparative psychological study being 50. Students were recruited by asking

them to complete the questionnaire after one of their lectures in the Medical School. These lectures are repeated, thus not all the students were available to complete the questionnaire on the day it was presented to them; 70 was considered sufficient for the study comparing first and final year students. Of the 70 students who completed the questionnaire, 12 did so anonymously, and for 4 students there were no results for admissions interview as they had attended the pre-dental course at the University. Thus, the final numbers available for this analysis were 58 for the relationship with the first year results and 54 for the relationship with the admission interview score.

Details from the UCAS form, results of the admissions interviews and of Year 1 examinations were entered onto a database together with the results of the personality profile. They were analysed using the *SPSS program.*[13]

In Manchester, Years 1 and 2 are taught

using the problem-based learning system (PBL).[14] The content of Semester 1 is mainly concerned with nutrition and metabolism; Semester 2 covers cardio- and respiratory fitness and includes a research-based special study module. The examinations include case-based, publication-based and knowledge-based components, an objective structured skills examination, and assessment of course work. In Semester 2, the special study module is included in the assessment.

The personality inventory used was Orpheus (The Psychological Corporation, 1996)[15] and is based on 'The Big Five' theory of personality which currently dominates the field of personality.[16,17] It consists of 190 questions and takes up to 20 minutes to complete. Although Orpheus differs in its labelling of factors: 'fellowship', 'authority', 'conformity', 'emotion', 'detail' (Table 1); the factor groupings are the same as those described by Costa and McRae.[16]

Table 1. Personality as measured by the ORPHEUS programme[15]

Orpheus Factors	Big Five Factor labels	Characteristics
Fellowship	Extraversion/ Introversion	High scorers are generally happier to work in teams, are gregarious, assertive and sociable. Low scorers prefer independent work, are more likely to be timid and quiet
Authority	Agreeableness	High scorers are able to take tough decisions; may be cold and disagreeable. Low scorers are more cooperative appearing warm and agreeable
Conformity	Openness to experience	High scorers prefer traditional methods (practical with narrow interests)and respect establishment. Low scorers may seek alternative methods being creative curious and cultured
Emotion	Neuroticism	High scorers are of a nervous disposition, insecure and anxious; sensitive to feelings of others. Low scorers may be better suited to performing under stress, calm and self confident
Detail	Conscientiousness (ability to perform tasks)	High scorers excel at mundane tasks requiring care although they may get involved in minutiae; hardworking, organised and dependable. Low scorers prefer the wider view showing less patience with routine tasks — lazy, disorganised and unreliable

Table 2 Relationship between psychological personality assessment and admission interview score (n = 54)

Personality assessment (Five Major Scales score)	% with high interview score					
	Professionalism	Communication skills	Manual dexterity	Leadership	Non academic interest	Overall score
Fellowship						
Low (≤5)	55	55	30	45	40	35
High (≥6)	59	71	21	47	56	53
	$\chi^2 = 0.08$, P~0.78	$\chi^2 = 1.34$, P~0.25	$\chi^2 = 0.61$, P~0.44	$\chi^2 = 0.02$, P~0.88	$\chi^2 = 1.27$, P~0.26	$\chi^2 = 1.63$, P~0.20
Authority						
Low (≤5)	57	57	26	43	45	41
High (≥6)	58	92	17	58	67	67
	$\chi^2 = 0.01$, P~0.94	$\chi^2 = 4.88$, P~0.03	$\chi^2 = 0.46$. P~0.50	$\chi^2 = 0.90$, P~0.34	$\chi^2 = 1.71$, P~0.19	$\chi^2 = 2.58$, P~0.11
Conformity						
Low (≤5)	66	72	25	47	53	50
High (≥6)	46	55	23	46	46	41
	$\chi^2 = 2.17$, P~0.14	$\chi^2 = 1.72$, P~0.19	$\chi^2 = 0.04$, P~0.85	$\chi^2 = 0.01$, P~0.32	$\chi^2 = 0.31$, P~0.58	$\chi^2 = 0.43$, P~0.51
Emotion						
Low (≤5)	70	70	26	52	44	48
High (≥6)	48	61	23	42	55	45
	$\chi^2 = 2.42$, P~0.12	$\chi^2 = 0.40$, P~0.53	$\chi^2 = 0.09$, P~0.77	$\chi^2 = 0.56$, P~0.46	$\chi^2 = 0.68$, P~0.41	$\chi^2 = 0.04$, P~0.85
Detail						
Low (≤5)	61	64	18	32	43	43
High (≥6)	54	65	31	62	58	50
	$\chi^2 = 0.26$, P~0.61	$\chi^2 = 0.01$, P~0.93	$\chi^2 = 1.23$, P~0.27	$\chi^2 = 4.69$, P~0.03	$\chi^2 = 1.19$, P~0.28	$\chi^2 = 0.28$, P~0.60

These five factors are independent of one another but, in combination, may provide means of differentiating people. They were developed from previous reports using 16 factors[18] and are widely recognised to be a valid predictor for job criteria across occupations.[19] Orpheus is especially designed to be used in an occupational setting and comprises 190 questions which are answered in booklet form. These raw data are processed, and reports for each participant generated using companion software. For this investigation, each final score for the five factors was categorised as low (1–5) or high (6–9). The median score for 'conformity' and 'detail' was 5, for 'fellowship' and 'emotion' 6 and for 'authority' 4. We decided to have the same cut point for high/low scores for each factor.

Results

The relationship between interview results and personality measures (Table 2)
Analysis of results showed that those who scored highly for communication skills at interview were significantly more likely to be high scorers for 'authority' in the personality questionnaire ($P = 0.03$). Also, those who scored highly for leadership at interview were likely to have scored highly for 'detail' ($P = 0.03$).

The relationship between results for Year 1 and the personality questionnaire (Table 3)
No relationship could be found between any of the personality factors and the total results of Year 1, Semesters 1 and 2 considered as 'pass' or 'fail'. However, when the results were separated out into the constituent parts of the examination it was found that in Semester 2, students who scored highly for the personality of 'authority' were less likely to fail during the course-based examination (17% failed among those with high score against 49% with low score $P = 0.04$).

Factors which may predict success or failure in Year 1 of the dental course
A backward stepwise logistic regression model was used to determine factors which could predict examination failure (probability for stepwise entry and removal were 0.05 and 0.10, respectively). Factors considered were: gender, whether students had studied A-level biology, whether they had completed the personality questionnaire and each of the five factors (classified as high or low). When

modelling results for Semester 2, results for Semester 1 were included in the model; this has been shown to be statistically, significantly related to success in Semester 2.[12] The only important factors that could predict performance in Semester 1 were whether students had A-level biology (odds ratio (OR) 0.33, 95% confidence interval (CI) 0.13–0.85) and high score for the factor of 'authority' (OR 0.18, 95% CI 0.02–1.54). However in Semester 2 those who failed in the first Semester were more likely to fail again (OR 10.02, 95% CI 3.85–26.10) and students with high score for 'detail' were less likely to fail (OR 0.19, 95% CI 0.04–0.91).

Generalised estimating equations with logit link and exchangeable correlation matrix, which are an extension of logistic regression (using xtgee command in *Stata*),[20] were used to identify predictors of student performance during the first year using results of both Semesters 1 and 2. It was apparent that female students were less likely to fail (OR 0.49 95%, CI 0.25–0.87) as were those with a high personality score for 'authority' (OR 0.18 95%, CI 0.03–1.09) and those who had studied A-level biology (OR 0.41 95%, CI 0.18–0.91).

Discussion

In a previous paper, it was shown that the main predictors for success on the course at the end of Year 1 (Semester 2) were A-level biology, those who scored highly for leadership at interview and being female.[12] In this part of the study, where personality assessment was added to the model in addition to the previous factors, instead of interview scores, it has been shown that candidates who score highly on the factors of 'detail' or of 'authority' are less likely to fail. Thus hardworking, organised, dependable and persevering students (although those who may get bogged down in minutiae, ie 'detail') will succeed as will those who are prepared to take tough decisions ('authority').

The results should be interpreted with some caution as, with the introduction of more variables into the model, the likelihood of finding a statistically significant

Table 3 Relationship between psychological assessment and Semester 1 and Semester 2 results (n = 58)

Psychological assessment (Five Major Scales score)	Semester 1 Fail %	Semester 2 Fail %
Fellowship		
Low ($\leq$5)	26	17
High ($\geq$6)	41	26
	$x^2 = 0.19, P{\sim}0.66$	$x^2 = 0.68, P{\sim}0.41$
Authority		
Low ($\leq$5)	35	26
High ($\geq$6)	8	8
	$x^2 = 3.21, P{\sim}0.07$	$x^2 = 1.67, P{\sim}0.20$
Conformity		
Low ($\leq$5)	29	18
High ($\geq$6)	29	28
	$x^2 = 0.00, P{\sim}0.98$	$x^2 = 0.90, P{\sim}0.34$
Emotion		
Low ($\leq$5)	23	19
High ($\geq$6)	34	24
	$x^2 = 0.88, P{\sim}0.35$	$x^2 = 0.21, P{\sim}0.65$
Detail		
Low ($\leq$5)	26	29
High ($\geq$6)	33	14
	$x^2 = 0.40, P{\sim}0.53$	$x^2 = 1.86, P{\sim}0.17$

result is increased. Initially the study was not designed to assess the role of psychological factors relative to the other factors which were being investigated but, the availability of the results from a recognised, reliable, personality questionnaire were thought to be of interest and relevant to our other research. This could therefore be considered to be a pilot study. A larger multi-school prospective study would provide more scientific evidence.

A larger study would also allow all students in the year to complete the questionnaire. Since only a maximum of 58 of the questionnaires could be used for our analysis, the results must be viewed with caution. There was no difference in gender distribution between those for whom the non-anonymous psychological profile was available (45% female) and not available (51% female) (P = 0.52). However, among students who completed the psychological questionnaire non-anonymously, there was a significantly lower proportion (29%) of students who failed

Semester 1 against non-completers and those who chose to remain anonymous (48%) (P = 0.044). Thus the results should be viewed as a trend; it is clear that further study with all students participating should be undertaken.

Ideally, the psychological assessment should be completed at the time of the admission interview as the current study has had to make an assumption of no change occurring in the year between the interviews and the presentation of the questionnaire at the end of Semester 1. It could not be presented earlier because of time-tabling and questionnaire availability problems.

Interview results were not included in the prediction part of the model as we have shown an association between the personality factor of 'authority' and high interview score for communication skill, and also between scores for 'detail' and leadership. It may be that both the interview and the personality scores assess similar factors. Since this study only

includes those who have scored highly at interview, inevitably they are a pre-selected group. The relationship between these two factors and communication skill and leadership as assessed at interview, and the fact that they are related to success in the course-based examination means that, during the admissions process, — or during interviewing — particular attention should be paid to these criteria. It is possible that they could be graded higher than other criteria eg non-academic interests, evidence of manual dexterity etc. Indeed our marking scheme has already been altered so that now, not all criteria are marked at the same level — evidence of good communication skills and professional knowledge being rated higher, and manual dexterity and knowledge of the need for Hepatitis B immunisation being rated lower. Also, as a result of this study, the type of interview which is conducted is under review with different methods of questioning being introduced.

It would be interesting to assess the personality of all candidates at interview and to relate this to their interview performance so that the relationship between both high and low scorers could be determined. Also, if students could be assessed at the commencement of the pre-clinical course and during the clinical period, any changes to personality which had occurred could be highlighted.

Salgado researching personality and job performance in the European Community felt that 'conscientiousness' and emotional stability ('emotion') are valid predictors across job criteria and occupational groups but that the reliability of other factors varies from occupation to occupation.[19] He indicated that 'agreeableness' was a valid predictor for training efficiency.

In a series of papers on the use of the admissions and aptitude tests in north America, which predict in two areas — theoretical/academic and technical/manual,

Boyd, Teteruck and Thompson felt that the grade point average was the best and most consistent single predictor with the chalk carving test being especially important.[21] Since 1974, in Canada, although not in the USA, a personality score has been included in the tests but it appears that there have been inconsistancies in its use.

Wilding and Valentine investigated factors predicting success in dental and medical students examinations and, although they found that reasons for failure were many and complex, they felt general study organisation and A-level performance were positive correlations.[22] They particularly recommended assisting dental students with work organisation, suggesting that different factors affect dental and medical students in their choice of course; medical students may be more academic and work focussed whereas dental students are more practically oriented.

Conclusions

This study has shown some relationship between measures of personality of first year dental students and their performance at interview and on the course. The results have informed the admissions process allowing reassessment of the interview marking system.

It is very important that students are selected who can benefit from the course provided and who will succeed in their chosen careers. Not only is failure a disaster for the individual concerned but it has financial and long-term manpower implications for the profession.

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