EMPIRICAL RESEARCH

The Pivotal Role of Adolescent Autonomy in Secondary School Classrooms

Christopher A. Hafen · Joseph P. Allen ·
Amori Yee Mikami · Anne Gregory ·
Bridget Hamre · Robert C. Pianta

Abstract Student engagement is an important contributor to school success, yet high school students routinely describe themselves as disengaged. Identifying factors that alter (increase) engagement is a key aspect of improving support for student achievement. This study investigated students' perceptions of autonomy, teacher connection, and academic competence as predictors of changes in student engagement within the classroom from the start to the end of a course. Participants were 578 (58% female) diverse (67.8% White, 25.2% African American, 5.1% Hispanic, 1.2% Asian American) high school students from 34 classrooms who provided questionnaire data both at the start and the end of a single course. Novel results from a cross-lagged model demonstrated that students who perceived their classrooms as allowing and encouraging their own autonomy in the first few weeks increased their engagement throughout the course, rather than the typical decline in engagement that was demonstrated by students in other classrooms. This finding is unique in that it extended to both students' perceptions of engagement and observations of student engagement, suggesting a fairly robust pattern. The pertinence of this finding to adolescent developmental needs and its relationship to educational practice is discussed.

C. A. Hafen (✉) · J. P. Allen · B. Hamre · R. C. Pianta
University of Virginia, Charlottesville, VA, USA
e-mail: cah3wy@virginia.edu

A. Y. Mikami
University of British Columbia, Vancouver, BC, Canada

A. Gregory
Rutgers, The State University of New Jersey, Newark, NJ, USA

Introduction

One alarmingly consistent finding in educational research is that student engagement in the classroom declines markedly within secondary classrooms from the start of the year to the end of the year (Marks 2000; Skinner et al. 2008), and is at its lowest in high school classrooms (Martin 2009). By high school, about half of students are chronically disengaged from school (Steinberg et al. 1996). This is particularly troubling in light of research highlighting the negative correlates of a lack of school engagement. Lower levels of student engagement are associated with a variety of indices of academic struggles including lower school grades (Goodenow 1993), lower scores on standardized achievement tests (Roderick and Engle 2001; Willingham et al. 2002), and higher rates of dropout (Croninger and Lee 2001). Conversely, adolescents reporting higher school engagement also tend to have more positive peer and parent relationships (Murray 2009; Van Ryzin et al. 2009) and engage in fewer delinquent activities (O'Farrell and Morrison 2003). Clearly, student engagement is a marker for healthy adjustment in adolescence and a precursor to attainment and performance in achievement and social domains. Sadly, recent research suggests disengagement is the norm, perhaps because recent standards-based reforms have resulted in a more narrow and constrained classroom which may often restrict the needs of a developing adolescent (Deci 2009; Olsen and Sexton 2008). The current study highlights an understudied contributor to student engagement in secondary schools, namely students' perceptions of their teacher and

the classroom environment, to better understand what drives engagement, or lack thereof, in the classroom.

Self-Determination Theory

Student engagement does not exist in a vacuum; rather it is likely influenced by the interplay of adolescent developmental goals and the context of the high school classroom. Self-determination theory provides a useful framework to conceptualize fundamental adolescent needs in that it identifies three needs that form the basis for an individual's self-motivation and well-being (Ryan and Deci 2000). These needs include competence, relatedness/connection, and autonomy (Reis et al. 2000). The need for competence is satisfied by the feeling that one can successfully produce desired effects and outcomes. The need for relatedness is derived from the experience of feeling close and connected to others one considers significant. The need for autonomy involves the perception that one's activities and environment are matched and endorsed with the self. The extent to which these needs are met for an individual relates directly to that individual's sense of well-being (Ryan and Deci 2000). While these needs apply to developmental writ, they may be particularly relevant to adolescents' perceptions of their classroom (Eccles 2004).

Each of the three needs outlined in self-determination theory have been linked to various indicators of achievement and adolescent adjustment. Competence beliefs are associated with greater achievement (Chouinard et al. 2007; Denissen et al. 2007), such that individuals who believe they are capable of performing well in a particular subject tend to achieve success. A sense of relatedness and teacher connection is also linked to better adjustment. Evidence suggests that school environments that foster perceptions of connection, particularly in the form of teacher support, are associated with students displaying greater emotional competence (Hoge et al. 1990; Roeser et al. 1998). Conversely, declines among middle school students in perceptions of teacher support have been linked with increases in depressive symptoms and behavioral problems (Way et al. 2007). Finally, environments that support autonomy are associated with increases in motivation (Grouzet et al. 2004) and greater psychological adjustment (Deci et al. 2001; Ratelle et al. 2004). Indeed, some have argued that the encouragement of autonomy may be the most salient developmental context for adolescent growth (McElhaney et al. 2009). Thus, there is reason to expect that autonomy is particularly important for understanding engagement in the classroom.

Given the evidence suggesting that engagement serves as a critical marker for healthy adjustment in adolescence (Staff et al. 2010; Van Ryzin et al. 2009), it is surprising that little is known about the predictors of *change* in

engagement. In other words, little is known about what increases student engagement in the classroom across the school year. The few studies that have addressed whether students' perceptions are related to *student-reported* engagement suggest that student autonomy, in particular, is linked with student engagement (Deci et al. 1989; Hardre and Reeve 2003; Vallerand et al. 1997). It also may be important to consider potential sex differences in the study of engagement. There is some evidence that girls are more likely to show higher levels of overall school motivation and satisfaction (Goodenow 1993; Fredricks et al. 2004), although there is evidence that sex does not moderate associations with engagement (Finn 1993; Wigfield et al. 2006).

Yet, these studies did not address how students' perceptions relate to changes in engagement nor did they use measures from multiple sources (e.g., observer reports of engagement among adolescents). A focus on predictors of change in student levels of engagement (as opposed to simply examining cross-sectional correlates) is critical to ruling out some alternative causal hypotheses (e.g., that associations of the two constructs exist only because engagement is changing students' perceptions, rather than the reverse). One study that did look at changes in student-reported engagement among middle school students found that perceptions of autonomy were particularly influential (Skinner et al. 2008), although their analyses failed to consider the possibility of an engagement to perceptions link. The current study will help address this gap by examining bidirectional predictions between students' perceptions and both student-reported engagement and observed engagement across an academic year in high school classrooms.

Measuring Engagement

There is considerable debate over how to best measure the multidimensional construct of student engagement (Fredricks et al. 2004). This debate centers around the fact that the construct of student engagement encompasses many different markers including behavioral markers such as time spent on work, emotional markers such as interest and enthusiasm for schoolwork, and the extent to which students persist in the face of challenging tasks by using effort and problem-solving skills (Appleton et al. 2008; Klem and Connell 2004). Researchers disagree on how best to capture the internal workings of engagement, which may involve emotions and cognitions that are difficult to capture, yet they agree that the end product is the behavior a student endorses by either reporting that they are involved in schoolwork and engaged in a course or by actually physically demonstrating engagement through eye contact and verbal involvement (Appleton et al. 2008).

It is important to note, however, that these studies are all based on adolescent reports of engagement rather than observations of actual behavioral indicators of engagement. While the research literature on observed engagement in secondary classrooms is sparse, there is evidence that observed behavioral engagement is strongly related to academic success in much the same way as student-reported engagement (Gregory et al. 2011; Marks 2000). Self-determination theory has been tested largely with student-reported engagement measures, mainly because most researchers assume that students themselves are the only source of information about their engagement in tasks and activities (Marks 2000). This view, however, is limited in that the engagement as observed in a classroom is a direct result of attention and effort on the part of the students, and not subject to influence by self-report biases.

Due to the complicated nature of measuring engagement, measures that tap engagement may be more reliable at the end of a course than at the beginning. The reason students' perceptions of engagement in particular are likely to be more reliable at the end of a course is because students are more likely to base their reports on expectations concerning engagement at the start of the course, while more likely to report on experiences at the end of a course (Appleton et al. 2008). Thus, at the classroom-level, by the end of a course a teacher who promotes engagement through interesting and relevant classroom activities is more likely to have students who report on these experiences. Studies that have used student and teacher reports of engagement have indeed found stronger correlations at the end of a course than at the beginning (Kindermann et al. 1996; Wood et al. 2006). Although not previously studied, it is likely that student-reported and observed engagement would be more closely aligned at the end of a course than at the beginning. In order to truly capture change in student engagement and test this possibility, it is important to both gather measures at the beginning and the end of a course and to collect measures of engagement from multiple sources.

The Current Study

The current study examines the extent to which high school students' perceptions about academic competence, teacher connection, and autonomy are associated with student-reported and observed engagement across the school year. The analyses were undertaken to accomplish two goals. The first goal is to determine the associations between perceived and observed measures of student engagement, as well as the extent to which student-reported perceptions about the teacher and the classroom are related to each measure of engagement concurrently. Correlations at the start of the course and at the end of the course were utilized to examine the hypothesis that the two measures of engagement will be more closely aligned at the end of a class than at the beginning, as will the associations between students' perceptions about the classroom and both measures of engagement.

The second goal of the study is to determine the extent to which teacher supports for competence, connection, and autonomy within the classroom environment, as perceived by students at the start of an academic year, predict changes in student-reported engagement and observed engagement across the year. Cross-lagged models were utilized to examine the counter hypothesis that engagement at the start of the class might lead to changes in the students' perceptions. It is hypothesized that the strongest predictor of change in engagement will be adolescents' perceptions about autonomy within the classroom, as adolescents are particularly prone to seek out and thrive in environments where they are afforded structured autonomy to apply their knowledge (Allen et al. 1994; Skinner et al. 2008), and thus should exhibit increased engagement in environments that afford autonomy (Smith et al. 2010), although other dimensions from self-determination theory (e.g., teacher connection and academic competence) are also examined.

Method

Participants

A total of 34 ($n = 18$ female teachers; $n = 16$ male teachers) high school classrooms with 578 ($n = 323$ males; $n = 255$ females) students were included in this study (M students per course $= 17.0$). These classrooms were drawn from four schools in Virginia. Teachers had an average of 7.5 years of teaching experience. The students in these classrooms ranged from 9th to 12th grade ($M = 10.24$, SD $= 0.88$) and were diverse (67.8% White, 25.2% African American, 5.1% Hispanic, 1.2% Asian American), with 39.75% (SD $= 26.54\%$) qualifying for a free and reduced lunch. Of the 34 study courses utilized in this study, 52.94% ($n = 18$) contained language arts/social studies content and 47.06% ($n = 16$) contained math/science content.

Procedure

Data collection for the current study occurred at the beginning of the course and again near the end of the course. Teachers received modest monetary compensation for their efforts along with professional development

credits from their district. Each participating classroom also was provided a small amount of money for each student assessment period so the teacher could buy a gift (e.g., pizza party) for the students. Teachers voluntarily provided written consent and all study procedures were approved by a university institutional review board. After a teacher had consented and chosen a study class, the parents of students in that study class were asked to provide consent for their child's participation and each student was asked to provide their assent. Over 75% of possible students across classrooms agreed to participate in the study.

Students who agreed to participate in each course completed questionnaires once at the beginning of the course (Time 1) and once at the end of the course (Time 2) about their behaviors and their perceptions of the classroom. Teachers distributed questionnaires during class time and asked students to record their responses on a scantron form. Teachers instructed students that responses would be kept confidential from the teacher, and the students themselves deposited their completed scantrons into a prepaid mailer and sealed it. For all teachers, the Time 1 videotape and student questionnaires were sent in approximately 1 month after the study course had begun, and the Time 2 videotape and student questionnaires were sent in with approximately 3 weeks from the end of the course. Teachers included in this study were drawn from an experimental teacher intervention study (My Teaching Partner-Secondary; Allen et al. 2011) in which they were randomly assigned to a professional development intervention or a business-as-usual control group. As teachers from both groups are used in this analysis, an experimental group control variable was included in the analyses (1 = control; 2 = intervention).

Measures

Observed Student Engagement

This variable was measured by observer ratings of student engagement within the classroom. Teachers videotaped their course once within the first several weeks at the start of their study course and once more in the last few weeks of their study course. A team of upper-level undergraduate and graduate students were trained in a 2-day workshop on the Classroom Assessment Scoring System-Secondary (CLASS-S; Pianta and Hamre 2009). Each coder was required to complete a reliability test subsequent to the training in which they watched five segments and needed to be within one point of the master-codes on 80% of their scores (coder average for this study = 89%). Additionally, coders met with master coders regularly to watch and code a calibration clip and discuss the codes. Teachers were asked to provide 40 min of instructional time and

this was split into two 20-min segments for coding. Each 20-min segment was coded by two separate coders for a total of four coders per tape. These codes were then averaged to create one overall code for each observation point in order to maximize reliability of the score (Raudenbush 2008). The Student Engagement dimension was included in this analysis. The scale for these codes ranges from 1 to 7. Coders rate overall classroom engagement by coding for the average engagement of students in the classroom. Scores in the low range (1 or 2) were assigned to segments in which the students were observed to be consistently disengaged or distracted. Scores in the mid range (3, 4, or 5) were assigned to segments in which most of the students were observed to be passively engaged. Scores in the high range (6 or 7) assigned to segments in which most of the students were actively engaged in the lesson. Active engagement was evidenced by students asking questions, volunteering information, participation in activities, and few indications of off-task behavior. Inter-rater reliability was moderate-to-good (ICC = .69) based on Cicchetti and Sparrow's (1981) standards for interpreting ICCs.

Student Reported Engagement

Student-reported engagement included 6 items (e.g., I try hard to do well in this class) taken from Patterns of Adapted Learning Scale (Midgley et al. 2000), describing the extent to which the student felt involved and invested in the course. Items ranged on a scale from 1 (Not at all true) to 5 (Very true). Internal reliability was good at both time points (α = .80 to .89). Perceptions were aggregated to the classroom level in order to capture the average adolescent's report of engagement within the course.

Academic Competence

Academic competence included 13 items (e.g., I'm certain I can master the skills taught in this class this year) adapted from academic efficacy and master motivation scales (Midgley et al. 2000), describing whether each student was confident in their abilities to do well in the study course. Items ranged on a scale from 1 (Not at all true) to 5 (Very true). Internal reliability was good at both time points (α = .83 to .84). Perceptions were aggregated to the classroom level in order to capture the average adolescent's perception of academic competence within the course.

Adolescent Autonomy

Adolescent autonomy included 18 items (e.g., Students often feel like they get to help lead the class; Students often

get choices about how to do project or assignments) describing the extent to which each student perceived the study course structure as allowing for autonomy and the content as being relevant. Items ranged on a scale from 1 (Not at all true) to 5 (Very true). Internal reliability was good at both time points ($\alpha = .84$ to $.86$). Perceptions were aggregated to the classroom level in order to capture the average adolescent's perception of autonomy within the class.

Teacher Connection

Teacher Connection included 5 items (e.g., This teacher really cares about me) adapted from a Teacher Affection scale (Skinner and Belmont 1993) and a Teacher–Student–Relationship Scale (Roeser et al. 1996), describing the extent to which each student felt as if they had a positive and close relationship with their teacher. Items ranged on a scale from 1 (Not at all true) to 5 (Very true). Internal reliability was adequate at both time points ($\alpha = .76$ to $.77$). Perceptions were aggregated to the classroom level in order to capture the average adolescent's perception of teacher connection within the class.

Plan of Analysis

Analyses were conducted to examine the associations between students' perceptions of autonomy, competence, and connection with both observed and student-reported engagement. An initial analysis looks at associations between these measures both at the start of a course (Time 1) and at the end of a course (Time 2) to determine if associations are similar or different. The main analysis uses a cross-lagged model to assess which student perception scale was the best predictor of change in engagement from Time 1 to Time 2. In these analyses, two separate two time-point cross-lagged models, which offer the advantage of inferring causal associations in data from longitudinal designs (Curran 2000; Kenny 1975), were conducted to examine the associations between autonomy, competence, and connection to change in student engagement throughout the year (see Figs. 1, 2).

Students' perceptions were aggregated to the classroom level in order to capture the average adolescent's perception within the class. Aggregated student-report scales were needed to parallel the classroom-level observed engagement scale which yields an overall score for the engagement of the average student in a classroom. The prediction of interest was whether students' perceptions at Time 1 would predict changes in student engagement; however, paths were also included from engagement at Time 1 predicting changes in students' perceptions to rule out the possibility of bidirectionality. Perceptions of autonomy,
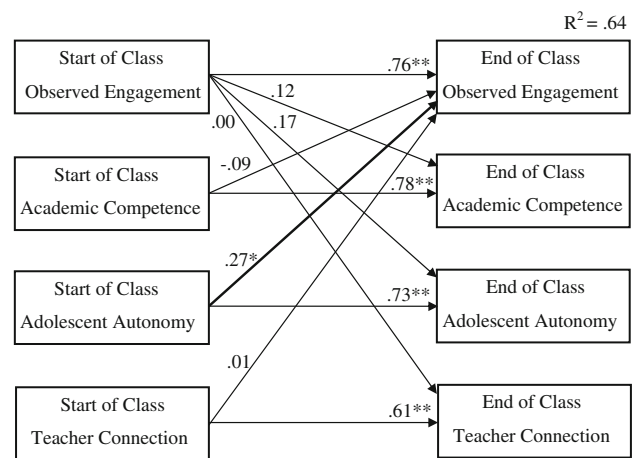
Fig. 1 Predicting changes in observed student engagement across the year from students' perceptions at the start of the class. $*p < .05$; $**p < .01$. Associations among variables at the start of the class were included in the analyses but are not listed here. Please see Table 2 for an estimate of those associations
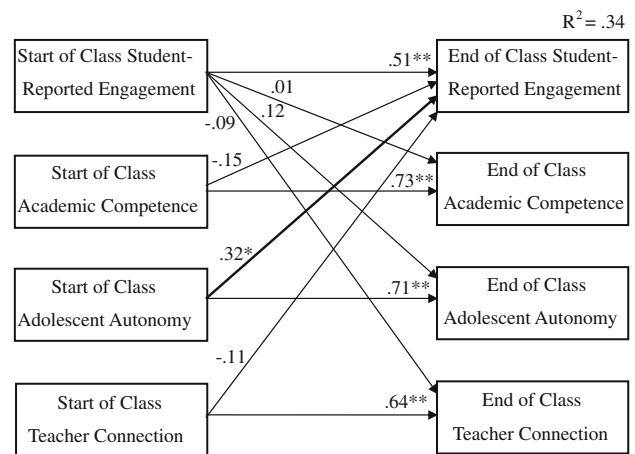
Fig. 2 Predicting changes in student-reported engagement across the year from student perceptions at the start of the class. $*p < .05$; $**p < .01$. Associations among variables at the start of the class were included in the analyses but are not listed here. Please see Table 2 for an estimate of those associations

competence, and connection were included in the same models to allow conclusions about the importance of each for predicting engagement. Both the intervention status of the classroom (1 = Yes, 2 = No) and gender balance of the classroom (% of females) were included as control variables. These analyses were conducted with MPlus (Version 6; Muthén and Muthén 2010). There was no missing data for observations of engagement at either time point, but 2 classrooms were missing student perception data at Time 1 and 4 classrooms were missing student perception data at Time 2. This missing data was handled using Full Information Maximum Likelihood (FIML; Arbuckle 1996).

Results

Table 1 presents the means and standard deviations for each of the variables included in the study at both the start (Time 1) and the end (Time 2) of the course. There was an overall decrease in both types of engagement and two of the three aspects of students' perceptions over the study period, and students' perceptions of teacher connection was the only variable to increase from Time 1 to Time 2. However, these changes were not statistically significant.

Associations at the Start of a Course Versus the End of a Course

Table 2 presents intercorrelations among the study variables both Time 1 and Time 2. At Time 1, only perceptions about teacher connection were associated with student-reported engagement ($r = .54$; $p < .001$). At Time 2, observed engagement was associated with student-reported engagement ($r = .39$; $p = .01$), representing a significant change from the same association at Time 1 ($r = -.18$), $z = 2.22$, $p = .03$. This suggests that these two measures of student engagement became more closely aligned throughout the course of the year. Additionally, at Time 2 observed engagement was associated with perceptions about adolescent autonomy ($r = .55$, $p < .001$), representing a significant change from the same association at Time 1 ($r = .00$), $z = 2.31$, $p = .02$.

Cross-Lagged Models Predicting Change in Student Engagement

As mentioned prior, both intervention status of the classroom and gender balance of the classroom were included as control variables. Neither variable moderated the associations between students' perceptions and change in engagement, and thus will not be discussed further.

Predicting Change in Observed Engagement Within the Classroom

The following are results from cross-lagged analyses predicting the observed engagement of students. The model included all three student perception scales as predictors of change in observed engagement from Time 1 to Time 2 (see Fig. 1). The inclusion of the three student-perception scales resulted in a significant amount of extra variance explained in the outcome ($\Delta R^2 = .06$). As is indicated in both Table 2 and Fig. 1, there were no significant associations with observed student engagement at Time 1. However, more positive classroom-level students' perceptions of adolescent autonomy predicted increases in observed engagement across the year ($\beta = .27$, p = .04). Neither student-reported competence nor connection predicted changes in the observed engagement of students. Further, observed engagement at Time 1 did not predict changes in any of the three student perception scales.

Predicting Change in Student-reported Engagement Within the Classroom

The second set of cross-lagged models was conducted predicting student-reported engagement in classroom activities and material. The model included all three student perception scales as predictors of change in student-reported engagement from Time 1 to Time 2 (see Fig. 2). The inclusion of the three student-perception scales resulted in a significant amount of extra variance explained in the outcome ($\Delta R^2 = .08$). As is indicated in both Table 2 and Fig. 2, only perceptions about teacher connection were

Table 1 Means and standard deviations of engagement and students' perceptions at the start and end of the class

Variable	Start of class		End of class	
	M	SD	M	SD
Observed student engagement	4.30	0.63	4.24	0.75
Student reports of engagement	3.57	0.18	3.51	0.24
Perceived academic abilities	3.75	0.46	3.63	0.57
Perceived teacher connection	2.86	0.42	3.02	0.33
Perceived adolescent autonomy	3.06	0.42	2.98	0.51

Table 2 Intercorrelations among study variables at the start and end of the class

Variable	1	2	3	4	5
1. Observed student engagement	–	.39*	.33	.55**	.28
2. Student-reported engagement	−.18	–	−.04	.15	.14
3. Perceived academic competence	.18	.01	–	.55**	.30
4. Perceived adolescent autonomy	.00	.20	.55**	–	.55**
5. Perceived teacher connection	−.05	.54**	.05	.62**	–

* $p < .05$; ** $p < .01$. Correlations below the diagonal are from the start of the class and correlations above the diagonal are from the end of the class. Perception scales are all based on classroom-level composites

significantly associated with student-reported engagement at Time 1. Figure 2 further shows that higher classroom-level students' perceptions about adolescent autonomy at Time 1 predicted increases in student-reported engagement across the year ($\beta = .32$, $p = .02$). Neither student-reported competence nor connection predicted changes in student-reported engagement. Student-reported engagement at Time 1 did not predict changes in any of the three student perception scales.

Discussion

This study presents steps towards better understanding the important dynamics of student engagement in high school classrooms. Studies have consistently identified decreasing engagement as a major issue among high school students (Marks 2000), but this study provides preliminary evidence that this decline can be avoided. To this end, the major goal of the study was to determine the extent to which supports for competence, connection, and autonomy within the classroom environment, as perceived by students at the start of an academic year, predicted changes in student-reported engagement and observed engagement across the year. As was hypothesized, the strongest predictor of change in both observed and student-reported engagement was adolescents' perceptions about autonomy within the classroom. This finding is supported by developmental literature suggesting that adolescents are most likely to succeed and engage in environments that allow for structured autonomy with which to apply their knowledge (Allen et al. 1994; Smith et al. 2010).

This study is unique as it examines features of the classroom that predict changes in both student-reported and observed engagement across the year. The findings from this study suggest that student engagement and autonomy within the classroom are related even though they may not always share strong concurrent associations. This finding echoes previous work based entirely on student self-report with early adolescents, which identified autonomy as a key to understanding changes in student-reported engagement among middle school students (Skinner et al. 2008). Unique to this study is the use of observed engagement as an additional outcome. The fact that changes in both student-reported and observed engagement were predicted by classroom-level students' perceptions of autonomy at the start of the course suggests that the stage is set in high school classrooms early in the year for processes that will to some degree impact student engagement throughout the year. This places added importance on the interactions and activities teachers provide their students early in the year, as they may not be able to engage students later in the year if they are unable to provide them with opportunities to experience autonomy early on.

The reason autonomy may be the key to unlocking engagement in high school classrooms is directly tied to the needs of developing adolescents. The autonomy measure in this study included questions about leadership, freedom of choice, and relevancy of the material. These are precisely the fundamental adolescent needs that researchers have identified as key to development and growth (Allen and Land 1999; Steinberg and Silverberg 1986), when teens are seeking environments outside of the home that allow them to flourish and grow. The extent to which adolescents feel they have some control over their setting allows them to feel more connected to what they are learning. Self-determination theory posits that autonomous environments promote increased engagement through increased cognitive involvement, increased effort, and decreased boredom (Ryan and Deci 2000). Further, adolescents are keenly attuned to whether or not an environment meets their needs for autonomy (Collins and Laursen 2004), and will choose to engage or disengage accordingly. This follows from the larger developmental literature, suggesting that achieving autonomy is one of the central markers of healthy adjustment in adolescence (Eccles et al. 1997; Allen et al. 1994). From these theories, one explanation for the current study's findings is that a classroom environment characterized by autonomy could lead to the internalization/development of autonomous learning and higher motivation, which would then be manifested in engaged behavior on the part of the students.

The inclusion of both observed engagement and student-reported engagement allowed a comparison across methods not provided in previous work. Overall, the results indicate that the two measures of engagement were not at all related at the beginning of the year, but by the end of the year were strongly related. Notably, perceptions of autonomy predicted changes in both types of engagement. The apparent discontinuity between the two measures of engagement early in the course suggests an important methodological issue. It may be the case that student-reports of engagement are more influenced by social desirability and intentions to be engaged at the start of the year, whereas their reports by the end of the year reflect the accumulation of actual experiences of engagement or lack thereof throughout the year (Appleton et al. 2008). As a result, observed engagement may in some ways be a stronger measure of student engagement at the beginning of the year, as it likely takes students some time to process and realize whether they are or are not being engaged.

These findings point to the importance of social-developmental issues in determining student effort, even in contexts such as the classroom which may seem like a purely academic context. Previous research has highlighted the importance of peers and the influence they can have on an individual's motivation and engagement in school

(Kindermann 1993; Van Ryzin et al. 2009). A student in a supportive learning environment that allows them an opportunity to express curiosity and become involved in the learning process will always fare better and engage more than a student who is subjected to lack of stimulation or a threatening environment. Thus, it is not simply that some students are more motivated than others, but rather that the environment created in a class, which is setup largely by the teacher early in the year, can either allow only the most intrinsically motivated students to flourish or allow all students the chance to express themselves and engage in the material regardless of their ability (Urdan and Schoenfelder 2006). The findings of the current study highlight that the classroom is best viewed in a broader perspective as both an academic and a social developmental context. It is thus particularly alarming that secondary classrooms so commonly lack elements of autonomy and material is very rarely communicated in terms of relevance to students' lives (Pianta and Allen 2008). A quick look at Table 1 of this study shows that the average classroom reports their autonomy right at the midpoint of the scale (3 = Somewhat True), which means that most students do not view their classrooms as promoting autonomy. Unfortunately, recent educational reforms often have resulted in curriculum and classroom structures that restrict rather than promote autonomy, only serving to further the disengagement that plagues secondary education (Legault et al. 2006; Deci 2009). Finding effective methods to curb adolescent disengagement from school may start with efforts to help teachers place autonomy at the forefront of their teaching.

The lack of findings for two of the self-determination theory needs is somewhat surprising. Neither perceptions concerning competence nor perceptions concerning teacher–student closeness predicted changes in observed or student-reported engagement across the year. This is contrary to previous research in which both have been associated with adolescent well-being (Denissen et al. 2007; Hoge et al. 1990). The lack of findings are attributable to two main causes. First, the stability of both student-reported and observed engagement was quite high (.51 and .76, respectively), which limited the leftover variance in the end of year engagement to predict. This lends further support to the conclusion that the association from autonomy is quite strong, as it predicted over and above the stability. Second, the lack of findings is at least partially due to the simultaneous testing of all three needs within the same analysis. The correlations between perceptions of autonomy and both competence and teacher–student closeness were quite strong at the start of the course, so it is likely that including all three as predictors in the same model reduced the magnitude of the associations from competence and teacher–student closeness to engagement.

It is also possible that competence and teacher–student closeness are related more strongly to other outcomes. For instance, teacher–student closeness might be more strongly related to psychosocial outcomes among adolescents (e.g., identification with school); while autonomy may simply be more predictive of involvement in process-oriented tasks such as engagement in classwork. An important next step is to focus on the contexts in which each of the three needs is most indicative of change for adolescents, as this study suggests that autonomy is most important in the context of school engagement.

Two major strengths of this study are the use of multiple measures of engagement and the use of longitudinal data to detect change in engagement. The use of observed engagement as an outcome eliminates one of the weaknesses plaguing previous research in that self-reports have typically been used to measure both predictors and outcomes. The use of observations in this study eliminates the self-report confound as a concern, thus yielding findings that provide strong support for the power of students' perceptions of autonomy within the classroom. The use of longitudinal data also allowed for ruling out the potential bidirectionality of influences. Specifically, the lack of association between engagement at the start of the year and perceptions of autonomy at the end of the year rules out the possibility that engagement drives changes in perceptions. This is important as it points to the uniqueness of the link between perceptions of autonomy and changes in engagement.

It is important to note that the current findings are at the classroom level rather than the individual level. Therefore, the findings speak to the fact that teachers who promote an environment of autonomy early in a class tend to have classrooms in which student engagement will increase throughout the year. This is not to say that individual differences do not play a role. While beyond the scope of this study, it is important to understand how the various characteristics (e.g., grade expectations, problem behavior) a student brings with them into the classroom help to shape their own engagement. Indeed, one key to understanding engagement in school that has yet to be studied is to understand the variability in an adolescent's engagement across different classrooms. The current findings suggest that autonomy is an important construct for understanding some of this variability, but it is certainly not the only one.

Several limitations to this study are worthy of note. First, this study comes from a larger intervention study and thus half the teachers were given a treatment and half the teachers were in a business-as-usual control condition. While the variable coding for condition was included as a control in these analyses, and did not change the pattern of effects, it is not clear to what extent this context may have altered the dynamics of these classrooms. Second, teachers

selected the video that they sent in for coding. This likely resulted in not receiving the full range of videos as some teachers may have been reluctant to send in what they considered their worst videos. Given that this would most likely restrict the variability of observations, and thus make it harder to detect results, it may be that some of the effects reported here are only conservative estimates. A design in which teachers are unaware of the lessons to be recorded would solve this limitation. Finally, the design utilized only two assessment points, one at the beginning of a class and one at the end of a class. This was beneficial and allowed for analysis of change in engagement, but in order to truly capture the impact of classroom environments on engagement, more assessment points would be optimal. While these limitations point to some important next steps, this study provides a significant advance to the existing literature on adolescent development.

The above findings point to one important factor, support for students' autonomy, which may help curtail declines in engagement among high school students. This study found that classrooms with students who reported having greater autonomy early in a course had increases in student engagement throughout the year, while classrooms without autonomy exhibited the all-to-common declines in student engagement. This novel finding is not surprising, although it provides an important contribution to adolescent research, as it strengthens the existing argument that adolescents are particularly prone to seek and flourish in environments that offer autonomous interactions. Unfortunately, autonomy is also a key element that is missing from most high school classrooms, and thus it should not be surprising that disengagement is often more common than engagement. The fact that students' perceptions form early in the school year to predict changes in engagement offers compelling evidence that setting an autonomous and supportive classroom environment early in the year can yield great benefits.

References

Allen, J. P., Hauser, S. T., Bell, K. L., & O'Connor, T. G. (1994). Longitudinal assessment of autonomy and relatedness in adolescent-family interactions as predictors of adolescent ego development and self-esteem. *Child Development, 65*(1), 179–194.

Allen, J. P., & Land, D. (1999). Attachment in adolescence. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment theory and research* (pp. 319–331). New York: Guilford.

Allen, J. P., Pianta, R. C., Gregory, A., Mikami, A. Y., & Lun, J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. *Science, 333*, 1034–1037.

Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools, 45*, 369–386.

Arbuckle, J. L. (1996). Full information estimation in the presence of incomplete data. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling: Issues and techniques* (pp. 243–277). Mahwah, NJ: Erlbaum.

Chouinard, R., Karsenti, T., & Roy, N. (2007). Relations among competence beliefs, utility value, achievement goals, and effort in mathematics. *British Journal of Educational Psychology, 77*, 501–517.

Cicchetti, D. V., & Sparrow, S. A. (1981). Developing criteria for establishing interrater reliability of specific items: Applications to assessment of adaptive behavior. *American Journal of Mental Deficiency, 86*, 127–137.

Collins, W. A., & Laursen, B. (2004). Changing relationships, changing youth: Interpersonal contexts of adolescent development. *Journal of Early Adolescence, 24*, 55–62.

Croninger, R., & Lee, V. E. (2001). Social capital and dropping out of high school: Benefits to at-risk students of teachers' support and guidance. *The Teachers College Record, 103*, 548–581.

Curran, P. J. (2000). A latent curve framework for studying developmental trajectories of adolescent substance use. In J. Rose, L. Chassin, C. Presson, & J. Sherman (Eds.), *Multivariate applications in substance use research* (pp. 1–42). Hillsdale, NJ: Erlbaum.

Deci, E. L. (2009). Large-scale school reform as viewed from the self-determination theory perspective. *Theory and Research in Education, 7*, 244–252.

Deci, E. L., Connell, J. P., & Ryan, R. M. (1989). Self-determination in a work organization. *Journal of Applied Psychology, 74*, 580–590.

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin, 27*, 930–942.

Denissen, J. J. A., Zarrett, N. R., & Eccles, J. S. (2007). I like to do it, I'm able, and I know I am: Longitudinal couplings between domain-specific achievement, self-concept, and interest. *Child Development, 78*, 430–447.

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

Eccles, J. S., Early, D., Fraser, K., Belansky, E., & McCarthy, K. (1997). The relation of connection, regulation, and support for autonomy to adolescents' functioning. *Journal of Adolescent Research, 12*, 263–286.

Finn, J. D. (1993). *School engagement and students at risk.* Washington, DC: National Center for Education Statistics.

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

Goodenow, C. (1993). Classroom belonging among early adolescent students. *The Journal of Early Adolescence, 13*, 21–43.

Gregory, A., Allen, J. P., Mikami, A. Y., Hafen, C., & Pianta, R. C. (2011). *Effects of a professional development program on behavioral engagement of students in middle and high school* (submitted).

Grouzet, F. M. E., Vallerand, R. J., Thill, E. E., & Provencher, P. J. (2004). From environmental factors to outcomes: A test of an integrated motivational sequence. *Motivation and Emotion, 28*, 331–346.

Hardre, P. L., & Reeve, J. M. (2003). A motivational model of rural students' intentions to persist in, versus drop out of, high school. *Journal of Educational Psychology, 95,* 347–356.

Hoge, D. R., Smit, E. K., & Hanson, S. L. (1990). School experiences predicting changes in self-esteem of sixth- and seventh-grade students. *Journal of Educational Psychology, 82,* 117–127.

Kenny, D. A. (1975). Cross-lagged panel correlation: A test for spuriousness. *Psychological Bulletin, 82,* 345–362.

Kindermann, T. A. (1993). Natural peer groups as contexts for individual development: The case of children's motivation in school. *Developmental Psychology, 29,* 970–977.

Kindermann, T. A., McCollam, T. L., & Gibson, E. G. (1996). Peer networks and student's classroom engagement during childhood and adolescence. In J. Juvonen & K. Wentzel (Eds.), *Social motivation: Understanding children's school adjustment* (pp. 279–312). Cambridge, England: Cambridge University Press.

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health, 74,* 262–273.

Legault, L., Green-Demers, I., & Pelletier, L. (2006). Why do high school students lack motivation in the classroom? Toward an understanding of academic motivation and the role of social support. *Journal of Educational Psychology, 98,* 567–582.

Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Education Research Journal, 37,* 153–184.

Martin, A. J. (2009). Age appropriateness and motivation, engagement, and performance in high school: Effects of age within cohort, grade retention, and delayed school entry. *Journal of Educational Psychology, 101,* 101–114.

McElhaney, K. B., Allen, J. P., Stephenson, J. C., & Hare, A. L. (2009). Attachment and autonomy during adolescence. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed., pp. 358–403). Hoboken, NJ: Wiley.

Midgley, C., Maehr, M. L., Hruda, L. A., Anderman, E., Anderman, L., Gheen, M., et al. (2000). *Manual for the patterns of adaptive learning scale.* Ann Arbor: University of Michigan.

Murray, C. (2009). Parent and teacher relationships as predictors of school engagement and functioning among low-income urban youth. *The Journal of Early Adolescence, 29,* 376–404.

Muthén, B. O., & Muthén, L. K. (2010). *Mplus (Version 6.00) [Computer Software].* Los Angeles, CA: Muthén & Muthén.

O'Farrell, S. L., & Morrison, G. M. (2003). A factor analysis exploring school bonding and related constructs among upper elementary students. *The California School Psychologist, 8,* 53–72.

Olsen, B., & Sexton, D. (2008). Threat rigidity, school reform, and how teachers view their work inside current education policy contexts. *American Education Research Journal, 46,* 9–44.

Pianta, R. C., & Allen, J. P. (2008). Building capacity for positive youth development in secondary school classrooms: Changing teachers' interactions with students. In M. B. Shinn & H. Yoshikawa (Eds.), *Toward positive youth development: Transforming schools and community programs.* New York: Oxford University Press.

Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: Standardized observation can leverage capacity. *Educational Researcher, 38,* 109–119.

Ratelle, C. F., Vallerand, R. J., Chantal, Y., & Provencher, P. (2004). Cognitive adaptation and mental health: A motivational analysis. *European Journal of Social Psychology, 34,* 459–476.

Raudenbush, S. W. (2008). Advancing education policy by advancing research on instruction. *American Education Research Journal, 45,* 206–230.

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26,* 419–435.

Roderick, M., & Engle, M. (2001). The grasshopper and the ant: Motivational responses of low-achieving students to high-stakes testing. *Educational Evaluation and Policy Analysis, 23,* 197–227.

Roeser, R. W., Eccles, J. S., & Sameroff, A. J. (1998). Academic and emotional functioning in early adolescence: Longitudinal relations, patterns, and prediction by experience in middle school. *Development and Psychopathology, 10,* 321–352.

Roeser, R. W., Midgley, C., & Urdan, T. C. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioral functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology, 88,* 408–422.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55,* 68–78.

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., 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.

Smith, D. C., Ito, A., Gruenewald, J., & Yeh, H. (2010). Promoting school engagement: Attitudes toward school among American and Japanese youth. *Journal of School Violence, 9,* 392–406.

Staff, J., Schulenberg, J. E., & Bachman, J. G. (2010). Adolescent work intensity, school performance, and academic engagement. *Sociology of Education, 83,* 183–200.

Steinberg, L., Brown, B., & Dornbusch, S. M. (1996). *Beyond the classroom: Why school reform has failed and what parents need to do.* New York: Simon & Schuster.

Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Development, 57,* 841–851.

Urdan, T., & Schoenfelder, E. (2006). Classroom effects on student motivation: Goal structures, social relationships, and competence beliefs. *Journal of School Psychology, 44,* 331–349.

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real- life setting: Toward a motivation model of high school dropout. *Journal of Personality and Social Psychology, 72,* 1161–1176.

Van Ryzin, M. J., Gravely, A. A., & Roseth, C. J. (2009). Autonomy, belongingness, and engagement in school as contributors to adolescent well-being. *Journal of Youth and Adolescence, 38,* 1–12.

Way, N., Reddy, R., & Rhodes, J. (2007). Students' perceptions of school climate during the middle school years: Associations with trajectories of psychological and behavioral adjustment. *American Journal of Community Psychology, 40,* 194–213.

Wigfield, A., Eccles, J. S., Schiefele, U., Roeser, R. W., & Davis-Kean, P. (2006). Development of achievement motivation. In N. Eisenberg (Ed.), *Handbook of child psychology* (Vol. 3, 6th ed) (pp. 933–1002). New York, NY: Wiley.

Willingham, W. W., Pollack, J. M., & Lewis, C. (2002). Grades and test scores: Accounting for observed differences. *Journal of Educational Measurement, 39,* 1–37.

Wood, N. B., Lawrenz, F., Huffman, D., & Schultz, M. (2006). Viewing the school environment through multiple lenses: In search of school-level variables tied to student achievement. *Journal of Research in Science Teaching, 43,* 237–254.

Author Biographies

Christopher A. Hafen is currently a Post Doctoral Research Associate at the University of Virginia. He received his Ph.D. in Developmental Psychology from Florida Atlantic University and is the project coordinator for an educational intervention project (www.myteachingpartner.com). His research interests include understanding the function and development of close relationships in adolescence.

Joseph P. Allen is currently Director of clinical training and Hugh P. Kelly Professor of Psychology at the University of Virginia. He has done extensive research in the area of adolescent social development, with an emphasis upon using observational techniques to identify the critical facets of adolescents' relationships with others in their social world (both adults and peers). He has also conducted randomized trials of interventions targeting school failure, school dropout, and other social difficulties (e.g., teen pregnancy) among adolescents.

Amori Yee Mikami is currently an Assistant Professor at the University of British Columbia. She received her Ph.D. from the University of California at Berkeley. Her work focuses on ways in which a supportive classroom or home environment can help children to make friends, with a special interest in designing and evaluating interventions that train teachers or parents in strategies to assist children with peer problems.

Anne Gregory is currently an Assistant Professor at Rutgers, The State University of New Jersey. She received her Ph.D. from the University of California at Berkeley. Her work addresses the persistent trend that African American adolescents are issued school suspension and expulsion at higher rates than adolescents from other groups. Through research and intervention, she aims to address this trend by strengthening characteristics of teachers, classrooms, and schools associated with the successful schooling of African American students.

Bridget Hamre is currently Associate Director of the University of Virginia's Center for Advanced Study of Teaching and Learning (CASTL). She received her Ph.D. from the University of Virginia. Her research interests include student–teacher relationships and classroom processes that promote positive academic and social development for young children. She has recently worked with leaders in several states and the Office of Head Start to implement CLASS as a tool to enhance teacher-child interactions through accountability and professional development systems.

Robert C. Pianta is currently Dean and Novartis Professor of Education for the Curry School of Education at the University of Virginia. He received his Ph.D. from the University of Minnesota. His work focuses on policy and practice that enhance children's outcomes, school readiness, and later achievement. He has served on the steering committee and was a study investigator for the NICHD Early Child Care Research Network.