

# Longitudinal Study of Academic Self-Efficacy and Academic Stress in University Students in Mexico (stage two)

Luis Fernando Hernández Jácquez\*

Pedagogical University of Durango, Durango, México

\*Corresponding author: [lfhj1@hotmail.com](mailto:lfhj1@hotmail.com)

**Abstract** This research deals around the variables of academic self-efficacy and academic stress arising from the problems presented by undergraduate students of a university in Mexico. The main objective is to corroborate the main theoretical hypothesis about the self-efficacy is an inhibitory potential of the experimented stress of the people, for which a 50-student cohort (divided into two groups) was studied through a quantitative, non-experimental, correlational and longitudinal or evolutionary study over two school semesters (representing the second of three stages of Research), and using the Academic Self-Efficacy Expectations Inventory as a data collection instrument. The results show that statistically it is not possible to accept the theoretical hypothesis mentioned previously, since a significant association between both variables has not been identified in the two moments of the study. However, it has been possible to determine that in one of the study groups, the input dimension of academic self-efficacy and the general academic self-efficacy have evolved positively from one stage to another, that is, they have increased significantly, which is what is expected According to Albert Bandura's Theory of Self-efficacy, contrary to what is desirable regarding academic stress, which also increased, but theoretically it would have been expected to decrease.

**Keywords:** *academic self-efficacy, academic stress, university students*

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## 1. Introduction

The study of self-efficacy has become increasingly important in various areas of knowledge and fields of professional development, since it has been linked to different variables that affect the positive or negative performance of people.

By this way, In 2016 in the Spanish language, the self-efficacy has been investigated in relation to variables such as reading and gender ability [17], academic self-attribution [11], self-regulated student learning practices [24]; Predictive power over self-concept [10]; As a mediator of beliefs and feelings about academic potential and life satisfaction [1], student achievement [4], sociodemographic variables [18] and study time and self-regulation [9].

Specifically, the relationship between self-efficacy and stress was studied in the same year 2016 by Merino and Lucas [16], who elaborated on the possible modulatory role that self-efficacy and self-regulation can exert in the experience of work stress, finding that subjects with higher self-efficacy and self-regulation scores have lower levels of stress.

Taking into consideration the two-factor model which posits that mental health is more than the absence of psychopathological symptoms, Schönfeld, Brailovskaya, Bieda, Chi and Margraf [22] examined the mediation of

self-efficacy separately for positive and negative mental health in German students, finding that self-efficacy is a mediator of the effects of daily stress with superior effects on positive mental health.

Finally, Hernández [12] found a positive correlation between these variables in students of higher education in Mexico, presenting the academic self-efficacy a medium level and the academic stress a high level; In the other hand, Barraza and Hernández reported in 2015 [6] that it was not possible to statistically determine a relationship between academic self-efficacy and academic stress in postgraduate students, the first variable presenting a high level and the second a moderate level.

For the reason of the exposed, as a brief description of the state of knowledge of the variables involved in this study, the results presented in this research report correspond to the second stage of the study that seeks to evaluate the evolution of the relationship between the perceived academic self-efficacy and the Academic stress in higher education students in Mexico.

Reminiscing, the object of study focuses on the Pedagogical University of Durango (UPD) located in the state of the same name in Mexico, being an institution of higher education that offer degrees, specialties, master's and doctoral related to the topic education. In this offer is a Bachelors Degree of Educational Intervention. (LIE) as a professional option for graduates of secondary education.

It is precisely in this degree where it has been observed a lack of confidence in students to obtain academic success, especially in the first semesters and it is believed that this may be due to other aspects, first one is stress generated by academic activities during the studying of a degree, including adaptation to change of an academic level to the workload from the university as well as the knowledge about classmates and teachers.

In the first part of the study [13] the results showed that the students presented a high level in the output and input dimensions of the academic self-efficacy, corresponding to the security to be able to develop academic activities oriented to the production of information, and safety in order to be able to carry out the academic activities of input to the learning. With regard to the confidence to be able to perform the interaction activities (feedback dimension), the level presented was medium. Due the above, it was determined, that even close to the high level, the students presented an average level of perceived academic self-efficacy. Arguing to the second variable, academic stress was expressed as medium or moderate. In addition, a statistical relationship between both variables was not determined, with the exception of the feedback (academic self-efficacy) dimension and academic stress ( $r=-.234$ ).

Based on the above, the second of three stages of the study is now presented, which corresponds to the measurement of both variables after one more semester of studies.

It is recalled that the general objective of the whole evolutionary study is to determine the relationship between the academic self-efficacy and the academic stress of students in the Bachelor's Degree in Educational Intervention (LIE), the 2015 cohort of the Pedagogical University of Durango (UPD), during the first three semesters of study.

## 2. Theoretical Support: Academic Self-efficacy and Stress

The self-efficacy beliefs relate to each individual makes judgments about their capabilities to perform a task. Bandura (1997) [7] states that individuals possess an internal system that permit them to practice control over their own actions, behaviors and thoughts, been this system a fundamental component of influence in achieving the goals that everyone is proposed. Again, Bandura (1997) [7] states that "self-efficacy beliefs forms a decisive factor in achieving goals and individuals' tasks. If people believe they have no power to produce results, they will not make the intent to this will occur".

The perception of self-efficacy is a dynamic construct and therefore, perceived efficacy tends to change over time as a result of new experiences that are lived in different circumstances and contexts where personalities that influence the performance of each individual are required [7].

In regards to the self-efficacy distinction from other self-referential constructs. Bandura (1997) [7] explains that self-efficacy beliefs differ from self-esteem, self-concept and value judgments that the subject has on its global image. While self-efficacy refers perception of specific skills, self-esteem has to do with value judgments to himself and self-concept "is the general perception of the individual about himself..." [20].

Paraphrasing Bandura [2], the self-efficacy perception is defined as the set of individual judgments about their own abilities to organize and execute actions or required tasks to manage possible and specific situations. It follows that if the subject is deemed able and confident in their abilities to execute a specific task, this self-perception contributes to the success of their performance, therefore arguably the expected success in achieving a goal relating to the direct outcome of expectations that the subject anticipates.

Therefore, it is possible to speak about expectations of academic self-efficacy, which, paraphrasing Bandura (1997) [3], can be defined as the students' beliefs about their own ability to achieve their required academic activities in their school environment.

Also, according to Schunk [20], individuals acquire feedback about their self-efficacy in a certain area or task from their own executions (direct experiences, domain), model observations (vicarious experiences, modeling or learning by observation), forms of social persuasion (verbal, symbolic) and physiological indices (activation, state) [20]; been the first one the most influential source of information on performance capacities, since when the basis for a person's sense of self-efficacy is his / her own actions and achievements, that basis tends to be generalized to a range of similar activities (Bandura, 1997) [23].

Based on all these sources that originate perceived efficacy beliefs, Bandura (1997) [7] states that: the extent to which the achievements are derived from an execution altering the perceived effectiveness that will depend on the preconceptions of the person in relation to their abilities, perceived difficulty in perceiving tasks amount of intended effort, their physical and emotional state at the current time, the amount of external aid they receive, and these circumstantial situations they carry out their actions.

In the other hand, the relationship of stress with self-efficacy has been explicitly recognized by Lazarus, main theoretical exponent of stress. However, beyond this acceptance, it has configured a model that explains the relationship between both variables and argues that self-efficacy is a "protective" factor or "buffer" of stress [21].

According to Schwarzer and Hallum [21], "building self-efficacy suggests a protective effect when faced with adversity. One optimistic belief is in one's own competitiveness to confront daily challenges to increase the motivation to participate in constructive ways of confrontation". This assumption is also explained by Fernandez [8] as follows (theoretical hypothesis of the research):

...the conviction of living up to the challenges posed by the task at hand, and the feeling of having the cognitive, social and emotional resources to solve them, would be a kind of reducer of the potential stressful effect, allowing adequate performance and effective management of anxiety. Perceived self-efficacy linked to work would thus fulfill this function.

## 3. Methodology

This research was developed under the quantitative approach of a correction reach, non-experimental, since "...

the scientist has no direct control over the independent variables because their demonstrations have already taken place or that are inherently non-manipulable" [15] and longitudinal or evolutionary, it is of interest "to analyze changes over time of determined categories, concepts, events, variables, contexts or communities ..." [14]; being the month of December 2015 the first three applications with a bi annual periodicity: in December 2015, May and December 2016, which are the ending moments of the first three semesters of the study plan.

The design type is "evolution of groups" (cohort) because "changes over time at specific groups or sub-populations will be examined" [14], being the 2015 generation's cohort in the Bachelors Degree of Educational Intervention. Like all evolutionary research, its importance is that "each person contributes with the same antecedents (genetic, ethnic or other) and experiences to the test situation" [19], in addition, that in general, "allows to make speculations of modified cause and effect on the relationship between variables" [19] with which it tries to test what was proposed by Schwarzer and Hallum [21] and Fernández [8].

### 3.1. Research Hypothesis

The general hypothesis of the evolutionary research is:

$H_{1G}$ : Students of the LIE presents a negative relationship that gets stronger between academic self-efficacy and academic stress, according to the semester finalization of their studies.

Its counterpart is the null hypothesis is as:

$H_{01G}$ : Students of the LIE does not present an increasingly strong negative relationship between academic self-efficacy and academic stress, as each semester end of their studies.

The semester that is particularly under review is the early stages of study, the research hypotheses are:

$H_{11}$ : The students present a high level of academic self-efficacy.

$H_{12}$ : The students present a high level of academic stress.

$H_{13}$ : There is a negative relationship between self-efficacy academic and academic stress shown by students.

The null hypotheses consist of previous denials which are defined below:

$H_{01}$ : Students do not have a high level of academic self-efficacy.

$H_{02}$ : Students do not have a high level of academic stress.

$H_{03}$ : A negative relationship does not exist between academic self-efficacy and academic stress shown by students.

### 3.2. Subject

In the first stage of the research the subjects totaled 58 students, divided into groups A and B (with 31 and 27 students respectively). Nevertheless, due to the institutional and individual dynamics, eight students deserted, so the population for this second stage is made up of 50 people with the following characteristics (who answered the data instrument of collection in both moments of the study):

- a) Group A: 27 students, 93% female and 7% male; age range of 18-23 years with an average of 20.07 years.
- b) Group B: 23 students, 78% female and 22% male; age range of 18-26 years with an average of 20.26 years.

### 3.3. Techniques and Instruments for Data Collection

The technique utilized to collect data was the survey, and the instrument to research about academic self-efficacy was the Academic Self-efficacy Expectations Inventory [5], validated for the Mexican context, consisting of 20 items that can be answered in a type scaling Likert four values: unsure, barely sure, sure and very sure; and within their parametric properties it has:

- A confidential level of .91 in Cronbach's alpha and .88 in the confidentiality by halves.
- A validation of internal adequate consistency now that all items positively correlated (with a significance level of .00) with the overall score obtained by each respondent.
- A validation of acceptable content to obtain an overall average of 2.1 on a scale of 0-3.
- An adequate analysis of contrasting groups now that all items permit discriminate (with a significance level of .00) between the groups report a high and low academic self-efficacy expectations.
- A three-dimensional structure, obtained via factor analysis explains 49% of the total variance: academic activities oriented to the production (output), the input from academic activities is for learning (input) and academic activities of interaction for learning (feedback).

Instead, the academic stress variable was investigated through a single item in which was asked about the students own evaluation on the frequency (on a scale of 1-10) in which experienced stress in the study period. It is recalled that both academic self-efficacy and academic stress have the same empirical domain of reference, and the possibility of using an inventory on academic stress (such as SISCO Inventory for studying academic stress, valid for Mexican context) meant repeating these empirical domains which would return to the tedious and repetitive questionnaire, taking the risk of not respond appropriately or present problems such as the *halo* effect; which is why the variable was handled as a mono-item.

## 4. Results

The following paragraphs explain the results for both the second stage of the study and the follow-up for stages 1 and 2.

### 4.1. Results for the Second Stage (Semester 2) of the Study

In this second stage, the arithmetic mean for the self-efficacy input dimension was 2.14 points (0-3 scale) for

group A, 2.07 points for group B, and 2.11 at cohort level (Table 3). These scores should be converted to percentages for interpretation according to the scale proposed by Barraza [5], where a percentage between 0 and 33 corresponds to a low level, from 34% to 66% an average level, and 67% To 100% a high level.

Thus, the confidence to be able to develop activities of input for learning (dimension input) is equivalent to 71.33%, 69% and 70.33% respectively for group A, group B and cohort, which means in all cases, a high level.

For the output dimension, that is, safety in order to be able to develop learning products, arithmetic means were 2.20, 2.04 and 2.13 for group A, B and cohort, equivalent to 73.33%, 68% and 71% respectively, that means that students in both, group A and group B, and consequently at the cohort level, have a high level of confidence related to the output dimension of their perceived academic self-efficacy.

The third dimension, feedback, reached 1.98, 1.89 and 1.94 points respectively for group A, B and cohort, which is equivalent to 66%, 63% and 64.66%, which means an average level of confidence to carry out activities of Interaction for learning, in both groups and consequently at generation level.

Finally, in general, the academic self-efficacy perceived by students for group A was 2.10 points, for group B, 2.00 points, and at generation level it was 2.06 points, which transformed to a percentage of 70%, 66.66% And 68.66%, which means that the students of group A present a high level of academic self-efficacy, the students of group B an average level (although very close to the high level); And at the cohort level they presented a high level.

Academic stress reached a score of 6.93 points for group A (on a scale of 1 to 10), 6.55 for group B, and 6.77 points for generation. These points are also converted to percentages, equivalent to 69.3%, 65.5%, and 67.7%, respectively, which are interpreted as a strong stress level for both group A and cohort level and moderate for group B (the scale for the interpretation of the level of academic stress is: from 0 to 33% a slight level, from 34% to 66% a moderate level and from 67% to 100% a strong level).

To analyze the correlation between the variables, the Pearson r statistic was used, and the results are presented in Table 1.

As shown, there is only a statistically significant correlation between the feedback dimension and academic stress, both negative, but considered weak at the cohort level and moderate for group A [19].

**Table 1. Result of academic correlation with academic self-efficacy and its dimensions**

Academic self-efficacy	Level of correlation with academic stress		
	Group A	Group B	Cohort
Dimension input	-.215	-.041	-.128
Dimension output	-.223	-.123	-.160
Dimension feedback	-.421*	-.289	-.350*
Overall perceived self-efficacy score	<b>-.350</b>	<b>-.180</b>	<b>-.255</b>

\*Significant correlation at the 0.05 level.

Source: own elaboration.

**Table 2. Kolmogorov-Smirnov test**

Dimensions and variables	Statistics	
	Z of K-S	Significance
Dimension input	.981	.291
Dimension output	.689	.730
Dimension feedback	.626	.828
Overall perceived self-efficacy score	.570	.901
Academic Stress	1.093	.183

Source: own elaboration.

**Table 3. Test t for sequenced samples**

Dimensions and variables	S	Group A		Group B		General	
		μ	Sig	μ	Sig	μ	Sig
Dimension input	2	2.14	.048	2.07	.039	2.11	.974
	1	1.98		2.26		2.11	
Dimension output	2	2.20	.195	2.04	.797	2.13	.558
	1	2.13		2.07		2.10	
Dimension feedback	2	1.98	.260	1.89	.738	1.94	.310
	1	1.90		1.86		1.88	
Overall perceived self-efficacy score	2	2.10	.039	2.00	.381	2.06	.521
	1	2.00		2.06		2.03	
Academic stress	2	6.93	.023	6.55	.004	6.77	.000
	1	5.70		5.15		5.47	

Source: own elaboration. S: stage (moment).

## 4.2. Follow-up Results (Longitudinal or Evolutionary)

To determine the appropriate statistic to test the general hypothesis of the investigation, the Kolmogorov-Smirnov test was used, which yielded the results shown in Table 2.

As observed, the significance was greater than 0.050 in all cases, so it is assumed that the data are distributed in a normal way, and given this, to verify the evolution of the variables throughout the two periods of study is used the Student t-test for related or sequenced samples, with a test value of 0.050, and the results are shown in Table 3.

Only a statistically significant difference was found at the cohort level in academic stress, increasing from 5.47 points in stage 1 to 6.77 points in stage 2. For the perceived academic self-efficacy variable and its three dimensions, it was not possible to statistically determine a significant difference about the two stages of the investigation.

In group analysis, is appreciable that in group A the input dimension, general academic self-efficacy and academic stress presented a statistically significant difference in relation to the stages of the study. By this way, the input dimension went from 1.98 to 2.14 points, the general academic self-efficacy, from 2.00 to 2.10 points; And academic stress from 5.70 to 6.93 points.

As for group B, a statistically significant difference in the input dimension of self-efficacy and in stress is identified, being for the first a decrease of 2.26 to 2.07 points, and for the second an increase of 5.15 to 6.55 points.

Finally, since there is no statistically significant correlation for both variables (general level of perceived

academic self-efficacy and academic stress, Table 1), it is not feasible to perform a statistical analysis of the evolution of this correlation, because it does not exist), since in the Stage 1 of the study, as in the present, only the feedback dimension presented a statistical association with academic stress.

## 5. Conclusions and Discussion

Particularly in the second stage of the study, the general results at the cohort level show that the students presented a high level of perceived academic self-efficacy, so it is possible to accept the  $H_{11}$  research hypothesis, which postulates that "students present a level High self-efficacy". On the other hand, the academic stress variable was located at the high or strong level, so it is not possible to accept the hypothesis  $H_{12}$  ("students present an average level of academic stress"), then accepting their counterpart  $H_{02}$ : students do not present an average level of academic stress. The results of correlation between both variables indicate that it is not possible to establish a statistically significant association between them, so contrary to expectations (according to the theoretical hypothesis of the research) and raised in the hypothesis  $H_{13}$ , the null hypothesis is accepted  $H_{03}$ : There is no negative relationship between academic self-efficacy and academic stress presented by students.

Regarding the follow-up results (longitudinal or evolutionary), it is not possible to accept the general hypothesis of  $H_{11G}$  research that deals with an increasingly strong negative correlation between academic self-efficacy and academic stress, as each semester ends of studies; Since in a transversal way both in stage 1 and stage 2, it was not possible to establish this association at the cohort level, so that at the moment (waiting for stage 3) the null hypothesis  $H_{01G}$  is accepted: the students of The LIE do not present an increasingly strong negative relation between academic self-efficacy and academic stress, as they finish each semester of their studies.

Although the above are the global results, it should be noted that in one of the two groups that make up the research, group A, the input dimension of academic self-efficacy and the general academic self-efficacy itself have evolved positively from one stage to another, Have increased significantly, which is expected according to the theoretical aspect related to the source or direct experience of self-efficacy [20,23], but not for academic stress, which also increased, but the opposite was expected, as explained by Schwarzer and Hallum [21] and Fernández [8].

As for group B, only the input dimension of self-efficacy and academic stress evolved in a statistically significant way, decreasing the first one and increasing the second one, being again, results that would not be expected if we think that as students have progressed in their Studies, they would feel more capable to develop academic activities immersed in them, which would decrease the level of stress they experience.

In the background check made for this research, no longitudinal study of these variables was found, so it is not possible to make any comparison. However, taking as reference only stage two of the study, the results differ

from those found by Merino and Lucas [16], Schönfeld et al. [22] and Hernández [12]; inasmuch as they identified a relationship between the variables. In contrast, these results only coincide with those of Barraza and Hernández [6] who did not identify a statistically relation between the variables.

The no coincidence with the mentioned studies can be explained from the conceptual approach that stress was addressed in these researches, this being centered stressors or sources of stress, which differs in conceptualizing considered in this study, which is the under-stress symptoms centered approach, and justly like was considered by Barraza and Hernandez [6].

Finally, the limitations of this study are two. In the first instance, it is the one that has been allowed to evolve "naturally" both variables (without intervention or mediation), to verify the theoretical hypothesis of the investigation. The second, the number of subjects involved makes the results practically exclusive to them and only generalizable to populations of characteristics very similar to the one involved in this research.

With all of the above, two of the three stages of the study have been completed, and the third stage is then to be completed, once the school semester ends from January to June 2017.

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