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Understanding the association between future time perspective and self-regulated learning through the lens of self-determination theory

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Abstract

The present cross-sectional research examined a process underlying the positive association between holding an extended future time perspective (FTP) and learning outcomes through the lens of self-determination theory. High school students and university students ($N = 275$) participated in the study. It was found that students with an extended FTP regulated their study behaviour on the basis of several internal motives, including feelings of guilt and shame (introjected regulation), personal conviction (identified regulation) and interest (intrinsic motivation). The association with identified regulation was strongest and the association with intrinsic motivation fell below significance when controlling for identified regulation. Moreover, introjected and identified regulation emerged as mediators accounting for the association between FTP and cognitive processing. Further, to the extent that FTP engenders an internally pressuring mode of regulation it was found to be indirectly negatively associated with determination/metacognitive strategy use. In contrast to FTP, a present fatalistic and present hedonic time-orientation yielded more negative motivational and learning correlates. The link between FTP and self-determination theory is discussed.

Keywords: Future time perspective; Self-regulated learning; Identified regulation: Self-determination theory

1. Introduction

Although schooling is by definition future-oriented as it contains utility value (Eccles & Wigfield, 2002) to attain future goals, not all students anticipate the future goals their current schooling might serve. Indeed, some students have a clear view of their future and understand how doing one's best at school is important to achieve highly valued educational or professional goals in the future. Other students, in contrast, lack such an extended future time perspective and, as a result, attach less value to their current school work. Several studies have shown that students who are highly involved in their future educational and professional career display a more optimal learning pattern (see Husman & Lens, 1999; Strathman & Joireman, 2005 for overviews). Few studies have, however, examined processes that might explain this association. In the present article, we examine explanatory processes underlying the positive association between future time perspective and adaptive learning, using Self-Determination Theory (SDT; Deci & Ryan, 2000) as a guiding framework. The broader aim of the present study was to further examine the empirical links between Future Time Perspective theory (FTP theory; De Volder & Lens, 1982; Nurmi, 1991; Nuttin & Lens, 1985; Seginer, 2009;

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Zimbardo & Boyd, 1999) and SDT (Deci & Ryan, 2000, see Vansteenkiste, Simons, Soenens, & Lens, 2004 for initial steps).

1.1. The future as a motivational source

When someone becomes preoccupied with a certain time zone, a dominant time orientation or time perspective[1] develops, which is said to yield a strong impact on one's key judgments, decisions and actions (Nuttin & Lens, 1985; Zimbardo & Boyd, 1999). A frequently studied and important part of time perspective is FTP, which is said to evolve from motivational goal setting and is formed by the more or less distant goals that are processed by an individual (Nuttin & Lens, 1985). More specifically, FTP has been defined as «the present anticipation of future goals» (Husman & Lens, 1999, p. 115). Thus, FTP concerns interindividual differences in the anticipated future goals one aims to attain. These differences can refer to the temporal distance towards those goals, as conceived within the athematic approach, and/or to the content of those goals, as conceived within the thematic approach (Seginer, 2009). In the athematic approach one only takes the extension of the psychological future or the degree to which people are future-oriented into account (De Volder & Lens, 1982; Husman & Shell, 2008; Zimbardo & Boyd, 1999). The temporal distance to one's future goals can vary from short (e.g., to pass a test tomorrow) to very long (e.g., saving money for retirement) and one's most distant goals can even extend beyond one's lifetime (e.g., going to heaven). By setting goals in the rather distant future and by developing a long range of intermediate projects to achieve those long-term goals, a long or deep FTP evolves (De Volder & Lens, 1982; Husman & Lens, 1999). Whereas people with a long or deep FTP set goals that are situated in the distant future, people with a short FTP set most of their goals in the near future. In a thematic study of FTP one primarily considers the motivational content of those future goals or motivational projects (Emmons, 1996; Little, 2007; Nurmi, 1991; Nuttin & Lens, 1985) or one measures FTP in specific domains (see Seginer, 2009 for a review).

Multiple studies have shown that being future-oriented or having an extended FTP is associated with several optimal study outcomes. Future-oriented students have been found to obtain better school grades (Zimbardo & Boyd, 1999), to be more strongly engaged in their school work, to spend more time studying (Peetsma, 1994), to use both deep-level and reproductive learning strategies to process their learning material (Horstmanshof & Zimitat, 2007), to manage their time more efficiently, to show up in class (Harber, Zimbardo, & Boyd, 2003) and to display less procrastination (Jackson, Fritch, Nagasaka, & Pope, 2003). Further, Zaleski (1987) found that students who set more relatively long-term goals are not only more persistent in carrying out their school work, but also derive a greater sense of satisfaction from studying.

Different from future-oriented individuals, present-oriented people live in the here and now. They are constantly looking for new stimuli and sensations. Although some researchers claim that being future-oriented is necessarily antithetical to adopting a present orientation, suggesting that both time orientations form a one-dimensional continuum (Strathman, Gleicher, Boninger, & Edwards, 1994), others disagree with such a view and claim that the two time orientations are relatively orthogonal. The latter view has been largely confirmed in empirical studies (Zimbardo & Boyd, 1999).

Further, Zimbardo and Boyd (1999) distinguish between a hedonistic and a fatalistic present orientation. Hedonistic people are locked in the present because they are looking for immediate satisfaction and hedonic pleasures (e.g., partying, TV, sex, etc). However, these people do not feel particularly happy; on the contrary, they often feel depressed (Zimbardo & Boyd, 1999). Present hedonism is also negatively associated with the amount of time studying and with a positive academic orientation (Horstmanshof & Zimitat, 2007; Zimbardo & Boyd, 1999). A second type of present orientation involves a fatalistic attitude. Fatalistic people equally feel entrapped in the present because they feel helpless and left without hope (Seligman, 1975). They do not experience any sense of control over future events and, as a result, they feel depressed and are unmotivated to engage in any activity. Present fatalism has been found to be negatively associated with self-efficacy (Bandura, 2001) and school engagement (Horstmanshof & Zimitat, 2007), whereas being positively predictive of procrastination (Jackson et al., 2003).

1.2. Understanding the motivational effects of the future

1.2.1. An expectancy-value account

The central aim of the present research was to shed light on the processes that may account for the beneficial effects of having a deep FTP. To explain its effects, De Volder and Lens (1982) made use of an expectancy-value account (Feather, 1982). In doing so, they argued that FTP consists of two important aspects. First, the *cognitive* aspect refers to the capacity to look far ahead in the future, such that one can anticipate the more distant future. Individuals with a deep FTP formulate longer means–goals structures in comparison with individuals with a short FTP. As a consequence, present actions acquire a higher utility value (Eccles & Wigfield, 2002) and are perceived as more instrumental (Simons, Vansteenkiste, Lens, & Lacante, 2004).

Second, the *dynamic* aspect of FTP (De Volder & Lens, 1982) refers to the capacity to ascribe high value to long-term goals. Although the anticipated value of a future goal decreases the more a future goal is delayed (Mischel, 1981), this decrease is less steep for individuals with a deep FTP. This is because a given temporal interval to the distant future is psychologically shorter for people with a long FTP, such that they will attach higher value to the anticipated future goals. This effect only applies, however, for future goals that are situated at

[1] Some researchers make a distinction between time perspective and time orientation (e.g., Nuttin & Lens, 1985). Although both concepts have been differentiated from one another, they have often been treated as synonyms as well (Husman & Lens, 1999), as they are semantically similar. In the present study, we will use them in an interchangeable way.

an intermediate distance and not for those that are situated in the very near (one week) or very long future (e.g., ten to twenty years from now; Moreas & Lens, 1991; Zhang, Karabenick, Maruno, & Lauermann, 2011). Because of their stronger valuation of mid-range future goals, individuals with an extended FTP perceive the present task as more valuable.

The importance of the cognitive and dynamic aspects of FTP has been established in numerous studies. For instance, in an initial examination, De Volder and Lens (1982) found that students who attached more value to long-term goals and attached more instrumental value to their school work for achieving these goals were more motivated for their school work and had better academic results. Subsequent studies by Creten, Lens, and Simons (2001); Lens and Decruyenaere (1991); Shell and Husman (2001); Tabachnik, Miller, and Relyea (2008) and Van Calster, Lens, and Nuttin (1987) further confirmed the motivating role of perceived instrumentality among diverse student populations and age groups. More recent experimental work indicates that experimentally increasing the perception of instrumentality causes (rather than merely accompanies) a change in optimal learning (Simons, Dewitte, & Lens, 2003).

The provided expectancy-value account of the beneficial effects of an extended FTP relies on a quantitative view on motivation. This is because it is argued that students with an extended FTP will be more motivated for their current school work because they perceive it as being more instrumental (cognitive aspect) and as leading to more valuable future goals (dynamic aspect). More recently, it has been suggested that FTP might not only increase one's amount of motivation and effort-expenditure, but might also be associated with a qualitatively different type of engagement in the activity at hand (Simons et al., 2004). Such a qualitative viewpoint is offered by the perspective of SDT (Deci & Ryan, 2000) and will be examined in greater detail in the present research.

1.2.2. A self-determination theory account

Within SDT, a qualitative differentiation is made between autonomous or volitional and controlled or pressured motivation, which should yield differential learning effects. Two types of autonomous motivation are discerned. First, when students are spontaneously interested in their studies and enjoy learning they are said to be intrinsically motivated. In the case of intrinsic motivation, one is fully immersed in the activity at hand. Hence, one is focused on one's present behaviour and is not concerned with obtaining external and future-oriented outcomes. Within SDT, intrinsic motivation is said to represent the prototype of autonomous motivation, because people volitionally enact their interests when being intrinsically motivated.

When students fail(ed) to develop or lost intrinsic interest in the material at hand, they are extrinsically motivated for their school work or not motivated at all (amotivated). Amotivation results from perceptions of helplessness or lack of self-efficacy, competence or valuation of the activity (Ryan & Deci, 2000). In the case of extrinsic motivation, behaviours are carried out because they are instrumental to achieve an outcome that is separate from the activity itself. Within SDT, it is maintained that such means-end actions vary in their degree of relative autonomy or self-determination, depending on the extent to which the reasons for acting have been internalised (Ryan & Connell, 1989). When the reason for enacting a behaviour is fully internalised, a person displays identified or even integrated regulation. Identified regulation occurs when the value of or the reason for the behaviour is recognized as personally valuable, such that one comes to endorse the activity at hand. Integrated regulation requires the integration of a particular identified value and commitment with other aspects of one's integrated sense of self. Integrated regulation requires a high degree of introspection and self-awareness and is not easily distinguished from identified regulation through self-reports; we therefore limited ourselves to assessing identified regulation in the current study.

Intrinsic, identified and integrated regulation all represent forms of autonomous or volitional motivation and numerous studies have demonstrated that autonomous motivation is associated with several positive learning outcomes, including more efficient time management and less procrastination, more active participative and less defiant behaviour in the classroom, better cognitive processing, and higher grades (Vansteenkiste, Zhou, Lens, & Soenens, 2005). Although SDT has not explicitly dealt with the notion of FTP, intrinsic and identified/integrated regulation may differ in their relationship to the future. While intrinsic motivation is by definition present-oriented as one is absorbed in the activity at hand, identified/integrated regulation is a form of goal-directed regulation that may yield a reference to future goals due to its instrumental character.

Different from autonomous motivation, controlled motivation occurs when behaviours are executed with a sense of pressure or obligation. SDT distinguishes two types of controlled regulation. External regulation is the most controlled type of regulation, as one feels pressured by external consequences (e.g., the promise of a reward or the threat of a punishment) or external expectations to comply with the activity at hand. When studying out of external forces, students will be more likely to drop-out and obtain low grades (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). The pressure to engage in studying does not necessarily come from external sources, as individuals can also buttress their own learning behaviour with internal prods and pressures, such as feelings of contingent self-worth, guilt and shame. This type of regulation is labelled introjected regulation. It is somewhat less pressuring in nature, as the reason for enacting the behaviour no longer resides in the external world. Nevertheless, the behaviour is still emitted with a sense of internal conflict as the reason for enacting the behaviour is not congruent with the person's abiding values. Although introjected regulation is associated with some academic engagement, albeit superficial sort (Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005), it equally predicts maladaptive coping strategies and fear of failure (Ryan & Connell, 1989) and yields less adaptive correlates when compared to identified regulation (Assor, Vansteenkiste, & Kaplan, 2009).

1.3. Self-regulated learning

In contemporary educational research, self-regulated learning plays a central role and various researchers have proposed somewhat different models of self-regulated learning (Boekaerts, 1997, 2002; Pintrich & De Groot, 1990; Schunk & Zimmerman, 1994; Winne, 1995). In sum, self-regulating students set a particular learning goal, select strategies to achieve their goal, engage in a variety of skills to monitor their progress and make modifications when confronted with obstacles (Winne, 1995). We mention three commonly discussed aspects of self-regulated learning. First, self-regulated learners are better in cognitively processing the learning material as they have a wide repertoire of learning strategies they use appropriately under various learning conditions. Cognitive strategies are for example the use of selection strategies, the use of elaboration tactics, and the use of study aids. The second aspect of self-regulated learning involves metacognitive strategies. Metacognition could be described as the awareness of one's own thinking and functioning, and examples of metacognitive strategies involve planning effort, staying concentrated, monitoring effort by blocking out distracters, and evaluating one's progress against a standard. The third aspect involves determination, as students must also be motivated and determined to use their cognitive and metacognitive strategies. Determined students develop a positive attitude towards the learning task, put effort in it, and persist at it.

1.4. The present study

According to FTP theory, striving towards future goals, which may be achieved via present schooling, creates by definition an instrumental and, hence, extrinsic type of motivation. The question, then, raised is whether the type of extrinsic motivation that is associated with adopting an extended FTP is of a more autonomous, or a more controlling sort. In line with SDT, it was expected that FTP will only yield adaptive correlates as far as it engenders an autonomous type of extrinsic motivation. More specifically, the following hypotheses with respect to the different motivational subtypes distinguished within SDT were formulated.

First, with respect to identified regulation, it was hypothesized that the enhanced perception of instrumentality and increased appreciation of long-term goals characterizing students with a long FTP leads them to perceive their present behaviour as more meaningful and valuable (Hypothesis 1a). As they understand the link between their current school work and personally valued future goals, they come to internalize the value of the learning activity at hand and identify themselves with their present school work. The hedonistic and fatalistic present orientation were expected to be unrelated to identified regulation (Hypothesis 1b), because none of these orientations enhance the perceived instrumentality of behaviour or the appreciation of distant goals.

Second, it is also well possible that individuals with an extended FTP are more inclined to pressure themselves into the activity at hand. This would be the case because individuals with an extended FTP, because of their greater capacity to anticipate future goals, would have a larger number and more valued set of distant goals to pursue, which might possibly put pressure on them. Said differently, a lack of engagement in the activity at hand would yield stronger implications for individuals with an extended FTP, which might lead them to buttress their activity engagement more easily with feelings of guilt, shame and contingent self-worth. For this reason, FTP might also be associated with a more introjected study regulation (Hypothesis 2). However, given that introjected and identified regulation have been found to be moderately positively correlated (Koestner & Losier, 2002), it was examined whether FTP would yield a unique association with introjected regulation. The association between FTP and introjected regulation could be spurious because the stronger presence of introjected motives might be solely due to the stronger identified regulation that characterizes people with an extended FTP. With respect to the other type of controlled regulation, that is, external regulation, FTP was not expected to be associated with it given that FTP represents an intra-personal characteristic and external regulation refers to being pressured to engage in the learning activity by external agents (Hypothesis 3).

Third, the prediction between having an extended FTP and intrinsic motivation is less clear. This is because intrinsically enjoying the learning at hand implies that one is by definition present oriented. Furthermore, some researchers on time perspective (e.g., Strathman et al., 1994) have exactly argued that there exists an inherent tension between being future- and present-oriented, such that both time orientations exclude one another. Similarly, early goal theories (Ames, 1992; Heyman & Dweck, 1992; Wentzel, 1991) suggested, at least implicitly, that adopting a long FTP should be antithetical to intrinsic motivation, because an orientation towards the future would distract a person from the present task at hand. Finally, a wealth of experimental studies (Deci, Koestner, & Ryan, 1999) has shown that enhancing participants' instrumental motivation for an already intrinsically motivated activity, for instance through the administration of a reward, may undermine participants' pleasure at the activity at hand. In contrast to these arguments, Simons et al. (2004) reported that perceptions of instrumentality can go hand in hand with being intrinsically motivated and task-oriented. This is because students would at the same time be able to strive for the future and enjoy the present, such that their total student motivation combines intrinsic and instrumental motivation (Creten et al., 2001). Given these conflicting arguments, a priori hypotheses with respect to the relation between FTP and intrinsic motivation were not formulated.

In short, it was hypothesized that FTP would be primarily associated with identified regulation. To the extent that this would be the case, it was expected that identified regulation would help to account for (i.e., mediate) the positive associations between FTP and optimal learning outcomes (i.e., using cognitive processing strategies, determination; Hypothesis 4). It was also examined whether the other types of regulation (i.e., intrinsic and introjected) would play any additional mediating role in this link. This mediational model was tested through structural equation modelling analysis.

2. Method

2.1. Participants – procedure

Participants were 275 Flemish students (90 boys and 172 girls, 13 students failed to disclose their gender). Of them, 247 were high school students and 28 university students. Age ranged from 14 to 21 years with a mean age of 17 years (SD = 1.28). As concerns the high school participants, 54 (22%) followed practical vocational secondary education, 78 (32%) followed a theory and practical oriented type of secondary education, and 115 (46%) followed preparatory general secondary education. Values ascribed to the educational background ranged respectively from 1 (vocational secondary education) to 4 (university students), thereby reflecting the relative amount of theory versus practice the students received. Questionnaires were administered to the students during a class period. At least one teacher was present during data collection and anonymity was guaranteed. Administration took approximately 45 min. All invited students participated in the study.

2.2. Measures

All items were rated on a 5-point Likert-type scale with alternatives ranging from 1 (not true) to 5 (very true).

2.2.1. Time perspective

Given that present schooling in general and learning activities in particular can be instrumental for a variety of future goals, we decided to measure time perspective in a global way, that is, without reference to specific domains such as education, professional life, family life, etc. To this end, the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo & Boyd, 1999), a widely used questionnaire, was selected. Items were selected and translated in Dutch, Three components of time perspective were assessed, namely (a) future time perspective, (b) present hedonistic perspective, and (c) present fatalistic perspective. The Future Time Perspective scale reflects a general orientation towards the future (e.g., ''I am able to resist temptations when I know that there is work to be done''; Cronbach's $\alpha = .73$; 15 items); the Present Hedonistic scale assesses a hedonistic, ''devil-may-care'', risk taking attitude towards time and life (e.g., ''Taking risks keeps my life from becoming boring''; Cronbach's $\alpha = .75$; 15 items); and finally, the Present Fatalistic scale is indicative of a fatalistic, helpless and hopeless attitude towards life (e.g., ''My life path is controlled by forces I cannot influence''; Cronbach's $\alpha = .67$; 10 items). The structure of the ZTPI was tested using confirmatory factor analysis. Model indices insensitive to the high number of indicators per factor reported acceptable model fit, Satorra–Bentler scaled $\chi^2(737) = 1287$, RMSEA = .05, although CFI = .86 and GFI = .77 were low.

2.2.2. Academic self-regulation

Students' reasons for studying were assessed with an adapted version of the Academic Self-Regulation scale (Ryan & Connell, 1989) which has been successfully used in previous work among Flemish students (Vansteenkiste et al., 2009). Participants were provided with an introductory statement, that is, ''I'm studying for school because…''. The 16-item scale contains four subscales, which correspond to four different types of regulation, with four items per subscale: (a) the *External Regulation* subscale which refers to studying out of external expectations, threats of punishment or promised rewards (e.g., ''because others force me to do so''; Cronbach's $\alpha = .78$); (b) the *Introjected Regulation* subscale which assesses the extent to which one is motivated by internal compulsions and obligations (e.g., ''because I would feel ashamed of myself if I would not study''; Cronbach's $\alpha = .81$); (c) the *Identified Regulation* subscale which reflects being motivated by personal commitments (e.g., ''because it is personally important to me''; Cronbach's $\alpha = .81$); and (d) the *Intrinsic Motivation* subscale reflects being motivated by inherent task pleasure and satisfaction (e.g., ''because I enjoy doing it''; Cronbach's $\alpha = .93$).

2.2.3. Learning strategies

Students' thought processes and study strategies were assessed with six scales of a validated Dutch version (Lacante & Lens, 2005) of the Learning and Study Strategies Inventory (LASSI; Weinstein & Palmer, 2002). The scales were: (a) The Persistence scale assesses students' tendency to put effort in their studies and to persist in times of difficulties (e.g., ''When work is difficult I either give up or study only the easy parts''; eight items, reversed score; Cronbach's $\alpha = .75$). (b) The Attitude scale assesses students' positive orientation towards schooling in general (e.g., ''I feel confused and undecided as to what my educational goals should be''; eight items, reversed score; Cronbach's $\alpha = .62$). (c) The Concentration scale reflects students' ability to direct and maintain their attention when studying (e.g., ''I pay attention fully when studying''; eight items; Cronbach's $\alpha = .78$), whereas (d) the Time Management scale assesses students' use of planning and efficient scheduling of their school work (e.g., ''When I decide to do school work, I set aside a certain amount of time and stick with it''; eight items; Cronbach's $\alpha = .70$). (e) The Selecting Main Ideas scale reflects students' ability to distinguish important from less important information (e.g., ''I have a hard time finding the important points in my reading''; five items, reversed score; Cronbach's $\alpha = .67$). (f) The Information Processing scale assesses how well students make use of imagery, verbal elaborations, organization strategies, and reasoning skills to process new information (e.g., ''I change the material I am studying into my own words''; eight items; Cronbach's $\alpha = .77$).

Additionally, exploratory and scale-level confirmatory factor analyses tested the factor structure of the LASSI. A three-factor model, as described above with a cognitive (information processing and main ideas), metacognitive (time management and concentration), and determination (persistence and attitude) component fitted the data poorly. A two-factor model fitted the data best, Satorra–Bentler scaled $\chi^2(5) = 24.32$, RMSEA = .12, CFI = .96, GFI = .96. Specifically, the first factor was represented by persistence, attitude, time management and concentration and was labelled Determination/Metacognitive Strategy Use, and the second factor was represented by information

processing (the scale Selecting Main Ideas failed to yield a significant factor loading) and was labelled Cognitive Processing Strategies. This two-factor solution is in line with the results obtained by Cano (2006).

3. Results

3.1. Preliminary analyses

3.1.1. Background variables

Independent samples *t*-tests indicated that male, relative to female, participants scored significantly lower on the FTP scale ($M = 3.20$, SD = .49 for males vs. $M = 3.34$, SD = .48 for females), $t(257) = -2.09$, $p < .05$, Cohen's $d = -.28$; on the Identified Regulation subscale ($M = 3.55$, SD = .78 for males vs. $M = 3.92$, SD = .83 for females; $t(255) = -3.68$, $p < .001$, Cohen's $d = -.46$; and on the Intrinsic Motivation subscale ($M = 2.04$, SD = 1.01 for males vs. $M = 2.47$, SD = 1.07 for females; $t(257) = -3.12$, $p < .01$, Cohen's $d = -.41$.

As can be noticed in Table 1, age was significantly positively related to FTP, identified regulation, intrinsic motivation, and the use of information processing strategies, while it was negatively related to a hedonistic present orientation. Educational background was positively associated with FTP, persistence, attitude and selecting main ideas and was negatively associated with present fatalism and external regulation. The correlations for age and educational background should be interpreted with caution as both background variables are confounded given that more highly educated students were also older. However, given these significant associations with psychological constructs, we controlled for age, gender and educational background in all primary analyses.

3.1.2. Correlations

Intercorrelations between all variables are given in Table 1. First, similar to previous research (Zimbardo & Boyd, 1999), FTP correlated negatively with both a hedonistic and fatalistic present orientation while the two present orientations were positively correlated. This suggests that being present- and future-oriented form relatively distinct, albeit related, constructs. Next, FTP correlated positively with introjected regulation, identified regulation and intrinsic motivation and with all study outcomes measures and was unrelated to external regulation. In contrast, both present time perspectives were negatively associated with most of the motivational and learning outcomes. Further, in line with previous work (Ryan & Connell, 1989), the relations between the four regulatory styles followed a simplex-pattern with regulatory subtypes next to each other being more positively correlated (e.g., external and introjected regulation) when compared to regulatory styles situated further apart from one another (e.g., external regulation and intrinsic motivation). However, the coefficients did not completely follow an ordered pattern, as intrinsic motivation and identified regulation yielded a similar relation with both types of controlled motivation. Further, the pattern of correlations between the four regulatory styles and the learning outcomes generally became more positive when moving along the continuum from external regulation to identified regulation, with intrinsic motivation yielding an almost similar pattern of correlates as identified regulation. Finally, strong positive associations between the scales from the LASSI were found, as could be expected.

3.2. Primary analyses

3.2.1. Time perspective as a predictor of motivation and learning outcomes

Prior to examining our proposed integrated mediational model, we performed a series of hierarchical multiple regression analyses to explore the independent associations between FTP, a hedonistic and fatalistic present perspective and the academic self-regulations and learning outcomes. In the first step, each of the outcome measures was regressed upon gender, age and educational background. The three time perspective measures were included in the second step.

In Step 1, it was found that both gender ($\beta = .14$, $p < .05$) and age ($\beta = .26$, $p < .001$) contributed significantly in the prediction of identified regulation, whereas age yielded an additional significant association with intrinsic motivation ($\beta = .31$, $p < .001$). Educational background was significantly related to attitude ($\beta = .18$, $p < .001$) and the selection of main ideas ($\beta = .15$, $p < .01$).

The addition of the three time perspective measures in Step 2 resulted in a significant increase in explained variance in all outcomes. The results of Step 2 can be found in Table 2. First, FTP yielded a unique positive association with introjected regulation, identified regulation, and intrinsic motivation. Present hedonism was positively related to introjected and identified regulation, while being negatively related to intrinsic motivation. The unique positive associations between a present hedonistic orientation and both introjected and identified regulation are remarkable given that a present hedonistic orientation was unrelated to them at the correlation level (see Table 1). Variance Inflation Factors (VIF range between 1.10 and 1.60) did not reveal any substantial multicollinearity problems, but these relations should be interpreted with caution. Present fatalism did not yield any unique significant association with any of the motivation measures.

In an additional set of analyses, it was examined whether the relation between FTP and both introjected regulation and intrinsic motivation would be carried by the extent that both are significantly associated with identified regulation. To do so, two additional regression analyses were run thereby entering identified regulation as an additional predictor next to the time perspective measures in the prediction of introjected regulation and intrinsic motivation. It was found that the predictive value of FTP to introjected regulation was substantially reduced although it remained significant ($\beta = .28-.17$, $p < .05$) when identified regulation was entered as an additional predictor ($\beta = .24$, $p < .01$). The significant association between FTP and intrinsic motivation dropped to non-significance ($\beta = .29-.07$, ns) after entering identified regulation as an additional predictor ($\beta = .51$, $p < .001$). These analyses suggest that the association

Table 1
Intercorrelations between measured variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	–													
2. Educational background	.14*	–												
Time orientation														
3. Future time perspective	.12*	.12*	–											
4. Present hedonism	−.15*	−.05	−.34***	–										
5. Present fatalism	−.05	−.36**	−.43***	.38***	–									
Academic self-regulation														
6. External regulation	−.11	−.12*	−.10	.15*	.15*	–								
7. Introjected regulation	.11	.02	.24***	.01	−.08	.40***	–							
8. Identified regulation	.32***	.05	.49***	−.10	−.22***	−.06	.30***	–						
9. Intrinsic motivation	.34***	.01	.34***	−.27***	−.09	−.11	.29***	.57***	–					
Self-regulated learning														
10. Persistence	−.07	.14*	.64***	−.25***	−.44***	−.12*	.20***	.38***	.27***	–				
11. Attitude	.04	.24*	.38***	−.24***	−.49***	−.23***	−.02	.30***	.17**	.45***	–			
12. Concentration	−.06	.12	.45***	−.33***	−.41***	−.25***	−.04	.23***	.28***	.58***	.52***	–		
13. Time management	.09	.03	.49***	−.26***	−.31***	−.22***	.05	.36***	.41***	.57***	.45***	.66***	–	
14. Selecting main ideas	−.05	.14*	.25***	−.09	−.25***	−.10	.01	.16**	.09	.27***	.46***	.50***	.31***	–
15. Information processing	.13*	.10	.32***	.01	.14*	.12	.36***	.40***	.29***	.39***	.14*	.18**	.20**	.25***

*$p < .05$, **$p < .01$, ***$p < .001$.

Table 2
Beta coefficients of hierarchical multiple regression analyses with time orientations as predictors for motivation and learning outcomes.

	FTP	Present hedonism	Present fatalism	R^2 change	R^2
Academic self-regulation					
External regulation	.01	.12	.11	.04*	.05*
Introjected regulation	.28***	.15*	.02	.07**	.09**
Identified regulation	.45***	.13*	−.05	.19***	.31***
Intrinsic motivation	.29***	−.15*	.12	.11***	.25***
Self-regulated learning					
Persistence	.56***	−.01	−.20***	.44***	.46***
Attitude	.18**	−.05	−.38***	.24***	.28***
Concentration	.33***	−.15*	−.22***	.29***	.30***
Time management	.40***	−.08	−.11	.23***	.26***
Selecting main ideas	.18*	.03	−.17*	.08***	.12***
Information processing	.36***	.17**	−.04	.12***	.15***

The reported beta-coefficients refer to the unique associations between the three time orientations and learning outcomes in Step 2 after controlling for background characteristics in Step 1. R^2 change denotes the additional amount of variance explained by the time orientations in Step 2.
*$p < .05$, **$p < .01$, ***$p < .001$.

between FTP and intrinsic motivation is spurious and due to the shared variance between intrinsic motivation and identified regulation. In contrast, FTP yields a significant unique positive association with introjected regulation even after controlling for identified regulation.

With respect to the learning outcomes, FTP was uniquely positively related with all learning outcomes. Present hedonism was positively related to information processing and negatively to concentration. Finally, present fatalism was significantly negatively associated with persistence, attitude, concentration and selecting main ideas.

3.2.2. Mediation effects

The second aim of the present study was to examine the mediating role of motivational regulatory styles in the association between FTP and learning outcomes through structural equation modelling (SEM) analysis. Given that FTP yields a unique positive association with introjected and identified regulation (but not with intrinsic motivation), both regulations were entered as potential mediating variables. To adjust for measurement error, SEM with latent variables was performed using Lisrel 8.7 (Jöreskog & Sörbom, 2004), which requires manifest indicators for each latent construct. Concerning identified and introjected regulation, their four items were used as indicators. The outcomes were modelled according to the results of the confirmatory factor analysis. Specifically, two latent constructs were modelled, that is, ''determination and metacognitive processing'' which was represented by four indicators (i.e., persistence, attitude, concentration, and time management) and ''cognitive processing'', which was represented by a single indicator (i.e., information processing). As for FTP, three parcels of 5 items were randomly created instead of using the 15 available items (see Marsh, Hau, Balla, & Grayson, 1998). As data screening using Prelis 2.71 (Jöreskog & Sörbom, 2004) revealed data non-normality at the multivariate level, in all subsequent models, both covariance matrix and the asymptotic covariance matrix was used and the Satorra–Bentler scaled chi-square instead of the common chi-square index was inspected. To further evaluate goodness of fit, we inspected the Root Mean Square Error of Approximation (RMSEA) with values below .08 indicating acceptable fit, the comparative fit index (CFI) with values above .95 indicating acceptable fit, and the goodness-of-fit index (GFI), with values above .90 indicating acceptable fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003). Solutions were generated on the basis of maximum-likelihood estimation.

Initial estimation of the measurement model by means of confirmatory factor analysis indicated a rather poor model fit, which could be improved by allowing error covariance between the introjection items with a similar orientation (i.e., introjection-approach aimed at attaining a positive outcome and introjection-avoidance aimed at avoiding a negative outcome; see Assor et al., 2009). The final measurement model fitted the data well, Satorra–Bentler scaled $\chi^2(109) = 158.2$, RMSEA = .04, CFI = .98, GFI = .93.

Next, the hypothesized structural model was examined. In line with the recommendations of Holmbeck (1997), two models were compared, one in which FTP was only indirectly related to optimal learning through introjected and identified regulation (i.e., a full-mediation model) and one model in which an additional path from FTP to the two indicators of learning outcomes was allowed (i.e., a partial mediation model). The full-mediation model fitted the data well, Satorra–Bentler scaled $\chi^2(111) = 199.47$, RMSEA = .057, CFI = .96, GFI = .91. After controlling for the effects of age, type of education and gender, FTP was found to be positively associated with both identified ($\beta = .64, p < .001$) and introjected ($\beta = .29, p < .001$) regulation. Whereas identified regulation was positively associated with both determination and metacognitive strategies ($\beta = .66$, $p < .001$) and cognitive processing ($\beta = .27$, $p < .001$), introjected regulation was negatively associated with determination and metacognitive processing ($\beta = -.33, p < .001$), while being positively related to cognitive processing ($\beta = .34$, $p < .001$). Then, a direct path from FTP to cognitive processing was allowed, which did not result in an improved model fit. In contrast, allowing a direct path from FTP to determination and metacognitive strategies yielded a considerable improvement in model fit, Satorra–Bentler scaled $\Delta\chi^2(2) = 38.09$, $p < .001$;

Satorra–Bentler scaled $\chi^2(110) = 159.63$, RMSEA = .04, CFI = .98, GFI = .93. As can be noted in Fig. 1, FTP was strongly positively related to this learning outcome, while the previously highly significant association between identified regulation and determination/metacognitive strategies was no longer significant. Introjected regulation, in contrast, remained to yield a negative relation with this learning outcome. Further, a Sobel test (Sobel, 1982) indicated that there was a significant indirect effect of FTP to cognitive processing, $z = 4.87$, whereas the indirect path from FTP to determination/metacognitive strategy use did not reach significance, $z = -.071$, ns. The lack of an indirect significant association in the latter case is probably due to the fact that introjected regulation was negatively associated with this learning outcome, while identified regulation tended to yield a (nonsignificant) positive association, which likely resulted in an overall null-effect. To examine this possibility, identified regulation as potential mediator was removed, instead the focus was on introjected regulation; it was found that FTP did yield a significant indirect effect to determination/metacognitive strategy use through introjected regulation, $z = -1.97$, $p < .05$. This suggests that to the extent that FTP engenders an internally pressuring mode of regulation it is negatively associated with determination/metacognitive strategy use. The final model with completely standardized coefficients is displayed in Fig. 1 (for clarity, gender, age, educational background, and the other manifest variables are not represented).

A noteworthy finding in the final model concerns the lack of significant association between identified regulation and determination/metacognitive strategies when controlling for FTP. This is remarkable in light of the strong association between identified regulation and this learning outcome when FTP is not controlled for. These results can, in our view, be interpreted in various ways. First, they may suggest that identified regulation might not play a mediating role. Second, the potentially mediating role of identified regulation might be undermined by item overlap between FTP and the scales used to measure determination/metacognitive strategy use. Indeed, one could criticize the Zimbardo FTP scale to measure a planning, conscious, and

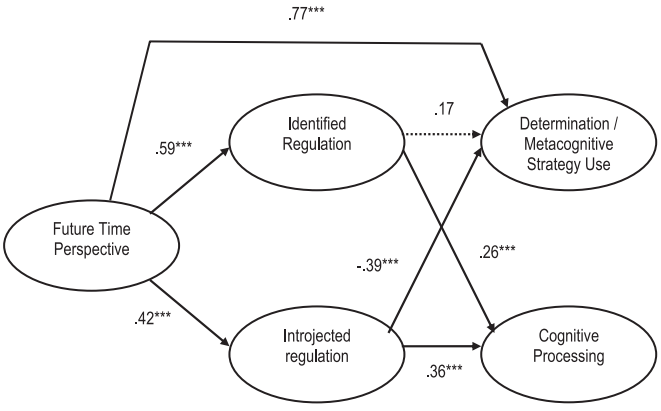

Fig. 1. The structural model, with standardized parameter estimates, of the associations between future time perspective, identified regulation, introjected regulation, and learning outcomes. **$p < .01$, ***$p < .001$. Dashed lines are nonsignificant.

persistent attitude rather than an orientation towards the future. To check such an interpretation, a confirmatory factor analysis was performed, examining whether FTP, as represented by three parcels, and self-regulation (determination/metacognitive strategy use), as represented by four subscale scores, would best be modelled according to a two-factor or single-factor model. A two-factor solution yielded a rather poor fit to the data. Modification indices suggested that one of the indicators of determination/metacognitive strategy use, that is, persistence, can better be allowed to co-load on both the learning composite score and FTP. Doing so substantially increased the model fit, Satorra–Bentler scaled $\Delta\chi^2(2) = 29.16$, $p < .001$, Satorra–Bentler scaled $\chi^2(12) = 17.40$, RMSEA = .04, CFI = .99, GFI = .98, suggesting that there is indeed some item overlap between FTP and persistence.

4. Discussion

The present study further examined the link between the FTP theory (De Volder & Lens, 1982; Husman & Lens, 1999; Nuttin & Lens, 1985; Seginer, 2009) and SDT (Deci & Ryan, 2000), two motivational theories that have received increasing empirical attention in the educational literature. In doing so, we examined whether the personal endorsement and internally pressuring regulation of one's study activities could explain the positive association between a deep FTP and learning outcomes. Several findings that emerged are discussed below.

First, in line with previous studies (De Volder & Lens, 1982; Zimbardo & Boyd, 1999), we demonstrated that FTP is associated with the use of several adaptive self-regulatory study strategies, while the hedonistic and fatalistic present orientations are either unrelated or negatively related to learning outcomes. Specifically, individuals who are more future-oriented seem to be more determined in their study behaviour, as they were found to adopt a more positive attitude towards their schooling and report greater persistence in times of difficulties. Moreover, when foreseeing the future consequences of one's present behaviour, one seems to be better able to manage and plan one's study time and to stay more focused on the task at hand. In addition, more future-oriented individuals also cognitively processed the learning material at hand more deeply, as they were found to be more focused on selecting core ideas of the text material.

A second set of findings pertains to the association between FTP and motivational regulations. First, being more future-oriented leads one to perceive one's current studying as more valuable and meaningful. The hypothesis that FTP is positively associated with identified regulation was verified (Hypothesis 1a). This association was not, or not consistently, found for the two types of present – orientation (Hypothesis 1b). Second, the unique positive association between FTP and introjected regulation suggests, as expected, that the anticipation of the future consequences of one's behaviour also engenders a sense of inner pressure and tension to achieve these (important) future goals (Hypothesis 2). Third, as expected, no association between FTP and external regulation was found (Hypothesis 3). These findings suggest that the claim that FTP enhances

extrinsic motivation, as would be suggested on the basis of an expectancy-value account, needs refinement as FTP is not significantly associated with external regulation as a particular form of extrinsic motivation. Fourth, the significant association between FTP and intrinsic motivation at the correlational level dropped below significance when controlling for the shared variance between identified regulation and intrinsic motivation. This finding suggests that the observed positive association between FTP and intrinsic motivation is spurious, that is, due to the fact that they both share considerable variance with a third variable (i.e., identified regulation). Thus, the present results suggest that when students foresee the future consequences of their studying, they do not derive any more inherent pleasure and satisfaction from their current studying. This seems logical given that being future oriented implies that one adopts an instrumental (i.e., extrinsically motivated) attitude towards the learning activity at hand, whereas intrinsic motivation implies a present-oriented absorption in the activity at hand.

Although present hedonism yielded no unique associations with the learning outcomes, it yielded a rather mixed pattern of associations with the motivational regulations. The one association that consistently emerged – both at the correlational level and in the beta-coefficients that represent unique associations – was the negative relation between present hedonism and intrinsic motivation. This is interesting because "enjoyment" is a common feature of both intrinsic motivation and present hedonism, although enjoyment is most likely to yield a different connotation in each case (Ryan & Deci, 2001). In the hedonic approach, well-being is equated with the pursuit of pleasure and happiness and denotes an immediate quest for gratification. Intrinsic motivation is considered within SDT to reflect a growth-oriented tendency; it denotes the natural tendency to discover and enact one's emerging interests such that one can realize oneself, enabling one to experience a sense of eudaimonic well-being over time. The present study suggests that the two types of "enjoyment" do not go hand in hand. On the contrary, the "carpe diem" attitude that characterizes present hedonism, might be adopted in an attempt to overcome the lack of eudaimonic and, hence, self-realizing enjoyment one experiences from the learning activity.

A third set of findings pertains to the explanatory role of identified and introjected regulation in the association between FTP and learning outcomes. The result of SEM analyses indicated that both identified and introjected regulation could account for the relationship of FTP with cognitive information processing. These findings suggest that students who are more future-oriented make more frequent use of information processing strategies because they find the learning material more personally useful and relevant, presumably because they better see a link between their current studying and the attainment of future goals. Introjected regulation also played an explanatory role in this association, suggesting that to the extent that FTP yields an internally pressuring regulation of one's studying, one is also more likely to process the learning material at hand. In previous experimental research (Vansteenkiste, Simons, et al., 2005), an internally controlling, relative to an autonomy-supportive communication style, which activates an introjected form of regulation, has been found to undermine deep level learning but to equally promote surface level learning. Further, introjected regulation also played a mediating role in the association between FTP and determination/metacognitive strategy use, albeit yielding a negative (instead of a positive) association with this learning outcome. This suggests that to the extent that future oriented students put themselves under pressure to achieve their future goals, they might get more easily distracted, are less efficacious in planning their time and are less positive about their schooling, presumably because the decision to study does not freely emanate from themselves but is rather self-imposed.

In contrast to introjected regulation, identified regulation failed to play an explanatory role in the relation between FTP and determination/metacognitive strategy use. We have several thoughts in this respect. First, it might be the case that identified regulation can not account for the association of FTP to students' determination/metacognitive strategy use; so Hypothesis 4 should be rejected. Second, the lack of mediational role of identified regulation might be obscured because association between FTP and this learning outcome is overestimated due to item overlap. For instance, both the FTP scale and the LASSI scales, which were used to assess self-regulated learning, contain items that yield a reference to persistence. For example, the item "I keep working at difficult uninteresting work if it will help me get ahead" from the FTP scale resembles the item "Even if I need to learn boring and uninteresting things, I succeed to work till the end" from the Persistence scale. Such item overlap might artificially inflate the association between FTP and the learning outcomes and preclude the possibility for identified regulation to serve as an explanatory variable. Some evidence for such an argument was found because a two-factor confirmatory factor analysis, in which FTP and determination/metacognitive strategy use were modelled as separate latent constructs, suggested that persistence can better be modelled as loading simultaneously on both latent factors. In short, these results suggest that at least part of the items of Zimbardo's FTP tap into a planning, conscious, persistent attitude instead of measuring participants' anticipation of future goals per se, which could inflate association with other (non-time related) measurements. Thus, the results of the present study support the critical view of Husman and Shell (2008), and Seginer (2009), who proposed other measures of time perspective. Future research may want to examine these issues in greater detail.

Further research may also want to examine which additional processes might account for the direct association of FTP to this learning outcome. We provide some suggestions. For example, in addition to be associated with a different quality of motivation as we suggested herein, FTP might be associated with a higher level or quantity of motivation, such that those foreseeing the future implications of their current behaviour would start to expend more effort in their learning. This increased effort expenditure might contribute to more optimal learning as well. Another possibility, suggested by the thematic perspective (Seginer, 2009), is to consider the content of the future goals that one is striving for. Previous experimental work on the

motivating role of FTP (Simons et al., 2003; Vansteenkiste et al., 2004; see Simons et al., 2004 for an overview) has shown that the content of an experimentally induced future goal can better be intrinsic (e.g., community contribution, growth, affiliation) rather than extrinsic (e.g., financial success, popularity) in nature to promote optimal learning, presumably because future extrinsic goals distract learners' attention from the activity at hand (Vansteenkiste, Lens, & Deci, 2006). It could be that future-oriented adolescents and young adults are more likely to strive for future intrinsic goals rather than future extrinsic goals, and that this association could also help to explain the positive effects of FTP on learning outcomes (see Tabachnik et al., 2008 for an initial step in this regard).

4.1. Limitations and suggestions for future research

The present study has a number of limitations. First, the present sample consisted primarily of adolescent high school students. The question needs to be addressed whether the current findings can be generalized to younger or less educated populations, who are perhaps cognitively less able to grasp the future consequences of their current behaviour. It might be the case that the association between FTP and motivational regulation becomes stronger with age because both life experiences and increasing cognitive maturity enables one to better understand the future implications of one's current behaviour (Lens & Gailly, 1980). Second, the correlational and cross-sectional nature of this study does not allow drawing causal inferences. Future longitudinal studies may help to examine the direction of the effects. For instance, FTP might not only contribute to a more identified regulation over time, but a stronger personal endorsement of the learning activity at hand might also lead one to better foresee the future implications of one's current studying.

Third, some disadvantages of the measurements used can be addressed. One problem is that we only used self-report questionnaires; the other concerns the measurement of FTP, namely the Zimbardo Time Perspective Inventory (ZTPI). As noted, there seems to be some overlap in the items that tap into ZTPI and self-regulated learning. For further research, it may be useful to not only measure the general degree of future orientation (as the ZTPI does) but also a variety of other facets, including the cognitive and dynamic aspect of FTP, the goal content, extension, degree of realism, specificity and the structure of the future time perspective (see Creten et al., 2001; De Volder & Lens, 1982; Husman & Shell, 2008).

Finally, in the present study it was found that present hedonism and present fatalism yielded a rather negative pattern of motivation and of learning outcomes, whereas they were incompatible with having a deep FTP. However, we do not think this is necessarily the case for two reasons. First, the relation between FTP and a present orientation might depend on the domain under investigation. In the present study, we relied on ZTPI which assesses a general orientation towards the future and present, but it remains to be investigated whether both time orientations yield a similar negative relation to each other at the domain level. Second, we believe that the relation between FTP and present orientation might depend on the type of studied present orientation. Following Sheldon and Vansteenkiste (2005), we suggest that mindfulness (Brown & Ryan, 2003) as a present time orientation is quite compatible with a future time orientation. Further research might examine the association between mindfulness, FTP and academic self-regulation. Possibly mindfulness, because it directs individuals to their inner needs and desires, is a present time perspective that is compatible with a future orientation and allows one to regulate one's behaviour in a more volitional or autonomous fashion (see Brown & Ryan, 2003 for initial attempts in this respect). Nuttin and Lens (1985) call this an ''open-present'' perspective, that is, a present attitude characterized by openness to the future.

5. Conclusion

The results of this study suggest that a consideration of the motivational regulations characterizing individuals with a deep FTP yields some interesting insights. Although FTP is by definition characterized by an instrumental and, hence, extrinsically motivated, attitude towards the learning activity, FTP is not equally predictive of all types of extrinsic motivation. Being future oriented seems to contribute to a stronger personal endorsement of one's present study activities, but at the same time is also predictive of more internally pressuring regulation of one's studying.

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