



The mediating role of self-efficacy in the relationship between resilience and academic performance in adolescence

Usán P. Supervía^{a,*}, Salavera C. Bordás^{b,*}, Quílez A. Robres^{c,*}

^a Departamento de Psicología y Sociología, Facultad de Ciencias Humanas y de la Educación, Universidad de Zaragoza, Calle Valentín Carderera no. 4., 22003 Huesca, Spain

^b Departamento de Psicología y Sociología, Facultad de Educación, Universidad de Zaragoza, Calle Pedro Cerbuna no. 12., 50009 Zaragoza, Spain

^c Departamento de Ciencias de la Educación, Facultad de Ciencias Humanas y de la Educación, Universidad de Zaragoza, Calle Valentín Carderera no. 4., 22003 Huesca, Spain

ARTICLE INFO

Keywords:

Self-efficacy

Resilience

Academic performance

Students

Adolescence

ABSTRACT

Background: During learning processes, some students lack the necessary skills and competences to cope with their academic demands successfully. During adolescence, emotions play a prominent role in academic and personal development. This study aims to analyse the relationship between resilience and academic performance and the possible mediating role of self-efficacy.

Methods: The study comprised 2652 students with ages ranging from 12 to 19 years ($M=14.55$; $SD=1.70$), both male ($N = 1368$; 51.58%) and female ($N = 1284$; 48.41%) from 14 secondary schools in Zaragoza, Aragón, Spain. The instruments used were the *Academic Self-efficacy Scale* (ASES) and the *Brief Resilience Scale* (BRS); average marks were used to measure academic performance.

Results: The results of the study revealed significant correlations between self-efficacy, resilience and academic performance. Self-efficacy was found to play a mediating role between resilience and academic performance, which explains a pattern of adaptive behaviours in adolescent students. These results have practical implications for educational policies.

Conclusion: The important role of self-efficacy as mediating variable between the constructs under analysis and for the promotion of adaptive behaviours is clear. Self-efficacy is important for the psychological and personal development of students, to prevent school drop out and improve the students' academic performance and experience.

1. Introduction

The investigation of psychological variables in academic environments can help not only to better understand students' cognitive processes during their school years but also to stimulate certain behavioural traits that greatly contribute to shape their adult personality (García & Meira, 2019).

While most students go through this stage without major issues in their personal and academic development, others can undergo sensations and perceptions that undermine their motivation and commitment towards school tasks, leading to school dropout. This is the result of personal and contextual variables and the lack of skills and/or strategies to cope with academic demands (Barreno, Haro & Flores, 2019).

* Corresponding authors.

E-mail addresses: pusan@unizar.es (U.P. Supervía), salavera@unizar.es (S.C. Bordás), aquilez@unizar.es (Q.A. Robres).

As such, the way adolescents face and experience their circumstances from a personal and psycho-educational perspective plays a central role in their learning process (Palacios, 2019).

Bandura, (2006) defined self-efficacy as the individual's perception of his or her ability to successfully cope with specific circumstances. This is affected by task performance, vicarious learning and meaningful feedback, as well as by the individual's skill to accurately interpret situations.

In an academic context, self-efficacy refers to the subject's perception of his or her own ability to learn and carry out a given task, a key variable for the student's ability to adapt to future situations (Rosal & Bermejo, 2017). In this way, self-efficacy is a self-regulatory mechanism that affects the student's academic behaviour and his or her choices with regard to external conditions. In turn, self-efficacy is also affected by the student's actions and academic setting (García et al., 2010).

Students with high levels of self-efficacy perceive school tasks as a challenge that they face confidently, armed with their knowledge and skills, resulting in a more responsible and efficient attitude towards school tasks (García et al., 2016).

Empirical research shows that academic self-efficacy can be used to predict school performance (Honicke & Broadbent, 2016) as well as other variables such as interest for learning, engagement, commitment, perseverance and motivation (Galyon, Blondin, Yaw, Nalls, & Williams, 2012; Huan, 2013; Weber & Ruch, 2012). Similarly, self-efficacy tends to be positively correlated with affectivity and academic satisfaction (Eakman, Kinney, Schierl, & Henry, 2019).

From a different perspective, low self-efficacy is seen as related to non-adaptive academic behaviours, leading to less commitment to school tasks and poor academic performance (Mao, Chiu, Owens, Brown, & Liao, 2019) and even to psychological problems in adolescents, such as anxiety, stress and even depression (Keye, & Pidgeo, 2013; Khan, 2013; Ye, Posada, & Liu, 2018).

On the other hand, resilience is understood as the individual's ability to adapt constructively to adverse conditions (González, 2016). In this way, resilience can be seen as a protection mechanism that enables the individual to turn negative conditions into occasions for achievement, a set of personal factors allowing the individual to evolve and achieve capably and confidently (Barcelata, 2015).

Currently, resilience is regarded as a dynamic (i.e. non-static) process, which largely results from the way individuals interact with, and adapt to, conflicts arising in his or her immediate environment (Ponte, 2017).

The literature on resilience in academic contexts relates this factor to emotional exhaustion (Ríos, García, Sabuco, Carrillo, & Martínez, 2016), personal and academic self-efficacy (Feldman & Kubota, 2015), emotional intelligence (Fernández-Berrocá, Ruiz-Aranda, Salguero, Palomera, & Extremera, 2018), self-esteem (Knowlden, Hackman & Sharma, 2016), optimism (Martínez & Ruch, 2017), and anxiety (Pino, Peñate, Fumero, Bethencourt & Zambrano, 2016). In general, in students resilience is positively correlated with life satisfaction and commitment to school tasks (Rodríguez-Fernández, Ramos-Díaz, Madariaga, Arrivillaga & Gelende, 2016).

As such, resilience is relevant for the personal and psychological development of students, and high levels of resilience have a positive effect on the students' ability to adapt to their social context and its challenges (González, 2018).

Finally, academic performance assesses the students' success in the teaching-learning process (Garbano, 2013). Performance is a multidimensional concept, which depends on targets and expected results (Abalde, Barca, Muñoz, & Fernando, 2009). Scientific literature has largely relied on two values to measure academic performance: one, more quantitative and objective in nature, uses school marks, and two, more qualitative and subjective, takes into account the personal circumstances of the student and its immediate social environment (Gil, 2011). School marks are particularly reliable predictors of school performance (Barca, Peralbo, Porto, Marcos, & Brenlla, 2011; Córdoba, García, Luengo, Vizuete, & Feu, 2012), but alternative variables have also been considered, such as the number of failed subjects, the number of repeated courses, and even the time spent in assimilating subject matters (Carmona, Sánchez, & Bakieva, 2011; Hernando, Oliva, & Pertegal, 2012; Mollada & Herrero, 2009).

The study of such a broad construct as academic performance has been addressed from different perspectives. Portolés and González (2015) focus on the personal factors that determine the personality of students, and the way they affect school performance. Fierro, Almagro, and Sáenz-López (2019) emphasise emotional factors, especially motivational processes and emotional intelligence. Guerra and Guevara (2017) take into account several academic variables, such as learning style and study strategy, while Pulido & Herrera (2019) underscore the predicting value of socio-demographic variables.

On the other hand, combining the constructs of self-efficacy, resilience and academic performance, the scientific literature leaves us with certain investigations of unequal results in which some of these variables are related to others in the school environment. Sadoughi (2018) suggested that self-efficacy and resilience are positively related to students' academic performance and both can predict it. Etherton, Steele-Johnson, Salvano, and Kovacs (2020) projected resilience as a variable with indirect effects on academic performance through self-efficacy and goal setting, which in turn leads to greater student well-being. Cassidy (2015) determines that a low perception of self-efficacy leads to worse academic results together with difficulties in dealing with school adversities. León, González, Arratia, and Barcelata (2019), in a group study, observed moderate levels of academic stress and resilience together with self-efficacy and satisfactory academic performance, forming a significant behavioural positive pattern. Mohebi, Shehni, and Sharifi (2014) showed that psychological capital (hope, optimism, resilience, and self-efficacy) was related to performance and academic performance, predicting the academic goal of mastery, as opposed to avoidance, in adolescent schoolchildren. Rachmawati, Setyosari, Handarini, and Hambali (2021) revealed the importance of social support in the self-efficacy and academic resilience of schoolchildren, showing a close relationship between them but not with a higher academic performance of the students. Alhadabi & Kar-pinski (2020) revealed the mediating role of self-efficacy in the performance of emotional support functions, increasing the positive effect of academic performance by reducing school dropout. Ahmed, Umrani, Qureshi, and Samad (2018) related the three variables of our study together with academic engagement moderated by teacher support, key to promoting adaptive behaviours.

For all of this, and following Méndez (2016), more studies are necessary to increase our understanding of the different variables

involved in academic performance, and to develop strategies to improve the students' personal development and academic satisfaction, ultimately contributing to reduce early school dropout (Vizoso & Arias, 2018).

In this context, and given the absence of studies that directly relate the variables under consideration, the main aim of this study is to analyse the relationship between self-efficacy, resilience and academic performance in a sample of adolescent secondary school students.

The study's two main hypotheses are:

- (a) Self-efficacy is related to resilience and academic performance, stimulating adaptive behaviours
- (b) Self-efficacy plays a mediating role in the relationship between resilience and academic performance.

2. Method

2.1. Sample

The sample comprises 2652 students with ages ranging from 12 to 19 ($M=14.55$; $SD=1.70$), both male ($N = 1368$; 51.58%) and female ($N = 1284$; 48.41%) from 14 secondary schools in Zaragoza, Aragón, Spain. Inclusion criteria were the ability to read and communicate in perfect Spanish (a necessary condition to understand the questionnaires). Incomplete questionnaires (34) and students with cognitive disorders that hampered the full understanding of the questionnaires were excluded. The schools were chosen by random sampling and all students in the chosen schools were furnished with a questionnaire; 98.72% of questionnaires were returned and counted. The study was undertaken between January and February 2020.

2.2. Instruments

The following questionnaires were used.

In order to measure self-efficacy, the *Academic Self-efficacy Scale* (ASES), validated for adolescents by García et al., (2010), was used. The scale comprises 10 items to measure self-efficacy in an academic setting (e.g. "I am convinced that I can carry out outstanding exams"). The responses measure the degree of agreement and disagreement of the subject in a 5-point Likert scale ranging from "Strongly disagree" (1) to "Strongly agree" (5). Previous studies have shown the reliability of the questionnaire in academic settings, yielding an overall Cronbach- α value of .91, and of .89 in our study.

Concerning resilience, the *Brief Resilience Scale* (BRS), translated and adapted to Spanish adolescents by Rodríguez, Alonso, and Hernansaiz (2016), was used. This mono-factorial scale comprises 6 items (e.g. "I tend to bounce back quickly after hard times"). Answers are expressed in a 5-point Likert scale ranging from "Strongly disagree" (1) to "Strongly agree" (5). The original instrument yields a Cronbach- α value of .88, and of .90 in our study.

Finally, academic performance was measured on the basis of the average marks in the first trimester, ranging from 0 (minimum) to 10 (maximum). This variable is widely used, and is regarded as an effective predictor of the students' academic performance (Barca et al. 2011; Córdoba et al. 2012; Risso, Peralbo, & Barca, 2010). For our study, this variable yielded a Cronbach- α of .85.

2.3. Protocol

The questionnaires were handed out to the students in the classrooms, all students in each school receiving the questionnaire in the same day, set out in advance in coordination with the school's management. The schools and parents/tutors signed informed consent forms. All students and parents/tutors were informed about the nature of the study, and participation was voluntary, in line with the ethical directives set out in the Declaration of Helsinki (AMM, 2000). The protocol was endorsed by the Ethics Committee of the Psychology and Sociology Department, University of Zaragoza. Questionnaires were anonymous and confidential, and students could opt out at any point in the process.

2.4. Data analysis

Descriptive statistics were undertaken to establish the socio-demographic profile of the sample, including such variables as gender, age, course, type of school and course repeats, as well as the variables analysed in the study. Following this, correlations between self-efficacy, resilience and academic performance were investigated using statistical software IBM SPSS v26.0. In order to establish the predictive value over academic performance, a stepwise multiple regression model was adopted. Finally, SPSS v26.0's MACRO tool was used to carry out mediation analyses by bootstrapping (10,000 runs). For all the operations, a $p \leq 0.05$ alpha level was adopted, with a 95% confidence level.

3. Results

3.1. Demographic variables

The study comprised 2652 adolescent secondary school students, both male ($N = 1368$; 51.58%) and female ($N = 1284$; 48.41%), with ages ranging from 12 to 19 ($M=14.55$; $SD=1.70$) (Table 1).

3.2. Descriptive variables

As illustrated in Table 2, scores for self-efficacy, resilience and academic performance were relatively even.

Males scored slightly higher in terms of self-efficacy, while females scored slightly higher in terms of resilience and academic performance.

3.3. Correlational analysis between self-efficacy, resilience and academic performance

Table 3 illustrates correlations between the variables under consideration. They are all significant correlations, but in different ways.

Self-efficacy is positively and significantly correlated with resilience ($r = .390$) and with academic performance ($r = .353$), while resilience showed a much weaker correlation with academic performance ($r = .125$).

3.4. Mediation effects of self-efficacy in the relationship between resilience and academic performance

In order to establish whether the relationship between resilience and academic performance is mediated by self-efficacy, Hayes's (2018) MACRO tool in Process 3.0 de SPSS (v 26.0) was used, following the methodology put forth by Tal-Or, Cohen, Tsarfati, and Gunther (2010) in a OLS regression. The three variables (self-efficacy, resilience and academic performance) was normally distributed. The mediation model has been tested through the Sobel test, yielding data with a coefficient of 6.61, $p < 0.001$.

As shown in Fig. 1, self-efficacy was found to play a mediating role between resilience and academic performance. The results indicate a mediating effect of resilience (VI) on self-efficacy of .31, and a mediating effect on academic performance (VD) of .35; in both cases $p > .001$. Zero was not included in the bootstrap interval, $B = .11$, $SE = .02$, 95% [CI.06,.15], so it can be argued that self-efficacy mediates in the relationship between resilience and academic performance.

These results suggest that, in and by itself, resilience has no direct significant effect on academic performance (.07, $p < .10$), but its combination with self-efficacy yields a result of .18, $p < .001$ (direct effect + indirect effect), the proportion of variance being explained by model $R^2 = .31^{***}$. This suggests that self-efficacy plays a mediating role in the relationship between resilience and academic performance. This has important practical implications.

4. Discussion

The aim of this study was to analyse the relationship between self-efficacy, resilience and academic performance in adolescent secondary school students.

The first hypothesis, that self-efficacy, is related to resilience and academic performance, was accepted; the results show that self-efficacy is positively correlated with resilience and academic performance.

This conclusion agrees with the existing literature. While few studies have explored the direct relationship between self-efficacy and resilience in secondary schools, some studies take both these variables into consideration, among others. Morales and González (2014) argued that intellectual capacity is positively correlated with resilience and self-esteem, promoting self-determined behaviour among secondary school students; Gaxiola, González, & Contreras (2012) argue that self-efficacy and resilience are positively correlated to goal orientation among secondary school students; Fínez & Morán (2017) draw a link between intrapersonal

Table 1
Socio-demographic characteristics of the sample.

		N	%
Gender	Male	1368	51.58
	Female	1284	48.41
Age	12 years	342	12.89
	13 years	368	13.87
	14 years	427	16.10
	15 years	475	17.91
	16 years	502	18.92
	17 years	456	17.19
	18 years	68	2.56
	19 years	14	0.52
Academic year	1° ESO	416	15.68
	2° ESO	510	19.23
	3° ESO	638	24.05
	4° ESO	652	24.58
	1° BACH	311	11.72
	2° BACH	125	4.71
Repeating course	Yes	596	22.47
	No	2056	77.52
Type of school	Public	1968	74.20
	Private	644	25.79

Table 2

Results of descriptive variables self-efficacy, resilience and academic performance.

	Total		Male		Female		Cohen's <i>d</i>
	Mean	SD	Mean	SD	Mean	SD	
Self-Efficacy	3.79	.80	3.89	.77	3.70	.83	.237
Resilience	2.73	1.01	2.71	.96	2.76	1.04	-.049
Academic Performance	2.93	1.02	2.88	1.08	2.98	.96	-.097

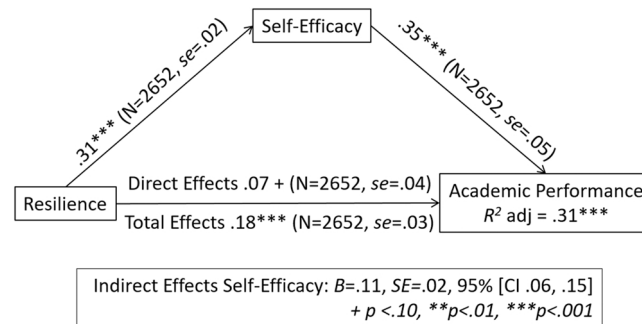
Table 3

Correlational analysis between self-efficacy, resilience and academic performance.

	1	2	3
Self-Efficacy	1		
Resilience	.390**	1	
Academic Performance	.353**	.125*	1
Mean	3.79	2.73	2.93
SD	.80	1.01	1.02
Cronbach- α	.89	.90	.85

** Correlation significant at 0.01 level (2-tailed)

* Correlation significant at 0.05 level (2-tailed)

**Fig. 1.** Mediating role of self-efficacy in the relationship between resilience and academic performance.

self-evaluation factors, such as self-concept, self-esteem, self-efficacy and resilience in adolescent students.

Other studies emphasise the close relationship between self-esteem and resilience in university students, also taking into consideration other variables, such as social skills, coping strategies and anxiety and stress control (Alfian, Adam, & Ibrahim, 2017; Blanco, Aguirre, Barrón, & Blanco, 2016; León, González, González, & Barcelata, 2019).

On the other hand, the relationship between self-efficacy and academic performance has been paid greater scholarly attention. Some studies establish a direct relationship between these variables; Avalos, Oropeza, Ramírez, and Palos (2018) and Galleguillos & Olmedo (2017) find statistically significant correlations between self-efficacy and academic performance in secondary school students; Castro (2020) draws a similar link in both primary and secondary school contexts. Other studies examine the relationship between self-efficacy and academic performance among other significant variables, such as study habits, the development of creativity, commitment and personal satisfaction, and motivation towards school tasks (Honicke & Broadbent, 2016; Martínez & Medina, 2019; Stajkovic, Bandura, Locke, Lee, & Sargent, 2018).

Our second hypothesis, that self-efficacy plays a mediating role in the relationship between resilience and academic performance, was also fully accepted, as self-efficacy was found to have an effect on the other two variables.

On the one hand, mediation analysis suggests that resilience is a poor predictor of academic performance; that is, the direct effect of the former over the latter is not statistically significant. However, the mediating role of self-efficacy in the relationship between resilience and academic performance was found to be significant. This confirms the importance of self-efficacy for adolescent students, which has important practical implications.

To our knowledge, no previous study has directly addressed the mediating role of self-efficacy in that relationship, as all existing studies have limited their analysis to the bidirectional correlations between the constructs.

However, many previous studies have examined the mediating role of self-efficacy in adolescent students; Avalos et al. (2018) establish the mediating role of self-efficacy in the relationship between academic skills and achievements; Cerezo et al., (2019) establish a direct correlation between training in self-regulated learning strategies and an increased understanding of said strategies, a relationship in which self-efficacy plays a mediating role; Soler, Fernández, and Meseguer (2017) establish the effect of self-efficacy on the relationship between personal roles and emotional wellbeing; Udavar, Fiori, and Bausseron (2020) underscore the modulating role

of self-efficacy in the relationship between emotional intelligence and academic performance in secondary school students.

All of this emphasises the important role played by the constructs under consideration which, alongside personal and contextual circumstances, have a direct effect on school performance. It is, therefore, imperative to address these issues in order to create the conditions for the adequate personal and academic development of the students (Bisquerra, Pérez, & García, 2015).

4.1. Limitations of the study

The limitations of this study are chiefly related to its lateral nature being a cross-sectional data-collection, which was a one-off event, and as a result the data have not temporal depth, while scores can easily change significantly from year to year, and even within the same school year. Hence, we must be cautious when interpreting the established mediation model. In a similar fashion, the schools were selected randomly, and are not a reliable section of the city in which the study was undertaken, in terms of types of school, students and teachers, socio-economic conditions and social/cultural settings.

4.2. Future prospects

Future studies should examine the relationship between academic self-efficacy and other psychological variables, besides resilience and academic performance. It is also necessary to undertake longitudinal studies that allow us to examine the evolution of these constructs over a longer time span. In addition, it would be interesting to take into consideration other academic tiers, such as primary school (6–11 years) and university (18 years and over). It would also be of interest to take into consideration other socio-demographic variables, such as gender, age, type of school.

4.3. Practical implications

Our results have practical implications for educational strategies, namely the promotion of teaching strategies that encourage self-determined and motivated behaviours from an early age, such as the development of self-efficacy, dedication and motivation towards academic tasks, contributing to students feeling more self-confident in coping with their daily work. In this way, students will be immersed in adaptive contexts, which will increase their chances of academic and, possibly, personal success. Similar implications apply in the emotional sphere, especially during adolescence, in which great physical and behavioural changes ensue, and in which a good training in emotional regulation can contribute to increase self-efficacy and resilience and other psychological variables.

Related to this, programmes directed by psychology and educational professionals and government policies can also help to improve students' overall experience, decreasing the risk of early school dropout. At the same time, parents must go hand in hand with their children's education at school, being the engine for promoting adaptive behaviours that enhance those reflected at school to ensure an optimal climate for adequate personal and school development.

Finally, it is worth emphasising that our results are but one step which encourages us to continue our research in the field of educational psychology and, specifically, in the characterisation of the different variables that affect the personal and academic development of adolescent students.

Disclosure

The authors declare no conflict of interests in this research.

Funding

The authors would like to thanks University of Zaragoza.

Data Availability

Data will be made available on request.

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