Personal Self-Regulation, Learning Approaches, Resilience and Test Anxiety in Psychology Students[1]

Autorregulación personal, enfoques de aprendizaje, resiliencia y ansiedad evaluativa en estudiantes de Psicología

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Resumen: La autorregulación personal se ha conceptuado como una meta-habilidad, de orden meta-motivacional y meta-afectivo. Esta investigación pretendió establecer las relaciones de asociación e interdependencia con otras variables motivacionales-afectivas relevantes. Participaron un total de 121 alumnos de 2º y 4º curso de Psicología, de la Universidad de Almería (España). Se realizaron análisis correlacionales bivariados de Pearson, ANOVAs y MANOVAs. Los resultados mostraron una relación significativa diferencial entre la autorregulación personal y cada tipo de enfoque de aprendizaje, positiva con la tenacidad y con control resiliente, y negativa con la preocupación. Se evidencia el valor de esta construcción psicoeducativa presagio de las variables estudiadas.

Palabras clave: autorregulación personal; enfoques de aprendizaje; resiliencia; ansiedad evaluativa; estudiantes universitarios.

Abstract: Personal self-regulation has been conceptualized as meta-hability, a meta-motivational and meta-affective variable. The objective of this investigation was to establish association and interdependence relationships with other important motivational-affective variables. There were 121 participants in the study, all of them students from the second and fourth year of the Psychology degree program at the University of Almería (Spain). Pearson bivariate correlational analyses, ANOVAs and MANOVAs were carried out. Self-regulation was shown to have a significant relationship with each type of learning approach, positive with tenacity and with resilient control, and a negative relationship with worry. Personal self-regulation is shown to have value as a presage psychological construct within the study of motivational-affective variables in Education.

Keywords: personal self-regulation; learning approach; resilience; test anxiety; university students.

INTRODUCTION

University education is undergoing a profound change process. The clearest illustration of this change is the creation of the *European Higher Education Area* (EHEA). In this context, the student takes a more active role in constructing his or her own learning, and the teacher must contribute to this learning process by advising, orienting and helping to solve difficulties that appear along the way. Beginning more than a decade ago with pilot projects using the European Credit Transfer System, these changes in the academic context of the European university can act as a stress-inducing variable (Gargallo et al., 2007; Martín-Monzón, 2007).

In analyzing teaching-learning processes at university, the *Biggs' 3P model* (2001) and the *DEDEPRO Model* (De la Fuente, 2011; De la Fuente & Justicia, 2007) have proven to be powerful heuristics that organize the different intervening variables and the complex relationships that exist between them. In the 3P Model, *presage variables* have been defined as having a dispositional nature, and pertain to either the student or the environment; they exist prior to the teaching-learning process and are predictive of the student's behavior during this process. *Process variables* are inherent to how the teaching-learning process is carried out, on the part of students and teachers, respectively. Finally, *product variables* are the final variables to be accounted for, including performance or one's ultimate satisfaction at the conclusion of the teaching-learning process.

Personal self-regulation as a presage, meta-motivational variable of the university student

Personal self-regulation, as a psychological variable, is closely related to personal development competencies, and has attracted much attention in the sphere of Educa-

tional Psychology. We can understand self-regulation as a process that is personal, behavioral and contextual in nature (Bandura, 1986; Torrano & González, 2004), adding in goals as a key factor (Latham & Locke, 1991, 2007). It plays a significant role both in health and in academic or vocational success (Karol, Boekaerts, & Maes, 2005; Vancouver & Scherbaum, 2008). In the theoretical model by Miller and Brown (1991), self-regulation occurs as a series of seven successive processes: 1) informational input, 2) self-evaluation, 3) instigation to change, 4) search, 5) planning for change, 6) implementation, and 7) evaluation. If any of these self-regulation processes is deficient, this will cause a breakdown in regulation of behavior. In this theoretical framework, Brown (1998) defines *self-regulation* as the ability to "plan, monitor and direct one's behavior in changing situations" (p.62). This construct differs from *self-regulated learning*, which includes both cognitive and motivational-affective levels of behavior (Boekaerts, 1997; Boekaerts, Pintrich, & Zeidner, 2000; Pintrich, 2000; Schunk & Zimmerman, 1994). This construct has been related to coping strategies, where greater personal self-regulation has a significant, negative association with emotion-focused coping strategies. Students with greater self-regulation use a fewer number of coping strategies, more selectively, while those who exercise less self-regulation use a greater number of coping strategies (De la Fuente & Cardelle-Elawar, 2011). This evidence has suggested that personal self-regulation could be considered a motivational and affective variable of regulation, in other words, a *meta-motivational* and *meta-affective* variable that would help manage coping strategies and act as a stress management mechanism.

Learning approach as a motivational-strategic variable in the process of learning at university

Biggs (1987) defined *learning approaches* as the way students learn, based on their perception of the academic tasks, and influenced by their personal characteristics. Learning approaches are characterized by the influence of the metacognitive process as it mediates between the student's intention, or *motive*, and the learning *strategy* used for study (Hernadez-Pina et al., 2002; Gargallo et al., 2007; Monroy & Hernández-Pina, 2014). Learning approaches address two different levels of study (Biggs, 1993): a more specific level that addresses a specific task (approach as a process) and a more general level (approach as a predisposition). Some studies have shown that both surface and deep approach to learning are determined by the perception of the learning context and by university students' motivation (Biggs, 1993; Heikkila & Lonka, 2006). Recently, relationships have been established be-

tween academic behavioral confidence, learning approaches and academic performance (Sander, Putwain, & De la Fuente, 2013).

Resilience as a motivational-affective variable during the learning process

Resilience is a personal variable that is currently of great interest (Bermejo, 2011; Forés & Grané, 2008). From an etymological point of view, the term comes from the Latin "saliere", which means to jump back, bounce, be repelled, come up. The prefix *re-* involves repeating or resuming action. To be resilient means "to revive, go forward, after receiving a blow or living through a traumatic situation" (Cyrulnik et al., 2004. p.12). In recent years the concept of resilience has been treated as the quality that is found in persons who endure and pick themselves up again after traumatic situations or loss (Spencer et al., 2012).

In the educational context, resilience plays an important role. Individuals measure their own strength in the face of different challenges and demands, not only academic but also psychosocial, negotiating their way through demanding situations where they must face up to themselves in order to better understand their potential and abilities. Research on resilience has focused mainly on identifying resilient characteristics in the childhood population (Bradley et al., 1994), in populations of poverty victims (Sammeroff & Seiffer, 1992) and in victims of disasters, but little has been examined in student populations (Gargallo et al., 2007). One prior work on resilience in student populations reveals the need to resist frustration (Bragagnolo et al., 2005). Similarly, research on stress in university students indicates that a lack of self-confidence creates a pattern of vulnerability, leaving students with low resistance and little confidence that they will be able to make progress. This is turn triggers various psychological disorders of an educational or social nature, not always addressed by student support services, and so affecting the student's academic performance, social relationships and affectivity (Solórzano & Ramos, 2006).

Test anxiety as an affective variable of academic stress

In order to understand the nature of anxiety and its effects on performance, it is helpful to conceptualize it in its biological-adaptive function. *Anxiety* is an adaptive emotional reaction involved when one is faced with adverse or dangerous events. More specifically, the function of anxiety is to prevent harm through preparatory responses. In order to fulfill this function, anxiety uses a double action mechanism. The first is *cognitive*, and consists of activating priority attention to the detection of

danger signals. The second is *behavioral*, and has to do with mobilizing resources to avoid possible harm. These resources may have a general physiological nature (increased sympathetic activity of the autonomic nervous system), or they may be motoric (increased muscle tension and fast movements) or cognitive (lower alert and monitoring thresholds). Or they may have an instrumental nature which is directly linked to the demands of the situation (studying longer, asking others for help, etc.).

Objectives and hypothesis

Prior evidence has defined the role and importance of each of our variables in the learning process at university. The variables have been studied in isolation, but without establishing any connection with the variable of *personal self-regulation*. For this reason, the general objective of this investigation was to determine any possible association or interdependence relationships between personal self-regulation –conceived as a self-managing or meta-ability variable – with other variables of a motivational-strategic, motivational-affective or emotional nature. Based on this objective, the following hypotheses were proposed:

1) *Personal self-regulation and learning approaches*. The first hypothesis was established based on prior evidence (De la Fuente, 2011; De la Fuente & Cardelle-Elawar, 2009, 2011). A positive association and significant interdependence were assumed between self-regulation and *deep learning* motivation and strategies, and a negative correlation and significant interdependence were assumed between self-regulation and the motivational-strategic behavior typical of the *surface approach*. Similarly, low-medium-high levels of self-regulation in students would be accompanied by similar levels of the deep approach, and by inverse levels of the surface approach.

2) *Personal self-regulation and resilience*. The second hypothesis established that self-regulation would have a positive association with each of the factors of resilience. Thus, levels of low-medium-high self-regulation were expected to discriminate students' level of resilience.

3) *Personal self-regulation and test anxiety*. The third hypothesis proposed that self-regulation would correlate negatively to levels of anxiety and its dimensions, particularly with worry. In addition, there would be significant differences between the different levels of self-regulation, where low levels of self-regulation would correspond to higher levels of anxiety.

Method

Participants

The sample was composed of 121 students (82 female and 39 male) from the second and fourth years of the Psychology degree program at the University of Almeria. The mean age was 21.06 years (sd=3.10).

Instruments

Personal self-regulation was evaluated using the *Self-Regulation Questionnaire (SRQ)*, in its Spanish version, CAR (De la Fuente, 2003), having already been validated in Spanish samples (Pichardo et al., 2014). Its validity and reliability values are acceptable and similar to those of the English version. The short version is made up of 16 items grouped into four factors that characterize personal self-regulation: Goals (before), Perseverance, Decision-making (during), and Learning from mistakes (after).

Approach to learning. The questionnaire from Biggs, Kemberm & Leung (2001), *Revised Two-Factor Study Process Questionnaire* (R-SPQ-2F), in its Spanish version (De la Fuente, 2003), was used to identify the different learning approaches that characterize our university students. The learning approach variable is composed of four subscales: deep motivation, deep strategies, surface strategies and surface approach, which in turn make up the deep approach and surface approach, respectively. This questionnaire provides two general scores in relation to deep and surface approach, and four partial scores that cover surface strategies and motivation, and deep strategies and motivation. This questionnaire has been validated in Spanish samples (Justicia et al., 2008). It contains 20 Likert-type items with responses ranging from 1 (Never or rarely) to 5 (Always or almost always). It also possesses adequate validity and reliability values.

Resilience was measured by the *CD-RISC* inventory (Connor & Davison, 2003), also validated in Spanish samples. This Likert-type scale contains 25 items and five subscales: (1) personal competence, high standards and tenacity, (2) tolerance to negative affect and strengthening effects of stress, (3) positive acceptance of change and secure relationships, (4) control and (5) spiritual influence. The authors report consistent reliability and validity values. In our sample we obtained alpha= .868, and Guttman split half = .714.

Test anxiety was assessed with the TAI 80, *Test Anxiety Inventory*. This questionnaire is a reduced, validated adaptation of the STAI (State Trait Anxiety Inventory), by Spielberger, Gorsuch, & Lushene (Spielberger et al., 1980). This inven-

tory offers a measurement of anxiety specifically in assessment situations, using two components that were described above: worry and emotionality. The test has two parts with 10 questions on each. The first part, worry, assesses interfering, recurring thoughts during the activity – a consequence of perceiving the situation as threatening. The second, emotionality, indicates a relatively stable propensity to anxiety, which characterizes individuals in terms of psycho-physiological activation. For our sample, we found *Alpha*= .919, and *Guttman* (split-half)=.865.

Procedure

All participants received the pertinent information about the research and about how to complete the different questionnaires that were used. Questionnaire completion was voluntary, during class hours, between the months of February and May, for each of the four scales (one scale each month), during the 2012-2013 academic year. Anonymity was guaranteed, and deontological norms were followed with regard to the use of personal data, as established by current Spanish legislation on data protection and by Spain's Deontological Code of Psychology.

Data analyses

A correlational, inferential design was used, with Pearson bivariate correlations (two-tailed) and analyses of variance (ANOVAs and MANOVAs). Cluster analysis was performed in order to categorize students as low, medium or high in self-regulation. This option is especially advised when the variable under study has normal distribution.

RESULTS

Personal self-regulation and learning approaches

The total self-regulation score showed a negative correlation with surface motivation and strategies, and with surface approach. By contrast, a positive correlation was found between self-regulation and the deep learning approach. If we look at the factors that make up self-regulation, all of them follow a similar pattern, having a negative relationship to surface approach and a positive relationship to deep approach. The *goals* and *perseverance* factors are most clearly related to all dimensions of the deep and surface approaches. See Table 1.

Table 1. Correlations between the components and dimensions of learning approach and factors of self-regulation

	GOALS	PERSEVERANCE	DECISIONS	LEARNING FROM MISTAKES	TOTAL SELF-REGULATION
SM	-.301**	-.287**	-.281**	-.210*	-.319**
SS	-.297**	-.228*	-.274**	-.218*	-.289**
DM	.271**				
DS	.339**	.242*	.237*		
SA	-.325**	-.280**	-.301**	-.232*	-.331**
DA	.341**	.238*			.261**

* p<.01, **p<.001.

Note: Self-regulation: Goals, perseverance, decision making, learning from mistakes. SM: Surface motivation; SS: Surface strategy; DM: deep motivation; DS: Deep strategy; SA: Surface approach; DA: Deep approach.

A significant partial effect was found on the MANOVA (IV=Level of self-regulation; DV= Learning approaches) between the low, medium and high groups of self-regulation and learning approaches; self-regulation had a significant effect on *surface approach*, $F(2, 100)=6.303$ (Pillai trace), $p<.01$, $eta^2=.112$, with a post-hoc effect 1>3 (*p*<.05), and on *deep approach* $F(2, 100)=3.366$ (Pillai trace), $p<.05$, eta^2 .063, with a post-hoc effect 1<3 (*p*<.05). This significant effect also appeared in the MANOVA carried out with the four factors corresponding to each of the two approaches, with a significant main effect of level of self-regulation on the types of motivation and strategies $F(4,190)=3.506$ (Pillai trace), $p<.001$, $eta^2=.119$. This general effect came through as a significant partial effect for *deep motivation*, $F(2, 100)=4.314$ (Pillai trace), $p<.01$, $eta^2 = .08$, with a post-hoc effect 3>1 (p<.01) and 3>2 (*p*<.05); for *deep strategy*, $F(2, 100)=8,746$ (Pillai trace), $p<.001$, $eta^2 =.153$, with an effect of 3>1 (*p*<.001) and 3>2 (*p*<.01); for *surface motivation*, $F(2, 100)=6.789$ (Pillai trace), $p<.01$, $eta^2 =.123$, with a post-hoc effect 3<1 and 3<2 (*p*<.01); and *surface strategy*, $F(2, 100)=7.747$ (Pillai trace), $p<.001$, $eta^2= .134$, with a post-hoc effect of 3<1 (*p*<.01) and 3<2 (*p*<.05). See direct values in Table 2.

Table 2. Mean values of the low-medium-high groups in self-regulation with respect to learning approaches

	1) LOW N=27	LEVEL OF SELF-REGULATION 2) MEDIUM N=49	3) HIGH N=27
SA	2.59 (.76)	2.13 (.49)	2.07 (.60)
DA	2.72 (.59)	2.89 (.49)	3.11 (.61)
DM	2.94 (.54)	2.98 (.54)	3.37 (.60)
DS	2.49 (.60)	2.72 (.61)	3.25 (.66)
SM	2.19 (.96)	1.96 (.55)	1.48 (.42)
SS	2.83 (.78)	2.52 (.55)	2.12 (.51)

Note: SA: Surface approach; DA: Deep approach. DM: deep motivation; DS: Deep strategy;
SM: Surface motivation; SS: Surface strategy.

Personal self-regulation and resilience

Significant correlations were obtained between total self-regulation and two of the resilience components (*tenacity* and *exercise of control*), while there was no significant correlation between the two questionnaire totals. *Goal setting* was associated with most components of resilience, except for spirituality. In addition, *decision making* correlated positively with tenacity and with control, and negatively with spirituality. See Table 3.

Table 3. Correlations between components and dimensions of learning approaches and factors of self-regulation

	GOALS	PERSEVERANCE	DECISIONS	LEARNING FROM MISTAKES	TOTAL SELF-REGULATION
TENACI	.381**	.259*	.254*		.321**
STRESS	236*				
CHANGE	.283**				
CONTROL	.343**	.230*	.300**		.272**
SPIRIT			-.224*		
TOT RESIL	.337**				

* p<.01, ** p<.001.

Note: Self-regulation: Goals, perseverance, decision making, learning from mistakes. TENACI: tenacity;
STRESS: resistance to stress: CHANGE: acceptance of change; CONTROL: perception of exercising control;
SPIRIT: spirituality. TOT RESIL: total resilience.

In the MANOVA (IV= Levels of self-regulation; DV= Resilience) the main effect was not significant, $F(10, 168)=1.678$ (Pillai trace), $p<.09$, e$ta^2=.091$, but there was a significant partial effect of levels of self-regulation on *tenacity*, $F(2,87)=6.059$ (Pillai trace), $p<.003$, *eta^2*=.122 (1<2,3, $p<.01$), and *exercise of control*, $F(2,87)=3.716$, $p<.05$, eta^2=.079 (2<3, $p<.05$). Direct values are shown below. See Table 4.

Table 4. Mean values of the low-medium-high groups in self-regulation with respect to resilience

	LEVELS OF TOTAL SELF-REGULATION		
	1) LOW N=24	2) MEDIUM N=42	3) HIGH N=24
TENACI	3.64(.61)	3.73(.52)	4.16(.56)
STRESS	3.44(.64)	3.53(.54)	3.64(.46)
CHANGE	3.96(.61)	3.93(.55)	4.04(.66)
CONTROL	3.42(.76)	3.69(.88)	4.22(.68)
SPIRIT	2.66(1.01)	2.73(.90)	2.64(.93)

Note: TENACI: tenacity; STRESS: resistance to stress: CHANGE: acceptance of change; CONTROL: perception of exercising control; SPIRIT: spirituality.

Personal self-regulation and test anxiety

Significant negative correlations appeared between decision making, learning from mistakes, total self-regulation and worry. In addition, decision making showed a significant, negative correlation with total anxiety. See Table 5.

Table 5. Correlation of factors of self-regulation with test anxiety dimensions and total score

	GOALS	PERSEVERANCE	DECISIONS	LEARNING FROM MISTAKES	TOTAL SELF-REGULATION
Worry			-.423**	-.232*	-.328**
Emotionality					
Anxiety			-.375**		

* $p<.01$, ** $p<.001$.

The ANOVA (VI= Levels of self-regulation; DV: Test anxiety) of self-regulation levels produced a significant main effect, $F(4, 152)=3.597$ (Pillai trace), $p<.05$, eta^2=.086. In the same way, there was a significant partial effect of levels of self-

regulation on worry, $F(2, 76)=7.059$ (Pillai trace), p<.002, $eta^2=.157$ (1>2, $p<.05$ and 1>3, $p<.01$). Direct values are shown below. See Table 6.

Table 6. Mean values of the low-medium-high groups in self-regulation with respect to anxiety

	LEVELS OF TOTAL SELF-REGULATION		
	1) LOW N=24	2) MEDIUM N=42	3) HIGH N=24
Worry	2.39(.30)	2.18(.30)	2.05(.29)
Emotionality	2.93(.31)	2.95(.29)	2.93(.33)

DISCUSSION AND CONCLUSIONS

Personal self-regulation and learning approach

With regard to our first hypothesis, the results showed a significant positive association between the different components of *self-regulation* and the strategies used in the *deep approach*. The same occurred in the case of self-regulation and the components of the deep approach. By contrast, significant negative correlations were obtained between self-regulation and the factors of surface motivation, surface strategies or *surface approach*. These results are consistent with prior evidence regarding self-regulation and its effect on the deep approach (De la Fuente, Pichardo, Justicia, & García-Berbén, 2008; Pichardo, García Berbén, De la Fuente, & Justicia, 2007). The novel result is a negative correlation between *self-regulation* and *surface approach* (including surface strategy and surface motivation), consistent with the idea that low levels in self-regulation are interdependent with surface approach and that, inversely, the deep approach is interdependent with high levels of self-regulation, an aspect which confirms the second part of our first hypothesis. This fact enlarges the current, overly restrictive view of learning approaches as a compendium of exclusively motivational-strategic behaviors (Biggs, 2001), and leads us to consider *personal self-regulation* as a presage, meta-motivational student variable that can materialize as a certain type of approach.

The implications of this finding are important in our understanding of potential problems or learning difficulties encountered by the university student who adopts a *surface approach to learning*. The university teaching-learning context is typically characterized by little external regulation, under the assumption that students possess a good level of personal self-regulation. However, this is not always borne out, just as proposed in the hypothesis of lack of regulation in learning contexts (De la Fuente & Justicia, 2007; De la Fuente et al., 2014). Students with a

surface approach, given their low personal self-regulation, should be trained to increase their levels of general self-regulation, and hence, applying self-regulation specifically to learning, while at the same time helped toward adopting deeper motivation and strategies in their learning process. For the first recommendation, one way to address the problem is intervention for *motivational and cognitive self-regulation while learning*, in other words, metacognitive self-regulation, through training programs in *self-regulated learning* (Martínez-Vicente & De la Fuente, 2004). For the second recommendation, *mindfulness* training may be an option to consider (De la Fuente, Franco, & Mañas, 2010).

Personal self-regulation and resilience to stress

The correlations that appeared serve to validate our second hypothesis. Behavior related to *goal-setting* proved to be associated with several important components of resilience, such as *tenacity* and *decision making*, except for the case of spirituality, which showed only a negative correlation with decisions. Therefore, interdependence of the two constructs was partially confirmed. Specifically, students with high levels of self-regulation appear to be more *persistent* and *consistent*, both in *tenacity* and in *perceived control* of the situation, aspects that make them more resistant to frustration, and therefore, reflect higher levels of resilience. This result is consistent with the idea of resilience as a potential buffering variable against stress, whereby a lack of resilience would act as the loss of a protective factor against stress. Our results are similar to previous research studies (Artuch, 2014), which report a strong relationship between self-regulation and resilience factors. For these reasons, self-regulation could be considered a *meta-motivational* and *meta-affective* variable that is predictive of resilience, as has already been demonstrated by other authors (Cardozo & Alderete, 2009).

Personal self-regulation and test anxiety

The correlations that appeared serve to validate our third hypothesis. Worry was found to correlate negatively with self-regulation. This finding is reasonable, to the extent that people who regulate their behavior would make better use of mechanisms that reduce or inhibit negative emotionality, and anxiety in particular. Interdependence effects between self-regulation and anxiety were also confirmed, especially with regard to worry. The findings also confirm our expectation that students with low levels of self-regulation are those that most exhibit signs of worry. This aspect points to personal self-regulation as not only a meta-

motivational and meta-strategic asset, but also as having a meta-affective role in academic behavior.

Conclusions and implications

Personal self-regulation may be considered to be a *presage* variable of the university student, very important for understanding and predicting later behaviors during teaching-learning processes, whether these behaviors are motivational, strategic or affective. The evidence to date reveals the value of personal self-regulation in accounting for how stress is dealt with while learning (De la Fuente & Cardelle-Elawar, 2011), and in predicting self-regulated learning (Phan, 2006, 2008) and performance (De la Fuente et al., 2008). The cumulative evidence appears to present us with an essential, personal *macro-construct*, having a *meta-motivational* and *meta-affective* nature (Bandura, 1997). This construct can be beneficial if taken into account in the development of broad-spectrum university programs that seek to *optimize students' personal development* – addressing problems such as health, values education, coping with academic stress, and character education – and that likewise seek to *optimize the learning process* – by addressing motivational, cognitive and affective strategies.

Limitations and research prospects

Although the type and number of participants in our sample may be considered a limitation, the results are no less eloquent in establishing a relationship between self-regulation and the rest of the variables assessed. We have begun to see the type of relationships that exist and accurate information has been provided that can mark a path for the development of future interventions to help improve *personal self-regulation* in university students (Gaeta, Teruel, & Orejudo, 2012; Román, 2004). Effectiveness in such interventions would have repercussions both in students' general sociopersonal adaptability, and of course, in their processes of self-regulated learning (Bembenutty, Cleary, & Kitsantas, 2013; Zimmerman & Schunk, 2011).

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