Exploring the differences in psychological traits between surgical specialties at an academic hospital in Bloemfontein

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Background: Studies have attempted to categorise undergraduate medical and postgraduate students and specialists into personality types, to determine what influences personality has on specialty choice and job satisfaction. This study explored the personality characteristics of doctors in four surgical and three consulting specialties at an academic hospital in Bloemfontein, South Africa.
Methods: This analytical cross-sectional study used the Zuckerman-Kuhlman Personality Questionnaire as a measuring tool which included five scales: *impulsive sensation seeking* (subscales *impulsivity* and *sensation seeking*), *neuroticism-anxiety, aggression-hostility, sociability* (parties and friends and isolation intolerance), and *activity* (*work activity* and *general activity*). Overall, 70 consultants and senior registrars from surgical specialties (anaesthesiology, obstetrics and gynaecology, orthopaedic surgery, surgery), (response rate 60.3%) and 58 consultants and senior registrars from three consulting specialties (internal medicine, paediatrics, family medicine) (response rate 71.6%) participated.
Results: Respondents from four surgical specialties had higher medians than the overall consulting group for the subscale *sensation seeking*. The subscale *sensation seeking* scored higher than *impulsivity* across surgical and consulting groups. The surgical group scored lower than the consulting group in *neuroticism-anxiety*, with anaesthesiology scoring the highest (42.1%) and orthopaedic surgery scoring the lowest (15.8%). Orthopaedic surgery scored the highest (50.0%) in *aggression-hostility, sociability* (52.9%), *parties and friends* (44.4%) and *isolation intolerance* (65.5%). The surgical group scored significantly higher than the consulting group for *activity* ($p < 0.01$).
Conclusion: In exploring the personality types of specialists, the orthopaedic surgeons in specialist departments in Bloemfontein seem unique in their sociability and aggression-hostility traits, anaesthesiologists scored strongly on the sensation seeking and neuroticism-anxiety scales, while the obstetricians and gynaecologists did not manifest either of these traits strongly. This data contributes to a growing discussion on personality choice and job satisfaction.
Keywords: surgical specialties; personality; behaviours; traits; surgery; anaesthesiology; obstetrics and gynaecology; orthopaedic

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Introduction

Staff in different medical specialties have long been stereotyped by distinct personality traits. Even physicians within the medical fraternity consider certain personality attributes common to the speciality and sometimes even essential for success in a specific speciality.[1,2] Surgeons are often viewed as having far fewer similarities with other specialists. They are considered as extraverted, temperamental, aggressive, assertive and goal-driven by their co-workers and the public.[2,3] Furthermore, they are perceived as less sociable and may seem to lack tact during interaction.[2,3]Measuring personality traits of different specialties could theoretically lead to implementation of specialty choice prediction. Some envisage it to become part of a selection tool for medical schools, and predetermine a candidate's experience of job satisfaction, depression and/or burnout in the chosen occupation.[2,3,4,5]Studies using different measuring instruments

investigated surgeons' personality types. A Greek study using the Symptom Check List 90-Revised determined that surgeons scored higher in *hostility* traits compared to other specialties, but much lower in *obsessive-compulsive* and *anxiety*.[4] A German study confirmed elevated *achievement-orientation* and *extraversion*, but only a slightly higher *aggression* score.[2] Drosdeck et al.[5] found with the Big Five Inventory that surgeons had higher *conscientiousness* and *extraversion* scores, but scored lower in *agreeableness* compared to other medical staff.

Teunis et al.[6] interviewed and tested surgeons using the Octogram Work and Leadership Style Test to determine how their decisions and confidence compared with their personality traits. They found that many of the personality traits of surgeons are required to make the correct decision to operate, be confident in their abilities and to be innovative when required.

Preece and Cope[7] speculated whether surgeons developed their personality traits during their studies, or whether the personality traits and learning styles were already present beforehand. They found (using the Big-Five Factor Marker) that medical students who harbour interest in following a surgical career path showed many similarities to surgical registrars and surgeons.

Hoffman et al.[3] found (using the Big Five Inventory) that surgical registrars showed much higher levels of *conscientiousness* and *extraversion* compared to other specialty registrars and medical students. *Agreeableness* was also lower among these registrars compared to their peers from other fields. The results of Woods et al.[8] (using the Big Five Inventory and Holland's RIASEC) successfully supported their hypothesis that personality traits could be used to predict which specialty medical students would select. Pawełczyk et al.[9] compared personality traits, using the Formal Characteristics of Behaviour-Temperament Inventory, with final-year medical students' preference for surgical or non-surgical specialist fields. Those interested in surgery displayed high *endurance* and *briskness*, compared to non-surgical specialties, which scored higher in *emotional reactivity*.

Hojat and Zuckerman[10] using a shortened version of the Zuckerman Kuhlman Personality Questionnaire (ZKPQ) found that those interested in surgical specialties displayed elevated *aggression-hostility* and *impulsive-sensation seeking traits*. Those interested in obstetrics and gynaecology displayed high *neuroticism-anxiety*, while those in emergency medicine and surgery showed higher scores in *activity*.

Most of these authors agree that more research should be conducted before personality could comfortably be used to determine whether a medical student will be successful as a surgeon.

Aim

The aim of the study was to explore the differences in personality factors between surgical specialties of practice of doctors at a South African academic hospital. An overall comparison between respondents from the surgical group and their consulting counterparts is provided to explore differences/similarities across the traits in these groups. The comparison of consulting specialties have been reported elsewhere.[11]

Methodology

This was an analytical cross-sectional study conducted in 2014 over a four-month period. The target population included 197 doctors working as consultants or senior registrars in seven specialty departments at an academic hospital in Bloemfontein. The surgical group (N = 116) included anaesthesiology, obstetrics and gynaecology, orthopaedic surgery and surgery. The consulting group (N = 81) included internal medicine, paediatrics and family medicine.

The allocation to these groups is based on local categorisations in practice.

All the practising consultants and senior registrars who attended the departmental meetings were invited to participate in the study. Those who completed the questionnaires constituted the sample.

Measurement

Anonymous self-administered questionnaires were distributed during the meetings and were collected by the authors. Due to one of the author's familiarity with and access to the tool, the ZKPQ, [12] which has been used in other published studies,[10-14] was used to measure different factors of the respondents' personality. This validated measurement tool comprises five scales [10]:

- Impulsive sensation seeking: 'The tendency to act quickly on impulse without planning, often in response to a need for thrills and excitement, change and novelty.'
- Neuroticism-anxiety: 'The tendency to be tense and worry, overly sensitive to criticism, easily upset, and obsessively indecisive.'
- Aggression-hostility: 'The tendency to express verbal aggression and show rudeness, thoughtlessness, vengefulness, spitefulness, a quick temper and impatient behaviour.'
- Sociability: 'Tendencies to interact with others, enjoyment in being with others, and intolerance for social isolation.'
- Activity: 'The tendency to be active, to prefer challenging work, and being impatient or restless when there is nothing to do.'

The ZKPQ consists of 99 items where the respondent has to check either 'true' or 'false' for each item. For this study, a separate page was added to the study questionnaire to capture demographic data such as age, gender and years in field of specialty.

Pilot study

A pilot study was conducted on eight medical interns rotating in the academic hospital. Minor adaptations were made to some of the questions to use locally appropriate terminology for different medical positions. Data collected from the pilot study were excluded from the analysis.

Table 1. Sample and population sizes

	Sample size n	Population size N	Response rate %
Surgical group, all	**70**	**116**	**60.3**
Anaesthesiology	14	29	48.3
Obstetrics and gynaecology	22	30	73.3
Orthopaedic surgery	14	20	70.0
Surgery	20	37	54.1
Consulting group, all	**58**	**81**	**71.6**

Table 2. Demographic data

	Surgical group					Consulting group
	All	Anaesthesiology	Obstetrics/ gynaecology	Orthopaedic surgery	Surgery	
Median age (years)	35.0	32.0	36.5	35.5	31.0	42.0
Range (years)	28-78	29-78	29-59	29-71	28-64	29-65
Median years in practice	4.0	4.0	4.0	4.0	5.0	10.0
Range (years)	1-50	1-50	1-35	1-40	2-32	1-32
Gender*						
Male n (%)	49 (75.4)	9 (69.2)	14 (70.0)	13 (100)	13 (68.4)	30 (56.6)
Female n (%)	16 (24.6)	4 (30.8)	6 (30.0)	0	6 (31.6)	23 (43.4)
Ratio	3.1:1	2.25:1	2.3:1	1:0	2.2:1	1.3:1

*Gender missing: Anaesthesiology n = 1; obstetrics and gynaecology n = 2; orthopaedic surgery n = 1 (it is however known that all potential respondents in this specialty were males); surgery n = 1; surgical group n = 5; consulting group n = 5

Analysis of the data

Data were analysed by the Department of Biostatistics, Faculty of Health Sciences, University of the Free State. Results are presented as median percentages of the maximum result for each specific scale. The score for each scale is expressed as a percentage out of the maximum total score applicable for that scale. If a respondent did not answer more than 20% of the questions for a specific scale, the result for that scale was excluded from the results.

A sixth scale, *infrequency*, is included in the ZKPQ and identifies respondents who provide invalid test results by selecting responses that are unlikely to be true.[10] Results that excluded questionnaires with scores > 30% on the *infrequency* scale were compared with results that did not exclude questionnaires with scores > 30%. A few differences were noted, however these were not significant enough to warrant the use of the results of excluded questionnaires.

Statistical analysis included the non-parametric Mann-Whitney test. The 95% confidence intervals (CIs) for the median differences were calculated and p-values < 0.05 were considered statistically significant.

Ethical aspects

The study was approved by the Ethics Committee of the Faculty of Health Sciences, UFS (STUD no 28/2014). Permission was obtained from the heads of the academic departments, the Head of Clinical Services at the academic hospital and Prof Marvin Zuckerman (co-creator) of the instrument.

Results

Overall, 60.3% of the consultants and senior registrars in the surgical group completed the questionnaires. The response rates from each surgical specialty and the overall consulting group are shown in Table 1.

Obstetrics and gynaecology was the surgical specialty with the highest median age (36.5 years) while surgery had the highest median number of years in practice (5.0 years) (Table 2). All surgical specialties had lower medians than the consulting group (age $p < 0.01$, 95% CI -10; -2 years, years in practice $p < 0.01$, 95% CI -6;-1 years). All surgical specialties had a smaller percentage of females than the consulting group ($p = 0.03$).

Impulsive sensation seeking

Obstetrics and gynaecology had the lowest median score for *impulsive sensation seeking* (26.3%), and for the subscale *sensation seeking* (36.4%) (Figure 1). This specialty also had the highest median score (25.0%) for the subscale *impulsivity*.

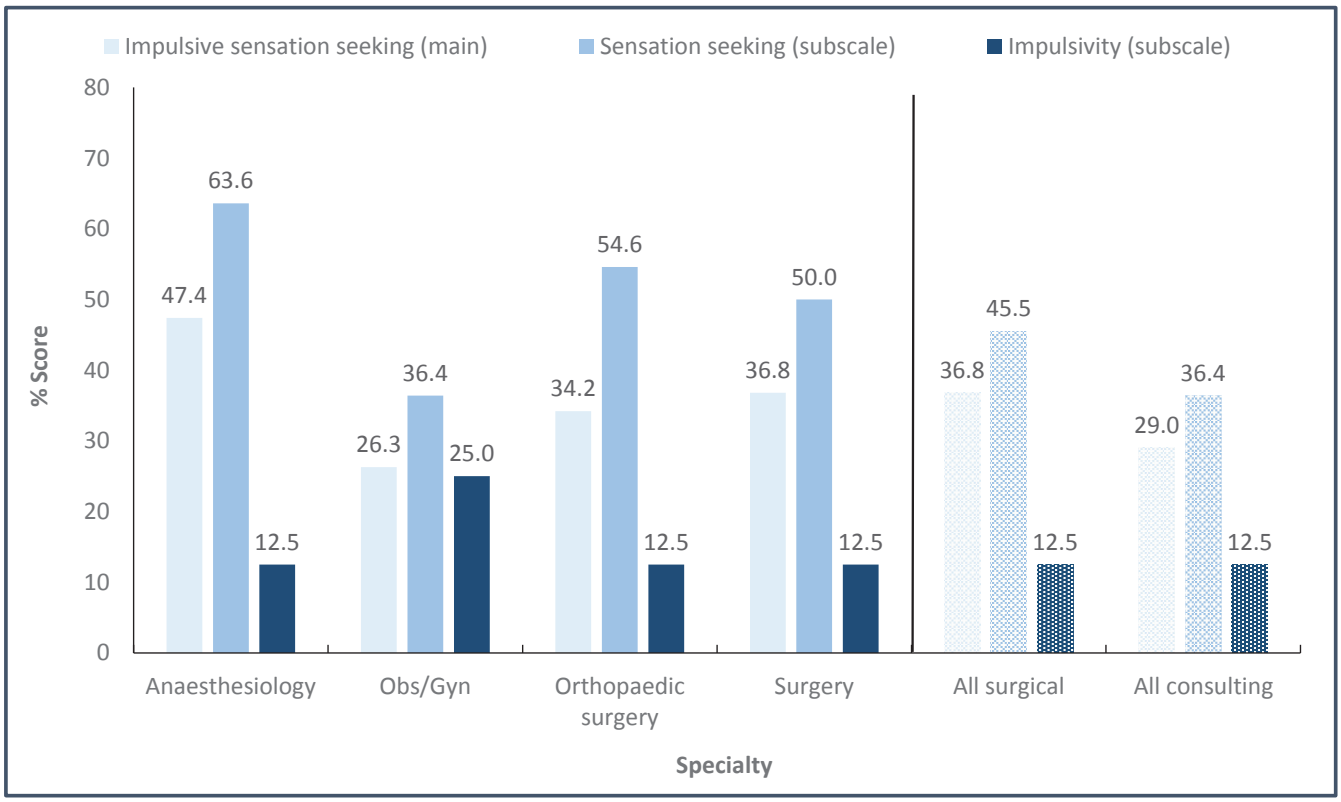

Figure 1. Median scores of the different specialties of the surgical group as well as overall surgical and overall consulting for impulsive sensation seeking

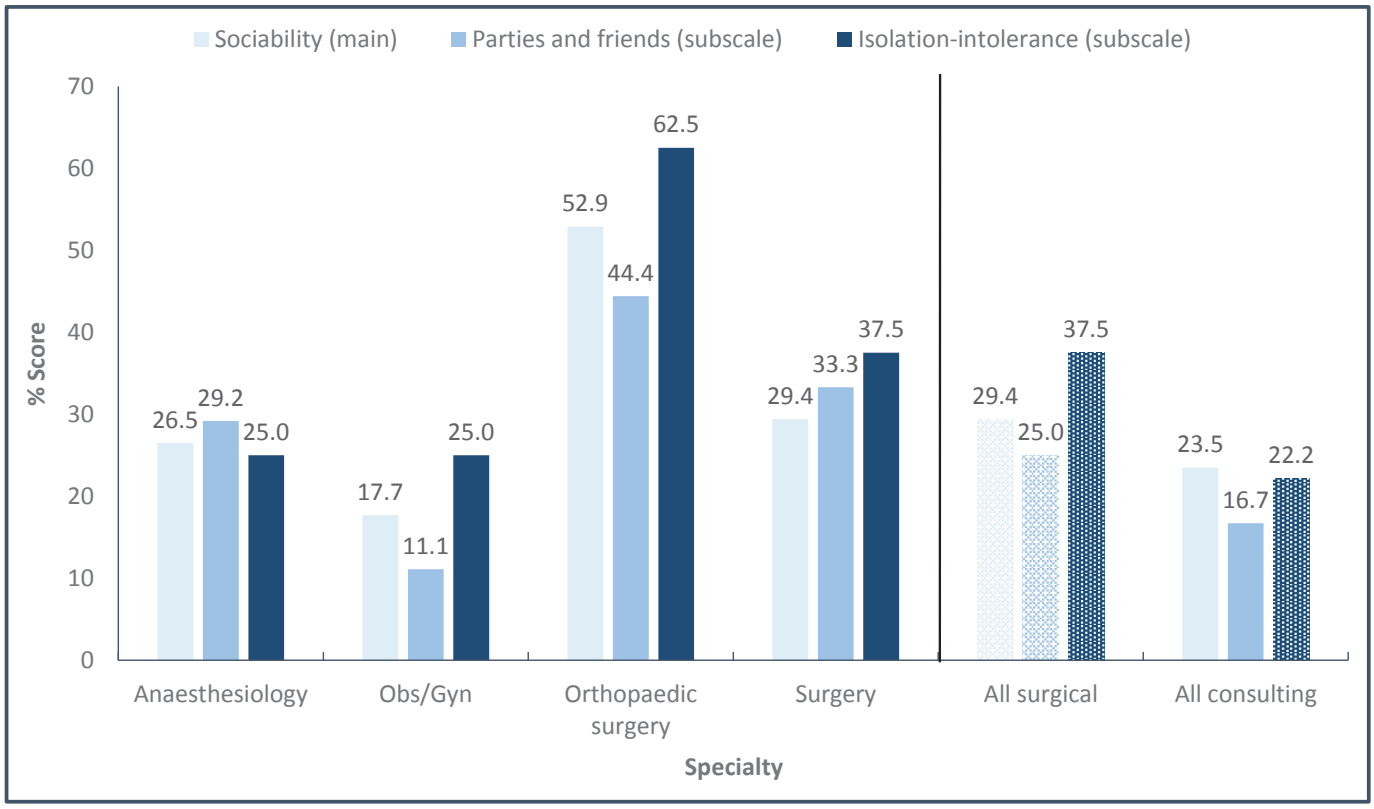

Figure 2. Median scores of the different specialties of the surgical group as well as overall surgical and overall consulting for sociability

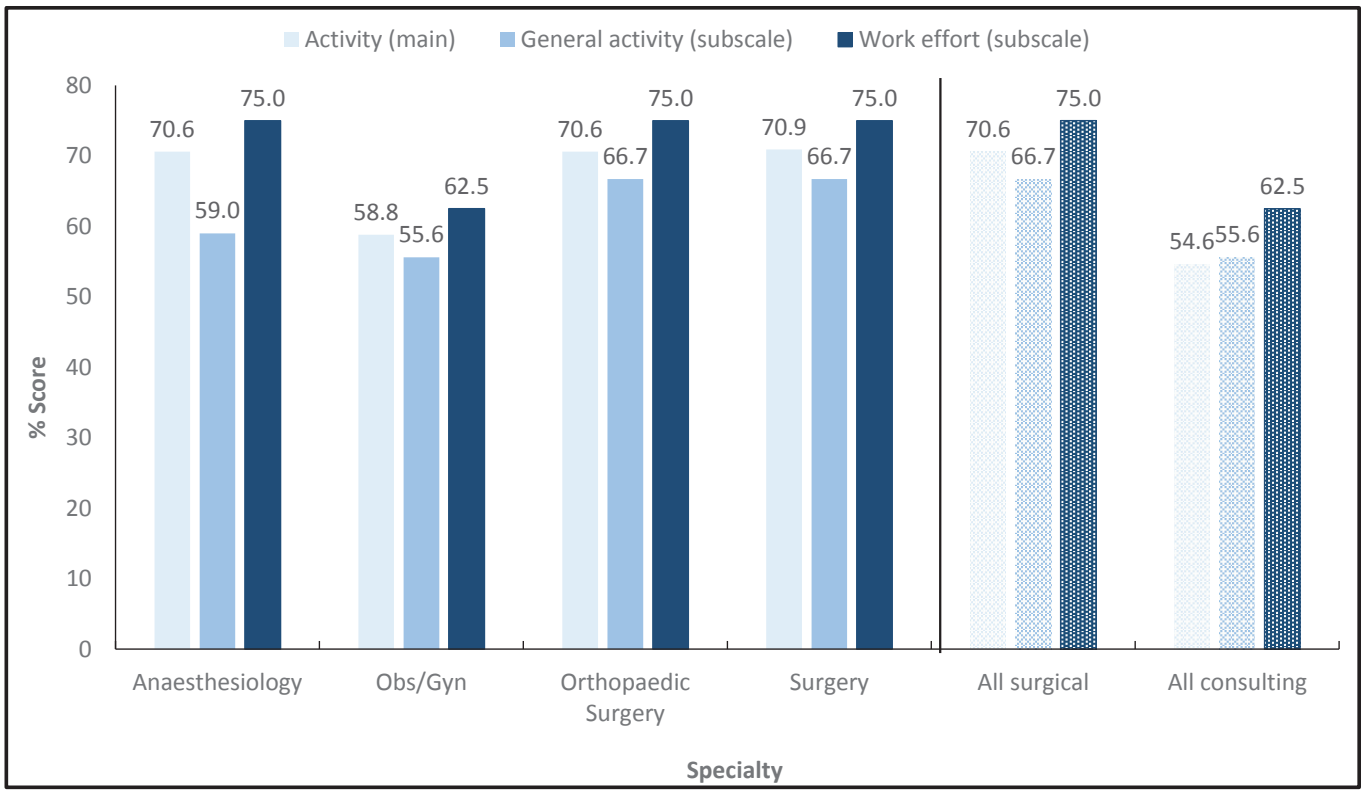

Figure 3. Median scores of the different specialties of the surgical group as well as overall surgical and overall consulting for activity

All four surgical specialties had higher medians than the overall consulting group for the subscale *sensation seeking* (p = 0.01; 95% CI 3.6%; 27.3%). This was also true for *impulsive sensation seeking* (p < 0.01; 95% CI 5.3%; 25.8%), except for obstetrics and gynaecology that had a similar median score (36.4%). The subscale *sensation seeking* scored higher than *impulsivity* across surgical and consulting groups.

Neuroticism-anxiety

Anaesthesiology scored the highest (median 42.1%) for *neuroticism-anxiety* and orthopaedic surgery scored the lowest (15.8%). The surgical group scored lower (26.3%) than the consulting group (36.8%) (p = 0.06; 95% CI -15.8%; 0).

Aggression-hostility

Orthopaedic surgery scored the highest (50.0%) and obstetrics and gynaecology the lowest (35.3%) for *aggression-hostility*. There was a strong distinction in the two major groups, with the surgical group (40.6%) scoring much higher than the consulting group (17.7%) (p < 0.01; 95% CI 11.8%; 23.5%).

Sociability

Orthopaedic surgery had the highest score for *sociability* (52.9%), *isolation intolerance* (44.4%) and *parties and friends* (65.5%). The surgical group scored higher than the consulting group for *sociability* (p = 0.01, 95% CI 0; 11.8%). A sub-analysis of males only (Table 3) did not influence the findings reported in Figure 2.

Activity

Obstetrics and gynaecology scored the lowest for *activity* (58.8%), *general activity* (55.6%) and *work effort* (62.5%) (Figure 3). The surgical group scored significantly higher than the consulting group for *activity* (p < 0.01, 95% CI 5.9%; 17.6%) and *work activity* (p = 0.01, 95% CI 0; 12.5%).

Since the orthopaedic specialty consisted only of male respondents, a sub-analysis of surgical disciplines was done using only information of male respondents (Table 3).

Patterns revealed in Table 3 are similar to those found for all surgical respondents. The only differences observed are that in male respondents, anaesthesiology reported the lowest medians for aggression/hostility and for general activity, whereas for all surgical respondents, obstetrics and gynaecology had the lowest medians for these.

Discussion

Anaesthesiology

Anaesthesiology had the highest median scores for *impulsive sensation seeking* (47.4%) and *sensation seeking* (63.6%). It is said that sensation seekers are attracted to high-risk vocations, such as air-traffic control.[13] The anaesthesiologist is responsible for patient well-being throughout surgery and this extends to emergencies that require skilful and rapid intervention. In previous studies,[10,14] physicians in the emergency room scored higher in *sensation seeking* than other doctors.

Table 3: Median scores of male respondents

		Surgical group			
	All	**Anaesthe-siology**	**Obstetrics/ gynaecology**	**Orthopaedic surgery**	**Surgery**
	n = 49	n = 9	n = 14	n = 13	n = 13
Median age (years)	35.0	35.5	39.5	35.5	32.0
Range	29-75	29-75	30-59	29-71	29-64
Median years in practice	5	4	5	4	5
Range	1-43	2-43	1-35	1-40	2-32
Scales and subscales scores (median)					
Impulsive sensation seeking	36.8	52.6	29.0	34.2	42.1
Sensation seeking	54.6	63.6	36.4	54.6	45.5
Impulsivity	12.5	12.5	25.0	12.5	25.0
Neuroticism-anxiety	26.3	42.1	23.7	15.8	26.3
Aggression-hostility	47.1	41.2	47.1	50.0	47.1
Sociability	29.4	23.5	11.8	52.9	35.3
Parties and friends	27.8	33.3	11.1	44.4	33.3
Isolation-intolerance	37.5	25.0	12.5	62.5	37.5
Activity	70.6	70.6	67.6	70.6	70.6
General activity	66.7	55.6	66.7	66.7	66.7
Work effort	75.0	75.0	62.5	75.0	75.0

Anaesthesiology scored higher in *neuroticism-anxiety* (42.1%) than other specialties in the surgical group. This is the only specialty in this group that does not perform surgical procedures, which may result in a lower need for *stress resistance*, as well as greater doctor-patient interaction compared with to other three specialties.

Obstetrics and gynaecology

Obstetrics and gynaecology had the lowest *impulsive sensation seeking* (26.3%) and *sensation seeking* (36.4%) scores among the surgical group, thus being closer to the consulting group results (29.0% and 36.4%, respectively) than to the other surgical specialties. These results are in contrast to findings from a study using the Cloninger inventory,[15] which showed that students who choose obstetrics and gynaecology scored high in *novelty-seeking*. Perhaps the consultative aspects of this specialty produced the lower *sensation seeking* scores. However, this is contrary to the low *neuroticism-anxiety* (21.1%) score for which the consulting group scored higher. Obstetrics and gynaecology also scored the lowest in *sociability* (17.7%) and *parties and friends* (11.1%).

At the academic hospital where the study was conducted, the obstetricians and gynaecologists scored lower on neuroticism and anxiety than the anaesthesiologists and surgeons. In a study performed in medical students in the United States (US),[10] on the other hand, obstetrics and gynaecology had the highest *neuroticism-anxiety* scores of all specialties. Traditionally, obstetrics and gynaecology is a male-dominated specialty at the academic hospital, while US students choosing obstetrics and gynaecology were more often female.[10] However, it appears the difference in *neuroticism-anxiety* may be due to inherent differences in the nature of obstetrics and gynaecology in South Africa compared to the US. Reasons could include the need for greater stress resistance in the South African obstetrical landscape compared to a greater legal burden in the US, resulting in correspondingly higher anxiety.

Orthopaedic surgery

Orthopaedic surgeons rated more sociable compared to any of the other surgical specialties, especially in the *isolation-intolerance* subscale. The medians for orthopaedic surgery in *sociability* and its two subscales were higher than the overall medians for the male surgical group. This is especially true for the *isolation-intolerance* subscale, with an estimated 25% difference between orthopaedic surgery and the male surgical group. A possible explanation is that an "old boys' network"-tradition exists in orthopaedics that draws socially-dependant individuals. This may also explain the low *neuroticism-anxiety* score.

The researchers postulated that women were possibly deterred from orthopaedics due to the high *aggression-hostility* (50.0%) environment. While the high *aggression-hostility* score is certainly influenced by the gender ratio, it is only slightly higher than the median for the male surgical group (47.1%). A 2003 study[16] in the US on the incidence of women joining surgical specialties, in particular orthopaedic surgery, concluded that while medical schools were 'approaching gender parity… orthopaedics has not had as much success in recruiting women as other surgical residencies.' The

representation of women in orthopaedics only increased from 0.6% in 1970 to 9.0% in 2001 in the US.[16] The percentage of women choosing orthopaedic residencies over the past two decades stayed at 0.6%. Although this study is outdated, this same gender disproportion is present at the academic hospital in our study. As more orthopaedic surgeons retire, but a smaller proportion of males enter medical school, the pool of orthopaedic applications will shrink in proportion to other specialties.

Surgery

Surgery mirrored the combined surgical group trend: relatively high *aggression-hostility* (26.3%), *sociability* (29.4%) and *activity* (70.9%) scores, and low *neuroticism-anxiety* (26.3%) score. While surgery did have the second highest *sociability* score, it was closer to the median of the other specialties compared to the most sociable specialty – orthopaedics (52.9%). Due to their high workload, surgeons may not have time to socialise; this could lower their *parties and friends* score and may cause them to adapt to social isolation, resulting in lower *isolation intolerance*. Surgery had higher *neuroticism-anxiety* than orthopaedic surgery, and obstetrics and gynaecology, the two other specialties that perform surgical procedures. As with the entire surgical group, *aggression-hostility* was considerably higher than in the consulting specialties. This is in line with other studies.[10,17]

Limitations

The small population and sample sizes for each specialty used in this study made generalisation and comparison difficult and prevented more in-depth analysis into the influence of gender, age and years in field of specialty on personality factors. The study was only on doctors at one academic hospital, and may not fully reflect the personality types of doctors working in the greater private and public sectors.

Comparison with other studies is hampered by the use of different measuring instruments and by some differences in categorisation of specialties. For example, Mehmood et al.[14] grouped anaesthesiology with hospital-based procedures, whereas we grouped it with surgical specialties. Furthermore, other studies using the ZKPQ measurement tool unfortunately did not report results for different surgical specialties.

Conclusion

When exploring the personality traits of surgeons of the different surgical specialist departments at an academic hospital in Bloemfontein, interesting trends are visible. While orthopaedic surgeons seem unique in their sociability and aggression-hostility traits, anaesthesiologists scored strongly on the *sensation seeking* and *neuroticism-anxiety* scales. The obstetricians and gynaecologists did not manifest these traits that strongly.

The purpose of the study at this stage is not to provide definitive answers, but rather provide additional data to a growing discussion on personality influences on specialty choice and job satisfaction.

Recommendations

While it is of interest to describe the personality traits of certain surgical consultants, this data is not suitable for predictive purposes at present. Further studies may well show up changing trends.

Conflict of interest

None

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