STATISTICAL CORRELATION BETWEEN CRITICAL THINKING AND PSYCHOLOGICAL WELL-BEING IN HIGHER EDUCATION STUDENTS

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Abstract - A study was conducted to estimate the statistical correlation between Critical Thinking and the Psychological Well-being of higher education students. To address this objective, Spearman formula was used in a population of 1458 subjects from four educational institutions. To collect data for this study, an electronic form was used that included items from two instruments: a validated questionnaire to measure Critical Thinking, which was in press at the time of data collection, and the standardized BIEPS-J test to measure Psychological Well-being. Analysis of the collected data revealed a nullnegative correlation between the two variables. This allows for progress towards more in-depth studies to find positive relationships between the complex university school life and its effects on the individual's integrity.

Keywords - Critical Thinking, Psychological Well-being, Statistical Correlation, Spearman formula

I. INTRODUCTION

Critical thinking is a highly valued intellectual ability in school settings because it has proven potential to determine the quality of learning for students of all educational levels and backgrounds.

This intellectual ability can be defined as the ability activated to evaluate the validity and accuracy of information generated personally, or information received through the analysis of arguments. It involves mature attitudes that allow for the acceptance of self-correction, an appreciation for evidence, and for systematic doubt (De la Borbolla, 2019; Facione, 2000; Vendrell & Rodríguez, 2020).

As can be seen, this higher-order capacity allows students to access the content of their study program but also allows them to direct their own learning and decision-making processes both inside and outside of the school environment.

On the other hand, Psychological Well-being, also known as Subjective Well-being, refers to each person's assessment of their quality of life, with an emphasis on self-acceptance, perceived autonomy, interpersonal relationships, and personal projects (Casullo, 2002; Douwes, Metselaar, Pijnenborg, Gerdina & Boonstra, 2023; Haldimann, Hascher & Flick, 2024; Lemon, 2021).

Since it was evident that these two variables are decisive for academic performance and for the personal assessment of well-being, the objective was to test the hypothesis of a relationship between the two in higher education students.

II. METHOD

This work was conducted through a quantitative correlational study.

To obtain the data necessary to address the objective, an electronic form was used that integrated the content of two instruments: a questionnaire to measure Critical Thinking in university students, designed and validated by Cardeña (2025); The second instrument used was the questionnaire for the Evaluation of Psychological Well-being in Latin America, known by the acronym BIEPS by María Martina Casullo (Casullo, 2002),in its J version, which is calibrated for subjects over 18 years of age.

This form communicated the purpose of the survey and requested consent for the use of the data received, ensuring its strictly academic use and the anonymous handling of information throughout the research process, including its publication.

This content was distributed to students at four higher education institutions in southeastern Mexico, which shared similar curricular programs, student age, and other common contextual characteristics. Thus, sampling was not performed, as it was possible to access all members of each unit of analysis, which is always preferable to working with a sample, even if appropriately selected(Lohr, 1999; Namakforoosh, 2014).
It is important to note that the coordinators or principals of each school collaborated to present the objective of the activity and monitor its progress.
In each case, a census was conducted among the school population, resulting in a total of 1,458 subjects between the ages of 18 and 24. Data collection lasted four weeks, spanning the months of September and October 2025.

For data analysis, a Spearman's Rho correlation test was performed, once the type of measurement of the variables was analyzed, and a data distribution test was performed using the Kolmogorov-Smirnov formula (Siegel & Castellan, 2012).

To interpret the strength of the correlation that was calculated, the Carranza et al. (2024)scale was used. These researchers propose the following decision intervals: 0 to 0.10, Null or very week; 0.11 to 0.30, Small; 0.31 to 0.50, Moderate; 0.51 to 0.70, Strong; 0.71 to 1, Very Strong or Perfect correlation. The normality test was performed by establishing a p value of .05 (Sig. .05), given that this is the value that prevails as recommended for the social and behavioral sciences (Cohen, 1994; Nickerson, 2000).Both statistical tests were developed using the Statistical Package for Social Sciences (SPSS) software.

When the data behavior was reviewed using the sampling distribution test, a significance level of less than 5% was obtained in both cases reviewed, leading to the conclusion that they were nonparametric. This suggested choosing Spearman's Rho test to develop the correlation test (Goodwin & Leech, 2006).

The K-S test results for the two variables are shown in the following table:

			Critical Thinking)[b]	Psychological Wellbeig)[c]
N			1458	1458
Normal parameters	Mean		3,0419753	1,5850480
	Standard Deviation		,49949261	,76881976
Most extreme differences	Absolute		,045	,056
	Positive		,041	,056
	Negative		-,045	-,021
Test statistic			,045	,056
Asymp.Sig.(2 tailed)[a]			,000	,000
Monte Carlo Sig. (2 tailed)	Sig.		,000	,000
	Confidence Interval for the mean 99%	Lower limit	,000	,000
		Upper limit	,000	,000

a. Lilliefors correction.

b. Lilliefors method basedon 10000 Monte Carlo samples with a starting seed of 299883525.

c. Lilliefors method based on 10000 Monte Carlo samples with a starting seed of 926214481.

Table 1Kolmogorov-Smirnov test

Regarding the hypothesis test (Ho: pXY = 0), an r value of -.043 was found, which corresponds to a null and negative correlation between the variables examined.

Furthermore, the significance level for this same test was less than 5% (0.05), suggesting a minimal probability of random error in this calculation.Table 2 shows the results of this test:

		CriticalThinking	PsychologicalWell-being
CriticalThinking	Correlation	1	-,043
	Sig. (Twotailed)		,000
	N	1458	1458
PsychologicalWellbeig	Correlation	-,043	1
	Sig. (Twotailed)	,000	
	N	1458	1458

Table 2 Spearman's Rho correlation test

This correlation can be visually represented with the following figure:

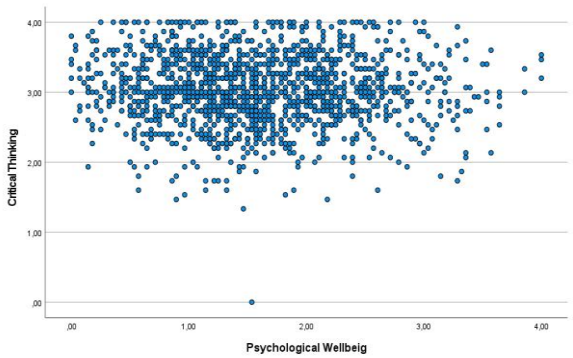


Figure 1 Scatter Plot

Based on the data analyzed, it can be concluded that no statistically significant correlation was found between the level of Critical Thinking and Psychological Well-being of the surveyed population; on the contrary, a negative relationship between the two conditions can be suggested.

This allows for progress towards more in-depth studies to find positive relationships between the complex university school life and its effects on the individual's integrity.

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