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How and why students make academic progress: Reconceptualizing the student engagement construct to increase its explanatory power

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ABSTRACT

This paper sought to explain how the student engagement construct could be reconceptualized so to increase its capacity to explain course-specific academic progress.

To do so, we proposed that agentic engagement should be added as a new engagement component while the status of emotional engagement should be reconsidered. In two longitudinally-designed studies, secondary-grade students self-reported four aspects of their course-specific classroom engagement (behavioral, emotional, cognitive, and agentic) throughout an 18-week semester, and these scores were used to predict their objectively-scored course achievement (Study 1) and end-of-semester gains in perceived academic progress and perceived autonomy-supportive teaching (Study 2). In both studies, multilevel regressions showed that agentic engagement explained independent variance in the outcomes, while emotional engagement (and cognitive engagement) did not. These findings highlight the need to add agentic engagement and to reconceptualize the role of emotional engagement, so the discussion offers a reconceptualized model with greater explanatory power than its 3-component (behavioral, emotional, cognitive) predecessor.

1. Introduction

Engagement is routinely conceptualized as the extent of a student's active and productive involvement in a learning activity, and educators emphasize three ways that students can be actively and productively involved—namely, behaviorally, emotionally, and cognitively (Ben-Eliyahu, Moore, Dorph, & Schunn, 2018; Burns, Martin, & Collie, 2018; Christenson, Reschly, & Wylie, 2012; Fredricks, Blumenfeld, & Paris, 2004; Fredricks, Christenson, & Reschly, 2019).

Behavioral engagement refers to the observable action students take to be on-task and exert effort. Behavioral engagement is typically conceptualized and measured in terms of students' effort and persistence in the face of difficulty (Skinner, Kindermann, & Furrer, 2009), but it also involves coming to class (attendance), coming to class prepared, completing tasks, and adhering to rules rather than being disruptive. Such an on-task exertion of effort generally arise from students' motivational states (e.g., psychological need satisfaction; Skinner, Furrer, Marchand, & Kindermann, 2008) and supportive learning conditions (e.g., teacher-provided structure; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009), and these displays of effort and participation do generally predict indicators of academic progress, such as skill development (Ericsson, Krampe, & Tesch-Romer, 1993), standardized test score gains (Alexander, Entwisle, & Dauber, 1993; Ladd & Dinella, 2009), and staying in school (vs. dropping out; Rumberger, 1995).

Emotional engagement refers to the affective connection between student and task that mobilizes task involvement, though "task" can be conceptualized narrowly as the learning activity of the moment, more generally as a particular class or subject matter, or quite broadly as with learning or education (Eccles & Wang, 2012; Sinatra, Heddy, & Lombardi, 2015). According to Pekrun (2006), the student's affective connection includes both valence (positive, negative) and activation (activating, deactivating) dimensions. Accordingly, emotional engagement is routinely conceptualized and measured with positive-activating emotions (e.g., interest, enjoyment; Skinner, Kindermann, Connell, & Wellborn, 2009). These positive-activating affective connections arise from both the student's motivational states (e.g., values, perceived control; Goetz, Frenzel, Stoeger, & Hall, 2010) and from supportive interpersonal relationships and learning conditions (e.g., teacher-provided autonomy support; Tsai, Kunter, Lüdtke, Trautwein, & Ryan, 2008). Positive-activating emotions have been shown to correlate (albeit only mildly) with indicators of academic progress, such as learning

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(i.e., conceptual change; Heddy & Sinatra, 2013) and course achievement (Pekrun, Goetz, Titz, & Perry, 2002).

Cognitive engagement refers to action taken to optimize one's thinking processes—usually to understand what one is trying to learn or to problem-solve through an obstacle that is impeding academic progress. Cognitive engagement is typically conceptualized and measured in terms of using sophisticated and strategic learning strategies (e.g., elaboration; Senko & Miles, 2008), but it also involves other ways of managing one's thinking, such as task concentration, attentional control, problem-solving, critical thinking, and the use of self-regulatory strategies. Such actions taken to optimize one's thinking arise largely from the student's motivational states (e.g., mastery goals, self-efficacy beliefs; Greene, Miller, Crowson, Duke, & Akey, 2004; Meece, Blumenfeld, & Hoyle, 1988), and their usage has been shown to predict (albeit mildly) indicators of academic progress, such as course achievement (Greene et al., 2004).

Engagement is an important construct because it predicts valued educational outcomes, such as learning, skill, talent, grades, standardized test scores, and adult educational and occupational attainment (Abbott-Chapman et al., 2014; Alexander et al., 1993; Ericsson et al., 1993; Jang, Kim, & Reeve, 2012, 2016; Ladd & Dinella, 2009; Skinner, Pitzer, & Steele, 2016; Skinner et al., 1998). These studies collectively show that changes in engagement do predict changes in achievement, but the magnitude of this predictive power is often modest (e.g., βs range from 0.00 to 0.30 for the individual components). It is this aspect of engagement—it's too-meager capacity to predict academic progress—that is the focus of the present paper.

1.1. Need to include agentic engagement

Students do become behaviorally, emotionally, and cognitively involved in the learning activities their teachers provide, but they do more than this. Students also, more or less, communicate their preferences, offer their input into the lesson, and ask questions to help them learn and make progress. By taking such initiative, students proactively contribute into the flow of instruction they receive and, in doing so, enhance their functioning (e.g., learning) and improve their learning conditions (Bandura, 2006, 2018). Agentic engagement is the proactive, constructive, and reciprocal action students initiate to catalyze their academic progress and to create a more supportive learning environment for themselves (Bandura, 2006, 2018; Reeve, 2013; Reeve, Cheon, & Yu, 2020). It is *proactive* in that the student takes the initiative to speak up and give voice to their inner motivations (e.g., interests, preferences, needs) and to "make a difference" in their own learning and learning conditions (e.g., "Teacher, as we talk about the solar system, can we also talk about life on Mars?"). When teachers encourage such initiative and respond positively to its classroom emergence, such initiative can shape the nature of the forthcoming learning opportunity (Pineda-Baez, Manzuoli, & Sanchez, 2019). It is *constructive* in that agentic acts of engagement are initiatives to make progress and recruit greater teacher support. Such initiatives originate out of students' high-quality motivation (e.g., autonomy need satisfaction, self-efficacy; Shin, 2019) to make possible (i.e., to mediate) the motivation-to-progress and the motivation-to-support linkages. It is *reciprocal* in that the student works collaboratively with the provider of the learning environment (e.g., the teacher) to affect and transform what the teacher says, does, and provides (Fitzpatrick, O'Grady, & O'Reilly, 2018). For instance, the agentically engaged student might voice a privately held motivational state (e.g., "I am interested in space travel!") to functionally request that the teacher bend (adjust) the lesson toward the potential satisfaction of that motivational state. Such agentic engagement is not a personal characteristic of the student (e.g., extraverted) but, instead, manifests itself as initiative to involve oneself in constructive, reciprocal, and collaborative social interactions and interpersonal relationships with others who offer an open and supportive communication style (e.g., teachers, peers; Pineda-Baez et al., 2019). Of the four engagement components, agentic engagement is typically the one that is least utilized by students (Manzuoli, Pineda-Baez, & Sanchez, 2019).

The need to include agentic engagement within the larger engagement construct comes from two empirical findings. First, agentic engagement explains unique (i.e., independent) variance in students' academic progress. That is, when researchers have entered the four aspects of engagement simultaneously into a multiple regression to predict end-of-course achievement, agentic engagement has explained unique variance in students' grades, even after controlling for the independent effects of the behavioral, emotional, and cognitive components (Reeve, 2013; Reeve & Tseng, 2011; Patall et al., 2019). Adding agentic engagement therefore strengthens the linkage (increases the adjusted R^2 value) between what students do to make progress (engagement) and the progress they actually make. Second, because agentic engagement gives voice to students' inner motivations, it tends to recruit motivational responsiveness and support from teachers. That is, when students express their interests and preferences, teachers tend to become increasingly supportive of their publicly expressed motivations (Fitzpatrick et al., 2018; Matos, Reeve, Herrera, & Claux, 2018). This is an important additional (indirect) pathway to academic progress because action taken to recruit teacher support is action taken to create optimal environmental conditions to make academic progress. Thus, agentic engagement serves two purposes—to enhance one's academic functioning and to recruit greater support from the learning environment.

1.2. Need to reconceptualize emotional engagement

Engagement is action and behavior (Skinner, 2016, chap. 8). It is what students *do* to make progress. Engaged students exert effort, solve problems, and voice their preferences. Emotional engagement, however, represents what students feel and experience. That is, emotional engagement is a different class of variable than are the other three components, as it resembles motivation more than it resembles engagement per se (Eccles & Wang, 2012). Following the work of Ellen Skinner et al. (2008), we suggest that emotional engagement can energize, sustain, amplify, deplete, diminish, and outright terminate the other aspects of engagement (e.g., if interest increases, then students' effort, problem-solving, and initiative may intensify; if discouragement increases, then students' effort, problem-solving, and initiative may weaken). If this is the case, emotion may need to be reconceptualized not as engagement per se but instead as a variable that predicts changes in the other aspects of engagement.

The first reason to reconceptualize emotion is a logical one. Emotional engagement is typically assessed as the extent to which students experience positively-valenced and energy-activating emotions during a learning experience. For instance, the five items from the widely-used emotional engagement scale (from the Engagement versus Disaffection with Learning measure; Skinner, Kindermann, Connell, et al., 2009) appear on the left side of Table 1. The essence of these items is the experience of interest, enjoyment, and having fun. The content of these items overlaps fully with measures of self-reported intrinsic motivation, which is a well-established *antecedent* of engagement (Froiland & Worrell, 2016). As a point of illustration, the four items from the Situational Motivation Scale's intrinsic motivation scale appear in the center portion of Table 1 (Guay, Vallerand, & Blanchard, 2000), while the four items from the Academic Self-Regulation Questionnaire's intrinsic motivation scale appear on the right side of Table 1 (Ryan & Connell, 1989). This content overlap reveals an unmistakable confound between the two constructs. Thus, it is not clear if "I feel interested" and "It is fun" assess emotional engagement or self-reported intrinsic motivation. On definitional grounds, however, we suggest (following Skinner, 2016, chap. 8) that such items better represent processes and experiences that take place inside the student to energize (motivate) action more than they represent that progress-enabling

Table 1
Questionnaire Content from One Measure of Emotional Engagement (Left Side) Compared to Questionnaire Content from Two Measures of Self-Reported Intrinsic Motivation (Center, Right Side).

Items from the Emotional Engagement Scale from the Engagement versus Disaffection with Learning Measure	Items from the Situational Motivation Scale	Items from the Academic Self-Regulation Scale [in Response to the Stem: "Why do I work on my classwork?"]
(Skinner, Kindermann, & Furrer, 2009)	(Guay et al., 2000)	(Ryan & Connell, 1989)
1. When we work on something in this class, I feel interested.	1. I think that this activity is interesting.	1. I do my classwork because it is fun.
2. This class is fun.	2. I think this activity is pleasant.	2. I do my classroom because I enjoy learning new skills.
3. I enjoy learning new things in this class.	3. This activity is fun.	3. I do my classwork because it is exciting.
4. When I'm in this class, I feel good.	4. I feel good when doing this activity.	4. I do my classwork because of the enjoyment I feel when learning new skills.
5. When we work on something in this class, I get involved.		

action and behavior itself. "I feel interested" and "It is fun" are not action and behavior per se but are, rather, reasons (motives) why the student might instigate that action and behavior (e.g., "The reason I work so hard on this activity is because it is so interesting and enjoyable."). In this example, emotion ("it is so interesting and enjoyable") explains behavioral engagement ("I work so hard"), rather than academic achievement.

The second reason to reconceptualize emotion is because emotional engagement has a poor track record in explaining independent variance in measures of academic progress, including academic achievement (Archambault, Janosz, Fallu, & Pagani, 2009; Dierendonck, Milmeister, Kerger, & Poncelet, 2019; Dogan, 2015; Froiland & Worrell, 2016; Gutiérrez & Tomás, 2019; King & Gaerlan, 2014; Pinxten, Marsh, De Fraine, Van Den Noortgage, & Van Damme, 2014; Reeve, 2013; Sagayadevan & Jeyaraj, 2012). In these studies, emotional engagement does correlate positively and significantly with both achievement and the other engagement components, but emotional engagement consistently fails to function as an individually significant predictor of independent variance in achievement. As one case in point, Gutiérrez and Tomás (2019) even found emotional engagement to be a significant negative predictor of academic performance, after controlling for the behavioral, cognitive, and agentic components.

The premise of the current investigation was that a reconceptualization of the student engagement construct could boost its predictive and explanatory power. Accordingly, the present paper pursued two purposes: (1) demonstrate that engagement's explanatory power would increase by including agentic engagement as a new, fourth component and (2) demonstrate that emotional engagement adds little or no independent explanatory power and its inclusion as an engagement component therefore needs to be reconsidered.

2. Study 1

A core function of engagement is to enable students' academic progress. To represent this purpose, Study 1 obtained students' end-of-course grades from the objective school records. To predict course grade, we assessed students' behavioral, emotional, cognitive, and agentic engagement twice during the course—once early in the semester to measure students' baseline level of the engagement component and a second time late in the semester to measure how much students increased or decreased that engagement component relative to its baseline level. For instance, a student who makes progress in the course might begin the course by working hard (T1 behavioral engagement) but he or she may also work even harder in the second half of the course (T2 behavioral engagement, controlling for T1 behavioral engagement). To the extent that any one engagement component was able to predict unique variance in academic achievement, then such a finding would provide supportive evidence that the hypothesized component served its core function (i.e., it enabled academic progress), and therefore its status as an engagement component would be warranted.

By adopting a repeated measures research design, we were able to examine eight predictors of students' achievement—the four engagement components assessed at both T1 and T2. The study hypothesis was that agentic engagement would individually predict end-of-course (T3) course achievement (along with behavioral engagement and cognitive engagement), while emotional engagement would not.

3. Method

3.1. Participants and procedure

Participants were 406 ethnic Korean secondary school students (217 females, 189 males) enrolled in the classes of 11 different teachers in the same urban, public, co-educational school located in a middle-class area of Seoul, South Korea. These teachers were all veteran, certified teachers who taught four different subject matters—namely, Korean (2 classes, $n = 70$), social science (2 classes, $n = 74$), math (6 classes, $n = 224$), and English (1 course, $n = 38$) across the 7th ($n = 216$), 8th ($n = 36$), and 9th ($n = 154$) grades.

Students completed the study questionnaire twice with wave 1 occurring early in the semester (Time 1, T1) and wave 2 occurring late in the semester (Time 2, T2). On both occasions, the survey was administered at the beginning of the class period, students completed the questionnaire in reference to that particular class, and students were assured that their responses would be confidential and used only for research purposes. Prior to the data collection, the research protocol was approved by the University Research Ethics Committee of the second author's university.

Three-hundred and fifty-six of the 406 students (87.7%) had complete data (T1 scores, T2 scores, and course grades), 41 participants had only T1 data and course grades, and 9 participants had only T2 data and course grades. Scores from the 41 students without T2 data did not differ from the scores of the 356 students with complete data on any T1 dependent measure or on gender, grade level, or subject matter, all t's < 1.80, *ns*. Similarly, scores from the 9 students without T1 data did not differ from the scores of the 356 with complete data on any T2 dependent measure or on gender, grade level, or subject matter, all t's < 1.46, *ns*. Overall, missing values were infrequent (2.6%) and were missing at random. So that we could analyze the full data set ($N = 406$), we used the expectation maximization algorithm in SPSS25 to impute these missing data and missing cases.

3.2. Measures

Each questionnaire used the same 1–5 response scale (1 = *strongly disagree*; 5 = *strongly agree*). We had available a previously-validated Korean-translated version of each English-language questionnaire from published studies (Jang et al., 2012, 2016).

Engagement Components. We assessed the four engagement components of behavior, emotion, cognition, and agency. To assess the behavioral and emotional components, we used the 5-item behavioral engagement scale (e.g., "In this class, I work as hard as I can"; α's at T1 and T2 = 0.92 and 0.93) and the 5-item emotional engagement scale (e.g., "When we work on something in this class, I feel interested", see Table 1; α's at T1 and T2 = 0.89 and 0.87) from the Engagement versus Disaffection with Learning measure (Skinner, Kindermann, & Furrer, 2009). To assess cognitive engagement, we used the 4-item Deep Learning Strategies measure (Senko & Miles, 2008). A sample item is, "When learning about a new topic in this course, I usually try to summarize it in my own words"; α's at T1 and T2 = 0.89 and 0.87). To assess agentic engagement, we used the 5-item Agentic Engagement Scale (Reeve, 2013). Items include, "In this class, I let my teacher know what I need and want"; "During this class, I express my preferences and opinions"; "When I need something in this class, I'll ask the teacher for it"; "During class, I ask questions to help me learn"; and "I let the teacher know what I am interested in."; α's at T1 and T2 = 0.86 and 0.81).

Course Achievement. Students' grades were taken from the actual objective school record after the semester ended. Grades were specific to that particular class and could range from 0 to 100. As is common practice in Korean education, grades were calculated from equally-weighted scores on two summative exams (mid-term, final) that covered the content knowledge of that particular course and did not include effort-based activities (e.g., extra-credit), compliance or attitude information, or grade inflation practices (Allen, 2005).

3.3. Multilevel data analyses

The data had a 3-level hierarchical (i.e., multilevel) structure with repeated measures (Level 1, 2-waves) nested within students (Level 2, $N = 406$) nested within teachers (Level 3, $k = 11$). Given this data structure, we used hierarchical linear modeling (HLM; Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011) for our hypothesis tests because it appropriately addresses nonindependence of observations in which lower level scores (i.e., students) were nested within a higher level of scores (i.e., teachers). Student gender was entered as a group mean-centered statistical control at level 2, while grade level was entered as a group mean-centered statistical control at level 3. We also entered the individual subject matters as level 3 statistical controls. To do so, we assigned the Korean course to be the reference group (scored as 0) so that we could create the three dummy variables for students taking the social science, math, and English course (scored as 1).

4. Results

Descriptive statistics and correlations among course achievement, the eight engagement predictors, and the 5 statistical controls appear in Table 2. The four engagement components were all positively intercorrelated at both T1 and T2 and each individual T1 and T2 engagement component correlated positively and significantly with course achievement.

4.1. Predicting achievement

In a multilevel regression to predict end-of-course achievement, the four T1 and the four T2 engagement components, along with the five statistical controls (gender, grade level, social science, math, and English), were entered as fixed effects predictors. As shown in Table 3, T1 behavioral engagement ($\beta = 0.16$, $p = .014$), T2 behavioral engagement ($\beta = 0.14$, $p = .033$), and T2 agentic engagement ($\beta = 0.21$, $p = .002$) each individually predicted course achievement (along with grade level and math class).[1]

Collectively, the predictors explained 15.6% of the variance in students' end-of-course (T3) achievement.[2] To determine the explanatory contribution of the emotional engagement predictors, we removed T1 and T2 emotional engagement from the list of predictors and re-ran the model. Without emotional engagement, the variance explained remained at 15.6%, suggesting no predictive value. To determine the explanatory contribution of the agentic engagement predictors, we removed T1 and T2 agentic engagement from the list of predictors and re-ran the model. Without agentic engagement (but with emotional engagement), the variance explained dropped to 13.8%, suggesting meaningful predictive value.

5. Discussion

Engagement provides students with the means to make academic progress—to learn, develop skill, and attain positive educational outcomes. Such progress is made by taking action, and the findings from Study 1 identified the importance of behavioral engagement and agentic engagement, while the findings also identified the limited significance of emotional engagement and, surprisingly, cognitive engagement. These results provide supportive evidence to the idea of adding agentic engagement as a new engagement component, while they raise questions concerning the role of emotional engagement (and perhaps cognitive engagement) in the engagement-to-outcomes relation, at least from a functional perspective in which the varying components of engagement are used to predict students' academic achievement.

6. Study 2

In Study 2, the overarching hypothesis was the same—namely, that agentic engagement would (along with behavioral engagement and perhaps cognitive engagement)—while emotional engagement would not—independently predict the extent to which students were able to make academic progress. Because academic progress is typically understood as learning, improving, and developing one's skills over time (Bailey, Duncan, Watts, Clements, & Sarama, 2018), Study 2 employed a longitudinally assessed indicator of academic progress—namely, course-specific perceived skill development, which was assessed at the beginning, middle, and end of an 18-week semester-long course. As in Study 1, the study rationale was that the extent to which any engagement component was able to predict independent variance in students' academic progress, then such a finding would provide supportive evidence to warrant its inclusion in the larger engagement construct.

In addition to predicting course-specific academic progress, there is a second reason to include agentic engagement within the larger engagement construct. Because of its proactive and reciprocal nature, agentic engagement serves a function that the other three components

[1] We conducted supplemental analyses to explore whether behavioral and agentic engagement would while emotional engagement would not individually predict achievement using only the subsamples of social science ($n = 74$); math ($n = 224$), English ($n = 38$); Korean ($n = 70$); 7th graders ($n = 216$), 8th graders ($n = 36$), 9th graders ($n = 154$), females ($n = 217$), and males ($n = 189$). Across all 9 follow-up analyses, emotional engagement failed to emerge as an individually significant statistical predictor of student achievement. Agentic engagement and behavioral engagement were both individually significant predictors in math and for 7th graders, 9th graders, and males. Behavioral engagement was the single individually significant predictor for 9th graders. Agentic engagement was the single individually significant predictor for females and in social science. No individually significant predictors emerged in Korean, English, and for 8th graders, presumably because of the small (i.e., statistically underpowered) sample sizes.

[2] The output from HLM software does not provide an R^2 value, so we calculated these values by hand using this formula: (variance of null model with no predictors – variance of model with predictors) / variance of null model with no predictors. This formula reports the ratio of explained variance from the predictors (at the student level) to the total variance in the outcome.

Table 2
Descriptive Statistics and Intercorrelations among Course Achievement, 8 Predictors, and 5 Statistical Controls Across 3 Waves of Data Collection (Study 1).

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Time 1 (Beginning of Semester)																
1. Behavioral Engagement	3.45	0.87	–													
2. Emotional Engagement	3.13	0.85	0.59	–												
3. Cognitive Engagement	3.16	0.82	0.57	0.62	–											
4. Agentic Engagement	3.03	0.79	0.56	0.62	0.62	–										
Time 2 (Middle of Semester)																
5. Behavioral Engagement	3.35	0.80	0.53	0.43	0.39	0.41	–									
6. Emotional Engagement	3.14	0.76	0.40	0.47	0.37	0.40	0.62	–								
7. Cognitive Engagement	3.16	0.67	0.32	0.33	0.42	0.38	0.49	0.49	–							
8. Agentic Engagement	3.11	0.69	0.42	0.37	0.41	0.48	0.49	0.61	0.54	–						
Time 3 (End of Semester)																
9. Course Achievement	72.2	21.6	0.27	0.22	0.20	0.21	0.30	0.23	0.26	0.28	–					
Statistical Controls																
10. Gender	0.53	0.50	0.06	0.16	0.10	0.13	0.08	0.13	0.10	0.17	0.03	–				
11. Grade Level	0.85	0.94	−0.18	−0.11	−0.12	−0.16	−0.09	−0.11	−0.07	−0.22	0.19	0.01	–			
12. Subject Matter: Social Science	−0.64	0.77	0.09	0.12	0.04	0.10	0.16	0.10	0.04	0.12	−0.05	−0.03	−0.42	–		
13. Subject Matter: Math	0.10	1.00	−0.02	−0.06	0.00	−0.06	−0.08	−0.14	−0.06	−0.09	−0.06	0.00	0.22	−0.52	–	
14. Subject Matter: English	−0.81	0.58	−0.10	−0.12	−0.06	−0.11	−0.04	−0.02	0.02	−0.12	0.07	0.00	0.39	−0.15	−0.36	–

$N = 406$. r's ≥ 0.13, $p < .01$; r's ≥ 0.16, $p < .001$. Course achievement is the student's objective course grade.
For gender, female = 0 and male = 1. For grade level, middle = 0 and high = 1.
For Social Science: Social Science = 1, Korean = 0; for math: math = 1, Korean = 0; for English: English = 1, Korean = 0.

Table 3
Multilevel Regressions with the Four Engagement Components at both T1 and T2 Predicting Objective Course Achievement (Study 1).

	Course Achievement (Course Grade)	
Fixed Effects	*B* (*SE*)	*β*
Teacher Level		
Intercept	79.94 (2.39)	
Grade Level	7.01 (1.29)	0.31**
Subject Matter: Social Science	−3.84 (3.37)	−0.07
Subject Matter: Math	−6.88 (2.79)	−0.16*
Subject Matter: English	−5.04 (4.43)	−0.07
Student Level		
Gender	1.11 (1.99)	0.03
Engagement Predictors		
T1 Behavioral Engagement	3.96 (1.61)	0.16*
T1 Emotional Engagement	1.43 (1.74)	0.06
T1 Cognitive Engagement	−0.85 (1.72)	−0.03
T1 Agentic Engagement	−0.23 (1.79)	−0.01
T2 Behavioral Engagement	3.74 (1.75)	0.14*
T2 Emotional Engagement	−2.23 (1.90)	−0.08
T2 Cognitive Engagement	2.72 (1.86)	0.08
T2 Agentic Engagement	6.56 (2.07)	0.21**
Random Effects	Variance	*SE*
Teacher (Level 2) Intercept	0.06	0.07
Student (Level 1) Intercept	379.7***	4.4

Note. Level 1 (students), $n = 406$; Level 2 (teachers), $n = 11$.
For grade level, 7th grade = 1, 8th grade = 2, 9th grade = 3. For gender, 0 = females, 1 = males.
For the subject matters: Science = 1, Korean = 0; Math = 1, Korean = 0; English = 1, Korean = 0.
B = unstandardized regression coefficient. *β* = standardized regression coefficient.
SE = standard error of the beta (*B*) coefficient.
* $p < .05$. ** $p < .01$. *** $p < .001$.

do not—namely, recruit greater motivational support from the surrounding learning environment (Bandura, 2006; Pineda-Baez et al., 2019; Reeve, 2013). To test if agentic engagement could serve this second function, Study 2 employed a longitudinally-assessed indicator of recruiting more supportive learning conditions—namely, perceived autonomy-supportive teaching. Being able to self-generate gains in autonomy-supportive teaching (through agentic engagement) would be an important accomplishment, because increases in autonomy-supportive teaching have an excellent track record of predicting and explaining subsequent (longitudinal) gains in classroom engagement, usually through a mediational effect on student motivations, such as psychological need satisfaction or self-efficacy (Gutiérrez & Tomás, 2019; Kaplan, 2018; Patall et al., 2018; Zhou, Ntoumanis, & Thøgersen-Ntoumani, 2019). Based on previous findings (Matos et al., 2018), we expected that only agentic engagement would predict independent variance in end-of-semester gains in perceived autonomy support. Thus, we hypothesized that agentic engagement would—while emotional engagement (as well as behavioral engagement and cognitive engagement) would not—individually predict an end-of-semester (T3) increase in perceived autonomy support [controlling for beginning-semester (T1) perceived autonomy support"].

Study 2 also included a measure of self-reported intrinsic motivation. We added this fifth predictor variable because we suspected that any capacity that emotional engagement might have in the prediction of the two outcome measures may actually be attributable to a confounded motivational effect (recall Table 1). That is, if emotional engagement did predict students' end-of-course progress, then that significant effect would disappear after entering self-reported intrinsic motivation (while the significant predictive effects from the other three engagement components would remain unchanged).

Finally, in Study 2, we sampled students taking a different subject matter—namely, physical education. By doing this, we sought to determine if our findings from Study 1 that sampled students involved with knowledge-based learning activities might replicate and generalize to a sample of students involved with skill-based learning activities (i.e., sport and exercise tasks).

7. Method

7.1. Participants and procedure

At the beginning of the academic year, 483 ethnic Korean secondary school students enrolled in the classes of nine physical education teachers who taught in nine different, public, co-educational, middle-class schools located in the Seoul metropolitan area completed the questionnaire. At mid-semester, 453 of the original 483 students completed the study questionnaire for a second time. At the end of the semester, 426 of the original participants (88.1%) completed the study

questionnaire for a third time. The 453 persisting students at T2 did not differ from the 30 T2 dropouts on any T1 dependent measure, and the 426 persisting students at T3 did not differ from the 27 T3 dropouts on any T1 or T2 dependent measures, all *t*'s < 1. The final sample consisted of 190 females and 293 males as well as 347 middle-school and 136 high-school students. For students who completed the questionnaire on all three occasions, missing values were rare (< 0.1%) and missing at random. So that we could analyze the full data set ($N = 483$), we used the expectation maximization algorithm to impute the missing data and missing cases.

In the Korean PE course, students are exposed to sport and exercise activities and skills, but they also learn a great deal of subject matter knowledge, such as biomechanics, principles of motor learning, and sports psychology, and they do so in a formal way that is similar to the content mastery emphasized in their other courses. PE teachers also help students learn rules, equipment, and strategy, such as teamwork and analytic ability through a games approach.

Prior to the data collection, the research protocol was approved by the University Research Ethics Committee of the second author's university. Students' data were collected in three waves in which students completed the same questionnaire at the beginning (T1; week 2), middle (T2; week 9), and end (T3; week 18) of an 18-week semester. The survey was administered at the beginning of the class period, students completed the questionnaire in reference to that particular teacher and class, and students were assured that their responses would be confidential. For six of the nine teachers, we administered the student survey to two classes; for the remaining three teachers, we administered the survey to only one class (i.e., 9 teachers, 15 classes).

7.2. Measures

Each questionnaire used the same 1–7 response scale (1 = *strongly disagree*; 7 = *strongly agree*).

Engagement Components. As in Study 1, we used the 5-item behavioral engagement scale (α's at T1, T2, and T3 = 0.86, 0.85, and 0.86) and the 5-item emotional engagement scale (α's = 0.90, 0.89, and 0.88) from the Engagement versus Disaffection with Learning measure (Skinner, Kindermann, Connell, et al., 2009), as well as the 5-item scale from the Agentic Engagement Scale (α's = 0.87, 0.88, and 0.91; Reeve, 2013). To assess cognitive engagement, we used a different measure—namely, the 9-item Metacognitive Strategy Use measure (Wolters, 2004). A sample item is, "Before starting an assignment in this course, I try to figure out the best way to do it"; α's = 0.86, 0.88, and 0.88).

Self-Reported Intrinsic Motivation. To assess self-reported intrinsic motivation, we used the 4-item intrinsic motivation scale from the Academic Self-Regulation Questionnaire (ARSQ; Ryan & Connell, 1989). The ASRQ's intrinsic motivation scale includes items such as, "I do my PE classwork because it is fun" (see Table 1; α's = 0.89, 0.91, and 91).

Academic Progress. To assess students' sense of making progress during the PE course, we used the 4-item Skill Development in Physical Education scale (SDPE; Cheon, Reeve, & Moon, 2012). The SDPE includes the following four items: "I have learned a lot in this PE class"; "I have learned new and important skills during this PE class"; "I have improved myself as a person because of this PE course"; and "I am more physically fit now than I was at the beginning of this PE class". Students were able to complete the SDPE measure in a reliable way (i.e., high internal consistency): α's = 0.92, 0.93, and 0.93. In a previous study, scores on this measure correlated significantly with the course grades of Korean secondary-grade students taking a similar PE course [$r(1158) = 0.42$, $p < .001$ (Cheon et al., 2012)].

Perceived Autonomy-Supportive Teaching. To assess perceived autonomy-supportive teaching, we used the 6-item Learning Climate Questionnaire (LCQ; Williams & Deci, 1996). The widely-used LCQ (Black & Deci, 2000) includes items such as, "My PE teacher listens to how I would like to do things" (α's = 0.87, 0.88, and 91).

7.3. Multilevel data analyses

The student data had a 3-level cross-classified hierarchical structure with repeated measures (Level 1, 3-waves) nested within students (Level 2, $N = 483$) nested within classrooms (Level 3, $k = 15$) nested within teachers (a cross-classified Level 3, $k = 9$). Given this data structure, we again used hierarchical linear modeling for our hypothesis tests (HLM; Raudenbush et al., 2011). At level 1, we scored the T1 value for each outcome measure (i.e., academic progress, perceived autonomy support) as 0 to have a meaningful interpretation of any observed change in the intercept, while we scored the T2 and T3 values as 1 and 2. At level 2, we entered student gender as group mean-centered statistical control and, at level 3, we entered grade level as a group mean-centered statistical control in each analysis. HLM treats student, classroom, and teacher as a random rather than as a fixed effect, thereby permitting generalizations of the findings to a wider population.

8. Results

Descriptive statistics and correlations for the two outcomes at T1 and T3, the five predictors at T1 and T2, and the two statistical controls at T1 appear in Table 4. The four engagement components were all positively intercorrelated at both T1 and T2, and each individual T1 and T2 engagement component correlated positively and significantly with the T1 and T3 outcome measures.

8.1. Predicting academic progress

In a first multilevel regression to predict end-of-semester (T3) academic progress (i.e., SDPE scores), the four T1 and T2 engagement components, along with the three statistical controls (T1 academic progress, gender, and grade level), were entered as fixed effects predictors. As shown in the left-side columns in Table 5, T1 behavioral engagement ($\beta = 0.24$, $p < .001$), T2 emotional engagement ($\beta = 0.19$, $p = .004$), and T2 agentic engagement ($\beta = 0.22$, $p < .001$) each individually predicted an end-of-semester (T3) increase in academic progress (controlling for T1 academic progress, gender, and grade level). In a second multilevel regression, we added the T1 and T2 measures of self-reported intrinsic motivation as two additional predictors and reran the above analysis. As shown in the right-side columns in Table 5, T1 behavioral engagement ($\beta = 0.26$, $p < .001$), T2 agentic engagement ($\beta = 0.20$, $p < .001$), and T2 self-reported intrinsic motivation ($\beta = 0.22$, $p < .001$)—but not T2 emotional engagement ($\beta = 0.09$, $p = .204$)—individually predicted an end-of-semester (T3) increase in academic progress (controlling for T1 academic progress, gender, and grade level).

Collectively, the predictors listed in Table 5 explained 48.5% of the variance in students' end-of-semester (T3) academic progress. To determine the explanatory contribution of the emotional engagement predictors, we removed T1 and T2 emotional engagement from the list of predictors and re-ran the model. Without emotional engagement, the variance explained was 48.2%, suggesting little predictive value. To determine the explanatory contribution of the agentic engagement predictors, we removed T1 and T2 agentic engagement from the list of predictors and re-ran the model. Without agentic engagement (but with emotional engagement), the variance explained dropped to 46.4%, suggesting meaningful predictive value.

8.2. Predicting perceived autonomy support

In a first multilevel regression to predict end-of-semester (T3) perceived autonomy support, the four T1 and T2 engagement components, along with the three statistical controls (T1 perceived autonomy

Table 4
Descriptive Statistics and Intercorrelations among the 2 Outcomes, 10 Predictors, and 2 Statistical Controls Across 3 Waves of Data Collection (Study 2).

Variable	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Time 1 (Beginning of Semester)																		
1. Perceived Academic Progress	4.62	1.19	–															
2. Perceived Autonomy Support	4.41	0.98	0.49	–														
3. Behavioral Engagement	4.77	1.11	0.68	0.44	–													
4. Emotional Engagement	4.69	1.36	0.72	0.46	0.78	–												
5. Cognitive Engagement	4.24	1.17	0.65	0.45	0.76	0.68	–											
6. Agentic Engagement	4.22	1.03	0.63	0.55	0.61	0.59	0.62	–										
7. Self-Reported Intrinsic Motivation	4.90	1.30	0.77	0.45	0.73	0.84	0.63	0.59	–									
Time 2 (Middle of Semester)																		
8. Behavioral Engagement	4.77	1.08	0.56	0.36	0.68	0.55	0.53	0.43	0.57	–								
9. Emotional Engagement	4.76	1.23	0.59	0.37	0.59	0.68	0.49	0.42	0.66	0.80	–							
10. Cognitive Engagement	4.42	1.16	0.55	0.39	0.57	0.54	0.57	0.46	0.56	0.74	0.72	–						
11. Agentic Engagement	4.28	1.03	0.51	0.38	0.48	0.45	0.45	0.49	0.49	0.60	0.64	0.66	–					
12. Self-Reported Intrinsic Motivation	4.86	1.21	0.61	0.40	0.59	0.65	0.47	0.43	0.68	0.76	0.85	0.65	0.62	–				
Time 3 (End of Semester)																		
13. Perceived Academic Progress	4.77	1.11	0.58	0.38	0.59	0.55	0.46	0.43	0.55	0.60	0.62	0.54	0.57	0.64	–			
14. Perceived Autonomy Support	4.55	1.09	0.46	0.46	0.44	0.41	0.39	0.41	0.40	0.53	0.53	0.51	0.55	0.52	0.62	–		
Statistical Controls																		
15. Gender	0.39	0.49	0.24	0.15	0.24	0.26	0.22	0.19	0.26	0.20	0.23	0.28	0.22	0.21	0.26	0.16	–	
16. Grade Level	0.28	0.46	0.14	0.15	0.16	0.17	0.16	0.17	0.18	0.17	0.18	0.11	0.18	0.23	0.15	0.24	0.17.	–

$N = 483$. r's $\geq 0.12, p < .01$; r's $\geq 0.15, p < .001$. *M* = Mean, *SD* = Standard Deviation. For gender, female = 0 and male = 1. For grade level, middle = 0 and high = 1.

support, gender, and grade level), were entered as fixed effects predictors. As shown in the left-side columns in Table 6, only T2 agentic engagement ($\beta = 0.25$, $p < .001$) predicted an end-of-semester (T3) increase in perceived autonomy support (controlling for T1 perceived autonomy support, gender, and grade level). In a second multilevel regression, we added the T1 and T2 measures of self-reported intrinsic motivation as two additional predictors and reran the same analysis. As shown in the right-side columns in Table 6, again only T2 agentic engagement ($\beta = 0.25$, $p < .001$) predicted an end-of-semester (T3) increase in perceived autonomy support.

Collectively, the predictors listed in Table 6 explained 37.3% of the variance in students' end-of-semester (T3) perceived autonomy support. To determine the explanatory contribution of the emotional engagement predictors, we removed T1 and T2 emotional engagement from the list of predictors and re-ran the model. Without emotional engagement, the variance explained was 37.0%, suggesting little predictive value. To determine the explanatory contribution of the agentic engagement predictors, we removed T1 and T2 agentic engagement from the list of predictors and re-ran the model. Without agentic engagement (but with emotional engagement), the variance explained dropped to 33.4%, suggesting meaningful predictive value.

9. General discussion

The first important new contribution to emerge from the findings was the need to include agentic engagement in the conceptualization of the larger engagement construct. This need was justified by two findings. First, late-semester (T2) gains in agentic engagement explained independent variance in students' course achievement in Study 1 (see Table 3) and in their academic progress in Study 2 (see Table 5). This means that those students who reported working in an increasingly proactive way during the course were the same students who demonstrated (Study 1) and self-reported (Study 2) making significant progress. Previous studies had shown that agentic engagement independently predicts academic achievement (Reeve, 2013; Reeve & Tseng, 2011), but the findings in the present study showed that it was an in-course *increase* in T2 (rather than baseline T1) agentic engagement that specifically explained students' academic progress. Second, late-semester (T2) gains in agentic engagement explained independent variance in gains in perceived autonomy support, which suggests a new proactive function within the original reactive conceptualization of the engagement construct. Because of these two findings, we conclude that it is warranted to include agentic engagement in the conceptual and operational definitions of classroom engagement.

The second important new contribution to emerge from the findings was the need to reconsider the status of emotion. This reconsideration was justified by the findings that emotional engagement was unable to independently explain objective course achievement (see Table 3). A mid-semester increase in T2 emotional engagement did predict independent variance in end-of-semester academic progress (in Study 2), but this effect disappeared after adding the intrinsic motivation predictor (see Table 5). This result occurred because the two predictors were so highly intercorrelated (i.e., $r = 0.84$ at T1 and $r = 0.85$ at T2; see Table 4). This shared variance ($R^2 = 70\%$) suggests their measurement overlap, but it more substantially suggests their conceptual overlap.

In support of this idea to reconsider emotion as an engagement component, it is important to note that not all educators believe that positive emotion is essential to making academic progress. Research on "deliberate practice" shows that students can (and do) develop their talents in music, fine arts, sports, and science without the support of positive emotion (Ericsson et al., 1993; Ericsson, 2002, chap. 1). Deliberate practice is defined as training activities designed to improve some specific aspect of performance. It is effortful activity that represents high behavioral (effort, persistence) and cognitive (concentration, strategic problem-solving) engagement but also low emotional engagement ("it is not inherently enjoyable"; Ericsson, 2005, p. 396) and even some negative emotionality ("feelings of discomfort"; Ericsson et al., 1993, p. 317).

9.1. What does emotional engagement predict?

Emotional engagement is clearly correlated with many positive educational events, including teacher support, student motivation, and indicators of academic success (see Tables 2 and 4). For instance, when teachers are supportive (Skinner et al., 2008) and interpersonally close (Hagenauer, Hascher, & Volet, 2015), students report positive emotional engagement. Similarly, students report positive emotional engagement when experiencing high-quality motivation, as with mastery goals (Roeser, Midgley, & Urdan, 1996), perceived control beliefs (Skinner et al., 2008), and psychological need satisfaction/intrinsic motivation (Liu & Chung, 2014). Thus, emotional engagement serves as

Table 5
Multilevel Regressions with the Four Engagement Components at both T1 and T2 Predicting End-of-Semester Perceived Academic Progress (Study 2).

	Year-End (T3) Perceived Academic Progress			
	Regression without Intrinsic Motivation		Regression with Intrinsic Motivation	
Fixed Effects	*B* (*SE*)	*β*	*B* (*SE*)	*β*
Teacher Level				
Intercept	1.19 (0.24)		1.15 (0.24)	
Classroom Level				
Grade Level	0.04 (0.09)	0.01	0.01 (0.09)	−0.01
Student Level				
Gender	0.14 (0.08)	0.06	0.15 (0.07)	0.07*
T1 Perceived Academic Progress	0.20 (0.05)	0.22***	0.20 (0.05)	0.21***
Engagement Predictors				
T1 Behavioral Engagement	0.25 (0.07)	0.24***	0.26 (0.07)	0.26***
T1 Emotional Engagement	0.00 (0.05)	0.01	0.01 (0.06)	0.01
T1 Cognitive Engagement	−0.10 (0.05)	−0.11	−0.09 (0.05)	−0.09
T1 Agentic Engagement	−0.03 (0.05)	−0.02	−0.02 (0.05)	−0.02
T2 Behavioral Engagement	0.08 (0.07)	0.08	0.02 (0.07)	0.03
T2 Emotional Engagement	0.18 (0.06)	0.19**	0.08 (0.07)	0.09
T2 Cognitive Engagement	0.00 (0.05)	−0.01	0.01 (0.05)	0.00
T2 Agentic Engagement	0.24 (0.05)	0.22**	0.21 (0.05)	0.20***
Motivation Predictors				
T1 Self-Reported Intrinsic Motivation	–		−0.07 (0.06)	−0.09
T2 Self-Reported Intrinsic Motivation	–		0.21 (0.06)	0.22**
Random Effects	Variance	*SE*	Variance	*SE*
Teacher Level (Level 3) Intercept	0.01	0.01	0.00	0.01
Classroom (Level 2) Intercept	0.00	0.01	0.00	0.01
Student (Level 1) Intercept	0.58***	0.04	0.57***	0.04

Note. Level 1 (students), $n = 483$; Level 2 (classrooms), $k = 15$; Level 3 (teachers), $k = 9$.
For grade level, middle school = 0, high school = 1. For gender, 0 = females, 1 = males.
B = unstandardized regression coefficient. *β* = standardized regression coefficient.
SE = standard error of the beta (*B*) coefficient.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6
Multilevel Regressions with the Four Engagement Components at both T1 and T2 Predicting End-of-Semester Perceived Autonomy Support (Study 2).

	Year-End (T3) Perceived Autonomy Support			
	Regression without Intrinsic Motivation		Regression with Intrinsic Motivation	
Fixed Effects	*b* (SE)	*β*	*b* (SE)	*β*
Teacher Level				
Intercept	0.93 (0.28)		0.94 (0.28)	
Classroom Level				
Grade Level	0.28 (0.13)	0.11*	0.28 (13)	0.11
Student Level				
Gender	−0.01 (0.08)	−0.01	−0.01 (0.08)	−0.01
T1 Perceived Autonomy Support	0.25 (0.05)	0.24***	0.25 (0.05)	0.21***
Engagement Predictors				
T1 Behavioral Engagement	0.03 (0.07)	0.04	0.04 (0.07)	0.05
T1 Emotional Engagement	−0.04 (0.05)	−0.05	0.00 (0.06)	0.00
T1 Cognitive Engagement	−0.01 (0.05)	−0.01	0.00 (0.05)	−0.01
T1 Agentic Engagement	0.01 (0.05)	0.02	0.02 (0.05)	0.03
T2 Behavioral Engagement	0.13 (0.07)	0.13	0.11 (0.07)	0.10
T2 Emotional Engagement	0.11 (0.06)	0.13	0.10 (0.07)	0.11
T2 Cognitive Engagement	0.04 (0.06)	0.05	0.05 (0.06)	0.06
T2 Agentic Engagement	0.27 (0.05)	0.25***	0.27 (0.05)	0.25***
Motivation Predictors				
T1 Self-Reported Intrinsic Motivation	–		−0.08 (0.06)	−0.10
T2 Self-Reported Intrinsic Motivation	–		0.06 (0.06)	0.08
Random Effects	Variance	SE	Variance	SE
Teacher Level (Level 3) Intercept	0.02**	0.01	0.02**	0.01
Classroom (Level 2) Intercept	0.00	0.01	0.00	0.01
Student (Level 1) Intercept	0.64***	0.04	0.64***	0.04

Note. Level 1 (students), $n = 483$; Level 2 (classrooms), $k = 15$; Level 3 (teachers), $k = 9$.
For grade level, middle school = 0, high school = 1. For gender, 0 = females, 1 = males.
B = unstandardized regression coefficient. *β* = standardized regression coefficient.
SE = standard error of the beta (*B*) coefficient.
* $p < .05$. ** $p < .01$. *** $p < .001$.

a barometer for the ups-and-downs of one's relationships, motivational status, and well-being. This is not, however, the same thing as suggesting that emotional engagement contributes a direct effect into these positive outcomes.

What emotional engagement does predict is the other engagement components (Linnenbrink-Garcia & Pekrun, 2011). Emotional engagement amplifies on-going and future behavioral engagement (Luo, Hughes, Liew, & Kwok, 2009), cognitive engagement (Roeser, Strobel, & Quihuis, 2002), and even other aspects of emotional engagement, as in "enjoyment in science predicts interest in science" (Ainley & Ainley, 2011).

9.2. Conceptual and measurement issues

The failure of emotional engagement to predict indicators of academic progress may signal a conceptual problem, but it may alternatively signal a measurement problem. Our measure clearly emphasized interest-enjoyment, which is the prototypical positive-activating emotion (Pekrun & Linnenbrink-Garcia, 2012), but the activating dimension may be as good a predictor of achievement and "getting things done" as is the valence dimension, as with anger, curiosity, anxiety, frustration, and confusion (Pekrun & Linnenbrink-Garcia, 2012; Shin & Kim, 2019; Sinatra et al., 2015). Future research may consider a wider range of activating emotions than just interest-enjoyment. Such a future study would yield at least two significant benefits. It would first move the field away from global constructs of positive vs. negative emotion to instead focus on the specific qualities of emotion (e.g., valence, activation; Pekrun & Linnenbrink-Garcia, 2012) and, second, it would allow the emotional engagement measure to be de-coupled from motivational predictors, such as intrinsic motivation. Our findings echo Sinatra et al. (2015) observation that, "Despite the importance of the concept of engagement to education, there are challenges with both its conceptualization and measurement" (p. 1).

It is also important to highlight that cognitive engagement did not predict any outcome measure. This null result occurred across all three analyses (see Tables 3, 5, and 6), and it was unexpected. Just as the null findings for emotional engagement might reflect a measurement concern, the same might be true for cognitive engagement. Our two measures emphasized deep learning strategies, which is the prototypical assessment strategy in the cognitive engagement literature (Christenson et al., 2012). Nevertheless, different manifestations of cognitive

engagement exist, including concentration, attentional effort, mental simulations, mental imagery, critical thinking, problem solving, goal setting, state-like growth mindset, and implementation intentions (i.e., implementation mindset). Just as emotional engagement can be differentiated into valence and activation, cognitive engagement can be differentiated into information-processing-rich deliberate thinking and strategic-action-rich implementation thinking (Gollwitzer & Sheeran, 2006; Kruglanski et al., 2002). That is, when cognitively engaged, a student might seek to understand the task at hand (deliberative mindset) or alternatively to act out a plan to make progress to achieve a desired outcome (implementation mindset). Thus, future research may consider a wider range of cognitive engagement by including implementation intentions. What is becoming apparent is the need to reconceptualize both emotional and cognitive engagement in ways that are more heterogeneous (multiple dimensions) than homogeneous (one prototype).

9.3. Implications

The overarching purpose of this investigation was to reconceptualize the engagement construct to increase its capacity to explain the academic progress that students do (and do not) make. To date, much of the engagement research literature has been guided by the "self-system model" (Skinner, 2016, chap. 8; Skinner et al., 2009), or by similar "Context → Self → Action → Outcomes" models (Appleton, Christenson, & Furlong, 2008; Blumenfeld, Kempler, & Krajcik, 2006; Eccles & Wang, 2012; Guthrie, Wigfield, & You, 2012). In the self-system model, the social context (e.g., teachers' motivating style) supports students' motivationally-rich self-system (e.g., need satisfaction, intrinsic motivation, self-efficacy, learning goals). Once energized by these social (teacher support) and personal (motivation) "engagement facilitators", engagement (i.e., "action") is then what makes learning, achievement, and academic progress ("outcomes") possible. Any future reconceptualization of this basic model will likely need to occur either at the theoretical/conceptual level or at the assessment/measurement level.

Theoretical Reconceptualization. One possible reconceptualized model of student engagement appears in Fig. 1—one that adds agentic engagement while reconceptualizing the role of both emotional and cognitive engagement. This recommended reconceptualized model depicts engagement as composed of two (not four) distinct, complementary, and positively intercorrelated pathways to progress—behavioral and agentic engagement.

As to the role of emotional engagement, Fig. 1 suggest that emotional engagement is an energizing engagement predictor. Skinner et al. (2008), for instance, found that enthusiasm, enjoyment, interest, satisfaction, and having fun all promote greater coping and engagement while anxiety, boredom, frustration, and apathy all lead to giving up and disengagement. In Fig. 1, the positive-activating emotions central to emotional engagement are repositioned into a role that is similar to that of student motivation. Reschly and Christenson (2012) presented a similar model in which emotional (and cognitive) engagement precede changes in students' behavioral engagement.

As to the role of cognitive engagement, Fig. 1 suggests that it too is an energizing engagement predictor. While future research is needed, it appears that cognitive engagement has a closer link to energizing action (behavioral and agentic engagement) than it does to energizing outcomes (Armor & Taylor, 2003; Brandtstadter & Frank, 2002). Such a function can be easily seen during deliberate practice, as the student continuously refines a skill development strategy and then puts forth the effort to implement that plan of action (i.e., "deliberate" can be translated as cognitive engagement, while "practice" can be translated as behavioral engagement). This same strategic thinking (i.e., cognitive engagement) that energizes behavioral engagement also occurs as action plans or implementation intentions (Gollwitzer, 1999) and as the self-regulation of effort (Boekaerts, 2006), which is essentially how students cognitively steer and direct their behavioral engagement.

In Fig. 1, emotional and cognitive engagement are represented as engagement antecedents, but there are other possible roles for these two components. Both emotional and cognitive engagement may alternatively be conceptualized as possible moderators of behavioral and agentic engagement. That is, behavioral and agentic engagement predict students academic progress strongly when emotional and cognitive engagement are high (enthusiastic effort, strategic initiative), while behavioral and agentic engagement predict students' academic progress weakly when emotional and cognitive engagement are low (disinterested effort, impulsive initiative). It is also easy to conceptualize emotional engagement as an outcome (that reflects well-being). We invite future research to investigate these possibilities.

As to the role of agentic engagement, the reconceptualized model (Fig. 1) suggests two functions. First, agentic engagement functions an underappreciated pathway to greater academic progress. Second, it feeds back to enable a more supportive learning environment. This is an important new function of engagement (represented by the line drawn at the bottom of the figure connecting agentic engagement to supportive learning environment). Such an addition to the self-system model allows for a more dynamic conceptualization of the nature and function of student engagement (i.e., not only reactive, but proactive, action).

The reconceptualized model also depicts student motivation as a malleable and unusually dynamic state in which the student's interests (emotions), goals (cognitions), and needs (motives) fluctuate from one moment to the next (especially in response to changes in the learning

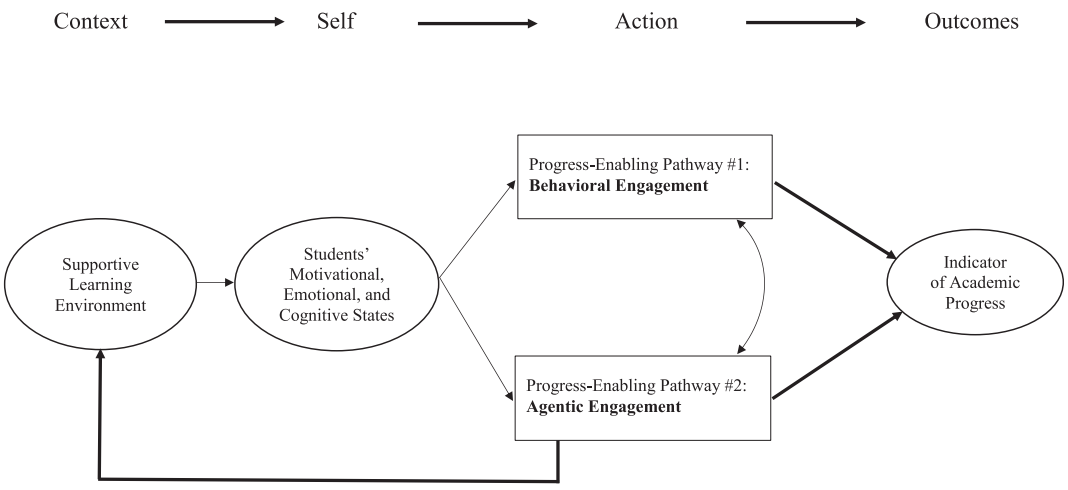

Fig. 1. Reconceptualized model of student engagement within the self-systems model.

environment). Motivational changes would bring about coordinated shifts in emotionality and cognition (Kruglanski et al., 2002). Together, students could use this dynamic motivational-emotional-cognitive state to figure out how to go about making progress (via behavioral and agentic engagement). Such a reconceptualized model might be able to predict and explain not only students' day-to-day academic process but also their longer-term developmental achievements, such as interest development (Harackiewicz, Smith, & Priniski, 2016) and identity formation (Robinson, Perez, Nuttall, Roseth, & Linnenbrink-Garcia, 2018).

Assessment Reconceptualization. As suggested by both Table 1 and the current findings, room for improvement may exists in the future assessment of engagement. The widely-used existing measures for emotional and cognitive engagement were both developed for a different purpose than the way such instruments may be used in the future. Originally, these measures were designed to describe how students' actively involved themselves in learning activities. Measures were created to differentiate active (i.e., positive-activating emotions, deep and sophisticated learning strategies) from passive (i.e., negative-deactivating emotions, surface and superficial learning strategies) task involvement. In contrast, the model suggested in Fig. 1 is a functional, rather than a descriptive, model. So, future assessments may be geared to assess purposive and progress-enabling actions.

9.4. Limitations

Four aspects of the investigation limit the conclusions that can be drawn. First, the measures of cognitive and behavioral engagement were highly correlated in Study 2, which raises the possibility that cognitive engagement's inability to emerge as an independent predictor might represent a statistical limitation. This same high overlap in which the two measures merged into a single, larger component has been found in previous investigations (Ben-Eliyahu et al., 2018; Burns, Martin, & Collie, 2019). We suggest, however, that the integration of these two components goes beyond just a statistical limitation to instead suggest that cognitive engagement is a closely intertwined predictor and energizer of behavioral engagement (as per Fig. 1).

Second, future studies might consider additional engagement indicators, such as "social engagement" (Linnenbrink-Garcia, Rogat, & Koskey, 2011), which has also been referred to as "collective engagement" (Ryu & Lombardi, 2015). We did not include this possible engagement component, however, because its utility applies to group-based activities, rather than to all learning activities. It is further possible that social engagement might energize and amplify other engagement components (Rogat & Linnenbrink-Garcia, 2011), rather than function as an engagement component itself. This could be another fruitful question for future research.

Third, our findings may have limited generalizability in terms of both the samples and the instruments utilized. As to the samples we utilized, Study 2 included only students taking PE courses, and both studies included only Korean secondary-grade students. Engagement may look differently in different learning contexts (e.g., PE vs. social studies; field vs. lecture-based classroom), in different nations, and in different grade levels. This means that, rather than being highly cross-situational, engagement may be constrained by or specific to the particular course students are taking. For instance, Study 1 showed that engagement was lower in math than in Korean (see Table 3). Engagement has also been shown to be specific to the particular activity of the day even within the same course. For instance, in a PE course, engagement is generally higher during ball games (e.g., basketball) than during artistic sports (e.g., gymnastics) (Aelterman et al., 2012). As to the measures we utilized, our findings might be further constrained by "instrument limitations". As discussed, both emotional and cognitive engagement can be measured in different ways than those utilized in our studies. Future investigations will need to expand on the operational definitions of how all of these engagement-related dimensions are measured.

Finally, we acknowledge that our focus on engagement recognizes only its "bright side" [to use Bartholomew, Ntoumanis, Ryan, Bosch, and Thøgersen-Ntoumani (2011) terminology]. A similar focus on engagement's "dark side", which would be "disengagement" or "disaffection", is yet another fruitful area for future research (e.g., see Jang et al., 2016; Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010). Eventually, a comprehensive conceptual model will likely feature both bright (engagement) and dark (disengagement) sides (Curran & Standage, 2017; Martin, 2012; Martin, Anderson, Bobis, Way, & Vellar, 2011; Skinner et al., 2008).

10. Conclusion

Future engagement research may be enriched by adding the promising new agentic component and by reconceptualizing the role of emotion (and probably cognition as well) in the engagement-to-progress dynamic. Agentic engagement represents students' constructive contribution into the flow of instruction they receive, and these proactive, purposive, and reciprocal actions are integral both to academic progress and to the shaping of a more supportive learning environment. The potential benefits of such a reconceptualization are (1) to explain how students actually make academic progress and (2) to understand how the four constructs depicted in Fig. 1 optimally work together (i.e., supportive learning environment, motivation, engagement, and making progress). Future research will need to include samples of students from different nations and different grade levels, different learning activities, multiple measures of emotionality and thinking, additional indicators of academic progress, and perhaps additional engagement components.

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