Time perspective, approaches to learning, and academic achievement in secondary students

Isabel Nunes Janeiro [a,], António Manuel Duarte [a], Alexandra M. Araújo [b], Ana Inocêncio Gomes [a]

[a] CICPSI, Faculty of Psychology, University of Lisbon, Portugal
[b] INPP, Department of Psychology and Education, UPT - Oporto Global University, Portugal

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a b s t r a c t

Previous research suggests that both the presence of an extended future time perspective and the generic use of a deep approach to learning predict academic achievement and overall adjustment to school. The present study aimed to investigate how the different dimensions of time perspective (future, present, past, and negative future) influence secondary students' approaches to learning and academic achievement. Participants were 400 students attending the 11th grade (248 girls and 152 boys; Mean = 16.70, SD = 0.94) at six Portuguese public schools. Structural equation modeling analysis showed that future time orientation influenced academic achievement via deep and achieving approaches to learning, while past orientation and negative future influenced achievement via surface approaches to learning. Present orientation was not related to approaches to learning but had a small direct negative effect on academic achievement. Implications are discussed, along with limitations and suggestions for future research.

The importance of considering time perspective (TP) for understand- ing behavior and motivation has been described by several theories (e.g., Lewin, 1951/1997; Nuttin & Lens, 1985; Super, 1990; Zimbardo & Boyd, 1999). Similarly, in the educational context, research has demonstrated the significant relations between dimensions of TP, namely the dimension of future time, and variables such as academic achievement, motivation, and school engagement (De Volder & Lens, 1982; Husman & Lens, 1999; King, 2016; Peetsma and Van der Veen, 2011).

An important variable for academic achievement and motivation is students' approaches to learning (SAL), which is a combination of the motivation to study and learning strategies students use to manage learning tasks (Entwistle, Tait, & McCune, 2000). Such approaches sub- stantially influence academic achievement and the quality of learning and are influenced by students' personal characteristics and learning environments (Biggs, 1999; Cano, 2005; Entwistle, 1989; Richardson, 2005). However, little is known about the influence of the different time orientations (past, present, and future orientations) on the ways students approach learning tasks at school. The aim of the present study was to investigate how secondary students' different time orientations are associated with SAL and academic achievement.

Corresponding author at: Faculty of Psychology, University of Lisbon, Alameda da Universidade, 1649-013 Lisbon, Portugal.
E-mail address: injaneiro@psicologia.ulisboa.pt (I.N. Janeiro).

1. Time perspective

TP may be defined as the subjective and sometimes non-conscious way individuals relate to time and how they organize and categorize personal and social experiences in temporal frames, namely the past, present, and future (Boyd & Zimbardo, 2005). As an old topic in psychology, TP research has evolved in two main directions: one focuses on the motivational dynamics associated with the way people think about time, while the other explores the individual differences on TP (Janeiro & Marques, 2010).

Research concerned with the motivational dynamics of TP integrates the study of TP with theories of human motivation and focuses mainly on the role of the future as a regulator element of human behavior (e.g., Lens, 1988; Simons, Vansteenkiste, Lens, & Lacante, 2004a). Future TP (FTP) is described as a multidimensional system (Husman & Lens, 1999; Husman & Shell, 2008) that incorporates both cognitive and affec- tive components. The cognitive components of FTP relate to the struc- ture of the events projected into the future, both in terms of time extension (i.e., how far in the future those events are projected) and in terms of the content (i.e., degree of realism of the objectives, density of events projected into the future, and clarity of those objectives). The affective component is described as a temporal attitude (Nuttin & Lens, 1985) and reflects the emotional valence of future events. The future may be seen in an optimistic way, with a sense of confidence in the achievement of the future objectives, or may, instead, be perceived as somewhat threatening (Ringle & Savickas, 1983).

Most of the studies about TP performed in academic contexts focus on the motivational impact of the subjective future. Generally, research has shown a positive and significant relationship between FTP and aca- demic achievement (Carvalho & Novo, 2015; De Volder & Lens, 1982; Lens & Tsuzuki, 2007; Peetsma and Van der Veen, 2011), motivation and self-regulated learning (de Bilde, Vansteenkiste, & Lens, 2011; Lens, Paixão, Herrera, & Grobler, 2012), and career adaptability (Janeiro, 2010; Marko & Savickas, 1998; Taber, 2013).

A second approach to the study of TP considers the three temporal periods (future, present, and past) and studies the individual differences in coping with everyday life events within a preferred time frame or dimension. This tendency to cope with events within a preferred time dimension has been described either as a trace of personality (Lens, 1988) or as a cognitive style (Zimbardo, Keough, & Boyd, 1997), and influences many areas of human thought and behavior (Ringle & Savickas, 1983; Zimbardo et al., 1997). The term “time orientation” is usually adopted to characterize this predisposition to be influenced by thoughts, emotions, and motivations of a distinct time frame, and is considered a more circumscribed element of the broader construct of TP (Lasane & O'Donnell, 2005).

A dominant time orientation is associated with diverse behavioral and psychological outcomes. For instance, individuals with a dominant future orientation focus predominantly on future goals and plans and tend to be self-disciplined and perseverant (Boyd & Zimbardo, 2005). In general, this orientation is associated with positive outcomes for per- sonal development and social integration (Jones & Brown, 2005). By contrast, a negative perception of the future seems to be related to low levels of self-esteem and career adaptability (Janeiro & Marques,
2010) and with adverse psychological dimensions, such as anxiety or depressive symptoms (Carelli et al., 2015). Individuals orientated to the past tend to value traditions and resist social changes; a negative perception of the past is associated with anxiety and depression (Jones & Brown, 2005). People with a predominant present orientation like to enjoy the moment and have a tendency to be more impulsive and extroverted; this time orientation is associated with some risk behaviors, such as drug or alcohol consumption (Boyd & Zimbardo, 2005; Keough, Zimbardo, & Boyd, 1999).

Research on TP and time orientation increased substantially in re- cent years, in part due to the development of new instruments for its assessment. One of the most used instruments is the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999), which measures different behaviors and attitudes toward time across the three temporal dimensions and is organized in five subscales: past positive, past negative, present hedonistic, present fatalistic, and future. While extensively used with adult samples, the ZTPI has shown some psychometric inconsistencies and low levels of reliability when the studies involve younger samples (Worrell & Mello, 2007, 2009). Some alternatives for the as- sessment of TP with adolescent populations have been advanced in re-cent years, including the Adolescent Time Inventory - Time Attitude (ATI-TA, Worrell & Mello, 2009) and the Time Perspective Inventory (TPI, Janeiro, 2012). The TPI was developed specifically for the assessment of TP in school settings (Janeiro, 2012). Taking into consideration the structural independence of the three dimensions of time, the TPI is organized in four scales: FTP, present orientation, past orientation, and the negative or anxious vision of the future. Contrasting with the ZTPI that identifies only one factor related to the future, factorial analysis with the TPI suggested two factors, one associated with a positive or optimistic perception of the future and other with a negative or anxious vision of the future (Janeiro, 2012).

2. Students' approaches to learning (SAL)

SAL refers to the combination of motivation and learning strategies students use to address learning tasks. Previous research has identified two main types of approaches to learning: a deep approach and a sur- face approach (Entwistle et al., 2000). The deep approach refers to intrinsic motivation to learn (learning for pleasure) and the use of a deep learning strategy (comprehension). In contrast, the surface ap- proach refers to instrumental motivation to learn (studying to avoid failure) and the use of a surface learning strategy (rote memorization). Some studies have also identified a third approach to learning - named achieving or strategic approach - that refers to achieving motivation (learning for good grades) and an organizing learning strategy (man- agement of time and resources) (Entwistle, 2001). However, the achiev- ing approach is less stable and it (or some of its elements) may be included in the deep or surface approach to learning (Fox, McManus,
& Winder, 2001).

There is a differential impact of these learning approaches on aca- demic achievement. The surface approach tends to be related to lower grades, while the deep and achieving approaches to higher grade levels (Cano, 2005; Diseth, 2013; Valadas, Almeida, & Araújo, 2016; Watkins,
2001). Moreover, SAL can be conceptualized both as variable behaviors, such as reactions to particular situations, and as relatively constant habits of addressing learning tasks based on the student's characteristics (Biggs, Kember, & Leung, 2001). In addition to its relationship with the learning context, SAL is affected by or relates to various individual characteristics, such as self-efficacy, goal orientations (Diseth, 2011), and personality (Diseth, 2013).

3. Time perspective, approaches to learning, and academic achievement

Because TP is a structural dimension of personal performance that significantly influences judgments, decisions, and behaviors (Zimbardo
& Boyd, 1999), it may play a relevant role in students' learning. For ex- ample, an extended FTP (e.g., believing that present studies will provide a better future career) is associated with academic persistence and deep conceptual thinking (Peetsma & Van der Veen, 2011; Simons, Dewitte, & Lens, 2004b). Some studies have explored the relationship between TP, particularly future time perspective, and motivational and strategic components of learning, suggesting that the perception of present school tasks as instrumental for the future contributes to an increase in motivation and the use of more effective learning strategies, which in turn promote academic success (Husman & Shell, 2008; Phan, 2009). In their study with first-year nursing students, Simons, Dewitte, et al. (2004b) showed that future orientation (i.e., perceiving the instrumentality of present tasks to future tasks or goals) predicted deep strategies, which ultimately led to higher levels of academic achievement, whereas the absence of that orientation led to the opposite result. Similarly, Phan (2009) found that FTP predicted academic achievement via deep processing and deep processing through mastery goals. Such associations between FTP and motivation in learning have also been de- scribed in younger students. Andriessen, Phalet, and Lens (2006), in a study with secondary students, showed that students with higher levels of positive perceived instrumentality of schoolwork for later success in life and internal regulation of school engagement, motivated by a per-spective of self-development, used deep learning strategies more fre- quently, whereas the students with higher levels of external regulation of school engagement, motivated by employment or income, tended to use surface strategies.

Considering these previous studies, it is expected that students' TP will also have a significant role in their approaches to learning; nevertheless, research on this topic is practically non-existent. An exception is a study with first-year university students by Horstmanshof and Zimitat (2007) that found that a “meaningful approach to learning” (i.e., deep and achieving motives, deep and achieving strategies) was positive and significantly correlated with a future time orientation. The same meaningful approach was negatively and significantly correlated with a present fatalistic time orientation. The study also found that a “reproductive approach to learning” (i.e., surface and achieving motives, surface and achieving strategies) was positively and significantly

correlated with both a future time orientation and a past negative time orientation.

In sum, evidence of the importance of the FTP on academic motiva- tion seems clear. Nevertheless, recent research on TP has shown that fo- cusing on the future alone is problematic because individuals also harbor feelings, attitudes, and cognitions about the other two time pe- riods (e.g., Andretta, Worrell, Mello, Dixson, & Baik, 2013; Mckay, Andretta, Magee, & Worrell, 2014). Therefore, looking solely at the asso- ciation between future variables and outcome variables may be mis- leading in that it does not account for the simultaneous effect of past and present variables on the outcomes in question.

4. Objectives and hypothesis

Based on theoretical assumptions and prior research findings, the objective of the present study is to explore how the different time orientations influence students' approaches to learning and academic achievement. We expected that secondary students' TP is associated with students' approaches to learning (SAL), which in turn, are related to students' academic achievement (AA), as follows: TP → SAL → AA. While examining the effects of TP on academic achievement, via ap- proaches to learning, we will test the following hypotheses: (H1) FTP will be positively associated with deep and achieving approaches to learning, leading to higher levels of academic achievement; (H2) Present orientation, past orientation, and negative future will be negatively associated with deep and achieving approaches; and (H3) Present orientation, past orientation, and negative future will be posi- tively associated with surface approach, leading to lower levels of aca- demic achievement.

Previous studies have suggested that gender plays a moderating role in students' time perspective (Mello & Worell, 2006; Zimbardo et al.,
1997) and in approaches to learning (Hayes & Richardson, 1995; Meyer, Dunne, & Richardson, 1994; Sadler-Smith, 1996). In addition, ap- proaches to learning are also influenced by the learning context, varying across disciplines (Richardson, 2013; Zhu, Valcke, & Schellens, 2008). Due to the relevance of these variables, in the current study we con- trolled for the effect of gender and studies field on the relationships be- tween TP, approaches to learning, and academic achievement.

5. Method

5.1. Participants

Data were collected through convenience sampling in six Portu- guese urban public secondary schools in the district of Lisbon. Partici- pants included 400 students (152 males and 248 females) of the 11th grade, with ages ranging between 15 and 21 years (M = 16.70, SD =
0.94; only 9 students had ages between 20 and 21 years). Participants were enrolled in arts programs (n = 165, 41%) and sciences and tech- nologies programs (n = 237, 59%). All students attended the curricular subjects that are compulsory and common to all 11th grade students in the Portuguese educational system, which are Portuguese studies, En- glish language, and Philosophy.

5.2. Measures

5.2.1. Time Perspective Inventory

The TPI (Janeiro, 2012) measures various dimensions of TP and is specifically designed for secondary students. The TPI was developed based on conceptions about the structure of FTP (Ringle & Savickas,
1983) and research about the structural independence of the three tem- poral dimensions (Zimbardo & Boyd, 1999). Early versions of the ques- tionnaire were based on a scale that assesses future time perspective, the Long-Term Personal Direction Scale (LTPD; Marko & Savickas,
1998; Wessman, 1973). The TPI has a total of 32 items and uses a 7- point scale, ranging from 1 (“Never true to me”) to 7 (“Always true to me”). The inventory is organized in four scales: (1) the Future orienta- tion scale includes 16 items that assess positive attitudes toward the fu- ture (e.g., “I have lots of projects for my future”), (2) the Present orientation scale has 8 items and assesses attitudes and beliefs about the present (e.g., “I think life should be lived day by day”); (3) the Past orientation scale, with 4 items, assesses attitudes toward the past (e.g., “I would like to be a child again because everything was easier then”), and the (4) Negative vision of the future scale (4 items) assesses negative or anxiety-laden perceptions about the future (e.g., “I am going into the future not by choice but because I cannot stop”). In a study with
620 participants from grade 9 and grade 12, Janeiro (2012) found ade- quate reliability for the Future orientation (α = 0.86), Present orienta- tion (α = 0.76), and Negative vision of the future (α = 0.70), but lower reliability for the Past orientation scale (α = 0.51). Studies on the con- struct validity of the TPI show that the conceptual structure of the in- strument is supported by the factorial structure, as explored by Principal Components Analysis (PCA) with varimax rotation (Janeiro,
2012). The psychometric properties of TPI have been found to be rela- tively stable in studies with samples with diverse ages and cultural backgrounds (e.g., Bardagi, Teixeira, Lassance, & Janeiro, 2015; Janeiro, Mota, & Ribas, 2014).

5.2.2. Learning Processes Inventory for Secondary Students

Students' deep, achieving, and surface approaches to learning were measured using the Learning Processes Inventory for Secondary Stu- dents (LPI-s; Moreira, Dias, Pettrarchi, Vaz, & Duarte, 2012), which is an adapted version of the Learning Processes Inventory for University Students (LPI-u; Duarte, 2007), developed for the Portuguese context. The LPI-u contains 48 items that address motivation to study and learn- ing strategies and uses a 5-point scale, ranging from 1 (“Never or rarely true to me”) to 5 (“Always or almost always true to me”). The study by Moreira, Dias, Pettrachi, Vaz, and Duarte (2012) with a sample of 833
Portuguese secondary students showed adequate reliability for a ver- sion with 33 items and the following subscales: Intrinsic motivation (8 items, including learning for pleasure, α = 0.86; e.g., “I take much plea- sure from studying”), Deep strategy (7 items, assessing comprehension, α = 0.83; e.g., “I try to relate school content”), Organizing strategy (4 items, organized study, α = 0.76; e.g., “ I try to organize my study time”), Instrumental motivation (3 items, including learning for com- plying with external expectations, α = 0.65; e.g., “I study because I am obliged to”), Achieving motivation (7 items, studying for good grades, α = 0.85; e.g., “High grades are my main incentive to study”), and Surface strategy (4 items, rote memorization, α = 0.83; “I try to learn most content by heart”).

5.2.3. Socio-demographic questionnaire

All students answered a brief questionnaire aimed to collect data re- garding their gender, age, studies field, and school grades.

5.2.4. Academic achievement

Academic achievement was obtained by calculating the arithmetic average of the first trimester grades in the school subjects that are com- mon to all 11th grade students, which are Portuguese studies, English language, and Philosophy. These grades can range between 0 and 20 points, meaning that a grade of 10 will allow students to pass the class. Students self-reported their grades at the moment of data collection.

5.3. Procedure

The data was collected from March to April 2012. The school admin- istration and parents authorized the study. Students were asked to vol- untarily participate in the study, and the percentage of those refusing to participate was b5%. All participants were informed about the confiden- tiality of the results. The instruments were administered during regular class hours. The order of presentation of the instruments was the same

for all students, and the time spent in each administration was approx- imately 45 min.

5.4. Statistical analysis

Preliminary data analyses were conducted with IBM SPSS Statistics 21, to analyze missing data frequency and pattern and items' distribu- tion. Following, confirmatory factor analysis (CFA) was used to examine and establish the factor structure of the constructs, using robust maxi- mum likelihood estimation, through Mplus 7.0 (Muthén & Muthén, 1998–2012). Reliability of the factors was investigated with Cronbach's alpha, using IBM SPSS.

A path analysis was performed also by means of Mplus 7.0 (Muthén & Muthén, 1998–2012), using maximum likelihood estimation, in order to produce a multivariate model of the relations between TP, ap- proaches to learning, and academic achievement, after controlling for gender (1 = males, 2 = females) and study field (1 = arts, 2 = sciences and technologies). The structural analysis was carried out at the level of manifest variables, resulting from the average score of the items in each factor for the analyzed constructs. The direct effects of TP on approaches to learning and academic achievement, and of approaches to learning on academic achievement were tested, as well as the indirect effects (fu- ture, past, and negative future) via approaches to learning. Mediation effects were studied using the bias-corrected bootstrap method (n = 10,000) to establish confidence intervals (Cheung & Lau, 2008).

The construct validity of the TPI (the four-factor model) and the LPI (the three-factor model), as well as the structural model were evaluated by observing the following goodness-of-fit indexes: Chi-square, Chi- square and degrees of freedom ratio, Comparative fit index (CFI), Tuck- er-Lewis fit index (TLI), Root mean square error of approximation (RMSEA), and the Standardized root mean square residual (SRMR). The fit was considered good for $\chi 2/df$ around 2, CFI and TLI larger than 0.90, RMSEA smaller than 0.08, and SRMR b0.05 (Bentler, 1990; Byrne, 2012).

6. Results

6.1. Preliminary data analysis

The frequency of missing values ranged from zero to 4 (1%) in TPI and LPI-s items. Overall, b1% of the data was missing. The Little's (1988) Missing Completely at Random (MCAR) test indicated that miss- ing items were MCAR, χ^2 (2125) = 2004.89, p = 0.97. Such missing data was therefore considered negligible for the current data analyses. In the subsequent analyses using Mplus 7.0 (Muthén & Muthén, 1998–2012), robust maximum likelihood estimation was used to obtain robust standard errors and use all available data for obtaining the model parameters without imputing data, while also controlling for non-nor- mality found in three LPI-s items (skewness N 1.0; kurtosis N 3.0).

6.2. Measurement models

The original four-factor structure of the TPI (with 32 items: 16 Fu- ture TP items, 8 Present TP items, 4 Past TP items, and 4 Negative future TP items) produced a poor fit to the data, $\chi^2(428) = 1268.815$, p b 0.001, $\chi^2/df = 2.96$, RMSEA = 0.07, CFI = 0.81, TLI = 0.79, SRMR = 0.08. In order to produce a more reliable and balanced model for the structure of TP, in terms of the number of items in each subscale, we se- lected the items of the TPI with the strongest factor loadings, including 6 items for the Future orientation, 6 items for the Present orientation, 3 items for the Past orientation, and 4 items for the Negative future (Ap- pendix A – Short Form TPI). The CFA indicated good fit for this four-fac- tor solution, $\chi^2(144) = 334.287$, p b 0.001, $\chi^2/df = 2.32$, RMSEA = 0.06, CFI = 0.92, TLI = 0.91, SRMR = 0.07. Standardized factor loadings ranged from 0.58 to 0.82 for Future and Present orientation, 0.46 to 0.90 for Past orientation, and 0.52 to 0.72 for the Negative vision of the future.

Concerning LPI-s, the original six-factor structure (with 33 items) produced fair fit to the data, $\chi^2(485) = 1096.185$, p b 0.001, $\chi^2/df = 2.26$, RMSEA = 0.06, CFI = 0.89, TLI = 0.88, SRMR = 0.08) but modifi- cation indexes suggested that two items loaded on three different sub- scales. In order to avoid cross-loadings, we chose to omit these two items, which improved model fit. Therefore, we produced a three-factor model of approaches to learning, using 31 items (Appendix B) of the LPI-s (standardized item loadings ranging from 0.58 to 0.89). The deep approach included the Intrinsic motivation (8 items) and the Deep strategy subscales (6 items). The surface approach included the Instru- mental motivation (3 items) and the Surface strategy subscales (4 items). Finally, the achieving approach included the Achieving motiva- tion (6 items) and the Organizing strategy (4 items) subscales. This model produced good fit to the data, $\chi^2(424) = 901.086$, p b 0.001, $\chi^2/df = 2.13$, RMSEA = 0.05, CFI = 0.91, TLI = 0.90, SRMR = 0.07.

6.3. Descriptive analysis

Table 1 presents the descriptive statistics and correlations between TP (future, present, past, and negative future), approaches to learning (deep, surface, and achieving) and academic achievement (average grades) in the 11th grade. Data were normally distributed, with accept- able skewness (b1.0) and kurtosis (b3.0) values for all variables.

The analysis of the correlations shows associations between future time orientation and deep and achieving approaches. Present time ori- entation and negative future was positively related to surface ap- proaches, and negatively related to deep and achieving approaches, as well as to academic achievement. By contrast, past orientation was pos- itively related to surface and achieving approaches to learning, but not related to academic achievement.

The analysis of the reliability coefficients showed that only the Past orientation scale registered a less satisfactory alpha value ($\alpha = 0.64$), which may be attributable to the low number of items included in this subscale (three items). All the other subscales of the TPI and the LPI-s registered adequate values, ranging from 0.75 (Negative future) to 0.91 (Deep approach).

6.4. Structural model

A structural equation model (SEM) was produced in order to further examine the relationships between TP, approaches to learning, and ac- ademic achievement. In the tested model, we examined the direct effect of TP on academic achievement and the indirect effect via approaches to learning, after controlling for the effect of gender and studies field. Co- variances between the different time orientations and between the dif- ferent approaches to learning were added because these variables are theoretically and empirically related (Bardagi et al., 2015; Duarte, 2007; Janeiro, 2012). The model produced satisfactory fit indices, $\chi^2(2) = 6.855$, p b 0.05, $\chi^2/df = 3.43$, RMSEA = 0.07, CFI = 0.99, TLI = 0.85, SRMR = 0.01. Although the χ^2/df ratio should preferably have been below 2 and the TLI closer to 0.90, the other fit indices are satisfac- tory. The TLI usually runs lower than the CFI and depends on the average size of the correlations in the data (Wang & Wang, 2012), which in the case of the current study tend to be low. No modifications indices were suggested to improve the model.

The analysis of the standardized parameters (Fig. 1) showed that fu- ture orientation had, as expected, a positive and significant effect on deep approaches ($\beta = 0.37$, p b 0.001) and on achieving approaches ($\beta = 0.38$, p b 0.001), while the effect on surface approaches was not significant. Past orientation had a positive effect on surface approaches ($\beta = 0.23$, p b 0.001) and on achieving approaches ($\beta = 0.11$, p b 0.05). Negative future also seemed to contribute to the surface approach ($\beta = 0.18$, p b 0.01). Present time orientation had no effect on approaches to learning.

Table 1
Descriptives and correlations between time perspective, approaches to learning, and academic achievement.

	M	SD	1	2	3	4	5	6	7	8	α	ICC
1. Future	4.14	1.23	–	−0.39□□□	0.02	−0.50□□□	0.36□□□	−0.06	0.41□□□	0.11□	0.85	0.82, 0.87
2. Present	3.98	1.32		–	0.16□□	0.48□□	−0.16□□	0.17□□	−0.21□□□	−0.24□□	0.84	0.82, 0.86
3. Past	4.32	1.28			–	0.07	0.003	0.23□□□	0.15□□	−0.07	0.64	0.58, 0.70
4. Negative	2.64	1.25				–	−0.15□□	0.21□□	−0.23□□□	−0.08	0.75	0.71, 0.79
5. Deep	2.92	0.75					–	−0.20□□□	0.45□□□	0.32□□□	0.91	0.90, 0.93
6. Surface	2.58	0.76						–	−0.10□	−0.27□□□	0.78	0.75, 0.81
7. Achieving	2.96	0.68							–	0.31□□□	0.78	0.75, 0.81
8. A A[(1)]	12.79	2.47								–	–	–

[(1)]= AA – Academic Achievement: Average grade level of the academic subjects of Portuguese, Philosophy and English.
□ p b 0.05.
□□ p b 0.01.
□□□ p b 0.001.

The tested path analysis also showed that academic achievement was positively related to the use of deep approaches to learning (β = 0.18, p b 0.001) and achieving approaches (β = 0.23, p b 0.001), and negatively influenced by surface approaches to learning (β = −0.22, p b 0.001). In addition, present time orientation had a direct negative ef- fect on academic achievement (β = −0.11, p b 0.05). All remaining tested relations were not statistically significant. Finally, the analysis of relations between variables show that deep approaches were posi- tively related to achieving approaches (β = 0.36, p b 0.001) and nega- tively related to surface approaches (β = −0.20, p b 0.001). Achieving approaches were positively related to surface approaches (β = 0.16, p b 0.01), although this relation is weak. Past time orientation was posi- tively related to present time orientation (β = 0.20, p b 0.001) and with negative future (β = 0.10, p b 0.05), present orientation was pos- itively related to the negative future (β = 0.45, p b 0.001) and negative- ly related to future time orientation (β = −0.39, p b 0.001), and the negative vision of the future was negatively related to future time orien- tation (β = −0.50, p b 0.001). This model accounted for 29.8% of the variance in academic achievement.

Testing of indirect effects aimed to determine whether deep, surface, and achieving approaches to learning mediated the relationship be- tween the TP (future orientation, past orientation, and negative future) and academic achievement. Future orientation had an indirect effect on achievement via the deep approach (β = 0.07, z = 3.13, p b 0.01, 95% CI [0.03, 0.11]) and the achieving approach (β = 0.09, z = 3.73, p b 0.001, 95% CI [0.04, 0.14]), while the indirect effect via surface approaches was not significant. Past orientation had an indirect effect on achievement via the surface approach (β = −0.05, z = −3.22, p b 0.01, 95% CI [−0.08, −0.02]) and the achieving approach (β = 0.03, z = 2.12, p b 0.05, 95% CI [0.002, 0.05]), while the indirect effect via deep approaches was not significant. Negative future had an indirect effect on achieve- ment via the surface approach to learning (β = −0.04, z = −2.74, p b 0.01, 95% CI [−0.08, −0.01]), and no indirect effect via deep and achieving approaches. The paths between present orientation, ap- proaches to learning, and academic achievement were not tested be- cause the lack of an initial relation between the predictor and the mediator variables prevents a mediator effect, according to Baron and Kenny (1986).

An alternative model examining the direct effect of all the variables as predictors of academic achievement, with no indirect effects, after controlling for gender and studies field, was tested, but produced a poorer fit, $\chi^2(13) = 140.738$, p b 0.001, χ^2/df ratio = 10.83, RMSEA = 0.16, CFI = 0.82, TLI = 0.40, SRMR = 0.09.

7. Discussion

Both theory and empirical studies have emphasized the importance of TP as a regulating factor for human behavior and motivation (Boyd & Zimbardo, 2005). The future dimension of TP, in particular, has been re- lated to several motivational components that are important for better school engagement and achievement. While most studies in school set- tings focus primarily on the dimension of the future, studies about the role of the other time orientations on school achievement and motivation are still scarce. The present study aimed to surpass this limitation,

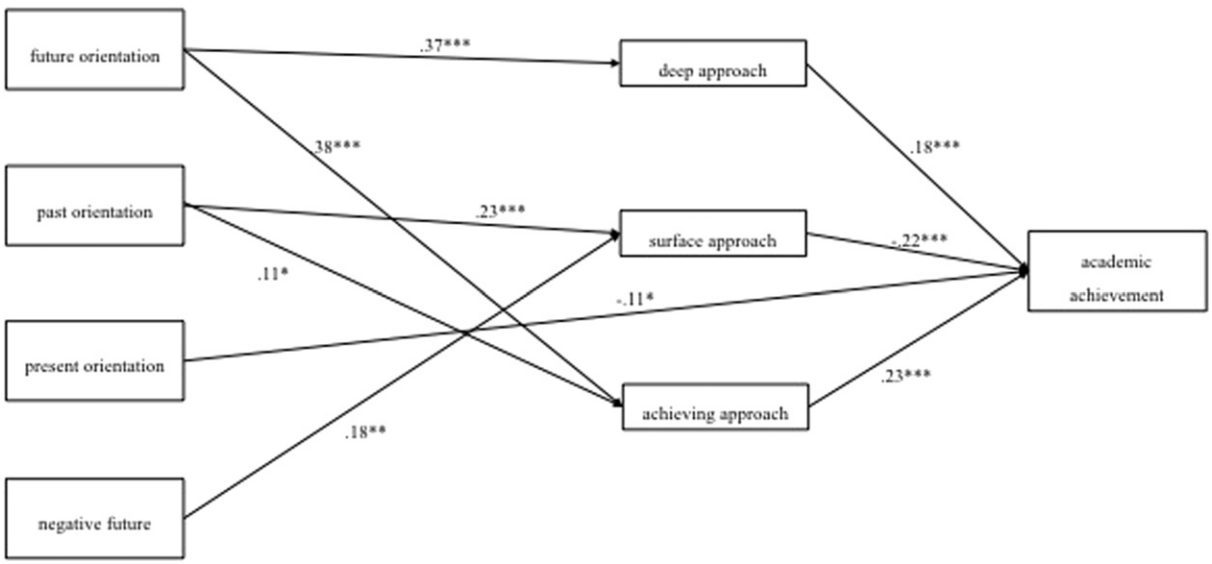

Fig. 1. Structural equation modeling of the relationship between TP, approaches to learning, and academic achievement controlled by gender and studies field. *p b 0.05, **p b 0.01, ***p b 0.001. Values are standardized coefficients. Not shown are covariates (gender and studies field) and covariances. Refer to the text for covariances.

by examining the influence of the diverse time orientations on students' approaches to learning and academic achievement.

In accordance with other studies (De Volder & Lens, 1982; Lens & Tsuzuki, 2007), the results suggest a positive association between FTP and academic achievement. However, rather than a direct effect, this re- lationship seems to be mediated by the role of approaches to learning. The tested model showed that FTP influences both the deep and the achieving approaches to learning, which, in turn, positively influence academic achievement, confirming H1. These results support the find- ings of other recent studies that also report a significant relationship be- tween FTP and deep approaches to learning (Horstmanshof & Zimitat,
2007; Phan, 2009). Having a more positive view of the future, including more academic and professional goals, possibly allows students to per- ceive academic subjects as more useful for their future, which may in- crease intrinsic motivation and deep and organizing strategies, both contributors to better performance. In the same direction, the positive association between FTP and achieving approaches to learning suggests the importance that academic success and achieving good grades have for students that are more future-oriented. As college admission is grade-dependent in Portugal, 11th grade students who have a more positive perspective of the future and more defined goals and career projects may be more prone to develop achievement-learning strate- gies. Although the relationship between FTP and achieving approaches to learning was expectable, the magnitude of the effect observed in the present study may be in part due to the nature of the current sam- ple. Therefore, it would be important to explore the degree of this effect in participants from other grade levels and ages.

Extending the comprehension of the nature of the relationships be- tween TP and attitudes toward learning, the current study also exam- ined the role of the other time orientations on approaches to learning and academic achievement. As expected, the correlational analysis showed that present and negative future establish negative relations with deep and achievement approaches to learning and positive rela- tions with the surface approach. However, past orientation had a differ- ent pattern of relations, as it relates negatively to deep approaches but is positively associated with achieving and surface approaches to learning.

The structural model clarifies these relations, showing that past, present, and negative future time orientations do not have direct effects on deep approaches to learning, refuting H2 (negative relations were hypothesized). By contrast, past time perspective was positively related (although the association was weak) to achieving approaches to learn- ing, also refuting our expectations. In addition, the structural model re- veals that only the past and the negative future seem to influence the use of a superficial approach to learning, partially confirming H3. These findings support other research studies that found that a negative vision of the future seems to have a more accentuated detrimental im- pact on psychological well-being than other dimensions of TP (Carelli, Wiberg, & Åström, 2015; Janeiro & Marques, 2010). In this sense, being pessimistic about the future or being too fixed on the past may contribute to feelings of helplessness that possibly lead to the adoption of less efficient learning strategies.

Against the initial hypothesis (H3), the effect of present time orien- tation on surface learning strategies was not significant. In fact, results show that having a favorable attitude to the present seems to be rela- tively unrelated to the adoption of any particular learning approach. These findings challenge previous research about the negative impact of present orientation on adaptive behaviors (Boyd & Zimbardo,
2005), but are in line with some recent studies conducted with high school and undergraduate students (e.g., De Bilde et al., 2011; King,
2016) also reporting mixed results between present orientation and motivational variables and academic achievement. At a conceptual level, two main reasons may be advanced for these unexpected results. The first one may be associated with developmental issues; most re- search about the relationship between present orientation and risk be- haviors has been conducted with young adults or adults samples (Boyd
& Zimbardo, 2005), and therefore the negative impact of present orientation on behavior in adolescence may not be as salient as in adult- hood. Secondly, present orientation seems to have a more complex na- ture than previously noted and may have some positive effects on well- being, as literature on mindfulness suggests (see Brown, Ryan, & Creswell, 2007; De Bilde et al., 2011). The current results reflect the need for further analysis of the nature of the diverse dimensions of pres- ent orientation and its relations with learning in educational contexts.

Although present orientation seems unrelated to approaches to learning, a small negative effect on academic achievement was ob- served. It is important to note that these results were attained for the general sample while controlling for gender and studies field differ- ences, and therefore future studies should explore if this kind of rela- tions are stable and similar in different groups of students.

Overall, these results show that focusing only on FTP to understand motivation to learn may be limited. Although FTP is important to elicit deep and achieving approaches and therefore more positive academic performance, both the past orientation and the negative future seem to have a significant role in the adoption of less efficient strategies of learning. In the current study, we showed that students who place their attention mostly on past experiences or who have a negative per- ception of the future also tend to rely on rote memorization, rather than comprehension, and to study in order to fulfill external pressures, rather than intrinsically valued goals, which has been largely associated with poorer academic performance (Cano, 2005; Diseth, 2013; Valadas et al., 2016; Watkins, 2001). The current study also showed that there is specific value in differentiating positive future orientations from nega- tive or anxious perceptions of the future in studying academic motiva- tion and achievement, as specific associations were identified between these time orientations and approaches to learning. This finding further supports the validity of describing future orientation as both in terms of an optimistic perception of the future and a negative or anxious vision of the future (Janeiro, 2012).

7.1. Limitations and future research

This study has several limitations that are worth mentioning. First, it is important to address the question that this study, as all cross-section- al research, does not allow causal inferences. Therefore, future research should further investigate the links between temporal dimensions and approaches to learning through experimental and longitudinal designs. A second limitation worth mentioning in the current study is that all measures of TP, approaches to learning, and academic achievement were self-reported, which can increase the risk of method and results bias. Moreover, in the present study, grade levels of only three academic subjects related to language and social sciences were selected. These ac- ademic subjects, although included in the general subjects all students must study in the Portuguese secondary curriculum, probably elicit var- iations in approaches to learning that may be slightly different from ap- proaches to learning of other academic subjects. Future studies should extend the scope of school subjects included in the indexes of grade levels. Finally, as TP and approaches to learning are multidimensional constructs, it would be interesting to explore in future studies how dif- ferent time profiles and approaches to learning relate, offering a more person-oriented analysis.

7.2. Practical implications

The results suggest the importance of facilitating students' aware- ness of their time orientation and strengthening a balanced TP in addi- tion to interventions that help students reflect on and possibly change their approach toward deeper and organizing ways of learning. At the school level, this process means that it is important for psychologists to better articulate the diverse types of psychological interventions. For instance, as vocational interventions promote academic and profes- sional projects and goals, and those goals may help students perceive the instrumental value of school subjects, these vocational interventions

should be articulated with psychoeducational interventions, such as those aiming to enhance a more adjusted approach to learning. These interventions might prevent school underachievement and dropout, thereby promoting school success.

Appendix A. Time Perspective Inventory (Short Form)

1. I go in an orderly path to the future, in the direction of the objectives I established long ago. (F).
2. I do not think too much about the future and I accept things as they are. (P).
3. I know very well who I am and where I am going in life. (F).
4. I like to live more in the present moment than to make plans for the future. (P).
5. I think that life has no predictable pattern or meaning. (NF).
6. I believe the future is an empty, dark hole. (NF).
7. I often think about the good things that happened to me in the past. (Pa).
8. I prefer to think about the present, because the future is unpredict- able. (P).
9. When I make plans for the future, I am sure that I will achieve them. (F).
10. I go into the future a little adrift, not by choice but because I can not stop. (NF).
11. I like to remember my past and how life was before. (Pa).
12. I have projects for what I want to do in the long term. (F).
13. When you think too much about the future you do not enjoy the present moment. (P).
14. I would like to be a child again because it was easier back then. (Pa).
15. I have many plans for the future. (F).
16. I feel that the future is a big void that is dragging me. (NF).
17. I think that life should be lived one day at a time. (P).
18. I keep my future open and uncompromised. (P).
19. I have my future well-defined. (F).

Note: F – Future subscale items; P – Present subscale items; Pa – Past subscale items; NF – Negative Future subscale items.

Appendix B. Learning Processes Inventory for Secondary Students (Short Form)

1. I get enthusiastic with some school contents. (IntM).
2. I mainly study on the basis of memorization. (SS).
3. I like to compete with my peers for the best grades. (AM).
4. I try to inter-relate different contents. (DS).
5. I mainly study to correspond to my parents' expectations. (InstM).
6. I plan my study time in order to take the maximum profit from it. (OS).
7. In school I try, above all, to get better grades than the others. (AM).
8. I feel very satisfied performing school tasks. (IntM).
9. I try to efficiently organize my study time. (OS).
10. I try to learn most of the contents by memorizing. (SS).
11. I try to be an organized student. (OS).
12. Some school tasks give me deep satisfaction. (IntM).
13. I try to develop an opinion on the topics I study. (DS).
14. What motivates me to study is the idea of getting better results than the others. (AM).
15. Studying certain school contents becomes truly fascinating. (IntM).
16. When studying I try to fill my head with information – even when it doesn't make sense. (SS).
17. My studying goal is to obtain high grades. (AM).
18. When I study I try to relate the content with real life. (DS).
19. I study because this is what is expected from me. (InstM).
20. I try to distribute the daily tasks by my available time. (OS).
21. I mainly study to fulfill my duty. (InstM).
22. Certain school contents are like a good fiction book – I just want to go on studying. (IntM).
23. I find many school contents extremely interesting. (IntM).
24. My main goal in school is to obtain a high average of grades. (AM).
25. I find myself thinking of the aspects that are common to different courses' contents. (DS).
26. I take much pleasure from studying. (IntM).
27. My main motivation to study is having high grades. (AM).
28. When studying some content I try to relate it with my personal ex- perience. (DS).
29. I mostly study on the basis of memorization than of comprehension. (SS).
30. It happens to me being so involved in studying that I forget the time. (IntM).
31. When I study a topic I try to develop a critical stand toward it. (DS).

Note: InstM – Instrumental motivation subscale items; IntM – In- trinsic motivation subscale items; AM – Achieving motivation; SS – Sur- face strategy subscale items; DS – Deep strategy subscale items; OS – Organizing strategy subscale items.

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