Author’s response to reviews

Title: Empathy and big five personality model in medical students and its relationship to gender and specialty preference. Cross-sectional study

Authors:

Teresa Guilera (tguilera37@gmail.com)
Iolanda Batalla (ibatalla@gss.scs.es)
Carles Forné (cforne@irb.﻿//leida.cat)
Jorge Soler-González (jorgesolergonzalez@gmail.com)

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Author’s response to reviews:

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Dear Editor,

Thank you for reviewing our article. Please find attached the revised version of manuscript entitled “Empathy and big five personality model in a medical students sample and this relationship with gender and specialty preference” (MEED-D-18-00558). We have read your comments very carefully and have made all the suggested changes that have undoubtedly improved our work.

We detail all the points in this letter.

Thanks for your consideration.

Yours faithfully,
Full Title: Empathy and big five personality model in a medical students sample and this relationship with gender and specialty preference

Abstract: Background. Given the influence that personality can have on empathy, this study explores the relationship between empathy and personality, using three empathy scales simultaneously, and taking into account gender and specialty preference. Methods. One hundred and ten medical students completed the Jefferson Scale of Physician Empathy, the Interpersonal Reactivity Index, the Empathy Quotient, and the NEO-FFI Big Five personality model. Results. Empathy scales showed weak and moderate correlation with personality. The strongest correlations were observed between IRI-Fantasy and Openness, and between IRI-Personal Distress and Neuroticism. Gender and specialty preference can modify this relationship. The extreme groups of Empathy Quotient had significant differences in most personality traits. Conclusions. This study confirmed that empathy is related to personality. Using three empathy scales allows personalizing the evaluation of different empathy models and its relation with personality. Although personality is by definition difficult to modify, some personalised intervention strategies could improve empathy in medical students.

Corresponding Author: Teresa Guilera, Ph.D., M.D. Hospital Universitario de Santa Maria. Lleida, Lleida SPAIN
Response to Reviewers:

We thank the Reviewers for their helpful comments, which have assisted us greatly in improving the manuscript.

Thelma Quince, PhD (Reviewer 1):

REVIEWER: This is an interesting article which adds to the debate surrounding the associations between personality and empathy. However it has a number of shortcomings which if addressed would improve the paper.

RESPONSE: Thank you very much for your review. We appreciate your contributions. We have made all the changes you have proposed and we have expanded everything you have requested. We will respond to you point by point and you will also find all the changes indicated in bold in the text.

- Background.

REVIEWER: It breaks new ground in using three different measures of empathy and specifically in using the EQ, which has not been used with medical students, and in considering specialty orientation. But a better justification for looking at this topic would enhance the paper. Why is it important? Personality is normally considered relatively stable. Perhaps the authors could comment on, or raise, some of the following in the background: the role of personality in selection of students for medicine and/or advice concerning suitability of specialty; personal
reflection on personality traits and how these could possibly influence empathetic behaviour towards patients.

RESPONSE: We add the following sentence that you will find on page 3 “Personality is normally considered relatively stable. Personality traits might influence empathetic behaviour towards patients, and might consider the role of personality in selection of students for medicine, or in advice concerning suitability of specialty.”

REVIEWER: Some dimensions of empathy, particularly cognitive empathy can, perhaps, be taught and/or modified. The authors need to be mindful that they do not express what are "associations" in terms of causality.

RESPONSE: We thank the Reviewer for their constructive comments. We will consider them in the discussion section (page 12), and we will modify the paragraph according to the Reviewer’s comments. “Based on the model that differentiates affective and cognitive empathy and that some dimensions of empathy can, perhaps, be taught and modified, these results can help to design programs to study if some personalized intervention strategies could improve the empathy in medical students.”

• Methods

REVIEWER: Please could the authors give a little more detail as to how the survey was administered, i.e Were there incentives? Was it completed online? What was the response rate? How was confidentiality ensured?

RESPONSE: This paragraph has been modified in page 5 according to the Reviewer’s comments.

"This observational cross-sectional study was conducted in a single institution, and the study population consisted of medical students. The research project of empathy was presented to the medical students from the Faculty of Medicine in Spain by email and a link to access the online questionnaire was provided. The survey was administered in the 2016/2017 academic year, and completed online. 669 medical students were enrolled during the 2016/2017 academic year. 472 (70.55%) of them were women. 110 medical students completed the survey and participated voluntarily with informed consent in this study. There were no incentives to participate. The response rate was the 16.44 %.
The study was approved by the ethics committee for clinical research (CEIC). The confidentiality is ensured. Only the principal investigator has access to survey results. The data collected were used exclusively for the purpose of the study.

• Results

REVIEWER:

These are fairly clearly described but some suggestions are given below.

Discussion

The main findings are clearly outlined and well compared with the existing literature. Although the authors make some suggestions relating to medical education the paper would benefit from more detailed comment on these and on the relevance of the associations found to patient care.

RESPONSE: We have modified this paragraph in the discussion (page 13) to express this notion and hope that the Reviewer agrees with our arguments: “According to our results, we might teach medical students to accurately perceive and identify their emotions and those of others. Although they could improve the scores of Agreeableness and decrease Neuroticism scores, above all it would improve empathic behaviour and patient care.”

• Limitations.

REVIEWER: In respect of the limitations of the study, it would be helpful if the authors clearly stated that the study was conducted in a single institution and used self-report instruments.

RESPONSE: We have expanded the paragraph in limitations according to the Reviewer’s comments in page 13 “This study has different limitations. This observational cross-sectional study was conducted in a single institution. Although the sample of 110 medical students may not be representative of the general medical student population, it opens empathy research lines to be evaluated in future multicentre studies. Despite the fact that it was being carried out in our small Faculty of medicine, there are many studies in progress, and that makes their collaboration being difficult.”
We used self-report instruments that inform us of the perception that the individual has of himself and of his abilities. Our team is interested in simplifying and optimizing the correlation process of psychometric instruments traditionally used, and new biometric devices that provide more objective information in the emotions research [44].”


Minor points:

Background:

REVIEWER: Page 3 line 81, Expression: To date higher empathy scores have been observed.
RESPONSE: This has been amended.

REVIEWER: Page 4 line 101, Expression: concluded that
RESPONSE: This has been amended.

Statistical methods:

REVIEWER: Page 8 line 181, reference to R software needed
RESPONSE: We added the reference in page 7. [33]


Results:

REVIEWER: Page 9 Generally, this section would benefit from insertion of the words "score" or "scores". Some examples are given below.

Line 208/209, expression: the percentile scores for Agreeableness recorded by our students were below those recorded for the Spanish population, while those for Openness were higher. Also reference is needed for Spanish population scores.

RESPONSE: Now it reads: “The percentile scores for Agreeableness recorded by our students were below those recorded for the Spanish population [32], while those for Openness to experience were higher.” (page 8)
The reference for Spanish population scores [32] is in the methods section (page 7)

REVIEWER: Line 216, Expression: Medical students with below average EQ scores recorded low scores for Openness ….

RESPONSE: This has been amended.

REVIEWER: Line 225, Expression: Higher IRI-PT scores were associated with

RESPONSE: This has been amended.

REVIEWER: Line 232, Expression: furthermore to specialty preference with lower IRI-PD scores…

RESPONSE: This has been amended.

Discussion:

REVIEWER: Line 266, Expression: The empathy is not so present….. This is not well expressed and it is a huge value judgement on the part of the authors. One can argue that, possibly, in some technology oriented specialties empathy may be is less apparent or important in the doctor/patient relationship.

RESPONSE: Now it reads in page 10: “In some technology oriented specialties empathy maybe is less apparent or important in the doctor-patient relationship.”

REVIEWER: Line 285, Statement unsupported ..An open and more flexible

RESPONSE: Now it reads in page 10: “In some technology oriented specialties empathy may be is less apparent or important in the doctor-patient relationship.”

REVIEWER: Line 290, Expression IRI-PD was only positively associated with Neuroticism, as found in other studies.

RESPONSE: This has been amended.

REVIEWER: Line 317/318, Expression: Consequently …this is unclear.

RESPONSE: Now it reads in page 12: “Probably, personality can be a good predictor in vulnerable medical students with extreme scores of empathy who benefit most from a specialty choice advice”

REVIEWER: Line 331, Expression: We must teach medical students

RESPONSE: Now it reads in page 13: “According to our results, we might teach medical students to accurately perceive and identify their emotions and those of others.”
Ya-huei Wang, Ph.D. (Reviewer 2):

REVIEWER. The study intended to explore the relationship between empathy and personality, using three empathy scales simultaneously and taking into account gender and specialty preference. In order to reach the goal, the researcher(s) recruited one hundred and ten medical students to complete the Jefferson Scale of Physician Empathy, the Interpersonal Reactivity Index, the Empathy Quotient, and the NEO-FFI Big Five personality model for data analysis. The quantitative results corresponded with the previous research in that empathy was related to personality. Finally, the researcher(s) jumped to the conclusion that "Although personality is by definition difficult to modify, some personalised intervention strategies could improve empathy in medical students". Nonetheless, in the paper, there was no intervention to verify or confirm that personalized intervention strategies could improve empathy in medical students. How come the researcher(s) could draw a conclusion, saying that personalized intervention strategies could improve empathy in medical students? The researcher(s) cannot draw a conclusion from previous literature review but should come up with a conclusion based on the results derived from the study.

Besides, without any substantial intervention or experiment in the study, that is definitely a research flaw in the paper. Since the researcher(s) mentioned that some personalized intervention strategies could improve empathy in medical students, the reviewer would suggest that the researcher(s) should give a personalized intervention strategy to examine how the intervention strategies could improve medical students' empathy and further explore the relationship between empathy and personality after the intervention. Without any intervention, it would be awkward to jump to the conclusion without logical connection and demonstration to prove that supposition.

RESPONSE: Thank you very much for your review. We appreciate your contributions. We have made all the changes you have proposed and we have expanded everything you have requested. Certainly, there are aspects that do not derive directly from the research carried out but as the
reviewer says, from the bibliography and also from other works of our research. We will respond to you point by point and you will also find all the changes indicated in bold in the text.

The paragraph in Discussion has been modified in page 12 according to the Reviewer’s comments.

“Based on the model that differentiates affective and cognitive empathy and that some dimensions of empathy can, perhaps, be taught and modified, these results can help to design programs to study if some personalized intervention strategies in medical students [23]. The results of two pilot studies recently published by our team show the wide acceptance of two psychoeducational intervention (sensory deprivation and shadowing patients) easily implemented in undergraduate medical studies [42, 43]. Accordingly, we proposed to improve cognitive empathy by increasing attitudes related to the agreeableness trait. Considering that people with low agreeableness have difficulty in changing the focus of attention towards others, we propose to train perspective taking in a fictional context with intervention strategies that will help them to direct the focus of attention towards the other patients, without fear or defensive behaviours that will distance them from patients. We also propose to improve affective empathy by modulating neuroticism and anxiety related to empathic concern and personal distress, especially in students with people-oriented specialty preference, who tend to have higher anxiety in their relationship with patients. According to our results, we might teach medical students to accurately perceive and identify their emotions and those of others. Although they could improve the scores of Agreeableness and decrease Neuroticism scores, above all it would improve empathic behaviour and patient care. “


With regard to the conclusions, we have reviewed them. For that reason we have changed the sentence "Although personality is by definition difficult to modify, some personalized intervention strategies could improve empathy in medical students" in the abstract. Now it says in page 1: “These results can help to design programs to study if some personalized intervention strategies could improve the empathy in medical students.”, and in the conclusion section on page 15: “These results can help to design programs to study if some personalized intervention strategies could improve the empathy in medical students. For instance perspective taking and decrease anxiety. However, more studies are needed to verify these hypotheses. Although they
could improve the scores of Agreeableness and decrease Neuroticism scores, above all it would improve empathic behaviour and patient care.”

REVIEWER: There is another problem in that the sample size of 110 medical students is too small. The sample size used in the study is a critical factor to obtain reliable results about the proportion in the whole population. Definitely, a sample size of 110 medical students is too small to obtain reliable results. Hence, it becomes inadequate to discuss the results based on those small samples because the small samples lose the representativeness.

RESPONSE: Without any doubt, the reviewer is right. As it happens in so many studies in which it is tried that the students of medicine collaborate, its response rate is never as satisfactory as it would be desired. In our Faculty there are many studies in progress, and that makes their collaboration being difficult. It should also be noted that our Medical School is small, so our sample is representative of our institution. For this reason we have added the following sentence on page 13 in the limitations section: “This observational cross-sectional study was conducted in a single institution. Although the sample of 110 medical students may not be representative of the general medical student population, it opens empathy research lines to be evaluated in future multicentre studies. Despite the fact that it was being carried out in our small Faculty of medicine, there are many studies in progress, and that makes their collaboration being difficult.”

Alessandra Lamas Granero Lucchetti (Reviewer 3):

REVIEWER: This is an observational cross-sectional study that aims to explore the relationship between empathy and personality, using three empathy scales and taking into account the gender and specialty preferences. Although this is an interesting idea, the manuscript needs to be clarified in the following topics:

RESPONSE: Thank you very much for your review. We appreciate your contributions. We have made all the changes you have proposed and we have expanded everything you have requested. We will respond to you point by point and you will also find all the changes indicated in bold in the text.

• Abstract:

REVIEWER: The article does not indicate the study’s design in the title and in the abstract.

RESPONSE:

We have changed the title in page 1: “Empathy and big five personality model in medical students and its relationship to gender and specialty preference. Cross-sectional study”.
REVIEWER: The description of the methods in the abstract needs to be expanded.

RESPONSE: We have expanded the methods in the abstract in page 1. “Methods. Cross-sectional study. One hundred and ten medical students completed the Jefferson Scale of Physician Empathy, the Interpersonal Reactivity Index, the Empathy Quotient, and the NEO-FFI Big Five personality model. Multivariable linear regression was performed to assess the association between personality traits and empathy.”

• Introduction:

REVIEWER: In my opinion, the differences between empathy scales would be better discussed in the Methods session

RESPONSE: We have added the differences between empathy scales in the methods section. All the changes are indicated in bold in the text. You will find it on pages 5-7.

REVIEWER: The authors should delete the sentence ‘We only have evidence of three studies’ because it is difficult to say that there are only three studies concerning this topic. Instead of this sentence they should include that ‘there are few studies’.

RESPONSE: We have deleted the sentence “We only have evidence of three studies” recommended by the Reviewer because it is evident that there may be more similar studies. Now it reads in page 3: "Two studies, which used the JSPE among Portuguese medical students [14, 24] concluded that empathy is positively associated with Agreeableness and Openness. Another study...”

• Methods:

REVIEWER: Authors do not describe in detail the setting, the location, the relevant dates, including periods of recruitment, exposure, and data collection. Authors do not describe the eligibility criteria, and the sources and methods of selection of participants. Why did you choose 110 students? How was the sample size calculated? How many refusals? How and by whom were students approached?

RESPONSE: We have added the following methodological description that you will find on page 5: "This observational cross-sectional study was conducted in a single institution, and the study population consisted of medical students. The research project of empathy was presented to the medical students from the Faculty of Medicine in Spain by email and a link to access the online questionnaire was provided. The survey was administered in the 2016/2017 academic year, and completed online. 669 medical students were enrolled during the 2016/2017 academic year. 472 (70.55%) of them were women. 110 medical students completed the survey and
participated voluntarily with informed consent in this study. There were no incentives to participate. The response rate was the 16.44 %.

REVIEWER: All variables need to be better described. For example, it is needed to describe better the Specialty preference classification. What is the cut off for each level of the EQ? I strongly recommend authors to describe in deeper detail each instrument used for empathy, including the psychometric properties in their sample of Spanish students.

RESPONSE: We have rewritten the description in the methods section page 5-7.

“All participants completed the online questionnaire with sociodemographic data (age, gender and academic course) and the following self-applied measurement instruments:

1. The JSPE consists of 20 items with scores ranging between 20 and 140. It measures empathy in the context of medical education [4]. The JSPE has been used in most of the studies carried out with medical students. In this study the adapted and validated Spanish version by Alcorta-Garza et al. [30] has been used.

2. The IRI is formed by four subscales of seven items each with scores ranging from 0 to 28. Two subscales measure cognitive empathy (IRI-PT and IRI-FS) and two subscales measure affective empathy (IRI-EC and IRI-PD) [6]. IRI-PT measures the spontaneous ability to adopt the perspective of others in real situations of daily life. IRI-FS measures the imaginative ability to put oneself in fictitious situations. IRI-EC measures compassion and concern feelings towards discomfort of others. IRI-PD measures anxiety and discomfort feelings in oneself when observing the negative experiences of others. In the present study, the Spanish validated version of Carrasco-Ortiz et al. [31] has been used.

3. The EQ consists of 60 items, 40 measure empathy and 20 measure control. Scores range from 0 to 80. It measures cognitive and affective empathy in adults. EQ allows classification into four categories, which facilitates the comparison between groups. The cut off for each level is: from 0 to 32 scores is low empathy (average scores in Asperger Syndrome is 20), from 33 to 52 scores: average empathy (average in men 42, average in women 47), from 53 to 63 scores: above average, from 64 to 80 scores high empathy. The version used, which has not been validated in Spanish, was obtained from http://espectroautista.info/tests/espectro-autista/adultos/EQ. We have the author’s consent to use the EQ questionnaire [1].

5. Specialty preference classification is based on Hojat’s study [4, 9] which defines two categories of professional preference: people-oriented specialties (Internal Medicine, Family Medicine, Pediatrics, Neurology, Rehabilitation, Psychiatry, Emergency Medicine, Obstetrics and Gynecology, Ophthalmology, Dermatology), and technology-oriented specialties (Surgery and Surgical Specialties, Radiology, Radiation Oncology, Pathology, Anesthesiology).
6. The NEO Five-Factor Inventory (NEO-FFI) is the short form version of one of the most prestigious instruments for the evaluation of normal personality [22]. The NEO-FFI consists of 60 items and evaluates five main factors. Openness to experience (O), describes the trend to seek new personal experiences and to creatively conceive the future; Conscientiousness (C) describes responsibility, ability to focus on goals, and discipline to carry them out; Extraversion (E) describes the trend to be open to others in social contexts; Agreeableness (A) describes kindness, respect and tolerance towards others; and Neuroticism (N) describes emotional stability and how to deal with the problems of life. As well as the direct scores, the corresponding percentiles have been obtained based on scales from the Spanish population [32].

• Results:

REVIEWER: The study does not clearly describe the recruitment of students: potentially eligible students, refusals and reasons, etc … In the descriptive data, authors provide the readers with demographic data. Nevertheless, little is known about the population from which the sample came from. What is the total number of students in this university? How is the gender distribution in the total population of students? Why did you find a predominance of women in your sample?

RESPONSE:

As we have answered in the previous observation, we have added all that in the methods section in page 5. “The research project of empathy was presented to the medical students from the Faculty of Medicine in Spain by email and a link to access the online questionnaire was provided. The survey was administered in the 2016/2017 academic year, and completed online. 669 medical students were enrolled during the 2016/2017 academic year. 472 (70.55%) of them were women. 110 medical students completed the survey and participated voluntarily with informed consent in this study. There were no incentives to participate. The response rate was the 16.44 %.”

On the other hand, our Faculty is strongly feminized, in the same way that it happens in the rest of Spanish medical faculties. We extended the paragraph in the limitation section in page 13:

“This study has different limitations. “This observational cross-sectional study was conducted in a single institution. Although the sample of 110 medical students may not be representative of the general medical student population, it opens empathy research lines to be evaluated in future multicentre studies. Despite the fact that it was being carried out in our small Faculty of medicine, there are many studies in progress, and that makes their collaboration being difficult.”

“The low proportion of males was a limitation of our study, and reflected the increased proportion of women attending medical school, more than 70% in Spain [45], and it is similar to the ratio of women and men in our Faculty.”

REVIEWER: It would help the reader if authors highlight in bold the significant correlations and associations in the tables.

RESPONSE:

We highlight in bold the significant correlations and associations in the tables.