

Moderator Effect of Time Orientation Patterns in Achieving Self-Regulated Learning

Calixto Gutiérrez-Braojos*, Honorio Salmerón-Pérez*,
and Jesús M. Muñoz-Cantero**

*Universidad de Granada, **Universidad de la Coruña

Abstract

This study explores time perspective patterns and their moderator effects on a causal model of academic achievement based on self-regulated learning. Participants were 697 students from Spanish universities. A battery of instruments was used to collect the data. The cluster analysis showed three time perspective patterns: proactive, balanced and interrupted. A multi-group analysis tested the moderation effect of each time pattern in a path analysis that explained grade point average (GPA) based on relevant variables within the self-regulated learning perspective. The results indicate that the explanatory model of academic achievement based on self-regulated learning is more appropriate for the proactive time pattern, while in the other time patterns, academic achievement is mainly explained by external regulation. Therefore, the time pattern could be an explanatory factor, or at least related, in the qualitative change from externally regulated learning to self-regulated learning. Based on the results, the concept of time competence is discussed.

Keywords: Time perspective, self-efficacy beliefs, achievement goals, regulation strategies, academic achievement.

Resumen

En este estudio se exploran patrones de orientación temporal y sus efectos de moderación sobre un modelo causal que explica el logro académico desde el aprendizaje autorregulado. Participaron 697 universitarios españoles. Los datos fueron recogidos mediante una batería de instrumentos. El análisis cluster mostró tres patrones temporales: proactivo, balanceado, e interrumpido. Desde un análisis multigrupo se testó el efecto de moderación de cada patrón temporal en un path-analysis que explica la calificación media del rendimiento académico a partir de variables propias de la perspectiva del aprendizaje autorregulado. Los resultados indican que el logro académico mediante el aprendizaje autorregulado es propio del patrón proactivo. En el resto de patrones el aprendizaje sucede por regulación externa. Por ello se sugiere que el patrón temporal puede ser un factor explicativo del cambio cualitativo que sucede desde el aprendizaje regulado externamente, al aprendizaje autorregulado. Desde estos resultados se discute sobre el concepto de competencia temporal.

Palabras clave: Perspectiva temporal, creencias de autoeficacia, metas de logro, estrategias de regulación, logro académico.

Correspondence concerning this article should be addressed to Calixto Gutiérrez-Braojos, Faculty of Education, Economy, and Technology, Department of Evaluation, Assessment and Research in Education, University of Granada, Campus de Ceuta, Cortadura del Valle s.n. CP: 51001 Ceuta, España. E-mail: calixtogb@ugr.es

Introduction

Autonoetic awareness refers to the individual awareness of one's own identity in a subjective time that extends from the past to the personal future, through the present (Tulvin, 1985). In addition to allowing one to remember the past, this awareness makes it possible to imagine or plan the future *self* (or *selves*) (Markus & Nurius, 1986). These time representations have a strong effect on motivation, and make it possible to self-regulate current behaviour (Lewin, 1942; Suddendorf & Busby, 2005). Various recent studies have attempted to understand and explain the role of time representations in the educational context based on the time perspective theory. Specifically, this line of study has emphasized the role of the future time perspective (FTP) within the theory of self-regulated learning (McInerney, 2004). This theory posits that learning is a proactive and goal-oriented process that can be facilitated by educational settings. Many studies consider the FTP to be a motivational resource with a strong impact on decision-making and academic behaviour (e.g. De Bilde, Vansteenkiste, & Lens, 2011). However, various authors suggest that to better understand the relevance of the time perspective, it is necessary to conceptualize it as a multi-dimensional construct (Worrell & Mello, 2007; Zimbardo & Boyd, 1999); in other words, an

analysis must be performed of all the constructions and time orientations (past, present and future). Following these indications, the purpose of the present study is to analyse the moderator effects of possible time orientations on key constructs of self-regulated learning (self-efficacy beliefs, achievement goals, and regulation strategies) and academic success.

Regulation strategies and academic success

Regulation strategies refer to the degree of control the learner has over the academic processes, goals and contents. Vermunt (1998, 2011) considers three types of regulation strategies depending on the control referent (external/ internal/ lack of control). The first type consists of the so-called self-regulation strategies of the learning processes, results and content. Students who apply these strategies self-direct their learning by planning, monitoring and evaluating the process and the achievement of learning objectives. The second type consists of the so-called external regulation strategies of the processes and results. The students who use these strategies are, for the time being, incapable of self-directing their learning, and they have to follow guidelines and teaching aides offered in the educational setting. Finally, the third type, the lack of regulation, refers to students who are not yet able to regulate (self-regulation and external

regulation) their learning processes, results and contents.

Regarding academic success, the studies reviewed show inconsistent results (García-Ros & Pérez-González, 2011; Zimmerman & Schunk, 2011). A wide range of studies observe that internal self-regulation strategies present a significant and positive relationship with academic success, while external regulation strategies are uncorrelated; moreover, the lack of regulation is positively and significantly related to low academic achievement (e.g. Boyle, Duffy, & Dunleavy, 2003; Busato, Prins, Hamaker, & Visser, 1995; Salmerón, Gutiérrez-Braojos, Rodríguez-Fernandez, & Salmerón-Vílchez, 2011; Vermunt, 1998). However, other authors have found that the combination of internal and external regulation strategies is related to academic success (e.g. Gutiérrez-Braojos, in press).

Achievement goals, regulation strategies and academic success

Achievement goals refer to orientations students adopt to guide their behaviour and commit themselves to academic activities and tasks (Ames, 1992). One of the most widely-accepted models among achievement goal theorists is the 2X2 model of goal orientations elaborated by Elliot and colleagues (Elliot & McGregor, 2001; Elliot & Muruyama, 2008). These authors organise the achievement goals into four types, depending on the va-

lence (positive vs. negative) and the typology of the referent or standard for evaluation (intrapersonal vs. normative). From the combination of these elements, different types of orientations toward achievement emerge:

- a) Students who adopt approach goals through mastery (positive valence and intrapersonal referent) activate and base their motivation and academic behaviour on aims such as mastering the learning processes and academic content;
- b) Students who adopt approach goals through performance (positive valence and normative referent) have the main goal of showing their personal worth to others and achieving external rewards. These students compare their own level of achievement with that of their classmates;
- c) Students who adopt avoidance goals through mastery (negative valence and intrapersonal referent) avoid activities that can affect their self-concept and self-esteem, and they focus more on the possibility of making errors than on the possibility of improving their learning;
- d) Students who adopt avoidance goals through performance (negative valence and normative referent) avoid failure in order to avoid showing a lack of competence compared to the rest of the group and receiving nega-

tive judgments from their peers about their capacity.

Although a first generation of studies were focused on explaining the role of the four types of goals in self-regulated learning and academic success (e.g. Elliot, McGregor, & Gable, 1999; VaderStoep, Pintrich, & Fagerlin, 1996), recent studies have shown the existence of many adaptive goals; that is, students could adopt one orientation or another, or even a combination, to guide their learning activity or their performance, according to the demands (normative, intrapersonal or both) and perceived difficulty of the activity in a contextual learning situation (e.g. Fernández, Anaya, & Suárez, 2012; Gutiérrez-Braojos, Salmerón-Vílchez, & Martín-Romero, 2012; Hidi & Harackiewicz, 2000; Liem, Lau, & Nie, 2008; Senko & Harackiewicz, 2005). Specifically, these authors suggest that approach goals contribute positively to academic success, while avoidance goals contribute negatively.

Self-efficacy beliefs and self-regulated learning

Another key construct that is closely linked to the self-regulated learning perspective consists of the self-efficacy beliefs (Bandura, 1986; Pajares, 2008). According to Bandura, self-efficacy beliefs are not an objective self-measure of one's skills, but rather a subjective judge-

ment of one's capacity to perform a task in a variety of circumstances. The importance of this construct is that competent functioning requires both skills and beliefs about using those skills in an effective way.

An extensive body of research indicates that self-efficacy beliefs have a strong impact on motivational and cognitive processes of learning and academic success. These studies indicate that students who present high self-efficacy beliefs usually adopt approach goals (mastery and performance); in contrast, students with low self-efficacy scores adopt avoidance goals, regardless of the standard (e.g. Elliot, 1999; Liem et al., 2008; Wigfield & Eccles, 2000). Likewise, regarding the use of self-regulation strategies, Zimmerman, Bandura, and Martinez-Pons (1992) indicate that self-efficacy beliefs about using self-regulation strategies predict the use of these strategies in the educational context, and academic success indirectly.

Time orientation, self-efficacy beliefs and self-regulated learning

Zimbardo and Boyd (1999) define the time perspective as a process that integrates the continual flow of personal and social experiences, making it possible to give these events order, coherence and meaning. According to Zaleski (1994), time competence refers to a balanced orientation of the different time frames (past, present

and future) in reaching goals or responding to situational demands. These orientations are constructions people make based on the perception of their experiences. Therefore, they do not depend as much on the events experienced as on the elaborated representation of these events. However, studies in university students indicate that they usually present a differential tendency toward certain time orientations: past (positive / negative), present (hedonist / fatalist) or future (Zimbardo & Boyd, 1999). As these authors point out, the orientation toward the positive past refers to a positive and nostalgic attitude about past events, while the orientation toward the negative past is related to a pessimistic attitude and an aversion toward the past. The fatalist present is more linked to self-destructive and maladaptive behaviours, while the hedonist present refers to a tendency toward current pleasure. In both cases, the future consequences of the behaviours are not considered, which increases the probability of presenting adaptation difficulties in the future. However, a characteristic that differentiates between the two is that people oriented toward the fatalist present show a generalized apathy about present activities, as they believe they cannot influence future events, while hedonist people seek pleasure constantly. Finally, the orientation toward the future is characterized by anticipating and planning future goals. People oriented toward the

future usually renounce immediate rewards in order to achieve greater and more stable satisfaction.

The orientation toward the positive past is usually significantly and positively related to both the future and the hedonist present, but significantly and negatively to the other time frames. However, the future and the hedonist present are significantly and negatively related to each other. In the same way, the orientations toward the negative past and toward the present (fatalist or hedonist) are significantly and positively related to each other, but significantly and negatively related to the future (e.g. Diaz-Morales, 2006; Horstmanshof & Zimitat, 2007; Zimbardo & Boyd, 1999).

Regarding the academic context, some evidence indicates that the orientation toward the future is characteristic of the profile of a self-regulated student. Students oriented toward the future elaborate high self-efficacy beliefs, prefer long-term goals and show perseverance, adopt approach goals, apply self-regulation strategies, and usually have greater academic and professional success (e.g. De Bilde et al., 2011; Gutiérrez-Braojos, in press; Peetsma, Hascher, van der Veen, & Roede, 2005; Shell & Husman, 2001). The orientation toward the positive past is uncorrelated with self-regulated learning topics (Horstmanshof & Zimitat, 2007). On the other hand, students with a negative past and/or present (fatalist and hedonist) orientation elabo-

rate low self-efficacy beliefs, prefer to postpone academic tasks in favour of other types of activities, select short-term goals, adopt avoidance achievement goals, and present a lack of self-regulation strategies that leads to academic failure (De Bilde et al., 2011; Horstmannshof & Zimitat, 2007).

In conclusion, an emerging line of studies has analysed the time perspective as a determining factor in motivational and cognitive regulation processes involved in academic activities. Studies coincide in confirming that only those students oriented toward the future are self-regulated learners. However, most of these studies have mainly focused on the future perspective, and the few studies that have included all the time frames have not analysed possible time patterns and their moderator effects on self-regulated learning.

Study Objectives

Based on the available body of knowledge, the general objective proposed in this study is to analyse the moderator effect of time patterns on self-regulated learning. Thus, the following subordinate objectives were established:

1. Identify patterns of students according to the time perspective. The existence of different time patterns is expected in this objective.
2. Analyse statistically significant differences between the means on self-regulated learning based on the time patterns. In this objective, differences are expected in the means of the variables involved in self-regulated learning based on the time patterns.
3. Test a self-regulated learning model in each group and test the multi-group invariance based on the time patterns. In this objective, a moderator effect is expected of the time patterns on the self-regulated learning model presented in Figure 1.

The lack of previous studies means that little is known about the possible time patterns in the study sample; therefore, it is not reasonable to formulate specific hypotheses (there are an infinite number) about possible patterns. Likewise, given that specific patterns have not yet been defined, there are infinite hypotheses about the significant causal relationships and their direction (negative or positive) depending on these patterns. The present study makes it possible to use deductive and inductive reasoning to generate knowledge for future studies. Even so, abductive reasoning, in the Peircian sense, would imply that the sample must be composed of different time patterns, and that these patterns must have a significant moderator effect on self-regulated learning. Along these lines, the study proposes that a time pattern more oriented toward the fu-

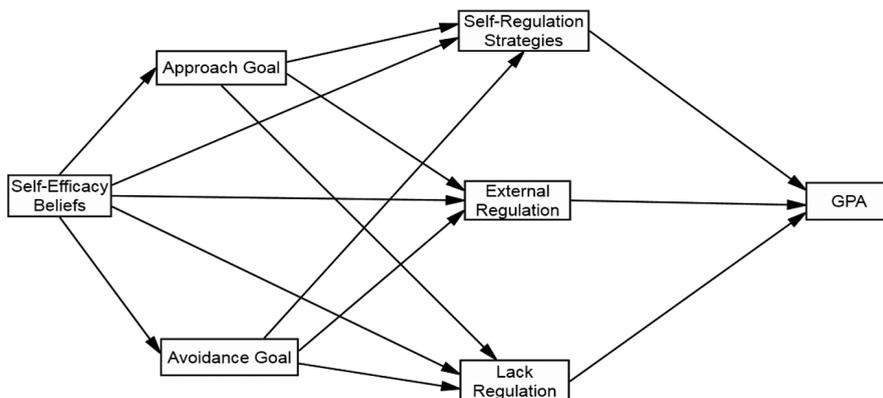


Figure 1. Model of Self-regulated learning and GPA.

ture would have a stronger total effect on the grade point average (GPA) than other possible time patterns.

Method

Participants

Participants were selected by means of incidental sampling. The criterion was the possibility and

ease of applying the battery of instruments. As table 1 shows, the participants in this study were 697 university students (22.3% men, 77.7% women) with a mean age of 22.33 years ($SD = 4.07$). All the student volunteers were enrolled in the following scientific branches: 78 in engineering (11.2% of the total); 348 in Social Sciences and Law (49% of the total); 271 in Health Sciences (38.9% of the total).

Table 1

Area of Study and Gender

		Gender		% of the Total
		%Men	%Women	
Area of study	Health Sciences	23.2	76.8	38.9
	Social Sciences	15	85	49.9
	Engineering	51.3	48.7	11.2

Information-gathering instruments and application procedure

The instruments were administered in the presence of the teacher during tutorial classes. First, the procedure for responding to the battery of instruments was presented and explained. Then the students were given a booklet containing the different subscales, along with instructions and examples of the response procedure. The battery was composed of four instruments and a question about their GPA. Participants responded to the questionnaires using a 5-point Likert scale, where the value of “1” was “very uncharacteristic of me”; and the value of “5” was “very characteristic of me”. Moreover, the GPA was requested from each student, using a range of values of between 0 and 10 points (see Shell & Husman, 2001, for similar measures of GPA).

- *Zimbardo’s Time perspective Inventory* (Zimbardo & Boyd, 1999): To measure the students’ attitudes with respect to the time perspective (past, present and future), the Zimbardo time perspective inventory was applied (ZTPI). The ZTPI is a multi-dimensional instrument made up of five time perspective factors: negative past, positive past, fatalist present, hedonistic present, and future, with a total of 56 items. Previous research using the ZTPI indica-

ted high scores on reliability and validity (Díaz-Morales, 2006; Horstmanshof & Zimitat, 2007; Zimbardo & Boyd, 1999). In the present study, the reliability was analysed using Cronbach’s alpha. Results indicated adequate reliability for all the time variables: Positive past ($\alpha = .82$); Negative past ($\alpha = .80$); Hedonist present ($\alpha = .83$); fatalist present ($\alpha = .76$); Future time perspective ($\alpha = .81$).

- *Albert Bandura’s Self-efficacy for Self-regulated Learning subscale* (Bandura, 2006): The subscale on perceptions about efficacy for self-Regulated Learning is one of the nine subscales from the self-efficacy survey by Bandura (2006). The subscale consists of 9 items. This questionnaire has shown reliability and validity to measure self-efficacy (Bandura, 2006); in the present study the Cronbach’s alpha value was good ($\alpha = .89$).
- *2x2 Achievement Goals scale by Elliot and McGregor* (2001): This scale consists of a total of 12 items grouped into two factors according to the valence: approach goals (mastery and performance) and avoidance goals (mastery and performance). The structural validity and reliability of the subscales were acceptable in numerous studies (e.g. Elliot, 1999; Salmerón et al., 2011). In the present study, the Cronbach’s alpha values were also good:

Approach Goals ($\alpha = .87$), Avoidance Goals ($\alpha = .86$).

- *Learning regulation scale by Vermunt (1998)*: This scale is integrated in the Inventory of Learning Styles or patterns (ILS; Vermunt, 1998, adapted by Martínez-Fernández et al., 2009). The regulation scale of the ILS consists of a total of 28 items grouped in three factors: self-regulation strategies; external regulation strategies; lack of regulation. The structural validity and reliability of the scale and subscale have been acceptable in numerous studies (e.g. Salmerón et al., 2011). In the present study, the Cronbach's alpha values were good: Self-regulation ($\alpha = .92$); External regulation ($\alpha = .86$); and Lack of regulation ($\alpha = .83$).

Analytical procedure

To fulfil the first objective, that is, identify time patterns in the participants, a Cluster K-means analysis was applied. The result of this classification was validated using discriminant analysis. Regarding the second objective, a generalized lineal model was carried out with the *Tamhane* test in order to make multiple comparisons of the self-regulated learning variables among the time patterns identified. Finally, to test the moderator effect of the

time patterns, a multigroup analysis was applied following the steps recommended by Cheung and Rensbold (2002). Likewise, each path analysis was performed using the bootstrapping procedure (10.000 bootstrap samples) in order to analyse the effect of the mediation (direct, indirect and total effects). To evaluate the goodness of fit of the different models, various indices were applied as criteria (Bentler, 1990). On the one hand, the absolute fit measures used were: Chi-square of estimated model, where non-significant values of the associated p -value with an alpha of .05 indicate a good fit; Root Mean Square Error of Approximation (RMSEA), where values of less than ".08" indicate an acceptable fit, and values of less than .05 indicate a good fit; RMR, where values near "0" are acceptable, and values near "1" are unacceptable. On the other hand, the incremental fit measures used were: the Goodness of Fit Index (GFI) and its adjusted measure, (AGFI), the Tucker and Lewis Index (TLI), and the Comparative Fit Index (CFI). For all of them, values near 1 show a good fit, while threshold values above .90 are recommended. The data analysis in objectives 1 and 2 was carried out with SPSS 20 (IBM Corp, 2011), while in objective 3, SPSS Amos 18 for Windows (IBM Corp, 2009) was used.

Results

Patterns according to the combination of time frames

The first study aim was to analyze patterns of time perspective variables. As proposed, a hypothesis "I" Cluster analysis using the K-mean procedure revealed three time perspective patterns (Table 2). Other solutions with a greater number of profiles were ruled out because they presented an insufficient n com-

pared to the rest of the patterns. Moreover, based on the observation differences per group, discriminant analysis was applied to measure the degree of success of the classification made by the cluster analysis. The results revealed that 95.6 % of the original cases were correctly classified. Furthermore, given that Cluster analysis is sensitive to the order of the data, the database was disarranged, and the analysis was replicated. The results are identical to those shown in table 2.

Table 2

Time Perspective Pattern

Variables	Cluster 1 ($n = 203$)		Cluster 2 ($n = 288$)		Cluster 3 ($n = 206$)		Associated values		
	Mean	SD	Mean	SD	Mean	SD	F	p	η^2
PPTP	4.10	.44	3.40	.48	3.90	.51	103.97	***	.26
NPTP	2.17	.46	3.04	.47	3.38	.56	327.16	***	.49
HPTP	3.11	.43	3.12	.52	3.67	.68	91.05	***	.23
FPTP	2.38	.53	2.51	.49	3.30	.47	213.86	***	.21
FTP	3.71	.48	3.43	.48	2.97	.53	124.15	***	.38

Note. PPTP, Positive past time perspective; NPTP, Negative past time perspective; HPTP, Hedonist present time perspective; FPTP, Fatalist present time perspective; FTP, Future time perspective.

*** $p < .001$.

The first pattern, made up of 203 students, presents high scores on the positive past and future orientation variables, a medium score on the hedonist perspective variable, and low scores on the negative past and fatalist present variables.

This pattern was called the "proactive pattern", as it presents future representations of one's identity.

The second pattern, made up of 288 students, presents medium scores on the majority of the variables, except for the fatalist present.

This pattern was called the “balanced time pattern”, due to the equivalence of all the variables and the fact that it does not present a fatalist present.

Finally, the third pattern, made up of 206 students, shows low scores on the future orientation variable and high scores on the rest of the variables. This pattern was called the “interrupted time pattern”, as it lacks a future orientation and presents a strong tendency toward the past and the present.

Time patterns and differences in self-regulated learning

The second objective of this study was to analyse the variables involved in self-regulated learning according to the time patterns. By applying multivariate generalized linear models, the means of these time patterns were compared in the self-regulated learning variables. A *post hoc Tamhane* test was applied to find out which means showed statistically significant differences (Table 3).

The results indicate that the students with a proactive time pattern: (a) Present significantly higher scores on self-efficacy beliefs, approach goals, self-regulation strategies, and GPA than the rest of the students with other time patterns; (b) Show a significantly lower score on avoidance goals than the rest of the time patterns and a significantly lower score on external regulation strategies compared to the balanced

time pattern. On the other hand, the students with a balanced time pattern present: (a) Significantly higher scores on approach goals, self-regulation strategies, external regulation and GPA than the interrupted time pattern; (b) Obtain a significantly lower score on lack of regulation, but present no significant differences with regard to self-efficacy beliefs or avoidance goals.

Analysing the moderator effect of the time patterns on the explanatory model of the GPA based on the self-regulated learning variables

Based on the results obtained in the previous analyses, the next step was to verify the third objective, that is, to analyse the moderator effect of these time patterns on a causal model of the GPA, using the self-regulated learning constructs as explanatory variables (Figure 1).

For this purpose, a multi-group analysis was performed of the causal model of self-regulated learning based on the three time patterns identified. The procedure followed consisted of two phases. The first was to test the model and the parameter estimations for each time pattern separately. The second phase consisted of re-estimating the self-regulated learning model, but with the restriction that the regression estimators had to be equal between groups.

Regarding the first phase, results of the path analysis revealed

Table 3

Multiple Comparisons using the Tamhane Test

Dependent variables	Initial number of cases (I)	Initial number of cases (J)	Difference in means (I-J)	Standard error	p	Confidence interval 95%	
						Lower limit	Upper limit
S.E.B.	1	2	.30	.06	***	.145	.454
		3	.46	.07	***	.287	.634
	2	3	.16	.07	.055	-.003	.324
A.G.	1	2	.48	.09	***	.276	.683
		3	.88	.1	***	.652	1.113
	2	3	.40	.09	***	.180	.627
Av.G.	1	2	-.38	.09	***	-.607	-.157
		3	-.58	.1	***	-.837	-.338
	2	3	-.21	.10	.104	-.439	.029
S.R.	1	2	.53	.06	***	.389	.672
		3	1.10	.07	***	.942	1.25
	2	3	.57	.07	***	.411	.723
E.R.	1	2	-.22	.07	.004	-.381	-.055
		3	-.05	.08	.911	-.226	.137
	2	3	.17	.07	.042	.005	.342
L.R.	1	2	-.23	.09	.043	-.458	-.005
		3	-.84	.11	***	-1.101	-.585
	2	3	-.61	.1	***	-.861	-.362
G.P.A.	1	2	.51	.09	***	.281	.729
		3	1.12	.1	***	.885	1.358
	2	3	.62	.09	***	.402	.832

Note. S.E.B. Self-efficacy Beliefs; A.G. Approach goals; Av. G. Avoidance goals; S.R: Self-regulation; E.R. External regulation; L.R. Lack of regulation; G.P.A. Grade Point Average.

*** $p < .001$.

that the self-regulated learning model shows a good fit to the data, regardless of the time pattern, with the group oriented toward the future having the best absolute and incremental fit indices,

followed by the interrupted pattern and finally, the balanced pattern (Table 4, Figure 1). Therefore, the three groups were found to share the same basic model of self-regulated learning.

Table 4

Goodness of Fit Indices of the PT/C Model

Groups	Measures of absolute fit					
	χ^2	DF.	<i>p</i>	CMIN/DF	RMSEA	SRMR
P.T.P.	4.676	3	.197	1.559	.053	.016
B.T.P.	7.084	3	.069	2.361	.069	.024
I.T.P.	4.937	3	.176	1.646	.056	.026

Groups	Measures of incremental fit			
	AGFI	TLI	GFI	CFI
P.T.P.	.939	.940	.994	.997
B.T.P.	.935	.963	.993	.995
I.T.P.	.937	.973	.993	.996

Note. P.T.P., proactive time pattern; B.T.P., balanced time pattern; I.T.P., Interrupted time pattern.

The results of the direct effects, total indirect effects and their significance are presented in table 5. Below, a comparison is made of the time patterns' total significant effects on GPA:

- Proactive pattern: the variables of self-efficacy beliefs ($\beta = .35, p < .001$), approach goals ($\beta = .32, p < .001$), and self-regulation strategies ($\beta = .62, p < .001$) have a positive effect on GPA, and the lack of regu-

lation presents a negative effect ($\beta = .62, p = .004$). However, external regulation strategies and avoidance goals did not have a significant effect on GPA.

- Balanced time pattern: the variables of self-efficacy beliefs ($\beta = .28, p < .001$), approach goals ($\beta = .17, p = .001$), external regulation strategies ($\beta = .353, p < .001$), and self-regulation strategies ($\beta = .29, p = .001$) presented a significant effect on GPA, and the lack of

Table 5

Direct, Indirect and Total Effects According to the Time Patterns

Causal Variables	Direct Effects			Indirect Effects			Total Effects		
	P.T.P.	B.T.P.	I.P.T.	P.T.P.	B.T.P.	I.P.T.	P.T.P.	B.T.P.	I.P.T.
On G.P.A.									
S.R.	.62 (***)	.288 (.001)	.143 (.137)	...	...	...	.62 (***)	.288 (.001)	.143 (.137)
E.R.	.083 (.131)	.353 (***)	.230 (.002)	...	...	...	.083 (.131)	.353 (***)	.230 (.002)
L.R.	-.201 (.004)	-.172 (.013)	-.290 (.004)	...	...	...	-.201 (.004)	-.172 (.013)	-.290 (.004)
Av.G.	...	...	...	-.029 (.585)	-.040 (.368)	.013 (.808)	-.029 (.585)	-.040 (.368)	.013 (.808)
A.G.	...	...	...	.32 (***)	.171 (.001)	.187 (.002)	.32 (***)	.171 (.001)	.187 (.002)
S.E.B.	...	...	...	.349 (***)	.277 (***)	.205 (***)	.349 (***)	.277 (***)	.205 (***)
On S.R.									
Av.G.	-.065 (.425)	-.287 (***)	-.241 (***)	...	...	...	-.065 (.425)	-.287 (***)	-.241 (***)
A.G.	.353 (***)	.132 (.063)	.172 (.025)	...	...	...	.353 (***)	.132 (.063)	.172 (.025)
S.E.B.	.277 (***)	.282 (***)	.269 (***)	.166 (***)	.181 (***)	.181 (***)	.443 (***)	.463 (***)	.450 (***)
On E.R.									
Av.G.	.205 (.032)	.199 (.014)	.148 (.136)	...	...	...	.205 (.032)	.199 (.014)	.148 (.136)
A.G.	.094 (.348)	.245 (.005)	.168 (.125)	...	...	...	.094 (.348)	.245 (.005)	.168 (.125)
S.E.B.	-.013 (.914)	.185 (.002)	.07 (.357)	-.030 (.344)	.028 (.362)	.018 (.720)	-.043 (.609)	.213 (***)	.087 (.189)
On L.R.									
Av.G.	.205 (.677)	.164 (.011)	.045 (.522)	...	...	...	.205 (.677)	.164 (.011)	.045 (.522)
A.G.	-.462 (***)	-.275 (.001)	-.425 (***)	...	...	...	-.462 (***)	-.275 (.001)	-.425 (***)
S.E.B.	-.185 (.007)	-.204 (***)	-.195 (.003)	-.199 (***)	.195 (***)	-.219 (***)	-.384 (***)	-.399 (***)	-.414 (***)
On Av.G.									
S.E.B.	-.334 (***)	-.421 (***)	-.415 (***)	...	...	...	-.334 (***)	-.421 (***)	-.415 (***)
On A.G.									
S.E.B.	.41 (***)	.458 (***)	.471 (***)	...	...	...	.41 (***)	.458 (***)	.471 (***)

Note. S.E.B. Self-efficacy Beliefs; A.G. Approach goals; Av. G. Avoidance goals; S.R: Self-regulation; E.R. External regulation; L.R. Lack regulation; G.P.A. Grade Point Average; P.T.P., Proactive time pattern; B.T.P., Balanced time perspective pattern; I.T.P., Interrupted time pattern.

*** $p < .001$.

regulation variable had a negative effect ($\beta = .17, p = .013$). However, external regulation strategies and avoidance goals variables did not have a significant effect on GPA.

- Interrupted time pattern: the variables of self-efficacy beliefs ($\beta = .21, p < .001$), approach goals ($\beta = .19, p < .002$), and external regulation strategies ($\beta = .23, p < .002$) presented a positive effect on GPA, while the lack of regulation variable showed a negative charge ($\beta = .29, p < .004$). On the other hand, the avoidance goals and self-regulation strategies variables presented a non-significant charge.

Based on these data, the proactive time pattern presents the greatest influence on the following explanatory variables of the GPA: self-regulation strategies, approach goals, self-efficacy beliefs. The balanced time pattern presents a combination of regulation strategies (self and external) and has the greatest influence on external strategies. The interrupted time pattern presents only external regulatory strategies. The three groups coincide in presenting a lack of significance of avoidance goals in explaining GPA.

Next, multigroup invariance was formally analysed to determine whether the time patterns have a moderator effect on self-regulated learning. To do so, restrictions were

placed on it in the regression estimators. To detect possible affinities between models, 2*2 comparisons were performed (Table 6).

Table 6

Multigroup Invariance

Model comparison	$\Delta\chi^2$	ΔDF	p	ΔCFI
P.T.P Vs. B.P.T.	80.146	14	.000	-.052
P.T.P Vs. I.T.P	60.411	14	.000	-.046
B.T.P Vs. I.T.P	13.960	14	.453	0

Note. P.T.P., Proactive time pattern; B.T.P., Balanced time pattern; I.T.P., Interrupted time pattern.

Results suggest that the moderator effect is due to the proactive pattern:

- Comparison of the proactive and balanced time patterns:

The chi-square difference between the two models (restricted in the regression vs. original estimators) suggests a lack of equivalence between the groups (CMIN = 80.15, $p < .001$). Moreover, a decrease in the CFI of more than .02 is observed, which suggests, according to the criteria of Cheung and Rensbold (2002), that the groups are not equivalent.

- Comparison of the proactive and maladaptive time patterns:

The chi-square difference between the two models suggests a lack of equivalence between the

groups ($CMIN = 60.41, p < .001$). Moreover, the CFI presents a decrease superior to .02; therefore, the groups are not equivalent.

- Comparison of the balanced and maladaptive time patterns:

The chi-square difference between the two models suggests that the groups are equivalent ($CMIN = 13.15, p < .453$). Moreover, no variation is observed in the CFI (presenting three decimals). Therefore, as there is not enough evidence to reject the null hypothesis in the case of these two groups, the time pattern has a moderator effect on self-regulated learning.

Discussion

The findings of this study show the existence of three time patterns and their moderator effects on self-regulated learning and academic achievement. The Proactive time pattern (P.T.P), characterized by a positive past and future oriented perspective, coincides with prior studies that found certain relationships of dependence between these time orientations (e.g. Díaz-Morales, 2006; Horstmanshof & Zimitat, 2007; Zimbardo & Boyd, 1999). The Balanced Time Pattern (B.T.P), characterized by a balance among the different time patterns. However, and in agreement with the literature reviewed (e.g. Díaz-Morales, 2007; Zimbardo &

Boyd, 1999), this pattern was not expected in university students, at least not in such a large group of students. Finally, the Interrupted time pattern (I.T.P) is characterized by the combination of past (negative and positive) and present (hedonist and fatalist) orientations. The most distinctive characteristics are an orientation toward the hedonist present and an interruption in the construction of future time constructions (more inappropriate depending on their life cycle and the requirements of a university degree).

The Proactive time pattern contains students with greater self-efficacy beliefs, approach goals, internal regulation strategies and academic success than the rest of the time patterns. The Balanced time pattern presented significantly higher scores on self-regulation strategies, external regulation strategies and approach goals than the Interrupted time pattern; however, in the case of the self-efficacy beliefs, avoidance goals did not present significant differences. Thus, these results coincide with the body of knowledge that emphasizes the proactive role and importance of students' future orientation as a determining factor in their learning and academic success (e.g. De Bilde et al., 2011; Horstmanshof & Zimitat, 2007; Husman & Lens, 1999; Peetsma et al., 2005; Shell & Husman, 2001; Wigfield & Eccles, 2000; Zimmerman & Schunk, 2011).

These results are confirmed by the analysis of the moderator effect of the time patterns on a self-regulated learning model. Although a good fit is observed, regardless of the time pattern, the results indicate that in the P.T.P., the model presents a better fit to the data than in the other patterns. Moreover, the I.T.P. presented a better fit than the B.T.P. Regarding the total effects, the P.T.P. profile corresponded to self-regulated learners to a greater degree, and the I.T.P. corresponded more to learners who need external regulation for their learning. The B.T.P. showed a combination of external and internal regulation strategies. While the B.T.P. and the I.T.P. coincide more with previous results from studies analysing self-regulated learning from the time perspective, the B.T.P. is more related to the findings by Gutiérrez-Braojos (in press).

These findings suggest that the explanatory model of the GPA based on self-regulated learning is more suitable for the proactive pattern than for the rest of the patterns. Therefore, in university students, time competence refers to an orientation with a future tendency, but not a balanced temporal pattern (Zaleski, 1994).

Furthermore, based on these results, in future studies the time pattern could be an explanatory factor, or related to it, for the qualitative change that occurs in learners when they go from being externally regulated to being internally regulated. Future studies should also identify time patterns consisting of a number of reasonably extensive observations, if possible more than in the present study, in order to identify other time patterns to add to the findings presented here. One of the limitations of this study is the sample size. Although the total can be considered acceptable, the identification of three groups produced a considerable decrease in the number of observations for each model to be tested in the multigroup analysis. Another limitation of this study has to do with the type of sample utilized, given that the selection procedure was incidental, which meant that a large number of students were female. Therefore, these results must be interpreted with this characteristic of the sample composition in mind. Thus, future studies should randomly select a sample that is balanced in gender and includes students in the Sciences field, an area that was not represented in this sample.

References

- Ames, C. (1992). Achievement goals and classroom motivational climate. In J. Meece, & D. Schunk (Eds.), *Students' perceptions in the classroom* (pp. 327-348). Hillsdale, NJ: Erlbaum.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares, & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 307-337). Greenwich, C.T.: Information Age Publishing.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*, 238-246. doi:10.1037/0033-2909.107.2.238
- Boyle, E. A., Duffy, T., & Dunleavy, K. (2003). The validity of Vermont's inventory of learning styles in a Scottish Higher education setting. *British Journal of Educational Psychology*, *73*, 267-290. doi: 10.1348/00070990360626976
- Busato, V. V., Prins, F. J., Hamaker, C., & Visser, K. H. (1995). Learning styles research replicated; Learning styles and intelligence. *Tijdschrift Voor Onderwijs Research* *20*, 332-340.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, *9*, 233-255. doi: 10.1207/S15328007SEM0902_5
- De Bilde, J., Vansteenkiste, M., & Lens, W. (2011). Understanding the association between future time perspective and self-regulated learning through the lens of self-determination theory. *Learning and Instruction*, *21*, 332-344. doi: 10.1016/j.learninstruc.2010.03.002
- Díaz-Morales, J. F. (2006). Factorial structure and reliability of Zimbardo Time Perspective Inventory. *Psicothema*, *18*, 565-571.
- Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist*, *34*, 149-169. doi: 10.1207/s15326985ep3403_3
- Elliot, A. J., & McGregor, H. A. (2001). 2*2 achievement goal framework. *Journal of Personality and Social Psychology: Special Issue* *80*(3), 501-519. doi: 10.1037/0022-3514.80.3.501
- Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology*, *100*, 613-628. doi: 10.1037/0022-0663.100.3.613
- Elliot, A. J., McGregor, H. A., & Gable, S. L. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology*, *91*, 549-563. doi: 10.1037/0022-0663.91.3.549
- Fernández, A. P., Anaya, D., & Suárez, J. M. (2012). Motivation features and motivational self-regulatory strategies in the middle school students. *Revista de Psicodidáctica* *17*(1), 95-111. doi: 10.1387/Rev Psicodidact.1835
- García-Ros, R., & Pérez-González, F. (2011). Predictive and incremental validity of self-regulation skills on academic success in the university.

- Revista de Psicodidáctica*, 16(2), 231-250. doi: 10.1387/RevPsicodidact.1002
- Gutiérrez-Braojos, C. (in press). Future time orientation and learning conceptions: Effects on metacognitive strategies, self-efficacy beliefs, study effort and academic achievement. *Educational Psychology*. doi: 10.1080/01443410.2013.858101
- Gutiérrez-Braojos, C., Salmerón-Vílchez, P., & Martín-Romero, A. (2012). Do achievement goals, strategies, regulatory and academic performance differ depending on the specific college degree? *Revista de Psicología y Educación*, 7(1), 111-124.
- Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of Educational Research*, 70(2), 151-179. doi: 10.2307/1170660.
- Horstmanshof, L., & Zimitat, C. (2007). Future time orientation predicts academic engagement among first-year university students. *British Journal of Educational Psychology*, 77(3), 703-718. doi: 10.1348/000709906X160778
- Husman, J., & Lens, W. (1999). The role of the future in student motivation. *Educational Psychologist*, 34, 113-125. doi: 10.1207/s15326985ep3402_4
- IBM Corp. (2009). *IBM SPSS Amos for trial*. Armonk, New York: IBM.
- IBM Corp. (2011). *IBM Statistical Package for Social Science (SPSS) for Windows, Version 20.0*. Armonk, New York: IBM.
- Lewin, K. (1942). Time perspective and morale. In G. Watson (Ed.), *Civilian morale* (pp. 48-70). New York: Houghton Mifflin.
- Liem, A., Lau, S., & Nie, Y. (2008). The role of self-efficacy, task value, and achievement goals in predicting learning strategies, task disengagement, peer relationship, and achievement outcome. *Contemporary Educational Psychology*, 33(4), 486-512. doi: 10.1016/j.cedpsych.2007.08.001
- Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, 41, 954-969. doi: 10.1037/0003-066X.41.9.954
- Martínez-Fernández, J. R., García-Ravidá, L., González-Velázquez, L., Gutiérrez-Braojos, C., Poggioli, L., Ramírez-Otálvaro, P., & Tellería, M. B. (2009). *Learning pattern inventory (in Spanish)*. Internal document of the PAFIU research team. Barcelona: Universitat Autònoma de Barcelona. Disponible en: <http://grupsderecerca.uab.cat/pafiu/>
- McInerney, D. M. (2004). A discussion of future time perspective. *Educational Psychology Review*, 16(2), 141-151. doi:10.1023/B:EDPR.0000026610.18125.a3
- Pajares, F. (2008). Motivational role of self-efficacy beliefs in self-regulated learning. In D.H. Schunk, & B.J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 111-141). Mahwah, NJ: Erlbaum.
- Peetsma, T., Hascher, T., van der Veen, I., & Roede, E. (2005). Relations between adolescents' self-evaluations, time perspectives, motivation for school and their achievement in different countries and at different ages. *European Journal of Psychology of Education*, 20, 209-225. doi: 10.1007/BF03173553
- Salmerón, H., Gutiérrez-Braojos, C., Rodríguez Fernández, S., & Salmerón-Vílchez, P. (2011). Achieve-

- ment goals, regulation strategies, and academic performance in different college degrees. *Revista de Investigación Educativa*, 29(2), 467-486.
- Senko, C., & Harackiewicz, J. M. (2005). Regulation of achievement goals: The role of competence feedback. *Journal of Educational Psychology*, 97, 320-336. doi: 10.1037/0022-0663.97.3.320
- Shell, D. F., & Husman, J. (2001). The multivariate dimensionality of personal control and future time perspective in achievement and studying. *Contemporary Educational Psychology*, 26, 481-506. doi: 10.1006/ceps.2000.1073
- Suddendorf, T., & Busby, J. (2005). Making decisions with the future in mind: Developmental and comparative identification of mental time travel. *Learning Motivation*, 36, 110-125. doi: 10.1016/j.lmot.2005.02.010
- Tulving, E. (1985). Memory and consciousness. *Canadian Psychologist*, 25, 1-12. doi: 10.1037/h0080017
- VanderStoep, S. W., Pintrich, P., & Fagerlin, A. (1996). Disciplinary differences in self-regulated learning in college students. *Contemporary Educational Psychology*, 21, 345-362. doi: 10.1006/ceps.1996.0026.
- Vermunt, J. D. (1998). The regulation of constructive learning processes. *British Journal of Educational Psychology*, 68(2), 149-171. doi: 10.1111/j.2044-8279.1998.tb01281.x
- Vermunt, J. D. (2011). Pattern on student learning and teacher learning. In S. Rayner, & E. Cools (Eds.), *Style differences in cognition, learning, and management. Theory, research, and practice* (pp. 172-187). New York: Routledge.
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology*, 25, 68-81. doi: 10.1006/ceps.1999.1015
- Worrell, F. C., & Mello, Z. R. (2007). Reliability and validity of Zimbardo time perspective inventory scores in academically talented adolescents. *Educational and Psychological Measurement*, 67, 487-504. doi: 10.1177/0013164406296985
- Zaleski, Z. (1994). *Psychology of future orientation*. Lublin, Poland: Lublin University Press.
- Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-difference metric. *Journal of Personality and Social Psychology*, 77(6), 1271-1288. doi: 10.1177/0961463X13487043
- Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, 29(3) 663-676. doi: 10.2307/1163261
- Zimmerman, B. J., & Schunk, D. H. (2011). Self-regulated learning and performance: An introduction and an overview. In B. J. Zimmerman, & D. H. Schunk (Eds.), *Handbook of Self-Regulation of Learning and Performance* (pp. 1-12). New York, NY: Routledge.

Calixto Gutiérrez-Braojos is Professor of Research and Diagnostic Methods in Education at the UGR and member of the follow Research groups: i) Innovation, Development and Evaluation in Education (IDEE) of the Andalusian Government; ii) Patterns of learning and research training (PAFIU) of Autonomous University of Barcelona (UAB). Finished doctoral studies at the University of Granada, with research stays at the University of Toronto and the Autonomous University of Barcelona. Current research areas include: i) knowledge building, collaborative knowledge creation and evaluation in virtual communities; ii) Time perspective, motivation and regulation of learning.

Honorio Salmerón Pérez is University full professor and director of the department of Research Methods and Diagnostic in Education at the UGR. Member of the Research group: Innovation, Development and Evaluation in Education (IDEE, University of Granada) of the Andalusian Government. Finished doctoral studies at the UNED, with stays in various universities in Argentina, Chile and Cuba. Current line of research: Orientation in learning processes, having published numerous papers on constructivism, self-regulated learning and developing competencies.

Jesús Miguel Muñoz Cantero is Director of department of Research and Diagnostic Methods in Education at the UDC and director of the Research group on Educational Evaluation and Quality (GIACE). Finished doctoral studies at the University of Santiago de Compostela, and has had various stays in Brazilian universities. Main lines of research: i) Evaluation of quality in university and non-university educational institutions; ii) evaluation of attention to diversity; and iii) evaluation of competencies in learning processes.

Received date: 19-09-2013

Review date: 03-12-2013

Accepted date: 08-03-2014

