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Positive and negative attitudes towards research of undergraduate students: A cross-sectional study

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ABSTRACT

Scientific research is extremely significant in nearly every element of modern life. Students at the undergraduate college or university level tend to perceive research-related courses with both positive and negative emotions. However, the previous studies mainly focus on positive attitudes; to our knowledge, few research explored the negative attitude of undergraduate students. This study investigates both positive and negative attitudes of the Vietnamese undergraduate students towards research. A total of 1067 respondents were sampled and who completed the Attitudes Toward Research Scale questionnaire. The data were analyzed using descriptive statistics, the t-test, Pearson correlation, and an analysis of variance (ANOVA). The results showed that the reliability of the scales was high and acceptable; and the validity of the scales was good and acceptable fit. There were both positive and negative attitudes toward research among undergraduates. Significant differences were seen between gender, school year, research experience, and continued study groups. Male students, who had research experience, and those who continued study had more positive attitudes than others. This study presents several theories for comparison and explanation with prior research. In addition, colleges must place a greater emphasis on teaching and scientific research in order to provide students with essential information and enhance their attitudes toward scientific research.

Contribution/Originality; The study investigated both positive and negative attitudes of undergraduate students towards research. This study shows how researchers of both types can develop a more impartial perspective for research assisted with theories and utilizing prior research.

1. INTRODUCTION

There is no denying that scientific research plays an incredibly important role in almost every aspect of modern life. Encouraging students to study science subjects is necessary for any country's future. Although the concept of scientific research is defined in various ways in the literature, according to Babbie (2015) scientific research is the way: (1) People systematically learn about scientific phenomena; and (2) The process of applying ideas, principles to find new knowledge to explain things and phenomena. In that way, the attitude towards scientific research is the

evaluation of students' feelings, thinking, and perceptions about research in universities. Attitude can be measured through the student's awareness or personal behavior towards the study.

Studying the attitudes of students towards science is not a fresh idea at all. There have been many studies around the world that have surveyed students' attitudes towards scientific research, with scales of gender differences, majors, school years, etc. When it comes to gender differences in scientific research attitudes, the study by Saleem, Farid, and Akhter (2015) found a significant difference between the attitudes of male and female students. Besides, results of the research by Shaukat, Siddiquah, Abiodullah, and Akbar (2014) also indicated that the males had significantly more positive attitudes toward research than the females. In the same way, research by Memarpour, Fard, and Ghasemi (2015) has shown that female students have better knowledge than male students at Shiraz University medical science students.

Another study Babalis, Xanthakou, Kaila, & Stavrou, 2012), showed the opposite, that there was no significant difference in research attitude and creative thinking between male and female students. Several other studies also suggested similar results in dental students (Habib, AlOtaibi, Abdullatif, & AlAhmad, 2018) medical students (Imran et al., 2019) and psychology students (Tran-Chi et al., 2019). Furthermore, some studies explored that level of education is an important factor affecting research attitude in undergraduates. Research by Halabi (2016) proved this when the results showed clearly that younger students had a more positive attitude. On the contrary, research by Ünver, Semerci, Özkan, and Avcibasi (2018) determined that third-year students had a more positive attitude toward research than other academic years. Meanwhile, the results of the study by Habineza (2018) revealed that there is no statistically significant difference based on academic years.

To our knowledge, there are no previous studies that have surveyed students' attitudes towards scientific research in a large area, specifically in Vietnam. To overcome this problem, in the next section, we demonstrate Vietnamese undergraduate students' attitudes towards scientific research. The main purpose of this study was to investigate Vietnamese students' attitudes toward scientific research based on the Attitudes Toward Research Scale. Hopefully, with the findings of our study, we will propose meaningful ways to solve the pressing problems that students could face in their science approaching.

2. METHODS

2.1. Data Collection

A simple random sampling method was used to collect data for this investigation. A sample size of 1067 students participated in the survey, out of which 458 (42.9%) were males, while 609 (57.1%) were females; 244 (22.9%) were freshmen, 372 (34.9%) were sophomores, 283 (26.5%) were juniors, and 168 (15.7%) were seniors. There were 196 (18.4%) students from Ho Chi Minh City University of Education (HCMUE), 61 (5.7%) students from Saigon University (SGU), 64 (6.0%) students from Van Hien University (VHU), 20 (1.9%) students from Ho Chi Minh City University of Technology (HUTECH), 22 (2.1%) students from University of Medicine and Pharmacy at Ho Chi Minh City (UMP), 49 (4.6%) students from Ton Duc Thang University (TDTU), 13 (1.2%) students from Viet Nam National University of Ho Chi Minh City-University of Social Sciences and Humanities (VNUHCM-USSH), 182 (17.1%) students from University of Economics Ho Chi Minh City (UEH), 52 (4.9%) students from Ho Chi Minh City University of Economics and Finance (UEF), 142 (13.3%) students from Viet Nam National University of Ho Chi Minh City-University of Technology (VNUHCM-UT), 132 (13.4%) students from Ho Chi Minh City University of Technology and Education (HCMUTE), and 134 (12.6%) students from the other universities.

Table 1 describes the demographic and number of participants.

Table 1. Demographic and number of participants.

Demographics		n	%
Gender			
	Male	458	42.9
	Female	609	57.1
Schoolyear			
	Freshmen	244	22.9
	Sophomore	372	34.9
	Senior	283	26.5
	Junior	168	15.7
Research experience			
	Yes	297	27.8
	No	770	72.2
Continue study			
	Yes	622	58.3
	No	445	41.7
University			
	HCMUE	196	18.4
	SGU	61	5.7
	VHU	64	6.0
	HUTECH	20	1.9
	UMP	22	2.1
	TDTU	49	4.6
	VNUHCM-USSH	13	1.2
	UEH	182	17.1
	UEF	52	4.9
	VNUHCM-UT	142	13.3
	HCMUTE	132	12.4
	Other universities	134	12.6

Note: N: Number of participants; %: Percentage.

2.2. Measurement

All participants were requested to identify their personal information, which included their gender (male/female), schoolyear (freshman/sophomore/junior/senior), research experience (yes/no), and whether or not they desired to continue with their studying (yes/no). We used the Attitudes Toward Research Scale (ATRS), created and re-tested by Papanastasiou and Schumacker (2014) to examine undergraduate students' attitudes toward research. The ATRS was translated into Vietnamese by two bilingual researchers who were knowledgeable about the examined construct. One spoke Vietnamese as their native language, while the other spoke English. Both forward and backward translation processes were utilized.

The five subscales of the ATRS included Research Usefulness for Profession (RUfP – 9 items), Research Anxiety (RA – 7 items), Positive Attitudes Toward Research (PATR – 7 items), Research Difficulty (RD – 3 items), and Relevance to Life (RtL – 4 items). All 30 items were rated on a 7-point Likert scale ranging from 1 – Strongly Disagree to 7 – Strongly Agree. In the original study, all negatively worded items were inverted so that a higher Likert scale score could indicate positive attitudes (Papanastasiou, 2005). However, we intended to examine both positive and negative attitudes in this study; thus, only three items (no. 21, 24, and 28) were reversed/recoded (Papanastasiou & Schumacker, 2014).

According to Malhotra, Nunan, and Birks (2017) the method for ranking discrete values is (Maximum – Minimum)/n = (7 – 1)/7 = 0.85. Therefore, the rankings used were Strongly Disagree (1.00 – 1.85), Disagree (1.86 – 2.71), Somewhat Disagree (2.72 – 3.57), Neutral (3.58 – 4.43), Somewhat Agree (4.44 – 5.29), Agree (5.30 – 6.15), Strongly Agree (6.16 – 7.00).

2.3. Data Analysis

To determine the validity and reliability of the ATRS, Confirmatory Factor Analysis (CFA), Cronbach's Alpha, and the Composite Reliability test were utilized. The data was then analyzed using T-test, ANOVA, and Pearson Correlations. All of the following analysis techniques were calculated using Statistical Package for the Social Sciences (SPSS) version 26 and Analysis of Moment Structures (AOMS) version 25.

3. RESULTS

3.1. Factorial Validity

The five subscales were examined using CFA with the acceptance level of the Model Fit model index according to Hair, Black, Babin, and Anderson (2009); Hu and Bentler (1999):

- Chi-square divided degree of freedom (CMIN/df) ≤ 3 is a good fit, and CMIN/df ≤ 5 is an acceptable fit. The result showed that CMIN/df = 8.720 is not fit.
- Comparative Fix Index (CFI) ≥ 0.90 is good fit and CFI ≥ .80 is acceptable fit. The result showed that CFI = 0.873 is an acceptable fit.
- The Goodness of Fix Index (GFI) ≥ 0.90 is a good fit, and some research considered GFI ≥ .80 to be an acceptable fit (Baumgartner & Homburg, 1996; Doll, Xia, & Torkzadeh, 1994). The result showed that GFI = .838 is an acceptable fit.
- Tucker-Lewis Index (TLI) ≥ 0.90 is a good fit. The result showed that TLI = 0.848 is not fit.
- Root Mean Square Errors of Approximation (RMSEA) ≤ .08 is a good fit. The result showed that RMSEA = 0.085 is not fit.

To the above results, there were just two values that were acceptable fit (CFI = 0.873 and GFI = 0.838); the other value (CMIN/df, TLI, RMSEA) were not fit with the data.

3.2. Reliability

The internal consistency was calculated by using Cronbach's Alpha (Cronbach, 1951; Hair, Hult, Ringle, & Sarstedt, 2016) and Composite Reliability (CR) (Hair et al., 2016) test for five subscales. The Cronbach's Alpha and Composite Reliability of five subscale were RUfP: α = 0.927, CR = 0.925; RA: α = 0.872, CR = 0.860; PATR: α = 0.913, CR = 0.917; RD: α = 0.403, CR = 0.561; RtL: α = 0.450, CR = 0.473. Despite the fact that two factors had low scores on Cronbach's Alpha and the Composite Reliability test, this may be due to contextual differences – students responded to scale items based on their own level of comprehension.

3.3. Descriptive Analysis

The participants' average score was M = 5.12 (SD = 1.32) in RUfP subscale, M = 4.35 (SD = 1.31) in RA subscale, M = 4.56 (SD = 1.36) in PATR subscale, M = 4.25 (SD = 1.13) in RD subscale, and M = 4.53 (SD = 1.06) in RtL subscale.

Table 2 shows the descriptive statistics of five subscales.

Table 2. Descriptive statistics of five subscales.

Attitude	M	SD
Positive attitude		
Research usefulness for profession (RUfP)	5.12	1.32
Positive attitudes toward research (PATR)	4.56	1.36
Relevance to life (RtL)	4.53	1.06
Negative attitude		
Research anxiety (RA)	4.35	1.31
Research difficulty (RD)	4.25	1.13

Note: M: Mean; SD: Standard deviation.

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3.4. Comparison of Analysis

3.4.1. Gender

The Independent-Samples T-Test was performed with test variables were five subscales (RUfP, RA, PATR, PD, and RtL), and the grouping variable was gender (male/female).

There was a significant difference between males and females in four subscales RA, PATR, RD, and RtL. Male (M_{PATR} = 4.77, SD_{PATR} = 1.35; M_{RtL} = 4.66, SD_{RtL} = 1.02) had the higher score than female (M_{PATR} = 4.40, SD_{PATR} = 1.34; M_{RtL} = 4.44, SD_{RtL} = 1.09) in PATR ($t_{(1065)}$ = 4.447, p < 0.001) and RtL ($t_{(1065)}$ = 3.297, p = 0.001). However, female (M_{RA} = 4.46, SD_{RA} = 1.33; M_{RD} = 4.38, SD_{RD} = 1.16) had the higher score than male (M_{RA} = 4.20, SD_{RA} = 1.27; M_{RD} = 4.07, SD_{RD} = 1.06) in RA ($t_{(1065)}$ = -3.252, p = 0.001) and RD ($t_{(1065)}$ = -4.484, p < 0.001). Besides, there was no significant difference between male (M_{RUfP} = 5.16, SD_{RUfP} = 1.35) and female (M_{RUfP} = 5.08, SD_{RUfP} = 1.31) in RUfP subscale ($t_{(1065)}$ = 1.040, p = 0.299).

3.4.2. Research Experience

The Independent-Samples T-Test was performed with test variables of five subscales (RUfP, RA, PATR, RD, and RtL), and the grouping variable was research experience (Yes/No).

There was a significant difference between those with research experience and those without research experience in three subscales RUfP, PATR, and RtL. Students who had research experience (M_{RUfP} = 5.32, SD_{RUfP} = 1.34; M_{PATR} = 4.75, SD_{PATR} = 1.43; M_{RtL} = 4.72, SD_{RtL} = 1.16) had the higher score than who had not (M_{RUfP} = 5.04, SD_{RUfP} = 1.31; M_{PATR} = 4.48, SD_{PATR} = 1.32; M_{RtL} = 4.46, SD_{RtL} = 1.02) in RUfP ($t_{(1065)}$ = 3.175, p < 0.01), PATR ($t_{(1065)}$ = 2.948, p < 0.01), and RtL ($t_{(1065)}$ = 3.358, p = 0.001).

Besides, there was no significant difference between students who had research experience (M_{RA} = 4.31, SD_{RA} = 1.38; M_{RD} = 4.23, SD_{RD} = 1.14) and had not research experience (M_{RA} = 4.37, SD_{RA} = 1.29; M_{RD} = 4.25, SD_{RD} = 1.13) in RA ($t_{(1065)}$ = -0.637, p = 0.525) and RD ($t_{(1065)}$ = -0.311, p = 0.756).

3.4.3. Continue Study (i.e., MA, Ph.D.)

The Independent-Samples T-Test was performed with test variables of five subscales (RUfP, RA, PATR, RD, and RtL), and the grouping variable was continued study (Yes/No).

There was a significant difference between the ones who decided to continue their study and who decided not to continue their study in three subscales RUfP, PATR, and RtL. The one who decided to continue their study (M_{RUfP} = 5.32, SD_{RUfP} = 1.30; M_{PATR} = 4.81, SD_{PATR} = 1.33; M_{RtL} = 4.72, SD_{RtL} = 1.05) had the higher score than who had not (M_{RUfP} = 4.83, SD_{RUfP} = 1.31; M_{PATR} = 4.19, SD_{PATR} = 1.32; M_{RtL} = 4.27, SD_{RtL} = 1.03) in RUfP ($t_{(1065)}$ = 6.104, p < 0.001), PATR ($t_{(1065)}$ = 7.550, p < 0.001), and RtL ($t_{(1065)}$ = 6.990, p < 0.001).

Besides, there was no significant difference between the one who decided to continue their study (M_{RA} = 4.35, SD_{RA} = 1.30; M_{RD} = 4.23, SD_{RD} = 1.13) and who had decided not to continue their study (M_{RA} = 4.35, SD_{RA} = 1.33; M_{RD} = 4.28, SD_{RD} = 1.14) in RA ($t_{(1065)}$ = -0.045, p = 0.964) and RD ($t_{(1065)}$ = -0.726, p = 0.468).

3.4.4. School Year

A One-Way ANOVA was performed with test variables of five subscales (RUfP, RA, PATR, RD, and RtL), and the grouping variable was schoolyear (freshman, sophomore, junior, senior). The Test of Homogeneity of Variances revealed that four subscales RUfP ($F_{(3, 1063)}$ = 1.620, p = 0.183), RA ($F_{(3, 1063)}$ = 0.334, p = 0.801), PATR ($F_{(3, 1063)}$ = 0.111, p = 0.954), and RD ($F_{(3, 1063)}$ = 1.917, p = 0.125) were statistically significant, indicating that the variances were not different; hence, the ANOVA table was chosen to display the results. Since the variances of RtL subscales different ($F_{(3, 1063)}$ = 3.425, p = 0.017), the Robust Tests for RtL subscales would be reported (Field, 2017; Green & Salkind, 2014).

Table 3 presents an analysis of variance (ANOVA).

Table 3. Analysis of variance (ANOVA).

Variable		Sum of squares	df	Mean square	F	Sig.
RUfP	Between groups	11.294	3	3.765	2.154	0.092
	Within groups	1857.878	1063	1.748		
	Total	1869.172	1066			
RA	Between groups	40.484	3	13.495	7.985	0.001
	Within groups	1796.400	1063	1.690		
	Total	1836.884	1066			
PATR	Between groups	7.666	3	2.555	1.389	0.245
	Within groups	1956.256	1063	1.840		
	Total	1963.922	1066			
RD	Between groups	6.945	3	2.315	1.812	0.143
	Within groups	1358.402	1063	1.278		
	Total	1365.347	1066			
RtL	Between groups	17.469	3	5.823	5.209	0.001
	Within groups	1188.415	1063	1.118		
	Total	1205.884	1066			

There was a significant difference between school year in RA and RtL subscale in which, Junior (M = 4.57, SD = 1.31) had the higher score than sophomore (M = 4.42, SD = 1.30), senior (M = 4.28, SD = 1.32), and freshman (M = 4.04, SD = 1.27) in RA ($F_{(3, 1063)}$ = 7.985, p < 0.001) subscale. Freshman (M = 4.76, SD = 0.98) had the higher score than sophomore (M = 4.51, SD = 1.03), senior (M = 4.47, SD = 0.96), and junior (M = 4.41, SD = 1.19) in RtL ($W_{(3, 1063)}$ = 5.458, p = 0.001) subscale.

Besides, there was not significant difference between school year in RUfP ($F_{(3, 1063)}$ = 2.154, p = 0.092), PATR ($F_{(3, 1063)}$ = 1.389, p = 0.245), and RD ($F_{(3, 1063)}$ = 2.315, p = 0.143) subscale.

Table 4 presents the robust tests of equality of means.

Table 4. Robust tests of equality of means.

Variable		Statistic[a]	df1	df2	Sig.
RUfP	Welch	2.136	3	511.659	0.095
RA	Welch	8.152	3	511.832	0.001
PATR	Welch	1.368	3	509.172	0.252
RD	Welch	1.824	3	514.669	0.142
RtL	Welch	5.458	3	519.516	0.001

Note: a: Asymptotically F distributed.

Table 5 shows the correlations between positive attitudes.

Table 5. Correlations between positive attitudes.

Variable	Research usefulness	Positive attitudes towards research	Relevance to life
Research usefulness	1	0.792**	0.531**
Positive attitudes towards research		1	0.553**
Relevance to life			1

Note: **. Correlation is significant at the .01 level (2-tailed).

3.5. Correlation

There was a strong correlation between RUfP and PATR (r = 0.792, p < 0.001), also a moderate correlation between RUfP and RtL (r = 0.531, p < 0.001); PATR and RtL (r = 0.553, p < 0.001) in the positive attitude subscales. In the negative attitude subscales, there was a moderate correlation between RA and RD (r = .589, p < 0.001).

Table 6 shows the correlations between negative attitudes.

Table 6. Correlations between negative attitudes.

Variable	Research anxiety	Research difficulty
Research anxiety	1	0.589**
Research difficulty		1

Note: **. Correlation is significant at the .01 level (2-tailed).

4. DISCUSSION

The result indicates that students had a positive attitude towards research; they agreed that it is beneficial to their profession and important to their lives. A prior study also demonstrated that students have a positive attitude toward research (Brooke, Hvalič-Touzery, & Skela-Savič, 2015; Halabi, 2016; Ünver et al., 2018). Concerning negative attitudes, students exhibited a neutral stance regarding research anxiety and research difficulty. One study indicated that students had a negative attitude toward research due to its complexity (Owens & Kelly, 1998).

Males showed a more positive attitude toward research and viewed it as more relevant to everyday life than females (Shaukat et al., 2014). A study revealed that males had a considerably more positive attitude toward research than females (Kakupa & Xue, 2019). However, females were more demanding and stressed than male while doing research. Williams and Coles (2003) found that females may be less enthusiastic about research or less oriented toward mathematics, statistics, and economics than their male counterparts (Lindsay, Breen, & Jenkins, 2002). In addition, both male and female acknowledged the value of research to their respective professions as Siamian, Mahmoudi, Habibi, Latifi, and Zare-Gavgani (2016) found that male and female opinions about research were identically positive and negative. Students with research experience or who desired to continue their education (MA, Ph.D.) were more positive than those who did not. Kakupa and Xue (2019). Ünver et al. (2018) discovered that participants with scientific research experience had a more favorable view toward research and researchers than those without such expertise. Other studies of (Uysal, Hamaratçılar, Tülü, & Erkin, 2017) reached the same conclusion. However, according to Ryan (2016), undergraduate students exhibited positive views about research but lacked sufficient experience with regard to support and opportunity. However, there was no difference between students with research experience and those who wished to continue their education (MA, Ph.D.) with a negative attitude. Williams and Coles (2003) observed that research experience influenced attitudes toward research, with individuals who have previously conducted research having a more positive outlook. Furthermore, doctoral students are typically people who are preparing for university careers in teaching and research or who are currently in junior academic positions in the research sector, and as such, they may already have a strong interest in learning.

Junior students showed greater research anxiety than other students, whereas freshmen had a greater appreciation for research's significance in life. This can be explained by the fact that some junior students were utilizing scientific research to prepare for their senior theses, hence challenging scientific research. First-year students were learning about "science" for the first time, which may lead them to believe that scientific study has practical applications. Mutz and Daniel (2012) demonstrated that younger students (freshmen) have a very optimistic view of research. However, Halabi (2016) discovered that senior students were more enthusiastic about research than their junior counterparts. However, research conducted by Siamian et al. (2016) revealed that there was no distinction between schoolyears. The study also indicated that the correlation between subscales of positive and negative attitudes was moderate to strong. A positive attitude toward research subscale increases, as do research usefulness and relevance to life; research difficulty increases, and so does research anxiety. This result provided evidence for the exploration of regression, mediator, and moderator statistics in the future study.

The unequal sample sizes between groups are one of the study's limitations. The sample size within each of the four groups (gender, schoolyear, research experience, and continued study) was roughly 1.5 times bigger than that of the other group. Future research must prioritize and select sample sizes that are more comparable in order to yield more accurate statistical results. The low Cronbach's Alpha of two negative subscales may be due, in part, to the fact that each of these subscales has fewer than five items. Another factor may be contextual variations; students responded to scale items based on their own level of comprehension.

5. CONCLUSION

This study examined undergraduate students' positive and negative attitudes towards research. Students exhibit both positive and negative attitudes, as was demonstrated by the findings. Students also differed in their attitude by gender, school year, research experience, and continued study (MA, Ph.D.). Lack of professional statistical instruction for young students hampered their ability to conduct research. A lack of knowledgeable teachers as a guide to answer research inquiries causes student confusion and apathy (Siamian et al., 2016). Haaga and Kaufmann (2021) believed that undergraduates performing psychological research should not be deterred if they find the task to be complex, stressful, and difficult, as these are characteristics of experiences that ultimately lead to better learning and professional development. Students who are immediately doing new and challenging research projects without help or preparation may not profit from the research experience, according to Haaga and Kaufmann (2021). Future research may examine both positive and negative attitudes toward research, or it may focus on the positive attitude as the original study did; however, it is required that this study's limitations be eliminated.

REFERENCES

Babalis, T., Xanthakou, Y., Kaila, M., & Stavrou, N. (2012). Research attitude and innovative-creative thinking: Differences between undergraduate male and female students. *Procedia-Social and Behavioral Sciences, 69*, 1452-1461. https://doi.org/10.1016/j.sbspro.2012.12.085

Babbie, E. R. (2015). *The practice of social research: Nelson education* (14th ed.). Boston, MA, USA Cengage Learning.

Baumgartner, H., & Homburg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing, 13*(2), 139–161. https://doi.org/10.1016/0167-8116(95)00038-0

Brooke, J., Hvalič-Touzery, S., & Skela-Savič, B. (2015). Student nurse perceptions on evidence-based practice and research: an exploratory research study involving students from the University of Greenwich, England and the faculty of health Care Jesenice, Slovenia. *Nurse Education Today, 35*(7), e6-e11. https://doi.org/10.1016/j.nedt.2015.02.026

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297-334. https://doi.org/10.1007/bf02310555

Doll, W. J., Xia, W., & Torkzadeh, G. (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS Quarterly, 18*(4), 453–461. https://doi.org/10.2307/249524

Field, A. (2017). *Discovering statistics using IBM SPSS statistics* (5th ed.). California: Sage Publications Ltd.

Green, S. B., & Salkind, N. J. (2014). *Using SPSS for windows and macintosh: Analyzing and understanding data* (7th ed.). New York: Pearson.

Haaga, D. A., & Kaufmann, A. (2021). Desirable difficulty and attitudes toward research among psychology undergraduates. *College Teaching, 69*(1), 9-11. https://doi.org/10.1080/87567555.2020.1791037

Habib, S. R., AlOtaibi, S. S., Abdullatif, F. A., & AlAhmad, I. M. (2018). Knowledge and attitude of undergraduate dental students towards research. *Journal of Ayub Medical College, 30*(3), 443–448.

Habineza, F. (2018). An exploratory survey of undergraduate students' attitudes towards research in Ines-Ruhengeri in Rwanda. *International Educational Applied Scientific Research Journal, 3*(3), 1–5.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). New York: Pearson.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). California: SAGE Publications, Inc.

Halabi, J. O. (2016). Attitudes of Saudi nursing students toward nursing research. *Saudi Journal for Health Sciences, 5*(3), 118–124. https://doi.org/10.4103/2278-0521.195813

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118

Imran, S., Nazir, M., Dar, W., Aziz, U., Shoaib, R., Saleem, Q., & Zaman, M. (2019). Attitude towards research among undergraduate and postgraduate medical students. *Biomedica, 35*(4), 239-243.

Kakupa, P., & Xue, H. (2019). Students' attitudes towards research: A study of graduate education students at a Chinese normal University. *Educational Process: International Journal, 8*(2), 97-110. https://doi.org/10.22521/edupij.2019.82.1

Lindsay, R., Breen, R., & Jenkins, A. (2002). Academic research and teaching quality: The views of undergraduate and postgraduate students. *Studies in Higher Education, 27*(3), 309-327. https://doi.org/10.1080/03075070220000699

Malhotra, N. K., Nunan, D., & Birks, D. F. (2017). *Marketing research: An applied approach* (5th ed.). New York: Pearson.

Memarpour, M., Fard, A. P., & Ghasemi, R. (2015). Evaluation of attitude to, knowledge of and barriers toward research among medical science students. *Asia Pacific Family Medicine, 14*(1), 1–7. https://doi.org/10.1186/s12930-015-0019-2

Mutz, R., & Daniel, H. D. (2012). University and student segmentation: Multilevel latent-class analysis of students' attitudes towards research methods and Statistics. *British Journal of Educational Psychology, 83*(2), 280–304. https://doi.org/10.1111/j.2044-8279.2011.02062.x

Owens, P., & Kelly, J. (1998). Student nurses' attitudes towards research. *Nurse Educator, 23*(5), 29-34. https://doi.org/10.1097/00006223-199809000-00006

Papanastasiou, E. C. (2005). Factor structure of the attitudes toward research scale. *Statistics Education Research Journal, 4*(1), 16-26. https://doi.org/10.52041/serj.v4i1.523

Papanastasiou, E. C., & Schumacker, R. (2014). Rasch rating scale analysis of the attitudes toward research scale. *Journal of Applied Measurement, 15*(2), 189-199.

Ryan, E. J. (2016). Undergraduate nursing students' attitudes and use of research and evidence-based practice–an integrative literature review. *Journal of Clinical Nursing, 25*(11-12), 1548-1556. https://doi.org/10.1111/jocn.13229

Saleem, K., Farid, S., & Akhter, N. (2015). Gender differences in research attitudes: Comparison of public and privates sector postgraduate students' attitude towards research. *Pakistan Journal of Social Sciences, 35*(2), 669–679.

Shaukat, S., Siddiquah, A., Abiodullah, M., & Akbar, R. A. (2014). Postgraduate students' attitudes towards research. *Bulletin of Education and Research, 36*(1), 111–122.

Siamian, H., Mahmoudi, R., Habibi, F., Latifi, M., & Zare-Gavgani, V. (2016). Students' attitudes towards research at Mazandaran University of medical sciences in 2015. *Materia Socio-Medica, 28*(6), 468–472. https://doi.org/10.5455/msm.2016.28.468-472

Tran-Chi, V.-L., Truong-Thi, T.-T., Dang-Thi, N.-T., Tran-Thai, Y.-T., Nguyen-Thi, T.-V., Ngo-Thi, H.-G., & Ly-Hoang, H.-C. (2019). Exploring Vietnamese psychology undergraduates' attitudes towards research. *International Journal of Educational Sciences, 25*(1-3), 51-57. https://doi.org/10.31901/24566322.2019/25.1-3.1082

Ünver, S., Semerci, R., Özkan, Z. K., & Avcibasi, I. (2018). Attitude of nursing students toward scientific research: A cross-sectional study in Turkey. *Journal of Nursing Research, 26*(5), 356-361. https://doi.org/10.1097/jnr.0000000000000244

Uysal, T. A., Hamaratçılar, G., Tülü, B., & Erkin, Ö. (2017). Nursing students' attitudes toward research and development within nursing: Does writing a bachelor thesis make a difference? *International Journal of Nursing Practice, 23*(2), e12517. https://doi.org/10.1111/ijn.12517

Williams, D., & Coles, L. (2003). *The use of research by teachers: Information literacy, access and attitudes.* Aberdeen, SD: Economic and Social Research Council.