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ARTIGO ORIGINAL

The assessment of personality traits and its association with learning communication skills

Avaliação dos traços de personalidade e sua associação com a aprendizagem de habilidades de comunicação

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Abstract:

Aims: The aim of this study was to investigate the association between personality traits and attitudes toward learning communication skills in undergraduate medical students. The relation between students' attitudes and personality trait could help us identify those who those who will need more support to develop communication skills, based on their personality traits.

Methods: The data was collected data from an intentional and cross-sectional sample composed of 204 students from three Brazilian universities. The students answered questionnaires containing the Communication Skills Attitude Scale (CSAS-BR) and the Big Five Mini-Markers (BFMM) for personality. Data were analyzed using frequency calculations, principal components analysis, and the multiple linear regression model.

Results: Seven among 26 items of the original Communication Skills Attitude Scale (CSAS) presented factor loads lower than |0.30| and must be excluded in the CSAS -BR that showed one domain including positive and negative attitudes. The value of Cronbach's alpha of the 19-item scale was 0.894. The BFMM showed similar dimensional results with five domains with Cronbach's alpha values of 0.804 for Extroversion, 0.753 for agreeableness, 0.755 for conscientiousness, 0.780 for neuroticism and 0.668 for openness. There were positive and statically significant linear associations with the CSAS-BR and agreeableness (β: 0.230, p<0.001), extraversion (β: 0.150, p=0.030), and openness to experience (β: 0.190, p=0.010). These personality factors drive social interactions and interpersonal relations, which involve the tendency to be friendly, flexible, and cooperative; to show a willing disposition; and the ability to actively engage with others.

Conclusions: Based on the methods applied in this study, the results demonstrated a relation between agreeableness, extraversion and openness to experience with attitudes on communication skills in students from three Brazilian universities. Our results suggest that the evaluation of personality traits can contribute to the recognition of students for whom the establishment of special teaching strategies can improve communication skills.

Keywords: Medical Education; Learning; Medical Students.

Resumo

Objetivos: Este estudo teve como objetivo determinar se se existe uma associação entre traços de personalidade e atitudes quanto à aprendizagem de habilidades de comunicação em estudantes de medicina. A relação entre as atitudes dos alunos e o traço de personalidade pode nos ajudar a identificar aqueles que necessitarão maior apoio para desenvolver habilidades de comunicação, a partir da identificação inicial do traço de personalidade.

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Métodos: Os dados foram coletados em uma amostra intencional em um corte transversal composta por 204 estudantes de três universidades brasileiras. Os alunos responderam a questionários contendo a *Communication Skills Attitude Scale (CSAS-BR)* e o *Big Five Mini-Markers* (*BFMM*) para personalidade. Os dados foram analisados usando cálculos de frequência, análise de componentes principais e o modelo de regressão linear múltipla.

Resultados: Sete dos 26 itens do *Communication Skills Attitude Scale* (escala original - CSAS) apresentaram cargas fatoriais inferiores a |0.30|e foram excluídos no CSAS-BR, que mostrou um domínio contendo atitudes positivas e negativas. O valor do alfa de Cronbach na escala de 19 itens foi 0,894. O *BFMM* mostrou resultados dimensionais semelhantes com cinco domínios com valores alfa de Cronbach de 0,804 para extroversão, 0,753 para amabilidade, 0,755 para conscienciosidade, 0,780 para neuroticismo e 0,668 para abertura. Houve associações lineares positivas e estatisticamente significativas do CSAS-BR com amabilidade (β: 0,230, p <0,001), extroversão (β: 0,150, p = 0,030) e abertura à experiência (β: 0,190, p = 0,010). Esses fatores de personalidade promovem interações sociais e relações interpessoais com tendência de serem amigáveis, flexíveis e cooperativas; bem como estarem disponíveis; e com capacidade de se envolver ativamente com as outras pessoas.

Conclusões: Este estudo, com a metodologia empregada, mostrou que traços amabilidade, extroversão e abertura à experiência estiveram associados com habilidades de comunicação em acadêmicos de três universidades brasileiras. Os resultados sugerem que a avaliação dos traços de personalidade possa contribuir para o reconhecimento de alunos para os quais o estabelecimento de estratégias especiais de ensino possa melhorar as habilidades de comunicação.

Palavras-chave: Educação médica; aprendizagem; estudantes de medicina.

Abreviaturas: BFMM, Big Five Mini-Markers; CSAS, Communication Skills Attitude Scale; CSAS-BR, Communication Skills Attitude Scale Brazilian Portuguese version.

Introduction

The physicians'communication skills have been related with better outcomes in healthcare [1–3]. Considering the importance of communication in the healthcare practice, medical associations and educational guideleines, have advocated for the students' learning of communication skills since the beginning of medical training [4–8]. Medical students learning of the communication skills are influenced by their attitudes [9–11], and studies have found that medical training may negatively affect students' attitudes toward communication [12, 13]. The understanding factors associated with students' learning attitudes would support and foster the development of teaching strategies lined up with students' needs.

Considering that students attitudes toward learning may be influenced by personal characteristics [12–14], students' personality traits may play an important role [15]. If personality traits are associated with attitudes toward learning, then the identification and analysis of these traits could support teachers to promote teaching activities tailored for personality dimensions, or even support the development of personal elements alongside with technical training. Despite the numerous studies on students' attitudes toward learning communication skills, the role of personality traits on students' attitudes toward learning communication skills has been poorly investigated.

Although there are many persronality theories, this study focus on the five-factor model, know as big five. The Five-Factor Model of personality developed by Costa & McCrae structured five dimensions of the traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness to new experiences [16–18]. Extraversion refers to the extent to which a person is communicative, active, and able to establish social interactions. Agreeableness refers to the ability that one has to create relationships that are high quality, harmonious, pleasant, and empathetic. Conscientiousness evaluates the extent to which a person is focused, able to exercise self-control, and willing to pursue his or her goals. Neuroticism refers to the way a person processes negative experiences and is able to achieve emotional stability. Openness to new experience evaluates a person's degree of curiosity and inclination to experience new situations, which often requires a more creative outlook [16–18].

The studies evaluating the impact of students' personality in attitudes toward communication in medical education are scarce. Conscientiousness, Agreeableness, Extraversion was positively correlated with the medical students' attitudes toward interactions with patients suggesting that personality traits have impact on students' attitudes on communication [19]. For other contexts, as in an elementary school, Hong, concluded that

extraversion and conscientiousness domains of personality were positively correlated with of students' attitudes toward the learning of science [20]. Thus, personality can have influence on the attitudes related to the relationship with patient as well as with learning attitudes. Probably, students' attitudes toward communication were driven by the alignment of the teaching and learning activities to the students' personality.

The studies on personality traits and communication skills are contradictory. A positive correlation between personality traits and communication skills, specifically, empathic listening and assertive communication was presented by Sims suggesting that Agreeableness and Openness can predict empathic listening and assertiveness in communication in adults [21]. However, no significant correlation between personality traits and communication skills was found considering psychology students before and after communication training [22]. Considering that these studies assessed different populations and applied different assessment methods of communication it is difficult to provide assumptions on the role of health care professionals' personality traits and the communication skills.

Based on the importance of communication skills for medical practice, and the lack of studies analyzing the relation between personality and students' attitudes toward learning communication, we raise the following question: Are personality traits related with undergraduate medical students' attitudes toward learning communication skills? If so, what are these traits? We believe that extraversion should have a positive correlation with attitudes on learning communication once this domain of personality must drive students to naturally starts a communication. Answering these research questions may expand the discussion of teaching clinical communication and increase support for the organization of individualized educational policies that consider students' personality traits.

Methods

Selection of Participants and Data Collection

The data were collected from an intentional sample composed of medical students from three Brazilian universities. It was a transversal study, and students were invited to participate in the study from a mandatory course on research methods in one university (University 1) and from an elective course on communication skills in medicine in other three universities (University 1, 2, and 3). The students who participated in the survey as part of the mandatory course were in the first to sixth year of their medical course, while those participating as part of the elective course were in their third or fourth year.

The students in an elective course on communication skills and professionalism answered three instruments questionnaire prior to the beginning of the learning activities. First, students answered a demographic questionnaire which consisted of questions such as age, gender, academic year, whether participated in previous course on (clinical) communication skills, and work history while in medical school. Second, students answered Communication Skills Attitude Scale **(**CSAS). Third, students answered the BFMM for personality.

Research Instruments: CSAS

The CSAS, a 26 item Likert-type questionnaire, is widely used and has been translated into and validated in several languages [23–26], including Portuguese for Portugal [34]. Despite its use since 2002, we did not find the application of this instrument in Brazilian sample of medical students. For the validation of the Portuguese version of the scale for the Brazilian, firstly, two independent translators translated items originally written in English into Portuguese. This Brazilian Portuguese version was then compared with the Portuguese from Portugal version. Discrepancies in translation were resolved through consensus between the translators and five medical students to obtain a final version of the CSAS-BR.

Research Instruments: Big Five Mini-Markers

The BFMM is a personality questionnaire based on the big five that can provide a reliable measurement of personality traits [27, 28]. The BFMM used in this study were based on the original Big Five Personality Markers Scale [29] that was translated and validated for the Brazilian population including 25 items with five factors (five items per factor). Equivalent psychometric properties were found in the BFMM when compared with the original scale [30].

Statistical Methods

The academic year was divided into three groups. Academic group 1 included first and second-year undergraduate medical students, academic group 2 included third and fourth-year students, and academic group 3 included fifth and sixth-year students.

Categorical and numerical variables were described using counts (percentages) and means, respectively. The CSAS and BFMM were analyzed using principal components analysis. The dimensionality was defined by a scree-plot, which was used to evaluate the number of components to retain in each scale. An item was considered to contribute to a principal component when it had a correlation value higher than |0.30| with that component.

The internal consistency of the data was evaluated using Cronbach's alpha. The component scores of all scales (CSAS-BR and BFMM) were standardized (z-scores) with a mean of 0, a standard deviation of 1, and a typical range of -3 to 3. The linear associations between the CSAS and the personality traits or student determinants (as age, gender, academic group) were assessed using beta coefficients and 95% confidence intervals from the multiple linear regression model. The data were analyzed using the Statistical Package for the Social Sciences (SPSS Version 22). The Ethics Committee for Health at the Pontifical Catholic University of Paraná approved this research protocol and assigned it numbers CAAE 39138714.3.0000.0020 and 45776715.7.0000.0020. Signed informed consent was obtained from all the participants who participated voluntarily.

Results

From the 536 students who were invited to participate in this study, 188 (35.1%) answered the survey: 114 (60.6%) from university 1, 48 (25.6%) from university 2, and 26 (13.8%) from university 3. Forty-two percent of the participants were in academic group 1, 52.1% were in academic group 2, and 5.9% were in academic group 3. The mean age of the participants was 22.75 years, ranging from 17 to 37 years (SD: 2.82). Most of the participants were women (139, 73.9%).

Reliability and Validity of Instruments - CSAS

Considering the "elbow rule", the scree plot suggested that the CSAS-BR had one component (**Figure 1**). The proportion variance explained by this component was 27% and the second component added only 7%. There were seven items with factor loads below |0.30| that must be excluded (**Table 1**). The final format of the scale consisted of 19 items, 12 items describing positive attitudes toward learning communication skills showed and 7 items describing negative attitudes, both of them, in this single component. The value of Cronbach's alpha of the 19-item scale was 0.894.

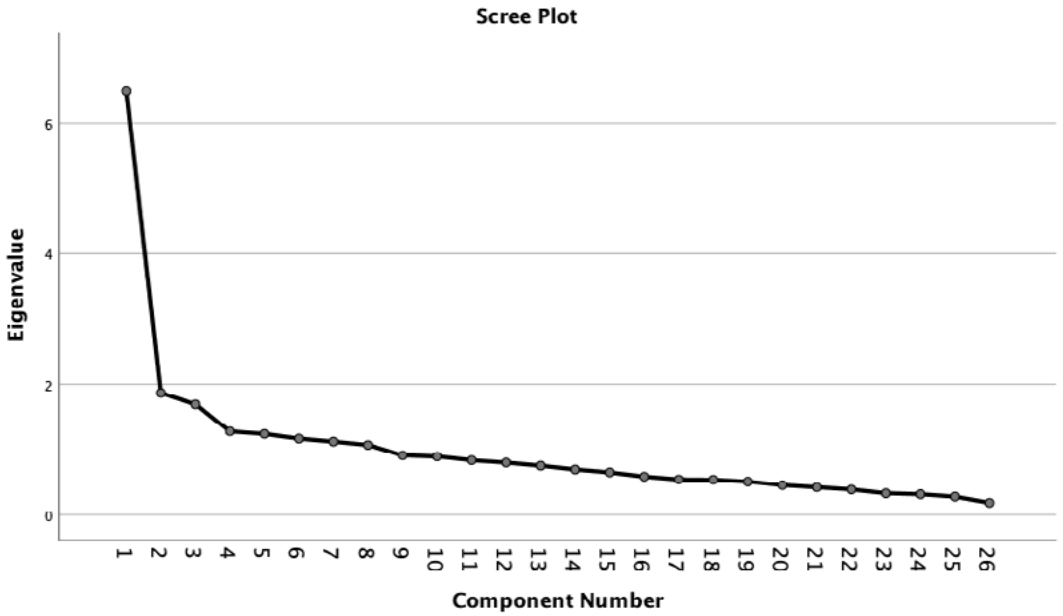

Figure 1 – The scree plot and CSAS-BR components according principal component analysis. Component Number is referred as the quantity of component necessary to explain the total variance of the scale. CSAS-BR, Communication Skills Attitude Scale Brazilian Portuguese version

TABLE 1 – Descriptive statistics for items, factor loadings for principal components analysis and Cronbach's alpha for the CSAS-BR.

Item	Description of CSAS Item	Mean/SD	Factor 1	Alpha reliability, deleting each item in turn
1	In order to be a good doctor, I must have good communication skills.	4.58±0.62	0.32*	0.90
2	I can't see the point in learning communication skills.	1.22±0.48	-0.48*	0.89
3	Nobody is going to fail to obtain medical degree due to having poor communication skills	3.37±1.11	-0.12	
4	Developing my communication skills is just as important as developing my knowledge of medicine.	4.01±0.97	0.71*	0.88
5	Learning communication skills has helped or will help me respect patients.	4.39±0.78	0.57*	0.89
6	I don't have the time to learn communication skills.	2.14±1.06	-0.47*	0.89
7	Learning communication skills is interesting.	4.15±0.79	0.67*	0.89
8	I can't be bothered to attend sessions on communication skills.	1.87±0.96	-0.54*	0.89
9	Learning communication skills has helped or will help facilitate my teamwork skills.	4.59±0.60	0.71*	0.89
10	Learning communication skills has improved or will improve my ability to communicate with patients.	4.66±0.54	0.72*	0.89

Item	Description of CSAS Item	Mean/SD	Factor 1	Alpha reliability, deleting each item in turn
11	Communication skills teaching states the obvious and then complicates it.	3.01±0.91	0.00	
12	Learning communication skills is fun.	3.05±0.85	0.53*	0.89
13	Learning communication skills is too easy.	2.43±0.76	-0.02	
14	Learning communication skills has helped or will help me respect my colleagues.	3.89±0.89	0.61*	0.89
15	I find it difficult to trust the information about communication skills given to me by non-clinical lecturers.	2.35±1.17	-0.18	
16	Learning communication skills has helped or will help me recognize patients' rights regarding confidentiality and informed consent.	4.09±0.83	0.65*	0.89
17	Communication skills teaching would have a better image if it sounded more like a science subject.	2.80±1.10	-0.05	
18	When applying to medical school, I thought it was a really good idea to learn communication skills.	4.38±0.80	0.80*	0.88
19	I don't need good communication skills to be a doctor.	1.56±0.84	-0.48*	0.89
20	I find it hard to admit to having some problems with my communication skills.	2.36±1.12	-0.16	
21	I think it's really useful to learn communication skills as part of medical education.	4.31±0.81	0.79*	0.88
22	My ability to pass exams will get me through medical school rather than my ability to communicate.	2.69±1.29	-0.20	
23	Learning communication skills is applicable to learning medicine.	4.29±0.83	0.70*	0.89
24	I find it difficult to take communication skills learning seriously.	2.13±0.96	-0.49*	0.89
25	Learning communication skills is important because my ability to communicate is a lifelong skill.	4.37±0.74	0.67*	0.890
26	Communication skills learning should be left to psychology students. It is not for medical student.	1.36±0.68	-0.41*	0.900

CSAS-BR, Communication Skills Attitude Scale Brazilian Portuguese version; SD: Standard Deviation; *only items with factor loads higher than 0.3 were included in the CSAS-BR.

Reliability and Validity of Instruments - BFMM

The scree plot suggested five components (**Figure 2**), which corresponded to the five personality traits. Together, the five components explained 58% of the variance. The items defining a component were higher than |0.30|. The Cronbach's alpha values were 0.804 for extroversion, 0.753 for agreeableness, 0.755 for conscientiousness, 0.780 for neuroticism and 0.668 for openness. (**Table 2**)

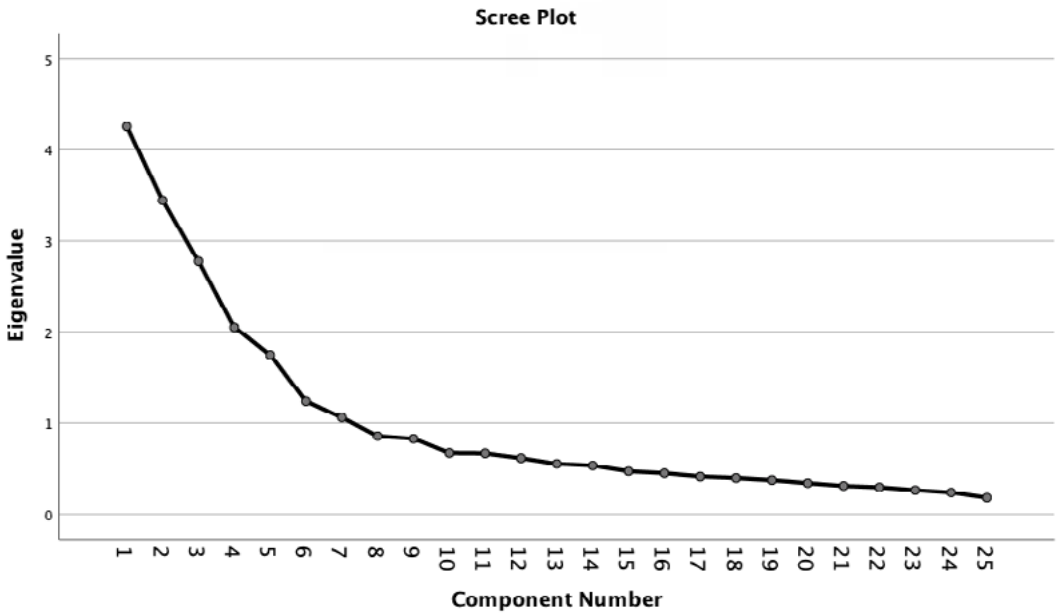

Figure 2 – The scree slot and BFMM components according principal component analysis. Component number is referred as the quantity of component necessary to explain the total variance of the scale. BFMM, Big Five Mini-Markers.

TABLE 2 – Descriptive statistics for items, factor loadings for principal components analysis and Cronbach's alpha for the BFMM.

Item	Mean/SD	Factor 1	2	3	4	5	Alpha reliability, deleting each item in turn
Extroversion							
Communicative	3.44±1.10	-0.73*	0.22	0.14	-0.01	0.29	0.76
Quiet	2.76±1.25	0.81*	-0.01	0.13	0.08	0.03	0.74
Shy	2.87±1.18	0.80*	0.05	0.09	0.26	-0.05	0.72
Cleared	2.66±1.05	-0.31*	0.10	-0.12	-0.01	0.48	0.84
Inhibited	2.55±1.07	0.72*	0.05	0.05	0.27	-0.05	0.75
Agreeableness							
Agreeable	3.64±0.90	-0.33	0.59*	0.22	0.09	0.09	0.69
Gentle	4.09±0.77	-0.22	0.75*	0.24	0.06	0.02	0.66
Friendly	3.76±0.89	-0.51	0.46*	0.04	0.10	0.30	0.72
Kind	4.12±0.76	-0.08	0.72*	0.05	0.06	0.04	0.70
Comprehensive	3.90±0.94	0.23	0.67*	-0.02	-0.16	0.17	0.77
Conscientiousness							
Enthusiastic	3.86±0.95	-0.09	0.16	0.79*	-0.07	0.01	0.69
Daring	4.09±0.91	-0.03	0.14	0.80*	0.00	0.05	0.69

Item	Mean/SD	Factor 1	2	3	4	5	Alpha reliability, deleting each item in turn
Accountable	4.19±0.88	0.08	0.15	0.78*	0.06	-0.13	0.66
Organised	3.27±1.22	0.19	0.06	0.58*	-0.08	0.02	0.76
Careful	3.84±0.93	0.26	0.58	0.32*	0.00	-0.01	0.75
Neuroticism							
Pessimistic	2.57±1.12	0.06	-0.08	-0.07	0.77*	-0.07	0.71
Depressed	2.17±1.22	0.22	-0.06	-0.07	0.77*	0.13	0.70
Insecure	3.30±1.16	0.16	0.23	-0.17	0.72*	-0.12	0.74
Anxious	3.88±1.22	0.00	0.09	0.16	0.72*	-0.11	0.75
Boring	2.25±1.09	0.13	-0.48	-0.03	0.57*	0.10	0.78
Openness							
Imaginative	3.07±1.15	-0.06	0.12	0.20	-0.15	0.63*	0.61
Artistic	2.37±1.28	0.11	0.17	-0.06	-0.05	0.69*	0.57
Philosophical	2.46±1.33	0.14	0.17	-0.37	0.13	0.59*	0.65
Adventuresome	3.23±1.25	-0.15	-0.02	-0.07	-0.04	0.60*	0.63
Audacious	2.98±1.07	-0.16	-0.23	0.18	0.05	0.68*	0.62

BFMM, Big Five Mini-Markers; SD, standard deviation; Factor 1, Extroversion; Factor 2, Agreeableness; Factor 3, Conscientiousness; Factor 4, Neuroticism; Factor 5, Openness. *: items clustered in the same factor.

The Association with Personality and Attitude toward Communication

Table 3 shows the linear regression analysis presenting beta coefficients between students' personality traits and other characteristics with the score on the CSAS-BR. The model 1 was not adjusted, and model 2 had adjustment for sample personality, gender, work history while in school, age, and academic group. Considering the adjusted model, among the five personality traits, three had a positive association with students' attitudes toward learning communication skills (CSAS-BR). Extraversion, agreeableness, and openness to experience had significant, positive linear associations with the CSAS-BR (**Figure 3**). The mandatory course where negatively associated with students' attitudes in comparison with students in elective course on communication. Age was found to have a negative effect on attitude, with younger students showing a more positive attitude toward learning clinical communication skills. To participate in elective course on communication skills were correlated with higher scores in the CSAS. There were no statistical differences between scores on the CSAS-BR considering gender and students' academic year.

TABLE 3 – Multilinear regression analysis on factors related with the CSAS-BR model.

	Model 1			Model 2		
	β	95% CI	p-value	β	95% CI	p-value
Personality						
Extraversion	0.110	0.03 to 0.25	0.120	0.150	0.02 to 0.29	0.030*
Agreeableness	0.240	0.10 to 0.37	0.001*	0.230	0.10 to 0.37	<0.001*
Conscientiousness	0.170	0.04 to 0.31	0.010*	0.130	0.00 to 0.27	0.060
Neuroticism	0.100	-0.03 to 0.23	0.140	0.110	-0.02 to 0.25	0.100
Openness	0.160	0.03 to 0.30	0.020*	0.190	0.05 to 0.33	0.010*
Gender						
Female	ref					
Male	-0.130	-0.45 to 0.19	0.420	-0.060	-0.38 to 0.26	0.700
Has completed prior communication course						
No	ref					
Yes	-0.220	-0.53 to 0.08	0.150	-0.110	-0.43 to 0.20	0.470
Works while in school						
No	ref					
Yes	0.170	-0.26 to 0.60	0.430	-0.120	-0.55 to 0.31	0.580
Age (years- SD)	-0.010	-0.06 to 0.04	0.580	-0.060	-0.11 to -0.01	0.020*
Academic group						
1	ref					
2	0.300	0.00 to 0.59	0.050	0.100	-0.24 to 0.44	0.560
3	0.380	-0.26 to 1.01	0.240	0.550	-0.11 to 1.20	0.100
Sample						
Elective Course	ref					
Mandatory Curricula	-0.452	-0.734 to 0.178	0.001	-0.556	-0.926 to 0.187	0.003*

CSAS-BR, Communication Skills Attitude Scale Brazilian Portuguese version Model 1: Null model for CSAS analysis; Model 2: Model 1 plus adjustment for sample, personality, gender, work history while in school, age, and academic group. *: variables with p-value < 0.05.

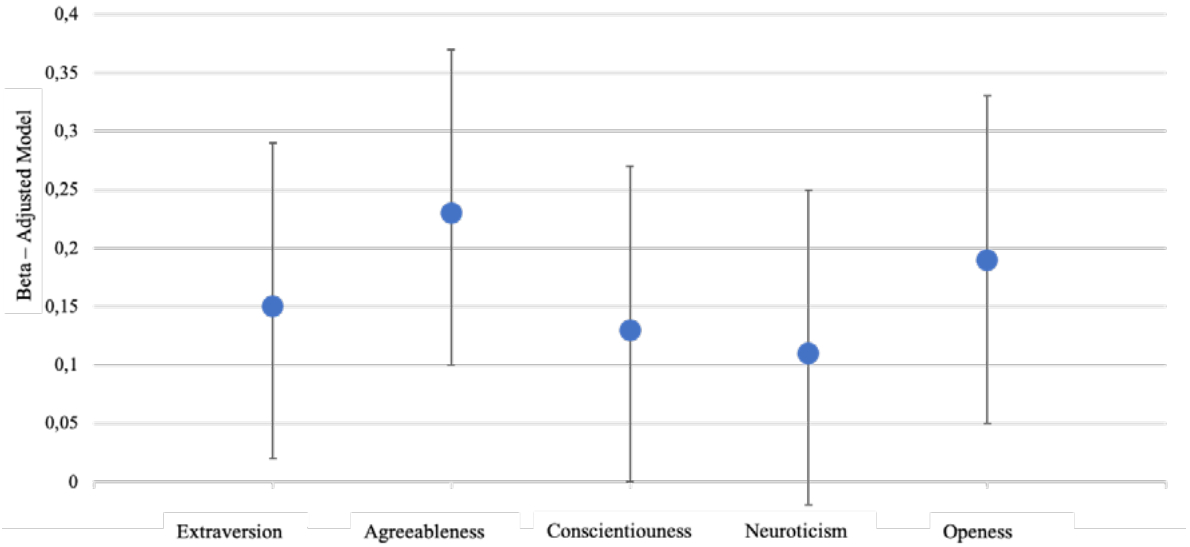

Figure 3 – Association between CSAS and BFMM using adjusted Beta. The model was adjusted for sample, personality, gender, work history while in school, age and academic group. BFMM, Big Five Mini-Markers; CSAS, Communication Skills Attitude Scale Brazilian Portuguese version

Discussion

This study sought to investigate the relation between personality traits and students' attitude toward learning communication skills. The validity and reliability of the BFMM was close to the original study. For CSAS-BR however we excluded 7 items because of the exploratory factor analysis. We found positive and statically significative association between three personality traits - agreeableness, openness to new experience, and extraversion - and students' attitude toward learning communication skills.

The CSAS-BR

The validation process in different countries had shown diverse results [10, 26]. For example, attitudes towards learning has been defined with 3 domains, Learning, Importance and Respect toward communication skills [10], with 2 domains, one related to learning process and other toward the learning attitudes [31], and the original study presented the two domains, one with Positive and other with Negative learning attitudes [26]. Anvik et al. and Rees et al. suggested respectively 3 and 2 factors, although, there were 27.2 and 31.5% and adding more factors (more one to more five factors) promotes just a little increases in the explained variance (from 3.8% to 6.8) for each one of factor added [10, 26]. Although there are theories proposing diverse factors, but the analyses seem to not reinforce these assumptions.

Most of the studies on the validation of the CSAS suggests that items must be excluded. For example, the item 20 was suggested to be excluded in 4 studies [10, 23, 26, 32], items 3 [23, 26], 13 [23,33], 15 [10, 33], and 22 [23, 34] in 2 studies and the items 11 [33] and 17 [10] in one study. All of the items that did not met the criteria for validity in our study were excluded in at least one other study. The exclusion of items varies but all of the previous studies suggests to excluded from one to seven items. Considering the results regarding the domains of the CSAS, and the excluded items it seems that the scale presents some inconsistency and reveal lack of validity to different cultures and contexts, since the internal structure changes according to the context.

In several studies, including those that pointed to more than one domain, the domain "learning attitudes" was always present. When present together with other domains, this domain was composed by positive and negative items [9, 10, 12, 31]. The inclusion of negative and positive items in the domain on learning by other researchers

[9, 10, 12, 31] and based on ours analysis, we assumed that our scale must have one factor and 19 items assessing exclusively learning attitudes on communication skills.

CSAS and Personality Traits

A better understanding of the association of students' personality traits on their attitudes towards communication training could help educationalists design teaching strategies that take personality traits into account in a wide-range of situations [35, 36]. Teachers would tailor courses to the students rather than using a one-size-fits-all approach [37]. For example, agreeableness, openness, and extraversion may positively influence communication competences of active-empathic listening [21]. Considering that there are some communication traits that correlate with the facility to communicate, we raise the following questions: Is the teaching for extroverted individuals and introverted individual to be the same? Should we use the same tools? For example, introverted students can experience more difficulties than extraverted students in performing a role-play or simulation. May the teacher use methods such as reflections and personal feedback for introverted students and may gradually have such students participate in simulated and real communication scenarios? Must teachers support students to work on personal characteristics necessary to a better communication? If do so, how?

The doctor-patient relationship is the core of medicine and strengthening doctor-patient relationships can improve therapeutic and health outcomes [38]. The agreeableness trait tendency to be friendly and cooperative [37] can support the connection between the physician and the patient once the building of functional and successful interpersonal relations flows more naturally [39]. The link between agreeableness with attitudes toward learning highlight the importance of the cordial and work together with the patient and health care team must be supported and stimulated by teachers. The uncertainty can be one of the most challenges in the clinical practice and the openness to experience could lower the anxiety of the clinical encounter that is unpredictable [40].

Students' openness are related with engagement and willingness[41] and the correlation of openness with learning communication should be not only based on the dealing new situations (as in the clinical encounter) but also to their personal receptiveness to the teaching. Student's openness to new experiences fosters the perception of diversity and is positively related to teachers' attitudes [42].

Teaching methods used in communication skills, like role-plays and simulation [43], may be influenced by the extraversion trait. The aptitude of the extroverted person to engage in social relations could facilitate students' participation in learning activities designed to teach communication skills and make teaching activities enjoyable. Moreover, extraversion drive social interactions [39] and its high level of activity, energy, and vigorousness may facilitate interpersonal communication [37].

The three personality trait could be related to students attitudes toward communication in diverse ways; agreeableness by the easiness start a relationship mostly by the tendency to be friendly [37]; the extraversion by the inner disposition and energy to social interaction [39]; and the openness by the better acceptance of adversity and disposition to change [41]. The idea of our research is not to associate personality traits with performance, as professional and practical performance involve more factors than simply students' and physicians' personality traits and personalities can change throughout the course of medical education and practice [44, 45]. However, if communication training for medical students uses teaching and assessment methods designed only for a certain group of students, other students may engage less in learning communication skills. Our study indicated that students' personality traits can be associated with their learning of communication skills; thus, teachers should consider students' different personalities, support the development of personal characteristics, design and adapt teaching strategies accordingly to improve learning.

Students' participation in an elective course on communication skills showed better attitudes toward learning. Electives courses are offered during medical training and research has demonstrated that improves students' competences and also stimulated self-directed learning [46]. However, communication courses should be developed to motivate the participation of students who needs most, often those who do not seek for one. Considering that in elective courses students can assume a more positive attitude toward learning, the design of these courses may include multiple teaching methods to engage students with different learning needs and personal abilities [46, 47].

The association between CSAS scores and personality traits such as agreeableness, extraversion, and openness should highlight the importance of relational personality factors on attitudes toward learning about communication skills. This research was a starting point to consider a wide range of strategies for teaching communication skills. Most communication skills training activities are based on role-play, simulation, and practice with real patients. In addition to determining if personality traits are related to academic achievement, we must consider activities used in teaching and measure their effect in terms of not only performance but also students' inner characteristics (such as learning styles, personality traits, and others).

The main limitations of this study were that the sample was intentional and there was a low number of participants from the last two years (internship). Moreover, the majority of students were women. To minimize these limitations associations were adjusted for personality, gender, age and academic group. This study is one of the first studies associating personality traits with learning attitudes toward communication and presented evidences of these associations as well promoted reflections on its impact in the teaching of communication skills. Thus, our research must be taken as an initial study, and its results must be understood in light of its limitations.

Notes

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The authors declare no competing interests relevant to the content of this study.

Authors' contributions.

All the authors declare to have made substantial contributions to the conception, or design, or acquisition, or analysis, or interpretation of data; and drafting the work or revising it critically for important intellectual content; and to approve the version to be published.

Availability of data and responsibility for the results

All the authors declare to have had full access to the available data and they assume full responsibility for the integrity of these results.

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