

BMJ Open Does doctors' personality differ from those of patients, the highly educated and other caring professions? An observational study using two nationally representative Australian surveys

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ABSTRACT

Objectives Personality differences between doctors and patients can affect treatment outcomes. We examine these trait disparities, as well as differences across medical specialities.

Design Retrospective, observational statistical analysis of secondary data.

Setting Data from two data sets that are nationally representative of doctors and the general population in Australia.

Participants We include 23 358 individuals from a representative survey of the general Australian population (with subgroups of 18 705 patients, 1261 highly educated individuals and 5814 working in caring professions) as well as 19 351 doctors from a representative survey of doctors in Australia (with subgroups of 5844 general practitioners, 1776 person-oriented specialists and 3245 technique-oriented specialists).

Main outcome measures Big Five personality traits and locus of control. Measures are standardised by gender, age and being born overseas and weighted to be representative of their population.

Results Doctors are significantly more agreeable (a: standardised score -0.12 , 95% CIs -0.18 to -0.06), conscientious (c: -0.27 to -0.33 to -0.20), extroverted (e: 0.11 , 0.04 to 0.17) and neurotic (n: 0.14 , CI 0.08 to 0.20) than the general population (a: -0.38 to -0.42 to -0.34 , c: -0.96 to -1.00 to -0.91 , e: -0.22 to -0.26 to -0.19 , n: -1.01 to -1.03 to -0.98) or patients (a: -0.77 to -0.85 to -0.69 , c: -1.27 to -1.36 to -1.19 , e: -0.24 to -0.31 to -0.18 , n: -0.71 to -0.76 to -0.66). Patients (-0.03 to -0.10 to 0.05) are more open than doctors (-0.30 to -0.36 to -0.23). Doctors have a significantly more external locus of control (0.06 , 0.00 to 0.13) than the general population (-0.10 to -0.13 to -0.06) but do not differ from patients (-0.04 to -0.11 to 0.03). There are minor differences in personality traits among doctors with different specialities.

Conclusions Several personality traits differ between doctors, the population and patients. Awareness about differences can improve doctor–patient communication and allow patients to understand and comply with treatment recommendations.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ We use two large samples representative of doctors and of the general population.
- ⇒ We exploit validated instruments assessing the most widely used personality traits (Big Five and locus of control).
- ⇒ We adjust for reasonably exogenous variables, sampling weights and missing variables.
- ⇒ The Big Five personality instruments are slightly different between the two surveys (long vs short instruments), yet rescaled.
- ⇒ Personality measures are self-rated by survey respondents.

INTRODUCTION

The non-cognitive skills of medical doctors, such as personality, can determine a range of professional and patient outcomes and be an important factor for the effectiveness of interventions and the quality of care through the doctor–patient relationship.¹ Beyond the clinical problem to be solved, doctors need to understand and empathise with patients and appreciate their particular non-medical and social circumstances to provide patient-centred care in the patient's best interest^{2–5} and to promote concordance with treatment recommendations.^{6 7} In addition, doctors are increasingly selected into the medical profession and into specialties on the basis of informal and formal assessments of their non-cognitive skills in addition to their academic ability, with the aim to ensure that they will be suited to a career as medical professionals or in specific speciality areas.^{8–13}

The effects of doctor personality traits on clinical performance have received some attention in the literature. Conscientiousness and empathy have been particularly identified as desirable traits of high-performing doctors^{5 8 14–16} and are highly valued by



patients.^{17 18} Furthermore, research shows that greater doctor openness may contribute to higher patient satisfaction.¹⁷ Self-directedness, persistence and cooperativeness were found to be positive predictors of doctor resilience,¹⁹ while negative personality traits such as psychopathy and narcissism contribute to counterproductive work behaviour (willingness to cause harm to one's workplace).²⁰ Personality is also related to a doctors' appetite for risk and tolerance for uncertainty.^{21 22}

The effects of patient personality on seeking treatment and clinical outcome have also been investigated. For example, findings show that personality affects how early patients suffering from depression and schizophrenia seek treatment, the degree of psychopathology experienced by MS patients and pain intensity and duration felt by patients following injury.^{23 24} Patient personality can also affect how they view communication with their doctor and their treatment choices.²⁵

Aside from the traits commonly included in personality classifications, locus of control (LOC) is also a relevant characteristic for both doctors and patients. Individuals with a more internal LOC believe that their own efforts determine outcomes in life, while those with an external LOC believe that external causes, such as luck or powerful others, are the main determinants of outcomes. Those with an external LOC have lower subjective well-being,²⁶ worse health outcomes²⁷ and are more likely to engage in unhealthy behaviours.²⁸

How we select and train doctors may lead them to have personality characteristics that differ from the patient population. For example, conscientiousness is a significant positive predictor of high academic performance and is likely to be further developed through medical training.²⁹ The personalities of doctors need to be suited to a demanding career in medicine, and to particular specialties, while also having sufficient compatibility with patients to allow doctors to treat and communicate with patients effectively. Yet one quarter of medical reports are concerned with poor communication,³⁰ which may reflect limited alignment between clinicians' and patients' personalities. Differences between doctor and patient personality can affect communication effectiveness and create a mismatch between how doctors deliver information and how information is best received by patients.² This has potential implications for aspects of patient care such as gaining compliance and sensitively delivering bad news. Furthermore, a growing literature identifies differences between doctors and patients in preferences that influence treatment choices.^{31–34} Personality differences may contribute to these divergent preferences.

Given the demonstrated association of personality with a variety of important outcomes, it is necessary to consider the extent to which practicing doctors have personality traits that differ substantially from members of the general population and particularly the patient population. Unfortunately, existing research on doctors' personality is dominated by convenience samples, low sample sizes and response rates and was undertaken for

specific types of doctors or in specific medical schools or geographic areas. The use of personality measures that are outdated or lack sufficient reliability and validity is also an issue. Although there are some consistent findings across studies, these findings have not been corroborated in larger scale surveys. The two most extensive studies by Mulla *et al*³⁵ and Stienen *et al*³⁶ show consistent patterns of variation in personality across specialties and at different stages of training, but to our knowledge, no prior study has shown how doctors' personality differs from the general population and patients based on nationally representative data.

The aim of this paper is to describe differences in personality traits between doctors and other groups of individuals (the general population, patients, the highly educated and those in caring professions). Since conscientiousness, agreeableness and interpersonal skills should be higher in doctors,^{5 8} we first compare these traits to the other groups. Empathy, which is part of agreeableness, should be higher for doctors compared with others with a similarly high level of education, whereas conscientiousness should be similar to those with high levels of education.^{15 37} Agreeableness should be on par for doctors and those in other caring professions, though conscientiousness might be higher for doctors given their higher levels of education.³⁸ Individuals with a more internal LOC tend to have better academic achievement and labour market outcomes,^{21 39} both of which characterised doctors. Thus, we expect doctors to have a higher internal LOC than the other groups except for the highly educated.

Finally, we expect differences in personality between different medical specialties. In particular, general practitioners (GPs) and those in 'person-oriented' specialties requiring higher levels of continuity of care and interpersonal care may have different traits to those in 'technique-oriented' specialties that require fewer direct interactions with patients and rely more strongly on procedural skills.^{35 36 38 40–42} Comparing doctors across specialty areas allows us to recognise heterogeneity in the medical profession with different specialties emphasising different types of non-cognitive skills. Yet, we expect that differences in personality traits between medical specialties will be smaller than differences between doctors and the general population.

METHODS

Patient and public involvement

It was not appropriate or possible to involve patients or the public in the design, conduct, reporting or dissemination plans of our research.

Data and personality variables

Our data come from two longitudinal datasets, the Medicine in Australia: Balancing Employment and Life (MABEL) survey and the Household, Income and Labour Dynamics in Australia (HILDA) survey. Each data set contains variables covering two of the most widely

used measures of personality, the Big Five (B5) personality traits and LOC. The B5 defines five main dimensions of individual personality: agreeableness, conscientiousness, extraversion, neuroticism and openness. Agreeable individuals describe themselves as being empathetic, kind, cooperative and warm; conscientious individuals describe themselves as orderly, systematic, inefficient (reversed), sloppy (reversed), disorganised (reversed) and efficient; extraverts as talkative, bashful (reversed), quiet (reversed), shy (reversed), lively and extroverted; neurotics as envious, moody, touchy, jealous, temperamental and fretful and open individuals as deep, philosophical, creative, intellectual, complex and imaginative. This classification is the broadest yet comprehensive form of classification for an individual's personality.^{43–45} LOC measures how much individuals believe their own behaviour versus external factors largely determine outcomes.⁴⁶ Those with more internal LOC are expected to be more active in their decision-making and take greater agency for their own lives.

Doctor information comes from MABEL, a longitudinal prospective cohort study representative of all doctors providing clinical medical services in Australia, with data collected annually for a total sample of about 9000 doctors each year. A detailed discussion of the MABEL study design is available elsewhere.⁴⁷ MABEL is a self-administered questionnaire with surveys sent to doctors who have completed the survey in previous years plus new doctors in the sample frame of practicing doctors every year. B5 personality traits questions were introduced in 2009 (wave 2) and LOC in 2010 (wave 3), with both B5 and LOC asked to all respondents in wave 2 (B5) and wave 3 (LOC) and then to new participants in subsequent waves up to 2017 (wave 10). The overall sample with B5 and LOC is 19599 doctors (see MABEL flow diagram in the online supplemental appendix 1). Overall response rates range from 64.9% in 2009 to 39% in 2017. The number of doctors contacted for the survey include all those who responded in at least one previous wave, and thus response rates naturally fall over time. Response rates to the specific B5 and LOC question modules range from 85.4% to 99.3% depending on the year.⁴⁸ As B5 and LOC questions were asked to each doctor only once, we construct a pooled cross-section of all the doctors at the time they answered the B5 and LOC questions, covering the 2009–2017 period.

The personality types of the general population, patients and other occupations come from HILDA, a nationally representative household longitudinal survey of adults aged 15 years and more, with more than 17000 Australian surveyed each year.^{49 50} The number of respondents is supplemented every year and a top-up sample of more than 5000 individuals was added in 2011, allowing us to draw on data from an overall sample of 26554 individuals (see HILDA flow diagram in the online supplemental appendix 2). HILDA uses a combination of interviews and self-administered questionnaires, such that the year-on-year response rates range from 86.9% to

92.4%.⁵⁰ HILDA data are collected annually, but the B5 and LOC questions are part of specific modules collected (about) every 4 years: B5 was collected in 2005, 2009, 2013 and 2017; LOC was collected in 2003, 2004, 2007, 2011 and 2015. To match information from HILDA with the period of MABEL survey, we only use HILDA data as cross-sections over the years 2009–2017.

B5 and LOC are measured by validated instruments in each survey. MABEL uses the 15-item Big Five Personality Inventory (BFI),⁴⁴ while HILDA uses the 36-item inventory,⁵¹ even though commonly only 28 items are used due to poor factor loading of eight items.⁵² Scores are derived for each personality trait by averaging the items relevant to the trait. To ensure B5 raw scores are comparable across surveys, HILDA scores are linearly rescaled such that each personality trait is measured on a scale from 1 to 21 in both surveys, with higher values indicating that the trait describes the respondent better. LOC is measured by a set of seven questions from the Psychological Coping Resources component of Pearlin-Schooler Mastery/Self-efficacy Scale⁵³ in both surveys. The LOC index is calculated by summing the five external items, subtracting the two internal ones and adding sixteen, such that the index ranges from 7 (internally controlled) to 49 (externally controlled).

Construction of comparison groups

To investigate if doctors differ from the general population and their patients, we compare four groups in HILDA to all doctors in MABEL (group 0). The general population (group 1) includes all adults aged 20–85. While personality may undergo changes during childhood and adolescence, it is relatively stable during adulthood.^{54 55} The stability of personality in old age has been less clearly documented^{56 57} and natural attrition may lead to potential selection effects, as personality may affect mortality, which leaves small samples with valid personality measures over the age of 85.⁵⁸ Since there is no official retirement age in Australia and some doctors will continue work past their mid-60s and to see retired patients, we include both older doctors and older participants up to the age of 85 in group 0 and group 1, respectively. (Note, however, that the results reported below do not change if we exclude those over the age of 65.) As a further restriction to group 1 membership, individuals who are likely to be medical doctors in the HILDA survey are excluded (ie, they hold a doctorate degree and work in hospitals, medical or other health care services). Group 2 are patients, defined as a subsample of individuals from group 1 who had at least one doctor visit in a given year.

Groups 3 and 4 were created from HILDA to assess if doctors differ in their personality, especially agreeableness and conscientiousness, relative to other highly educated individuals and those who practice in caring professions. Group 3 (highly educated) includes all respondents from group 1 who have a postgraduate (masters or doctorate) degree. Group 4 (caring professions) includes all individuals from group 1 who work in professions of

caring, public service or education. Definitions for the comparison groups are included in online supplemental appendix 3.

Finally, we explore differences across three different doctor subgroups within MABEL. Group 5 are GPs. To keep the comparison tractable among other specialists, we include 36 possible Australian medical specialties in 'person-oriented' specialties as group 6 and in 'technique-oriented' specialties as group 7, using a well-established classification system.^{59 60} 'Person-oriented' specialties include obstetrics/gynaecology, paediatrics and psychiatry, while 'technique-oriented' specialties include anaesthesiology, radiology and surgery, with a full list of the specialties included in online supplemental appendix 3.

Data analysis

The six measures of B5 and LOC in HILDA and MABEL are statistically standardised z-scores (mean=0; SD=1) that provide a comparable measure of the size of the difference between doctors and the other population (sub)groups. These measures are used as outcomes in regression analyses where we adjust for respondents' age, gender and being born outside Australia. We select only a limited set of demographics to avoid overadjustment, focusing on individual characteristics likely to affect, rather than be affected by, personality.^{61 62} We adjust for immigration status given the multicultural nature of Australian society, especially in the medical workforce. To account for the complex design of the two nationally representative surveys, we use HILDA and MABEL probability sampling weights in our regressions, providing results that are representative of the respective populations (ie,

the general population for HILDA and the population of doctors for MABEL). In addition, sample weights control for potential bias due to missing observations in HILDA. We report these standardised, adjusted and weighted B5 and LOC measures with 95% CIs, with SEs cluster-robust at the individual level to account for the correlations of multiple personality measurements per respondent in HILDA. All analyses are conducted with STATA/SE V.15.1.

RESULTS

The raw values of personality prior to any adjustment, as well as key demographics used for adjustment, are reported in online supplemental appendix 4. It is worth noting that the sample size of personality traits and demographics do not exactly match because LOC and B5 are measured in different survey waves, such that some respondents completed B5 only, others completed LOC only, but most completed both.

Comparison of doctors with patients and population subgroups

We report key findings as adjusted means of personality outcomes in SD units with their 95% CIs. For purposes of ease of interpretation, all results are reported in figures, with exact values in regression table (online supplemental appendix 5).

Figure 1 reports the estimated differences between all doctors (group 0) and the comparison groups 1 to 4. The figure includes the estimated mean value for each personality trait and for LOC as well as the estimated 95% CI. For

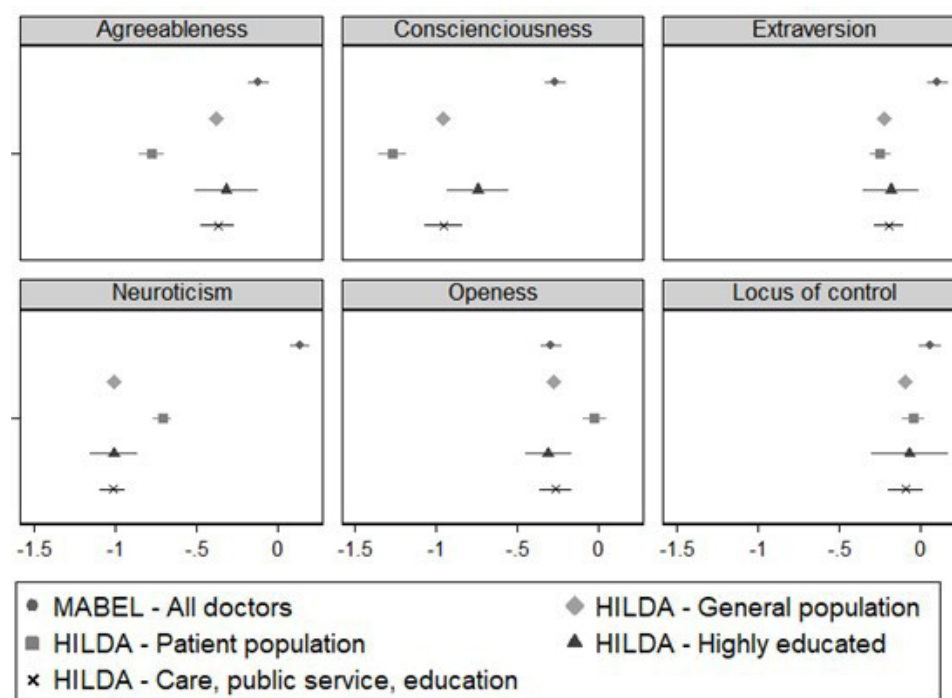


Figure 1 Comparison of personalities of doctors with the general population, patients, highly educated and caring professions. HILDA, Household, Income and Labour Dynamics in Australia; MABEL, Medicine in Australia: Balancing Employment and Life.

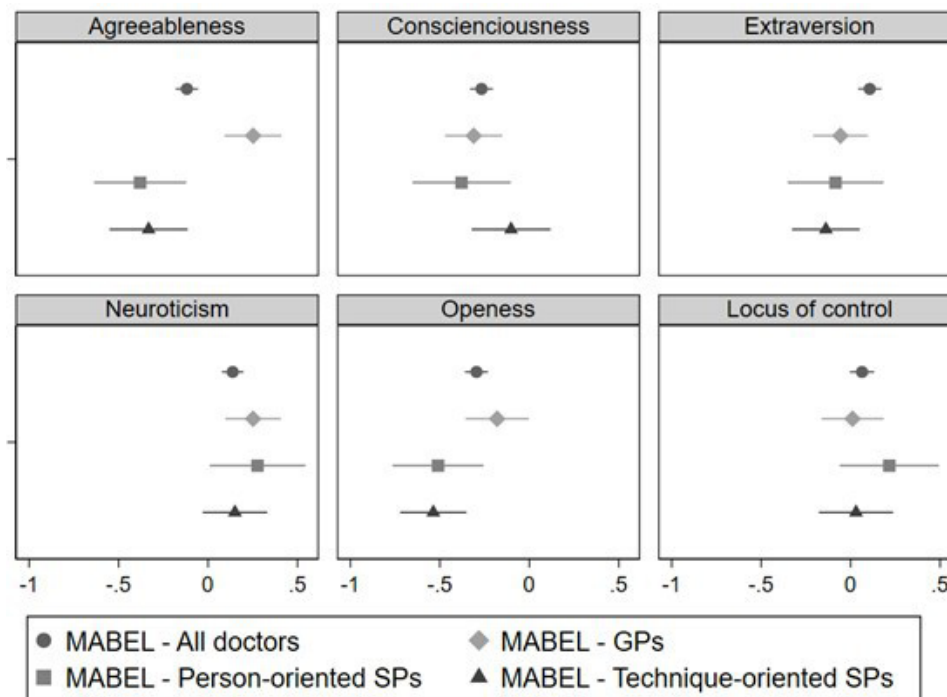


Figure 2 Comparison of personalities between doctors. GPs, general practitioners; HILDA, Household, Income and Labour Dynamics in Australia; MABEL, Medicine in Australia: Balancing Employment and Life; SPs, specialists.

each characteristic, the estimates from top to bottom are for doctors (group 0), the general population (group 1), patients (group 2), highly educated individuals (group 3), and those working in caring professions (group 4). Recall that all values are standardised relative to a mean of zero and an SD of one relative to the full sample in MABEL. However, the estimated value for MABEL doctors can be different from zero due to adjustments made to the sample based on demographic factors and on weighting that makes MABEL respondents representative of doctors in Australia.

As is seen in figure 1, doctors are overall more agreeable, more conscientious, more extroverted and more neurotic than the other groups, but there are few differences in openness and LOC. Recall that we expected differences between doctors and the other groups to be greatest for agreeableness and conscientiousness. Doctors are more agreeable (standardised score -0.12 , 95% CI -0.18 to -0.06) than the general population (-0.38 , 95% CI -0.42 to -0.34). This difference between doctors and the general population is greater than the difference between doctors and the patient population (-0.77 , 95% CI -0.85 to -0.69). Doctors are also more agreeable than individuals in caring professions (-0.37 , 95% CI -0.47 to -0.27). However, the difference in agreeableness between doctors and other highly educated individuals (-0.31 , 95% CI -0.51 to -0.12) is not statistically significant. Doctors are more conscientious (-0.27 , 95% CI -0.33 to -0.20) than the general population (-0.96 , 95% CI -1.00 to -0.91) and this difference is even greater, with a one SD difference, relative to

patients (-1.27 , 95% CI -1.36 to -1.19). The difference in conscientiousness between doctors and other groups is less marked compared with highly educated individuals (-0.75 , 95% CI -0.94 to -0.56) and again greater compared with those in caring professions (-0.96 , 95% CI -1.07 to -0.84).

Apart from these two traits, the difference between doctors and patients is significant for neuroticism (0.14 , 95% CI 0.08 to 0.20 vs -0.71 , 95% CI -0.76 to -0.66) and for extraversion (0.11 , 95% CI 0.04 to 0.17 vs -0.24 , 95% CI -0.31 to -0.18). Despite dissimilarities, the highly educated appear to be the most comparable group to doctors, except for neuroticism (0.14 , 95% CI 0.08 to 0.20 vs -1.01 , 95% CI -1.16 to -0.86). No statistically significant differences between doctors and the other groups are observed for openness, except for the patients, who are significantly more open than doctors (-0.30 , 95% CI -0.36 to -0.23 vs -0.03 , 95% CI -0.10 to 0.05). Finally, doctors have a more external LOC than the general population (0.06 , 95% CI 0.00 to 0.13 vs -0.10 , 95% CI -0.13 to -0.06) but do not significantly differ from the other groups.

Further analysis (online supplemental appendix 6) that disaggregates the results by gender shows that these findings are partly driven by female doctors, who appear to differ more strongly from the other groups relative to men. This is particularly noticeable for neuroticism, as female doctors are almost two SDs more neurotic than the female general population (0.83 , 95% CI 0.76 to 0.91 vs -1.00 , 95% CI -1.02 to -0.97), while the difference is of one SD for men

(−0.03, 95% CI −0.11 to 0.04 vs −1.06, 95% CI −1.08 to −1.03).

Comparison between doctors

Figure 2 reports the estimated differences between the different doctor groups. Like the previous comparisons, all values are relative to the full sample in MABEL. For each personality characteristic, the first estimate is for all MABEL doctors (group 0), the second for GPs (group 5), the third for person-oriented specialists (group 6) and the fourth for technique-oriented specialists (group 7).

There are almost no statistically significant differences in personality between groups of doctors (detailed results in online supplemental appendix 7). The exception is that GPs are more agreeable (0.25, 95% CI 0.09 to 0.41) than all the other groups, including the all-doctors group (−0.12, 95% CI −0.18 to −0.06) and are most different from person-oriented specialists (−0.38, 95% CI −0.64 to −0.12); however, person-oriented specialists and technique-oriented specialists (−0.33, 95% CI −0.55 to −0.11) appear similar in terms of their agreeableness.

Compared with the all-doctors group (group 0), technique-oriented specialists are more conscientious (−0.10, 95% CI −0.32 to −0.12 vs −0.27, 95% CI −0.33 to −0.20) and less extroverted (−0.14, 95% CI −0.33 to 0.05 vs 0.11, 95% CI 0.04 to 0.17) but the observed difference is not statistically significant. There is no noticeably different pattern across other specialties for these traits. Differences between the groups are smallest in terms of their LOC, with person-oriented specialists somewhat more (but again not significantly) externally controlled (0.22, 95% CI −0.06 to 0.49 vs 0.06, 95% CI −0.004 to 0.13).

Further analysis by gender (online supplemental appendix 8) indicates that female doctors are overall not only more conscientious and extroverted but also more neurotic and less open compared with male doctors. There is no discernable gender difference for agreeableness and LOC. These patterns hold across medical specialties.

This relative homogeneity of conscientiousness and neuroticism is informative when comparing doctors with the general population and with patients. As doctors are more extroverted and agreeable than the rest of the population, it is noticeable that these traits are similar across specialties (except for GPs). Overall, the comparison indicates that there is less variation in personality between doctors than there are differences between doctors and other population groups.

DISCUSSION

Statement of principal findings

Using nationally representative samples of Australian doctors and the Australian general population, we found that there were important differences in personality between doctors, the population, patients, highly educated individuals and those working in caring professions. As expected, doctors were more conscientious

and extroverted than all other groups but they were also more neurotic. Consistent with expectations, we found that both doctors and caring professionals were more agreeable than patients, but doctors were significantly more agreeable than caring professionals. Unexpectedly, doctors had a more external LOC than the general population. While significant, this difference was relatively small, and there were no significant differences between doctors and patients, caring professionals or the highly educated. Differences among doctors across medical subspecialties were overall smaller than between doctors and population subgroups, with GPs standing out with their higher level of agreeableness.

Strengths and weaknesses of the study

Our study has several strengths, including our large, representative data sets. Our doctors' sample is much larger (roughly 18500 instead of 5150) than the largest existing study of doctors' personality.³⁶ Beyond sample sizes, the uniqueness of our analysis and its contribution to the literature are its comparison of representative data on doctors' personality with representative data on patients, highly educated individuals and individuals working in caring professions.

Our study also has limitations. Scales used to assess personality are self-rated, however, we used well-known and validated instruments.^{43 63} While the LOC instruments are the same in HILDA and MABEL, the B5 instruments are slightly different. MABEL employed the shortened version of the BFI used in HILDA. The Shortened BFI has adequate reliability and convergent validity^{64 65} and short personality instruments perform as well as longer ones.⁶³ Furthermore, short survey instruments are necessary to ensure enough responses from doctors with high demand on their time in a large survey where personality is not the focus. HILDA data provide repeated measures for the personality traits of some but not all survey respondents, allowing for more precise estimates while controlling for repeated observations by using individual-clustered SEs. MABEL data only include one personality measure per individual. With repeated observations for some HILDA respondents, differences with MABEL doctors may become statistically significant.

Strengths and weaknesses in relation to other studies

To the best of our knowledge, no other study has compared doctors' personality to other population groups as systematically or on such a large scale as we do. Our results are more general than previous studies with small samples or studying specific contexts. The closest to ours is Mullola, Hakulinen³⁵ who compared Big Five personality traits, but not LOC, across medical specialties of a large representative sample of Finnish doctors. While their methodology is slightly different than ours, including their exploration of differences between all types of specialties, they find similar results of higher conscientiousness for technique-oriented specialties (surgery and internal medicine) and higher agreeableness in general practice. Their findings

differ, in that they find higher extroversion in person-oriented specialties (paediatrics and psychiatry). Similarities may reflect the process of medical education, both in selection and training, which is relatively standardised in high-income countries while differences may speak to the specificities of Australia and Finland. The other closest study is Stienen, Scholtes³⁶ who compared personality traits of doctors and surgeons in five European countries and Canada using a non-representative online survey. They measure Big Five personality traits, but not LOC. Like us, they find that doctors in different specialties are closer in personality compared with the general population, with the caveat that the population estimates are directly obtained from the general B5 survey instrument norms and not specific to the countries covered (ie, their population-comparison personality measures have not been elicited for the five European countries and Canada that were used to elicit personality traits of doctors). By contrast, our study compares representative data for all our comparison groups from the same country. One major difference is that they find doctors to be less neurotic than the population, while we find the opposite. One possible explanation for this difference is survey design: their survey was focused on personality traits, and it is, therefore, possible that respondents who were more neurotic chose not to respond. This problem should not affect MABEL since the core of the survey focuses on other factors and MABEL was designed to be representative of doctors in Australia.

Implications for clinicians and policymakers

We show that doctors are more agreeable, conscientious, extroverted and neurotic, but less open than their patients, which has clinical implications. Not only understanding a patient's personality is important in clinical practice⁶⁶ but also knowing the difference between a patient's and one's own personality may be useful as these differences may affect treatment success. For example, being more conscientious has implications for treatment adherence⁶⁷ as conscientious doctors may overestimate their patients' ability to follow recommendations. Higher doctor neuroticism, which is related to stress,⁶⁷ could lead doctors to see stress as a normal part of life, and, thus, underestimate the impact of stress on patient well-being. Doctor agreeableness and conscientiousness increase patient satisfaction with care¹⁷ but could potentially lead doctors to view patients—in contrast to themselves—as more confrontational and less conscientious than patients actually are, causing an asymmetry in doctor and patient judgements of one another, which could impact outcomes.

Implications for personality differences may be more complex. For example, high neuroticism combined with high conscientiousness can be beneficial for health because patients may act on their health worries by seeking care, while neuroticism without conscientiousness can be harmful to health.⁶⁸ Given that doctors tend to be higher than patients on both traits, doctors will need to consider how patients lower on these dimensions,

and, particularly, how those high in neuroticism but low in conscientiousness, will respond to communication and treatment.

In summary, our findings can help raise doctors' awareness of existing personality differences between themselves and their patients. By taking into account these differences, doctors can better calibrate their judgements of patients and gain insight into factors that influence their patient interactions.

Finally, diversity in experience and psychological perspective has a positive impact on team performance.⁶⁹ The lack of personality difference we found between doctor specialties suggests that adding more doctors to a team will not increase diversity of personality-base perspectives. However, the differences found between doctors and those in other caring professions suggest that including non-doctor caring professionals in clinical teams will increase personality diversity and, thus, team performance.

Unanswered questions and future research

Our findings of large personality differences between patients and doctors support previous hypotheses about the potential key role of agreeableness (including empathy) and conscientiousness and the ongoing role of non-cognitive abilities in medical student selection. Future research should focus on neuroticism among doctors in comparison to other population groups and the role it plays in medical practice. It will be important to verify whether differences in results between our study and Stienen *et al.*³⁶ are due to differences in survey design and respondents' representativeness. It would also be of interest to conduct research using doctor–patient dyads and the specific alignment of their personality traits and associations with health outcomes and costs. In health-care systems where patients have a choice of their GP or medical specialist, patients may effectively match with doctors that have more complementary personalities and so ensure much stronger relational continuity of care.⁷⁰ Doctors are different to patients in many ways and improving understanding of effective doctor–patient relationships is central in providing high-quality medical care.

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have reviewed and approved the final version of the manuscript. MA is responsible for the overall content as the guarantor.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The HILDA study has been approved by the Human Research Ethics Committee of The University of Melbourne (Ref number 1647030). The MABEL study has been approved by The University of Melbourne Faculty of Business and Economics Human Ethics Advisory Group (Ref. 0709559) and the Monash University Standing Committee on Ethics in Research Involving Humans (Ref. CF07/1102 – 2007000291). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data may be obtained from a third party and are not publicly available. The data that support the findings of this study are not publicly available due to privacy or ethical restrictions, but data access request can be made separately. To access de-identified unit record HILDA data, application can be made at <https://melbourneinstitute.unimelb.edu.au/hilda/for-data-users>. To access de-identified unit record MABEL data, application can be made at <https://melbourneinstitute.unimelb.edu.au/mabel/for-researchers/data>.

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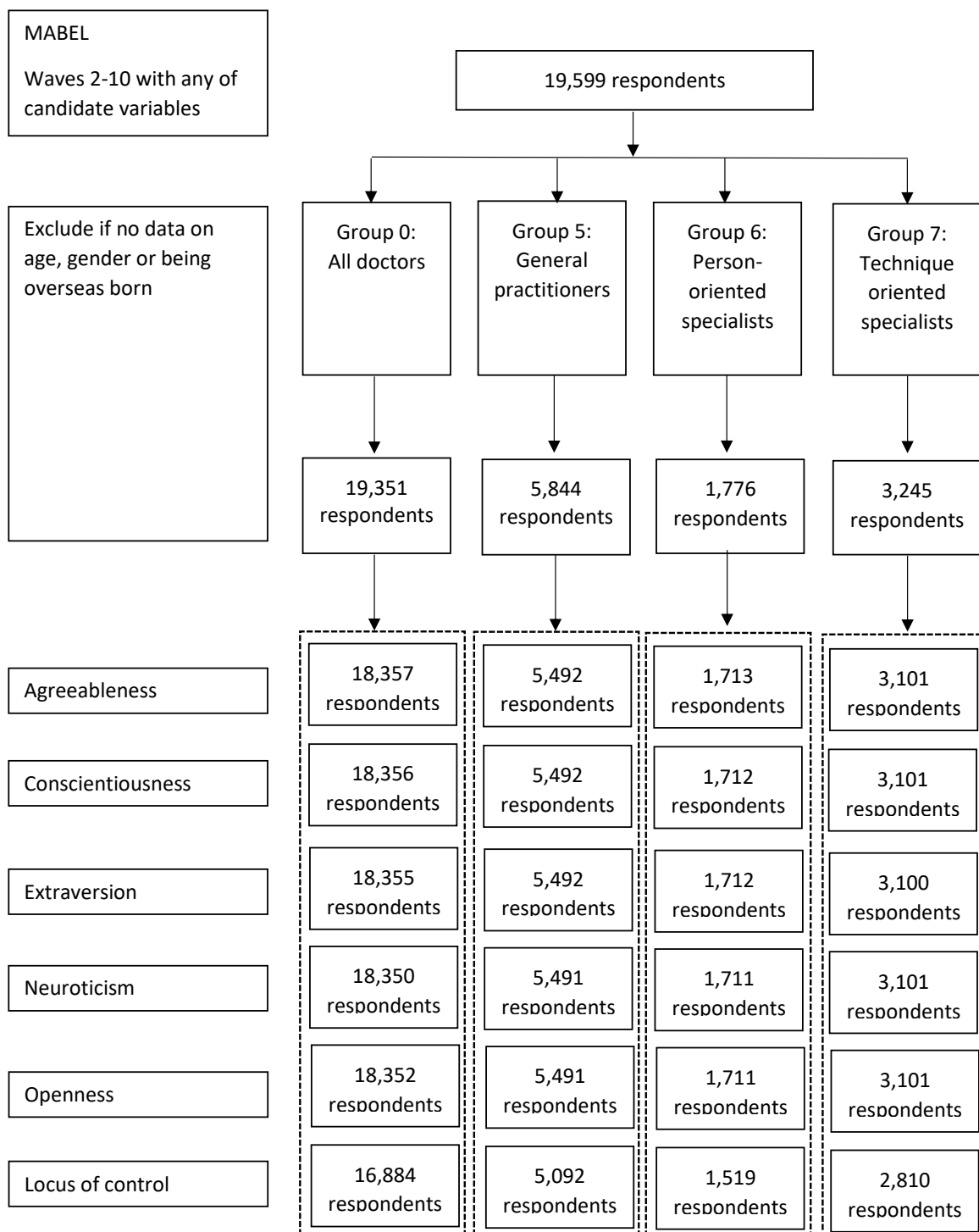
REFERENCES

- Wu X, Jiang Y-N, Zhang Y-L, *et al*. Impact of physicians' personalities and behavioral traits on treatment-related decision-making for elderly acute myeloid leukemia. *J Gen Intern Med* 2021;36:3023–30.
- Clack GB, Allen J, Cooper D, *et al*. Personality differences between doctors and their patients: implications for the teaching of communication skills. *Med Educ* 2004;38:177–86.
- Alarcon G, Eschleman KJ, Bowling NA. Relationships between personality variables and burnout: a meta-analysis. *Work Stress* 2009;23:244–63.
- Prins DJ, van Vendeloo SN, Brand PLP, *et al*. The relationship between burnout, personality traits, and medical specialty. A national study among dutch residents. *Med Teach* 2019;41:584–90.
- Costa P, Alves R, Neto I, *et al*. Associations between medical student empathy and personality: a multi-institutional study. *PLoS One* 2014;9:e89254.
- Christensen AJ, Smith TW. Personality and patient adherence: correlates of the five-factor model in renal dialysis. *J Behav Med* 1995;18:305–13.
- Bruce JM, Hancock LM, Arnett P, *et al*. Treatment adherence in multiple sclerosis: association with emotional status, personality, and cognition. *J Behav Med* 2010;33:219–27.
- Hojat M, Erdmann JB, Gonnella JS. Personality assessments and outcomes in medical education and the practice of medicine: AMEE guide No. 79. *Med Teach* 2013;35:e1267–301.
- Patterson F, Knight A, Dowell J, *et al*. How effective are selection methods in medical education? A systematic review. *Med Educ* 2016;50:36–60.
- Patterson F, Prescott-Clements L, Zibarras L, *et al*. Recruiting for values in healthcare: a preliminary review of the evidence. *Adv Health Sci Educ Theory Pract* 2016;21:859–81.
- Patterson F, Roberts C, Hanson MD, *et al*. 2018 Ottawa consensus statement: selection and recruitment to the healthcare professions. *Med Teach* 2018;40:1091–101.
- de Visser M, Fluit C, Cohen-Schotanus J, *et al*. The effects of a non-cognitive versus cognitive admission procedure within cohorts in one medical school. *Adv Health Sci Educ Theory Pract* 2018;23:187–200.
- Bexelius TS, Olsson C, Järnbert-Pettersson H, *et al*. Association between personality traits and future choice of specialisation among swedish doctors: a cross-sectional study. *Postgrad Med J* 2016;92:441–6.
- Austin EJ, Evans P, Magnus B, *et al*. A preliminary study of empathy, emotional intelligence and examination performance in mbchb students. *Med Educ* 2007;41:684–9.
- Li J, Dow WH, Kariv S. Social preferences of future physicians. *Proc Natl Acad Sci U S A* 2017;114:E10291–300.
- Boerebach BCM, Scheepers RA, van der Leeuw RM, *et al*. The impact of clinicians' personality and their interpersonal behaviors on the quality of patient care: a systematic review. *Int J Qual Health Care* 2014;26:426–81.
- Duberstein P, Meldrum S, Fiscella K, *et al*. Influences on patients' ratings of physicians: physicians demographics and personality. *Patient Educ Couns* 2007;65:270–4.
- Scott A, Vick S. Patients, doctors and contracts: an application of principal-agent theory to the doctor-patient relationship. *Scottish J Political Economy* 1999;46:111–34.
- Eley DS, Cloninger CR, Walters L, *et al*. The relationship between resilience and personality traits in doctors: implications for enhancing well being. *PeerJ* 2013;1:e216.
- Li C, Murad M, Shahzad F, *et al*. Dark tetrad personality traits and counterproductive work behavior among doctors in Pakistan. *Int J Health Plann Manage* 2020;35:1173–92.
- Mendolia S, Walker I. The effect of personality traits on subject choice and performance in high school: evidence from an english cohort. *Econ Educ Rev* 2014;43:47–65.
- Bogacheva N, Kornilova T, Pavlova E. Relationships between medical doctors' personality traits and their professional risk perception. *Behav Sci (Basel)* 2019;10:6.
- Jo A, Kim H, Lee J-Y, *et al*. The effects of patient personality traits and family cohesion on the treatment delay for patients with first-episode schizophrenia spectrum disorder. *Early Interv Psychiatry* 2021;15:889–95.
- Bruce JM, Lynch SG. Personality traits in multiple sclerosis: association with mood and anxiety disorders. *J Psychosom Res* 2011;70:479–85.
- Pruyn JF, Rijckman RM, van Brunschot CJ, *et al*. Cancer patients' personality characteristics, physician-patient communication and adoption of the moerman diet. *Soc Sci Med* 1985;20:841–7.
- Kesavayuth D, Binh Tran D, Zikos V. Locus of control and subjective well-being: panel evidence from Australia. *PLOS ONE* 2022;17:e0272714.
- Kesavayuth D, Poyago-Theotoky J, Tran DB, *et al*. Locus of control, health and healthcare utilization. *Econ Model* 2020;86:227–38.
- Cobb-Clark DA, Kassenboehmer SC, Schurer S. Healthy habits: the connection between diet, exercise, and locus of control. *J Econ Behav Organ* 2014;98:1–28.
- Hakimi S, Hejazi E, Lavasani MG. The relationships between personality traits and students' academic achievement. *Procedia Soc Behav Sci* 2011;29:836–45.

- 30 Bismark MM, Spittal MJ, Gurrin LC, *et al.* Identification of doctors at risk of recurrent complaints: a national study of healthcare complaints in Australia. *BMJ Qual Saf* 2013;22:532–40.
- 31 Harrison M, Milbers K, Hudson M, *et al.* Do patients and health care providers have discordant preferences about which aspects of treatments matter most? Evidence from a systematic review of discrete choice experiments. *BMJ Open* 2017;7:e014719.
- 32 Ubel PA, Angott AM, Zikmund-Fisher BJ. Physicians recommend different treatments for patients than they would choose for themselves. *Arch Intern Med* 2011;171:630–4.
- 33 Garcia-Retamero R, Galesic M. Doc, what would you do if you were me? On self-other discrepancies in medical decision making. *J Exp Psychol Appl* 2012;18:38–51.
- 34 Galizzi MM, Miraldo M, Stavropoulou C, *et al.* Doctor-patient differences in risk and time preferences: a field experiment. *J Health Econ* 2016;50:171–82.
- 35 Mulla S, Hakulinen C, Presseau J, *et al.* Personality traits and career choices among physicians in Finland: employment sector, clinical patient contact, specialty and change of specialty. *BMC Med Educ* 2018;18:52.
- 36 Stienen MN, Scholtes F, Samuel R, *et al.* Different but similar: personality traits of surgeons and internists—results of a cross-sectional observational study. *BMJ Open* 2018;8:e021310.
- 37 Poropat AE. A meta-analysis of the five-factor model of personality and academic performance. *Psychol Bull* 2009;135:322–38.
- 38 Eley DS, Eley RM. Personality traits of Australian nurses and doctors: challenging stereotypes? *Int J Nurs Pract* 2011;17:380–7.
- 39 Cobb-Clark DA. Locus of control and the labor market. *IZA J Labor Econ* 2015;4:3.
- 40 Mehmood SI, Khan MA, Walsh KM, *et al.* Personality types and specialist choices in medical students. *Med Teach* 2013;35:63–8.
- 41 Hojat M, Nasca TJ, Magee M, *et al.* A comparison of the personality profiles of internal medicine residents, physician role models, and the general population. *Acad Med* 1999;74:1327–33.
- 42 Wasserman E, Yufit RI, Pollack GH. Medical specialty choice and personality. II. Outcome and postgraduate follow-up results. *Arch Gen Psychiatry* 1969;21:529–35.
- 43 Goldberg LR. An alternative description of personality: the big-five factor structure. *J Pers Soc Psychol* 1990;59:1216–29.
- 44 John O, Srivastava S. The big five trait taxonomy: history, measurement, and theoretical perspectives. In: Previn LA, John OP, eds. *Handbook of personality: theory and research*. Guilford Press: New York, 1999: 102–38.
- 45 John OP, Donahue EM, Kentle RL. *The big five inventory*. Berkeley, CA: Institute of Personality and Social Research, University of California, Berkeley, 1991.
- 46 Rotter JB. Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied* 1966;80:1–28.
- 47 Joyce CM, Scott A, Jeon S-H, *et al.* The medicine in Australia: balancing employment and life (MABEL) longitudinal survey -- protocol and baseline data for a prospective cohort study of Australian doctors' workforce participation. *BMC Health Serv Res* 2010;10:50.
- 48 Szawłowski S, Choong PFM, Li J, *et al.* *Medicine in Australia: balancing employment and life (MABEL). MABEL user manual: wave 10 release*. Melbourne: Melbourne Institute: Applied Economic and Social Research, The University of Melbourne, 2019.
- 49 Wooden M, Watson N. The HILDA survey and its contribution to economic and social research (so far). *Economic Record* 2007;83:208–31.
- 50 Summerfield M, Bevvit A, Fok Y, *et al.* *HILDA user manual – release 17*. Melbourne: The University of Melbourne, 2018.
- 51 Saucier G. Mini-markers: a brief version of goldberg's unipolar big-five markers. *J Pers Assess* 1994;63:506–16.
- 52 Losoncz I. Personality traits in HILDA. *Australian Social Policy* 2009;8:169–98.
- 53 Pearlman LI, Schooler C. The structure of coping. *J Health Soc Behav* 1978;19:2–21.
- 54 Cobb-Clark DA, Schurer S. The stability of big-five personality traits. *Econ Lett* 2012;115:11–5.
- 55 Bleidorn W, Hopwood CJ. Stability and change in personality traits over the lifespan. In: McAdams D, Shiner RL, Jaccott JL, eds. *Handbook of personality development*. The Guilford Press: Guilford, 2019: 237–52.
- 56 Allemand M, Zimprich D, Hertzog C. Cross-sectional age differences and longitudinal age changes of personality in middle adulthood and old age. *J Pers* 2007;75:323–58.
- 57 Allemand M, Steiger AE, Hill PL. Stability of personality traits in adulthood. *Geropsych* 2013;26:5–13.
- 58 Wortman J, Lucas RE, Donnellan MB. Stability and change in the big five personality domains: evidence from a longitudinal study of Australians. *Psychol Aging* 2012;27:867–74.
- 59 Yufit RI, Pollock GH, Wasserman E. Medical specialty choice and personality. *Arch Gen Psychiatry* 1969;20:89.
- 60 Borges NJ, Richard GV. Using the delphi method to classify medical specialties. *Career Dev Q* 2018;66:85–90.
- 61 Srivastava S, John OP, Gosling SD, *et al.* Development of personality in early and middle adulthood: set like plaster or persistent change? *J Pers Soc Psychol* 2003;84:1041–53.
- 62 Weisberg YJ, Deyoung CG, Hirsh JB. Gender differences in personality across the ten aspects of the big five. *Front Psychol* 2011;2:178.
- 63 Thalmayer AG, Saucier G, Eigenhuis A. Comparative validity of brief to medium-length big five and big six personality questionnaires. *Psychol Assess* 2011;23:995–1009.
- 64 Soto CJ, John OP. The next big five inventory (BFI-2): developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *J Pers Soc Psychol* 2017;113:117–43.
- 65 Konstabel K, Lönnqvist J, Walkowitz G, *et al.* The 'short five' (S5): measuring personality traits using comprehensive single items. *Eur J Pers* 2012;26:13–29.
- 66 Redelmeier DA, Najeeb U, Etchells EE. Understanding patient personality in medical care: five-factor model. *J Gen Intern Med* 2021;36:2111–4.
- 67 Wrzus C, Luong G, Wagner GG, *et al.* Longitudinal coupling of momentary stress reactivity and trait neuroticism: specificity of states, traits, and age period. *J Pers Soc Psychol* 2021;121:691–706.
- 68 Weston SJ, Jackson JJ. Identification of the healthy neurotic: personality traits predict smoking after disease onset. *J Res Pers* 2015;54:61–9.
- 69 Horwitz SK, Horwitz IB. The effects of team diversity on team outcomes: a meta-analytic review of team demography. *J Manag* 2007;33:987–1015.
- 70 Saultz JW. Defining and measuring interpersonal continuity of care. *Ann Fam Med* 2003;1:134–43.

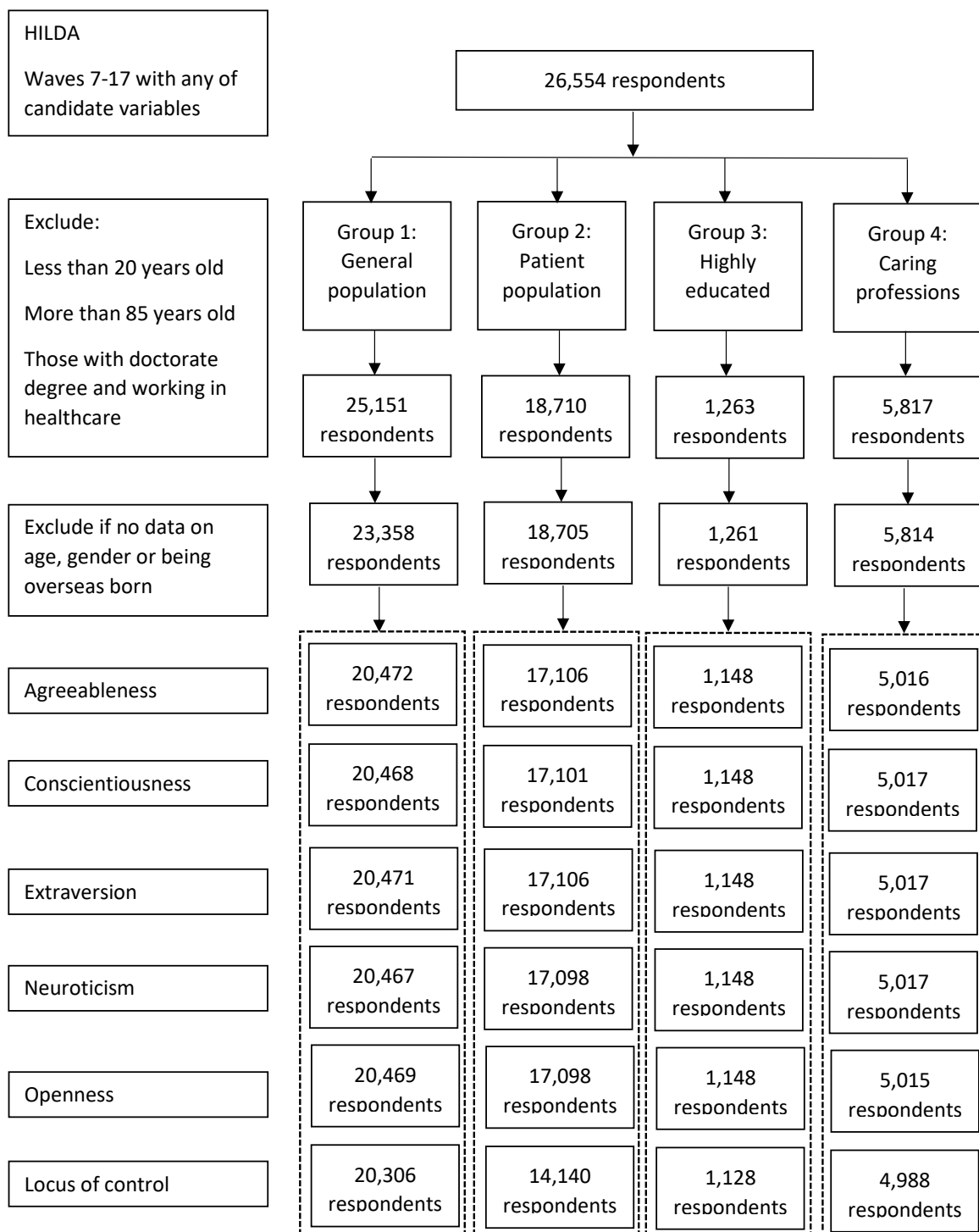
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Appendix 1: Flow diagram for MABEL sample



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Appendix 2: Flow diagram for HILDA sample



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Appendix 3: Definitions of HILDA and MABEL groups

Group in the analysis	Definition of individuals included in the group
HILDA	
Group 1: General population	All individuals from 20 to 85 years old. This group excludes individuals likely to be doctors. Individuals likely to be doctors are defined as working in Hospitals or Medical and Other Health Care Services (based on Australian and New Zealand Standard Industrial Classification [ANSIC] codes 84, 85 that are included in HILDA) and have one or more doctorate degrees.
Group 2: Patients	All individuals from 20 to 85 years old with at least one doctor visit in the year. This group excludes individuals likely to be doctors.
Group 3: Highly educated	All individuals from 20 to 85 years old whose level of education is reported as "Postgrad - masters or doctorate", the highest level of education classified in HILDA. This group excludes individuals likely to be doctors.
Group 4: Caring professions	All individuals from 20 to 85 years old whose current main job is in Public Administration, Hospitals, Medical and Other Health Care Services (ANSIC codes 75, 84, 85) or whose occupation is classified as Health Professionals, Health and Welfare Support Workers, Carers and Aides, Legal, Social and Welfare Professionals, Education Professionals (based on Australian and New Zealand Standard Classification of Occupations [ANZCO] codes 24, 25, 27, 41, 42 that are included in HILDA). This group excludes individuals likely to be doctors.
MABEL	
Group 0: All doctors	All doctors active at the year of data collection. This group includes general practitioners, specialists working in thirty-six different specialties, as well as "junior doctors". Junior doctors in Australia are classified in two categories: hospital non-specialists and specialists-in-training. Hospital non-specialists are mostly interns and resident medical officers, but this group also includes career medical officers and hospital medical officers. Specialists-in-training are yet to complete their fellowship.
Group 5: General practitioners	All general practitioners.
Group 6: Person-oriented specialists	All doctors in person-oriented specialties: General medicine; Geriatrics; Intensive care - internal medicine; Paediatric medicine; Obstetrics and gynaecology; Occupational medicine; Psychiatry; Rehabilitation medicine; Palliative Medicine; Internal medicine - others
Group 7: Technique oriented specialists	All doctors in technique-oriented specialties: Cardiology; Clinical haematology ; Endocrinology ; Gastroenterology ; Infectious diseases ; Medical oncology ; Neurology ; Nuclear medicine ; Renal medicine ; Rheumatology ; Thoracic medicine ; Pathology ; General surgery ; Cardiothoracic surgery ; Orthopaedic surgery ; Otolaryngology ; Plastic/reconstructive surgery; Urology ; Anaesthesia; Dermatology; Diagnostic radiology ; Emergency medicine ; Ophthalmology ; Radiation oncology ; Surgery – others.

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Appendix 4: Descriptive statistics of the doctors and other population groups

HILDA, Population survey	General population (Group 1)			All patients (Group 2)			All highly educated (Group 3)			All care, public service or education (Group 4)		
<i>Personality traits</i>	Mean	S.d.	Observations	Mean	S.d.	Observations	Mean	S.d.	Observations	Mean	S.d.	Observations
Agreeableness	16.26	2.42	130,315	16.32	2.38	35,195	16.34	2.33	6,529	16.45	2.34	21,699
Conscientiousness	15.40	2.66	130,267	15.41	2.62	35,185	15.52	2.63	6,525	15.49	2.64	21,697
Extraversion	13.23	2.81	130,317	13.26	2.78	35,197	13.23	2.86	6,528	13.32	2.83	21,706
Neuroticism	6.31	2.82	130,228	6.38	2.80	35,176	6.27	2.77	6,525	6.30	2.78	21,689
Openness	12.62	2.81	130,213	12.64	2.78	35,173	13.20	2.75	6,526	12.77	2.79	21,686
Locus of control	18.23	6.83	130,218	18.28	6.84	27,957	17.89	6.74	6,331	17.91	6.67	21,743
Demographics*												
Non-Australian born	0.23		157,102	0.22		37,112	0.39		7,821	0.20		26,773
Age	46.40	17.03	165,948	47.61	17.26	37,125	46.70	13.91	7,843	42.49	13.01	26,785
Female	0.52		165,948	0.56		37,125	0.49		7,843	0.74		26,785
MABEL, Physicians survey	All doctors (Group 0)			General practitioners (Group 5)			Person-oriented specialists (Group 6)			Technique-oriented specialists (Group 7)		
<i>Personality traits</i>	Mean	S.d.	Observations	Mean	S.d.	Observations	Mean	S.d.	Observations	Mean	S.d.	Observations
Agreeableness	16.49	2.57	18,357	16.83	2.55	5,492	16.45	2.54	1,713	16.07	2.68	3,101
Conscientiousness	17.04	2.44	18,356	16.98	2.52	5,492	17.13	2.39	1,712	17.26	2.38	3,101
Extraversion	13.93	3.52	18,355	13.78	3.51	5,492	13.97	3.42	1,712	13.48	3.49	3,100
Neuroticism	11.13	3.92	18,350	10.89	4.03	5,491	10.82	3.84	1,711	10.65	3.74	3,101
Openness	14.00	3.22	18,352	13.99	3.29	5,491	14.61	3.06	1,711	14.14	3.09	3,101
Locus of control	18.35	7.10	16,884	18.15	7.23	5,092	18.36	6.98	1,519	18.43	7.21	2,810
Demographics*												
Non-Australian born	0.27		19,351	0.34		5,844	0.34		1,776	0.28		3,245
Age	41.10	12.75	19,351	46.72	11.73	5,844	49.99	10.50	1,776	48.11	10.00	3,245
Female	0.47		19,351	0.50		5,844	0.41		1,776	0.28		3,245

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Notes: *Demographics for the year based on respondent answers when they answer the locus of control question for the first time. Samples for Big Five personality measures may differ and are typically larger.

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Appendix 5: Regression results for comparison of personalities of doctors with the general population, patients, highly educated and caring professions

VARIABLES	(1)			(2)			(3)			(4)		
	Group 1 Agreeableness			Group 2 Agreeableness			Group 3 Agreeableness			Group 4 Agreeableness		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.014	-0.011,0.038	0.272	0.015	-0.035,0.066	0.550	0.009	-0.073,0.091	0.824	0.015	-0.030,0.059	0.525
Age	0.001** *	0.001,0.002	0.000	0.002**	0.001,0.003	0.001	0.003	-0.000,0.006	0.090	0.003** *	0.001,0.004	0.000
Female	0.142** *	0.124,0.160	0.000	0.391** *	0.354,0.428	0.000	0.064	-0.027,0.154	0.170	0.136** *	0.097,0.175	0.000
Personality z-score	- 0.378** *	-0.417,-0.339	0.000	- 0.774** *	-0.853,-0.695	0.000	- 0.315 **	-0.507,-0.123	0.001	- 0.371** *	-0.471,-0.271	0.000
Observations	114536			32985			6027			20187		
R-squared	0.006			0.043			0.002			0.006		

VARIABLES	(5)			(6)			(7)			(8)		
	Group 1 Conscientiousness			Group 2 Conscientiousness			Group 3 Conscientiousness			Group 4 Conscientiousness		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born												0.021
Age	0.034**	0.009,0.059	0.007	0.077**	0.028,0.127	0.002	-0.052	-0.130,0.027	0.195	0.065*	0.010,0.121	0.001
Female	0.073** *	0.054,0.092	0.000	0.173** *	0.134,0.212	0.000	0.012	-0.071,0.095	0.769	0.086** *	0.040,0.133	0.000
Personality z-score	- 0.957** *	-0.999,-0.915	0.000	- 1.271** *	-1.355,-1.187	0.000	- 0.747 ***	-0.935,-0.558	0.000	- 0.955** *	-1.069,-0.841	0.000

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	(9)			(10)			(11)			(12)		
	Group 1 Extraversion			Group 2 Extraversion			Group 3 Extraversion			Group 4 Extraversion		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Observations	114498			32977			6024			20185		
R-squared	0.004			0.018			0.002			0.004		
Non-Australian born	0.020*	0.003,0.038	0.025	0.035	-0.003,0.072	0.072	0.002	-0.057,0.062	0.938	0.025	-0.019,0.070	0.268
Age	-			-			-			-		
	0.001**	-0.002,-0.001	0.000	0.003**	-0.004,-0.002	0.000	-0.002	-0.004,0.001	0.134	-0.001*	-0.003,-0.000	0.029
Female	0.053**	0.039,0.067	0.000	0.118**	0.089,0.147	0.000	0.053	-0.010,0.117	0.101	0.045*	0.007,0.082	0.020
Personality z-score	-			-			-			-		
	0.224**	-0.255,-0.192	0.000	0.244**	-0.308,-0.181	0.000	0.182	-0.353,-0.010	0.038	0.191**	-0.283,-0.099	0.000
Observations	114537			32986			6026			20191		
R-squared	0.002			0.010			0.002			0.001		
	(13)			(14)			(15)			(16)		
	Group 1 Neuroticism			Group 2 Neuroticism			Group 3 Neuroticism			Group 4 Neuroticism		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.024**	0.008,0.040	0.003	0.042*	0.009,0.075	0.012	0.079**	0.022,0.136	0.007	-0.012	-0.049,0.024	0.516
Age	-			-			-			-		
	0.004**	-0.005,-0.004	0.000	0.010**	-0.010,-0.009	0.000	0.005***	-0.007,-0.003	0.000	0.005**	-0.006,-0.004	0.000

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Female	-0.013*	-0.026,-0.001	0.039	-0.031*	-0.056,-0.006	0.015	-0.007	-0.068,0.055	0.834	0.004	-0.028,0.037	0.79 6
Personality z-score	-			-			-			-		0.00 0
	1.006**	-1.034,-0.978	0.000	0.710**	-0.764,-0.656	0.000	1.011	-1.158,-0.864	0.000	1.018**	-1.097,-0.938	
Observations	114461			32969			6024			20177		
R-squared	0.010			0.052			0.014			0.008		

	(17)			(18)			(19)			(20)		
	Group 1 Openness			Group 2 Openness			Group 3 Openness			Group 4 Openness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.034**			0.076**								0.04 2
	*	0.014,0.055	0.001	*	0.033,0.119	0.001	-0.044	-0.107,0.020	0.178	0.047*	0.002,0.093	
Age	-			-								0.08 6
	0.002**	-0.003,-0.002	0.000	0.006**	-0.007,-0.005	0.000	0.003	0.000,0.005	0.037	-0.001	-0.003,0.000	
Female	-			-								0.02 8
	0.032**	-0.048,-0.016	0.000	0.074**	-0.107,-0.040	0.000	-0.035	-0.103,0.033	0.308	-0.045*	-0.085,-0.005	
Personality z-score	-			-			-			-		0.00 0
	0.277**	-0.312,-0.243	0.000	-0.028	-0.101,0.046	0.460	0.312	-0.454,-0.169	0.000	0.264**	-0.363,-0.165	
Observations	114443			32965			6024			20174		
R-squared	0.003			0.018			0.003			0.001		

	(21)			(22)			(23)			(24)		
	Group 1 Locus of Control			Group 2 Locus of Control			Group 3 Locus of Control			Group 4 Locus of Control		

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VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.045**						0.184					0.36
	*	0.022,0.067	0.000	-0.001	-0.044,0.042	0.967	***	0.098,0.269	0.000	0.024	-0.028,0.076	4
Age	0.002**											0.50
	*	0.001,0.002	0.000	0.001	-0.000,0.002	0.296	0.000	-0.004,0.003	0.767	0.001	-0.001,0.002	0
Female												0.72
	0.009	-0.008,0.026	0.281	0.006	-0.026,0.038	0.723	-0.011	-0.107,0.085	0.823	0.008	-0.035,0.051	1
Personality z-score	-											0.09
	0.096**											6
	*	-0.135,-0.058	0.000	-0.040	-0.111,0.030	0.261	-0.064	-0.298,0.171	0.595	-0.091	-0.198,0.016	
Observations	114623			25170			5872			20267		
R-squared	0.001			0.000			0.009			0.000		

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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Appendix 6: Comparison of personalities of doctors with the general population, patients, highly educated and caring professions by sex

Table 6.1: Regression results

Male												
	(1m)			(2m)			(3m)			(4m)		
	Group 1 Agreeableness			Group 2 Agreeableness			Group 3 Agreeableness			Group 4 Agreeableness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.028	-0.005,0.061	0.100	0.029	-0.045,0.103	0.444	0.116*	0.026,0.207	0.012	-0.004	-0.093,0.086	0.937
Age	0.002***	0.001,0.003	0.000	0.003***	0.001,0.005	0.001	0.001	-0.002,0.004	0.544	0.003*	0.000,0.005	0.027
Personality z-score	-0.258***	-0.300,-0.215	0.000	-0.440***	-0.527,-0.353	0.000	-0.224*	-0.396,-0.052	0.011	-0.238***	-0.358,-0.118	0.000
Observations	53289			14454			3062			5337		
R-squared	0.001			0.003			0.004			0.002		

Male												
	(5m)			(6m)			(7m)			(8m)		
	Group 1 Conscientiousness			Group 2 Conscientiousness			Group 3 Conscientiousness			Group 4 Conscientiousness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.043*	0.009,0.078	0.014	0.114**	0.043,0.184	0.002	-0.057	-0.152,0.038	0.236	0.013	-0.088,0.114	0.800
Age	0.003***	0.003,0.004	0.000	0.006***	0.005,0.008	0.000	0.001	-0.002,0.005	0.444	0.004*	0.000,0.007	0.024
Personality z-score	-0.887***	-0.932,-0.842	0.000	-1.108***	-1.199,-1.017	0.000	-0.665***	-0.846,-0.483	0.000	-0.841***	-0.986,-0.697	0.000
Observations	53261			14450			3060			5336		
R-squared	0.003			0.014			0.001			0.002		

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<i>Male</i>												
	(9m)			(10m)			(11m)			(12m)		
	Group 1 Extraversion			Group 2 Extraversion			Group 3 Extraversion			Group 4 Extraversion		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.016	-0.010,0.043	0.223	0.061*	0.006,0.115	0.029	0.016	-0.069,0.101	0.716	0.015	-0.076,0.107	0.741
Age	-0.001***	-0.002,-0.001	0.000	-0.003***	-0.004,-0.002	0.000	-0.003	-0.006,0.001	0.112	-0.002	-0.004,0.000	0.107
Personality z-score	-0.169***	-0.201,-0.136	0.000	-0.138***	-0.203,-0.073	0.000	-0.095	-0.267,0.077	0.280	-0.125*	-0.231,-0.020	0.020
Observations	53285			14455			3062			5341		
R-squared	0.001			0.005			0.002			0.001		

<i>Male</i>												
	(13m)			(14m)			(15m)			(16m)		
	Group 1 Neuroticism			Group 2 Neuroticism			Group 3 Neuroticism			Group 4 Neuroticism		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.025*	0.001,0.048	0.038	0.021	-0.023,0.065	0.356	0.060	-0.016,0.135	0.120	-0.020	-0.099,0.059	0.624
Age	-0.004***	-0.004,-0.003	0.000	-0.007***	-0.008,-0.006	0.000	-0.004*	-0.006,-0.001	0.011	-0.002*	-0.004,-0.000	0.017
Personality z-score	-1.055***	-1.083,-1.027	0.000	-0.849***	-0.902,-0.796	0.000	-1.073***	-1.217,-0.930	0.000	-1.124***	-1.218,-1.030	0.000
Observations	53247			14448			3060			5336		
R-squared	0.007			0.030			0.008			0.002		

<i>Male</i>												
	(17m)			(18m)			(19m)			(20m)		
	Group 1 Openness			Group 2 Openness			Group 3 Openness			Group 4 Openness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval

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Non-Australian born	0.051***	0.023,0.078	0.000	0.061	-0.004,0.126	0.064	-0.010	-0.087,0.067	0.807	0.048	-0.045,0.141	0.315
Age	-0.003***	-0.003,-0.002	0.000	-0.006***	-0.008,-0.005	0.000	0.002	-0.001,0.005	0.165	-0.001	-0.004,0.002	0.428
Personality z-score	-0.302***	-0.337,-0.266	0.000	-0.117**	-0.194,-0.041	0.003	-0.339***	-0.480,-0.197	0.000	-0.313***	-0.441,-0.184	0.000
Observations	53242			14446			3060			5335		
R-squared	0.003			0.015			0.001			0.001		

Male

VARIABLES	(21m)			(22m)			(23m)			(24m)		
	Group 1 Locus of Control			Group 2 Locus of Control			Group 3 Locus of Control			Group 4 Locus of Control		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.039*	0.006,0.071	0.019	0.006	-0.055,0.067	0.852	0.181**	0.070,0.292	0.001	0.048	-0.055,0.151	0.361
Age	0.001*	0.000,0.002	0.019	0.000	-0.002,0.001	0.901	0.000	-0.004,0.004	0.928	0.002	-0.002,0.005	0.364
Personality z-score	-0.057**	-0.097,-0.017	0.005	-0.005	-0.083,0.073	0.898	-0.105	-0.325,0.116	0.352	-0.133	-0.279,0.013	0.075
Observations	53251			10971			2983			5335		
R-squared	0.001			0.000			0.008			0.001		

Female

VARIABLES	(1f)			(2f)			(3f)			(4f)		
	Group 1 Agreeableness			Group 2 Agreeableness			Group 3 Agreeableness			Group 4 Agreeableness		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	-0.001	-0.036,0.034	0.955	0.002	-0.067,0.071	0.948	-0.134	-0.278,0.009	0.067	0.022	-0.029,0.074	0.394
Age	0.001*	0.000,0.002	0.018	0.001	-0.001,0.002	0.236	0.006	-0.000,0.013	0.063	0.003**	0.001,0.004	0.003

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Personality z-score	-0.071***	-0.111,-0.032	0.000	0.056	-0.020,0.132	0.152	-0.268	-0.566,0.031	0.078	-0.097*	-0.176,-0.019	0.015
Observations	61247			18531			2965			14850		
R-squared	0.000			0.000			0.012			0.001		

Female

	(5f)			(6f)			(7f)			(8f)		
	Group 1 Conscientiousness			Group 2 Conscientiousness			Group 3 Conscientiousness			Group 4 Conscientiousness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.025	-0.010,0.060	0.164	0.045	-0.024,0.114	0.198	-0.049	-0.181,0.083	0.468	0.087**	0.021,0.153	0.009
Age	0.003***	0.003,0.004	0.000	0.006***	0.005,0.008	0.000	0.005	-0.000,0.010	0.069	0.004***	0.002,0.006	0.000
Personality z-score	-0.806***	-0.848,-0.764	0.000	-0.915***	-0.996,-0.835	0.000	-0.818***	-1.070,-0.565	0.000	-0.792***	-0.881,-0.703	0.000
Observations	61237			18527			2964			14849		
R-squared	0.003			0.011			0.004			0.004		

Female

	(9f)			(10f)			(11f)			(12f)		
	Group 1 Extraversion			Group 2 Extraversion			Group 3 Extraversion			Group 4 Extraversion		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.025*	0.000,0.049	0.049	0.012	-0.040,0.064	0.661	-0.017	-0.099,0.064	0.674	0.015	-0.076,0.107	0.741
Age	-0.001***	-0.002,-0.001	0.000	-0.003***	-0.004,-0.002	0.000	0.000	-0.003,0.003	0.834	-0.002	-0.004,0.000	0.107
Personality z-score	-0.120***	-0.150,-0.089	0.000	0.002	-0.058,0.062	0.945	-0.128	-0.273,0.017	0.084	-0.125*	-0.231,-0.020	0.020
Observations	61252			18531			2964			5341		

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R-squared	0.001			0.004			0.000			0.001		
Female												
	(13f)			(14f)			(15f)			(16f)		
	Group 1 Neuroticism			Group 2 Neuroticism			Group 3 Neuroticism			Group 4 Neuroticism		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.023*	0.001,0.044	0.041	0.058*	0.010,0.105	0.018	0.108*	0.019,0.197	0.018	-0.007	-0.047,0.032	0.714
Age	-0.005***	-0.005,-0.004	0.000	-0.012***	-0.013,-0.010	0.000	-0.007***	-0.011,-0.004	0.000	-0.006***	-0.007,-0.005	0.000
Personality z-score	-0.998***	-1.025,-0.971	0.000	-0.683***	-0.737,-0.629	0.000	-0.938***	-1.104,-0.772	0.000	-0.961***	-1.020,-0.902	0.000
Observations	61214			18521			2964			14841		
R-squared	0.013			0.074			0.023			0.011		

Female												
	(17f)			(18f)			(19f)			(20f)		
	Group 1 Openness			Group 2 Openness			Group 3 Openness			Group 4 Openness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.019	-0.011,0.049	0.224	0.089**	0.031,0.147	0.002	-0.089	-0.197,0.019	0.105	0.047	-0.004,0.099	0.072
Age	-0.002***	-0.003,-0.002	0.000	-0.007***	-0.008,-0.006	0.000	0.004	-0.001,0.008	0.106	-0.001	-0.003,0.000	0.117
Personality z-score	-0.347***	-0.382,-0.312	0.000	-0.162***	-0.228,-0.097	0.000	-0.407***	-0.608,-0.206	0.000	-0.352***	-0.421,-0.283	0.000
Observations	61201			18519			2964			14839		
R-squared	0.002			0.019			0.006			0.001		

Female												
	(21f)			(22f)			(23f)			(24f)		

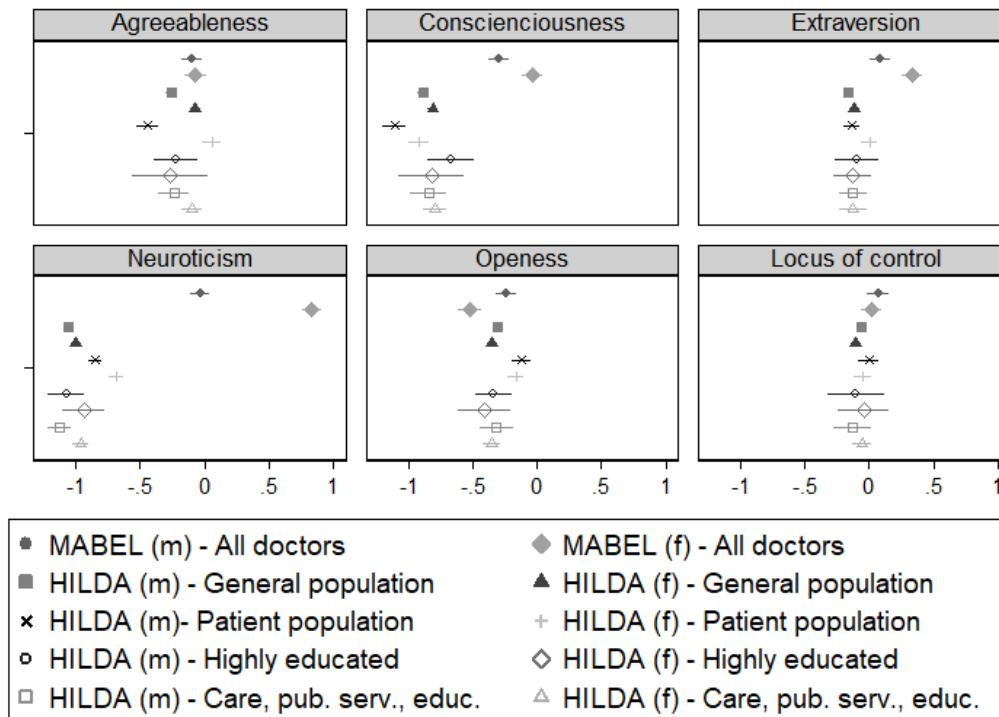
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VARIABLES	Group 1 Locus of Control			Group 2 Locus of Control			Group 3 Locus of Control			Group 4 Locus of Control		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.051***	0.021,0.082	0.001	-0.006	-0.065,0.054	0.850	0.189**	0.055,0.323	0.006	0.014	-0.045,0.073	0.636
Age	0.002***	0.001,0.003	0.000	0.001	-0.000,0.002	0.134	-0.001	-0.006,0.003	0.508	0.000	-0.002,0.002	0.895
Personality z-score	-0.106***	-0.141,-0.071	0.000	-0.052	-0.121,0.016	0.134	-0.044	-0.246,0.157	0.666	-0.055	-0.132,0.023	0.166
Observations	61372			14199			2889			14932		
R-squared	0.002			0.000			0.010			0.000		

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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Figure 6.2: Graphical results



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Appendix 7: Regression results for Comparison of personalities of doctors across specialties grouping

VARIABLES	(1)			(2)			(3)			(4)		
	Group 0 Agreeableness			Group 5 Agreeableness			Group 6 Agreeableness			Group 7 Agreeableness		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.225** *	0.187,0.263	0.000	0.210** *	0.144,0.277	0.000	0.230 ***	0.124,0.336	0.000	0.101**	0.009,0.193	0.03 1
Age	0.001	-0.001,0.002	0.357	- 0.004** *	-0.007,-0.001	0.005	0.005 **	0.000,0.010	0.030	0.002	-0.002,0.007	0.25 6
Female	0.092** *	0.060,0.125	0.000	0.048	-0.014,0.110	0.129	0.079	-0.027,0.185	0.142	0.097**	0.010,0.185	0.02 9
Personality z-score	- 0.118** *	-0.181,-0.055	0.000	0.252** *	0.093,0.411	0.002	- 0.380 ***	-0.637,-0.122	0.004	- 0.332** *	-0.551,-0.114	0.00 3
Observations	18,357			5,492			1,713			3,101		
R-squared	0.012			0.015			0.013			0.003		

VARIABLES	(5)			(6)			(7)			(8)		
	Group 0 Conscientiousness			Group 5 Conscientiousness			Group 6 Conscientiousness			Group 7 Conscientiousness		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.147** *	0.110,0.184	0.000	0.195** *	0.128,0.261	0.000	0.200 ***	0.096,0.305	0.000	0.100**	0.012,0.188	0.02 6
Age	0.003** *	0.002,0.005	0.000	0.003**	0.000,0.006	0.042	0.006 **	0.001,0.011	0.030	0.002	-0.002,0.006	0.37 6
Female	0.194** *	0.161,0.227	0.000	0.158** *	0.095,0.221	0.000	0.170 ***	0.070,0.271	0.001	0.240** *	0.154,0.327	0.00 0

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Personality z-score	-	-	-	0.267**	0.311**	0.379	0.36
	*	-0.331,-0.203	0.000	*	-0.471,-0.151	0.000	5
Observations	18,356	5,492	1,712	3,101			
R-squared	0.012	0.011	0.014	0.012			

	(9)			(10)			(11)			(12)		
	Group 0 Extraversion			Group 5 Extraversion			Group 6 Extraversion			Group 7 Extraversion		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	-0.023	-0.064,0.018	0.270	0.020	-0.050,0.091	0.569	0.055	-0.048,0.158	0.296	0.087**	0.004,0.169	0.03
Age	-			0.005**			-0.002	-0.005,0.001	0.199	-0.000	-0.005,0.005	0.909
	*	-0.006,-0.003	0.000									
Female	0.196**	0.160,0.232	0.000	0.215**	0.149,0.280	0.000	0.217	0.111,0.322	0.000	0.269**	0.185,0.353	0.00
	*			*			***			*		0
Personality z-score	0.107**	0.042,0.172	0.001	-0.057	-0.210,0.096	0.465	-0.084	-0.351,0.183	0.538	-0.138	-0.328,0.051	0.15
	*											2
Observations	18,355	5,492	1,712	3,100								
R-squared	0.017	0.013	0.012	0.016								

	(13)			(14)			(15)			(16)		
	Group 0 Neuroticism			Group 5 Neuroticism			Group 6 Neuroticism			Group 7 Neuroticism		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	-			-			-			-		
	0.195**	-0.234,-0.156	0.000	0.238**	-0.308,-0.168	0.000	0.279	-0.380,-0.177	0.000	0.143**	-0.223,-0.063	0.00
	*			*			***			*		0

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Age	-	-	-	-	-	-	-	-	-	-	-	-
	0.007**			0.008**			0.008			0.006**		0.00
	*	-0.008,-0.005	0.000	*	-0.011,-0.005	0.000	***	-0.012,-0.003	0.001	*	-0.010,-0.003	1
Female	0.382**			0.294**			0.292			0.220**		0.00
	*	0.349,0.415	0.000	*	0.229,0.360	0.000	***	0.190,0.395	0.000	*	0.137,0.303	0
Personality z-score	0.138**			0.252**			0.276			0.150	-0.030,0.331	0.10
	*	0.077,0.198	0.000	*	0.096,0.407	0.002	**	0.009,0.544	0.043			3
Observations	18,350			5,491			1,711			3,101		
R-squared	0.063			0.048			0.051			0.020		

	(17)			(18)			(19)			(20)		
	Group 0 Openness			Group 5 Openness			Group 6 Openness			Group 7 Openness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.063**			0.044	-0.034,0.121	0.266	0.049	-0.054,0.153	0.351	0.064	-0.016,0.143	0.11
	*	0.022,0.104	0.003	*			*			*		6
Age	0.008**			0.005**			0.014			0.012**		0.00
	*	0.006,0.009	0.000	*	0.002,0.008	0.002	***	0.009,0.018	0.000	*	0.008,0.015	0
Female	-			-			-			-		
	0.094**			0.128**			-0.038	-0.138,0.062	0.458	0.034	-0.049,0.117	0.41
	*	-0.128,-0.059	0.000	*	-0.199,-0.058	0.000						9
Personality z-score	-			-			-			-		
	0.295**			0.180**	-0.357,-0.003	0.047	0.511	-0.765,-0.256	0.000	0.537**		0.00
	*	-0.360,-0.231	0.000	*			***			*	-0.722,-0.351	0
Observations	18,352			5,491			1,711			3,101		
R-squared	0.016			0.009			0.027			0.016		

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VARIABLES	(21)			(22)			(23)			(24)		
	Group 0 Locus of Control			Group 5 Locus of Control			Group 6 Locus of Control			Group 7 Locus of Control		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.096**											
	*	0.051,0.141	0.000	0.094**	0.015,0.173	0.020	0.007	-0.103,0.117	0.904	0.011	-0.081,0.103	0.81
Age	-											
	0.002**	-0.003,-0.000	0.032	-0.001	-0.004,0.002	0.598	-0.003	-0.008,0.002	0.212	-0.000	-0.004,0.004	0.85
Female	-											
	0.043**	-0.079,-0.007	0.021	-0.052	-0.124,0.019	0.150	0.110					0.93
							**	-0.218,-0.002	0.047	0.004	-0.087,0.094	8
Personality z-score												0.77
	0.064*	-0.004,0.132	0.064	0.011	-0.162,0.184	0.902	0.216	-0.061,0.493	0.126	0.030	-0.178,0.238	6
Observations	16,884			5,092			1,519			2,810		
R-squared	0.003			0.003			0.003			0.000		

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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Appendix 8: Comparison of personalities of doctors across specialties grouping, by sex

Table 8.1: Regression results

<i>Male</i>												
	(1m)			(2m)			(3m)			(4m)		
	Group 0 Agreeableness			Group 5 Agreeableness			Group 6 Agreeableness			Group 7 Agreeableness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.222***	0.172,0.273	0.000	0.252***	0.158,0.345	0.000	0.203***	0.067,0.338	0.004	0.060	-0.048,0.169	0.276
Age	0.000	-0.002,0.002	0.878	-0.004**	-0.008,-0.000	0.032	0.005**	0.000,0.011	0.048	0.003	-0.001,0.008	0.154
Personality z-score	-0.094**	-0.173,-0.016	0.018	0.237**	0.027,0.447	0.027	-0.389**	-0.694,-0.084	0.012	-0.370***	-0.614,-0.126	0.003
Observations	9,708			2,773			1,018			2,239		
R-squared	0.010			0.019			0.011			0.002		

<i>Male</i>												
	(5m)			(6m)			(7m)			(8m)		
	Group 0 Conscientiousness			Group 5 Conscientiousness			Group 6 Conscientiousness			Group 7 Conscientiousness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.164***	0.115,0.214	0.000	0.205***	0.113,0.297	0.000	0.215***	0.081,0.350	0.002	0.090*	-0.016,0.195	0.095
Age	0.004***	0.002,0.005	0.000	0.003	-0.001,0.007	0.140	0.007**	0.001,0.013	0.029	0.001	-0.003,0.006	0.565
Personality z-score	-0.292***	-0.372,-0.212	0.000	-0.307***	-0.516,-0.098	0.004	-0.447***	-0.778,-0.116	0.008	-0.073	-0.322,0.175	0.563
Observations	9,707			2,773			1,017			2,239		
R-squared	0.008			0.009			0.013			0.002		

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<i>Male</i>												
	(9m)			(10m)			(11m)			(12m)		
	Group 0 Extraversion			Group 5 Extraversion			Group 6 Extraversion			Group 7 Extraversion		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.001	-0.055,0.056	0.983	0.054	-0.045,0.154	0.284	0.062	-0.065,0.189	0.340	0.098**	0.002,0.194	0.045
Age	-0.004***	-0.006,-0.003	0.000	-0.001	-0.005,0.003	0.739	0.001	-0.004,0.007	0.673	-0.001	-0.005,0.003	0.641
Personality z-score	0.084**	0.002,0.166	0.044	-0.133	-0.337,0.070	0.199	-0.165	-0.471,0.142	0.292	-0.172	-0.383,0.038	0.108
Observations	9,706			2,773			1,017			2,238		
R-squared	0.004			0.001			0.001			0.002		

<i>Male</i>												
	(13m)			(14m)			(15m)			(16m)		
	Group 0 Neuroticism			Group 5 Neuroticism			Group 6 Neuroticism			Group 7 Neuroticism		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	-0.169***	-0.221,-0.117	0.000	-0.254***	-0.350,-0.158	0.000	-0.269***	-0.399,-0.139	0.000	-0.126***	-0.218,-0.034	0.007
Age	-0.003***	-0.005,-0.001	0.000	-0.005**	-0.008,-0.001	0.017	-0.006**	-0.011,-0.001	0.030	-0.005***	-0.009,-0.001	0.008
Personality z-score	-0.033	-0.107,0.042	0.388	0.073	-0.126,0.272	0.474	0.190	-0.125,0.505	0.236	0.100	-0.099,0.299	0.325
Observations	9,703			2,772			1,017			2,239		
R-squared	0.008			0.016			0.019			0.006		

<i>Male</i>												
	(17m)			(18m)			(19m)			(20m)		
	Group 0 Openness			Group 5 Openness			Group 6 Openness			Group 7 Openness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval

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Non-Australian born	0.077***	0.022,0.132	0.006	0.034	-0.076,0.144	0.544	0.063	-0.068,0.194	0.344	0.052	-0.040,0.143	0.268
Age	0.006***	0.005,0.008	0.000	0.002	-0.002,0.006	0.365	0.012***	0.007,0.017	0.000	0.011***	0.007,0.015	0.000
Personality z-score	-0.234***	-0.313,-0.156	0.000	-0.023	-0.255,0.209	0.847	-0.415***	-0.710,-0.120	0.006	-0.511***	-0.715,-0.307	0.000
Observations	9,704			2,772			1,016			2,239		
R-squared	0.009			0.001			0.020			0.016		

Male

VARIABLES	(21m)			(22m)			(23m)			(24m)		
	Group 0 Locus of Control			Group 5 Locus of Control			Group 6 Locus of Control			Group 7 Locus of Control		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.087***	0.026,0.148	0.005	0.057	-0.055,0.169	0.315	0.037	-0.103,0.177	0.600	0.025	-0.082,0.132	0.652
Age	-0.002*	-0.003,0.000	0.079	-0.002	-0.007,0.002	0.274	-0.002	-0.008,0.004	0.510	-0.002	-0.006,0.003	0.493
Personality z-score	0.070	-0.015,0.155	0.105	0.105	-0.124,0.334	0.367	0.143	-0.189,0.475	0.398	0.086	-0.147,0.319	0.469
Observations	8,811			2,543			888			2,010		
R-squared	0.002			0.002			0.001			0.000		

Female

VARIABLES	(1f)			(2f)			(3f)			(4f)		
	Group 0 Agreeableness			Group 5 Agreeableness			Group 6 Agreeableness			Group 7 Agreeableness		
	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.226***	0.172,0.280	0.000	0.140***	0.054,0.226	0.001	0.293***	0.126,0.459	0.001	0.261***	0.101,0.420	0.001
Age	0.002	-0.000,0.004	0.109	-0.004*	-0.008,0.001	0.099	0.003	-0.006,0.012	0.506	-0.005	-0.014,0.004	0.285

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Personality z-score	-0.070*	-0.153,0.013	0.096	0.295***	0.105,0.484	0.002	-0.220	-0.631,0.190	0.292	0.044	-0.358,0.446	0.830
Observations	8,649			2,719			695			862		
R-squared	0.011			0.007			0.019			0.015		

Female

	(5f)			(6f)			(7f)			(8f)		
	Group 0 Conscientiousness			Group 5 Conscientiousness			Group 6 Conscientiousness			Group 7 Conscientiousness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.118***	0.064,0.172	0.000	0.176***	0.086,0.266	0.000	0.177**	0.014,0.339	0.033	0.133*	-0.012,0.277	0.072
Age	0.002**	0.000,0.005	0.027	0.004	-0.001,0.008	0.111	0.002	-0.007,0.010	0.693	0.005	-0.004,0.013	0.270
Personality z-score	-0.036	-0.119,0.047	0.397	-0.168*	-0.367,0.030	0.097	-0.021	-0.429,0.387	0.920	0.005	-0.363,0.373	0.979
Observations	8,649			2,719			695			862		
R-squared	0.004			0.007			0.007			0.006		

Female

	(9f)			(10f)			(11f)			(12f)		
	Group 0 Extraversion			Group 5 Extraversion			Group 6 Extraversion			Group 7 Extraversion		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	-0.064**	-0.120,-0.009	0.022	-0.030	-0.117,0.057	0.500	0.050	-0.125,0.225	0.576	0.052	-0.106,0.210	0.520
Age	-0.005***	-0.007,-0.003	0.000	-0.004**	-0.008,-0.000	0.030	-0.005	-0.015,0.004	0.283	-0.005	-0.013,0.003	0.226
Personality z-score	0.332***	0.253,0.411	0.000	0.271***	0.104,0.437	0.001	0.374	-0.088,0.837	0.112	0.290	-0.075,0.656	0.120
Observations	8,649			2,719			695			862		

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R-squared	0.005			0.002			0.003			0.002		
Female												
	(13f)			(14f)			(15f)			(16f)		
	Group 0 Neuroticism			Group 5 Neuroticism			Group 6 Neuroticism			Group 7 Neuroticism		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	-0.210***	-0.264,-0.155	0.000	-0.190***	-0.278,-0.101	0.000	-0.288***	-0.450,-0.126	0.001	-0.196**	-0.361,-0.031	0.020
Age	-0.015***	-0.017,-0.013	0.000	-0.016***	-0.020,-0.012	0.000	-0.013***	-0.022,-0.004	0.005	-0.011***	-0.019,-0.003	0.008
Personality z-score	0.832***	0.756,0.908	0.000	0.886***	0.715,1.056	0.000	0.824***	0.399,1.248	0.000	0.605***	0.240,0.971	0.001
Observations	8,647			2,719			694			862		
R-squared	0.039			0.031			0.029			0.017		

Female												
	(17f)			(18f)			(19f)			(20f)		
	Group 0 Openness			Group 5 Openness			Group 6 Openness			Group 7 Openness		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.022	-0.035,0.080	0.446	0.043	-0.051,0.137	0.372	0.006	-0.162,0.173	0.949	0.102	-0.057,0.262	0.208
Age	0.011***	0.009,0.014	0.000	0.011***	0.007,0.015	0.000	0.021***	0.012,0.030	0.000	0.014***	0.006,0.022	0.001
Personality z-score	-0.515***	-0.606,-0.425	0.000	-0.587***	-0.780,-0.394	0.000	-0.875***	-1.317,-0.433	0.000	-0.619***	-1.000,-0.238	0.001
Observations	8,648			2,719			695			862		
R-squared	0.016			0.013			0.034			0.016		

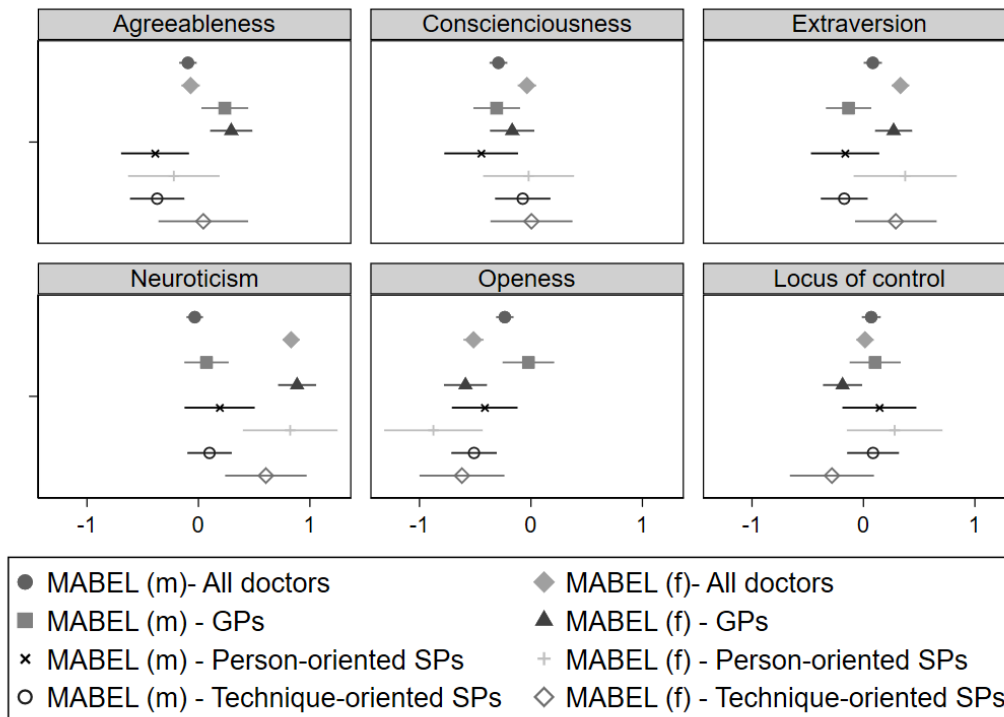
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Female												
	(21f)			(22f)			(23f)			(24f)		
	Group 0 Locus of Control			Group 5 Locus of Control			Group 6 Locus of Control			Group 7 Locus of Control		
VARIABLES	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval	coeff	ci	pval
Non-Australian born	0.111***	0.052,0.171	0.000	0.146***	0.050,0.243	0.003	-0.051	-0.226,0.125	0.572	-0.049	-0.223,0.126	0.584
Age	-0.001	-0.004,0.001	0.163	0.002	-0.002,0.006	0.309	-0.006	-0.015,0.002	0.158	0.007	-0.001,0.016	0.101
Personality z-score	0.014	-0.064,0.092	0.723	-0.187**	-0.363,-0.012	0.036	0.280	-0.149,0.709	0.200	-0.283	-0.660,0.094	0.141
Observations	8,073			2,549			631			800		
R-squared	0.002			0.005			0.003			0.004		

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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Figure 8.2: Graphical results



Doctors more extroverted, but also more neurotic and less open than patients: study

Character trait differences might have clinical implications for doctor-patient relationships

Doctors are more extroverted, agreeable, and conscientious, but also more neurotic and less open than their patients, finds an analysis of responses to two nationally representative Australian surveys, published online in the open access journal **BMJ Open**.

These character trait differences might have clinical implications for the doctor-patient relationship, suggest the researchers.

The selection and training of doctors may accentuate personality characteristics that differ from their patients, say the researchers, adding that, in turn, these differences may create a mismatch between how doctors deliver information and how patients receive it.

The available body of research on doctors' personality is dominated by convenience samples, low sample sizes and response rates, and limited by a focus on specific types of doctors, medical schools, or geographic areas, point out the researchers.

To avoid these issues, the researchers drew on two nationally representative Australian surveys, in which respondents were asked to assess their own personality traits.

The Household, Income and Labour Dynamics in Australia (HILDA) survey of 25,358 members of the general public aged 20-85 included 18,705 patients, 1261 highly educated people, and 5814 professional carers.

The Medicine in Australia: Balancing Employment and Life (MABEL) survey of 19,351 doctors included 5844 general practitioners, 1776 patient-oriented specialists, and 3245 'technique-oriented' specialists.

The researchers wanted to find out if there were personality trait differences between doctors and all the other groups, and if there might be equivalent differences between the two groups of medical specialists.

They focused on the 'big 5' personality traits of conscientiousness, agreeableness, extroversion, neuroticism, and openness as well as locus of control—belief in personal agency (internal) rather than external forces, such as fate, a higher power, or powerful others (external).

Agreeableness encapsulates empathy, kindness, cooperation, and warmth; conscientious includes the descriptors orderly, systematic, efficient, careful, and organised; extroverts are talkative, confident, loud, bold and lively; neurotics describe themselves as envious, moody, touchy, jealous, temperamental and fretful; while the descriptors philosophical, creative, intellectual, complex, and imaginative apply to openness.

Not unexpectedly, doctors were more agreeable and extroverted than all the other groups, but they were also more neurotic. And both doctors and caring professionals were more agreeable than patients. But doctors were significantly more agreeable than caring professionals.

Somewhat unexpectedly, doctors more strongly believed themselves subject to external forces beyond their control than the general public. Although significant, this difference was relatively small, and there were no significant differences between doctors and patients, caring professionals, or the highly educated, caution the researchers.

Finally, differences among doctors across medical specialties were, overall, smaller than those between doctors and patients and the public, with family doctors (GPs) standing out for their higher level of agreeableness.

Women doctors seemed to differ more strongly from the other groups relative to men, the survey responses suggested. This was particularly noticeable for neuroticism, with women doctors scoring significantly higher on this trait than female members of the general public.

The researchers acknowledge certain limitations to their findings. Although based on well known and validated instruments, the scales used to assess personality traits were self-rated. And the 'big 5' descriptors differed slightly between the two surveys.

Nevertheless, the researchers suggest that these personality differences might have implications for the doctor-patient relationship and ultimately the success of treatment.

“For example, being more conscientious has implications for treatment adherence as conscientious doctors may overestimate their patients’ ability to follow recommendations. Higher doctor neuroticism, which is related to stress, could lead doctors to see stress as a normal part of life, and, thus, underestimate the impact of [it] on patient wellbeing,” they write.

“Doctor agreeableness and conscientiousness increase patient satisfaction with care, but could potentially lead doctors to view patients—in contrast to themselves—as more confrontational and less conscientious than patients actually are, causing an asymmetry in doctor and patient judgements of one another, which could impact outcomes,” they add.

“By taking into account these differences, doctors can better calibrate their judgments of patients and gain insight into factors that influence their patient interactions,” they suggest.

And a range of different personalities is also likely to be better for clinical team performance, they add. “The lack of personality difference we found between doctor specialties suggests that adding more doctors to a team will not increase diversity of personality-base perspectives. However, the differences found between doctors and those in other caring professions suggest that including non-doctor caring

professionals in clinical teams will increase personality diversity and, thus, team performance.”