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ORIGINAL ARTICLE

RESILIENCE AS A PREDICTOR OF EMPATHETIC BEHAVIOUR IN DENTISTRY STUDENTS

La resiliencia como predictor del comportamiento empático en estudiantes de odontología

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ABSTRACT

Introduction: Empathy is an important attribute in the relationship between the health professional and the patient and is responsible for establishing the intersubjective relationship between them. However, empathy could be modulated by exogenous factors where one of them could be resilience. Therefore, it can be hypothesized that resilience serves as a predictor of empathy.

Objective: The aim of the present study is to evaluate whether resilience can predict empathy.

Material and Methods: A non-experimental, cross-sectional study was conducted. The levels of two latent constructs were measured: individual resilience and student-patient empathy. Population: Dentistry students at the Universidad Autónoma de Santa Ana, El Salvador. The sample was chosen based on the voluntary participation of students in this research. The sample is convenience-based. Resilience was considered as the independent variable and empathy as the dependent variable. There is no established theory fully supporting the nature of these variables. A Structural Equation Modelling (SEM) was applied to determine the relationship between both variables.

Results: It was found that resilience is capable of predicting empathy. Specifically, the engineering dimension negatively and significantly predicts all dimensions of empathy. The adaptation dimension of resilience negatively and significantly predicts the CC (Compassionate Care) and WIPS (Walking in the Patient's Shoes) dimensions of empathy, and finally, the ecological dimension positively and significantly predicts all dimensions of empathy. The negative and significant predictions are explained based on the students' responses, which may reflect their concept of themselves in relation to resilience.

Conclusions: There is a relationship between resilience and empathy. The findings could constitute empirical elements that could contribute to verifying a working hypothesis consistent with describing resilience as a predictor variable of empathy.

Keywords: *Empathy; Resilience, psychological; Prediction; Correlation measures; Factor analysis, statistical; Cross-sectional studies*

Received: May 08, 2024. | **Accepted:** May 22, 2025. | **Published online**: October 01, 2025.

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doi:10.17126/joralres.2025.017

RESUMEN

Introducción: La empatía es un atributo importante en la relación entre el profesional de la salud y el paciente, y es responsable de establecer la relación intersubjetiva entre ambos. Sin embargo, la empatía podría verse modulada por factores exógenos, entre ellos la resiliencia. Por lo tanto, la hipótesis de trabajo es que la resiliencia tiene la capacidad de predecir la empatía.

Objetivo: El objetivo del presente estudio es evaluar si la resiliencia puede predecir la empatía.

Material y métodos: Se realizó un estudio transversal no experimental. Se midieron los niveles de dos constructos latentes: resiliencia individual y empatía estudiante-paciente. Población: Estudiantes de Odontología de la Universidad Autónoma de Santa Ana, El Salvador. La muestra se seleccionó con base en la participación voluntaria de los estudiantes en esta investigación. La muestra se basa en la conveniencia. La resiliencia se consideró la variable independiente y la empatía la variable dependiente. No existe una teoría establecida que respalde plenamente la naturaleza de estas variables. Se aplicó un Modelo de Ecuaciones Estructurales (MEE) para determinar la relación entre ambas variables.

Resultados: Se encontró que la resiliencia puede predecir la empatía. Específicamente, la dimensión de ingeniería predice negativa y significativamente todas las dimensiones de la empatía. La dimensión de adaptación de la resiliencia predice negativa y significativamente las dimensiones de empatía CC (*Compassionate Care*) y WIPS (*Walking in the Patient's Shoes*), y finalmente, la dimensión ecológica predice positiva y significativamente todas las dimensiones de la empatía. Las predicciones negativas y significativas se explican con base en las respuestas de los estudiantes, que pueden reflejar su autoconcepto en relación con la resiliencia.

Conclusiones: Existe una relación entre la resiliencia y la empatía. Los hallazgos podrían constituir elementos empíricos que podrían contribuir a verificar una hipótesis de trabajo consistente con la descripción de la resiliencia como una variable predictora de la empatía.

Palabras clave: *Empatía; Resiliencia psicológica; Predicción; Medidas de correlación; Análisis factorial; Estudios transversales*

INTRODUCTION

Empathy is a human attribute that forms the basis of pro-social behaviour.[1,2] In healthcare, empathy allows for an intersubjective connection between the professional and the patient (including the dental student).[3,4] This connection enables the professional to delve into the mind and understand the subjectivity of the other's thoughts ("Walking in the patient's shoes"), intellectual understanding of what the patient feels (Perspective Taking), and assuming a compassionate attitude and a feeling of assistance manifested in action (Compassionate Care).[5,7]

Each of these characteristics constitutes dimensions of empathy. Individual resilience can be summarised as the ability to examine how individuals address and react to negative exogenous elements and their capacity to recover.[6,8] The theoretical development9 and the operationalisation of the concept are not entirely clear.[10,11]

There are two approaches: State Resilience, which examines specific psychological processes and is distributed binomially to examine the capacity to buffer an external negative event,[12] and Individual Resilience (trait-based) which examines how individuals

address and react to negative events and analyses their recovery capacity.[13] Individual resilience is the result of the combination of systems theory and ecology, giving rise to three dimensions: Engineering Resilience (examining the subject's ability to regain equilibrium after a disturbance), Ecological Resilience (the capacity of a person to resist an exogenous disturbance while maintaining their functional stability), and Adaptive Resilience (the ability to manage change and adapt, allowing for resistance to disturbances).[13,14]

Both constructs are complex. Any study on this subject will face the following situations: empathy in Latin America has been characterised by great variability in distribution by sex, course, and specialisation,[5-7,15] and there is still no established theory and sufficient empirical evidence that can clearly specify which is the dependent or independent variable between Empathy and Resilience.[16-19]
As a result, current studies should focus on obtaining empirical evidence to clarify the sense of predicting one variable over another or if there are other variables that can predict empathy and resilience simultaneously, and also, as a consequence, elucidate the processes that exist and explain the empirical predictions found.

Dentistry students are characterised by being affected by various exogenous factors that negatively impact them and could affect empathetic behaviour.[20,21] This leads to the need to formulate a working hypothesis consistent with knowing whether resilience can predict empathy in this type of student and, if so, would also imply the need to include it in student training. Based on the expressed background, the objective of the present study is to evaluate whether resilience can predict empathy.

MATERIALS AND METHODS

Study type

Non-experimental and cross-sectional research[20] (STROBE). Population. Consisting of all dentistry students belonging to the School of Dentistry of the Faculty of Health Sciences of the Universidad Autónoma de Santa Ana, El Salvador. Sample. Consisting of all students who voluntarily responded to the instruments applied (from first to seventh year). It is not random and considered as a convenience sample. Data. Data was collected by applying instruments in paper format during June-September 2023.

Inclusion criteria

All students who attended the day of instrument application, who voluntarily responded, and who signed the informed consent.

Instruments

Jefferson Scale of Empathy for Healthcare Professionals (JSE-HPS).[23] This scale consists of 20 items that measure levels of empathy with patients in healthcare students of any specialty. The items are rated on a 7-point response scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The scale measures three dimensions: Compassionate Care (CC, items 1, 7, 8, 11, 12, 14, 18, 19), Perspective Taking (PA, items 2, 4, 5, 9, 10, 13, 15, 16, 17, 20), and "Walking in the Patient's Shoes" (WIPS, items 3 and 6). The scale has demonstrated adequate internal consistency (α=0.78-0.92) and appropriate correlations with other psychological variables.[26]

Individual Resilience. Trait Resilience Scale (TRS).[13] It assesses three facets of resilience: engineering, ecological, and adaptive resilience. It has a 12-item Likert-type format, with five response levels per item, from "Strongly disagree"[1] to "Strongly agree".[5] The Trait Resilience Scale 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.[13]

Both instruments were subjected to cultural validation through a translation and back-translation process and their results were submitted to Judges' Criterion in order to verify if the questions did not have translated terms that could distort the meaning of the question of the original instrument and, finally, It was applied to a group of 20 dentistry students chosen at random from all academic years to verify that these students could understand each and every one of the questions on both instruments.

Ethical aspects

This research adhered to the guidelines of the Helsinki Declaration of the World Medical Association (2013).[24] This research was approved by the Institutional Ethics Committee of Universidad Andrés Bello. Santiago. Chile. Code: 020/2022.

Procedure

The instruments were administered in groups during the students' regular class hours. Data were collected by faculty members of the Faculty of Health Sciences who did not participate in this research and who had received the necessary training to correctly admi-nister the instruments, address students' doubts, and ensure the proper reception of responses. All students signed an informed consent before completing the instruments.

Descriptive analysis

Empathy and resilience data and their dimensions in both constructs were subjected to estimates of average, standard deviation, kurtosis, and symmetry.

Data Analysis

Structural Equation Modelling (SEM) was used for data ana-lysis. Multiple Linear Regression (MLR) estimator was employed, and the fit of the proposed model was evaluated using the Comparative Fit Index (CFI) (>0.95), Tucker-Lewis Index (TLI) (>0.95), Root Average Squared Error of Approximation (RMSEA) (<0.08), and Standardized Root Average Square Residual (SRMR) (<0.08).[25,26]

Regarding the measurement models, Confirmatory Factor Analysis (CFA) was conducted using the MLR estimator, and the same fit indicators as those used in the SEM model were considered.

RESULTS

Population

It comprised 296 male and female dentistry.

students

Sample. Consisted of 226 students (76.35% of the population). In the sample, there were 62 males (27.43% of the sample) and

Figure 1.
Model for predicting resilience based on empathy in dental students.

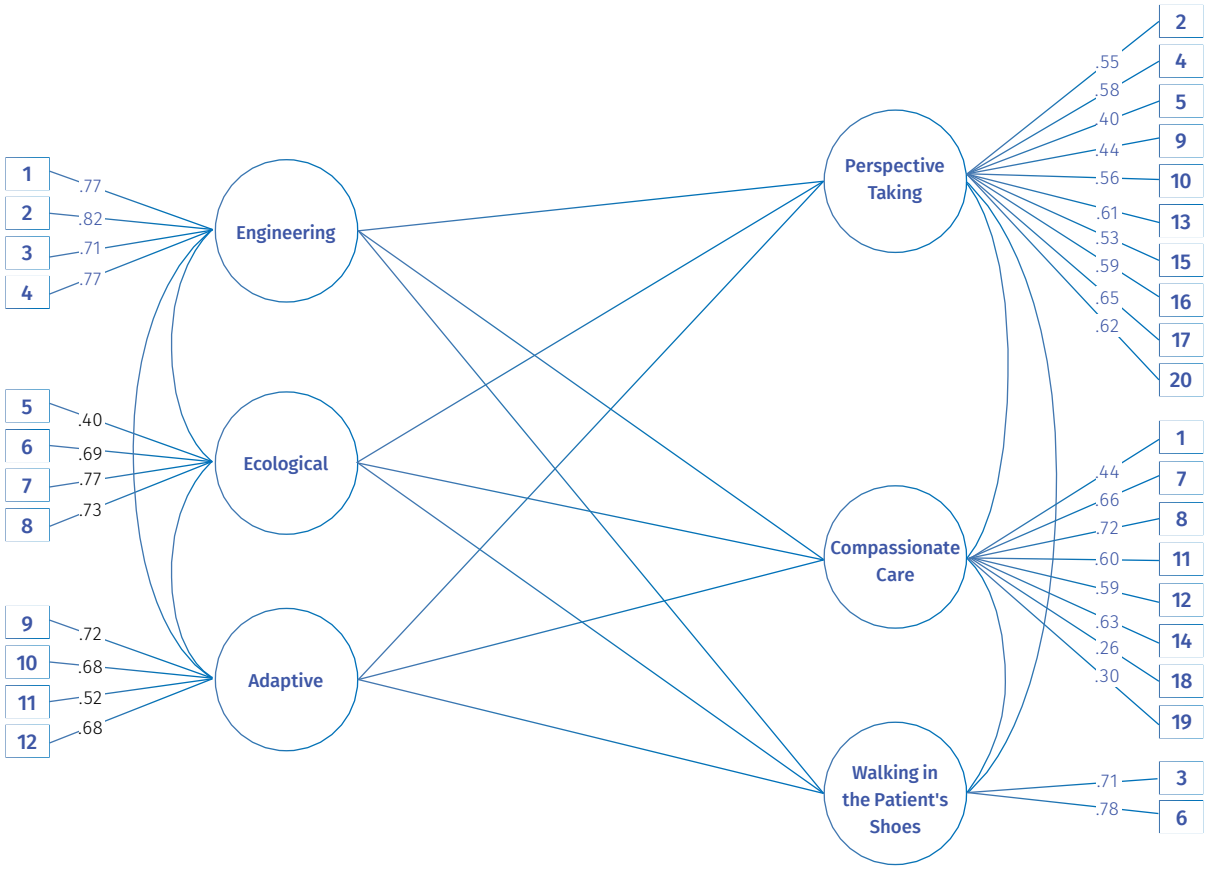

Table 1.
Results of estimation of average, standard deviation, skewness, and kurtosis of Empathy, Resilience, and dimensions of both instruments

Variables	n	Average	Standard deviation	Skewness	Standard Error	Kurtosis	Standard Error
Empathy	226	105.74	14.459	-0.308	0.162	0.446	0.322
Compassionate Care	226	38.14	9.308	-0.659	0.162	0.026	0.322
Perspective Taking	226	60.00	8.241	-1.588	0.162	4.902	0.322
Walking in the Patient's Shoes	226	7.60	3.130	0.151	0.162	-0.679	0.322
Resilience	226	42.31	7.046	-0.087	0.162	0.328	0.322
Engineering	226	12.58	3.747	-0.079	0.162	-0.581	0.322
Ecology	226	16.03	2.550	-0.416	0.162	0.194	0.322
Adaptation	226	13.70	3.341	-0.241	0.162	-0.019	0.322

164 females (72.57% of the sample). The age distribution among males was: Average (M) = 21.34 and Standard Deviation (SD) = 3.35. Among females, it was: M = 20.77 and SD = 2.73. The results of descriptive measures of empathy and individual resilience (and their respective dimensions) are presented in Table 1.

Measurement models. In the present study, it was found that the empathy scale shows acceptable fit indices to the data (χ^2 = 275.13; df = 165; *p*< .001; RMSEA=.056 [90% CI .044 – .067]; CFI=.89; TLI=.87; SRMR = .065). It also showed adequate levels of reliability in all its dimensions: Perspective Taking (ω=.80; α=.81), Compassionate Care (ω=.75; α=.77), and Standing in the Other Person's Shoes (ω = .71; α =.71).

On the other hand, the factorial structure of the scale has shown evidence of being strictly invariant according to the sex of the participants, in the sequence of invariance models proposed: metric invariance (ΔCFI=.007; ΔRMSEA=-.003), scalar (ΔCFI=-.002; ΔRMSEA=-.001), and strict (ΔCFI=.004; ΔRMSEA=-.002).

Regarding the resilience scale, it was found that this instrument shows strong evidence in favour of validity based on internal structure (χ^2 =113.46; d*f* = 50; *p*<.001; RMSEA=.075 [90% CI.058 –.092]; CFI=.93; TLI=.91; SRMR =.064).
Additionally, it showed adequate levels of reliability in all its dimensions: Engineering (ω=.82; α=.87), Ecological (ω=.75; α=.74), and Adaptive (ω=.75; α=.74). On the other hand, the factorial structure of the scale has shown evidence of being strictly invariant according to the sex of the participants, in the sequence of invariance models proposed: metric invariance (ΔCFI = -.007; ΔRMSEA = .000), scalar (ΔCFI= -.020; ΔRMSEA = .005), and strict (ΔCFI = -.003; ΔRMSEA = -.003). 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 shows acceptable fit indices to the data (χ^2=667.86; d*f* = 448; *p*<.001; RMSEA=.048 [90% CI .040 – .055]; CFI=.89; TLI=.88; SRMR = .063). Additionally, it can be observed in Figure 1 that the Engineering dimension significantly and negatively predicts Perspective Taking (-.26; *p*<.05), Compassionate Care (-.16; *p*<.05), and Standing in the Other Person's Shoes (-.31; *p*<.05).
Regarding the Ecological dimension, in Figure 1 it is observed that it significantly and positively predicts the components of Perspective Taking (.33; *p*<.05), Compassionate Care (.31; *p*<.05), and Standing in the Other Person's Shoes (.31; *p*<.05). Finally, it is observed in Figure 1 that the Adaptive dimension predicts significantly and negatively the components of Compassionate Care (-.40; *p*<.05) and Standing in the Other Person's Shoes (-.26; *p*<.05). However, this resilience dimension did not manage to predict the Perspective Taking component (.08; *p*>.05). (Figure 1).

DISCUSSION

The results of the psychometric evaluation of the two analysed instruments, as well as the estimated reliability, ensure that the inferences that can be drawn from the data of both instruments are methodologically grounded, and structural equations could be

applied to explore the possible prediction of empathy based on resilience.

If the engineering dimension of resilience reflects an individual's capacity to recover or return to normal after a difficult event, the results of the negative prediction on the three dimensions of empathy; that is, on empathy itself as a whole, show us that a decrease in engineering values will result in an increase in each and every dimension of empathy. This empirical observation contradicts the theory, which indicates that a positive relationship should be expected between engineering resilience traits and empathy dimensions.[27-29]

Similarly, the Adaptation dimension of resilience shows that decreasing values of this dimension result in an increase in the CC and WIPS dimensions of empathy.[30] However, with the Ecological dimension of resilience, it was observed that increasing levels of this dimension imply an increase in all dimensions of empathy, *i.e.*, empathy itself. This result coincides with what the theory might indicate.[31] Consequently, the observed negative empirical correlations are difficult to explain.

If we observe the empathy cutoff values for dentistry students in Latin America[32] and compare the empathy values from this study (Table 1) with these cutoff values, we can find that the empathy and its dimensions are at a medium to high level. On the other hand, the average values of the Resilience dimensions were: Engineering 12.58 and Adaptation 13.70 and can be classified as relatively low, while the Ecology dimension was 16.03; relatively high. The maximum value for each of these dimensions is 20 points.

There are no cutoff point studies on this instrument. If empathy values, in general, are relatively high, we should expect students to be resilient, and therefore, the negative correlations observed in the engineering and adaptation dimensions could be explained by severe self-assessment by the students.

A possible plausible cause that could explain these self-assessments might lie in the fact that they see themselves as having a relatively low ability to return to their previous state after a difficult experience and also see themselves as having a relatively low ability to adjust, be flexible, be able to modify a situation, and respond well to exogenous alterations (resilience of engineering and adaptation).

In light of these factors, difficulties are observed in the formation of identity (I am) and autonomy (I can) in dentistry students, which together condition a negative or limited self-perception of their own personal resources, *i.e.*, feelings of in-competence in the face of problems, lack of independence to solve them, and negative self-perception of being able to emerge strengthened from adversity.

Despite the above, students project all their energy, goals, and desires to achieve their objectives onto the patient, which benefits them in developing empathetic behaviours. However, when they make an internal evaluation of their coping ability in life, this could be affected because they have poor self-esteem, little emotional control, lack of stress management strategies, low frustration tolerance, and sometimes hopelessness about their ability to successfully complete their university studies. Such a situation could be considered "normal" in dentistry students due to the nature of their relationship with the patient, characterized by the incidence of many negative exogenous factors.[5,7,15,20,21]

On the contrary, positive correlations can be explained because they may appreciate, about

themselves, that they have confidence in their own strengths and that they are determined to successfully navigate key moments in their lives (ecological resilience).[13]

Although it is not the objective of this work, the explanation of the findings mentioned opens the door to carry out an intervention aimed at developing traits and applying them to face negative exogenous factors affecting dentistry students.

It is known that analyses with structural equations allow exploring hypothetical causal relationships but cannot demonstrate causalities.[33] The discovery of causal relationships between latent variables must be supported by theoretical foundations that can robustly suggest causality of one variable on another or of many variables on many others. Causality can only be demonstrated with controlled experimental studies.[34]
Consequently, the prediction found of resilience on empathy in this work will be valid to the extent that the theory explaining why a change in resilience can effectively be the cause or one of the causes of changes in empathy develops. Several authors have hypothesised that empathy could be the consequence of the permanent action of several other factors during the ontogenetic development process of a person.[35-37]

Limitations

The specific findings regarding the prediction of empathy for resilience found in this study cannot be generalized to all student populations. Each population may have a unique or specific way of predicting empathy for resilience.

CONCLUSIONS

There is a relationship between resilience and empathy. The findings could constitute empirical elements that could contribute to testing a working hypothesis consistently describing resilience as a predictor of empathy. Further research is required to positively answer the working hypothesis.

Recommendations

All health sciences students experience negative experiences during their education. Therefore, it is necessary to conduct these types of studies, obtain a diagnosis, and take the necessary measures to contribute to developing empathetic and resilient students.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest.

ETHICS APPROVAL

This study was approved by the Institutional Ethics Committee of Universidad Andrés Bello. Santiago. Chile. Code: 020/2022; and adhered to the guidelines of the Helsinki Declaration of the World Medical Association.

FUNDING

Self-funded

AUTHORS' CONTRIBUTIONS

Mildred Sandoval: Conceptualization; formal analysis; methodology; supervision; writing – review & editing.

Adán Acosta: Conceptualization; formal analysis; methodology; supervision; writing – review & editing.

Leida Monterroza: Conceptualization; formal analysis; methodology; supervision; writing – review & editing

Lindsey Vilca: Data analysis; writing – review & editing.

Alejandro Reyes-Reyes: Data analysis; writing – review & editing.

Víctor Díaz-Narváez: Conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; supervision; validation; visualization; writing – original draft; writing – review & editing.

ACKNOWLEDGEMENTS

None.

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PUBLISHER'S NOTE

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PEER REVIEW

This manuscript was evaluated by the editors of the journal and reviewed by at least two peers in a double-blind process.

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ISSN PRINT 0719-2460 - ISSN ONLINE 0719-2479
https://joralres.com/index.php/JOralRes

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