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Resilience as a Predictor of Academic Performance in Teenagers

La resiliencia como predictor del rendimiento en adolescentes

Jonatan Frutos de Miguel*.[1]
*Department of Pedagogy. Universidad de Valladolid (Spain)

Abstract

Academic performance is a determinant factor for the improvement of any country's education system. Establishing which aspects positively or negatively influence academic performance has given rise to different types of research. To further the existing knowledge on this matter, the present study analyzes the relationship between students' resilience, self-concept, motivation, and academic performance in Secondary Education. To do so, three data collection instruments were used in a sample of 842 students from the city of Valladolid, aged between 13 and 16 years (M=14.8; SD=1.498): Self-concept Scale Form-5, Resilience Scale RS-14, and Attributional Motivation to Achieve Scale. Data analysis was conducted using mediational techniques based on structural equation modelling (SEM), which suggested that there was no direct relationship between the students' self-concept, motivation, and academic performance. Interestingly, resilience was positioned as the mediating factor in the relationship between their self-concept and motivation and their academic performance. The results showed that students with a high level of resilience tended to cope better with difficult situations and to understand and appreciate the effort required and invested in study time.

Keywords: self-concept, motivation, mediation, secondary education.

[1] **Correspondence:** Jonatan Frutos de Miguel, jonatan.demiguel@uva.es, Paseo de Belén, 1. C.P. 47011 Valladolid (Spain).

Resumen

El rendimiento académico es un factor de interés en el ámbito formativo para la mejora del sistema educativo de cualquier país. Determinar qué factores influyen de forma positiva o negativa en el mismo ha dado lugar a diferentes tipos de investigación. Por ello, el presente estudio se centra en analizar la relación entre la resiliencia, el autoconcepto, la motivación y el rendimiento académico de los estudiantes de Educación Secundaria Obligatoria (E.S.O.). Para este cometido, se utilizó tres instrumentos de recogida de datos: la escala de autoconcepto Forma 5 (AF-5), la escala de resiliencia RS-14 y la escala Atribucional de Motivación al Logro (EAML); en una muestra de 842 estudiantes de la ciudad de Valladolid, con edades comprendidas entre los 13 y los 16 años (M=14.8; DT=1.498). Los datos se analizaron mediante un análisis de la mediación basado en modelos de ecuaciones estructurales (SEM), que sugirieron la no existencia de una relación directa entre el autoconcepto y la motivación con el rendimiento académico. Asimismo, la resiliencia se posicionó como el factor mediador en la relación entre el autoconcepto y la motivación en relación con el rendimiento académico. Los resultados mostraron que el alumnado que arrojó un alto nivel de resiliencia tendía a afrontar mejor los momentos difíciles y a comprender y valorar el esfuerzo que requiere y que se invierte en el tiempo de estudio.

Palabras clave: autoconcepto, motivación, análisis mediación, educación secundaria.

Introduction and objectives

Academic performance is an important predictor of achievement, not only at the educational stage, but also later in life (Wolff et al., 2018). Its possible prediction, as well as the explanation of factors related to it, has been a significant issue in education (Deighton et al., 2018). And this can be altered by different dimensions, such as social, psychological, economic and environmental (Ayala and Manzano, 2018; Rudd et al., 2021).

Following a review of the state of the art, research was observed in which the relationships between academic performance and different constructs had been analysed. Taking into account factors such as self-concept (Sewasew and Schroeders, 2019), resilience (Supervía et al., 2022) and motivation (Paechter et al., 2022). However, to date, no study has been found that addresses the contribution of these elements, jointly, in the analysis of the academic performance of Secondary Education students, taking the resilience dimension as a mediator. This is the strength of the present study, as it formulates a joint consideration of these three psychoeducational dimensions (resilience, self-concept and motivation), through the analysis of their link with academic performance in an adolescent population.

The identification of this association could facilitate a better understanding of how different psychoeducational elements are related to young people's academic performance. In this sense, this would provide a basis for the implementation of programmes that can help to improve academic performance,

focusing on the development and promotion of resilience, self-concept and/or motivation in young people. More specifically, it would also help in teaching and learning processes when designing and implementing teaching practices (Zaw et al., 2022).

This is because high levels of distress and stress have interfered with learning processes, study habits, emotions and results; the negative impact of which was transferred to evaluations. These emotions arose mainly from low levels of self-concept. Derived from negative expectations of learning processes and outcomes (Sewasew and Schroeders, 2019). In contrast, when students experienced control over their learning moments and, at the same time, considered the reason why they were learning to be important, they were affected by a higher level of self-concept. This should propel them into situations of achievement (Putwain et al., 2021).

Resilience and academic performance

Resilience has been defined as a process that enables a person to adapt positively during and after exposure to risk situations (Haktanir et al., 2021). In contrast, other authors have defined resilience as the capacity, within a dynamic system, to overcome adverse experiences (Kwek et al., 2013). This is why people who coped competently with difficult situations had high levels of resilience. This may have led to a positive chain reaction that combated adversity and enhanced favourable outcomes (Haktanir et al., 2021). This would imply a healthy state of cognitive functioning, ranging from returning to a state of equilibrium (after a stressful situation), to developing optimal conditions of functioning under adverse conditions (Ayala and Manzano, 2018).

From an educational perspective, resilience has been a relevant concept to explain performance in academic and work settings (Supervía et al., 2022). In educational settings, studies such as the one by Liew et al. (2018) suggested that resilience in young people had short- and long-term benefits for learning and performance. In terms of research with university students, Kwek et al. (2013) found that self-esteem and resilience were significant predictors of academic performance. In the same vein, Ayala and Manzano's (2018) study suggested that resilience and motivation should be taken into account if academic performance outcomes were to be improved.

Consequently, maintaining resilience in educational settings could help students reduce the presence of anxiety or stress, thus positively affecting their well-being, both now and in the future. On the other hand, not all research has agreed on this. Some studies have not confirmed the relationship between resilience and academic performance (Deighton et al., 2018; Sarwar et al., 2010). Despite this, the consideration that has been held today was that individuals, who manifest high levels of resilience, tended to show high levels of achievement motivation. This had a direct impact on academic performance, despite the occurrence of stressful conditions (Paechter et al., 2022).

Self-concept and academic performance

Self-concept has, over time, been defined as one's personal perception of oneself, with different levels of specificity or dimensions. See personal, physical, academic and social self-concept (Fox and Corbin, 1989; Shavelson et al., 1976). This structure has maintained an important link given its relationship to academic performance in educational research (Deighton et al., 2018). Early studies, which have analysed this relationship, used cross-sectional designs (Hansford and Hattie, 1982). Whereas, more recent research has examined their connection through longitudinal designs and/or analytical strategies (Lazarides and Raufelder, 2021). Despite all of the above, the progression in research regarding the significance of the relationships between self-concept and academic performance has not been entirely conclusive (Piqueras et al., 2019).

Even so, there have been indications that situations of high self-concept would increase motivation to achieve learning goals, increasing levels of effort and time devoted to academic achievement (Paechter et al., 2022). In addition, it would also increase sustained attention to learning activities, avoiding attention to distracting cues and favouring the processing of information necessary for task performance (Liew et al., 2018).

Although, on the other hand, there has been some controversy about the relationship between self-concept and self-esteem (Wolff et al., 2018). This was because both came to be considered similar concepts (Huang, 2011). As mentioned above, self-concept measures global perceptions of the self (e.g., positive view of the self). Self-esteem, on the other hand, would indicate an overall appraisal of the person (e.g., feeling good about oneself when performing a task). Although conceptual differences between the two terms have been identified, they have not been empirically differentiated (Wolff et al., 2018). Both general self-concept and self-esteem have comprised descriptive and evaluative elements of the self, which would make such a differentiation difficult (Rentzios and Karagiannopoulou, 2021).

Motivation and academic performance

Motivation has played a relevant role when it comes to assessing academic behaviours as well as persistence in learning (Paechter et al., 2022). This was because it can explain, to some extent, the degree to which a person strives to achieve a particular goal (e.g. a good grade in an exam). In line with self-determination theory (Deci and Ryan, 2008), intrinsic motivation has been described as an experience of competence and autonomy; which would manifest itself in sustained effort over a period of time. It is autonomous in the sense that it is experienced as self-determined (Paechter et al., 2022; Van-Soom and Donche, 2014). In contrast, extrinsic motivation was related to lifelong learning and the search for personal meaning (Rentzios and Karagiannopoulou, 2021).

Intrinsic motivation could be triggered by external rewards (e.g. positive feedback), but mostly it would depend on internal sources within the person (e.g.

when making decisions in one's own learning and accepting the need to cope with it, even if one does not always experience enjoyment in doing so). In that case, there would be an identified regulation. That is, a person would know that a behaviour has been beneficial to his or her development and would therefore adopt that behaviour as his or her own (Paechter et al., 2022). In contrast, extrinsic motivation has been considered to be more related to superficial learning approaches, such as rote learning, and the application of minimal effort to learning (Rentzios and Karagiannopoulou, 2021).

An important fact influencing academic performance has been the propensity for high motivation. Luttenberger et al. (2019) described individual differences in the tendency to perceive stressful situations as dangerous or threatening in the presence of low levels of motivation. In educational settings, individuals may experience anxiety in different academic situations such as an exam, while studying, or while attending class. The propensity for anxiety in academic situations has been related to the application of less efficient cognitive learning strategies, as well as lower intrinsic motivation. This may reduce aspects such as attention, effort or time spent studying (Paechter et al., 2022). In addition, it may be accompanied by low expectations of success and low evaluations of controllability of a learning situation, as well as low personal motivation (Lazarides and Raufelder, 2021). As opposed to high motivation, which would contribute to better planning and decision-making, which should have a positive impact on academic performance.

Consequently, the present study aimed to analyse the relationship between self-concept and motivation, with respect to their influence on academic performance, applying resilience as a mediating factor in a youth population aged 13 to 16. In this way, the aim was to contribute to the body of research, which is aimed at studying the link between the different elements related to academic performance. All of this, with the aim of being able to help in the future in the design of training programmes based on the reinforcement of these aspects to improve academic achievement.

Method

Population and Sample

The causal or incidental study sample consisted of 842 students of compulsory secondary education (E.S.O.) from seven secondary schools in the city of Valladolid, aged between 13 and 16 years (M=14.8; SD=1.498). Of these, 487 (58%) were boys and 355 girls (42%). The distribution by year and sex can be seen in table 1.

Table 1

Distribution of the sample according to sex and grade level

Males	Frequency	Percentage (%)	Women	Frequency	Percentage (%)
1ST E.S.O.	195	40%	1ST E.S.O.	113	32%
2ND E.S.O.	104	21%	2ND E.S.O.	64	18%
3RD E.S.O.	95	20%	3RD E.S.O.	91	26%
4TH E.S.O.	93	19%	4TH E.S.O.	87	24%
Total	487	100%	**Total**	355	100%

Instrument

AF-5 Self-Concept Scale Form 5

The AF-5 Self-Concept Form 5 scale (García & Musitu, 2014) measures the dimensions of academic, social, emotional, family and physical self-concept in children and adults aged 10 years and older. It consists of 30 items, which are scored on a Likert scale with five response options, ranging from 1 = Never to 5 = Always. The overall reliability of the scale in the youth population aged 13-16 years was α= .85. For each dimension the values were for: academic (α= .90), social (α= .74), emotional (α= .73), family (α= .81) and physical (α= .76).

Resilience Scale RS-14

The RS-14 Resilience Scale (Sánchez-Teruel and Robles-Bello, 2015), based on the RS-25 Resilience Scale (Wagnild and Young, 1993). It was designed to assess the degree of individual resilience through a balanced perspective of life and personal experiences. Accordingly, the scale assesses a person's ability to accept what may happen, thus moderating extreme responses to adversity. The RS-14 version, validated by Sánchez-Teruel et al. (2020), was used in this study. The instrument consists of 14 items, distributed in two dimensions a) personal competence (PC) and b) self-acceptance and acceptance of life (SAA). The reliability analysis of the scale was α= .87. For each dimension the values were for PC (α= .89) and for SLA (α= .82).

Attributional Motivation to Achieve Scale EAML

The EAML Attributional Motivation to Achieve scale (Manassero and Vázquez, 2000) is intended for application in secondary education. Based on Weiner's (1986) motivational model, it is based on causal attribution-emotion-action dispositions. It consists of a total of 22 items divided into five subscales: interest motivation (α= .86), task/ability motivation (α= .82), effort motivation (α= .88), test motivation (α= .88) and teacher motivation (α= .87); answered on a rating scale graduated from one to nine. The reliability analysis of the scale was α= .90.

Academic performance

For academic performance, the average of the student's academic record up to the last completed academic year was established as objective data. In the case of pupils in the first year of Secondary Education, as they had not yet completed a full academic year, the data taken was the average appearing in the last report card of the termly assessment. In this sense, students were asked to indicate the average mark. In the case of the rest of the students other than those in the first year, the academic secretary's office of each school provided them with this information so that they could note it down when answering the scales.

Collection procedure

The study was conducted in accordance with the 1964 Declaration of Helsinki and the Code of Ethics of the University of Valladolid. The collaboration of different secondary schools in the city of Valladolid was requested by formal letter addressed to the management teams; seven of them showed interest. An explanatory meeting was held with those schools that agreed to proceed with the data collection. In all cases, the e-mail addresses of the research team were provided for contact in the event of doubts or the need for further information. Within the centres, participation in the research was voluntary. All families or legal guardians of the participants gave written consent to participate and were informed about how their data would be used in the empirical study. To simplify the completion of the different scales used in this study, they were all unified into a single instrument through the *Google Form* tool.

Data analysis

Statistical analyses were performed with Mplus version 7.0 (Muthén and Muthén, 2015). The variables used in the study were self-concept (AC), resilience (R), motivation (MO) and academic performance (RA), which was signified by

the average grade of the academic records. Prior to the main statistical study, a pre-analysis of the data was carried out by means of data screening to guide the necessary assumptions. A confirmatory factor analysis (CFA) was performed on each scale to verify the validity and internal consistency of the scales in the study sample. Because the data did not show a multivariate normal distribution, the diagonal weighted least squares statistic (DWLS; Li, 2016) was used. As for the reliability study of the scales, Cronbach's alpha and McDonald's omega coefficient were used. Once the CFA part of the analysis was conducted, the original scores reported by the participants on each instrument were used to calculate the standardised factor loadings. Finally, the proposed mediation model was analysed using structural equation modelling (SEM). Mediation analysis is used to understand a known relationship by exploring the underlying mechanism or process by which one variable influences another through a mediating variable.

Results

For multivariate normality analysis, the Multivariate Normality Test (Mardia, 1975) was performed. The results obtained indicated that the data did not correspond to a normal distribution (ZKurtosis= 74.57; $p<.01$). On the other hand, the sample did not show multicollinearity ($r>.90$), nor uniqueness ($r>.95$). To analyse linearity, homogeneity and homoscedasticity, a linear regression of the obtained data and a random data series was performed. Subsequently, attention was paid to the residuals yielded by this regression; given that, if there was any anomaly in the distribution, this would be due to the arrangement of the data collected, the other variables being random (Kline, 2016). Accordingly, the distribution of the residuals did not present any anomaly, with most of them varying between -2 and +2.

Analysis of the scales

In order to analyse the validity and internal consistency of the instruments used in the research, a CFA was conducted on each of the data sets obtained for each of the scales (see Table 2, 3 and 4). In the analysis of the AF-5 Self-Concept Scale, standard factor loadings were found to range from .248 (σ_x = .022) to .823 (σ_x = .033). In terms of fit, the AFC indicated very good results with CFI= .876; TLI= .906; SRMR= .059 and RMSEA= .053. The reliability index measured by Cronbach's alpha gave a score of .85 and the omega coefficient showed a score of .89.

Table 2

Factor loadings of the self-concept scale

Factor	Item	Standard factor	Standard error	Z	p
Academic	Aca1	.746	.020	27.421	<.05
	Aca2	.772	.012	33.089	<.05
	Aca3	.682	.015	30.986	<.05
	Aca4	.548	.022	28.674	<.05
	Aca5	.750	.014	33.783	<.05
	Aca6	.601	.023	31.647	<.05
Emotional	Emo1	.682	.018	22.142	<.05
	Emo2	.729	.020	23.977	<.05
	Emo3	.689	.015	20.630	<.05
	Emo4	.489	.024	14.996	<.05
	Emo5	.547	.024	16.439	<.05
	Emo6	.519	.016	20.832	<.05
Family	Fam1	.562	.020	14.622	<.05
	Fam2	.802	.019	28.193	<.05
	Fam3	.318	.025	11.307	<.05
	Fam4	.823	.033	24.721	<.05
	Fam5	.789	.018	28.578	<.05
	Fam6	.756	.021	26.200	<.05
Social	Soc1	.762	.015	28.290	<.05
	Soc2	.810	.028	28.117	<.05
	Soc3	.359	.017	19.155	<.05
	Soc4	.719	.024	28.066	<.05
	Soc5	.248	.022	20.211	<.05
	Soc6	.648	.015	29.120	<.05
Physicist	Fis1	.597	.019	27.558	<.05
	Fis2	.450	.020	19.334	<.05
	Fis3	.620	.023	29.104	<.05
	Fis4	.534	.018	26.346	<.05
	Fis5	.650	.025	22.626	<.05
	Fis6	.425	.020	25.035	<.05

Regarding the RS-14 Resilience Scale, the standard factor loadings ranged from .349 (σx= .017) to .817 (σx= .023). As with the previous instrument, the fit was very good considering the values CFI= .987; TLI= .989; SRMR= .060 and RMSEA= .050. The reliability index measured by Cronbach's alpha gave a score of .87 and the omega coefficient showed a score of .89.

Table 3

Factorial loadings of the resilience scale

Factor	Item	Standard factor	Standard error	Z	p
Personal competence	CP1	.490	.015	32.623	<.05
	CP2	.742	.019	24.460	<.05
	CP3	.681	.022	22.268	<.05
	CP4	.801	.015	37.542	<.05
	CP5	.817	.023	37.109	<.05
	CP6	.515	.018	38.297	<.05
	CP7	.490	.020	29.015	<.05
	CP8	.729	.023	27.682	<.05
	CP9	.747	.019	25.635	<.05
	CP10	.699	.020	26.193	<.05
	CP11	.433	.017	37.859	<.05
Self-acceptance and acceptance of life	AUM1	.349	.017	20.946	<.05
	AUM2	.715	.025	28.620	<.05
	AUM3	.575	.022	33.071	<.05

For the EAML Attributional Achievement Motivation Scale, the standard factor loadings ranged from .349 (σx= .028) to .850 (σx= .022). As with the other measurement instruments, the fit was very good considering the values CFI= .979; TLI= .982; SRMR= .055 and RMSEA= .057. The reliability index measured by Cronbach's alpha had a value of .90 and the omega coefficient was set at .92.

Table 4

Factor loadings of the motivation scale

Factor	Item	Standard factor	Standard error	Z	p
Motivation of interest	MI1	.720	.028	30.715	<.05
	MI2	.799	.025	32.282	<.05
	MI3	.617	.035	32.940	<.05
	MI4	.445	.030	26.065	<.05
	MI5	.770	.025	19.458	<.05
Task/capacity motivation	MTC1	.805	.037	20.457	<.05
	MTC2	.489	.027	14.715	<.05
	MTC3	.721	.022	20.725	<.05
	MTC4	.577	.030	23.890	<.05
	MTC5	.618	.035	30.857	<.05

Motivation for effort	ME1	.850	.022	36.101	<.05
	ME2	.770	.031	28.369	<.05
	ME3	.614	.025	30.173	<.05
	ME4	.620	.033	29.010	<.05
	ME5	.799	.019	23.473	<.05
	ME6	.565	.028	35.070	<.05
Examination motivation	MEX1	.573	.020	23.025	<.05
	MEX2	.626	.025	27.727	<.05
	MEX3	.349	.028	24.162	<.05
	MEX4	.834	.030	31.134	<.05
Teacher motivation	MP1	.605	.021	28.159	<.05
	MP2	.512	.018	22.752	<.05

Analysis of mediation

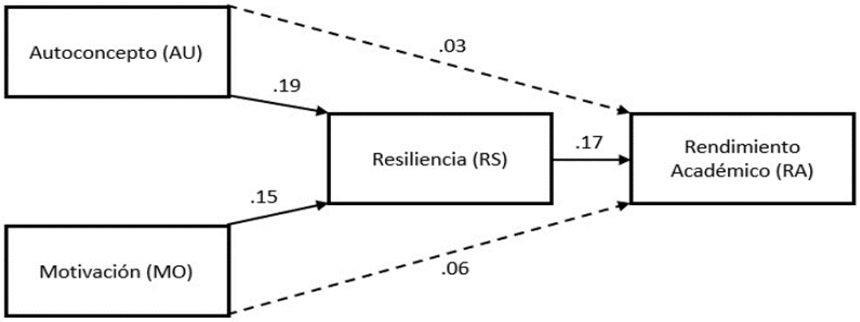

Figure 1. Mediation model

Figure 1 shows the mediation model that was analysed in this study. Within the figure, each square represents the values of the variables obtained from each of the scales. The one-way arrows indicate the regression relationships, with the solid arrows showing the significant relationships, while the dashed arrows show the non-significant relationships in the model.

As can be seen, all the significant relationships in the model involve resilience; it is the only factor that is significantly directly related to academic performance (β= .17; p= .001). That is, those students with a higher level of resilience obtained better grades. In addition, this variable indirectly measured the relationship between self-concept (β= .03; p= .005) and motivation (β= .02; p= .045) with academic performance. The remaining significant relationships were between self-concept and resilience (β= .19 p= .001) and between motivation and resilience (β= .15; p= .031). Table 5 shows the results of the analysis of the direct and indirect regression relationships of the mediation model.

Table 5

Results of the mediation analysis

Type	Effect	Estimator	Standard Error	95% confidence interval		β	z	p
				Inferior	Top			
Indirect	AU=>RS=>RA	.05	.03	.01	.11	.03	2.70	.005
	MO=>RS=>RA	.06	.02	-.01	.08	.02	1.82	.045
Components	AU=>RS	.12	.04	.04	.19	.14	3.59	.001
	RS=>RA	.60	.10	.23	.17	.18	4.39	.001
	MO=>RS	.06	.05	.02	.15	.11	2.01	.031
Direct	AU=>RA	-.05	.11	-.25	.16	.03	-0.79	.411
	MO=>RA	.18	.14	-.10	.31	.06	1.01	.320
Total	AU=>RA	-.01	.10	-.25	.18	.01	-0.51	.748
	MO=>RA	.21	.16	-.15	.39	.04	1.19	.212

Note: AU= self-concept; MO= motivation; RA= academic achievement

The results suggested that, although self-concept or motivation were not able to directly predict students' academic performance, they could do so through the level of resilience. Thus, students with high motivation or self-concept who also show high levels of resilience are likely to obtain high academic scores. It is worth mentioning that previous studies have shown results where the gender variable could unequally affect the relationship between some of the variables in the model. In such a case, part of the effect could have been due in the proposed model to this unequal modulating effect of the sex variable. In order to test this in this study, the analysis was carried out, but in this case the sex variable was introduced as a modulator of the relationships in the model. The results indicated that the sex variable did not show a significant moderating effect in any of the proposed relationships. The largest effect was in MO=>sex (β= .087; p= .191).

Discussion and conclusions

The present study analysed the relationship between self-concept, motivation and resilience with respect to academic achievement in students in compulsory secondary education (E.S.O.). All three elements have been shown to play a relevant role in academic and career success (Rentzios and Karagiannopoulou,

2021). In this case, it was shown that there was no direct relationship between self-concept and academic achievement, nor between motivation and academic achievement.

In other educational levels and age populations, motivation has been found to be a strong predictor of academic grades (Piqueras et al., 2019). Research conducted by Haktanir et al. (2021), with a university population, aimed to examine the role of these psychoeducational constructs on adjustment in first-year students, finding significant direct relationships between self-concept and resilience with respect to academic performance, as in the present study.

In the data analysed, resilience mediated the relationship between self-concept and motivation on academic performance in adolescents. Thus, students who generally assumed low control over their learning outcomes were prone to a range of adverse learning behaviours, such as investing less effort and time, despite showing acceptable levels of self-concept and motivation, if their level of resilience was low. In contrast, students with high levels of resilience tended to cope better with difficult moments and to understand and value effort, which had a positive impact on their grades (Lazarides and Raufelder, 2021).

Therefore, in order to carry out this work, we started from the axiom that beliefs (self-concept) and positive behaviours (motivation), for better academic performance, did not have an impact on academic performance if there was not a high level of resilience. This would make it possible to cope with stressful and anxious situations (Kwek et al., 2013). These adverse situations would alter the values of self-concept and motivation, diminishing their effects on the person and, therefore, their performance. In this sense, resilient adolescents would be more likely to cope with contextual demands, especially those related to the learning environment in unpleasant situations (such as adverse learning situations), and this attitude would determine their success in the proposed achievements. These findings were consistent with those found by Hartley (2011), who highlighted the importance of resilience in academic achievement.

Haktanir et al. (2021) also supported the idea that resilience was a significant predictor of academic performance. In this study, participants with a higher level of motivation and self-concept showed better academic performance when their level of resilience was also higher. In the same vein; motivation, like self-concept, would have an effect on academic performance. The question is why we do not always see a correspondence between high self-concept and/or motivation and good academic performance.

Motivation is related to students' educational engagement, which in turn promotes higher academic achievement among students (Luttenberger et al., 2019). The fact that the relationship between motivation and academic achievement is not linear and direct, as well as self-concept (as it appears in this study), could be due to the influence of other uncontrolled characteristics or variables. For example, mental health or psychological balance, being variables that would also mediate the relationship affecting academic performance.

This would be consistent with other research (Paechter et al., 2022; Piqueras et al., 2019), which delved into individuals with certain deficits (poor skills,

emotional maladjustment or learning disabilities), where the idea emerged that individuals were more likely to experience stress and emotional difficulties during their studies (Putwain et al., 2021). Consequently, they could benefit from strategies that would impact on their adaptive academic skills, enabling them to cope with such difficulties.

Anxiety, stress and emotional deficits were some of the factors that could have a negative influence on academic performance, and a high resilience, as well as a good capacity to recover from adverse situations. This could have an important effect when the demands of a particular situation tend to overwhelm the resources of the adolescent, despite a high motivation and/or self-concept.

Based on the results shown, it would be advisable to develop and implement interventions to help underachieving secondary school students through resilience-based strategy programmes, in order to have a direct impact on academic performance through the reinforcement of self-concept and motivation, for the improvement of academic development.

These intervention programmes should integrate a combination of self-improvement and learner development capacity (Huang, 2011). It is worth mentioning that there are already examples where a resilience training programme has been implemented. This is the case of Sternberg (2003), who proposed the training programme called "Other 3Rs". This programme focused on personal interaction with the environment and how to solve individual problems effectively. This requires students to learn to reason, develop resilience and become more responsible.

Furthermore, research on understanding the relationships between motivation, self-concept and resilience in the prediction of academic performance factors could be beneficial in guiding the decision-making of adolescents who want to opt for careers in which they are more likely to experience stressful situations, such as medicine. It could also be useful for intervening in the determinants of academic success in adolescents who show weaknesses in their basic training, cultivating strengths that will allow them to achieve better academic performance.

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