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# Achievement goals, motivations, and social and emotional adjustment in high school: a longitudinal mediation test

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## ABSTRACT

This 2-year prospective study aimed to examine the predictive role of students' achievement goals (mastery-approach and performance-avoidance) on socioemotional adjustment in high school by assessing the potential mediating contribution of academic motivations. A total of 407 high school students (46% boys) were surveyed each year in Secondary 2 (Grade 8), 3 (Grade 9), and 4 (Grade 10). Results indicated that mastery and performance-avoidance goals in Secondary 2 predicted emotional adjustment in Secondary 4, and that these links were mediated by introjected regulation and amotivation in Secondary 3. In addition, performance-avoidance goals predicted social adjustment in high school, without it being mediated by motivation types. Results are discussed with respect to their implications for teacher training programmes. Limitations and future research directions are also outlined.

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## Introduction

Since the mid-1980s, studies have demonstrated that achievement goals, particularly mastery-approach and performance-avoidance goals, are reliable and differential predictors of several indicators of academic adjustment (for a review, see Anderman & Patrick, 2012). In recent years, achievement goal theory has focussed on other critical facets of school adjustment such as students' social relations (Duchesne et al., 2017; Shin & Ryan, 2014) and emotional well-being (Tian et al., 2017). Despite the scope of these studies, the prospective associations between these constructs and their potential underlying processes are relatively unknown. The present investigation aims to fill these gaps by examining, over a period of 2 years, the predictive power of mastery-approach and performance-avoidance goals on high school students' social and emotional adjustment, and by exploring probable motivational mechanisms responsible for these relationships. These mediators – motivational types – are derived from self-determination theory (SDT; Ryan & Deci, 2017), a perspective that combines a focus

on individuals' goals and types of motivation as explanatory mechanisms for achievement behaviours, which could provide insights into individual differences in social and emotional adjustment in academic settings.

### ***Achievement goals***

Achievement goals hold a distinct place in the self-regulated learning and achievement of students of different ages (Elliot, 2005; Senko, 2016). Conceptualised as a basic motivational system governed by an appetitive, positively-valenced component (approach competence and success) or by an aversive, negatively-valenced component (avoid incompetence and failure), these goals act to regulate actions, cognitions and affects in learning settings (Elliot, 1999). Empirical studies and theoretical reflections based on achievement goal theory have led to the elaboration of a four-factor model (the  $2 \times 2$  framework) that includes four distinct goals (Elliot & McGregor, 2001; Pintrich, 2000). Mastery-approach goals (MAP) place emphasis on the development and improvement of one's competence in terms of self- and task-based reference standards. Mastery-avoidance goals (MAv) focus on avoiding the loss of competence based on intrapersonal and task-referenced standards. Performance-approach goals (PAp) are oriented towards demonstrating one's competence according to interpersonal and task-referenced criteria, and Performance-avoidance goals (PAv) focus on avoiding the demonstration of one's incompetence relative to social and task-referenced standards.

Three important issues were raised in the achievement goals literature. First, the current state of knowledge indicates that MAP and PAv goals allow clear and robust distinction between students with optimal academic functioning (in terms of motivation, engagement, emotionality, and performance) and those with more problematic functioning (for reviews, see Anderman & Patrick, 2012; Elliot & Hulleman, 2017; Maehr & Zusho, 2009). Essentially, the former tend to adopt MAP goals while the latter is more oriented towards PAv goals. In contrast, the distinction between PAp and MAv goals is much less conclusive. Both types of goals were related to positive and negative indicators of academic functioning, which complicates predictions. Second, strong correlations ( $r$  values  $>.72$ ) between PAp and PAv goals have been reported in adolescent samples (Bong, 2008; Kaplan et al., 2009; Paulick et al., 2013), suggesting some overlap between these two types of goals at this developmental stage. Methodologically, it would be justified to group these goals under a second-order factor (Kline, 2011), but conceptually and practically, it would be problematic to interpret a factor with opposite motivational components (approach vs. avoidance). Third, researchers questioned the necessity to measure MAv goals, especially in younger samples (Maehr & Zusho, 2009). These goals would be more difficult to understand (Van Yperen et al., 2009) and possibly limited to certain individuals who are concerned about losing their expertise (DeShon & Gillespie, 2005; Elliot, 2005).

In light of these issues and because considering goals whose contribution to academic adjustment have been robustly demonstrated might allow stronger predictions of other dimensions of students' adjustment (i.e. social and emotional components), the present prospective study focuses on MAP and PAv goals.

### ***Socioemotional adjustment in school***

Adjustment to high school is known to play a critical role in students' academic success and persistence (Mac Iver et al., 2015). Moreover, education researchers largely agree that school adjustment can be conceptualised in a multidimensional fashion (Ratelle & Duchesne, 2017). In addition to academic adjustment – or students' ability to handle the demands of academic work and exams – two other important dimensions of adjustment were found to be important for student school success. The social adjustment refers to students' capacity to form and maintain positive interpersonal relationships with peers and teachers at school while emotional adjustment refers to how students deal with an environment that involves pressure and stress through indicators of emotional (e.g. anxiety) and somatic (e.g. appetite problems) functioning.

A few strands of evidence support the contribution of MAP and PAV goals to students' social and emotional adjustment in academic settings. In terms of social adjustment, MAP goals have been positively associated with adaptive peer integration at school in a sample of nine grade Singapore's students (Liem et al., 2008) and a tendency to maintain harmonious and cooperative relationships with others in a sample of 7–10th graders living in Hong Kong (Cheung et al., 1998). Whereas MAP goals have been positively associated with acceptance by peers in third-grade American students (Wilson et al., 2016), the opposite association was found between PAV goals and the ability to make friends and gain peer acceptance in a sample of Canadian students transitioning from elementary school to secondary school (Duchesne et al., 2017). In terms of emotional status, MAP goals in seventh-grade Chinese adolescent students were positively associated with subjective well-being at school (Tian et al., 2017). In samples of undergraduate students, MAP goals were also positively associated with achievement emotions such as enjoyment, hope, and pride, and negatively with boredom, hopelessness, and shame (Pekrun et al., 2009). Alternatively, PAV goals were positively related to worries and cognitive interference during tests in Korean high school students (Bong, 2009). In addition, undergraduate students' PAV goals positively predicted state test anxiety, worries, and emotionality in exam performance (Elliot et al., 1999). They were also positively associated with anger, anxiety, hopelessness, and shame, but negatively with hope and pride (Pekrun et al., 2009).

By and large, these results suggest that MAP goals promote social and emotional adjustment at school, whereas PAV goals undermine these dimensions. Despite these findings, the number of studies remains limited, calling for further investigation. In addition, because the constructs have been examined transversally (Wilson et al., 2016) or were examined at a 1-year interval maximum (Duchesne et al., 2017), the long-term association remains unclear. An analysis of prospective relationships would help clarify the issue. Another gap to be filled is the understanding of the potential mediators between achievement goals and social and emotional adjustment over time. Understanding the explanatory mechanisms underlying students' social integration process and emotional well-being at school could allow us to deepen our knowledge of the pathways by which goals contribute to adjustment over time. Using a self-determination perspective, academic motivations are postulated to be the mediators of goals' contribution to socioemotional adjustment.

### **Academic motivations as mediating mechanisms**

According to SDT (Ryan & Deci, 2017), motivation (i.e. why we engage in an activity or perform a task) needs to be considered in terms of quality, more than the quantity of motivation, for an optimal understanding of individuals' optimal functioning. The theory describes three forms of motivation: intrinsic, extrinsic, and amotivation. These motivations differ according to the voluntary nature of the behaviour. *Intrinsic motivation* is the most self-determined form of regulation. It can be observed when individuals engage in actions out of interest, pleasure, and satisfaction. Contrastingly, extrinsic motivation refers to the act of engaging in an activity for reasons other than the pleasure and satisfaction inherent to the activity itself. This motivation covers four regulations that differ in their respective level of autonomy. The most autonomous are *integrated regulation* (i.e. engaging in an activity because it aligns with one's identity and values) and *identified regulation* (i.e. engaging in an activity because it has been chosen or considered important), while the most controlled are *introjected regulation* (i.e. behaving as a result of internal pressure or constraints such as obligation, guilt or shame), and *external regulation* (i.e. engaging in an activity to obtain a reward or avoid a punishment). Finally, *amotivation* refers to the lack of regulation (intrinsic or extrinsic) where an action or activity is undertaken without perceiving the reasons for doing so.

There is strong empirical support for the relation of motivation types and student outcomes that fall under the umbrellas of social and emotional adjustment, both within and outside of the school context. For instance, intrinsic motivation has been positively related to social adjustment (Bailey & Phillips, 2016), peer relatedness, subjective well-being (Beiswenger & Grolnick, 2010), and positive emotions in classroom situations (Vallerand et al., 1989). The opposite association was also reported with negative indicators of socioemotional adjustment such as stress (Baker, 2004) and anxiety symptoms (Ng et al., 2012; Ratelle et al., 2007). Identified regulation has been positively linked with peer and teacher relatedness (Beiswenger & Grolnick, 2010; Ryan & Connell, 1989) as well as with positive emotions in the classroom (Vallerand et al., 1989), whereas the opposite association has been observed with anxiety (Ng et al., 2012; Ratelle et al., 2007). Non self-determined regulations have generally demonstrated a more negative pattern of association with students' socioemotional adjustment. Specifically, introjected regulation was found to be negatively associated with emotional adjustment (Bailey & Phillips, 2016) and well-being (Beiswenger & Grolnick, 2010), but positively associated with anxiety symptoms and concerns about test performance (Duchesne & Ratelle, 2016; Ng et al., 2012; Ryan & Connell, 1989). For external regulation, past research found it to be negatively associated with peer relatedness (Beiswenger & Grolnick, 2010) but positively associated with anxiety (Ng et al., 2012) and concerns about test performance (Ryan & Connell, 1989). Lastly, amotivation has been negatively related to social and emotional adjustment (Bailey & Phillips, 2016), but positively with stress and psychological illness (Baker, 2004).

Students' academic motivations are postulated to mediate the relationships from MAP and PAv achievement goals to social and emotional adjustment in school. Two considerations supported this decision. First, according to the hierarchical model of achievement motivation (Elliot, 1999; Elliot & Church, 1997), motive dispositions and

competence expectancies predict achievement-related outcomes (e.g. intrinsic motivation) through achievement goals. Thus, goals would act as proximal predictors of academic motivations. Empirical findings tend to support this theorised association. For example, MAP goals have been a positive predictor of intrinsic motivation (Barkoukis et al., 2007; Bieg et al., 2017; Elliot & Church, 1997; Elliot & Murayama, 2008; Murayama & Elliot, 2009), academic interest or enjoyment (Benita et al., 2014), and identified regulation (Barkoukis et al., 2007). Moreover, they have negatively predicted external regulation and amotivation (Barkoukis et al., 2007). Furthermore, PAV goals negatively predicted intrinsic motivation (Elliot & Church, 1997; Elliot & Murayama, 2008) and identified regulation (Barkoukis et al., 2007), and positively predicted introjected regulation and external regulation (Barkoukis et al., 2007). Second, autoregressive cross-lagged panel analyses showed that MAP goals predicted intrinsic motivation over a 10-week period, but intrinsic motivation did not predict MAP goals (Bieg et al., 2017).

Given these findings, students' orientation towards MAP goals can be expected to be better socially and emotionally adjusted in school because their school behaviours would be regulated in a self-determined fashion. More specifically, endorsing MAP goals could lead students to adopt certain behaviours and attitudes towards academic tasks (e.g. making an effort, seeking and accepting help from others, peer support, calmness, and enthusiasm), which would become progressively internalised and integrated into the self. This would contribute to feelings of pleasure (intrinsic motivation) and/or the importance of attending school (identified regulation). Over time, this internalisation and integration of behaviours and attitudes would foster social adjustment and strengthen any positive effects of the school environment (Ryan & Deci, 2017). Alternatively, students guided by PAV goals would be less socially and emotionally adjusted in school, because they would tend to show behaviours and attitudes in learning situations (e.g. expending little effort, avoiding help, uncooperative, disruptive, anxious) that would push them towards more controlled forms of motivational regulation (i.e. introjected or external), or else lack of motivation altogether (amotivation). In the end, these students could have problems building and maintaining significant relationships, ultimately leading to feelings of ill-being at school.

### ***The present study***

The main goal of this prospective study was to test a mediation model in which students' achievement goals predict their social and emotional adjustment in high school two school years later and where types of academic motivation mediate these relationships. Two sequences were proposed. The first sequence postulates that the adoption of MAP goals will predict stronger levels of social and emotional adjustment in school and that these relationships would be mediated by students' intrinsic motivation and identified regulation. The second sequence postulates that the pursuit of PAV goals will negatively predict social and emotional adjustment and that introjected and external regulations or amotivation will mediate these relations.

In testing the proposed model, the contribution of three variables was controlled for in light of past results showing their contribution to socioemotional adjustment,

namely students' intimacy with peers in the classroom, depressive symptoms, and gender. Studies have shown associations between intimacy (or relatedness) with peers and higher satisfaction with interpersonal relationships (Losier et al., 1993) as well as greater engagement in prosocial activities (Gagné, 2003). Moreover, depressive symptoms in adolescence have been associated with emotional problems such as anxiety (Garnefski & Kraaij, 2018). Furthermore, compared to boys, adolescent girls tend to score higher on intrinsic motivation and identified and introjected regulation, but lower on external regulation and amotivation (Ratelle et al., 2007). Girls have also shown more prosocial behaviour and emotional symptoms than boys (Becker et al., 2018). By controlling for all these variables, we aimed to isolate some of the variance that might be attributable to them in the tested mediation model.

## Method

### *Participants and procedure*

This study was carried out with a sample of 407 students (186 boys; 221 girls;  $M_{age} = 13.64$  years;  $SD = 0.54$ ) attending a French-speaking high school in the province of Québec (Canada). They were surveyed annually as part of a longitudinal study investigating the antecedents of academic success and persistence in high school. The information available for 308 of them (76%) indicates that they were scattered among 206 schools. Thus, it can be reasonably assumed that very few participants have attended the same schools and classes. For the present study, data from Secondary 2 (Grade 8; Time 1 [T1]), 3 (Grade 9; Time 2 [T2]), and 4 (Grade 10; Time 3 [T3]) was used. Considering the second year of secondary school as a starting point is supported by studies showing that students' motivational dynamics can be affected by changes in pedagogical and evaluative practices that characterise the beginning of secondary school (see, for example, Eccles & Roeser, 2011). We have thus focussed on a period occurring after these changes have stabilised.

The study has been endorsed by the Research Ethics Committee of the Université Laval and was in accordance with the ethical principles and guidelines recommended by the American Psychological Association. Recruiting was conducted in collaboration with the Ministry of Education, Recreation and Sports, which proposed a representative sample stratified and randomly selected based on three demographic variables: gender, socioeconomic status, and geographic location (rural or urban). Written informed consent was obtained from students and one of their parents. Nearly all participants spoke French at home (99%), and 77% lived with both biological parents. The median family income (as declared by mothers) fell between \$60,000 and \$69,000 CAD, which is slightly above the median family income in Québec when the study began (\$56,130 CAD; Statistics Canada, 2017). Each spring in 2009, 2010 and 2011, participants completed a questionnaire – either online or in paper – to assess diverse aspects of their school life and functioning. As compensation for their participation, they were offered a movie ticket or a gift card for an online music and book store.

## Measures

### *Achievement goals (T1 – predictors)*

MAP and PAV goals in Secondary 2 were assessed with the Mastery and Performance-avoidance goal scales of the Patterns of Adaptive Learning Survey (PALS; Midgley et al., 2000). The MAP goals scale included five items assessing students' focus on developing their academic competence (e.g. 'It's important to me that I improve my skills'). PAV goals were assessed by four items assessing the degree to which students tried to avoid looking incompetent (e.g. 'It's important to me that I don't look stupid in class'). Students were asked to rate the extent to which each item corresponded to their goals using a five-point Likert scale ranging from 1 (very little or not at all) to 5 (very much). The PALS has demonstrated reliability coefficients of .85 for MAP and .74 for PAV goals (Midgley et al., 2000). In this study, Cronbach's alphas were .87 for MAP and .82 for PAV goals.

### *Academic motivations (T2 – mediators)*

The French version (Vallerand et al., 1989) of the Academic Motivation Scale (AMS) was used to assess five types of academic motivation: intrinsic motivation (IM), identified regulation (ID), introjected regulation (IJ), external regulation (EX), and amotivation (AM). Each subscale contains four items representing a reason for attending school. Sample items are 'Because I experience pleasure and satisfaction while learning new things' (IM), 'Because I think that a high school education will help me better prepare for the career I have chosen' (ID), 'Because I want to show myself that I can succeed in my studies' (IJ), 'Because I need at least a high school diploma in order to find a high-paying job later on' (EX), and 'I can't see why I go to school and frankly, I couldn't care less' (AM). Participants indicated their level of agreement with each statement on a five-point Likert scale (1 = not at all; 5 = completely). The internal consistency of the AMS has been previously demonstrated (Vallerand et al., 1989). In the present study, Cronbach's alphas ranged from .78 (EX) to .92 (AM).

### *Socioemotional adjustment in high school (T3 – outcomes)*

Students' social and emotional adjustment in high school was assessed with two subscales of the French version (Larose et al., 1996) of the Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1989), adapted for high school (Duchesne et al., 2007). The *social adjustment* subscale assesses how students are coping with their relationships with groups and peers, and social isolation at school (4 items; e.g. 'I have friendly relationships with several people at school.'). The *personal-emotional adjustment* subscale assesses general emotional status (e.g. emotional control) and physical status (e.g. sleep quality; 7 items). A sample item is, 'I've been feeling in good health'. Items were rated on a five-point Likert scale ranging from 1 (does not apply to me at all) to 5 (applies to me very well). The French version of the SACQ has demonstrated adequate internal reliability in high school samples (Duchesne et al., 2007). In the present study, internal consistency coefficients were .64 and .76 for social and personal-emotional adjustment subscales, respectively.

### *Intimacy with peers (T1 – control variable)*

The Intimacy subscale of the Need for Relatedness Scale (Richer & Vallerand, 1998) was used to assess students' perceived proximity in their relationships with other students. It contains three items rated on a seven-point Likert scale ranging from 1 (do not agree at all) to 7 (strongly agree). A sample item is, 'In my relationships with my classmates, I feel close to them'. Previous studies (Losier et al., 1993; Richer & Vallerand, 1998) have supported the psychometric qualities of this subscale. In the current study, the Cronbach's alpha for this subscale was .89.

### *Depressive symptoms (T1 – control variable)*

Five items from the short version of the Children's Depression Inventory (CDI-S; Kovacs, 1992) were used to assess depressive symptoms. Students indicated the extent to which each item (e.g. 1 = 'I don't feel lonely', 2 = 'I often feel lonely', 3 = 'I always feel lonely') corresponded to their feelings in the last 2 weeks. The CDI-S was found to be reliable in the past (Kovacs, 1992). In this study, Cronbach's alpha was .66.

## **Statistical analyses**

### *Model testing*

We examined the hypothesised mediational model Achievement goals → Motivations → Adjustment with structural equation modelling (SEM) using Mplus (version 7.11; Muthén & Muthén, 2015) under robust maximum likelihood estimation (MLR), which provides standard errors and fit indices that are robust to the Likert nature of the items and to the non-normality of some variables (Muthén & Kaplan, 1992). We used the Bentler comparative fit index (CFI), the Tucker-Lewis index (TLI; also known as the Bentler-Bonett non-normed fit index), and the root mean squared error of approximation (RMSEA) and its 90% confidence interval to assess the adequacy of model fit. Values above .90 for the CFI and TLI are assumed to indicate an acceptable fit, and a RMSEA below .08 suggests a well-fitting model (Byrne, 2012; Hu & Bentler, 1999). Latent constructs in the model were assessed by their respective measurement items (manifest variables) and scaled by fixing one-factor loading to 1 per factor.

### *Testing mediation*

Indirect effects were estimated with the bootstrap resampling technique (Hayes, 2013; Marcoulides & Schumacker, 2013) using 1000 bootstrap resamples. This non-parametric analysis method is robust to violations of data normality conditions and produces a 95% confidence interval around the indirect effect. When this interval is beyond zero, the indirect effect is judged significant (Hayes, 2013).

### *Missing data*

The rate missing data for this longitudinal sample ranged from 0% (achievement goals at T1) to 37% (adjustment variables at T3). We examined whether participants with complete data (55% of the sample) differed from those with incomplete data on several demographic and key variables assessed at T1. Findings showed that students in the complete data subsample did not differ from students with incomplete data on

family type ( $\chi^2 = 9.62$ ,  $df=6$ ,  $p = .14$ ), family income ( $\chi^2 = 11.77$ ,  $df=7$ ,  $p = .11$ ), achievement goals, intimacy with peers, and depressive symptoms (Wilk's  $\lambda$  [4, 388] = 1.98,  $p = .10$ ). One gender difference was however obtained with girls being more numerous (59%) in the complete than incomplete data subgroup (49%;  $\chi^2 = 3.93$ ,  $df=1$ ,  $p < .05$ ). Missingness was statistically handled using the full-information maximum likelihood (FIML) algorithm in SEM (Graham, 2003; Muthén & Muthén, 2015).

## Results

### Preliminary analyses

Data was screened to ensure it met basic statistical postulate and for outlier cases. Results indicated deviations from normality at the univariate (nine items) and multivariate (30 cases) levels, thereby justifying the use of a MLR estimation.

Results of a multivariate analysis of variance revealed that boys and girls differed on several variables at T1 (Wilk's  $\lambda = .88$ ;  $df=4$ , 389;  $p < .001$ ), T2 (Wilk's  $\lambda = .96$ ;  $df=5$ , 310;  $p = .039$ ), and T3 (Wilk's  $\lambda = .93$ ;  $df=2$ , 254;  $p < .001$ ). Univariate results indicated relatively moderate differences on PAv goals ( $F[1, 392]=6.82$ ,  $p < .01$ ,  $\eta^2 = .02$ ), intimacy with peers ( $F[1, 392]=14.85$ ,  $p < .001$ ,  $\eta^2 = .04$ ), depressive symptoms ( $F[1, 392]=16.61$ ,  $p < .001$ ,  $\eta^2 = .04$ ), identified regulation ( $F[1, 314]=5.68$ ,  $p = .018$ ,  $\eta^2 = .02$ ), emotional adjustment ( $F[1, 255]=6.72$ ,  $p < .01$ ,  $\eta^2 = .03$ ), and social adjustment ( $F[1, 255]=4.54$ ,  $p = .03$ ,  $\eta^2 = .02$ ). Compared to boys, girls were more strongly oriented towards PAv goals ( $M_{Girls} = 2.29$  [95% CI = 2.16–2.42] vs.  $M_{Boys} = 2.56$  [95% CI = 2.41–2.71]), perceived greater intimacy with their peers ( $M_{Girls} = 5.38$  [95% CI = 5.21–5.54] vs.  $M_{Boys} = 4.86$  [95% CI = 4.65–5.07]), reported more depressive symptoms ( $M_{Girls} = 1.35$  [95% CI = 1.31–1.39] vs.  $M_{Boys} = 1.23$  [95% CI = 1.219–1.27]), reported stronger levels of identified regulation ( $M_{Girls} = 4.44$  [95% CI = 4.35–4.53] vs.  $M_{Boys} = 4.25$  [95% CI = 4.12–4.38]), and were better adjusted socially ( $M_{Girls} = 4.29$  [95% CI = 4.19–4.39] vs.  $M_{Boys} = 4.12$  [95% CI = 3.97–4.25]). They did, however report lower emotional adjustment than boys ( $M_{Girls} = 3.69$  [95% CI = 3.57–3.81] vs.  $M_{Boys} = 3.93$  [95% CI = 3.79–4.07]). Hence, girls in our sample showed slightly better functioning than boys on motivation and socialisation, but slightly lower in terms of emotional status. Gender was therefore used as a control variable in subsequent analyses.

### Confirmatory factor analysis (CFA)

A CFA was performed to examine the measurement adequacy of the latent factors in the proposed model. Fit indices for the CFA suggested good model fit,  $\chi^2$  (407) = 1544.103,  $p < .001$ ; CFI = .92; TLI = .91; RMSEA = .035 [90% CI = 0.032–0.039]). Standardised factor loadings for each latent factor ranged from moderate (.37) to high (.92), supporting the adequacy of the measurement model proposed. Table 1 presents the means, standard deviations, and correlations among latent factors.

**Table 1.** Means, standard deviations, and correlations among latent variables ( $n = 407$ ).

	1	2	3	4	5	6	7	8	9	10	11	Mean (SD)
1. Intimacy with peers (T1)												5.14 (1.36)
2. Depressive symptoms (T1)	<b>-.21</b>											1.30 (0.31)
3. Mastery-approach (T1)	<b>.16</b>	<b>-.14</b>										3.82 (0.87)
4. Performance-avoidance (T1)	-.07	-.06	<b>.23</b>									2.42 (1.03)
5. Intrinsic motivation (T2)	.07	<b>-.14</b>	<b>.48</b>	<b>.22</b>								3.31 (1.05)
6. Identified regulation (T2)	<b>.23</b>	-.10	<b>.27</b>	.06	<b>.35</b>							4.34 (0.70)
7. Introjected regulation (T2)	.12	-.03	<b>-.38</b>	<b>-.30</b>	<b>.54</b>	<b>-.38</b>						2.77 (1.10)
8. External regulation (T2)	.11	-.03	-.01	<b>.18</b>	-.10	<b>.60</b>	<b>-.35</b>					3.93 (0.96)
9. Amotivation (T2)	<b>-.17</b>	-.15	<b>-.27</b>	.12	<b>-.33</b>	<b>-.58</b>	<b>-.15</b>	-.07				1.42 (0.79)
10. Emotional adjustment (T3)	.12	<b>-.39</b>	-.12	<b>-.24</b>	<b>-.17</b>	<b>.24</b>	-.06	-.06	<b>-.40</b>			3.77 (0.76)
11. Social adjustment (T3)	<b>.41</b>	-.16	<b>.18</b>	<b>-.27</b>	<b>.26</b>	<b>.33</b>	<b>.17</b>	-.03	<b>-.27</b>	<b>.61</b>		4.20 (0.66)

Note: correlations in bold are statistically significant at  $p < .05$ . T1 = Time 1 (second year of high school), T2 = Time 2 (third year of high school), T3 = Time 3 (fourth year of high school).

### Model testing

Results showed that the structural mediational model fits the data well ( $\chi^2 (1062) = 1623.43$ ,  $p < .01$ ; CFI = .91; TLI = .91; RMSEA = .036 [90% CI = 0.033–0.039]). Figure 1 shows the statistically significant standardised path coefficients. Control variables are not presented for the sake of clarity. Their role will be described next.

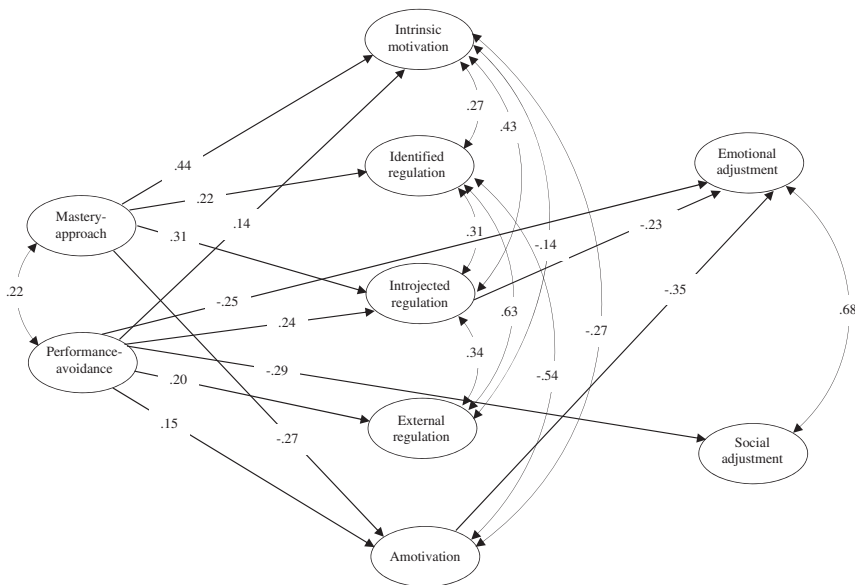
Standardised regression coefficients indicate that MAp goals positively predicted stronger intrinsic motivation and identified but also introjected regulation, while negatively predicting amotivation. No direct relationships were detected between MAp goals and social and emotional adjustment variables. Moreover, PAv goals predicted stronger intrinsic motivation, introjected regulation, external regulation, and amotivation. It also directly predicted lower social and emotional adjustment in high school 2 years later. With respect to mediating factors, introjected regulation and amotivation negatively predicted emotional adjustment, while no motivation types predicted social adjustment. Overall, the amount of variance explained by the model was .26 for intrinsic motivation, .12 for identified regulation, .21 for introjected regulation, .05 for external regulation, .13 for amotivation, .37 for emotional adjustment, and .37 for social adjustment, after adjusting for students' intimacy with peers, depressive symptoms, and gender. It should be noted that the pattern of results remains the same without controlling for intimacy with peers. However, this variable was kept in the model since it was associated with several variables in the model, including social adjustment (see next).

Other associations emerged from the tested model. MAp goals are positively linked to PAv goals and intimacy with peers ( $\beta = .22$ ,  $p < .01$ , and  $.16$ ,  $p < .01$ , respectively), but negatively to depressive symptoms ( $\beta = -.16$ ,  $p = .02$ ). Intimacy with peers is positively related to identified regulation ( $\beta = .15$ ,  $p < .05$ ), external regulation ( $\beta = .14$ ,  $p < .05$ ), and social adjustment ( $\beta = .31$ ,  $p < .01$ ), but negatively to depressive symptoms ( $\beta = -.20$ ,  $p < .01$ ). These symptoms are also negatively associated with emotional adjustment ( $\beta = -.26$ ,  $p = .02$ ). In addition, intrinsic motivation is positively related to both identified ( $\beta = .27$ ,  $p < .01$ ) and introjected regulation ( $\beta = .43$ ,  $p < .01$ ), but negatively to external regulation ( $\beta = -.14$ ,  $p < .05$ ) and amotivation ( $\beta = -.27$ ,  $p < .01$ ). Identified regulation is positively associated with both introjected

Second year of high school (Time 1)

Third year of high school (Time 2)

Fourth year of high school (Time 3)



**Figure 1.** Motivational mediation model of socioemotional adjustment ( $n = 407$ ). All standardised coefficients are statistically significant at  $p < .05$ , above and beyond gender, intimacy with peers, and depressive symptomatology.

( $\beta = .31$ ,  $p < .01$ ) and external regulation ( $\beta = .63$ ,  $p < .01$ ), but negatively with amotivation ( $\beta = -.54$ ,  $p < .01$ ). Positive relationships are observed between introjected and external regulation ( $\beta = .34$ ,  $p < .01$ ) and between emotional and social adjustment ( $\beta = .68$ ,  $p < .01$ ). Finally, being a girl is positively associated with depressive symptoms ( $\beta = .22$ ,  $p < .01$ ), intimacy with peers ( $\beta = .14$ ,  $p < .01$ ), and identified regulation ( $\beta = .13$ ,  $p < .05$ ), but negatively with PAv goals and emotional adjustment ( $\beta = -.18$ ,  $p < .01$ , and  $-.15$ ,  $p < .05$ , respectively).

### Mediation effects

The bootstrapping results revealed four statistically significant indirect effects, all involving emotional adjustment. Two of these mediation effects indicated that MAP goals predicted emotional adjustment through introjected regulation (95% CI =  $-0.24$  to  $-0.00$ ) and amotivation (95% CI =  $0.02$ – $0.23$ ), over and beyond the contribution of intimacy with peers, depressive symptoms, and gender. The first mediation pattern shows that MAP goals in Secondary 2 predicted higher levels of introjected regulation in Secondary 3. In turn, introjection negatively predicted emotional adjustment in Secondary 4. The second pattern revealed that students' MAP goals in Secondary 2 negatively predicted amotivation in Secondary 3, which in turn negatively predicted their emotional adjustment the following year.

The two other indirect effects indicate that PAv goals predicted emotional adjustment via introjected regulation (95% CI =  $-0.14$  to  $-0.00$ ) and amotivation

(95% CI =  $-0.11$  to  $-0.00$ ). These mediation effects show that PAv goals in Secondary 2 positively predicted students' introjected regulation and amotivation in Secondary 3, which in turn negatively predicted their level of emotional adjustment in Secondary 4.

## Discussion

The associations between students' achievement goals and their socioemotional adjustment in school have been understudied, and little is known about the underlying mechanisms. Hence, the main goal of this prospective study was to inspect the contribution of two specific achievement goals, MAp and PAv, to students' social and emotional adjustment in high school, as well as to test the mediating role of their academic motivations. Results indicated that introjection and amotivation in secondary 3 mediated the relationship from secondary 2 achievement goals to emotional adjustment in secondary 4, but no indirect effect was obtained for social adjustment, which was directly and negatively predicted by students' PAv goals. In addition, MAp goals positively predicted intrinsic motivation, identified regulation, and introjected regulation. They also negatively predicted amotivation. For PAv goals, positive associations were observed with academic motivations (intrinsic motivation, introjected regulation, external regulation, and amotivation), and negative associations with social and emotional adjustment. The next section examines the implications of these findings in light of achievement goals and self-determination theories.

### *Associations between achievement goals, motivational regulation types, and adjustment*

Based on the motivational literature, we hypothesised that MAp goals would predict stronger socioemotional adjustment through self-determined motivations (intrinsic motivation and identified regulation). Our results did not support this mediation hypothesis. As expected, high levels of MAp goals in Secondary 2 predicted higher levels of emotional adjustment in Secondary 4. However, this predictive relationship was explained by the mediating effect of amotivation in Secondary 3. Previous studies have shown that seeking to develop one's competence was associated with positive emotional adjustment in school (Tian et al., 2017) and that amotivation could alter the quality of that adjustment (Baker, 2004). The prospective sequence herein obtained suggests that mastery-oriented students cope more successfully with the stress of school life, not only because they enjoy their school experience and/or appreciate its importance, but because they are less likely to become amotivated. Given that MAp goals have been linked with positive indicators of academic engagement such as effort, persistence (Elliot et al., 1999), and the use of various cognitive strategies (Bong, 2009), it might be that these students are more likely to regulate their thoughts and actions in order to achieve the desired end (e.g. to be competent), and consequently, to spend more time reflecting on their reasons for attending school. Such efforts could translate into progress and success, along with feelings of emotional control, and hence boost confidence in their ability to handle the stresses of school life.

An unexpected indirect effect emerged where MAp goals predicted emotional adjustment through students' introjected regulation. This suggests that mastery-oriented motivation could hinder their emotional adjustment when they regulate their academic behaviours through internal strains (e.g. guilt, obligation). It is possible that this association reflects a propensity in certain mastery-approach oriented students to set and maintain high personal standards of competence (see, for example, Hanchon, 2010). This ambitious pursuit (e.g. mastering a difficult skill or task) could lead to frequent self-questioning and self-testing on academic objectives. When these students struggle to reach their self-imposed standards, they might become sensitive to negative emotions. Over time, these feelings could catalyse emotional and/or somatic problems at school.

As expected, PAv goals predicted low emotional adjustment through non-self-determined regulation (introjected regulation) and amotivation. These results concur with earlier findings that PAv goals predicts negative emotions in school (Pekrun et al., 2009). This is congruent with the fact that students striving to avoid appearing incompetent and who tend to compare themselves with others are less likely to report high perceived competence (Da Fonseca et al., 2004) or obtain high grades (Elliot & Church, 1997). On the one hand, these students, whose self-image and feelings of competence are often threatened, could be motivated to bolster their ego by proving to themselves that they are intelligent and accomplished at schoolwork (i.e. develop a stronger introjected regulation). However, because these efforts might not translate into academic success, they could experience negative feelings such as guilt and shame, which would gradually result in emotional problems. On the other hand, the profile for these students (low competence, low success) could undermine their academic motivation to the point where they might see no point in attending school (i.e. develop amotivation). This lack of purpose could be particularly anxiety-provoking and, as such, detrimental to their emotional adjustment.

Results also revealed that PAv goals in Secondary 4 predicted lower social adjustment 2 years later, regardless of their academic motivations. No study to date has reported a prospective relationship between these constructs. Certain characteristics commonly observed in students reporting high PAv goals might partly explain this result. Adding to their lack of engagement in schoolwork and weak academic performance (Elliot & Church, 1997), performance-avoidant oriented students would find it harder to win peer acceptance (Duchesne et al., 2017), and they might fall prey to negative emotions such as anger (Pekrun et al., 2009). Over time, this problematic academic functioning could make these students appear less attractive to their classmates (e.g. to do teamwork), which would lessen proximity relationships and increase feelings of isolation.

The results supporting the role of MAp goals in predicting self-determined motivations 1 year later are consistent with previous research (Bieg et al., 2017). They suggest that seeking to develop one's competence leads to the adoption of behaviours (e.g. making an effort) and attitudes (e.g. enthusiasm) during learning tasks that would promote positive outcomes, such as acquiring a desired skill or gaining positive recognition from peers and teachers. Such behaviours and attitudes could then become internalised, ultimately encouraging students to appreciate the importance of schooling.

Finally, two direct associations involved PAV goals, which positively but weakly predicted intrinsic motivation and external regulation. Although the relationship with intrinsic motivation contradicts what has been observed in university students (Elliot & Church, 1997), the relationship with external regulation was previously reported in high school students (Barkoukis et al., 2007). We believe that these results should be considered in light of the correlations obtained between the different motivation types. Thus, it appears that these motivations tend to coexist in students (see also Ratelle et al., 2007), although their significance may vary according to certain endogenous factors, such as individual achievement goals and assigned school tasks. Here, it is possible that students who strive to avoid appearing incompetent might engage more spontaneously and wholeheartedly in tasks that pose fewer threats to the ego. These would be simpler, more interesting tasks that they feel they could handle. Such tasks would provide opportunities for success, thus raising feelings of competence and at the same time increasing the enjoyment of the school experience (intrinsic motivation), as well as ambitions to succeed and ultimately to find a lucrative job (external regulation).

### ***Implications***

The overall pattern of the results of this study suggests that in order to facilitate social and emotional adjustment in high school students, it appears important to encourage learning practices that move away from fearing to appear of incompetence. Several researchers from the perspectives of achievement goal theory (Anderman & Patrick, 2012) and self-determination theory (Reeve, 2002; Ryan & Deci, 2017) recommended avoiding encouraging strategies that are based on performance (e.g. providing feedback that encourages social comparison) and control (e.g. using external rewards and punishments), which contribute to higher controlled motivation, disengagement from tasks, and negative feelings about school. The current knowledge argues for creating a learning environment that emphasises mastery, autonomy support, and structure. Such conditions promote the development of skills and abilities, allow students to express their views and feelings, and provide them with opportunities to make meaningful choices. Furthermore, they allow the establishment of a predictable framework for behavioural regulation, based on clearly stated and reasonable expectations, informative feedback, and appropriate consequences. We believe that these practices and their theoretical foundations should be taught in teacher training programmes, and more particularly in classroom management courses. Internships should be designed to allow future teachers to try out these methods in real-life settings, with experienced teachers on hand to provide feedback on their performance.

### ***Limitations and future research directions***

Although this study has several strengths (e.g. stratified sample, prospective design, sophisticated statistical analyses, control of potential confounding variables), some limitations need to be highlighted. First, the study design does not allow inferring causal relationships between the model constructs. Although it would be theoretically

legitimate to propose achievement goals as antecedents of the motivational regulation types (Elliot & Murayama, 2008), it is also logical to consider the inverse relationship (Harackiewicz et al., 2008). However, a recent prospective study supports our hypothesis by demonstrating that MAp goals predict intrinsic motivation, but not the inverse (Bieg et al., 2017). Further studies are needed to confirm the directionality of these associations. Second, the present study relies exclusively on self-report information, rendering the results liable to shared method variance. Future studies could benefit from a mixed-method approach with open interviews. Third, this study focussed on two types of achievement goals, MAp and PAv goals, which have received the most research attention. Further studies could enrich our tested model by integrating performance-approach and mastery-avoidance goals.

## Conclusion

In this prospective investigation, introjected regulation and amotivation emerged as key mediators of the temporal relationship between achievement goals (MAp and PAv) and emotional adjustment in high school. With respect to social adjustment, only PAv goals contributed to explaining a portion of the variance, after adjusting for control variables. These results have implications for teacher training: future teachers could learn how to target malleable factors such as motivational orientation in order to foster social integration and psychological well-being in high school students.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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