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Attitudes toward research in undergraduate psychology students at a public university in Mexico: A cross-sectional study[1]

Actitudes hacia la investigación en estudiantes de licenciatura en psicología de una universidad pública de México: Un estudio transversal

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Abstract

This research aims to examine the relationship between perceived experience in research methodology (RM) courses and attitudes toward research in a sample of undergraduate psychology students from a public university in Mexico City. A cross-sectional study was carried out with 261 students. A 10-unit analog scale to assess perceived experience in RM courses and two measures of attitudes toward research were used. Between the two attitude scales, four attitude dimensions were identified: positive appraisal, negative appraisal, meaningless and boring. Four multivariate models were estimated, one for

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each attitude dimension. A positive correlation was found between learning experiences in RM courses and positive appraisal of research ($p < 0.01$). Negative associations were also found between RM course experience and two of the three negative research attitudes ($p < 0.01$). Results highlight the significance of teaching in the knowledge and attitude development of students' research competencies. An approach to teaching RM at the undergraduate level that places more emphasis on encouraging evidence-based practice than on developing and carrying out research projects seems to be a promising subject for study, with implications for changing teaching methods and contents.

Keywords: Research methodology, Teaching, Undergraduate, Psychology, Students

Resumen

Esta investigación tuvo como objetivo examinar la relación entre la experiencia percibida en los cursos de metodología de la investigación (MI) y las actitudes hacia la investigación en una muestra de estudiantes de licenciatura en psicología de una universidad pública de la Ciudad de México. Se realizó un estudio transversal con 261 estudiantes. Se utilizó una escala analógica de 10 unidades para evaluar la experiencia percibida en los cursos de MI y dos medidas de actitudes hacia la investigación. Entre las dos escalas de actitudes se identificaron cuatro dimensiones de actitud: valoración positiva, valoración negativa, sin sentido y aburrimiento. Se estimaron cuatro modelos multivariados, uno para cada dimensión de actitud. Se encontró una correlación positiva entre las experiencias de aprendizaje en los cursos de MI y la valoración positiva de la investigación ($p < 0,01$). También se encontraron asociaciones negativas entre la experiencia en cursos de MI y dos de las tres actitudes negativas hacia la investigación ($p < 0,01$). Los resultados resaltan la importancia de la enseñanza en el desarrollo de los conocimientos y actitudes de los estudiantes en materia de investigación. Un cambio en

el enfoque de la enseñanza de la MI a nivel de pregrado que haga hincapié en el fomento de la práctica basada en la evidencia más que en el desarrollo y la realización de proyectos de investigación parece ser un tema de estudio promisorio, con implicaciones para el cambio de los métodos y contenidos de su enseñanza.

Palabras clave: Metodología de la investigación, Enseñanza, Licenciatura, Psicología, Estudiantes

Introduction

Research methodology (RM) teaching is included in the curricula of all scientific disciplines. Its teaching in undergraduate programs is important for several reasons. First, RM teaches students to analyze and evaluate data and build logical arguments based on evidence, thereby promoting their ability to think critically (McKelvie & Standing, 2018). These skills are essential in any field of study and are highly valuable in the workplace. Second, it prepares students for graduate studies: Many students pursue graduate studies, where RM is an integral part of their coursework. By introducing RM at the undergraduate level, students are better prepared for the demands of graduate research (Madan & Teitge, 2013). Third, encourages evidence-based decision making: RM provides students with the skills to collect and analyze data, which is essential for making evidence-based decisions in a variety of settings, including academia, business, and government (Webber, 2013). Fourth, increases research productivity: By offering RM courses, students are better equipped to conduct research, which can lead to increased research productivity and quality in Universities (Madan & Teitge, 2013). Fifth, RM teaches students to think creatively and innovatively, which is essential for solving complex problems and developing new ideas (Peachey & Baller, 2015). Overall, teaching RM in undergraduate education

encourages a culture of evidence-based decision making and innovation and supports the acquisition of essential skills for future careers.

Despite these advantages, teaching RM can be challenging because it depends on teacher's choice of teaching methods, knowledge of the subject, teaching style, experience, and enthusiasm of each teacher in this area (Estacio & Medina, 2020; Rivadeneira et al., 2017). Furthermore, undergraduate students often approach the course with a negative attitude because they are unaware of its benefits, their experience of learning the subject has been unfavorable, or both (Matos et al., 2023; Sizemore & Lewandowski, 2009).

The study of attitudes as a powerful predictor of behavior mediated by intentions is a well-established field of study (Conner & Sparks, 2015). Ajzen (2005) defines attitudes as the disposition to respond favorably or unfavorably toward an object, person, institution or event, characterized by being evaluative in nature.

There is variability on the outcomes of studies investigating the attitudes of undergraduate psychology students toward science, the science of psychology, and the teaching of research methodology. Some studies indicate a preference among students for activities that demand less commitment, effort, and initiative compared to the conventional tasks associated with psychological research, such as passive engagement through reading or listening to research findings rather than active participation (Vittengl et al., 2004). Other studies indicate that students' willingness to engage in research activities is primarily influenced by their attitudes toward research in their future careers, rather than their previous research experiences and their perceptions of the research environment. (Griffioen, 2019). Furthermore, the observation that students may not recognize

psychology as a scientific discipline may imply a limited appreciation of scientific research. (Holmes & Beins, 2009).

An underexplored topic is the relationship between attitudes toward research and the perceived experience in research methodology courses. Recent qualitative research with Colombian university students revealed that they regarded RM as an annoying, unimportant, and easy-to-pass course. The study also identified the teacher's pedagogical practice and the curricular content of the course as the reasons for the negative perceptions (Álvarez Merlano et al., 2022).

Based on the hypothesis that a satisfactory experience with the course of RM will be associated with more positive attitudes toward research, the objective of this study was to identify the association between perceived experience with research methodology courses and attitudes toward research in psychology students at a public university in Mexico City.

Method

Participants

Using non-probabilistic sampling, students and graduates from different courses and semesters of a public school of psychology were invited to participate voluntarily in the study. Students enrolled in the program at the time of data collection or within six months of graduating from the program were included in the study.

Table 1 shows the characteristics of the study sample. A total of 261 participants were recruited, mostly women (62%). No significant differences were observed between male and female participants in the distribution by semester, average age, and percent of failed

courses. However, female participants had a slightly and significant higher grade point average (GPA) than males.

Table 1. Sociodemographic and academic characteristics of the sample (N=261).

Variable	Total	Male	Female	p
Semester, n (%)	n	99 (38)	162 (62)	
1	54	23 (43)	31 (57)	0.60
3	63	21 (33)	42 (67)	
5	48	18 (37)	30 (63)	
7	68	29 (43)	39 (57)	
Graduates	28	8 (29)	20 (71)	
Age, mean (s.d.)	20.4 (2.28)	20.5 (2.47)	20.4 (2.15)	0.64
Failed courses, n (%)				
Yes	36 (14)	18 (18)	18 (11)	0.11
GPA, mean (s.d.)	8.8 (0.70)	8.7 (0.75)	8.9 (0.65)	0.02

Note: s.d. standard deviation; GPA: Grade point average.
For the GPA and failed courses variables, 1st semester students were excluded.

Variables

Research attitudes. According to De las Salas et al. (2014) and Aldana et al. (2019), attitudes toward research methodology are defined as psychological dispositions to react favorably or unfavorably to things, people or situations related to the research, and are influenced by beliefs, experiences, and feelings. Two instruments were used that emphasize the cognitive, and affective dimensions, respectively, to measure the construct comprehensively.

The questionnaire "Attitude toward research in university students" (Barrios & Delgado, 2020) was utilized. The questionnaire consists of twenty-eight statements. Four constructs with seven items each were identified in the original version: research skills (e.g. I must know how to make decisions to carry out research), positive appraisal (e.g. Doing research fosters creativity), obstacles to research (e.g. The lack of support from my professors is an

obstacle to doing research), and negative appraisal (e.g. It seems to me that research is only useful for writing a thesis). The responses have a 4-point Likert scale with values from 0 (*strongly disagree*), 1 (*disagree*), 2 (*agree*) and 3 (*strongly agree*). The authors only reported a coefficient of internal consistency of 0.73 for the complete questionnaire.

Another scale of attitudes toward research was developed for the purpose of the current study, based on earlier research with psychology students from the same university where the research was conducted (Montero, 2019). This scale has a differential semantic structure and is composed of 10 bipolar adjectives (e.g., "interesting - boring" and "easy - difficult"), each with an analog scale of 10 units.

Experience in research methodology courses (ERMC): The students' perception was evaluated with a 10-point analog scale from 1 (equaled the worst experience in research methodology courses) to 10 (equaled the best experience in research methodology courses), developed for the purposes of this study.

As covariates, the following sociodemographic and academic performance variables were included: age, gender, subjects failed, last semester grade point average (in a range from 5 to 10), and semester enrollment.

Procedure

First, judges reviewed the scales to ensure their face validity. Once grammatical, spelling and/or apparent content errors have been revised a survey using the 3 scales and a demographic questionnaire to assess covariates was created on Google Forms. A pilot test was conducted, with ten students from the target population, to identify any potential errors in the instructions and the usability of the form’s navigation.

Students were recruited during psychology classes with permission form the instructors. Participants used their cell phones to access the form using a QR code. The survey contained an informed consent form, which explained the goal of the study, the potential risks and benefits, and asked participants if they wanted to willingly participate in the study. Those who accepted to take the survey were directed to the survey questions. The processing of their personal data was assured to maintain anonymity and to be used solely for academic reasons. At the end, they were all thanked for their participation. Participants did not receive any type of incentive or remuneration.

Statistical analysis

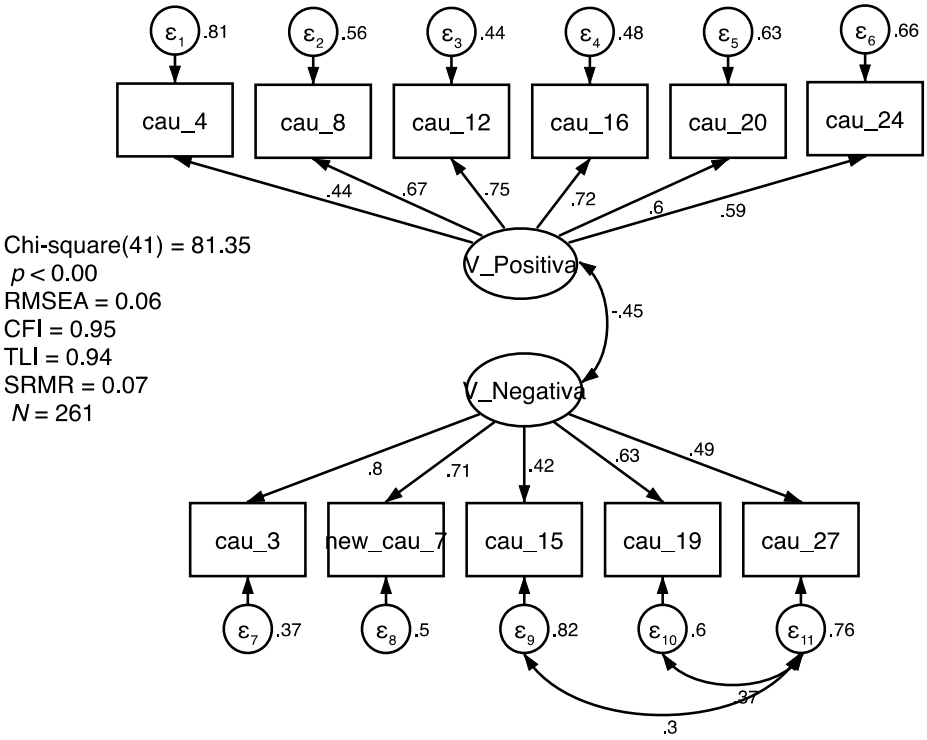
A descriptive analysis of the sociodemographic and academic variables was performed. Quantitative continuous variables were described with measures of central tendency and dispersion, and qualitative categorical variables with frequencies and proportions. To identify possible differential associations between the variables of interest, both academic variables and age were compared by sex. A confirmatory factor analysis (CFA) of the research attitude scale was performed to verify the factorial structure of the questionnaire designed by Barrios and Delgado (2020). On the other hand, to determine the presence of latent dimensions inside the attitude scale utilizing a semantic differential format, an exploratory factor analysis was conducted. The internal consistency of both scales was estimated using Cronbach's alpha coefficient. Likewise, the type of data distribution was identified using the Shapiro-Wilk test to decide the appropriate approach for the analyses (parametric or nonparametric). Correlations between the two attitude scales and research methodology experience were estimated. The scale scores were compared according to sex, semester, and whether a course had been failed. Finally, multiple linear regression

models were estimated, one for each attitude scale, with the experience with the research methodology courses as the independent variable and the sociodemographic and academic variables as covariates. A value of $p < .05$ was established as the significance criterion. All analyses were performed with Stata v. 17 software (StataCorp, 2021).

Results

Regarding the research attitude questionnaire (Barrios & Delgado, 2020), the original scale, consists of 28 items, where 7 belong to the dimension of investigative skills, 7 to positive appraisal, another 7 to the dimension of obstacles to research and the last 7 to the dimension of negative appraisal. The CFA carried out did not replicate the original factor structure. Only the positive and negative appraisal factors were reproduced with fewer items than in the original scales. (Figure 1). The internal consistency coefficients were 0.79 and 0.78 for the positive and negative appraisal factors, respectively. The model showed satisfactory goodness of fit for most indicators (Acock, 2013).

Figure 1. Confirmatory Factor Analysis of the Research Attitudes Questionnaire.



For the Semantic Differential attitude scale, the matrix determinant was equal to 0.034, Keiser-Meyer Olkin (0.80) and Bartlett's sphericity tests (χ^2=864.36, $p < 0.05$), which together showed that the exploratory factor analysis was feasible to perform. The AFE with oblique rotation identified three factors that explained 56.5% of the variance of the items. Table 2 shows the factor loadings of the three factors and the corresponding items. Given that the complexity dimension had an internal consistency coefficient below what is usually recommended (Taber, 2018), it was excluded from subsequent analyses. Three dimensions were identified and based on combinations of adjectives, they were labeled "Complexity", "Boring" and "Meaningless", these labels refer to the features or attributes assigned to the RM by students. For interpretation purposes, higher scores indicate a worse assessment of the importance of and interest in research.

Table 2. Exploratory factor analysis of the semantic differential attitude scale.

	Factor			
Items	**1**	**2**	**3**	**Dimension**
Simple - complex	-0.009	-0.122	**0.591**	Complexity
Easy - difficult	0.069	0.111	**0.610**	
Interesting - boring	0.035	**0.753**	-0.008	Boring
Pleasant - unpleasant	0.033	**0.708**	0.002	
Useful - useless	**0.493**	0.199	-0.021	Meaningless
Valuable - worthless	**0.861**	-0.053	0.056	
Important - trivial	**0.633**	-0.110	-0.070	
An investment - a waste of time	**0.768**	0.108	0.020	
Clear - confusing	0.066	0.129	0.217	
Relaxing - stressful	-0.102	0.384	0.361	
Cronbach's alpha	0.819	0.781	0.595	

Notes. Extraction method: principal factor; Rotation method: Oblique promax; Loadings larger than .40 are in bold.

Although some of the correlations had low coefficients, most study variables correlated significantly in the predicted directions. As expected, as students' experiences in research methodology courses improved, their attitudes toward research also improved. Furthermore, the correlations support the instruments' criterion validity in general (Table 3).

Except for the meaningless scale where a marginally significant difference (p = 0.05) was found between men and women (means 6.5 and 5.3, respectively), no significant differences were found in the variables of positive appraisal, negative appraisal, meaningless, boring and ERMC, by sex, semester or having failed courses.

Table 3. Descriptive Statistics and Spearman Correlations for Study Variables (n=261)

Variable	M	IQR	1	2	3	4	5	6
1. ERMC	7	6, 8	--					
2. GPA	8.9	8.4, 9.3	-.15*	--				
3. Positive appraisal	14	12, 16	.19**	-.02				
4. Negative appraisal	8	6, 10	-.32**	.00	-.27**	--		
5. Meaningless	4	4, 6	-.08	-.11	-.41**	.17*	--	

6. Boring	5	4, 7	-.23**	-.17	-.38**	.59**	.40**	--

Note. M: Median, IQR: Inter-quartile range; ERMC: Experience in research methodology courses; GPA: Grade point average. *p < .05; **p < .01.

Multivariate analyses

Since the dependent variables did not have a normal distribution, it was decided to perform the multiple linear regression analyses using a robust method. The four models were adjusted for sex, failing courses and GPA (Table 4). In all four cases, perceived experience in research methodology courses was significantly associated with research attitudes. Clearly, as the appraisal of the experience improves, negative evaluations decrease, and positive evaluations increase.

Table 4. Multivariate models of attitudes by experience in research methodology courses.

Variable	Coefficient	RSE	t	p	95% CI
Model 1. Positive appraisal.	.41	.13	3.18	.00	.15, .66
Model 2. Negative appraisal.	-.56	.11	5.14	.00	-.77, -.34
Model 3. Meaningless.	-.26	.13	2.45	.05	-.52, .00
Model 4. Boring.	-.42	.11	3.80	.00	-.64, -.20

Note. RSE: Robust standard error. Adjusted for sex, semester, GPA, and reported having failed courses.

Discussion

The purpose of the study was to examine the relationship between experience and knowledge acquired in RM courses and attitudes towards research in a sample of undergraduate psychology students from a public university in Mexico City.

The findings revealed a positive correlation between learning experiences in RM courses and positive attitudes toward RM. Similarly, negative associations between RM course experience and negative attitudes toward RM were found. These findings were independent of the participants' grade point average, failing courses, academic semester, or gender.

The results are consistent with the study of Landa-Blanco & Cortés Ramos (2021) who identified that regardless of academic degree, number of courses and research projects completed, GPA and gender, attitudes towards research were positively associated with satisfaction with research courses, which seems to indicate that it is the latter variable that is best associated with attitudes towards RM. This underscores the importance of learning experiences on student attitudes.

On the other hand, the results indicated that GPA was slightly and negatively associated with ERMC, but not with attitudes toward RM. In this regard, a study with undergraduate psychology students showed that after attending an RM and statistics course, students' knowledge improved, while their interest and attitudes about perceived usefulness

decreased (Sizemore & Lewandowski, 2009). While in Freng's (2020) study, the GPA of students in advanced psychology courses was not associated with the number of RM courses completed, the perception of psychology as a scientific discipline, nor with perceived anxiety about RM which is consistent with the results of this report.

Clearly, the results show the importance of teaching in the development of students' research competencies, both in terms of knowledge and attitude, and confirm what has been described in other studies (e.g., Becerra et al., 2020; Hernandez et al., 2022; Kumar et al., 2020) regarding the conflict between the importance of research training and how difficult and discouraging teaching it can be.

Typically, at the undergraduate level, RM is taught to introduce students with research methods and data processing so that they can develop their own research studies, i.e., to produce knowledge, which may impact the perceived disconnection of RM with practice and, consequently, negative attitudes about its usefulness and significance (Griffioen, 2019; Gurung & Stoa, 2020; Strohmetz et al., 2023). In contrast, when a teaching strategy is adopted that explicitly considers students' baseline knowledge, interests, attitudes, and anxiety toward RM, attitudes toward RM improve, and even more so when students are able to investigate topics of personal interest and apply course concepts in non-academic and professional contexts (Wishkoski et al., 2022).

Regarding the limitations of the study, although the instruments employed proved to be an adequate measure of attitudes, the omission of the complexity dimension in the semantic differential scale due the low reliability coefficient suggests the need to include more precise descriptors that facilitate the understanding of the perceived complexity of research by students, as some studies report that difficulty is perceived as a barrier that is negatively associated with attitudes towards IM (Balloo, 2019; Kumar et al., 2020). In

addition, it is conceivable that the sample size utilized affected the statistical power of the study, despite the consistency of the identified associations when employing robust statistical analysis methods and controlling for multiple variables.

Conclusions

Students' experiences in research methodology courses appear to affect their attitudes toward research and, consequently, the likelihood of incorporating it into their professional practice following academic training. Research in this area with appropriate designs is warranted.

An approach to teaching RM at the undergraduate level that is based more on the promotion of evidence-based practice than on the production and execution of research projects, which are almost always limited in scope and manufacture, appears to be a potential area of research, with implications for the transformation of teaching strategies and contents.

This implies that effective training in RM is significant in the formation of empirical epistemic thinking, as opposed to intuitive thinking, which is more likely to promote practices without scientific basis (Gaudiano et al., 2011; Landa-Blanco & Cortés-Ramos, 2021; Nussbaumer-Streit et al., 2022).

Contribución de cada autor

Mario E. Rojas-Russell: Concepción y diseño, Metodología, Análisis e interpretación de datos, Redacción del artículo.
Ma. Fernanda Martínez-Hirota: Recopilación de datos, Metodología, Análisis e interpretación de datos.
Angel F. García-Pacheco: Adquisición de fondos, Metodología, Redacción del artículo.
Karina Serrano-Alvarado: Metodología, Análisis e interpretación de datos, Redacción del artículo.

Declaración de no conflicto de intereses

Los autores declaran no tener conflicto de intereses.

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