Empathy Alleviates the Learning Burnout of Medical College Students Through Enhancing Resilience

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Abstract

Objective The problem of learning burnout of medical students is becoming prominent, and empathy can play a good predictive role in learning burnout. The present study aimed to investigate the relationship between empathy and learning burnout, as well as the mediation effect of resilience in this relation.

Methods A random sample of 588 college students from a key medical university in Yunnan Province was investigated using the Basic Empathy Scale, Learning Burnout Scale, and Connor-Davidson Resilience Scale. All the measures showed good reliability and validity in the present study. Data were analyzed using SPSS 23.0 and Amos 22.0.

Results Using structural equation modeling, we tested a conceptual model indicated that: (1) medical students' empathy negatively and significantly predicted learning burnout; (2) medical students' empathy positively predicts mental resilience; (3) resilience of medical students negatively predicts learning burnout; (4) resilience partially mediated the relationship between empathy and learning burnout of medical students, while also controlling for family socioeconomic status.

Conclusion These findings highlight the mediating role of resilience in the effect of empathy on learning burnout of medical college students. It may contribute to a better understanding of the effect of empathy. Moreover, it can also provide constructive suggestions for protecting and improve empathy and resilience of medical college students.

1 Introduction

Learning burnout refers to the negative physical and psychological performance of students due to over-study[1]. Learning burnout not only affects students' academic performance, but also adversely affects students' physical and mental health and future development, directly leading to a serious decline in academic quality, and thus some students have negative life events such as suspension or dropout[2]. Compared with other types of universities, medical school students have a long professional academic system, complex learning content, and high learning pressure, so their learning psychological state should be paid more attention to. A number of studies have shown that medical students show a higher level of learning burnout, and the burnout level improves as the grade increases[3–6]. The learning burnout of medical students is not only detrimental to their physical and mental development, but will also cause some students to fail to meet the standards of becoming a qualified doctor, which will affect the quality of the future medical team.

Related studies have shown that empathy can play a good predictive role in learning burnout[1, 7–9]. Empathy refers to the individual's ability to understand and share the emotional experience of others, and to respond appropriately to it. It is generally considered to contain two components: cognitive empathy and emotional empathy[10–13]. Studies have found that there is a negative correlation between empathy and learning burnout in medical students[14, 15], but some studies have reached the opposite conclusion[1, 16], thus the specific mechanism of action of these two variables is not yet clear.

Cultivating empathy is not only important for medical students to maintain their personality, promote physical and mental health, and improve professionalism, but also help improve their sense of work accomplishment in the future medical practice[17] and build harmony doctor-patient relationship[18]. Therefore, it is necessary to deeply explore the mechanism of empathy and learning burnout, in order to stimulate medical students' enthusiasm for learning, improve their academic level, and alleviate learning burnout while cultivating the empathy ability and professional identity of medical students.

Resilience refers to the psychological process that an individual can still actively adapt when encountering a major threat or trauma[19]. It is regarded as a good personal quality that can perform well after experiencing setbacks, and it plays an important role in the process of coping with external pressure situations. A large number of studies have shown that empathy fatigue is common among medical staffs [20, 21]. Empathy fatigue can affect individuals' work stress and cause them careers burnout, and explain to a certain extent the willingness to leave[22–24]. Improving psychological resilience can effectively enhance the quality of individual life and mental health status[25], thereby alleviating the impact of empathy fatigue of medical staff on psychological problems[26]. Empathy and resilience can predict the professional decision-making self-efficacy of medical staff to a certain extent, and then affect their work engagement[27]. The improvement of medical staff's own empathy ability can not only improve their psychological resilience level[28], but also promote the generation of pro-social behavior, which is beneficial to the physical and mental health of patients[18, 29–31].

At present, medical students generally have high learning burnout, high psychological pressure, high loneliness, and decreased mental flexibility[32–34]. Resilience has a direct predictive effect on the individual's autonomous learning ability, and it is the main factor that affects the professional applicability and learning career adaptation of medical students. Improving psychological resilience can reduce the generation of learning burnout[35–37]. The framework of resilience in action points out that the innate potential of individuals is the source of resilience, and external protective factors from society schools, families, relatives and peers can help young people develop individual internal resources, including empathy, cooperation, problem solving and so on, which will protect young people from risk factors and promote their healthy development[38]. Therefore, the improvement of the empathy ability of medical students can help improve the psychological resilience, and a good psychological resilience level can avoid the appearance of learning burnout [7, 39]. In other words, psychological resilience plays a mediating role between empathy and learning burnout in medical students.

In summary, the present study aims to investigate the influence of empathy of medical students on learning burnout and the mediating role of resilience. In addition, according to the family investment model, families with higher family socioeconomic status (FSES) have significant advantages in terms of income, social capital, and human capital, which can be converted into student development resources, thereby affect the development level of students[40], improve empathy and mental flexibility, and then face learning tasks with a more positive attitude, alleviating learning burnout[41]. Therefore, this study takes family socioeconomic status as a control variable. Based on this, this study puts forward the following hypotheses: (1) Medical students' empathy negatively predicts learning burnout (H1), higher

empathy ability is beneficial to alleviate learning burnout; (2) Medical students' empathy positively predicts mental resilience (H2); (3) Resilience of medical students negatively predicts learning burnout (H3); (4) Resilience plays a mediating role between empathy and learning burnout of medical students (H4).

2 Materials And Methods

2.1 Participants

The sample comprised 588 (362 girls) medical college students. Participants ranged in age from 17 to 26 years ($M = 19.90$; $SD = 1.55$) and were distributed across the school years as follows: 1st year: $N = 150$; 2nd year: $N = 290$; 3rd year: $N = 90$; 4th year and above: $N = 58$. Participants who volunteered and gave informed consent before the survey were recruited at A key medical university of Yunnan Province in the Southwest of PRC.

To test the adequacy of the sample size, the present study used G*Power 3.1 Software for Post-hoc Statistical Efficacy Test (effect size = 0.15, $\alpha = 0.05$), the results showed power = 1, indicating sufficient sample size[42].

2.2 Instruments and Procedure

Students completed three self-report instruments measuring their empathy, resilience, and learning burnout, respectively. All instruments were in written format and were anonymously administered in the classroom in counterbalanced order. The testing session lasted approximately 15 min.

2.2.1 Basic Empathy Scale

The Basic Empathy Scale consists of 16 items and measures two aspects of empathy abilities: (1) cognitive empathy, (2) emotional empathy. The questionnaire uses a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). Responses across the 16 items were summed to obtain the total score, with higher scores indicating higher capacity for empathy[43]. Participants were administered the Chinese version of the instrument which has also been confirmed to have a two-factor structure[44]. In this study, the second-order CFA model generated a very good fit, with $\chi^2/df = 2.171$, $p < 0.001$, $RMSEA = 0.071$, $GFI = 0.910$, $AGFI = 0.860$, $IFI = 0.857$, $CFI = 0.850$, and $PGFI = 0.582$, and both the absolute and value-added adaptation indexes were in the acceptable range. The Cronbach's alpha coefficient for the Basic Empathy Scale was 0.827.

2.2.2 Connor-Davidson Resilience Scale

The Connor-Davidson Resilience Scale consists of 25 items and measures three aspects of resilience: (1) tenacity, (2) strength, (3) optimism. The questionnaire uses a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). Responses across the 25 items were summed to obtain the total score, with higher scores indicating higher capacity for resilience[45]. Studies have proved that it has

good reliability and validity in the context of Chinese culture[46]. In this study, the second-order CFA model generated a very good fit, with $\chi^2/df = 2.655$, $p < 0.001$, $RMSEA = 0.055$, $GFI = 0.934$, $AGFI = 0.909$, $IFI = 0.912$, $CFI = 0.911$, and $PGFI = 0.678$, and both the absolute and value-added adaptation indexes were in the acceptable range. The Cronbach's alpha coefficient for the Connor-Davidson Resilience Scale was 0.912.

2.2.3 Learning Burnout Scale

The Learning Burnout Scale (LBS) consists of 20 items including three dimensions: (1) dejection, (2) improper behavior strength, (3) reduced personal accomplishment. The questionnaire uses a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). Responses across the 20 items were summed to obtain the total score, with higher scores indicating higher degree of learning burnout[47]. In this study, the second-order CFA model generated a very good fit, with $\chi^2/df = 5.907$, $p < 0.001$, $CFI = 0.767$, $IFI = 0.772$, $NFI = 0.737$, $TLI = 0.665$, $RMSEA = 0.095$, and both the absolute and value-added adaptation indexes were in the acceptable range. The Cronbach's alpha coefficient for the Learning Burnout Scale was 0.835.

2.2.4 Family socio-economic status

The family socio-economic status index is composed of family income, parents' education level and occupation. Among them, family income refers to family monthly income. Combined with the actual situation of local economy, the family monthly income is divided into five levels: "less than 2000 yuan", "2000-6000 yuan", "6000-10000 yuan", "10000-14000 yuan" and "more than 14000 yuan", The education level of parents includes "primary school and below", "junior high school", "senior high school or technical secondary school", "College", "undergraduate" and "graduate". The evaluation method of parents' occupation is based on the five economic and social levels divided by Gu Honglei[48]. The measurement standard of FSES is that the scores of family income, parents' education level and parents' occupation are transformed into standard scores and summed[48, 49].

2.3 Data Analysis and Conceptual Model

To identify patterns of association between the participants' empathy, resilience, and learning burnout, we chose structural equation modeling (SEM) as our method of analysis. SEM methods are a well-established approach to multivariate data analysis that provide robust estimations of the associations among complex variables[50, 51]. In the present study, the proposed conceptual model (see **Figure 1**) featured three latent endogenous variables: empathy, resilience, and learning burnout.

In the specific data processing process, there are some missing values in the study due to subjects' filling in and answering, data entry and other reasons. The study uses the Little test with completely random missing values to investigate the randomness of missing values. The results show that $\chi^2(6342) = 14127.266$, $p < 0.001$, indicating that the missing value is not completely random. Therefore, we use Mean Adjusted Maximum Likelihood Estimator (MLM) to deal with missing values. In addition, this study uses χ^2/df , $RMSEA$, TLI , CFI and $SRMR$ are used to evaluate the fitting of the model χ^2/df less than 5, CFI

and *TLI* greater than 0.90, *RMSEA* and *SRMR* less than 0.08 were used as the criteria for evaluating the good fitting data of the model[52].

Each variable was operationalized via at least two different empirical indicators as the minimum condition for model identification[53]. The total and direct effects of empathy on resilience and learning burnout were estimated within a single structural model, with FSES as an external controlling variable. Mahalanobis' distances ($p < 0.001$) were computed for all variables, with a view to identifying and, if appropriate, removing multivariate outliers. No extreme multivariate values were found. Descriptive statistics and zero-order correlations were calculated. Next, the data were assessed for normality by computing kurtosis and skewness scores. Given that none of the variables under study had indicators falling outside the recommended thresholds of +1 and -1 (see **Table 1**), the maximum likelihood method was used to estimate the parameters for the structural models[54]. With respect to goodness of fit, two classes of indexes (i.e., statistical indicators reflecting the degree of fit between the hypothesized conceptual model and the empirical data) were adopted: absolute fit and relative fit measures. The former included χ^2 and normed- χ^2 (NC), where a non-statistically-significant χ^2 value and NC values of under 2.0 indicate good fit(Hair et al., 2014). The latter comprised the root mean square error of approximation (*RMSEA*), normed fit index (*NFI*), non-normed fit index (*NNFI*), and comparative fit index (*CFI*). Thresholds for good model fit were: *RMSEA* < 0.08, *NFI* > 0.90, *NNFI* > 0.90, *CFI* > 0.90 [55, 56]. To estimate the statistical significance of effects, confidence limits were calculated using both Monte Carlo simulation[57]and bootstrapping methods with a set of random samples ($k = 2000$).

3 Results

3.1 Multicollinearity assessment and Common method deviation test

The tolerance range of all predictors was 0.951–0.974 (≤ 0.1 means multicollinearity), and the variance expansion factor was 1.027–1.052 (≥ 10 means multicollinearity), indicating that there was no multicollinearity problem between predictors.

The common method deviation was controlled by anonymous, different measurement forms and scoring methods, and two methods were used to test the common method deviation. (1) Carry out common variance analysis on the four questionnaires through factor analysis. The chi-square statistic of Bartlett's sphericity test was significant. After principal component analysis, 18 eigenvalues greater than 1 were extracted. The first factor explaining the variance is 18.622%, which was lower than the 40% required by the critical standard[58], indicating that the questionnaire used in this study did not have a significant common method deviation problem. (2) A four-factor model consisting of four latent variables and their indicators was tested, and the results showed that the four-factor model fits well ($\chi^2 = 110.270$, $df = 20$, *CFI* = 0.940, *NFI* = 0.928, *RMSEA* = 0.088). Then, the single-method latent factor method[59, 60] was used to test the five-factor model after adding method factors, and the fitting index was good ($\chi^2 = 72.136$, $df =$

14, $CFI = 0.961$, $NFI = 0.953$, $RMSEA = 0.084$). The comparison between the four-factor model and the five-factor model shows that $\Delta\chi^2$ was significant ($\Delta df = 6$, $\Delta\chi^2 = 38.134$, $p < 0.001$), but $\Delta\chi^2$ would be systematically affected by the sample size, so the model comparison still needs to refer to other fitting indicators Change[61]. It could be seen that the degree of improvement before and after CFI , NFI and $RMSEA$ does not exceed 0.05, indicating that the model fitting was not significantly improved after adding the common law factor[62]. According to the results of the above two analysis methods, it could be determined that the homology variance problem did not have a serious impact on this study.

3.2 Descriptive statistics for the variables under study and the zero-order correlations among them

Table 1 shows the main descriptive statistics for the variables under study and the zero-order correlations among them.

The correlational analysis revealed that cognitive empathy positively correlated with resilience (with all factors). Regarding the association between empathy and learning burnout, cognitive empathy was positively correlated with all factors of learning burnout and emotional empathy was negatively correlated with dejection ($r = -0.15$, $p < 0.01$). Finally, in addition to the optimism dimension and dejection dimension, the measures of resilience were negatively associated with all dimensions of learning burnout, with mean correlations ranging between -0.46 and -0.07 . The variable FSES was correlated (with varying patterns and magnitude of effect sizes) with all the key research variables except emotional empathy.

3.3 The SEM analysis results

The SEM analysis (see **Figure 2**) suggested that the proposed structural model provided an excellent fit for the data: $\chi^2 / df = 4.58$, $p < 0.001$, $RMSEA = 0.08$, $NFI = 0.95$, $NNFI = 0.91$; $CFI = 0.96$, $SRMR = 0.037$. Reading the figure from left to right, we see that empathy exerted a direct, negative, medium-sized standardized effect on learning burnout ($\beta = -0.61$, $p = 0.003$, 95% C.I. $[-0.78 - -0.52]$). This outcome provides support for H1, implying that more empathy medical students were more likely to experience lower levels of learning burnout. Concerning the association between empathy and resilience, the standardized direct effect ($\beta = 0.67$, $p = 0.005$, 95% C.I. $[0.47 - 0.88]$) was positive and medium in size. This outcome bore out H2, suggesting that stronger empathy was associated with more powerful resilience.

Finally (H3), a large, statistically significant, negative direct standardized effect ($\beta = -0.52$, $p = 0.001$, 95% C.I. $[-0.72 - -0.37]$) was found between resilience and learning burnout, confirming the role of resilience in mitigating burnout. Empathy had a significant direct effect on learning burnout, which still existed when the intermediary variable was added ($\beta = -0.26$, $p = 0.001$, 95% C.I. $[-0.47 - -0.09]$). Analysis of the indirect effect of empathy on burnout via resilience ($\beta = -0.35$, $p = 0.005$, 95% C.I. $[-0.58 - -0.22]$) suggests the crucial importance of having strong resilience for medical college students, which proves H4. Besides, FSES was directly and negatively associated with resilience ($\beta = 0.03$, $p = 0.04$, 95% C.I. $[0.02 - 0.04]$), with higher FSES students reporting stronger resilience than lower FSES ones.

4 Discussions

In the current study, we investigated the effects of medical college students' empathy ability on their levels of learning burnout, while also considering the role of resilience. The main findings were as follows. First, medical college students' empathy ability and their levels of learning burnout were negatively correlated; second, medical college students' empathy ability was significantly positively associated with resilience, and resilience was significantly negatively associated with school burnout; third, empathy had an indirect effect on medical college students' learning burnout via resilience; fourth, students' FSES also exerted significant effects on resilience. We now discuss each of these findings in detail.

Cultivating empathy is beneficial to alleviating the learning burnout of medical students, which is consistent with previous research results[1]. This may be because medical students with higher empathy ability are better able to recognize and understand their own emotions and thoughts, and at the same time be good at understanding the experiences of others and maintaining their own unique views on things, and then use these feelings to adjust their emotions to cope with stress, thereby reducing learning burnout[16]. Moreover, some researchers pointed out that empathic reading can better realize deep learning in the process of subject teaching[63], which is conducive to the improvement of academic performance and further relieves learning burnout.

The improvement of empathy ability is also conducive to the construction of medical students' psychological resilience[28, 29]. The cultivation of clinical medical students' cognitive empathy and emotional empathy can encourage them to consider problems from the perspective of others, reduce the infection of others to their own negative emotions and empathy pressure, and improve psychological resilience. Resilience can relieve students' pressure on learning, enhance students' psychological resources and adaptability, and reduce learning burnout. In addition, there is a significant positive correlation between psychological resilience and learning input[64]. Studies have pointed out that psychological resilience has a significant negative predictive effect on academic frustration through core literacy, which is an important cause of academic burnout[2, 65]. When an individual perceives a setback, its protective mechanism is activated to produce avoidance behavior, and the improvement of psychological resilience can make the individual better cope with the setback.

The research results show that mental resilience as an internal psychological trait will be affected by the individual's empathy ability. Previous studies have also found that emotional intelligence (including empathy) can promote mental resilience [66, 67]. This result also supports the framework of resilience in action. Resilience can alleviate the impact of stress on anxiety and depression[68], enabling individuals to quickly and effectively "rebound" from painful experiences. Individuals with high mental resilience can show faster cardiovascular recovery from negative emotional arousal, have a higher level of positive emotions, a more optimistic attitude towards life, and greater openness[69]. When students are in a positive emotional state, they can be willing to learn, thereby avoiding learning burnout[70]. Medical students having learning burnout experience negative emotions such as depression, anxiety, indifference, exhaustion, confusion, etc. They can increase the repeated experience of positive emotions through the

cultivation of empathy and the improvement of resilience, and inhibit the autonomous response of negative emotions, thereby reducing learning burnout.

Finally, concerning the effects of FSES, resilience was found to increase over the FSES, while learning burnout declined. This is consistent with reports in the literature that students with high family SES can get more company and support, have stronger ability to cope with pressure and higher psychological resilience. Conversely, students who grow up under low family SES will experience more low self-esteem and helplessness due to the lack of parental companionship and inadequate material conditions, show more obvious resistance to stress, and lower psychological resilience[71, 72]

5 Implications

The survey results show that medical students' empathy can negatively predict learning burnout, and psychological resilience has an intermediary effect between medical students' empathy and learning burnout; Cultivating empathy and enhancing psychological flexibility are effective ways to relieve medical students' learning burnout and improve their mental health. Accordingly, the following countermeasures are proposed:

5.1 Strengthening professional ethics training for medical students

Medical students should have good ideological and political literacy, professional ethics and medical humanistic spirit, have a noble sense of being a doctor, and establish a patient-centered service concept. No matter when and where, medical students must put patients first and firmly establish the service tenet of accepting patients, respecting patients, and caring for patients. Professional ethics education for medical students can not only be carried out through classroom lectures and group discussions, but also through practice to deepen their understanding.

5.1.1 Deepening moral education through extracurricular practical activities.

Encourage medical students to enter hospitals, make more contact with patients, and provide voluntary services for them; enter communities and rural areas to help people in difficulties. Furthermore, teachers with physician qualifications should organize medical students to conduct free consultations in remote areas and conduct popular science publicity. Through these practical activities, medical students have more contact with patients, understand their thoughts, and gradually establish the concept that treating diseases and saving people is the sacred and glorious duty of doctors[73].

5.1.2 Deepening professional ethics education in the clinical practice stage.

Medical students can transform the theoretical knowledge they have learned into professional skills through internships. The clinical practice stage is also a critical period for medical students to contact the clinic, serve patients, and strengthen professional ethics. Clinical teaching teachers can conduct corresponding professional ethics education for the problems that arise during the internship process, guide medical students to correctly understand the unethical phenomena around them, strengthen the people-oriented and patient-centered concept, and enable medical students to gradually establish correct medical ethics.

5.2 Improving teaching methods

Gradually change the status quo of pure theoretical teaching, encourage clinicians to participate in the teaching of humanistic literacy, advocate philosophy, psychology and other humanities teachers to discuss humanistic issues in the medical field with clinicians, and establish medical humanities teachers' team who can participate in the entire process of medical education. In the basic course study, try to use a variety of teaching methods such as group discussion, role-playing, psychodrama, etc., so that medical students can slowly understand how to listen, how to think in different places, and so on, so as to better understand patients' own feelings and the emotional state of others, and finally achieve people-oriented, respect and accept others. In clinical practice, medical students can flexibly use the basic knowledge they have learned through the establishment of doctor-patient relationship, medical history collection, treatment plan negotiation, disease notification and other links[74] to know patients. Thinking and worrying about patients' worries, so that patients can experience the care and respect of doctors in the medical process, and try to avoid medical disputes caused by medical attitudes.

5.3 Improving the overall quality of clinical teachers

In the clinical practice stage, the teaching teachers are not only busy with medical work and scientific research, but also take into account the training of medical students' professional skills, and they will pay less attention to the humanistic practice ability of medical students. However, the success of education depends largely on teachers. Teachers play a very important role in the cultivation of empathy for medical students. Teachers must not only improve their communication skills and empathy with patients through various channels, but also guide all teaching activities, and have a subtle influence on students through their own behavior. Teachers can teach medical students how to empathize with patients and establish good communication relationships while dealing with patients' diseases, and allow medical students to communicate with patients more. In response to common problems encountered by students, students can repeat practice and practice through special topics. try.

5.4 Paying attention to the psychological resilience level of medical students

Take effective intervention measures to improve the level of psychological resilience. Studies have shown that the use of positive psychology-oriented group counseling can significantly improve the psychological resilience of medical students. Peng has effectively improved different levels of psychological resilience of military medical students through psychological resilience training[75]. In addition, educators can also

guide medical students to combine their personal characteristics with family and social support, and guide them to adopt active coping methods to deal with problems in study, interpersonal communication, employment and advancement, and help medical students adjust their psychological state in time and adapt environmental changes so as to increase the level of psychological resilience.

6 Limitations And Future Directions

This study is not without its limitations. First of all, due to space and time constraints, this research adopts a cross-sectional research design. Although previous research has provided the basis for this research, it is still difficult to determine the causal relationship between variables. Future research can adopt longitudinal or experimental research to validate the results of this study. Secondly, this study only examines the impact of medical students' internal psychological resources on their learning burnout, while other external social environmental factors also have an important impact on medical students' learning burnout. Future studies need to examine the mechanism how social environmental factors such as parental rearing styles and peers' support affect learning burnout of medical students. In addition, due to the large number of variables involved, the sample size of this study is not large enough, and only a medical school in Yunnan Province is taken as an example. The conclusions obtained need to be further verified. Future studies should expand the sample size to enhance the credibility and effectiveness of the results.

Declarations

Ethical approval and informed consent section

The article has been conducted within the guidelines of the Declaration of Helsinki. Participants were informed of the purpose and main content of this research and possible ways of using the data before completing the survey of this research questionnaire, and had signed an informed consent form agreeing to use the above data for paper publication. The approval was issued by the Sixth Affiliated Hospital of Kunming Medical University (Ethics approval number: 2021kmykdx6f65) from June 30th 2021.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

WW, YZ and ZT: research idea and study design. QQ, SL, and ZG: data collection. WW, LY, XM, YL: data analysis and paper writing. YC, and QL: supervision, project administration, and funding acquisition.

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All authors contributed to the article and approved the submitted version.

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Tables

TABLE 1 | Main descriptive statistics and zero-order correlations of variables under study

	Min	Max	M(SD)	Skeweness	1	2	3	4	5	6	7	8	9
(1) Cognitive empathy	2.25	5.00	3.76(0.57)	0.01	-								
(2) Emotional empathy	1.13	5.00	3.41(0.62)	-0.36	0.32**	-							
(3) Tenacity	0.92	4.00	2.46(0.50)	0.13	0.20**	-0.05	-						
(4) Strength	1.13	4.00	2.70(0.49)	-0.01	0.32**	0.02	0.76**	-					
(5) Optimism	1.25	4.00	2.46(0.58)	0.40	0.20**	-0.08	0.53**	0.61**	-				
(6) Dejection	1.00	4.63	2.69(0.63)	-0.08	-0.26**	-0.15**	-0.26**	-0.29**	-0.07	-			
(7) Improper behavior strength	1.33	4.83	2.89(0.57)	0.24	-0.10*	-0.06	-0.28**	-0.23**	-0.13**	0.55**	-		
(8) Reduced personal accomplishment	1.17	4.83	2.77(0.56)	0.16	-0.29**	0.02	-0.46**	-0.44**	-0.38**	0.22**	0.29**	-	
(9) FSES	-6.49	9.18	0.01(3.59)	0.75	0.17**	0.00	0.13**	0.18**	0.24**	-0.09*	-0.19**	-0.19**	-

Figures

Figure 1

Hypothesized conceptual model of association among empathy, resilience and learning burnout

Figure 2

Results of the Structural equation model (SEM). Standardized direct effects were reported.