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Examining differential trajectories of engagement over the transition to secondary school: The role of perceived control

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Abstract

The present study was particularly interested in identifying resilient trajectories of engagement, and analyzing their association with student's motivation, specifically, their perceived control. In a longitudinal study following 391 students across three measurement points, encompassing the transition from 9th to 10th grade (from basic to secondary school), students' beliefs (control, effort capacity, and ability capacity beliefs), engagement, and academic achievement were assessed. Consistent with previous research, an overall decline in levels of engagement was found over this time, associated with perceived control. To uncover alternative pathways, latent class growth analysis was used, and three groups of students were identified based on their distinct engagement trajectories: (1) students whose engagement started high but decreased (high-decreasing engagement), (2) students who started at average levels and declined (average-decreasing engagement), and (3) students whose engagement started low but then increased (low-increasing engagement). Comparison of the three groups demonstrated that control beliefs play a critical role in reducing the normative rate of decline in engagement. The recovery trajectory (low-increasing engagement), which is of particular interest, showed smaller declines in control beliefs. Findings also suggest that effort capacity beliefs seem to protect engagement in the face of the challenges this group of lower performing students are likely to encounter. The emergence of the three distinct engagement groups is of special interest as it shows positive, counter-normative changes in engagement trajectories. The observed changes in engagement, motivation, and achievement of the potentially at-risk students (low-increasing engagement group) suggest that these students may be especially sensitive to a supportive and engaging academic environment.

Keywords

Students' engagement, differential trajectories of engagement, perceptions of control, motivation, recovery paths

Students' engagement, which refers to the quality of their active involvement and participation in school-based activities, is a positive force in the healthy development of children and youth and may act as a protective factor from multiple risks (Li, Lerner, & Lerner, 2010; Wang & Fredricks, 2014). At the more general school level, it can be seen as the participation in school activities and a sense of belonging to school, which have been associated with positive school outcomes, such as retention and graduation (Bohnert, Fredricks, & Randall, 2010; Rumberger & Rotermund, 2012). At the more specific classroom level, students' engagement concerns their involvement within academic activities. In this latter sense, academic engagement refers to students' enthusiastic, cognitively focused, participation in learning activities and comprises a key component of the learning process (Boekaerts, 2016; Fredricks, Filsecker, & Lawson, 2016; Skinner, Kindermann, Connell, & Wellborn, 2009).

Over the last several decades, research has documented the role of engagement and its effects on student learning and persistence, long-term achievement, and educational success (for a review, see Fredricks, Blumenfeld, & Paris, 2004). There is robust evidence showing that sustained engagement is a positive force in students' learning and academic functioning (Christenson, Reschly, & Wylie, 2012; Dotterer & Lowe, 2011; Skinner, Furrer, Marchand, & Kindermann, 2008; Upadyaya & Salmela-Aro, 2013; Wigfield et al., 2015). Prior studies have also shown that students' engagement versus disaffection can act as a resource or as a hindrance to adaptive coping in the face of challenging academic tasks (Skinner, Pitzer, & Steele, 2016). Moreover, engagement is conceptualized as malleable and responsive to context and personal endeavors. As a result, researchers are very interested in identifying the contextual and personal factors in play and examining the way they operate to foster engagement and learning.

Pathways of Engagement Over Time[AQ3]

Research on academic engagement has consistently shown that, in general, students experience steady declines in engagement from

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primary school and continuing decreases over the course of high school, which may be more marked across school transitions (for a review, see Fredricks et al., 2004; Skinner et al., 2008; Upadyaya & Salmela-Aro, 2017; Wigfield et al., 2015). Furthermore, individual trajectories of students' engagement tend to persist on the same trajectory across time. Thus, the steady intraindividual declines evidenced in research may be particularly critical for students who are low in engagement. They risk reaching severe levels of alienation from learning tasks, which accrues vulnerability when dealing with academic demands. For these at-risk students, such cumulative disadvantage may contribute to mutually reinforcing processes of school failure, undermining competence self-beliefs. Consequently, their relative position may be difficult to change over time.

Although several cross-sectional and longitudinal studies confirm these age-related differences and changes, few longitudinal studies have investigated whether and how these trajectories of school engagement may vary among student subpopulations (Eccles & Wang, 2012; Janosz, Archambault, Morizot, & Pagani, 2008; Li & Lerner, 2011; Upadyaya & Salmela-Aro, 2017). Studying the course of students' engagement within subgroups is of particular interest, because it can provide important insights into the factors that may mitigate the normative trend of progressive disaffection or even facilitate recovery from low levels of engagement.

Competence Beliefs and Engagement

One possible factor that may protect students from declines in engagement is perceived competence, a self-appraisal that is centrally important in the school context. Competence refers to the need to experience oneself as effective in achieving desired outcomes (Skinner & Belmont, 1993). Expectancy-value theory (Eccles, 2004) and self-determination theory (SDT; Deci & Ryan, 2000) both highlight perceptions of academic competence as key determinants of students' engagement with academic tasks and with school.

Expectancy-value theory (Eccles, 2004) proposes that school engagement derives from an interaction between individual motivational characteristics, such as students' academic self-concept (and subjective task values), and the school context. Indeed, Wang and Eccles (2013) showed that these motivational beliefs (academic self-concept) acted as a mediating mechanism in the association between school environment and students' engagement. Studies have consistently shown both concurrent and predictive associations between perceived competence and engagement over the school years. Research has thoroughly documented students' confidence in their personal academic ability as a robust predictor of school engagement, task involvement (Eccles & Wigfield, 2002; Pintrich, 2003; Pintrich & Schunk, 2002), and students' learning and academic success (see Bandura, 1997; Dweck, 2002). This link may be established very early, starting in the primary grades (Valeski & Stipek, 2001).

Building on SDT's integrated conceptualization of basic psychological needs (Connell & Wellborn, 1991; Deci & Ryan, 2000), the self-system model of motivational development (Connell, 1990) takes into account how contextual and personal assets may influence engagement and subsequent learning. Studies based on this framework have accumulated evidence on the effects of supportive or non-supportive classroom contexts in promoting or undermining self-perceptions, which in turn shape the development of engagement or disaffection with learning activities (Skinner et al., 2008). Conversely, control beliefs can also be affected by performance, since overall success expectancies and personal beliefs about access to specific means can be built on perceptions of past performance (Skinner & Greene, 2008; Skinner, Zimmer-Gembeck, & Connell, 1998). For example, in a time series study, Schmitz and Skinner (1993) documented reciprocal relationships, showing a sequence of control beliefs-effort-performance-beliefs cycles[AQ4]. Thus, competence beliefs and engagement appear to be closely related, influencing one another over time. The development of this dynamic motivational system may contribute to self-perpetuating trajectories in motivational resources and in engagement.

To gain an in-depth understanding of the nature and role of competence self-perceptions in the dynamics of motivation, multiple kinds of beliefs have been considered. A multidimensional conceptualization of competence beliefs (Connell, 1990; Skinner, Wellborn, & Connell, 1990) involves control beliefs (the general belief that one can succeed), strategy beliefs (interpretations of what it takes to do well), and capacity beliefs (beliefs about personal access to specific resources). Studies that used the multidimensional conception have shown that control and capacity beliefs are more powerful in influencing engagement, based on their regulatory effect on action (see Skinner et al., 1998).

The Current Study

The current study examined normative trajectories of student engagement over the transition from 9th to 10th grade, and its associations with trajectories of perceived control. In addition to the expected normative/typical declining trend shared by a large number of students, this study also explored unexpected engagement pathways that may be exhibited by subgroups of students. By identifying differential trajectories and their determinants, this study contributes to a better understanding of the development of adolescents' engagement in school. We were particularly interested in identifying resilient trajectories, as well as the factors associated with weaker declines or even recovery from initially low levels of engagement.

Three goals were addressed. First, we used latent growth analysis to investigate the engagement trajectories of the overall sample and to examine whether initial levels and trajectories of perceived control (control beliefs, effort capacity, and ability capacity) were associated with engagement growth estimates. A normative decline in engagement over time was expected, according to a large body of previous research (Fredricks et al., 2004; Skinner et al., 2008; Wigfield et al., 2015). Moreover, both concurrent and predictive associations between students' perceived competence and engagement over the school years were also anticipated, considering that students with higher confidence in their academic ability show higher concomitant and subsequent involvement in academic tasks (Eccles & Wigfield, 2002; Pintrich, 2003; Pintrich & Schunk, 2002), which in turn promote positive self-perceptions.

Second, we used latent class growth analysis (LCGA) to address both the need for longitudinal research explaining changes in engagement over time and the need to differentiate students who become more or less engaged (Fredricks et al., 2004). To shed light

upon these interindividual differences, we adopted a person-centered approach aiming to identify subgroups of students based on their distinct engagement trajectories. Based on previous research (Janosz et al., 2008; Li & Lerner, 2011; Upadyaya & Salmela-Aro, 2017), it was expected that non-normative patterns of engagement trajectories might be detected (i.e., subgroups showing slower rates of decline or even recovery).

Third, we tested whether groups of students who exhibited distinct engagement trajectories also differed in their initial levels or growth of perceived control. Based on past research, it was expected that subgroups showing different engagement trajectories would also differ on motivation-related variables such as control beliefs (Skinner et al., 1998, 2008; Wang & Eccles, 2013). Most importantly, this study can help explore the extent to which motivational processes may act as personal resources that buffer students against normative declines in engagement, thereby informing the design for targeted interventions.

Method

Participants

Participants were recruited from public schools in the north region of Portugal, one of the most populated areas of the country. There was a total of 391 students (50% girls), for whom data from at least two measurement points were available. The number of students who participated at each time point was 387 at T1, 380 at T2, and 321 at T3. Students' age ranged from 13 to 14 at the first measurement point.

Measures

Academic engagement. Teachers reported on students' academic engagement by completing a questionnaire adapted from Skinner, Wellborn, and Connell (1990; Skinner et al., 1998). Engagement was assessed as the quality of students' participation with learning activities in the classroom (Skinner et al., 1990). We used a 7-item 3-point Likert-type scale capturing an overall aggregate engagement, encompassing behavioral and emotional indicators of engagement, including both positive and negative instances. Behavioral engagement involves students' effort, attention, and persistence while initiating and participating in learning activities (e.g., "In my class, this student works as hard as he or she can"); behavioral disaffection entails students' lack of effort and withdrawal from learning activities while in the classroom (e.g., "In my class, this student does just enough to get by"); emotional engagement captures emotions indicating motivated involvement during learning activities (e.g., "In my class, this student is enthusiastic"); emotional disaffection captures students' emotions indicating motivated withdrawal or alienation during learning activities (e.g., "In my class, this student is bored").

We used confirmatory factor analysis to test the model fit of a one-factor model aggregating the 7 items. The overall model fit was assessed using the χ^2 statistic, the root mean square error of approximation (RMSEA), the comparative fix index (CFI), the Tucker–Lewis index (TLI), and the standardized root mean square residual (SRMR). Values lower than .05 for RMSEA, greater than 0.95 for TLI and CFI, and lower than .08 for SRMR indicate good model fit (Hu & Bentler, 1999; MacCallum, Browne, & Sugawara, 1996). A RMSEA value between .05 and .08 indicates fair fit and between .08 and .10 indicates mediocre fit according to this index (MacCallum et al., 1996). The one-factor model provided adequate fit at T1 ($\chi^2(12) = 78.674$, $p < .001$; CFI = 0.972; TLI = 0.950; SRMR = .024), T2 ($\chi^2(12) = 28.522$, $p = .0046$; CFI = 0.993; TLI = 0.989; SRMR = .011), and T3 ($\chi^2(12) = 29.277$, $p = .0036$; CFI = 0.980; TLI = 0.965; SRMR = .026). In all models, factor loadings were above .65.

Cronbach's α coefficients were .94 at T1, .95 at T2, and .91 at T3. Next, we examined the extent to which the factor structure remained invariant across time (Vandenberg & Lance, 2000). Metric invariance was supported ($\chi^2(169) = 358.459$, $p < .001$; CFI = 0.970; TLI = 0.963; RMSEA = .054; SRMR = .053; $\Delta\chi^2(10) = 13.40$, $p = .202$) after releasing the factor loadings for one item, which is considered acceptable to establish metric invariance (Van de Schoot, Lugtig, & Hox, 2012). These results confirmed the invariance of the model of classroom engagement across time. Whereas researchers have proposed multidimensional models of engagement, namely, differentiating engagement and disaffection (e.g., Martin, 2013), as well as behavioral, cognitive, and emotional engagement (see Fredericks, 2004**[AQ5]**), it is plausible that teacher-reported student engagement emerges as a unidimensional construct, since teachers base their judgement of student engagement on more observable indicators, with ratings of student emotional engagement converging with their behavioral engagement.

Control beliefs. Control beliefs were assessed using the Portuguese version (Lemos & Gonçalves, 1998) of the Control, Agency, and Means-Ends Interview instrument (Skinner, Chapman, & Baltes, 1988), which was developed based on an action-theoretical framework and focuses on several aspects of control, namely, control expectancies, capacity beliefs, and strategy beliefs. For the purposes of the present study, the scales for effort capacity, ability capacity, and control beliefs were used. Effort capacity (4 items; example item "Do you try as hard as you can in school?") represents beliefs about the self's access to effort, and ability capacity (4 items; example item "If you want to do well in school, can you?") represents beliefs about the self's access to ability as potentially effective means to positive performance outcomes. Control beliefs (4 items; example item "If you decide to learn something really hard, can you do it?") represent general beliefs about the capability to obtain positive performance outcomes. Students answered on a 4-point Likert-type response scale ranging from *almost never*, through *not very often* and *often*, to *almost always*. Internal consistencies at the three time points were acceptable, ranging from .72 to .83.

Academic achievement. At each time of measurement, semester grades for Portuguese language and Mathematics were collected and averaged to form an index of academic performance, ranging from 1 to 5.

Procedures

After informed consent for data collection was obtained, students answered the school-related control beliefs questionnaire in their classrooms. Teachers reported on students' engagement, and students' academic achievement was retrieved from the school records. Data were collected at three time points, at the beginning (T1: 4–5 weeks into the school year) and at the end of the 9th grade (T2: 4–5 weeks before the end of the school year), and at the

Table 1. Correlations, Means, and Standard Deviations for the Study Variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	*M*	*SD*	Min.	Max.
1. Engagement T1															2.29	.60	1.00	3.00
2. Engagement T2	.79**														2.14	.65	1.00	3.00
3. Engagement T3	.40**	.47**													2.28	.67	1.00	3.00
4. Control beliefs T1	.48**	.49**	.32**												3.02	.64	1.25	4.00
5. Control beliefs T2	.48**	.52**	.22**	.61**											3.00	.65	1.00	4.00
6. Control beliefs T3	.31**	.31**	.19**	.48**	.48**										3.00	.54	1.25	4.00
7. Effort capacity beliefs T1	.17**	.16**	.21**	.20**	.13**	.15**									3.05	.51	1.50	4.00
8. Effort capacity beliefs T2	.16**	.16**	.12	.14**	.27**	.08	.46**								2.98	.58	1.00	4.00
9. Effort capacity beliefs T3	.13*	.09	.23**	.14*	.13*	.31**	.44**	.44**							3.01	.50	1.25	4.00
10. Ability capacity beliefs T1	.40**	.45**	.35**	.62**	.51**	.38**	.12*	.05	.05						2.61	.63	1.00	4.00
11. Ability capacity beliefs T2	.40**	.41**	.30**	.53**	.66**	.41**	.06	.19**	.12*	.59**					2.62	.66	1.00	4.00
12. Ability capacity beliefs T3	.31**	.33**	.22**	.50**	.40**	.56**	.03	.01	.23**	.52**	.58**				2.64	.52	1.50	4.00
13. Academic achievement T1	.67**	.71**	.49**	.55**	.53**	.31**	.03	.07	.09	.48**	.49**	.40*			3.04	.76	1.00	5.00
14. Academic achievement T2	.65**	.78**	.55**	.51**	.50**	.34**	.05	.11	.14*	.47**	.48**	.37**	.86**		3.22	.82	1.50	5.00
15. Academic achievement T3	.50**	.54**	.60**	.43**	.36**	.34**	.13*	.08	.19**	.42**	.34**	.45**	.63**	.70**	3.08	.71	1.50	5.00

Note. $N = 391$.
*$p < .05$. **$p < .01$.

beginning of the 10th grade (T3: 4–5 weeks into the school year), following the same procedure.

Analytic Strategy

To address our first research goal, a growth model was estimated to examine normative change in student engagement over time. Latent growth models were also estimated for control beliefs, effort capacity, and ability capacity. A series of conditional models were then estimated in which the slope of each variable was regressed on the initial levels of the other variables to examine whether initial levels and growth of control beliefs, effort capacity, and ability capacity were associated with both the intercept and slope of the engagement trajectories.

To answer our second research question, LCGA was used to identify subgroups of students who exhibited distinct engagement trajectories across the three time points. The LCGA estimates different growth trajectories based on differences in growth parameter means (i.e., intercept and slope) and individuals are classified based on their likelihood of class membership (Nylund, Asparouhov, & Muthén, 2007). No variation in the intercept or slope is allowed within classes. To determine the optimal number of latent classes, LCGA models with varying numbers of trajectory classes were estimated. The optimal number of classes was selected based on several criteria: (1) statistical tests of relative fit, namely, Akaike's information criterion, the Bayesian information criterion (BIC), the sample-size-adjusted BIC, with lower values indicating a better fitting model; (2) interpretability and parsimony; and (3) classification quality, using the entropy statistic, which estimates the membership probability for a given class as compared to the other classes (Muthén & Muthén, 2000). Finally, group differences in perceived control were examined through a series of models in which groups were compared on initial levels and growth estimates of the perceived control subscales.

All models were fit using Mplus version 7 (Muthén & Muthén, 1998–2015). In order to account for missing data, all analyses were conducted using full information maximum likelihood procedures, which use all available information to estimate the model parameters and are considered an adequate method to handle missing data (Enders, 2001).

Results

Descriptive Statistics and Correlations Among Study Variables

Table 1 presents the means, standard deviations, and correlations for the study variables. Students generally had moderate levels of engagement at each time point. Engagement was moderately to strongly correlated across time points, as well as with most indicators of perceived control and achievement, especially within the same school year. Control beliefs, effort capacity, and ability capacity were positively correlated with concurrent engagement levels at each time point. The relationships between students' perceived control and engagement could be considered particularly robust given that students' engagement was rated by their teachers, instead of relying exclusively on students' self-reports.

Latent Growth Analyses

The latent growth model for engagement fit the data well ($\chi^2(1) = 1.515$, $p = .218$; CFI = 0.999; TLI = 0.996; RMSEA = .036 (90% confidence interval [CI] = [0.000, 0.145]); SRMR = .035). On average, the intercept was 2.29, $p < .001$ with a negative linear growth over time (slope = −0.106, $p < .001$). There was significant individual variability in intercepts ($\sigma^2 = .377$, $p < .001$) and slopes ($\sigma^2 = .056$, $p = .008$). Slopes and intercepts were negatively correlated ($r = -.498$), indicating that students with higher initial levels of engagement generally had more negative slopes.

The latent growth models testing change in the perceived control subscales over the three measurement points revealed that control beliefs also showed a negative linear slope over time (slope = −0.04, $p < .05$), whereas slopes for effort capacity and ability capacity beliefs were not significantly different from zero (see Table 2). In the next series of models, associations between the trajectory of engagement and trajectories of control beliefs, effort capacity, and ability capacity were estimated. Results are presented

Table 2. Model Estimates for Latent Growth Models of Perceived Control Subscales and Change-To-Change Models.

	Intercept		Slope					RMSEA
	B	95% CI	*B*	95% CI	χ^2	CFI	TLI	90% CI
Latent growth models (unconditional)								
Control beliefs	3.03***	[2.94, 3.11]	−0.04*	[−0.08, 0.00]	0.00	1.00	1.00	.00 [0.00, 0.00]
Effort capacity	3.03***	[2.97, 3.10]	−0.02	[−0.06, 0.02]	3.60	0.986	0.958	.08 [0.00, 0.18]
Ability capacity	2.61***	[2.53, 2.69]	−0.00	[−0.04, 0.04]	0.15	1.00	1.00	.00 [0.00, 0.09]
Change-to-change models								
Control beliefs and engagement					12.79	0.993	0.985	.05 [0.00, 0.08]
Control beliefs	3.03***	[2.94, 3.11]	0.07	[−0.04, 0.18]				
Engagement	2.29***	[2.21, 2.37]	−0.24*	[−0.56, −0.07]				
Effort capacity and engagement					7.81	1.00	1.00	.00 [0.00, 0.06]
Effort capacity	3.04***	[2.97, 3.10]	−0.02	[−0.12, 0.07]				
Engagement	2.29***	[2.21, 2.37]	−0.16	[−0.61, 0.30]				
Ability capacity and engagement					6.66	1.00	1.00	.00 [0.00, 0.05]
Ability capacity	2.61***	[2.53, 2.69]	0.05	[−0.05, 0.15]				
Engagement	2.29***	[2.21, 2.37]	−0.39*	[−0.67, −0.11]				

Note. $N = 391$. RMSEA = root mean square error of approximation; CFI = comparative fix index; TLI = Tucker–Lewis index; CI = confidence interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

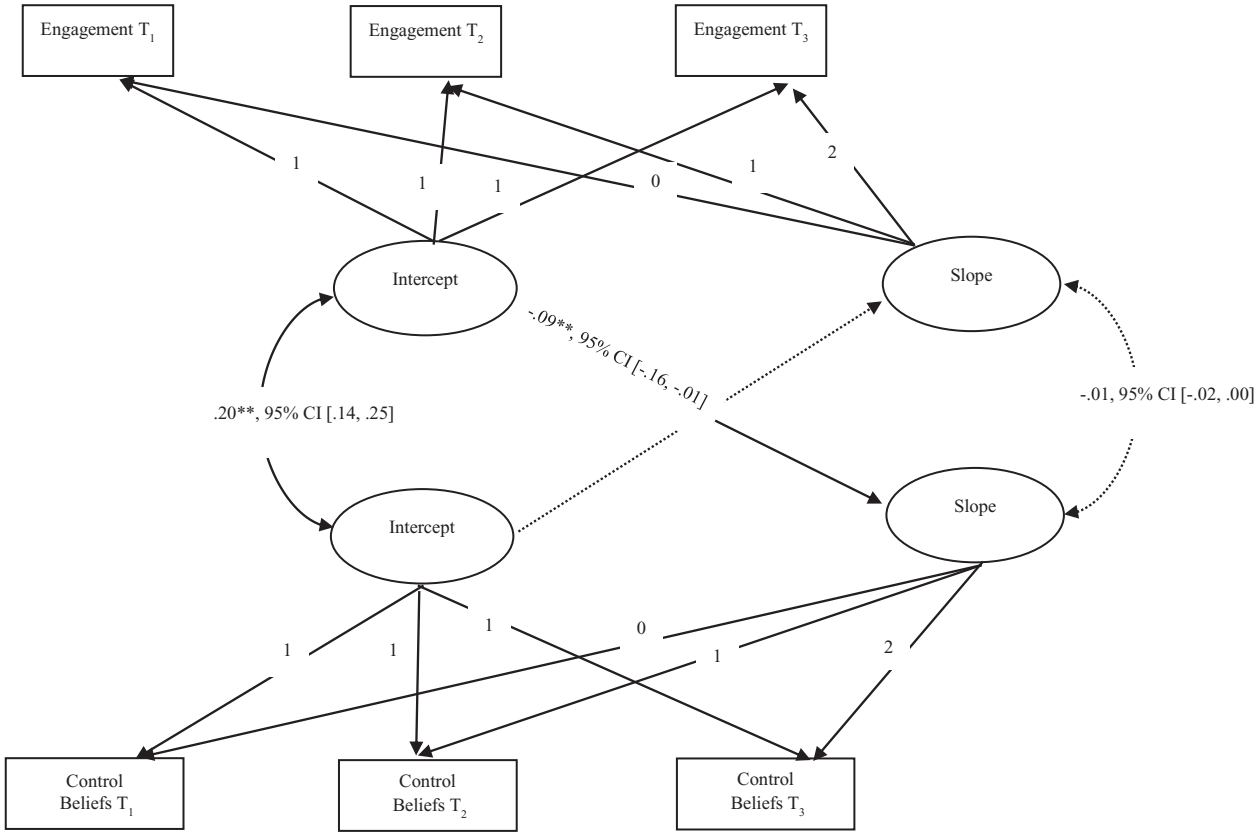

Figure 1. Unstandardized Coefficients From the Conditional Model Testing Associations Between Growth Estimates for Control Beliefs and the Engagement Growth Estimates.
Note. $N = 391$.
*$p < .05$. **$p < .01$. ***$p < .001$.

in Figures 1, 2, and 3, respectively, and summarized in Table 2. Initial levels of control beliefs, effort capacity, and ability capacity beliefs were all positively associated with initial levels of engagement. In addition, ability capacity beliefs were positively associated with the slope of engagement ($\beta = 0.11$, $SE = 0.04$, $p = .010$), indicating that students with higher initial levels of ability capacity beliefs also showed a slower decline in engagement over time (see Figure 3). Initial levels of engagement were negatively associated

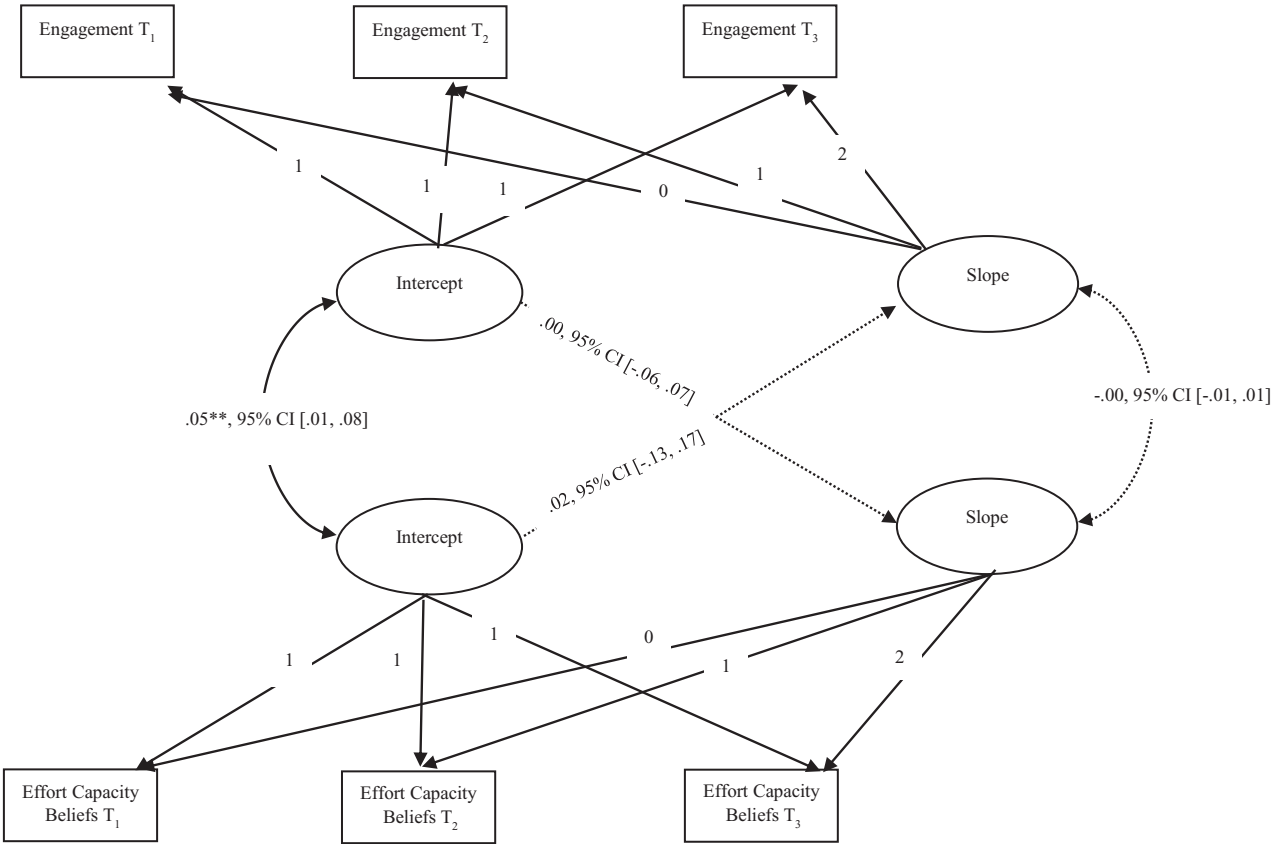

Figure 2. Unstandardized Coefficients From the Conditional Model Testing Associations Between Growth Estimates for Effort Capacity Beliefs and the Engagement Growth Estimates.
Note. $N = 391$.
*$p < .05$. **$p < .01$. ***$p < .001$.

with control beliefs ($\beta = 0.09$, $SE = 0.03$, $p = .003$), indicating that students with higher levels of engagement at T1 also showed greater decline in control beliefs over the next year (see Figure 1).

Identifying Subgroups With Different Trajectories of Engagement

LCGA was used to identify subgroups of students who exhibited distinct engagement trajectories. To identify the optimal number of classes, models with varying numbers of classes were estimated. According to the model-fitting statistics (see Table 3), the four-class model best represented the data; however, we selected the three-class model as the most parsimonious, because the model with four classes had convergence problems, indicating overextraction of classes (Nylund et al., 2007) and signaling that three classes were sufficient to account for heterogeneity in engagement trajectories. Moreover, the additional class only accounted for a small percent of the total sample size. The three-class model had adequate classification quality and the model-fitting statistics indicated improved fit compared to the two-class model.

Figure 4 shows the estimated engagement trajectories from the three-class solution and Table 4 shows the parameter estimates. About half the sample (51.7%, $n = 202$) was characterized by relatively high levels of engagement at baseline, and a significant and negative slope mean indicating a decrease in engagement over time, so it was designated as the high-decreasing engagement group. The second class (27.6%, $n = 108$), designated as the average-decreasing engagement group, was characterized by moderate levels of engagement at baseline, and a significant linear decrease over time, as indicated by the negative slope mean. The third class (20.7%, $n = 81$), designated as the low-increasing engagement group, was characterized by generally low levels of engagement at baseline that significantly increased over time, as indicated by the positive slope mean.

Students' characteristics in the three groups. As depicted in Table 5, the three groups display contrasting levels of engagement at T1 and T2, but show a tendency to greater convergence over time. Importantly, the increase in engagement of the low-increasing group was substantial as these students developed from being low in engagement at the beginning of the 9th grade to moderate at the beginning of the 10th grade, catching up with both the average- and the high-decreasing groups at T3. Thus, students in the low-increasing trajectory seem a truly resilient group, who show increasing tendencies of recovery from low levels of academic engagement when they move from 9th to 10th grade. By contrast, the high-decreasing group suffered a decline in engagement over time, even though these students still ended at a moderate to high level.

Regarding academic achievement, as expected, the high-decreasing group had higher grades compared to the other groups

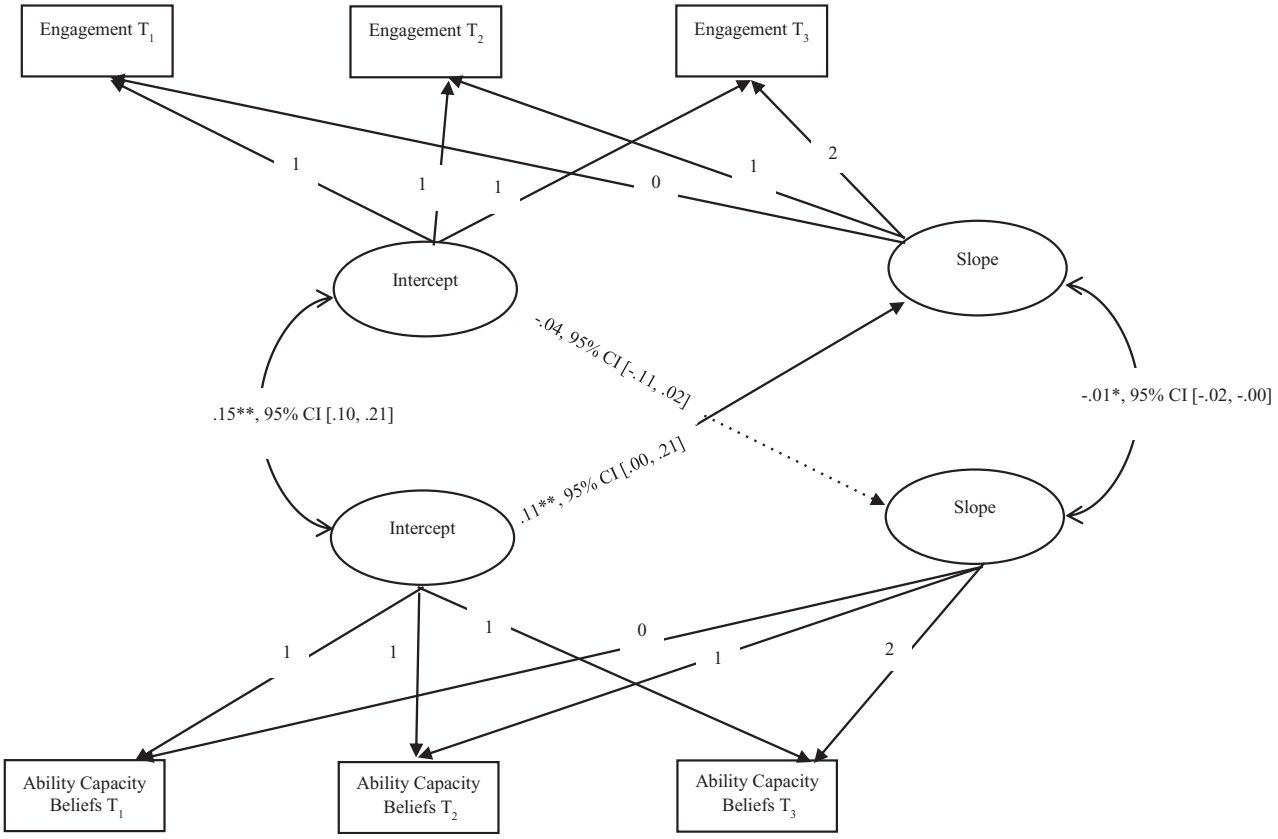

Figure 3. Unstandardized Coefficients From the Conditional Model Testing Associations Between Growth Estimates for Ability Capacity Beliefs and the Engagement Growth Estimates.
Note. $N = 391$.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3. Model-Fitting Statistics for the Latent Class Growth Model.

	Free parameters	AIC	BIC	Sample-size-adjusted BIC	Entropy
Two class	11	1,350.411	1,394.067	1,359.164	.810
Three class	14	1,300.184	1,355.746	1,311.324	.841
Four class	17	1,270.707	1,338.175	1,284.235	.877

Note. $N = 391$. AIC = Akaike information criterion; BIC = Bayesian information criterion.

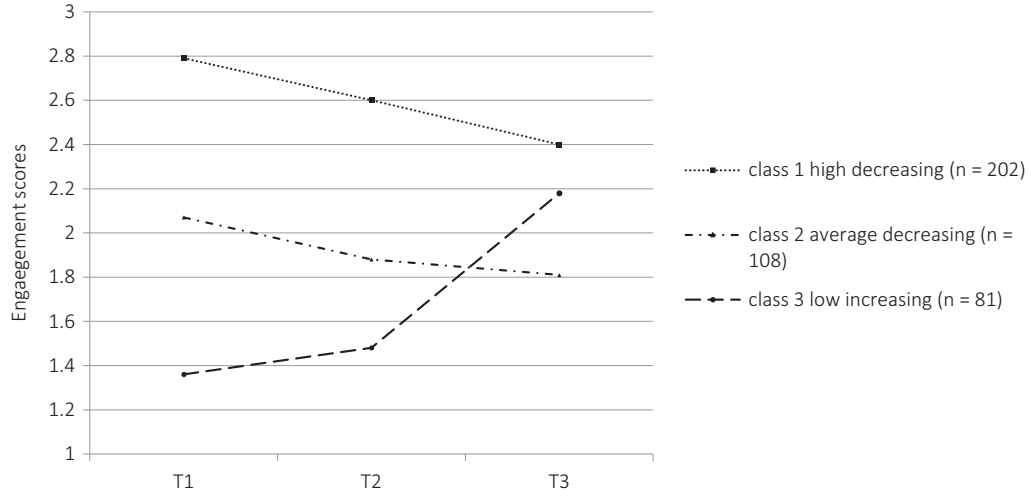

Figure 4. Estimated Values for Each Class Identified in the Three-Class LCGA.
Note. LCGA = latent class growth analysis.

Table 4. Parameter Estimates for the Three-Class LCGA Model.

	B	95% CI
Class 1 (high-decreasing engagement)		
Intercept mean	2.78*	[2.73, 2.84]
Slope mean	−0.18*	[−0.25, −0.12]
Class 2 (average-decreasing engagement)		
Intercept mean	2.06*	[1.93, 2.20]
Slope mean	−0.16*	[−0.27, −0.05]
Class 3 (low-increasing engagement)		
Intercept mean	1.35*	[1.24, 1.46]
Slope mean	0.17*	[0.05, 0.29]

Note. $N = 391$. LCGA = latent class growth analysis; CI = confidence interval. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 5. Estimated Means and Standard Errors of Engagement and Academic Achievement for the Three Engagement Groups.

	High-decreasing		Average-decreasing		Low-increasing	
	M	95% CI	*M*	95% CI	*M*	95% CI
Engagement						
Time 1	2.79^a	[2.75, 2.82]	2.07^b	[2.02, 2.11]	1.36^c	[1.29, 1.42]
Time 2	2.60^a	[2.51, 2.68]	1.88^b	[1.76, 2.01]	1.48^c	[1.37, 1.61]
Time 3	2.40^a	[2.26, 2.54]	1.81^b	[1.56, 2.06]	2.19^a	[1.79, 2.58]
Academic achievement						
Time 1	3.40^a	[3.26, 3.54]	2.71^b	[2.57, 2.85]	2.30^c	[2.15, 2.45]
Time 2	3.62^a	[3.47, 3.77]	2.80^b	[2.66, 2.95]	2.48^c	[2.34, 2.62]
Time 3	3.34^a	[3.20, 3.47]	2.81^b	[2.66, 2.96]	2.59^c	[2.39, 2.78]

Note. $N = 391$. Different superscripts within each row indicate statistically significant differences. Estimations based on multigroup analyses using Mplus through statistically significant differences in model fit χ^2 changes. CI = confidence interval.

at all data collection time points. Similarly, even though the grades of the low-increasing group increased over time, the average group still had higher grades than the low-increasing group at all three time points (see Table 5). Interestingly, the proportion of girls in each group was similar ($\chi^2(2) = 0.068$, $p = .966$).

Group differences in perceived control. The last set of analyses examined whether students in the three groups differed in terms of their initial levels and slopes of perceived control. The low-increasing engagement group was used as the reference category because we were particularly interested in investigating how students who show increasing trends in engagement differ from students who show normative declines. The results are presented in Table 6.

For control beliefs, the model had good model fit ($\chi^2(3) = 4.915$, $p = .178$; CFI = 0.995; TLI = 0.985; RMSEA = .040 (90% CI = [0.000, 0.102]); SRMR = .036). The results from the model revealed that the low-increasing engagement group had significantly lower initial levels of control beliefs, compared both to the high group ($\beta = 0.723$, $SE = 0.075$, $p < .001$) and the average group ($\beta = 0.315$, $SE = 0.084$, $p < .001$). However, the trajectory of control beliefs differed between the low-increasing engagement group and the high-decreasing group ($\beta = -0.111$, $SE = 0.043$, $p < .001$), indicating that the low-increasing group did not suffer a decline in control beliefs over time, whereas the high group did.

Table 6. Comparisons Between the Engagement Groups on the Intercepts and Slopes of Perceived Control Subscales.

	Intercept		Slope	
	B	95% CI	*B*	95% CI
	Control beliefs			
Low-increasing versus				
High-decreasing	0.72***	[0.53, 0.92]	−0.11*	[−0.22, 0.00]
Average-decreasing	0.32***	[0.10, 0.53]	−0.03	[−0.16, 0.09]
	Effort capacity beliefs			
Low-increasing versus				
High-decreasing	0.10	[−0.07, 0.27]	0.04	[−0.07, 0.14]
Average-decreasing	−0.14*	[−0.33, 0.00]	0.09	[−0.03, 0.20]
	Ability capacity beliefs			
Low-increasing versus				
High-decreasing	0.51***	[0.31, 0.71]	−0.04	[−0.14, 0.07]
Average-decreasing	0.16	[−0.06, 0.38]	0.02	[−0.10, 0.14]

Note. $N = 391$. CI = confidence interval.
*$p < .05$. **$p < .01$. ***$p < .001$.

Regarding effort capacity beliefs, model fit was also adequate ($\chi^2(3) = 9.99$, $p = .019$; CFI = 0.966; TLI = 0.897; RMSEA = .077 (90% CI = [0.000, 0.102]); SRMR = .023). Interestingly, the low-increasing engagement group showed higher initial levels compared to the average-decreasing engagement group ($\beta = -0.141$, $SE = 0.073$, $p = .049$). No other differences between groups were found. Finally, concerning ability capacity beliefs, the low-increasing engagement group started with lower initial levels of ability beliefs compared to the high-decreasing engagement group ($\beta = 0.510$, $SE = 0.077$, $p < .001$). No other differences were found. Model fit was also adequate ($\chi^2(3) = 5.081$, $p = .166$; CFI = 0.994; TLI = 0.983; RMSEA = .042 (90% CI = [0.000, 0.103]); SRMR = .026).

Discussion

This investigation had three main aims: (1) to map the normative trajectory of students' engagement over the transition from 9th to 10th grades, and to examine whether trajectories of perceived control were associated with trajectories of engagement, (2) to identify specific groups of students based on their distinct engagement trajectories, and (3) to determine whether students from these differing engagement trajectory groups also differed on their initial levels and growth in perceived control (i.e., control, effort capacity, and ability capacity beliefs).

There are several limitations of this study that should be acknowledged. First, this study is correlational and, as such, causal inferences cannot be drawn. Second, participants were not randomly selected and were from one region of Portugal, thus preventing the generalization of the results. Third, this study used a unidimensional measure of engagement. Although the measure fitted the data well, possibly because it was based on teacher reports, further research using a multidimensional measure of engagement will allow the examination of whether different dimensions of engagement show different normative trajectories, are correlated with different motivational appraisals, or lead to the formation of different subgroups. Finally, considering the exploratory nature of this study, the finding of a counter-normative pattern

of increasing engagement should be replicated in further research. Results should be interpreted in light of these caveats.

In general, students had moderate levels of engagement at each time point, but a statistically significant trend indicating decreases in engagement throughout these school years was observed. These results are in line with previous research findings consistently showing progressive declines in engagement over time (for a review, see Skinner et al., 2008; Wang & Eccles, 2013; Wigfield et al., 2015). The confirmation of this decline is troubling, considering the importance of engagement as a desirable educational outcome in itself. Moreover, engagement is critical to teaching and learning (Wang & Eccles, 2013), given its links with self-regulated learning (e.g., Boekaerts, Pintrich, & Zeidner, 2000), and its predictive value for later school success (e.g., Alexander, Entwisle, & Dauber, 1993; Chase, Hilliard, Geldhof, Warren, & Lerner, 2014; Wang & Eccles, 2013; Wang & Holcomb, 2010).

Multiple Trajectories

However, even though the norm for the entire sample was a decline in levels of engagement over time, three specific trajectories were identified, capturing important differences in student's engagement: one high-decreasing, one average-decreasing, and one low-increasing trajectory. This finding provided a more nuanced description of the dynamics of engagement at these grade levels, emphasizing the contribution of a person-oriented approach to better understanding of subgroups of students. Specifically, the high-decreasing engagement group represented about half of the students (51.7%) and was characterized by relatively high levels of engagement at T1, and a significant decrease over time. This group closely mirrors the normative decline trajectory described in the literature (Wigfield et al., 2015). It consisted of students who had relatively high grades (higher grades than the other two groups). The average group represented about a quarter of the students (27.6%) and was characterized by moderate levels of engagement at T1, and a significant, but less than normative, decrease over time. It consisted of students who had moderate grades (significantly higher than Group 3 at T1 and T2). Similar to Janosz, Archambault, Morizot, and Pagani's (2008) findings, most of the students belong to these two moderate to high trajectories of school engagement.

The low-increasing engagement group represented about 20% of the students and was characterized by generally low levels of engagement at baseline that significantly increased over time. We refer to this group of students as resilient in light of their capacity to achieve positive engagement despite previous poor academic experiences, which would theoretically lead to self-perpetuating negative cycles. Instead, this group showed an unexpected positive change in their trajectory, avoiding or even overcoming the negative outcomes associated with their initial engagement pattern. These students had modest grades (significantly lower than both the other two groups at all measurement points), but who recover in engagement, catching up with the average group and even the high-decreasing group at T3. Hence, the current study supports the proposition that school disaffection is not necessarily a process of progressive disengagement that unfolds inexorably over the course of middle and secondary school years. The emergence of the three distinct engagement groups is of special interest as it highlights the possibility of positive, counter-normative changes in engagement trajectories.

The differences observed in academic achievement among the three groups echo the positive relationship between engagement and achievement-related outcomes found in other studies (Christenson et al., 2012; Dotterer & Lowe, 2011; Skinner et al., 2008; Upadyaya & Salmela-Aro, 2013). Importantly, recent research has shown that school engagement and academic achievement are reciprocally linked (Chase et al., 2014; Li et al., 2010). The proportion of girls and boys in each group was similar. Although past research has suggested that girls show higher levels of school engagement (Li & Lerner, 2011; Martin, 2004; Wigfield et al., 2015) and less progressive disaffection than boys, no studies had yet examined gender differences in developmental trajectories of engagement. Results suggest that at this grade level, gender does not matter as much as other sources of differences (i.e., control beliefs) for students' engagement over the transition from basic to secondary school.

Perceived Control

The present study also examined the role of perceived control, and found three kinds of evidence for its centrality, supporting the association between the two variables consistently found in previous research (Connell, 1990; Dweck, 2002; Eccles & Wigfield, 2002; Pintrich, 2003). First, students' perceived control is correlated with their engagement at each measurement point. Second, control beliefs, effort, and ability beliefs at the baseline are associated with the intercepts of normative engagement trajectories, and ability beliefs uniquely predict normative slopes.

Third, and of greatest interest, the differential engagement trajectories are associated with students' initial levels and growth of perceived control (i.e., control, effort capacity, and ability capacity beliefs). The results showed significant differences in the initial levels of control beliefs among the three groups—high-decreasing, average-decreasing, and low-increasing. Since the three groups in the present study represent trajectories of engagement over time, the differences found in control beliefs of three groups also demonstrate their role in differentiating long-lasting trajectories of engagement. A chain of reciprocal effects may be in place here. Perceived control likely influences students' engagement in learning activities and in dealing with difficulties, which will be reflected in academic success and failure (Chase et al., 2014; Lemos, 2002; Li et al., 2010), which in turn shapes students' perceptions of control (Skinner et al., 1998; Skinner & Greene, 2008).

Results also showed differences in the evolution of control beliefs, suggesting that they may play a significant role in students' engagement over time, in particular for students who show resilient trajectories (i.e., low-increasing engagement group). Whereas the high-decreasing group, whose trajectories paralleled the normative declines in engagement, showed decreasing scores in control beliefs, the recovery group (low-increasing engagement) showed more steady scores on this variable. That is, students who recover from lower levels of engagement showed less than expected declines in school-related perceptions of control. Previous research (Skinner et al., 2008) suggested that beyond the interindividual stability in engagement trajectories determined by the amplifying effects of the initial levels of engagement itself, slow declines were observed as a function of initial levels of motivation. In contrast, the low-increasing engagement group in the present study, who also showed low initial levels of motivation, demonstrated significant increases in engagement, associated with positive changes in

motivation (i.e., perceived control). These results suggest that control perceptions may be exerting a compensatory effect, one that buffers students from further declines in engagement and achievement.

An additional key difference in control beliefs that distinguishes the low-increasing trajectory group was their effort capacity beliefs. The fact that this group starts with higher initial levels of beliefs for effort compared to the average group may also elucidate their recovery. Students' beliefs for effort, assessed as their perceived personal ability to exert effort, to pay attention in class and to work hard, seem to fit closely the indicators describing classroom engagement. The role of effort beliefs regulating action by maintaining positive beliefs about the effectiveness of effort has been previously stressed (Connell, 1990; Skinner et al., 1998). The present study further emphasizes the role of effort beliefs for the group of at-risk students. Beliefs for effort seem to have protected engagement in the face of failure or setbacks that this group of lower academic achievement students most probably frequently encounter. It is worth recognizing the observed changes in the group of potentially at-risk students with regard to motivation, school engagement, and achievement. This finding suggests that these students may be especially sensitive to a supportive and engaging academic environment.

Stage–Environment Fit Over School Transitions

It is also worth noting that more marked changes observed in engagement over time seem to occur in the transition from lower to upper secondary school (9th to 10th grade). This finding extends previous research suggesting that students' engagement may increase after school transitions (Upadyaya & Salmela-Aro, 2017). Upper secondary school is more difficult than lower secondary school (ProjAVI, 2013). When students enter upper secondary school, they usually face a number of academic challenges, including spending more time studying by themselves and testing practices that cover more material, require more effort, and involve more frequent failure and setbacks. From this perspective, it is possible that students in the low-increasing engagement group, who also have a history of lower achievement, may be more resilient and better prepared to face challenges and difficulties by exerting effort and increasing engagement. In contrast, the high-decreasing engagement group (who also had higher achievement) shows a steeper decline in engagement during this transition. Differences in effort capacity and ability capacity beliefs between the two groups help to further explain the opposing patterns of change in engagement found for the two groups over the transition. The resilient group reports an increase in the kinds of effort capacity beliefs that have been associated with a positive pattern of learning behavior and persistence (Chapman, Skinner, & Baltes, 1990; Skinner et al., 1990), showing even higher scores than the average group. These findings may help guide interventions to improve social contextual supports (e.g., teacher involvement) and pedagogical methods (e.g., mastery grading) that highlight the role of effort.

Moreover, the higher scores in ability beliefs of the high-decreasing group also suggest a potential explanation. Having a history of positive academic achievement and high perceived ability, these students may be less prepared to respond with increased engagement in the face of difficulties and new demands. Covington and Omelich (1979) contend that feelings of personal competency and efforts to preserve a sense of self-worth play a role in the dynamics of achievement behavior. Considering the perceived compensatory relations between effort and ability described by Covington, according to which trying hard increases attributions of failure to lack of ability, these students may react defensively, trying to maintain favorable ability self-perceptions in the face of difficulties, by avoiding exerting added effort.

Finally, these findings seem to invite a contextualized framework for understanding engagement, pointing to the established link between students' engagement and aspects of the classroom and school context. From this perspective, changes in the school environment associated with the transition to secondary school may be investigated as playing a role in modifying the fit between individual factors, such as individual motivational beliefs, and their school environment (Jang, Kim, & Reeve, 2016; Shernoff et al., 2016; Wang & Eccles, 2013). Eccles and colleagues integrated models of person–environment fit to understand how age and contextual changes may explain declines in motivation and engagement over school transitions (Eccles, 2004; Eccles & Wigfield, 2002). These frameworks may be helpful in future studies examining changes in engagement and achievement over the transition from basic to secondary school, so researchers can include the assessment of changes in the social context as well.

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References

Alexander, K. L., Entwisle, D. R., & Dauber, S. L. (1993). First-grade classroom behavior: Its short- and long-term consequences for school performance. *Child Development*, *64*, 801–814.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Boekaerts, M. (2016). Engagement as an inherent aspect of the learning process. *Learning and Instruction*, *43*, 76–83. doi:10.1016/j.learninstruc.2016.02.001

Boekaerts, M., Pintrich, P. R., & Zeidner, M. (Eds.). (2000). *Handbook of self-regulation*. San Diego, CA: Academic Press.

Bohnert, A., Fredricks, J. A., & Randall, E. (2010). Comparing unique dimensions of youths' organized activity involvement: Theoretical and methodological considerations. *Review of Educational Research*, *4*, 576–610. doi:10.3102/0034654310364533

Chapman, M., Skinner, E. A., & Baltes, P. B. (1990). Interpreting correlations between children's perceived control and cognitive performance: Control, agency, or means-ends beliefs? *Developmental Psychology*, *26*, 246–253.

Chase, P. A., Hilliard, L. J., Geldhof, G. J., Warren, D. J. A., & Lerner, R. M. (2014). Academic achievement in the high school years: The changing role of school engagement. *Journal of Youth and Adolescence*, *43*, 884–896. doi:10.1007/s10964-013-0085-4

Chen, F. F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology*, *95*, 1005–1018. doi:10.1037/a0013193 [AQ6]

Christenson, S. L., Reschly, A. L., & Wylie, C. (Eds.). (2012). *Handbook of research on student engagement*. New York, NY: Springer Science. doi:10.1007/978-1-4614-2018-7

Connell, J. P. (1990). Context, self, and action: A motivational analysis of self-system processes across the life-span. In D. Cicchetti (Ed.), *The self in transition: Infancy to childhood* (pp. 61–97). Chicago, IL: University of Chicago Press.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *The Minnesota symposia on child psychology, Vol. 23. Self processes and development* (pp. 43–77). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Covington, M. V., & Omelich, C. L. (1979). Effort: The double-edged sword in school achievement. *Journal of Educational Psychology*, *71*, 169–182. doi:10.1037/0022-0663.71.2.169

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.

Dotterer, A. M., & Lowe, K. (2011). Classroom context, school engagement, and academic achievement in early adolescence. *Journal of Youth and Adolescence*, *40*, 1649–1660. doi:10.1007/s10964-011-9647-5

Dweck, C. (2002). The development of ability conceptions. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 57–88). San Diego, CA: Academic Press.

Eccles, J. S. (2004). Schools, academic motivation, and stage-environment fit. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed., pp. 125–153). Hoboken, NJ: Wiley.

Eccles, J. S., & Wang, M. T. (2012). Part 1 commentary: So what is student engagement anyway? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 133–145). New York, NY: Springer Science + Business Media. doi:10.1007/978-1-4614-2018-7_6

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*, 109–132. doi:10.1146/annurev.psych.53.100901.135153

Enders, C. K. (2001). The performance of the full information maximum likelihood estimator in multiple regression models with missing data. *Journal of Educational and Psychological Measurement*, *61*, 713–740.

Fredricks, J. A., Blumenfeld, P., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*, 59–109. doi:10.3102/00346543074001059

Fredricks, J. A., Filsecker, M., & Lawson, M. A. (2016). Student engagement, context, and adjustment: Addressing definitional, measurement, and methodological issues. *Learning and Instruction*, *43*, 1–4. doi:10.1016/j.learninstruc.2016.02.002

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.

Jang, H., Kim, E. J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction*, *43*, 27–38. doi:10.1016/j.learninstruc.2016.01.002

Janosz, M., Archambault, I., Morizot, J., & Pagani, L. S. (2008). School engagement trajectories and their differential predictive relations to dropout. *Journal of Social Issues*, *64*, 21–40. doi:10.1111/j.1540-4560.2008.00546.x

Lemos, M. S. (2002). Social and emotional processes in the classroom setting: A goal approach. *Anxiety, Stress, and Coping: An International Journal*, *15*, 383–400. doi:10.1080/1061580021000056537

Lemos, M. S., & Gonçalves, T. (1998). Dimensions of school-performance related beliefs in Portuguese students. In P. Nenniger, R. S. Jager, A. Frey, & M. Wasnitza (Eds.), *Advances in motivation* (pp. 69–82). Landau: Verlag Empirische Padagogik.

Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology*, *47*, 233–247. doi:10.1037/a0021307

Li, Y., Lerner, J. V., & Lerner, R. M. (2010). Personal and ecological assets and academic competence in early adolescence: The mediating role of school engagement. *Journal of Youth and Adolescence*, *39*, 801–815. doi:10.1007/s10964-010-9535-4

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*, 130–149.

Martin, A. J. (2004). School motivation of boys and girls: Differences of degree, differences of kind, or both? *Australian Journal of Psychology*, *56*, 133–146. doi:10.1080/00049530412331283363.

Martin, A. J. (2013). Commentary: Motivation and engagement: Conceptual, operational, and empirical clarity. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 303–311). New York, NY: Springer. doi:10.1007/978-1-4614-2018-7_14

Muthén, B., & Muthén, L. (2000). Integrating person-centered and variable-centered analysis: Growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research*, *24*, 882–891.

Muthén, L. K., & Muthén, B. O. (1998–2015). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.

Nylund, K. L., Asparouhov, T., & Muthen, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling*, *14*, 535–569.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, *95*, 667–686.

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education*. Englewood Cliffs, NJ: Prentice Hall.

ProjAVI. (2013). *PISA 2012. Portugal—Primeiros Resultados* [PISA 2012. Portugal—First results]. Lisboa: ProjAVI, MEC. [AQ7]

Rumberger, R. W., & Rotermund, S. (2012). The relationship between engagement and high school dropout. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 491–514). New York, NY: Springer.

Schmitz, B., & Skinner, E. (1993). Perceived control, effort, and academic performance: Interindividual, intraindividual, and multivariate time-series analyses. *Journal of Personality and Social Psychology*, *64*, 1010–1028. doi:10.1037/0022-3514.64.6.1010

Shernoff, D. J., Kelly, S., Tonks, S. M., Cavanagh, R. F., Anderson, B., Abdi, B., & Sinha, S. (2016). Student engagement as a function of environmental complexity in high school classrooms. *Learning and Instruction*, *43*, 52–60. doi:10.1016/j.learninstruc.2015.12.003

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, *85*, 571–581.

Skinner, E. A., Chapman, M., & Baltes, P. B. (1988). Control, means-ends, and agency beliefs: A new conceptualization and its measurement during childhood. *Journal of Personality and Social Psychology*, *54*, 117–133. doi:10.1037/0022-3514.54.1.117

Skinner, E. A., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger

motivational dynamic. *Journal of Educational Psychology*, *100*, 765–781. doi:10.1037/a0012840.

Skinner, E. A., & Greene, T. (2008). Perceived control: Engagement, coping, and development. In T. L. Good (Ed.), *21st century education: A reference handbook* (pp. 121–130). Newbury Park, CA: Sage.

Skinner, E. A., Kindermann, T. A., Connell, J. P., & Wellborn, J. G. (2009). Engagement and disaffection as organizational constructs in the dynamics of motivational development. In K. R. Wenzel & A. Wigfield (Eds.), *Handbook of motivation at school (educational psychology handbook series)* (pp. 223–245). New York, NY: Routledge/Taylor & Francis Group.

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*, 493–525. [AQ8]

Skinner, E. A., Pitzer, J. R., & Steele, J. (2016). Can student engagement serve as a motivational resource for academic coping, persistence, and learning during late elementary and early middle school? *Developmental Psychology*, *52*, 2099–2117. doi:10.1037/dev0000232

Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: The role of perceived control in children's engagement and school achievement. *Journal of Educational Psychology*, *82*, 22–32. doi:10.1037/0022-0663.82.1.22

Skinner, E. A., Zimmer-Gembeck, M. J., & Connell, J. P. (1998). Individual differences and the development of perceived control. *Monographs of the Society for Research in Child Development*, *6*, 1–220.

Upadyaya, K., & Salmela-Aro, K. (2013). Development of school engagement in association with academic success and well-being in varying social contexts: A review of empirical research. *European Psychologist*, *18*, 136–147. doi:10.1027/1016-9040/a000143

Upadyaya, K., & Salmela-Aro, K. (2017). Engagement with studies and work: Trajectories from post-comprehensive school education to higher education and work. *Emerging Adulthood. Journal of Youth and Adolescence*, *46*, 343–357. doi:10.1007/s10964-016-0494-2 [AQ9]

Valeski, T. N., & Stipek, D. J. (2001). Young children's feelings about school. *Child Development*, *72*, 1198–1213. doi:10.1111/1467-8624.00342

Vandenberg, R., & Lance, C. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*, 4–70. doi:10.1177/109442810031002

Van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, *9*, 486–492. doi:10.1080/17405629.2012.686740

Wang, M. T., & Eccles, J. S. (2013). School context, achievement motivation, and academic engagement: A longitudinal study of school engagement using a multidimensional perspective. *Learning and Instruction*, *28*, 12–23. doi:10.1016/j.learninstruc.2013.04.002

Wang, M. T., & Fredricks, J. A. (2014). The reciprocal links between school engagement and youth problem behavior during adolescence. *Child Development*, *85*, 722–737. doi:10.1111/cdev.12138

Wang, M. T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal*, *47*, 633–662. doi:10.3102/ 0002831209361209

Wigfield, A., Eccles, J. S., Fredricks, J. A., Simpkins, S., Roeser, R., & Schiefele, U. (2015). Development of achievement motivation and engagement. In R. M. Lerner (Series Ed.) & M. Lamb (Vol. Ed.), *Handbook of child psychology and developmental science, Vol. 3: Socioemotional processes* (7th ed., pp. 657–700). Hoboken, NJ: Wiley.