

General empathy and medical empathy in Mexican medical students: integration of an empathic profile

Empatía general y empatía médica en estudiantes mexicanos de medicina: integración de un perfil empático

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Abstract

Objective: To identify the association between general empathy and medical empathy. Detect predictors of the level of medical empathy from general empathy. To determine the psychosocial profile that describes the relationship between general empathy, medical empathy and demographic and academic characteristics in medical students. **Method:** Descriptive cross-sectional study. Medical students completed the Interpersonal Reactivity Index (IRI) and the Jefferson Medical Empathy Scale student version (EEMJ-E). **Results:** Relatively high levels of general and medical empathy were detected. The total score of the IRI and the EEMJ-E and their dimensions were positively correlated ($r = 0.14-0.52$), except for the personal distress dimension of the IRI. The score in the empathic concern dimension of the IRI was the best predictor of the EEMJ-E score and its dimensions ($\beta = 0.27-0.54$). Four profiles were detected: 1) men, preference for technology-oriented specialty, lower empathy; 2) students of the preclinical period, less empathy; 3) students of the clinical period, greater empathy; and 4) women, patient-oriented specialty preference, greater empathy. **Conclusions:** General empathy and medical empathy are associated. Differentiated empathic profiles will allow the design of empathy instruction strategies according to the specific needs of each one.

Keywords: Level of empathy. Medical students. Psychometric evaluation. Predictors.

Resumen

Objetivo: Identificar la asociación entre empatía general y empatía médica. Detectar predictores del nivel de empatía médica a partir de la empatía general. Determinar el perfil psicosocial que describa la relación entre empatía general, empatía médica y características demográficas y académicas en estudiantes de medicina. **Método:** Estudio transversal descriptivo. Estudiantes de medicina completaron el Índice de Reactividad Interpersonal (IRI) y la Escala de Empatía Médica de Jefferson versión estudiantil (EEMJ-E). **Resultados:** Se detectaron niveles relativamente altos de empatía general y médica. El puntaje total del IRI y la EEMJ-E y sus dimensiones se correlacionaron positivamente ($r = 0.14-0.52$), excepto para la dimensión malestar personal del IRI.

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*El puntaje en la dimensión preocupación empática del IRI fue el mejor predictor del puntaje de la EEMJ-E y sus dimensiones ($\beta = 0.27-0.54$). Se detectaron cuatro perfiles: 1) hombres, preferencia por especialidad orientada a la tecnología, menor empatía; 2) estudiantes del periodo preclínico, menor empatía; 3) estudiantes del periodo clínico, mayor empatía; y 4) mujeres, preferencia por especialidad orientada al paciente, mayor empatía. **Conclusiones:** La empatía general y la empatía médica se encuentran asociadas. Unos perfiles empáticos diferenciados permitirán el diseño de estrategias de instrucción en empatía acordes con las necesidades específicas de cada uno.*

Palabras clave: Nivel de empatía. Estudiantes de medicina. Evaluación psicométrica. Predictores.

Introduction

Empathy is a key element in health care. Its expression in the doctor-patient relationship is associated with greater adherence to treatment and greater patient satisfaction¹, a lower rate of medical complaints² and a lower level of burnout in physicians³, and better clinical outcomes⁴. Due to its benefits during professional practice, empathy has been considered a skill that should be evaluated and instructed during the professional training of the medical student^{5,6}.

Empathy is an ability to identify the emotional state of others (cognitive component) and issue an emotional response according to this (affective component)⁷, with an adjustment to the particular context in which it is expressed⁸. In the field of health care, medical empathy has been defined as the physician's predisposition to understand the patient's experience, also communicating this understanding⁹. Although this last definition highlights its cognitive component, there is evidence of the relevance of the affective component of empathy in the doctor-patient relationship^{2,10,11}.

In medical students, the assessment of empathy has typically been conducted through two instruments¹¹: the Interpersonal Reactivity Index (IRI)¹² and the Jefferson Medical Empathy Scale student version (EEMJ-E)⁹. The IRI evaluates general empathy and considers its two components: the cognitive is evaluated through the dimensions perspective taking (adopting the perspective or points of view of others) and fantasy (identifying with fictional characters), while the affective component is evaluated through the empathic concern dimensions (feelings of compassion, concern and affection in the face of the discomfort of others) and personal discomfort (feelings of anxiety and discomfort that the subject manifests when observing the negative experiences of others). The EEMJ-E assesses medical empathy through the dimensions of perspective taking (the physician's ability to perceive the world as the patient does), caring with

compassion (the physician's understanding of the patient's experiences and feelings), and putting oneself in the patient's shoes (the physician's ability to think as the patient does).

The use of both instruments has demonstrated the existence of an association between general empathy and medical empathy^{13,14}, greater empathy in women and students with preference to pursue a patient-oriented specialty (e.g., family medicine, internal medicine, pediatrics) compared to men and students with a preference to pursue a technology-oriented specialty (e.g., surgery, radiology, anesthesia)^{8,13}, in addition to changes in the level of empathy depending on the progress in the professional training of the students. This last aspect, despite being the one that has generated the most research, is controversial, because while some authors report decreases in this level¹⁵, others report increases¹⁶ and even the absence of changes¹⁷. In addition, when variations in the level of empathy are reported, these are accompanied by small effect sizes whose implication is a reduced practical utility of the phenomenon¹¹.

A limitation of these studies is that most of them analyze only differences in the level of possession of this variable, typically between sexes, according to the period of training or by the preference of specialty to be studied; or bivariate associations between the level of empathy and some sociodemographic or academic variable. This prevents obtaining more detailed information on the joint characteristics or sociodemographic and academic profile of medical students in possession of different levels of empathy. This information is necessary to design differentiated instructional strategies, according to the different empathic profiles in this population, which maximize the probability of causing tangible changes in this skill¹⁸. In this context, the objectives of the present study were to identify the association between general empathy and medical empathy, to detect predictors of the level of medical empathy from general empathy, and finally to determine profiles that describe the relationship

between general empathy, medical empathy and demographic and academic characteristics in medical students.

Method

Descriptive cross-sectional study through structured survey. Through a non-random sampling for convenience, between November 2019 and January 2020, medical students enrolled in the first to thirteenth semester of two private universities in Mexico City were recruited. The inclusion criteria were to be 18 years or older and to voluntarily agree to participate in the study. 296 students were invited to collaborate, of which 15 (5.06%) refused.

The participating students signed an informed consent letter and completed a battery that included an identification card and the EMMJ-E and IRI instruments, both validated with the Mexican population^{19,20}. The identification form collected sociodemographic variables (age, sex, marital status, religion), academic variables (medicine as the first choice of studies, enrolled shift, training period: preclinical or clinical) and intention to perform a patient-oriented or technology-oriented specialty. The EEMJ-E comprises 19 reagents on the Likert scale with seven response options ranging from 1 (strongly disagree) to 7 (strongly agree) organized in three dimensions: perspective taking (ten reagents), caring with compassion (seven reagents) and putting yourself in the patient's shoes (two reagents). It has an overall internal consistency $\alpha = 0.93$. The higher the score, the greater the medical empathy; This was considered low (≤ 102 points), medium (103-120 points) and high (≥ 121 points)¹⁹. The IRI comprises 28 reagents on a Likert scale with five response options ranging from 1 (does not describe me well) to 5 (describes me very well), organized in four dimensions: perspective taking (seven reagents), fantasy (seven reagents), empathic concern (eight reagents) and personal discomfort (six reagents). It has an overall internal consistency $\alpha = 0.81$. The higher the score, the greater the possession of the attribute measured by dimension; Possession that was also considered low (≤ 25 th percentile), medium (> 25 th percentile < 75 th percentile), and high (≥ 75 th percentile). The battery was completed in printed or digital form, according to the participant's preference.

For data analysis, the program was used SPSS v. 20 and $p \leq 0.05$ was considered significant. Descriptive statistics, mean and standard deviation for

metric variables, and frequencies with percentages for non-metric variables were obtained. The association between metric variables was analyzed using Pearson's correlation test, and between non-metric variables using the χ^2 independence test. For the latter, with a significant result, the standardized Pearson residuals were calculated as a *post hoc* test and Cramer's V as an indicator of strength of the association. The strength of the association was interpreted trivial with absolute values less than 0.10, low with 0.11-0.29, mean with 0.30-0.49 and high with ≥ 0.50 ²¹. Four multiple linear regression models were estimated by the successive step method. The response variable was the score obtained in the EEMJ-E, and its dimensions and predictor variables were the score obtained in each dimension of the IRI. The explanatory strength of the model was determined by the coefficient of determination (corrected R^2), its significance by the F-test, and collinearity was evaluated by statistical tolerance and the variance inflation factor. Finally, a multiple correspondence analysis (MCA) was performed with a two-dimensional spatial structure identified by the value of discrimination measures (MD). For this analysis, the set of non-metric variables that were associated with the level of medical empathy and with a low association strength was used.

This study belongs to a protocol approved by the Research Committee (ESM-CI-02/10-04-2018) and the Ethics Committee (ESM-CEI-01/30-08-2018) of the Higher School of Medicine of the National Polytechnic Institute, Mexico.

Results

281 medical students participated, but the data of 10 were deleted because they had partially answered the instruments. The 271 students retained were 178 (65.7%) women and 93 (34.3%) men, between 18 and 58 years old (mean = 21.90; standard deviation = 3.59), mostly single ($n = 255$; 94.1%) and professing some religion ($n = 185$; 68.3%). For 232 (85.6%), medicine was their first choice of studies, 73 (26.9%) were in the preclinical training period and 198 (73.1%) in the clinical period, 134 (49.4%) attended the morning shift, 71 (26.2%) the evening shift and 66 (24.4%) the mixed shift. The intention to perform a patient-oriented specialty was reported by 142 (52.4%) students, while performing a technology-oriented specialty was reported by 115 (42.4%); the rest indicated that they had not yet decided ($n = 14$; 5.2%).

Table 1 shows the descriptive statistics of the scores obtained in the IRI and the EEMJ-E and their respective dimensions. Table 2 shows the association between IRI and EEMJ-E and their respective dimensions. A correlation was detected between both instruments except for the personal distress dimension of the IRI. The strength of association ranged from low to high. Each linear model obtained was significant ($p < 0.001$) and the variance explained ranged between 12% and 36%, with no evidence of collinearity between the retained variables. Note in Table 3 that, based on the value obtained for β , the best predictor of the EEMJ-E score and its dimensions was the empathic concern dimension of the IRI.

Table 4 shows the association of the variables sex, training period, orientation of the preferred specialty and the dimensions evaluated by the IRI with the level of medical empathy. The strength of the association was low in all cases, except for the empathic concern dimension, which was high. According to the previous data, the MCA integrated the variables sex, training period, orientation of the preferred specialty and the dimensions evaluated by the IRI. Figure 1 shows the two-dimensional spatial structure obtained. Dimension 1 of the MCA explained 27.81% of the variance and was defined by the dimensions care with compassion of the EEMJ ($MD = 0.57$) and empathic concern of the IRI ($MD = 0.56$). Dimension 2 explained 17.11% of the variance and was defined by the training period ($MD = 0.38$) and the personal distress dimension of the IRI ($MD = 0.43$). The profiles identified were:

- Profile 1: men, preference for technology-oriented specialty, medium level of putting oneself in the patient's shoes (EEMJ-E), low level of perspective taking (IRI), low level of personal discomfort (IRI) and low level of fantasy (IRI).
- Profile 2: students of the clinical training period, medium level of perspective taking (EEMJ-E), high level of perspective taking (IRI) and high level of putting oneself in the patient's shoes (EEMJ-E).
- Profile 3: students of the preclinical training period, low level of empathic concern (IRI), low level of perspective taking (EEMJ-E), low level of empathic compassion (EEMJ-E), low level of putting oneself in the patient's shoes (EEMJ-E) and medium level of fantasy (IRI).
- Profile 4: women, patient-oriented specialty preference, medium level of personal distress (IRI), medium level of perspective taking (IRI), high level of perspective taking (EEMJ-E), high level

Table 1. Descriptive statistics of the scores obtained in the Jefferson Medical Empathy Scale student version (EEMJ-E) and the Interpersonal Reactivity Index (IRI), and their dimensions, by medical students

	Rank	Stocking	DE		Rank	Stocking	DE
IRI	28-140	97.68	13.96	EEMJ-E	19-133	106.35	15.66
TP	7-35	25.80	4.75	TP	10-70	60.89	8.04
FS	7-35	22.39	5.79	CC	7-49	37.70	9.60
PE	8-40	30.96	5.55	PZP	2-14	7.75	3.04
MP	6-30	18.52	4.36				

CC: care with compassion; SD: standard deviation; FS: fantasy; MP: personal discomfort; PE: empathic concern; PZP: putting yourself in the patient's shoes; TP: perspective taking.

Table 2. Association between the Jefferson Medical Empathy Scale student version (EEMJ-E) and the Interpersonal Reactivity Index (IRI), and their respective dimensions, in medical students

	EEMJ-E	TP	CC	PZP
IRI	0.42**	0.29**	0.36**	0.24**
TP	0.35**	0.25**	0.27**	0.26**
FS	0.24**	0.18**	0.19**	0.14*
PE	0.55**	0.33**	0.52**	0.31**
MP	-0.06	0	-0.07	-0.10

CC: care with compassion; FS: fantasy; MP: personal discomfort; PE: empathic concern; PZP: putting yourself in the patient's shoes; TP: perspective taking.

* $p < 0.05$.

** $p < 0.001$.

of empathic compassion (EEMJ-E), high level of fantasy (IRI), high level of empathic concern (IRI) and high level of personal discomfort (IRI).

Discussion

The medical students evaluated showed a relatively high level of general empathy and medical empathy. In addition, the score obtained in the IRI and EEMJ-E is consistent with that obtained in other studies with Hispanic population^{13,16,19,20} and English speakers^{8,17}. This high level of empathy has been reported in students from biological areas, including health, and has been explained from evolutionary, neurohormonal and cultural mechanisms^{22,23}.

In agreement with previous studies¹⁴, the correlation between IRI and EEMJ-E was positive and with a medium strength of association. However, because the IRI is not designed to assess empathy as a general skill from its total score, this result is neither

Table 3. Predictors of the Jefferson Medical Empathy Scale score student version (EEMJ-E) and its dimensions from the dimensions of the Interpersonal Reactivity Index (IRI) in medical students

	B	IC	t	p	β	TOL	FIV	R2 corr
EEMJ-E: Total								0.36
IRI: PE	1.54	1.24 a 1.85	10.04	< 0.001	0.54	0.78	1.26	
IRI: MP	-0.77	-1.12 a -0.41	-4.30	< 0.001	-0.21	0.93	1.06	
IRI: TP	0.49	0.14 a 0.83	2.79	0.006	0.14	0.83	1.20	
EEMJ-E: TP								0.12
IRI: PE	0.40	0.22 a 0.57	4.41	< 0.001	0.27	0.83	1.20	
IRI: TP	0.24	0.03 a 0.44	2.26	0.02	0.14	0.83	1.20	
EEMJ-E: CC								0.31
IRI: PE	1.00	0.83 a 1.18	11.22	< 0.001	0.58	0.93	1.06	
IRI: MP	-0.48	-0.70 a -0.25	-4.21	< 0.001	-0.21	0.93	1.06	
EEMJ-E: PZP								0.14
IRI: PE	0.16	0.09 a 0.23	4.68	< 0.001	0.29	0.78	1.26	
IRI: MP	-0.13	-0.21 a -0.05	-3.32	0.001	-0.19	0.93	1.06	
IRI: TP	0.10	0.02 a 0.17	2.54	0.01	0.15	0.83	1.20	

CC: care with compassion; IVF: variance inflation factor; CI: confidence interval; MP: personal discomfort; PE: empathic concern; PZP: putting yourself in the patient's shoes; R2 corr: R2 corrected; TOL: statistical tolerance; TP: perspective taking.

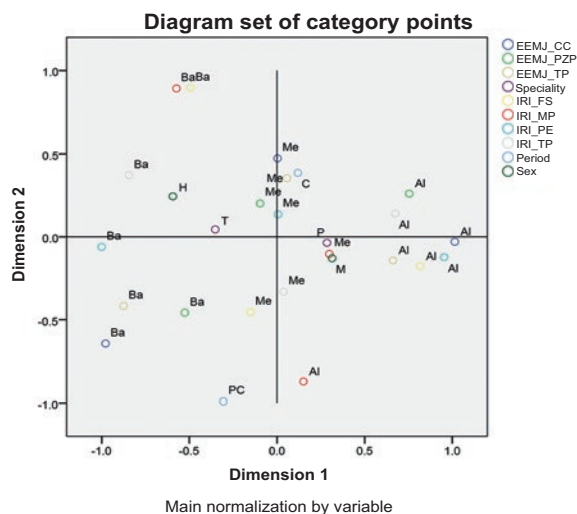


Figure 1. Empathic profile of medical students. AI: high level; Ba: low level; C: clinical period; CC: care with compassion; EMMJ: Jefferson Medical Empathy Scale student version; FS: fantasy; H: male; IRI: Interpersonal Reactivity Index; M: female; Me: medium level; MP: personal discomfort; P: patient orientation; P1 to P4: profiles; CP: preclinical period; PE: empathic concern; PZP: putting yourself in the patient's shoes; T: technology orientation; TP: perspective taking.

conceptually nor empirically relevant. On the other hand, with the exception of the personal distress dimension of the IRI, the rest of its dimensions showed a positive and significant correlation with the total score of the EEMJ-E and its dimensions, whose strength of association ranged from low to medium. Although the latter is expected, as there is no equivalence

between general and medical empathy, this result indicates certain aspects shared between the two. Additionally, the empathic concern dimension showed a high association strength with the total score of the EMMJ-E and with the care with compassion dimension of this same scale. The latter indicates a close relationship between the affective component of general empathy and medical empathy, whose definition is largely based on the cognitive component of empathy⁹.

In accordance with the above, the data obtained in the linear models highlight the importance of the affective component of general empathy, specifically empathic concern, in medical empathy, as previously indicated^{2,10,11}. In addition, these data are partly consistent with those obtained by Costa et al.¹⁴. While the explained variance of such models reaches a maximum of 36%, this is an expected result given that empathy is a multifactorial skill.

The χ^2 independence tests objectively revealed how different sociodemographic and academic variables are associated with the level of medical empathy. The low level of medical empathy present in men and students of the preclinical training period is similar to that observed in previous studies^{8,16,24}. This does not necessarily imply that men are less empathetic, since it is possible that there is a lower male willingness to express empathy²⁵. In addition, there is also evidence that male students in the area of health show greater empathy compared to male students in areas of exact sciences²².

Table 4. Association of the level of medical empathy with sociodemographic, academic variables and level of general empathy in medical students

	Medical empathy level [F (%)]			χ^2	p	V
	Low	Middle	High			
Sex				9.37	0.009	0.18
Woman	36 (13.3)	91 (33.6)	51 (18.8)			
Man	34 (12.5)*	42 (15.5)	17 (6.3)			
Marital status				5.21	0.07	-
Bachelor	62 (22.9)	128 (47.2)	65 (24)			
Other	8 (3)	5 (1.8)	3 (1.1)			
Religious				1.14	0.49	-
Yes	45 (16.6)	90 (33.2)	50 (18.5)			
No	25 (9.2)	43 (15.9)	18 (6.6)			
First option				1.28	0.52	-
Yes	59 (21.8)	117 (43.2)	56 (20.7)			
No	11 (4.1)	16 (5.9)	12 (4.4)			
Shift				5.96	0.20	-
Morning	42 (15.5)	64 (23.6)	28 (10.3)			
Evening	13 (4.8)	35 (12.9)	23 (8.5)			
Mixed	15 (5.5)	34 (12.5)	17 (6.3)			
Period				8.74	0.01	0.18
Preclinical	28 (10.3)*	32 (11.8)	13 (4.8)			
Clinical	42 (15.5)	101 (37.3)	55 (20.3)			
Speciality				8.15	0.01	0.17
Patient	31 (12.1)	65 (25.3)	46 (17.9)*			
Technology	36 (14)	59 (23)	20 (7.8)			
IRI: TP				28.31	<0.001	0.22
Low	28 (10.3)*	38 (14)	7 (2.6)			
Middle	30 (11.1)	60 (22.1)	25 (9.2)			
High	12 (4.4)	35 (12.9)	36 (13.3)*			
IRI: FS				20.83	<0.001	0.19
Low	21 (7.7)	46 (17)*	11 (4.1)			
Middle	41 (15.1)*	53 (19.6)	29 (10.7)			
High	8 (3)	34 (12.5)	28 (10.3)*			
IRI: PE				83.30	<0.001	0.55
Low	42 (15.5)*	34 (12.5)	1 (.4)			
Middle	24 (8.9)	63 (23.2)*	24 (8.9)			
High	4 (1.5)	36 (13.3)	43 (15.9)*			
IRI: MP				12.57	0.01	0.15
Low	25 (9.2)	42 (15.5)	15 (5.5)			
Middle	20 (7.4)	64 (23.6)	37 (13.7)			
High	25 (9.2)*	27 (10)	5.9)			

FS: fantasy; IRI: Interpersonal Reactivity Index; MP: personal discomfort; PE: empathic concern; TP: perspective taking.

*Higher than expected frequency.

The lower empathy in students of the preclinical period is possibly due to the greater exposure to theoretical content and not to the interaction with patients. However, this is a hypothesis that should be tested. Also, similar to other studies, the preference for a patient-oriented specialty was associated with a high

level of medical empathy¹³. In accordance with the correlation analysis and linear regression previously described, the affective dimension empathic concern of general empathy was associated with the level of medical empathy. This reinforces the importance of the affective component in the latter^{2,10,11}.

The most relevant aspect of this research is the detection of profiles that describe the way in which both types of empathy, general and medical, are related to sociodemographic and academic variables. Profiles 1 and 4 can be explained, respectively, by the cognitive styles defined as systematizing and empathetic. The first refers to a style commonly present in men, in which the interest in understanding abstract relationships and following principles predominates, which is also accompanied by a lower empathic ability²². Instead, the second is commonly present in women, and involves greater empathic ability and less interest in systematizing thoughts. These cognitive styles have been shown to influence the academic interests of university students²⁶. It is possible that the differences between profiles 2 and 3 are explained by the absence of contact with patients during the preclinical training period and their subsequent involvement with them during the clinical period. However, the mechanism of this change still needs to be explained.

One aspect that should be noted is that profile 4 can be constituted as a population at risk because it is made up mostly of women, with medium and high levels of empathy, but also with a medium to high level of personal discomfort. This last situation can cause in the empathic actor a condition described as compassion fatigue, which can include symptoms of anxiety and depression²⁷. These symptoms are greater in health students than in students from other areas^{25,28}, and their intensity is greater in female students²⁹.

This study has several limitations, one of them being its descriptive cross-sectional design, which is why it is not possible to identify causal factors of the results obtained. This is of particular importance for the aforementioned difference between profiles 2 and 3. Another limitation is that it focuses only on two private universities, which are also aimed at a population with high economic resources. This limits the generality of the results. Likewise, the assessment of empathy was carried out using self-report instruments, which may have biased the quality of the information collected by an effect of social desirability. Despite the above, it is important to mention that the results are consistent with the current literature on the subject, which

provides evidence of their validity. The absence of a control group, made up of students from outside the health area, is another limitation. Although this was not considered in the present study, there are data that indicate that engineering students show a lower level of empathy in the fantasy and perspective-taking dimensions of the IRI, compared to psychology and social work students³⁰. Based on this result and the data presented by Varella et al.²⁶, a lower level of empathy could also be expected in engineering students compared to medical students. Future studies should provide empirical verification of this hypothesis.

A strength of this study is the use of the ACM, which allowed to identify the association of sets of variables and delineate specific empathic profiles in the target population. With this, it will be possible to design different empathy instruction strategies that respond to the needs of each identified segment.

Conclusions

Due to its multiple benefits, empathy is a required skill in the doctor-patient relationship. Their evaluation and instruction must be carried out from the professional training of medical students. However, it is necessary to have information that allows the design of instructional strategies that guarantee positive changes in this skill. In this study, a statistical technique was used to identify the association between a set of variables typically analyzed in their relationship with empathy, although individually, and it was possible to establish four empathic profiles. Each profile suggests different intervention needs.

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Conflicts of interest

The authors declare the absence of conflicts of interest.

Ethical disclosures

Protection of people and animals. The authors declare that no experiments were carried out on humans or animals for this research.

Data confidentiality. The authors declare that they have followed the protocols of their work center regarding the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appears in this article.

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