

# Resilience as a Modulating Factor of Empathy in Medical Students

## Resiliencia como Factor Modulador de la Empatía en Estudiantes de Medicina

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## ABSTRACT

**Introduction:** Empathy is a complex and multidimensional attribute. Attempts have been made to explain empathic behavior based on other variables. Empirical evidence shows that empathy could be the product of the influence of several factors. One of these factors could be resilience. There is still no developed theory and consistent empirical evidence demonstrating that empathy depends on resilience. **Objective:** The aim of this study is to determine if resilience can predict empathic behavior. **Methodology:** This study is non-experimental and ex post facto with a cross-sectional design. Variables. Dependent: Empathy; Independent: Resilience. Population: Medical students belonging to the Faculty of Health Sciences of the Universidad Autónoma de Santa Ana (UNASA), Santa Ana, El Salvador (N=579). The sample (n=465) consisted of students (both sexes). Convenience sampling. Jefferson Scale of Empathy for Healthcare Professionals, student version (JSE-HPS). Trait Resilience Scale (EEA). A Structural Equation Modelling (SEM) model was used. Additionally, the Comparative Fit Index (CFI) (>0.95), Tucker-Lewis Index (TLI) (>0.95), Root Mean Square Error of Approximation (RMSEA) (<0.08), and Standardized Root Mean Square (SRMR) (<0.08), Confirmatory Factor Analysis (CFA) were employed. The significance level employed was  $\alpha < 0.05$ . **Results:** All these results show that both measurement models (empathy and resilience) are adequately represented and are suitable for the structural model. **Discussion:** Individual resilience is a variable that can predict empathic behavior in medical students belonging to a Faculty of Health Sciences. The results constitute indirect empirical evidence that it is possible to define empathy as a dependent variable and resilience as an independent variable.

**Keywords:** empathy; resilience; dimensions; association.

## RESUMEN

**Introducción:** La empatía es un atributo complejo y multidimensional. Se han realizado intentos para explicar el comportamiento empático basado en otras variables. La evidencia empírica muestra que la empatía podría ser el producto de la influencia de varios factores. Uno de estos factores podría ser la resiliencia. Aún no existe una teoría desarrollada y evidencia empírica consistente que demuestre que la empatía depende de la resiliencia. **Objetivo:** El objetivo de este estudio es determinar si la resiliencia puede predecir el comportamiento empático. **Metodología:** Este estudio es no experimental y ex post facto con un diseño transversal. Variables. Dependiente: Empatía; Independiente: Resiliencia. Población: Estudiantes de medicina pertenecientes a la Facultad de Ciencias de la Salud de la Universidad Autónoma de Santa Ana (UNASA), Santa Ana, El Salvador (N=579). La muestra (n=465) consistió en estudiantes (ambos sexos). Muestreo por conveniencia. Escala de Empatía de Jefferson para Profesionales de la Salud, versión estudiantil (JSE-HPS). Escala de Resiliencia de Rasgo (EEA). Se utilizó un modelo de Modelado de Ecuaciones Estructurales (SEM). Además, se emplearon el Índice de Ajuste Comparativo (CFI) (>0.95), Índice de Tucker-Lewis (TLI) (>0.95), Error Cuadrático Medio de Aproximación (RMSEA) (<0.08) y Error Cuadrático Medio Estandarizado (SRMR) (<0.08), Análisis Factorial Confirmatorio (CFA). El nivel de significancia empleado fue  $\alpha < 0.05$ . **Resultados:** Estos resultados muestran que ambos modelos de medición (empatía y resiliencia) están adecuadamente representados y son adecuados para el modelo estructural. **Discusión:** Los resultados constituyen evidencia empírica indirecta de que es posible definir la empatía como una variable dependiente y la resiliencia como una variable independiente.

**Palabras clave:** empatía; resiliencia; dimensiones; asociación.

## INTRODUCTION

The development of empathy is linked to prosocial behavior and has complex neural bases (1). Medical empathy is an attribute that allows for the construction of an intersubjective relationship between the treating physician and the patient (2). It is proven that such a relationship provides benefits for both physicians and patients in the care process and positively enhances treatment outcomes (3). The empathy of the medical professional can be measured using the Jefferson Empathy Scale (JSE) (4), that of the healthcare professional in general can be measured using the JSE-HP version, and for students with the JSE-HPS version. This scale is characterized by having two components (cognitive and emotional), and these components give rise to three dimensions: Compassionate care (emotional) (CC), Perspective Adoption (PA), and "Walking in the patient's shoes" (WIPS) (cognitive) (4-6).

Individual resilience is also a human attribute that can be measured. However, this concept has not been fully and completely defined. Its operationalization depends on the theoretical model adopted for study. The characterization of resilience, proposed by Maltby et al. (7), is based on traits and allows for the creation of a construct with three dimensions: Engineering Resilience, Ecological Resilience, and Adaptive Resilience, which would explain the resilient attitude towards different negative external factors that could act on a subject (6).

From an empirical point of view, it has been found that empathy and emotional intelligence are associated with positive adaptation and resilience (8). However, on one hand, there are also findings pointing to the mediating role of resilience in the effect of empathy on the learning burnout of medical university students; (9) and, on the other hand, modest positive associations of resilience with cognitive and affective empathy have been found (10). Even some studies show that empathy and resilience can increase in tandem in the presence of certain interventions. (11) It can be inferred that not enough research has been conducted on how these two factors interact: empathy and resilience, (8) in the presence or absence of mediating factors (5,8-10). The theoretical development of the explanation of empathic behavior still requires more empirical evidence, and the findings support the general hypothesis that empathy could be the product of several factors acting simultaneously or at different times and with different intensities on empathy in an individual or a population (6,11-13). The objective of this study is to determine if resilience can predict empathic behavior.

## METHODOLOGY

**Study Type and Design:** The study type was non-experimental and ex post facto cause-effect with a cross-sectional design (14).

**Variables. Dependent:** Empathy (E): Compassionate Care (CC) (8 items), Patient Perspective Adoption (PA). (10 items), Walking in the Patient's Shoes (WIPS) (2 items). **Independent Variable:** Resilience (R): Engineering Resilience (RI), Ecological Resilience (RE), and Adaptive Resilience (RA) with four items each.

**Population:** Medical students belonging to the Faculty of Health Sciences at the Universidad Autónoma de Santa Ana (UNASA), Santa Ana, El Salvador (N=579).

**Sample:** The sample consisted of students formally enrolled in the School of Medicine who voluntarily agreed to participate in this research. Therefore, the evaluated students were not randomly selected, and the studied sample can be considered the product of convenience sampling.

**Inclusion Criteria:** Undergraduate students from the Faculty of Health Sciences at the Universidad Autónoma de Santa Ana (El Salvador) formally enrolled as medical students.

**Exclusion Criteria:** Absence at the time of assessment, refusal to participate in the research, and absence of informed consent signature in case of consenting to respond to the instruments.

**Data Collection Strategy:** Data were collected by non-participating teachers (properly trained for their application) belonging to the Faculty of Health Sciences. Informed consent along with the instrument used to measure empathy were administered in paper format and during hours prior to or following the teachers' class delivery. Subsequently, the data were tabulated in an Excel spreadsheet by administrative staff of the Faculty of Health Sciences previously trained for this purpose.

**Instruments:** Jefferson Empathy Scale for Health Professionals, student version (JSE-HPS). This instrument measures levels of empathy with the patient in medical students and consists of 20 items. The questions are constructed on a Likert scale with responses numbered from 1 to 7, reflecting the degree of agreement with the question content. 1 signifies strongly disagree and 7 strongly agree. It comprises three dimensions or underlying variables: Compassionate Care (CC) (Items 1, 7, 8, 11, 12, 14, 18, and 19); Patient Perspective Adoption (PA) (Items 2, 4, 5, 9, 10, 13, 15, 16, 17, 20); and "Walking in the Patient's Shoes" (WIPS) (Items 3, 6). This instrument

has demonstrated internal consistency, cultural validity, and is one of the most widely used instruments to measure non-pathological levels of empathy in students with patients (4,5,14).

Trait Resilience Scale (EEA) (15). It assesses three facets of resilience: Engineering (4 items), ecological (4 items), and adaptive resilience (4 items). It has a 12-item Likert-type format, with five response levels per item, ranging from "Strongly disagree" (1) to "Strongly agree" (5). The EEA Trait Resilience has demonstrated adequate internal and test-retest reliability, a cross-culturally stable factor structure, convergent and construct validity in terms of associations with personality, and a positive contribution to clinical and non-clinical psychological health states (15,16).

**Data Analysis:** For data analysis, a Structural Equation Modeling (SEM) model was employed. The Multiple Linear Regression (MLR) estimator was used, and to evaluate the fit of the proposed model, the Comparative Fit Index (CFI) coefficient ( $>0.95$ ), Tucker-Lewis Index (TLI) ( $>0.95$ ), Root Mean Square Error of Approximation (RMSEA) ( $<0.08$ ), and Standardized Root Mean Square (SRMR) ( $<0.08$ ) were used (17,18). Regarding measurement models, a Confirmatory Factor Analysis (CFA) was conducted using the MLR estimator, and the same fit indicators as those in the SEM model were considered. The significance level used was  $\alpha < 0.05$ . IBM SPSS 27 was used for calculating descriptive statistics, and the Factor program (version 12.04.05) was used for CFA. McDonald's omega ( $\omega$ ) coefficient was used to determine data reliability (19).

**Ethical Implications:** This work was carried out under the considerations of the ethical principles stipulated by the World Medical Association (WMA) in the 2017 Declaration of Helsinki (20). The project supporting this research was approved by the Institutional Bioethics Committee of the Universidad Andrés Bello (Chile): Approval Act 020/2022.

## RESULTS

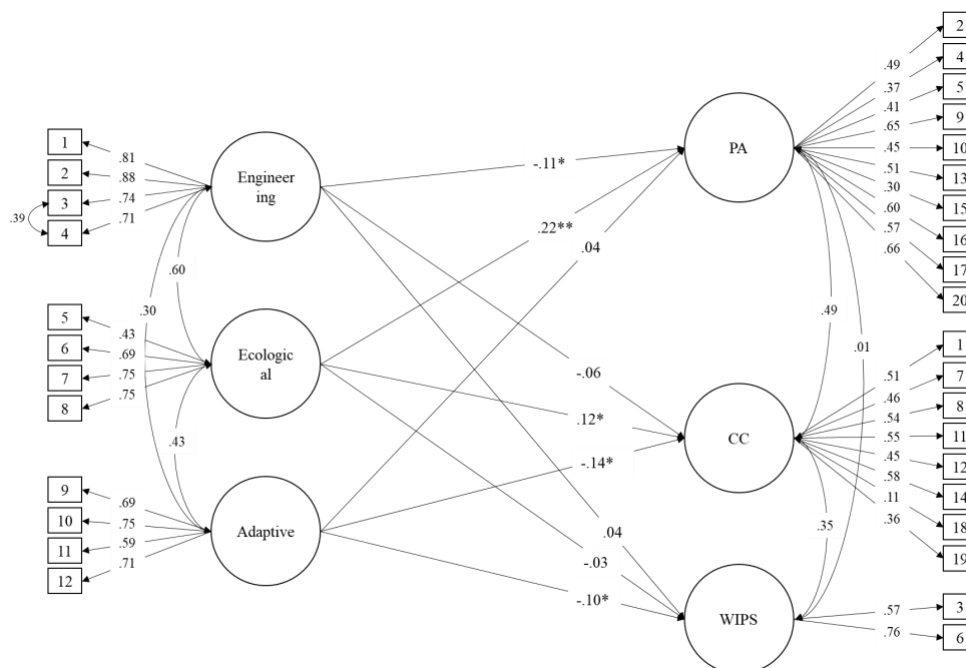
**Population:** It consisted of all formally enrolled medical students in the academic year 2023 (N=579). The percentage of men in this population was 33.1 (n=194) and women 66.9 (n=385). **Sample:** The student sample was collected between July and November 2023 and comprised 465 students (80.31% of the total population), of which 153 (n) were men (32.9%) and 312 women (n) (67.1%). The age, in men, was characterized by a mean (M) of 21.52; a standard deviation (SD) of 3.32 (95% CI=20.99;22.05). In women, the M was 21.14; SD 3.04 and (95% CI= 20.80;21.48).

**Measurement Models:** In the present study, it was found that the empathy scale exhibits adequate fit indices to the data ( $\chi^2 = 290.03$ ;  $df = 166$ ;  $p < .001$ ; RMSEA=.043 (90% CI .034 – .051); CFI=.90; TLI=.89; SRMR = .049), demonstrating that the instrument has validity based on internal structure. It also showed adequate levels of reliability in all its dimensions: Perspective Taking ( $\omega = .77$ ;  $\alpha = .75$ ), Compassionate Care ( $\omega = .67$ ;  $\alpha = .65$ ) and Walking in the patient's shoes ( $\omega = .61$ ;  $\alpha = .60$ ). On the other hand, the factorial structure of the scale has shown evidence of being strictly invariant by participants' gender, in the sequence of proposed invariance models: metric invariance ( $\Delta CFI = -.003$ ;  $\Delta RMSEA = -.001$ ), scalar ( $\Delta CFI = -.002$ ;  $\Delta RMSEA = -.001$ ), and strict ( $\Delta CFI = -.009$ ;  $\Delta RMSEA = .0005$ ).

Regarding the resilience scale, it was found that this instrument shows strong evidence in favour of validity based on internal structure ( $\chi^2 = 142.49$ ;  $df = 50$ ;  $p < .001$ ; RMSEA=.068 (90% CI .055 – .084); CFI=.95; TLI=.93; SRMR = .049). Additionally, it evidenced adequate levels of reliability in all its dimensions: Engineering ( $\omega = .84$ ;  $\alpha = .87$ ), Ecological ( $\omega = .76$ ;  $\alpha = .75$ ), and Adaptive ( $\omega = .78$ ;  $\alpha = .78$ ). On the other hand, the factorial structure of the scale has shown evidence of being strictly invariant by participants' gender, in the sequence of proposed invariance models: metric invariance ( $\Delta CFI = .002$ ;  $\Delta RMSEA = -.004$ ), scalar ( $\Delta CFI = -.014$ ;  $\Delta RMSEA = .007$ ), and strict ( $\Delta CFI = .001$ ;  $\Delta RMSEA = -.004$ ). All these results show that both measurement models (empathy and resilience) are adequately represented and are suitable for the structural model.

**Explanatory Model:** In the present study, it was evidenced that the structural model exhibits adequate fit indices ( $\chi^2 = 747.73$ ;  $df = 448$ ;  $p < .001$ ; RMSEA=.039 (90% CI .034 – .044); CFI=.91; TLI=.90; SRMR = .049). As depicted in Figure 1, the Engineering dimension significantly and negatively predicts Perspective Taking ( $-.11$ ;  $p < .05$ ). However, this resilience dimension did not manage to predict the other empathy components. Regarding the Ecological dimension, Figure 1 shows that it significantly and positively predicts Perspective Taking (.22;  $p < .01$ ) and Compassionate Care components (.12;  $p < .01$ ). However, it did not predict the component of Putting Oneself in the Other Person's Situation. Finally, it is observed in Figure 1 that the Adaptive dimension significantly and negatively predicts the components of Compassionate Care ( $-.14$ ;  $p < .05$ ) and Walking in the patient's shoes ( $-.10$ ;  $p < .05$ ). On the other hand, this resilience dimension did not predict the Perspective Adoption component (Figure 1).

FIGURE 1. EXPLANATORY MODEL OF EMPATHY PREDICTION FROM RESILIENCE IN MEDICAL STUDENTS (N=579).



## DISCUSSION

The confirmation that the theoretical model of the instruments used to assess empathy and resilience allows us to ensure that the estimated levels of the constructs are in line with theory is essential. This certainty is necessary because both attributes can be influenced by cultural factors (6) and family functioning, among other factors, which may alter the internal structure of the items in the dimensions of these constructs. Furthermore, the results explained above show that the structure of the data is suitable for analysis using the SEM method. Consequently, the procedure employed guarantees a solid methodological basis for extracting robust results from the studied population (6,12-14).

The complexity of the empathy concept is still subject to theoretical contradictions (21). In this regard, it has been suggested that empathy is a system, and there is a dynamic relationship between its dimensions; thus, a deficiency in one of these dimensions implies a weakening of the intersubjectivity process between the medical student and the patient (22,23). The same occurs with individual resilience (24). Consequently, studying how resilience can modulate empathetic behaviour is the study of one complex system modulating another equally complex one. This situation could explain the empirical variability found when studies of the characteristics presented in this article are conducted (5,6,8-13).

It is known that students in health sciences are exposed to external disturbances that hinder their academic

performance in all areas: basic, preclinical, and especially clinical. Some of these factors include stress, anxiety, depression, academic pressure, workload, financial problems, year of study, exams, grades, and patient care (24). In this sense, considering that measures of resilience may be related to different traits that allow for successful coping with the aforementioned factors (among others), and thus reduce the risk of experiencing empathic erosion (25), constitutes a plausible working hypothesis.

In the present study, it was found that the Engineering dimension of resilience can predict the Perspective Taking dimension negatively, but it is not related to the other dimensions of empathy. In this regard, it is possible to suggest that the greater the capacity for recovery in the presence of a negative external factor, the greater would be the capacity for intellectual or imaginative understanding of the other's condition while maintaining differentiation from the other and avoiding emotional contagion.

However, the recovery process may not be immediate, and the ability to adopt a patient's perspective may be temporarily lost or diminished; that is, the perceptual ability to represent the patient's actual situation in one's mind (27) or to limit the cognitive ability to represent the patient's thoughts or infer their emotional states until the initial state of equilibrium can be regained. Consequently, the negative correlation should not be interpreted unambiguously; that is, it does not simply decrease students' ability to face adversities affecting patient perspective adoption

(which is possible). Of course, this finding needs to be studied in greater depth and cannot be extrapolated to different populations of health science students in one country or in different countries because the observed results may only be a particular expression of the examined student population.

On the other hand, the ecological component of resilience managed to positively predict the dimensions of PA and CC. The main characteristic of the ecological component of resilience, in general, would allow the student to develop capacities to resist external disturbance and maintain balance in relation to their psychological state without being affected in the function and purpose of their activity by a decrease in empathy in patient care, regardless of the magnitude of external disorder to which they may be subjected. The traits associated with this component also allow for an understanding of the patient's pain and suffering by delving into their subjective thought, while avoiding empathetic erosion or contagion.

The adaptive component of resilience managed to negatively predict the CC and WIPS dimensions. In other words, a greater active presence of the traits associated with the adaptive component would reduce the student's capacity for compassionate attention and a diminished capacity to penetrate and understand the patient's internal mental state. These results show that traits associated with the ability to manage and accommodate change (disruptive alteration) and to adapt and resist disturbances persistently affect the student's empathy with the patient.

However, it is also possible to suggest that students, based on the traits of the adaptive component they have developed, may have the ability to "apply" emotional empathy and be conscious in modulating the appropriate use of this dimension, achieving a compassionate balance that limits the effect of the

patient's pain on the student in relation to empathic activity, ensuring proper patient care despite consciously limiting the compassionate threshold (28). In this case, adaptive resilience would contribute to finding a balance by temporarily modulating and decreasing its capacity to feel compassion. In the case of WIPS, traits of adaptive resilience could operate by reducing levels of understanding of the subjectivity of the patient's thoughts.

Certainly, the responses to these inferences should be studied in future research, as well as the consistent findings that some dimensions of resilience (Engineering) act negatively on the dimension PA, while another dimension (Ecological) acts positively on the same dimension of empathy (PA). Ecological resilience has a positive effect on CC, but adaptive resilience has a negative effect on them. This type of finding reflects the complexity of the relationship between resilience and empathy, and it is necessary to delve into the causes of the aforementioned. Although it is not the objective of this work, the findings suggest that the positive and negative correlations found, although statistically significant, have very low values. This means that resilience can only partially explain the empathic behaviour of the examined students, and that there are other factors not studied or studied insufficiently that contribute to modulating empathy (29,30).

## AUTHORS CONTRIBUTIONS

V D-N, F R-R, and A R-R have been involved in the conception and design of the study, as well as in the analysis and interpretation of data. AA-M, MA-S, and LG-M have been involved in the collection and obtaining of results. All the authors contributed to the writing of the manuscript, critical review, and approval of the final version.

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