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Body Composition and Risk of Eating Disorders in Dance Students

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Abstract

Introduction: To analyze the relationship between body composition in students of contemporary and classical dance and the risk of eating disorders. **Methods:** Twenty-five students from contemporary dance and classical dance training programs at a public university participated in the study, all signed informed consent forms. Anthropometric assessment was conducted in the fasting state and after bladder voiding by a Level 3 anthropometrist. Measurements were taken in duplicate, with a third measurement performed when necessary. Data were entered into ISAK Metry software using the five-component fractionation profile. Risky eating behaviors were assessed using the EAT-18 questionnaire. All data were recorded in Excel and analyzed using JASP. **Results.** The body composition of the sample showed a somatotype of 4.2 (± 1.08) – 3.7 (± 0.98) – 2.0 (± 1.09), fat mass of 17.52 (± 2.78) kg, and muscle mass of 19.26 (± 3.15) kg. Mesomorphy was higher in the contemporary dance group ($p = .032$), whereas ectomorphy was higher in the classical dance group ($p = .025$). When analyzing the relationship between EAT-18 scores and body composition, higher scores were found among individuals with greater endomorphy. **Conclusion:** The study revealed differences in body composition between classical and contemporary dance students, with greater endomorphy observed in the classical dance group, although both disciplines exhibited a predominance of endomorphic characteristics. Endomorphy, rather than dance type, was associated with a higher risk according to EAT-18 scores. Given the small sample size, these results should be interpreted with caution; however, they highlight the need to integrate body composition assessments and mental health support to promote healthier dance training.

Keywords: Dance, Somatotype, Eating Disorders, Anthropometry

Resumen

Introducción: Analizar la relación entre la composición corporal de estudiantes de danza contemporánea y clásica y el riesgo de padecer trastornos de la conducta alimentaria. **Métodos:** En el estudio participaron veinticinco estudiantes de programas de formación en danza contemporánea y clásica de una universidad pública; todos firmaron el consentimiento informado. La evaluación antropométrica fue realizada en ayunas y tras el vaciado vesical por un antropometrista de Nivel 3. Las mediciones se tomaron por duplicado, realizándose una tercera medición cuando fue necesario. Los datos se introdujeron en el software ISAK Metry utilizando el perfil de fraccionamiento de cinco componentes. Los comportamientos alimentarios de riesgo se evaluaron mediante el cuestionario EAT-18. Todos los datos se registraron en Excel y se analizaron utilizando JASP. **Resultados:** La composición corporal de la muestra mostró un somatotipo de 4,2 (± 1,08) – 3,7 (± 0,98) – 2,0 (± 1,09), una masa grasa de 17,52 (± 2,78) kg y una masa muscular de 19,26 (± 3,15) kg. La mesomorfia fue mayor en el grupo de danza contemporánea ($p = 0,032$), mientras que la ectomorfia fue mayor en el grupo de danza clásica ($p = 0,025$). Al analizar la relación entre las puntuaciones del EAT-18 y la composición corporal, se hallaron puntuaciones más altas entre los individuos con mayor endomorfia. **Conclusión:** El estudio reveló diferencias en la composición corporal entre los estudiantes de danza clásica y contemporánea, observándose una mayor endomorfia en el grupo de danza clásica, si bien ambas disciplinas mostraron un predominio de características endomórficas. La endomorfia —más que el tipo de danza— se asoció con un mayor riesgo según las puntuaciones del EAT-18. Dado el reducido tamaño de la muestra, estos resultados deben interpretarse con cautela; no obstante, subrayan la necesidad de integrar las evaluaciones de la composición corporal y el apoyo a la salud mental para promover una formación en danza más saludable.

Palabras Clave: Danza, Somatotipo, Trastornos de la conducta alimentaria, Antropometría.

Introduction

Eating disorders (EDs) represent a significant concern among professional dancers and dance students, with prevalence rates considerably higher than those observed in the general population (Arcelus, Witcomb, and Mitchell, 2014). In classical dance, approximately one in three adolescents exhibits risky eating behaviors due to the specific aesthetic body demands of the discipline (Jiménez, 2014).

Anthropometric assessment using standardized protocols established by the International Society for the Advancement of Kinanthropometry (ISAK) allows for the evaluation of body composition through multicomponent models. The five-component fractionation model—adipose, muscle, bone, bone mineral, and residual mass—provides a more precise characterization compared to conventional models (Martínez, 2010).

Somatotype, expressed through the endomorphic, mesomorphic, and ectomorphic components, enables the characterization of body profiles specific to each discipline. Classical ballet dancers typically show a predominance of ectomorphic characteristics, whereas contemporary dance requires greater mesomorphic components (Toro et al., 2009). Higher levels of endomorphy have been associated with greater body dissatisfaction and restrictive eating behaviors in this population (Douglas et al., 2025).

Despite its clinical relevance, few studies have integrated body composition, somatotype, and the assessment of risky eating behaviors among Latin American university dance students. The Eating Attitudes Test-18 (EAT-18), recently validated in the Mexican population with a cutoff score of 15, represents an appropriate instrument for this evaluation (Pérez et al., 2023).

The present study aims to analyze the relationship between body composition assessed through anthropometry and the risk of eating disorders among first-year classical and contemporary dance students. Differences in somatotype between modalities are expected, with a positive association between endomorphy and risky eating behaviors.

2. Material and Methods

2.1 Study Design

A descriptive, cross-sectional study design was used.

2.1.1 Participants

The study population consisted of first-year students enrolled in the Bachelor's Degree programs in Dance (Classical Dance Pedagogy [CLA] and Contemporary Dance [CON]) at the Universidad de las Artes de Yucatán (UNAY) during the 2025–2026 academic period.

2.1.2 Inclusion Criteria

Participants were eligible if they met the following criteria: (1) being enrolled in the first year of one of the Bachelor's Degree programs in Dance (Classical Dance Pedagogy or Contemporary Dance) at UNAY during the 2025–2026 academic period; (2) being 18 years of age or older at the time of data collection; and (3) providing signed informed consent.

2.1.3 Exclusion Criteria

Participants were excluded if they met any of the following conditions: (1) presence of active musculoskeletal injuries that could interfere with the accurate collection of anthropometric measurements; (2) self-reported medical conditions or treatments that could significantly affect body composition or fluid retention (e.g., corticosteroid treatment or pregnancy); or (3) refusal to continue with the measurement protocol.

2.1.4 Elimination Criteria

Participants were removed from the analysis if they: (1) were absent during the measurement period or did not complete the full anthropometric assessment protocol; (2) failed to complete all data collection instruments; or (3) presented extreme outliers or erroneous measurements identified during data cleaning and database analysis.

2.2 Protocol

2.2.1 Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki. The research protocol was reviewed and approved by the Research Committee and the Ethics Committee of the Universidad Anáhuac Mayab, under the identification code CE-01-2026-H.

2.2.2 Informed Consent

All participants signed an informed consent form in which the objective of the study, as well as the potential risks and benefits of participation, were clearly explained.

2.2.3 Materials and Methods Anthropometric Measurements

The following equipment was used to obtain anthropometric measurements: a Cescorf skinfold caliper with a precision of 0.1 mm for the assessment of skinfold thickness; a solid anthropometric box measuring 40 cm in height × 50 cm in width × 30 cm in depth to standardize posture during measurements; a Crescent Lufkin anthropometric tape (model W606PMMX) for measuring body circumferences; a Smartmet segmometer with 10.5 cm measurement tips for segment length assessment; a SmartMet large-bone anthropometer for measuring bone breadths; and a Seca stadiometer (model 213) for measuring height. Body weight was determined using a Beurer scale (model BF 1000).

Anthropometric measurements followed the five-component profile established by the International Society for the Advancement of Kinanthropometry (ISAK). All measurements were performed by an ISAK Level 3 anthropometrist. Each measurement was taken in duplicate, and a third measurement was obtained when necessary. Participants attended the assessment session in the morning, prior to engaging in physical activity and after bladder voiding. The collected data were entered into the five-component profile form of the ISAK Metry software. From this profile, somatotype values, the sum of six skinfolds (triceps, subscapular, supraspinale, abdominal, anterior thigh, and medial calf), adipose mass, and muscle mass were obtained using the five-component fractionation model.

2.2.4 EAT-18

Risky eating behaviors were assessed using the short version of the Eating Attitudes Test (EAT-18), derived from the original EAT-26 instrument and validated in the Mexican population by Pérez et al. (2023). The established cutoff score for this instrument is 15. The questionnaire was administered on a different day from the anthropometric assessments, in a comfortable, air-conditioned classroom, using an electronic format (Google Forms).

2.2.5 Handgrip Dynamometry

Handgrip strength was assessed using a digital hand dynamometer (GMP brand) with a capacity of up to 90 kg. This instrument allowed quantification of the maximum force exerted with the dominant hand, recorded in kilograms of force (kgf).

For the assessment, participants stood upright with their feet positioned shoulder-width apart. The dominant arm remained extended alongside the body, without contacting the trunk, with the elbow fully extended and the wrist in a neutral position. The dynamometer was adjusted to each participant's hand size so that the second phalanx of the fingers made contact with the handle.

Participants were then instructed to exert maximal force for a duration of 3 to 5 seconds while avoiding any compensatory movements. Three attempts were performed with a one-minute rest interval between trials. The highest value obtained, expressed in kilograms of force (kgf), was recorded as the final result.

2.3 Data Analysis

Somatotype values, the sum of six skinfolds, adipose mass, muscle mass, EAT-18 scores, and handgrip dynamometry results were initially recorded in Microsoft Excel and subsequently analyzed using the statistical software JASP (Jeffrey's Amazing Statistics Program), version 0.18.2.

An exploratory analysis was conducted to identify potential data entry errors and to examine the distribution of the variables. Mean and standard deviation were reported for variables measured on a ratio scale with a normal distribution. For variables that did not follow a normal distribution, the median and interquartile range were reported. Frequencies and percentages were calculated for nominal variables.

To evaluate differences between groups, an independent samples t-test was performed. Subsequently, Spearman's correlation analysis was used to assess the relationship between body composition variables, EAT-18 scores, and handgrip dynamometry results. The level of statistical significance was set at 0.05.

3. Results

Table 1. Somatotype and body composition (n = 25) in dance students.

	Endo	Meso	Ecto	Fat Mass		Muscle Mass		Waist	Hip	WHR	Σ 6 SF
				Kg	% *	Kg	%				
Mean	4.25	3.70	2.03	17.52	33.00	19.26	35.68	66.98	92.96	0.72	90.7
Standard deviation	1.08	0.98	1.09	2.78	1.00	3.15	2.45	5.23	5.87	0.03	19.9

*Median and interquartile range.

Endo: Endomorphy; Meso: Mesomorphy; Ecto: Ectomorphy. Waist: Waist circumference (cm); Hip: Hip circumference (cm); WHR: Waist-to-hip ratio; Σ6 SF: Sum of six skinfolds (triceps, subscapular, supraspinale, abdominal, thigh, and calf).

Dance students include those enrolled in Classical Dance Pedagogy (CLA) and Contemporary Dance (CON) programs.

Table 2. Differences in somatotype and body composition by dance type (classical and contemporary).

	Group	n	Mean	SD	t	df	p
Endomorphy	CLA	10	3.79	0.94	-1.84	23	.078
	CON	15	4.56	1.09			
Mesomorphy	CLA	10	3.19	0.90	-2.28	23	.032
	CON	15	4.04	0.90			
Ectomorphy	CLA	10	2.62	0.87	2.39	23	.025
	CON	15	1.65	1.06			
Fat mass (kg)	CLA	10	15.98	1.90	-2.49	23	.020
	CON	15	18.55	2.84			
Muscle mass (kg)	CLA	10	17.12	2.18	-3.29	23	.00
	CON	15	20.6	2.91			
Fat mass (%)	CLA	10	32.40	2.98	-0.18	23	.85
	CON	15	32.60	2.32			
Muscle mass (%)	CLA	10	34.40	2.87	-2.32	23	.02
	CON	15	36.53	1.72			
Waist circumference (cm)	CLA	10	64.69	3.46	-1.87	23	.07
	CON	15	68.50	5.73			
Hip circumference (cm)	CLA	10	89.85*	3.30*	-1.50	23	.14
	CON	15	94.37	6.63			
WHR	CLA	10	0.71	0.03	-0.92	23	.36
	CON	15	0.72	0.03			

Σ SF (mm)	CLA	10	78.35	13.71	-2.63	23	.01
	CON	15	101.6	20.09			

*Median and interquartile range.

SD = Standard deviation; df = degrees of freedom; CLA = Classical Dance Pedagogy students; CON = Contemporary Dance students; WHR = Waist-to-Hip Ratio; Σ6 SF = Sum of six skinfolds (triceps, subscapular, supraspinale, abdominal, thigh, and calf)

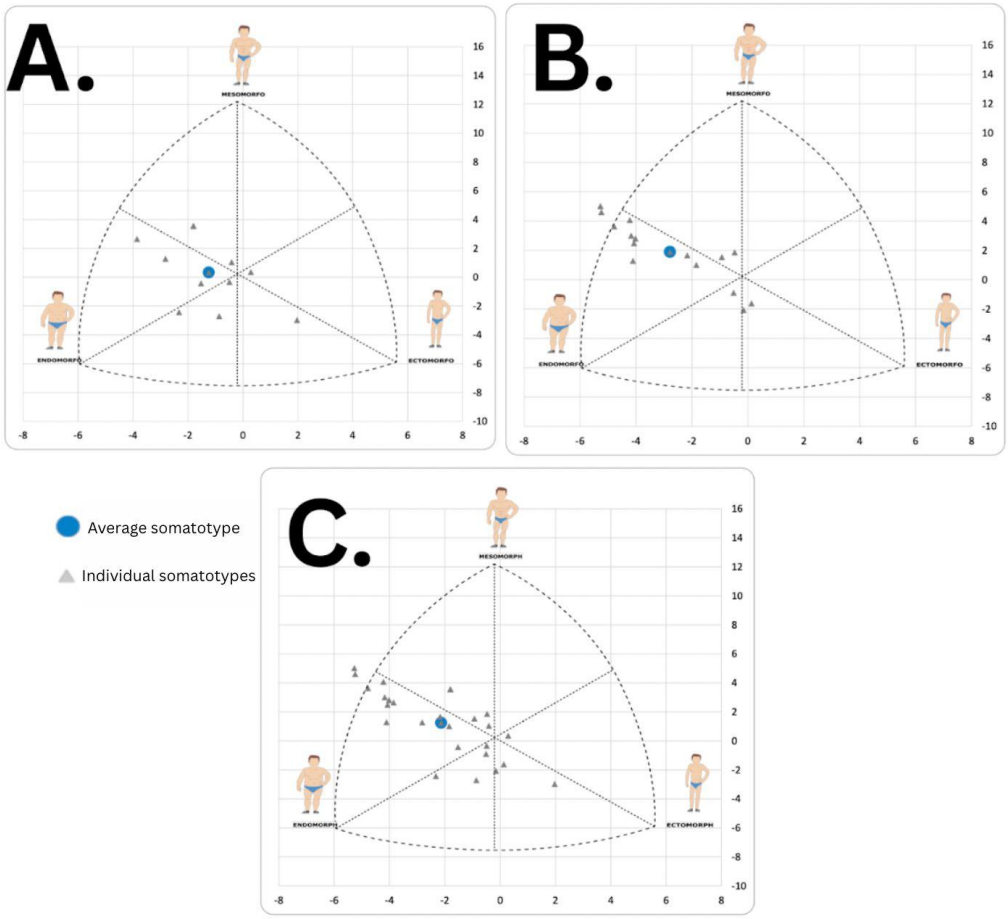

Figure 1. Somatochart of the total sample

A. Somatochart of the classical dance sample (n = 10); B. Somatochart of the contemporary dance sample (n = 15); C. Somatochart of the total sample (n = 25).

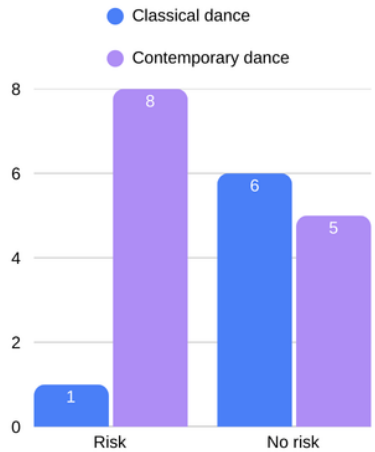

Figure 2. Participants at risk of eating disorders according to the EAT-18 score (n = 20).

* CLA: Classical Dance Pedagogy students; CON: Contemporary Dance students. EAT-18 cutoff score: 15; Median: 13.5; Interquartile range: 11.25.

Table 3. Contingency table of dance type and risk of eating disorders according to the EAT-18 cutoff score (n = 20).

EAT-18 Risk			
Dance type	**Yes**	**No**	**Total**
CLA	1	6	7
CON	8	5	13
Total	5	11	20

* CLA: Classical Dance Pedagogy students; CON: Contemporary Dance students.

Fisher's exact test: Log Odds Ratio = −2.14; 95% Confidence Interval: −6.202, 0.347; p = .070.

Table 4. Nonparametric correlations between the total EAT-18 score and body composition variables (n = 20).

		Spearman		**Kendall**	
EAT-18		**rho**	**p**	**tau B**	**p**
	Endomorphy	0.47	0.04	0.39	0.02
	Mesomorphy	0.35	0.13	0.27	0.11
	Ectomorphy	-0.38	0.10	-0.31	0.06
	Adipose tissue (kg)	0.19	0.42	0.12	0.47
	Muscle mass (kg)	0.32	0.17	0.24	0.15
	Waist circumference (cm)	0.31	0.18	0.26	0.13
	Hip circumference (cm)	0.16	0.51	0.10	0.54
	WHR	0.23	0.33	0.15	0.37
	Handgrip strength	0.16	0.49	0.13	0.45
	Σ SF (mm)	0.36	0.12	0.27	0.10

WHR = Waist-to-Hip Ratio; Σ6 SF = Sum of six skinfolds (triceps, subscapular, supraspinale, abdominal, thigh, and calf).

4. Discussion

The sample used for the analysis of body composition and somatotype consisted of 25 female participants, following the exclusion of the single male participant in order to minimize the potential influence of outlier data.

The somatotype characterization of the total sample *(n = 25)* resulted in a mean of 4.2 – 3.7 – 2.0, indicating an endomorphic predominance. When analyzed by discipline, the Classical Dance (CLA) group presented a somatotype of 3.8 – 3.2 – 2.6 (endomorphic predominance), whereas the Contemporary Dance (CON) group showed a somatotype of 4.6 – 4.9 – 1.6 (mesomorphic predominance). When comparing somatotypes between CLA and CON, several significant differences were identified. The CON group exhibited greater mesomorphy compared with the CLA group *(t = −2.28, p = .032)*. In contrast, the CLA group showed higher ectomorphy *(t = 2.39, p = .025)*, and this difference was statistically significant.

This distinction between groups is consistent with general trends reported in the literature on somatotype in dance. Although the absolute somatotype values in our study do not exactly replicate those reported by Liiv et al. (2013)—who found values of 3.59 – 3.43 – 3.65 for ballet and 3.79 – 4.07 – 3.29 for contemporary dance—the relative predominance remains similar. Specifically, the CON group consistently exhibited greater mesomorphy,

which may be attributed to the physical demands of the discipline that require greater muscular endurance in the upper limbs and higher explosive strength in the lower limbs *(Angioi et al., 2009).*

In contrast to the findings reported by Llanos et al. (2025), who observed that professional classical ballet dancers presented predominantly ectomorphic somatotypes (reported value of 3.6), the classical dance students in our sample showed a higher endomorphic component (3.79). This discrepancy may be explained by the training level of the participants. While the Chilean study evaluated professional dancers with many years of specialized training and more rigorous selection processes, our sample consisted of students in training who have not yet reached the morphological homogeneity typically expected in professional ballet.

These findings suggest that the more linear and slender body profiles associated with classical ballet tend to consolidate as dancers progress in their professional development, whereas greater body variability and higher endomorphic components are more common during earlier academic stages of training. Regarding body composition variables, fat mass *($t = -2.49$, $p = .020$)*, muscle mass *($t = -3.29$, $p = .001$)*, and the sum of six skinfolds (Σ6 SF) *($t = -2.63$, $p = .01$)* were significantly higher in the CON group than in the CLA group. Of the total sample, only 20 participants completed the EAT-18. The median score was 13.5 (IQR = 11.25), with 45% of participants (n = 9) scoring in the risk range for attitudes associated with eating disorders.

The distribution of risk according to dance discipline was analyzed using Fisher's exact test. This method was selected due to its robustness in the presence of low expected frequencies in the contingency table (Emin = 3.15), which made the use of the chi-square test (χ^2) inappropriate. Fisher's exact test did not indicate a statistically significant association between dance discipline and the risk of eating disorders *($p = .07$)*.

Despite the lack of formal statistical significance, the Odds Ratio (OR) associated with this table was 8.53 (calculated from the log odds ratio of −2.144). This suggests that students in the CON group had 8.53 times higher odds of presenting risk of eating disorders compared with those in the CLA group. However, the 95% confidence interval for the log odds ratio ranged from −6.202 to 0.347. Because this interval includes zero, it confirms that the difference does not reach the threshold for statistical significance ($\alpha = .05$), a situation that is common in studies with small sample sizes.

Non-parametric correlation analyses (Spearman and Kendall) revealed a positive and statistically significant relationship between the endomorphy component and EAT-18 risk scores. Specifically, the correlations obtained were Spearman ($\rho = 0.47$, $p = .037$) and Kendall ($\tau B = 0.38$, $p = .019$). These results suggest that higher levels of endomorphy are associated with a greater tendency to exhibit attitudes indicative of eating disorder risk in this population.

In this context, Alvero et al. (2020) reported that mesomorphy and ectomorphy showed moderate to high predictive accuracy for eating disorder risk, particularly in a group of beginners. In contrast, the present study identified endomorphy as the only component significantly correlated with EAT-18 scores. Although mesomorphy, adipose mass, and muscle mass showed positive correlations with EAT-18, these associations did not reach statistical significance. Conversely, ectomorphy was the only variable that showed a negative relationship with EAT-18 scores, though this correlation was also not statistically significant.

These findings highlight the importance of investigating dietary intake to better understand this phenomenon, as well as examining potential differences across dance disciplines. Such analyses could help clarify whether nutritional behaviors, training demands, or aesthetic expectations within each discipline influence the observed associations between body composition and eating disorder risk.

5. Conclusion

The present study revealed differences in body composition between classical and contemporary dance students. The classical dance group presented a higher endomorphic component, while the contemporary dance group showed a more mesomorphic tendency; however, both groups demonstrated a predominance of the endomorphic component.

Furthermore, higher endomorphy was associated with higher risk scores on the EAT-18, regardless of the dance discipline practiced. The type of dance did not significantly influence the risk of presenting behaviors associated with eating disorders. These findings highlight the importance of considering individual body characteristics, beyond the dance modality, when evaluating psychological risk factors and body perception among dance students.

Additionally, it should be noted that our sample size was small, which limits the generalizability of the results. Overall, these findings highlight the importance of including both anthropometric assessment and mental health support within dance training programs, in order to create learning environments that prioritize the physical and emotional well-being of students and promote a healthier relationship with the body, free from unrealistic aesthetic expectations.

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Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Informed Consent Statement

All the athletes included in the study provided written informed consent.

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