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Attitudes Toward Research in Undergraduate Psychology Students at a Public University in Mexico: A Cross-Sectional Study

Actitudes hacia la investigación en estudiantes de licenciatura en Psicología de una universidad pública de México: un estudio transversal

Mario Rojas-Russell | Universidad Nacional Autónoma de México
María Fernanda Martínez Hirota | Universidad Nacional Autónoma de México
Ángel Francisco García Pacheco | Universidad Nacional Autónoma de México
Karina Serrano-Alvarado | Universidad Nacional Autónoma de México

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Abstract

This research aims to examine the relationship between experience and knowledge acquired 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-point 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 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 ($p < 0.01$). Our results highlight the significance of teaching in developing student knowledge and attitudes toward research. 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 appears to hold promise as a focus for future research, with implications that may inform changes in teaching methods and content.

Keywords: methodology, teaching, undergraduate, psychology, students

Resumen

Esta investigación tiene como objetivo examinar la relación entre la experiencia y los conocimientos adquiridos en los cursos de metodología de la investigación (MI) y las actitudes hacia la investigación en una muestra de estudiantes de licenciatura de 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 puntos para evaluar la experiencia percibida en los cursos de MI, junto con dos medidas de actitudes hacia la investigación.

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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 los cursos de MI y dos de las tres actitudes negativas hacia la investigación ($p < 0.01$). Nuestros resultados resaltan la importancia de la enseñanza en el desarrollo de los conocimientos y actitudes de los estudiantes en materia de investigación. Un 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 ejecución de proyectos de investigación, parece una orientación prometedora para investigaciones futuras, con implicaciones que podrían transformar los métodos y contenidos de esta enseñanza.

Palabras clave: metodología, enseñanza, estudiante universitario, psicología

I. Introduction

Research methodology (RM) is included in the curricula of all scientific disciplines and is important for several reasons. First, RM teaches students to analyze and evaluate data and build logical evidence-based arguments, 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 lays the groundwork for graduate studies, in which RM is an integral part of coursework. In this sense, introducing RM at the undergraduate level better equips students to meet the demands of graduate research (Madan & Teitge, 2013). Third, RM provides students with data collection and analysis skills that are essential for making evidence-based decisions in a variety of settings, including academia, business, and government (Webber, 2013). Fourth, students become better equipped to conduct research, which can lead to increased research productivity and quality (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 students' future careers.

Despite these advantages, teaching RM can be challenging. Undergraduate students often approach the course with a negative attitude because they are unaware of its benefits or because their past experience of learning RM has been poor, 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 and Fishbein (2000) "use the term 'attitude' to refer to the evaluation of an object, concept, or behavior along a dimension of favor or disfavor, good or bad, like or dislike" (p.3).

There is variability in the results of studies that have described undergraduate psychology students' attitudes toward science, psychology as a science, or the teaching of research methodology. While some report that students prefer activities requiring less commitment, effort, and initiative than commonly available psychological research activities (e.g., listening to or reading about research vs. helping to conduct it; Vittengl et al., 2004), others have found that undergraduates' intentions to engage in research-related activities were most influenced by their attitudes toward research in their future career field. These attitudes were found to be more influential than their research activities and perceptions of the research environment (Griffioen, 2019). In addition, the fact that students do not recognize psychology as a science may be suggestive of their low regard for scientific inquiry (Holmes & Beins, 2009).

One underexplored line of inquiry is the relationship between attitudes toward research and perceived experience in research methodology training. Recent qualitative research with Colombian university students found that RM courses were seen as annoying, unimportant, and easy to pass. The study also identified the teacher's pedagogical practice and the curricular content of the course as reasons for the negative perceptions (Álvarez Merlano et al., 2022).

Based on the hypothesis that a satisfactory experience with an RM course will be associated with more positive attitudes toward research, and that knowledge gained through training will also be positively related to RM, this study examined these relationships in psychology students at a public university in Mexico City.

II. Method

Design. A cross-sectional study was conducted between August and October 2022.

Participants. Using non-probability sampling, students from different groups and semesters at a public school of psychology were invited to participate voluntarily in the study. The inclusion criteria were that participants had to be formally enrolled in any semester of the degree program or have completed their degree in the previous six months at the time of measurement.

Variables. Research attitudes: The questionnaire "Attitude Toward Research in University Students" (Barrios & Delgado, 2020), consisting of 28 statements, was used. Four constructs with seven items each were identified in the original version: research skills, positive appraisal, obstacles to research, and negative appraisal. The responses follow a Likert scale format (0 = strongly disagree; 1 = disagree; 2 = agree; 3 = strongly agree). The authors reported a coefficient of internal consistency of 0.73 for the full questionnaire.

Also, based on earlier work with psychology students at the university where the study was conducted (Montero, 2019), another scale of attitudes toward research with a semantic differential structure was also developed, which included a set of ten bipolar adjectives (Research is... interesting - boring, easy - difficult, etc.).

Experience in research methodology courses (ERMC): A 10-point analog scale (from 1 to 10) was used, where 1 was the "worst experience in research methodology courses" and 10 was the "best experience in research methodology courses."

The following were included as sociodemographic and academic performance covariates: age, gender, subjects failed, grade point average (from 5 to 10), and semester of enrollment.

Procedure. First, judges reviewed the instruments to ensure their face validity. Once corrected, all instruments were uploaded to a form hosted on Google Forms. A pilot test was carried out with 10 students from the target population to discover potential mistakes in the instructions and form navigation.

Participating students were recruited on a voluntary basis through classroom invitations and with the consent of the class professor. Participants used their cell phones to access the form using a QR code. They were first required to explicitly state that they agreed to participate and give their informed consent, with the assurance that confidentiality and anonymity would be maintained. Those who agreed proceeded to complete the instruments. All of them were thanked for their participation upon conclusion.

Statistical Analysis. A descriptive analysis of the sociodemographic and academic variables was performed. Quantitative variables were described with measures of central tendency and dispersion, and qualitative variables with frequencies and proportions. A confirmatory factor analysis (CFA) of the research attitude scale and an exploratory factor analysis (EFA) of the attitude scale in semantic differential format were performed, respectively. 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, multivariate models were estimated, one for each attitude scale, with research methodology experience as the independent variable and the sociodemographic and academic variables as covariables. A value of $p < .05$ was established as the significance criterion. All analyses were performed with Stata v. 17 software (StataCorp, 2021).

III. Results

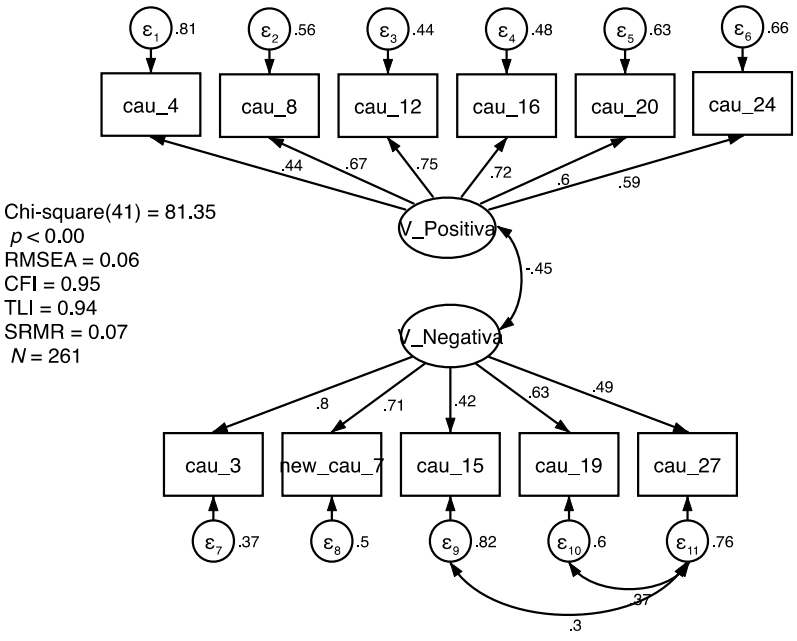
Table 1 shows the characteristics of the study sample. A total of 261 participants were recruited, mostly women (62%). No significant differences were observed in the distribution of participants by sex and semester, nor were there differences between sexes in age or in percentage of failed students. Females had a slightly but significantly higher grade point average (GPA) than males.

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

Variable	N	Male	Female	*p*
Semester, n (%)	Total	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 (SD)	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 (SD)	8.8 (0.70)	8.7 (0.75)	8.9 (0.65)	0.02

Note: SD: standard deviation; GPA: grade point average.
For the GPA and failed courses variables, first-semester students were excluded.

Figure 1. Confirmatory Factor Analysis of the Research Attitudes Questionnaire



For the research attitude questionnaire, CFA did not replicate the factor structure of the original instrument (Barrios & Delgado, 2020). 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).

For the semantic differential attitude scale, the matrix determinant of 0.034, Keiser-Meyer Olkin (0.80), and Bartlett's sphericity tests (χ^2 = 864.36, p < 0.05) together showed that exploratory factor analysis was feasible. EFA 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. 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. The correlations support the instruments' 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 of 6.5 and 5.3, respectively), no significant differences were found in the positive appraisal, negative appraisal, meaningless, boring, or ERMC variables, by sex, semester, or existence of previous failed courses.

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

Variable	Mdn	IQR	1	2	3	4	5	6
ERMC	7	6, 8	--					
GPA	8.9	8.4, 9.3	-.15*	--				
Positive appraisal	14	12, 16	.19**	-.02				
Negative appraisal	8	6, 10	-.32**	.00	-.27**	--		
Meaningless	4	4, 6	-.08	-.11	-.41**	.17*	--	
Boring	5	4, 7	-.23**	-.17	-.38**	.59**	.40**	--

Note. Mdn: Median, IQR: Interquartile range; ERMC: Experience in research methodology courses; GPA: Grade point average. *p < .05; **p < .01.

3.1 Multivariate Analyses

Since the dependent variables were not normally distributed, it was decided to perform the 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 appraisal of 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 having reported failed courses.

IV. Discussion and conclusions

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, having failed courses, academic semester, and gender.

The results are consistent with a study by Landa-Blanco and Cortés Ramos (2021) who found 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 appears to suggest that this is the variable best associated with attitudes towards RM. This underscores the importance of the impact 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 previous study with undergraduate psychology students showed that after attending an RM and statistics course, students' knowledge improved, while their interest and attitudes regarding perceived usefulness decreased (Sizemore & Lewandowski, 2009). Additionally, in research by Freng (2019), 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, or perceived anxiety about RM, which is consistent with the results reported here.

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 it can be to teach RM.

Typically, at the undergraduate level, RM is taught in order to introduce students to research methods and data processing so that they can develop their own research studies to produce knowledge; this may impact the perceived disconnect between RM and practice and, consequently, may result in negative attitudes regarding the usefulness and significance of RM (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 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).

Although the instruments employed proved to be an adequate measure of attitudes, the omission of the complexity dimension in the semantic differential scale due to the low reliability coefficient suggests a need to include more precise descriptors that facilitate understanding of perceived complexity of RM among students, as some studies report that difficulty is perceived as a barrier that is negatively associated with attitudes towards RM (Balloo, 2019; Kumar et al., 2020). As an additional limitation, it is conceivable that the sample size used affected the statistical power of the study, despite the consistency of the identified associations, shown here by applying robust statistical analysis methods and controlling for multiple variables.

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 any scientific basis (Gaudiano et al., 2011; Landa-Blanco & Cortés-Ramos, 2021; Nussbaumer-Streit et al., 2022).

Students' experiences in research methodology courses appear to affect their attitudes toward research and, consequently, the likelihood of incorporating research into later professional practice. 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 content.

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Contribution of each author

Mario Rojas-Russell: conceptualization, methodology, formal analysis, writing-original draft.
María Fernanda Martínez: data curation, methodology, formal analysis.
Ángel Francisco García: funding acquisition, methodology, writing-original draft.
Karina Serrano-Alvarado: methodology, formal analysis, writing-original draft.

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