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## MEASURING AGREEABLENESS IN MEDICAL STUDENTS WITH AN INVENTORY OF PERSONALITY TRAITS

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### ABSTRACT

**Objectives:** In several medical schools, empathy levels decrease along the years, and there is no measure of agreeableness in medical schools. This study aimed to evaluate agreeableness as empathy marker in medical students, in a short version of a personal traits questionnaire, and to compare with other personal characteristics and other students at different times of medical graduation. **Methods:** We applied the self-report Big Five Inventory (BFI-10) to 200 medical students in one Brazilian medical school, set in 5 cohorts from 1st to 6th year. Analysis was upon the agreeableness scores as well psy-chometric characteristics of scales on the BFI-10, including their part-whole correlations with the BFI-44 scales, retest reliability, structural validity, and convergent validity with the IRI. **Results:** Although agreeableness shows some correlation to gender and self-related spirituality, BFI-10 scales retain low levels of reliability and convergent validity. No decreasing levels of agreeableness scores have happened along the years in medical school and no relation to medical specialty choice. Female (n=121) has higher agreeableness scores in relation to male students. Self-related higher level spirituality has relation to higher agreeableness scores ( $p < 0,05$ ). **Conclusions:** Agreeableness as a personality trait and a non-direct measure of empathy must be managed all through the medical course. Thus, it is a multifactorial trait, and self-reports questionnaires may not be sufficient to assess such interpersonal feature. Considering the fact that BFI-10 is a brief inventory with a short application time it can easily be used in transcultural studies, as well in research settings with truly limited time constraints.

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## INTRODUCTION

In a contextualized fashion in patient-doctor relationship, empathy is a trait that involves cognitive, emotional and affective domains (Hojat, 2004). Among minimal medical competences, empathy or empathetic understanding is one of the most important skills applied in an interpersonal relationship, used in regard to patients or multidisciplinary team. Usually professional empathy, or its lack, is the first feature that seems evident to the other person when he enters the health system, especially in primary health care. This capacity of understanding how someone feels like and let him know, through verbal or non-verbal language, has been investigated very much in several researches, due its benefits.

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Empathy may improve patient comprehension about counselling given by the physician, appointment comebacks, treatment adherence, satisfaction about the professional care and reduces psychological distress (Shapiro, 2009 and Stepien, 2006). More empathetic physicians may enjoy better their practice and can make more accurate diagnosis because they let patients express better their demands (du Pre, 2001 and Romm, 2007), thus less complaints concerning bad practice (Glaser, 2007). Several studies including a systematic review identify empathy as an important component that may come down to better clinical outcomes (Derksen, 2013). Sometimes empathy is considered a cognitive mechanism that can be moulded and taught through training in medical schools (Pedersen, 2009). But empathy is just one basic aspect of agreeableness (Miller, 2012), a part of a personality trait (Hemmerdinger, 2007). Beyond empathy, agreeableness

involves aspects altruism, affection, modesty, trust and so on<sup>11</sup>. The concept of agreeableness implies a prosocial and communal orientation toward others that is important when one have performance in interpersonal relationship and work groups. Thus, there is an association between empathy as a cognitive tool during medical practice and agreeableness as a personality dimension (Magalhães, 2012), using the Big Five Personality Traits, besides Openness to Experience, Neuroticism, Conscientiousness and Extraversion.

**Big Five Factors Model:** Since ancient times, human personality is a matter of study in Psychology and in Medicine. From Galeno and the “five humours” to Kant’s philosophy (Miller, 2012). This Big Five Factors (or traits) Model has been studied since the years 1960’s and several studies has established psychometric tools that assess that factor model (Goldberg, 1993 and McCrae, 2003). Since then, the great variety of personality characteristics may be grouped under five higher order personality factors: *extraversion*, *conscientiousness*, *agreeableness*, *neuroticism* (also known as *emotional stability*) and *openness to experience* (Goldberg, 1993). In regard to the complexity of the patient-physician relationship that involves ethical, moral, emotional, human but also technical aspects, it is very important assess which is the level of agreeableness as a performance predictor. Through this measure, agreeableness and empathy may be trained and stimulated in the medical school in moments when one uses more techniques and less communication skills. This way, agreeableness became an object of aim in this study.

**METHODS**

**Setting and participants:** The study has taken place in one large medical school in South Brazil between September 2013 and July 2014. The sample was drawn from a population of 472 students from first to sixth year. The medicine course on its actual fashion mixed in years 1 and 2 basic courses with pre-clinical training. Years 3 and 4 they have most of clinical courses before going to final clinical training on years 5 and 6 in five main areas: Internal Medicine, Paediatrics, Gynaecology, Primary Health Care and Surgery. They also have an optional training according to their chosen medical specialty in agreement with the medical school. The students of the sample filled the questionnaires during their normal classes, far from evaluations and final exams. The study sample includes students from the end of the 1<sup>st</sup> to the end of the 6<sup>th</sup> year, except 5<sup>th</sup> because they are at the same final clinical training as 6<sup>th</sup> year students. All participants assigned consent terms. Ethics Committee granted this study.

**Design and instruments:** Design chosen was cross-sectional with mixed methods, quantitative and qualitative approaches. Mixed methods may give more complete information about the sample, mainly when it fits featured of medical education and psychology. The total sample was analysed in five cohorts, according to the year in medical school. Instruments used to proceed the study includes: (a) The Big Five Inventory short version (BFI-10), an 11-item inventory of the Big Five dimensions with acceptable psychometric properties<sup>15</sup>; (b) The Big Five Inventory full version (BFI-44), a 44-questions inventory, including the 11 sentences of the BFI-10<sup>15</sup>; (c) The Interpersonal Reaction Index (IRI), a 21-item index that analyses empathy in different three sub dimensions<sup>16</sup>; and (d) A survey with socio demographic questions. BFI-10 was applied twice. In the first place, total sample completed BFI-

10, and a second subsample completed BFI-10 thirty days later, in order to proceed its time reliability. Besides, subsamples completed the full version of BFI, the BFI-44, and the Interpersonal Reaction Index (IRI) in order to test convergent validity of the BFI-10, as well the survey about general features of the students.

**Variables:** The main variable evaluated in this study was agreeableness domain in BFI-10, in correlation to variables and to instruments. It was proceeded internal reliability, as well time stability (test-retest), and two convergent validities (BFI-44 and IRI). Agreeableness global score of BFI-10 were analysed according to year in medical school, gender, intended medical specialty and a five-rank self-reported spirituality level.

**Statistical analysis:** Descriptive statistics and analyses of variance were undertaken to assess whether any variances in mean global agreeableness scores between groups and variables, and classified into ranks. Statistically significance were considered at level of 0,05. Additional post hoc tests were undertaken in order to assess further differences. Quantitative data were analysed using IBM SPSS Statistics for Windows, Version 19.0 (IBM Corp., Armonk, NY, USA). Medical specialty were categorized and classified into three groups: people-oriented specialties, technology-oriented specialty and unknown (Chen, 2007).

**RESULTS**

From the population of 472 students at the time when study was designed, a total of 200 students was the sample obtained for the study. These students represent 42,37 % of the total students in the second semester of 2013. Overall response rate was of 99% (1% of missing data from 3<sup>rd</sup> year). The sample was allocated into five classes of students (Table 1). Female students represent 60,5% of the sample (n=121), as male 39,5% (n=79). Mean age was 22 ± 3, 06 years old, from minimum age of 18 and maximum age of 38.

**Table 1. Sample of the Medical School Classes**

Year	n	% sample
1 <sup>st</sup>	25	12,5%
2 <sup>nd</sup>	64	32,0%
3 <sup>rd</sup>	63	31,5%
4 <sup>th</sup>	38	19,0%
6 <sup>th</sup>	10	5,0%
TOTAL	200	100,00%

Concerning medical specialty choice, people-oriented specialties have the preference among the students (n=87, 43,5%), followed by technologies-oriented specialties (n=82, 41%), and a little set of students have not decided yet which specialty they will choose (n=31, 15,5%). Self-reported spirituality level was assessed through a Likert scale from 1=“No spiritualized” to 5=“Well spiritualized”. Most students declare themselves as 4=“Something spiritualized”. That variable will be analysed together with BFI-10 agreeableness scores.

**BFI-10 validity:** Regardless missing data (1%), BFI-10 validity sample was of 198 students. BFI-10 showed internal reliability r=0,256 (Cronbach’s alpha), Spearman-Brown Coefficient 0,28 (linear regression) and Guttman Split-Half Coefficient 0,274. Time reliability was r=0,3 (n=198, p<0,01);

convergent validity in relation to its full version, BFI-44, was  $r=0,65$  ( $n=135$ ,  $p<0,01$ ), as correlation to IRI was  $r=0,378$  ( $n=135$ ,  $p<0,01$ ). Analysis of variance (one-way ANOVA) between each instrument was not statistically significant (test-retest  $p=0,603$ ; BFI-10 and BFI-44  $p=0,125$ ; BFI-10 and IRI  $p=0,443$ ). Isolated BFI-44 Cronbach's alpha was  $r=0,78$ .

### Agreeableness scores and students features

Agreeableness was the main dimension of BFI-10 analysed. For its assessment ( $n=200$ ) was measured its mean global score ( $11,53 \pm 2,05$ ), variance (2,05) and  $r$  (0,305) through adjustment  $r$ -to- $Z$  test (Kolmogorov-Smirnov). Correlation between agreeableness and age was under 0,04. We will analyse agreeableness scores and gender, chosen medical specialty, self-reported spirituality and year of medical school. According to gender,  $t$  test for independent sample was undertaken for not knowing which exactly agreeableness in regard to gender. In this case, female students showed higher agreeableness levels and thus significance statistically ( $p<0,05$ ) in BFI-10 as well in BFI-44 (Table 2).

**Table 2. Agreeableness scores according to gender**

	Gender	n	Mean (SD)	p*
Agreeableness Score BFI-10	Female	121	11,85 ( $\pm 1,30$ )	<0,01
	Male	79	11,04 ( $\pm 1,50$ )	<0,01
Agreeableness Score BFI-44	Female	86	35,02 ( $\pm 4,43$ )	0,019
	Male	50	33,02 ( $\pm 5,23$ )	0,025

\*T test

In regard to medical specialty, no differences were perceived among the three groups of specialties when they have BFI-10 agreeableness scores analysed through Kruskal-Wallis test and HSD Tukey as post hoc among categories ( $p=0,95$ ). The same occurred when agreeableness scores were assessed through BFI-44 -  $p=0,696$  through ANOVA and  $p=0,77$  through HSD Tukey. In order to assess if spirituality keeps any relation to agreeableness, we applied Kruskal-Wallis test for independent samples and impaired groups. When we worked impaired groups 1="No spiritualized" and 2="Too little spiritualized" Likert scales as less spiritualized versus 4="Something spiritualized" and 5="Very spiritualized", we find a difference between less spiritualized groups and more spiritualized groups, showing more agreeableness in the last ones ( $n=169$ ,  $p=0,021$ ), as seen in Table 3.

**Table 3. BFI-10 agreeableness scores in relation to self-reported spirituality**

Spirituality	n (%)	Mean Rank*
Very spiritualized <sup>a</sup>	49 (25,5%)	101,01
Something spiritualized <sup>a</sup>	75 (37,5%)	82,95
Too little spiritualized <sup>b</sup>	22 (11%)	68,59
No spiritualized <sup>b</sup>	23 (11,5%)	73,28

\*Kruskal-Wallis,  $p=0,021$ . Different index letters mean statistically significance.

When the classes of the medical school were assessed, we found no decreasing on BFI-10 (Table 4) and BFI-44 agreeableness scores along the years, as well on IRI empathy scores. In order to find differences among the classes and concerning each questionnaire, HSD Tukey test was applied in subsets for BFI-10 ( $n=198$ ,  $p=0,556$ ), BFI-44 ( $n=136$ ,  $p=0,326$ ) and for IRI ( $n=187$ ,  $p=0,438$ ).

**Table 4. Agreeableness scores (IBGFP-5) in relation to medical school classes**

Year	n (%)	Mean Rank*
1 <sup>st</sup>	25 (12,5)	96,04
2 <sup>nd</sup>	64 (32)	99,70
3 <sup>rd</sup>	63 (31,5)	100,46
4 <sup>th</sup>	38 (19)	95,75
6 <sup>th</sup>	10 (5)	135,05

\*Kruskal-Wallis,  $p=0,378$

## DISCUSSION

This present study was drawn to analyse empathy along the years in medical school, but the last year contains only 10 students at the 6<sup>th</sup> year. This occurred due to sample has been enough for validity at the four years before, where students stay most of their time in touch with technical disciplines. Thus, this fact might decrease empathy scores as described in literature<sup>18</sup>. The 6<sup>th</sup> year has two distressing factors: the end of the graduation and entry into the medical practice on their own with implications and responsibilities, and the pressure concerning medical residency exams. The questionnaire BFI-10 used onto this study was validated in USA and Germany samples and exhibited possession of psychometric properties even in brevity (Rammstedt, 2007). In this research, it captured a mean consistence in relation to its full version (BFI-44) and a poor consistence in relation to IRI that assess only empathy. In regard to the measure of agreeableness in students along the classes, such distribution seems to be uniform and with a little improve in the 6<sup>th</sup> year. As it worked differently from several studies concerning empathy and agreeableness among medical students, further studies must take place, especially utilizing observation tools. Besides, empathy has a multifactorial behaviour that includes intrinsic psychological aspects that come down to unconscious and automatic mechanism<sup>19</sup>. It involves more moral choices and not always emotional choices, for agreeableness is the prelude to compassion and to helping another one. Female students have a direct relation to higher empathy as well to agreeableness in several studies, and this fact also occurred in this study. Spirituality has also a proportionally direct relationship to agreeableness, due to more spiritualized people has tended to show more social well-being and more availability to share and help others (Koenig, 2008).

As empathy did not show difference between classes, it may mean that empathy is not a so mouldable trait as literature assume. Thus, several factors can explain the hypothesis of no decreasing of empathy from publication bias to difficulties of measure empathy and agreeableness with self-reported instruments (Colliver, 2010). Observation and acknowledgement of agreeableness may be essential for future studies. We have as limitations on this study the very homogeneous sample, because all respondents came from the same institution. This can be assessed under factorial analysis and including more medical schools samples. It is also essential analyse BFI-10 in a larger and more heterogeneous sample. However, the aim of BFI-10 validation was evaluate agreeableness along the cohorts of classes and not to assess other personality traits, even it seems that there is a relation between agreeableness and extroversion due the facility of expressing and keep positive emotions (Mustaffa, 2012). Another limitation was the use of the concept of general agreeableness and not agreeableness specifically during practice. As a preliminary study, it can be useful assess relation between personality traits and tools that involves

empathetic elements in straight observation of appointments like Calgary-Cambridge guide to the medical interview (Silverman, 1996). The main role of the empathy training process is to associate a capable and evidence-based medical practice to the skill of listening patients' stories, perceiving and valuing their meanings and acting together with their beliefs (Charon, 2001). This may take medical practice and medical teaching to a higher level of agreeableness, reflections, trust and professionalism.

## Conclusion

Agreeableness has featured higher levels among female and more spiritualized students. No difference of agreeableness along the classes, in regard to the years of medical school. Given the importance of a more humanistic medical care, there is a need of further studies about factors that may influence agreeableness and empathy in medical students and even in medical professors.

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