

Enhancing Students' Engagement by Increasing Teachers' Autonomy Support¹

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Engagement refers to the behavioral intensity and emotional quality of a person's active involvement during a task. Recognizing the benefits highly engaged people experience, we tested whether classroom teachers could incorporate the relatively foreign concept of autonomy support into their motivating styles as a way to promote their students' engagement during instruction. Teachers in an experimental group and teachers in a delayed-treatment control group received information and guidance consistent with self-determination theory on how to support students' autonomy. Over a series of 3 classroom observations, trained raters scored each teacher's autonomy support and 2 measures of their students' engagement—task involvement and influence attempts. Trained teachers displayed significantly more autonomy-supportive behaviors than did nontrained teachers. Further, the more teachers used autonomy support during instruction, the more engaged were their students. This was true on both measures of engagement.

KEY WORDS: autonomy; autonomy support; engagement; high school teachers; self-determination.

Engagement refers to the behavioral intensity and emotional quality of a person's active involvement during a task (Connell, 1990; Connell & Wellborn, 1991; Fiedler, 1975; Koenigs, Fiedler, & deCharms, 1977; Wellborn, 1991). It is a broad construct that reflects a person's enthusiastic participation in a task and subsumes many interrelated expressions of motivation, such as intrinsically

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motivated behavior, self-determined extrinsic motivation, work orientation, and mastery motivation (Fincham, Hokoda, & Sanders, 1989; Furrer & Skinner, 2003; Harter & Connell, 1984; Reeve, Jang, Hardre, & Omura, 2002).

Researchers measure engagement either through a person's active involvement such as effort and positive emotion or through a person's voice and initiative in trying to take personal responsibility for their behavior. For example, in one line of research, engaged people express their active task involvement by being goal-directed, focused, intense, persistent, and interested (Connell, 1990; Connell & Wellborn, 1991; Furrer & Skinner, 2003; Wellborn, 1991). Disengaged people, in contrast, show their passivity by being apathetic, distracted, half-hearted, helpless, or burned out. In a second line of research, engaged people express their voice and take initiative in trying to produce changes in their environment (deCharms, 1976; Fiedler, 1975; Koenig et al., 1977). Disengaged people, in contrast, show passivity by allowing external forces outside their personal control to regulate their task involvement.

In school settings, engagement is important because it functions as a behavioral pathway by which students' motivational processes contribute to their subsequent learning and development (Wellborn, 1991). For instance, engagement predicts students' achievement (Skinner, Zimmer-Gembeck, & Connell, 1998) and eventual completion of school (vs. dropping out; Connell, Spencer, & Aber, 1994). Engagement is further important because teachers (e.g., practitioners) rely on it as an observable indicator of their students' underlying motivation during instruction (Furrer & Skinner, 2003; Patrick, Skinner, & Connell, 1993; Skinner & Belmont, 1993). Thus, engagement is important both because it predicts important outcomes (e.g., learning, development) and because it reveals underlying motivation.

Teachers' Motivating Styles

Several motivation theories provide insight as to how teachers' motivating styles affect students' engagement (e.g., mastery vs. performance goal climates; Ames & Archer, 1988). We focused specifically, however, on self-determination theory (Ryan & Deci, 2000, 2002). According to this theory, a teacher's motivating style toward students can be conceptualized along a continuum that ranges from highly controlling to highly autonomy supportive (Deci, Schwartz, Sheinman, & Ryan, 1981). In general, autonomy-supportive teachers facilitate, whereas controlling teachers interfere with, the congruence between students' self-determined inner motives and their classroom activity. Autonomy-supportive teachers facilitate this congruence by identifying and nurturing students' needs, interests, and preferences and by creating classroom opportunities for students to have these internal motives guide their learning and activity. In contrast, relatively controlling teachers interfere with students' inner motives because they tend to make salient a teacher-constructed instructional agenda that defines what students should think, feel, and do. To shape students' adherence toward that agenda, controlling teachers

offer extrinsic incentives and pressuring language that essentially bypass students' inner motives.

The motivating style of one person influences the motivation, emotion, learning, and performance of others (Deci & Ryan, 1985, 1987; Deci, Vallerand, Pelletier, & Ryan, 1991; Reeve, 2002; Ryan & La Guardia, 1999). In school settings, for instance, students with autonomy-supportive teachers, compared to students with relatively controlling teachers, show greater mastery motivation, perceived competence, and intrinsic motivation (Deci, Nezlek, & Sheinman, 1981), more positive emotionality (Patrick et al., 1993), greater conceptual understanding (Grolnick & Ryan, 1987; Ryan & Grolnick, 1986), higher academic performance (Boggiano, Flink, Shields, Seelbach, & Barrett, 1993), and greater persistence in school (vs. dropping out; Vallerand, Fortier, & Guay, 1997). Autonomy-supportive teachers are able to facilitate these positive educational and developmental outcomes in their students because they find ways to involve and satisfy their student's psychological needs (for autonomy, competence, and relatedness) during instruction (Hardre & Reeve, 2003; Reeve, 2002).

Can Teachers Expand Their Motivating Styles to Be More Autonomy Supportive?

Generally speaking, most teachers embrace a more positive attitude toward controlling motivational strategies (e.g., rewards) than they do toward autonomy-supportive strategies (Barrett & Boggiano, 1988; Boggiano, Barrett, Weiher, McClelland, & Lusk, 1987). They also use controlling strategies more than autonomy-supportive strategies (Newby, 1991), and they often feel pushed into implementing controlling strategies by external pressures such as high stakes testing policies (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982; Pelletier, Seguin-Levesque, & Legault, 2002; Ryan & La Guardia, 1999). In addition, most teachers report that the concept of autonomy is an unfamiliar—even a foreign—concept (Boggiano et al., 1987).

The above discussion notwithstanding, a couple of studies suggest that expanding teachers' existing motivating style from relatively controlling to more autonomy-supportive is plausible. In a study involving preservice teachers (Reeve, 1998), participants read an instructional booklet for 45 min on how to support students' autonomy. Compared to those who read an instructional booklet on a neutral topic, preservice teachers who read the instructional booklet on autonomy support self-reported a change in their motivating style toward a more autonomy-supportive orientation. This change in self-reported motivating style was true both immediately after exposure to the booklet and also 1 month later in a follow-up assessment. This study showed that preservice teachers can use information from self-determination theory about how to support students' autonomy to conceptually change their existing beliefs about how to motivate students. While encouraging, the study featured two important limitations. First, the study focused

on preservice teachers. Unlike veteran teachers, preservice teachers possess relatively tentative motivating styles (Hoy & Woolfolk, 1990), because they typically have not yet gained sufficient classroom experience and because they have not yet adjusted to structural constraints within the profession (e.g., large class sizes, high priority on standardized test scores). Second, the study did not assess teachers' actual autonomy-supportive behaviors. A self-reported motivating style may or may not be actualized during classroom instruction.

In a study involving experienced teachers (deCharms, 1976), fifth-grade teachers worked extensively with a research team throughout an academic year to learn how to promote their students' achievement motivation and "origin" behavior. These teachers participated in an intensive workshop based on McClelland and Winter's (1969) achievement motivation workshop with businessmen, but it was expanded to include workshop components on the origin-pawn concept. Overall, the experience promoted teachers' origin-supportive (i.e., autonomy-supportive) style. Evidence that the teachers were successful in becoming more origin-supportive was found both in students' ratings that their teachers provided an "origin climate" and in students' educational outcomes—higher achievement motivation, greater preference for challenge, more frequent attendance, and higher academic achievement. While impressive in its scope and effectiveness, this research featured three limitations, at least in respect to the purposes of this study. First, the origin training workshop was developed before self-determination theory researchers began to articulate what constitutes an autonomy-supportive motivating style (in the 1980s, starting with Deci, Schwartz, et al., 1981). Second, it is not clear if the benefits from the workshop experience were attributable to increases in achievement motivation, origin motivation, or both of these motivational resources. Third, as a practical concern, the extensive workshop is not a realistic option for contemporary teachers. Participation required teachers to forfeit their spring break, live for that week in a residential setting that excluded family members, sign a year-long contract of participation, prepare for and attend monthly meetings with the research team, and continually develop and implement new activities.

In both studies, evidence emerged that an autonomy-supportive style can be acquired. Both studies, however, featured limitations that prevented us from drawing a definitive conclusion that veteran teachers can use insights from self-determination theory to expand their existing motivating styles to become significantly more autonomy supportive during instruction.

Is Students' Engagement Sensitive to Experimentally Induced Changes in Teachers' Motivating Styles?

The existing literature universally suggests a positive relationship between teachers' classroom autonomy support and students' educational outcomes (as

discussed earlier). But this literature has relied heavily on questionnaire-based correlational studies. For instance, several studies asked teachers to complete a questionnaire to assess their motivating styles and simultaneously asked students to complete questionnaires to assess some educational outcome, such as perceived competence or positive emotionality (Deci, Nezlek, & Sheinman, 1981; Deci, Schwartz, et al., 1981; Patrick et al., 1993; Vallerand et al., 1997). As such, these studies leave open not only the distinction between self-report and behaviorally rated data but also the causal status of the association between teachers' motivating styles and students' engagement.

The existing literature does not yet justify the directional influence conclusion that teachers' classroom autonomy support enhances students' engagement. That is, teachers' autonomy support could enhance students' engagement, but it is equally likely that students' active engagement could enhance teachers' provision of autonomy support (Pelletier et al., 2002; Pelletier & Vallerand, 1996; Skinner & Belmont, 1993). Thus, a significant gap exists in this literature that prevents us from drawing the conclusion that if teachers would adopt a more autonomy-supportive style then their students would show increased engagement.

Hypotheses

To overcome the limitations of the pair of studies on teachers' efforts to integrate autonomy support into their motivating styles, we designed this study to investigate (1) whether or not experienced high school teachers could capitalize on a brief workshop experience with follow-up independent study to expand their existing motivating styles and (2) whether students' engagement would be sensitive to such an experimentally induced change in their teacher's motivating style. In doing so, we first hypothesized that practicing teachers exposed to information on how to be autonomy supportive would later show an increased use of autonomy-supportive behaviors, compared to practicing teachers not exposed to this same information. We predicted that teachers who were exposed to our informational session and a self-study website would incorporate autonomy-supportive concepts into their classroom motivating styles. To test our first hypothesis, we designed a practical workshop experience that was both brief and sensitive to teachers' scheduling limitations. To develop the workshop experience, we relied exclusively on the principles of self-determination theory. To provide teachers with concrete autonomy-supportive strategies, we presented the following four aspects of an autonomy-supportive motivating style (from Deci, 1995; Deci et al., 1991; Deci, Eghrari, Patrick, & Leone, 1994; Reeve, 1996, 1998; Reeve, Deci, & Ryan, 2004; Ryan & La Guardia, 1999): nurture inner motivational resources; rely on informational, noncontrolling language; promote value in uninteresting activities; and acknowledge and accept students' expressions of negative affect. We used the workshop experience to expose teachers to the concept of autonomy support, and

we used a website designed exclusively for this study so that teachers could engage in independent study so to translate this concept into their own classroom practice.

To test our second hypothesis, we focused on students' engagement as the educational outcome of interest. We predicted that when teachers support students' interests, communicate with noncontrolling and informational language, promote valuing for the uninteresting aspects of school work, and acknowledge and accept students' negative affect as a valid reaction to requests and assignments, then students would show a rather large, positive, and immediate engagement response. In doing so, we collected a pair of observable engagement measures. The first engagement measure assessed the extent of students' active involvement during instruction. The second engagement measure assessed the extent of students' voice and initiative in taking personal responsibility for their learning and classroom activity.

METHOD

Participants

Working through four departmental chairs (math, economics, English, science), we recruited 20 teachers (9 women and 11 men) from two high schools in the Midwest for the study. Our pilot work led us to expect a large effect size for Hypothesis 1 (expected $d > 1$), so we deemed 20 to be the optimal number of teachers that would allow our raters to observe teachers' classrooms on the same day of the week for each of the three observations. Observing teachers on the same day of the week was important because we wanted to control for teachers' systematic instructional decisions that might affect students' engagement (e.g., quiz days, laboratory days). Working with this limited number of teachers also allowed us to keep the attrition rate of teachers over the study's 10 weeks to 0%. To compensate for the small sample size, we used an experimental design that allowed us to replicate our findings with the experimental group of teachers with a second group of teachers in a delayed-treatment control condition.

The two schools were located in different school districts, although their school profiles shared many similarities, including the sizes of their student bodies, faculties and staffs, range of curricular and cocurricular offerings, graduation rates and requirements, students' scores on standardized tests, and socioeconomic statuses of the local areas. The two samples of teachers also shared many similarities, including gender and ethnic ratios, teaching experience, class sizes, and subjects taught. After looking at the teachers' data on these demographic variables and also on the study's dependent measures broken down by school, we found no significant differences. We also found no significant differences among the teachers based on gender. Accordingly, we collapsed the data from the two samples of teachers into a single sample of 20 Midwest high school teachers with an average of 14.8 years of teaching experience and an average class size of 24.0 students.

Experimental Design

The study took place over a 10-week period and began with an introductory 30-min session so that teachers could learn about the procedures of the study (week 1). The following week, raters observed each teacher for the first time (all during the same week). After the first round of observations, teachers were randomly assigned into either an experimental ($n = 10$) or a delayed-treatment control ($n = 10$) condition. During the 3rd week, teachers in the experimental group attended a 1-h, after-school informational session on how to be autonomy supportive toward students (as explained below). During weeks 3–5, these same teachers also participated in independent study on how to support students' autonomy using a study-specific website. Teachers in the control group did not attend the informational session during week 3 and they did not engage in self-study on the website during weeks 3–5. During week 5, raters, who were blind to the teachers' experimental conditions, observed all 20 teachers for a second time. During week 6, teachers in the delayed-treatment control group attended the informational session, and they engaged in independent study on the website during weeks 6–8. During week 10, the raters completed their third and final round of observations, again rating all 20 teachers in the same week. All the procedures that took place in one school also took place in the other school during the same week.

Exposure to Information on How to Support Students' Autonomy

Exposure to information on how to support students' autonomy, the study's independent variable, consisted of two components: (1) a group-delivered informational session on how to support students' autonomy and (2) independent study using a study-specific website. The informational session began with a presentation of the basic tenets of self-determination theory, including different types of students' motivation (external regulation, introjected regulation, identified regulation, intrinsic motivation), different types of teachers' motivating styles (controlling, autonomy supportive), and empirical support for the assertion that students benefit when teachers support their autonomy rather than control their behavior. After this introduction, the four autonomy-supportive instructional strategies were identified and classroom illustrations of each strategy were provided. The informational session concluded with a group discussion about the viability, applicability, criticisms, and obstacles of an autonomy-supportive style. Teachers were asked not to share the information with teachers in the delayed-treatment control condition for at least 1 month (i.e., until these teachers participated in the delayed informational session).

At the conclusion of the informational session, teachers were introduced to a study-specific, interactive website. The website was designed to supplement and to elaborate on the information included in the informational session. It was

Autonomy-Supportive Behavior #1

Nurture Inner Motivational Resources

Why? When? To Encourage Students' Initiative, To Initiate Students' Participation

When a teacher introduces a learning activity, he or she hopes that students will participate actively and enthusiastically. For example, a teacher might ask students to participate in a discussion, start a worksheet, or write an essay.

To initiate students' participation, teachers:

Nurture inner resources:

- * *Interests*
- * Preferences
- * Choice-Making
- * *Curiosity*
- * Sense of Challenge

Rely on extrinsic motivators:

- * Incentives
- * Consequences
- * Directives
- * Deadlines
- * Assignments

What autonomy-supportive teachers do:

To solve the motivational problem of initiating students' activity, autonomy-supportive teachers find ways to incorporate students' interests, preferences, choices, curiosity, or sense of challenge into the lesson.

(For illustrations of nurturing interest or curiosity, click the hypertext above.)

What controlling teachers do:

To solve the motivational problem of initiating students' activity, controlling teachers neglect students' inner resources and instead try to manufacture extrinsic motivation by offering incentives, consequences, directives, deadlines, or assignments.

Fig. 1. One computer screen from the study-specific website to communicate how teachers might support students' autonomy during instruction.

included in the study to help teachers translate the four autonomy-supportive instructional behaviors they learned about during the informational session into their own classroom practice. For instance, on the website, participating teachers could access samples of what a classroom teacher might say and do to enact each autonomy-supportive behavior via audio and audio-visual clips. For purposes of illustration, one of the web pages appears in Fig. 1. Each page identified when it might be most useful to enact that particular autonomy-supportive behavior, examples of what a teacher might say and do to enact the behavior, and what the instructional behavior looks like when practiced by an autonomy-supportive (vs. when neglected by a controlling) teacher. Poststudy conversations revealed that 100% of the teachers did access and make use of the website during the study.

Procedure

The study began with a brief introductory session in which each teacher scheduled a day and time that a pair of raters could complete a series of classroom observations. Teachers were told that the raters would observe and rate the "classroom dynamics." During the three classroom observations (during weeks 2,

5, and 10), the teacher, classroom, raters, and day of the week were always the same. The students were the same during the first and second observations, but the students were different during the third observation, because the first two observations took place during winter trimester while the third observation took place during spring trimester. This longitudinal procedure allowed us to assess whether the hypothesized increased use of autonomy-supportive behaviors with one group of (winter semester) students would persist over time and still be evident 5 weeks later with a different group of (spring semester) students.

Raters

Trained raters with classroom observation skills rated teachers' autonomy support and two aspects of students' engagement (engagement measure # 1: task involvement; engagement measure # 2: influence attempts). Raters also scored teachers' provisions of structure and involvement, for reasons explained in the next paragraph. None of the raters knew into which group (experimental or control) each teacher had been assigned. No rater attended the informational session with teachers, and no rater had access to the information presented to teachers—either during the informational session or via the study-specific website. To conduct classroom observations, raters worked in pairs. In doing so, they sat nonintrusively in the back of the classroom and made independent ratings.

Rating Sheet

The observer's rating sheet (see Fig. 2) included items to assess five dependent measures: teachers' autonomy support; two measures of students' engagement; teachers' provision of structure; and teachers' provision of involvement. These latter two categories were scored only to disguise the purpose of the study to the raters and also to allow us to confirm statistically that the experimental manipulation affected only teachers' autonomy support and not their instructional style in general.

Teachers' Autonomy Support

The rating sheet listed the four autonomy-supportive behaviors in a bipolar format with the autonomy-supportive style on the right side of the page (scored as 7) accompanied by illustrative descriptors and the controlling style on the left side (scored as 1) accompanied by illustrative descriptors. The bipolar descriptors used for each autonomy-supportive behavior appear in the upper left quadrant of Fig. 2. We selected these four behaviors after an extensive review of the existing

Influence Attempts: _____
 Behavior intended to produce a change in the flow of the class or the behavior of the other person.
 Teacher-Initiated HIs (Influence attempts): _____
 Student-Initiated HIs (Influence attempts): _____

Rating Period (circle one):
 1* 10m, 2** 10m, 3** 10m, 4* 10m, 5* 10m
 Number of Students:
 Day/Date/Hour:

Rater: _____
 Teacher: _____
 Classroom: _____
 School: _____

Teacher's Autonomy Support

Relies on Extrinsic Motivational Resources	1	2	3	4	5	6	7
* Incentives, Consequences							
* Directives, Deadlines							
* Makes Assignments							
* Seeks Compliance							
Controlling Language	1	2	3	4	5	6	7
* Controlling, Coercive							
* Threats, Blame, Got to							
* Pressuring, Rigid, No recourse							
Neglects Value, Importance, of Task/Lesson/Behavior	1	2	3	4	5	6	7
* Neglects Value, Meaning, Use, Benefit, Importance							
Reaction to Negative Affect: Is Not OK; Change It	1	2	3	4	5	6	7
* Neg. Affect is Unacceptable							
* Tries to Fix, Coerce, or Change into Something Else							

Teacher's Structure

During Instruction/Directions:	1	2	3	4	5	6	7
Absent, Confusing							
* Unclear, Complicated							
* Rules, Procedures are Confusing, Absent							
* Little or No Organization							
* Clear Organization							
During Lesson/While Students Learn:	1	2	3	4	5	6	7
Four Leadership							
* Fails to Show Leadership							
* No Plan, No Goals							
Low, Easy, Workload	1	2	3	4	5	6	7
* Little Challenge, Slow Pace							
* Asks for only Small Capacity							
Scaffolding is Fully Absent	1	2	3	4	5	6	7
* Lack of Hints, Clues, Tips							
* Questions Missed, Answered Poorly							
During Feedback, Post-Performance/Communication:	1	2	3	4	5	6	7
None, Ambiguous, Off-Task, Rambling							
* Ineffective, Instructive							

Teacher's Involvement

Seems Cold, Closed	1	2	3	4	5	6	7
* Business-like							
* Doesn't Engage Time with Ss							
Withholds Personal Resources	1	2	3	4	5	6	7
* Time, Attention, Energy							
Physical Proximity: Distant	1	2	3	4	5	6	7
* Keeps Distance							
* Steps Up from During Class							
Knows Students: No, Not at all	1	2	3	4	5	6	7
* No Mention of Names, Academic/Personal Histories							

Student's Collective Engagement

Dispersed Attention	1	2	3	4	5	6	7
* Expresses Affect, Caring							
* Does, Enjoys Time with Ss							
Passive, Slow, Minimal Effort	1	2	3	4	5	6	7
Verbally Silent	1	2	3	4	5	6	7
* Student Doesn't Talk, Ask Questions, Discuss							
During Challenge, Failure, or Confusion:	1	2	3	4	5	6	7
Gives Up Fast/Doesn't Persist							
* Decreases Effort Over Time							
Flat Emotional Tone	1	2	3	4	5	6	7
* Bored, Disinterested, Flat							

Student's Collective Engagement

Dispersed Attention	1	2	3	4	5	6	7
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Gives Up Fast/Doesn't Persist							
* Decreases Effort Over Time							
Flat Emotional Tone	1	2	3	4	5	6	7
* Bored, Disinterested, Flat							

Note for Each Rating: Use the bold, underlined 4 as your anchor/starting point.

Fig. 2. Observer's rating sheet to score teachers' autonomy support and students' engagement.

literature (Deci, 1995; Deci et al., 1991, 1994; Reeve, 1996, 1998; Reeve et al., 2004; Ryan & La Guardia, 1999). As expected, high intercorrelations among the four autonomy-supportive behaviors emerged to show that teachers used the instructional behaviors in a collective way. The four-item alpha coefficients among the autonomy-supportive behaviors were high during each classroom observation: .81 (first class); .90 (second class); and .82 (third class). Given these high internal consistencies, we averaged the four scores during each classroom observation into one overall “autonomy-supportive behavior” score per class. We used these three overall scores to test our hypotheses.

Students' Engagement

We scored two aspects of students' engagement: students' active task involvement during instruction (engagement measure #1: task involvement) and students' voice and initiative in trying to take personal responsibility for their learning (engagement measure #2: influence attempts). For engagement measure #1 (task involvement), we assessed attention, effort, verbal participation, persistence, and positive emotion (following Furrer & Skinner, 2003; Wellborn, 1991; Wellborn, Connell, & Skinner, 1989). The rating sheet listed each of these five items in a bipolar format with the engagement indicators on the right side of the page (scored as 7) and the disaffected indicators on the left side (scored as 1). The bipolar descriptors used for each engagement indicator appear in the lower right quadrant of Fig. 2. In making these ratings, raters considered both the percentage of students enacting each behavior and the intensity of students' expressions of these behaviors. So a high score on an engagement indicator means that most or almost all of the students expressed the behavior and, when they did express it, they did so intensely. Following the earlier studies (listed above), we combined the five ratings into one overall engagement score. The five-item alpha coefficients for engagement measure #1 (task involvement) were high during each classroom observation: .88 (first class); .93 (second class); and .86 (third class).

For engagement measure #2 (influence attempts), we assessed students' active attempts to influence the flow of classroom events (Fiedler, 1975; Koenigs, Fiedler, & deCharms, 1977). Influence occurs at two levels—teacher influence and student influence, and it consists of a verbal or nonverbal attempt to affect the behavior or decision making of the other party in a constructive way (e.g., the teacher might ask students to open their books, a student might suggest to the teacher how to use extra class time). To assess influence attempts, we used the Hit-Steer Observation System developed by Fiedler (1975) and applied to classrooms by Koenigs et al. (1977). This system assesses the frequency of teachers' attempts to constructively influence students and also the frequency of students' attempts to constructively influence the teacher. Using these two tallies, a ratio is calculated to index the proportion of students' influence attempts (proportion of students' influence

attempts = frequency of students' influence attempts/frequency of students' influence attempts + frequency of the teacher's influence attempts). Following Fiedler (1975), we used this proportion score as an indicator of students' engagement. These proportion scores have been shown to be sensitive to teachers' motivating styles and to predict students' academic achievement (Koenigs et al., 1977). Overall, teachers averaged 17.2 ($SD = 8.8$) influence attempts per class, students averaged 15.6 ($SD = 10.4$) influence attempts per class, and little covariation existed between the two sources of influence; $rs(20) = .13, -.11, \text{ and } -.15, ns$, for the first, second, and third observations, respectively. As expected, engagement measure #1 and engagement measure #2 correlated significantly across all three classroom observations: $rs(20) = .48 (p < .05), .74 (p < .01), \text{ and } .69 (p < .01)$, respectively.

Each class lasted either 53 (school A) or 55 (school B) min. During each class, raters completed a series of five identical rating sheets. The first rating sheet was completed during either the first 13 or first 15 min, and the second, third, fourth, and fifth rating sheets were completed during each subsequent 10-min period. By having raters complete five rating sheets per class, we were able to estimate interrater reliabilities for each measure (following Fiedler's, 1975, procedure), a procedure that produced 15 (rather than just 3) scores for each teacher. Median reliabilities for the autonomy-supportive instructional behaviors (based on scores from 15 ratings) were as follows: nurtures inner motivational resources, $r = .83$; relies on informational language, $r = .86$; promotes valuing, $r = .86$; and acknowledges and accepts negative affect, $r = .65$. Median interrater reliabilities for engagement behaviors were as follows: attention, $r = .74$; effort, $r = .74$; verbal participation, $r = .77$; persistence, $r = .75$; positive emotion, $r = .83$; teacher influence attempts, $r = .66$; students' influence attempts, $r = .77$; and proportion of students' influence attempts, $r = .81$. Overall, these scores show that raters were able to score all 12 ratings in a reliable way.

RESULTS

We predicted that participation in an informational session on how to support students' autonomy that was followed up by independent study on an interactive website would enable teachers to increase their use of autonomy-supportive behaviors during their later instruction, compared to a control group of teachers (Hypothesis 1). We tested this first hypothesis twice—first with teachers in the experimental group and again with teachers in the delayed-treatment control group. In addition, we predicted that the extent to which teachers increased their use of autonomy-supportive behaviors would forecast a subsequent and corresponding increase in their students' engagement (Hypothesis 2). We also tested this second hypothesis twice—first using the students of teachers in the experimental group and again using the students of teachers in the delayed-treatment control group.

Did Teachers Learn to Use More Autonomy-Supportive Behaviors?

In the first test of Hypothesis 1, we compared the use of autonomy-supportive instructional behaviors by teachers in the experimental group versus teachers in the control group. Teachers in the experimental group participated in the informational session and website study after the first observation but before the second observation. So we compared their mean use of autonomy-supportive behaviors during the second observation with the use of these behaviors shown by teachers in the control group. To do so, we used an analysis of covariance (ANCOVA) with teachers' autonomy-supportive behaviors during the second observation as the dependent measure and teachers' autonomy-supportive behaviors during the first observation as the covariate. Teachers' mean use of autonomy-supportive behaviors during the second observation appears in the upper portion of Table I. As hypothesized, teachers in the experimental group used significantly more autonomy-supportive behaviors (Adj. $M = 4.57$) than did teachers in the control group (Adj. $M = 2.91$), $F(1, 17) = 11.68$, $d = 1.94$, $p < .01$.

To clarify our test of Hypothesis 1, we conducted two supplemental analyses. First, we tested for the effect of the experimental manipulation on each individual autonomy-supportive behavior. Teachers' mean use of each behavior during the second observation appears in the lower portion of Table I. As shown in a series of ANCOVAs, teachers in the experimental group used each behavior more than did teachers in the control group: nurtures inner motivational resources, $F(1, 17) = 7.79$, $d = 1.15$, $p < .05$; relies on informational language, $F(1, 17) = 12.44$, $d = 1.83$, $p < .01$; promotes valuing, $F(1, 17) = 4.74$, $d = 1.10$, $p < .05$; and acknowledges and accepts negative affect, $F(1, 17) = 11.00$, $d = 1.80$, $p < .01$. Second, we tested how the experimental manipulation affected teachers' provision of structure and involvement. For structure, teachers in the experimental group did not provide more structure during the second observation than did teachers in the control group (Adj. M s, 5.17 vs. 5.02), $F(1, 17) = 0.28$, *ns*. For involvement, teachers in the experimental group did not provide more involvement during the second observation than did teachers in the control group (Adj. M s, 5.11 vs. 4.91), $F(1, 17) = 0.24$, *ns*. These data show that the experimental manipulation enhanced teachers' autonomy support in particular, rather than producing a more general "positive" instructional style.

In the second test of Hypothesis 1, teachers in the delayed-treatment control group participated in the informational session after the second observation but before the third observation, so we compared their mean use of autonomy-supportive behaviors during the third observation (after the informational session and independent study) with their mean use of these behaviors during the second observation (before the informational session and independent study). For this analysis, we used a paired-samples t test involving only teachers in the control group (i.e., a repeated measures, within-subjects design). Teachers in the delayed-treatment control group used significantly more autonomy-supportive behaviors during

Table 1. Teachers' Autonomy-Supportive Behaviors During the Second Observation Broken Down by Experimental Condition

Autonomy-supportive behavior	Control group (<i>n</i> = 10)		Experimental group (<i>n</i> = 10)	
	<i>M</i> ^a	<i>SD</i>	Adj. <i>M</i> ^b	<i>SD</i>
Overall autonomy-supportive behaviors	2.72	0.90	2.91	1.19
Change from first to second observation	-0.41	0.77		+0.89
Nurtures inner motivational resources	3.05	1.35	3.40	1.44
Change from first to second observation	-0.52	1.05		+0.73
Relies on informational language	2.69	1.32	2.86	1.43
Change from first to second observation	-0.65	1.20		+1.10
Promotes valuing	1.86	1.12	1.96	1.54
Change from first to second observation	-0.24	0.80		+0.82
Acknowledges and accepts negative affect	3.28	0.95	3.37	1.11
Change from first to second observation	-0.24	1.22		+0.92

^aPossible range of scores, 1–7.

^bTeachers' autonomy-supportive behaviors during the second observation have been adjusted for their use of autonomy-supportive behaviors during the first observation.

the third observation ($M = 4.02$) than they did during the second observation ($M = 2.72$), $t(9) = 4.20$, $d = 1.44$, $p < .01$. As a point of comparison, teachers in the experimental group (who did not receive further instruction during this same time) showed no such increase in their use of autonomy-supportive behaviors from the second ($M = 4.76$, $SD = 1.19$) to the third ($M = 4.69$, $SD = 0.78$) observation, $t(9) = 0.24$, $d = 0.07$, *ns*.

We again conducted two supplemental analyses. First, in regard to how the experimental manipulation affected each individual autonomy-supportive behavior, teachers in the delayed-treatment control group used each instructional behavior significantly more during the third observation than they did during the second observation: nurtures inner motivational resources, $t(9) = 2.53$, $d = 0.95$, $p < .05$; relies on informational language, $t(9) = 2.92$, $d = 1.09$, $p < .05$; promotes valuing, $t(9) = 3.48$, $d = 1.28$, $p < .01$; and acknowledges and accepts negative affect, $t(9) = 3.57$, $d = 1.35$, $p < .01$. Second, in regard to how the experimental manipulation affected teachers' provision of structure and involvement, teachers in the delayed-treatment control group did not show greater structure or greater involvement during the third observation than during the second observation: structure (M s, 5.04 vs. 4.86), $t(9) < 1$; and involvement (M s, 4.89 vs. 4.63), $t(9) < 1$.

Did Students' Engagement Respond to Changes in Teachers' Autonomy Support?

To assess the extent to which teachers' increased use of autonomy-supportive behaviors predicted their students' subsequent engagement (i.e., Hypothesis 2), we conducted two sets of hierarchical regressions. The first pair of regressions used students' engagement during the second observation as the outcome measure (one regression for engagement measure # 1 and a second regression for engagement measure # 2). The second pair of regressions used students' engagement during the third observation as the outcome measure. Each of the four hierarchical regressions used the same method of entering variables. On the first step, we entered teachers' autonomy support and students' engagement during the earlier class as control variables. On the second step, we entered teachers' autonomy support during the subsequent class as the hypothesized predictor variable. By entering variables in this manner, we first controlled for the influence of teachers' prior autonomy support and students' prior engagement to see if the teachers' increased or decreased use of autonomy-supportive behaviors could predict students' engagement.

Students' Engagement During the Second Observation

The results from the hierarchical regressions on both measures of engagement during the second observation appear in Table II. All three potential predictor

Table II. Regression Analyses to Predict Students' Engagement During the Second Observation

Predictor variables	Student's engagement during second observation							
	Engagement outcome # 1: Task involvement			Engagement outcome # 2: Influence attempts				
	<i>r</i> (20)	<i>F</i> (1, 16)	<i>B</i>	Unique <i>R</i> ²	<i>r</i> (20)	<i>F</i> (1, 16)	<i>B</i>	Unique <i>R</i> ²
Control variables								
Students' Engagement (1st observation)	.58**	1.07	.22	.05	.53*	3.92	.30	.09
Teacher's autonomy support (1st observation)	.57**	<1	.08	.01	.21	3.55	-.28	.08
Hypothesized predictor								
Teachers' autonomy support (2nd observation)	.75**	9.63**	.59	.35	.71**	6.74**	.59	.35
Overall <i>F</i> (3, 16) and overall <i>R</i> ²				0.62		9.44**		.57

* $p < .05$. ** $p < .01$.

variables correlated with the corresponding outcome measure (see *rs* in the first column), and both overall three-term models to predict the engagement outcomes were significant: For engagement measure # 1, $F(3, 16) = 8.67, p < .01 (R^2 = .62)$; and for engagement measure # 2, $F(3, 16) = 9.44, p < .01 (R^2 = .57)$. Most importantly to Hypothesis 2, teachers' autonomy support during the second observation had a unique and significant effect on both measures of engagement during the second class: engagement measure # 1, $F(1, 16) = 9.63, p < .01 (\beta = .59)$; and engagement measure # 2, $F(1, 16) = 6.74, p < .01 (\beta = .59)$. In both regression equations, teachers' autonomy support was an even better predictor of students' classroom engagement than was students' own engagement during an earlier class (β s .59 vs. .22 for engagement measure # 1; β s .59 vs. .30 for engagement measure # 2).

Students' Engagement During the Third Observation

The results from the hierarchical regressions on both measures of engagement during the third observation appear in Table III. Again, both overall three-term models to predict the engagement outcomes were significant: For engagement measure # 1, $F(3, 16) = 7.86, p < .01 (R^2 = .60)$; and for engagement measure # 2, $F(3, 16) = 6.27, p < .01 (R^2 = .54)$. Most importantly to Hypothesis 2, teachers' autonomy support during the third observation had a unique and significant effect on both measures of students' engagement during the third class: engagement measure # 1, $F(1, 16) = 14.70, p < .01 (\beta = .61)$; and engagement measure # 2, $F(1, 16) = 10.04, p < .01 (\beta = .54)$.

We recognized that because raters scored both teachers' autonomy support and students' engagement, this methodological feature might potentially inflate the magnitude of the findings. To control for this potential problem of shared method variance, we repeated the set of four hierarchical regressions involved in the test of Hypothesis 2 (as summarized in Tables II and III) by using the teacher ratings of Rater 1 to predict the student ratings of Rater 2 and also by using the teacher ratings of Rater 2 to predict the student ratings of Rater 1. Rater 1's scoring of teachers' autonomy support consistently and uniquely predicted Rater 2's scoring of students' engagement: engagement measure # 1 during second observation, $F(1, 16) = 5.28, p < .05 (\beta = .51)$; engagement measure # 2 during second observation, $F(1, 16) = 10.33, p < .01 (\beta = .64)$; engagement measure # 1 during third observation, $F(1, 16) = 3.77, p < .10 (\beta = .50)$; and engagement measure # 2 during third observation, $F(1, 16) = 5.58, p < .05 (\beta = .64)$. In addition, Rater 2's scoring of teachers' autonomy support consistently and uniquely predicted Rater 1's scoring of students' engagement: engagement measure # 1 during second observation, $F(1, 16) = 3.58, p < .10 (\beta = .49)$; engagement measure # 2 during second observation, $F(1, 16) = 4.30, p < .05 (\beta = .64)$; engagement measure # 1 during third observation, $F(1, 16) = 2.78, p = .10 (\beta = .42)$; and engagement measure # 2 during third observation, $F(1, 16) = 5.88, p < .05 (\beta = .57)$.

Table III. Regression Analyses to Predict Students' Engagement During the Third Observation

Predictor variables	Student's engagement during third observation							
	Engagement outcome #1: Task involvement				Engagement outcome #2: Influence attempts			
	<i>r</i> (20)	<i>F</i> (1, 16)	<i>B</i>	Unique <i>R</i> ²	<i>r</i> (20)	<i>F</i> (1, 16)	<i>B</i>	Unique <i>R</i> ²
Control variables								
Students' engagement (2nd observation)	.34	< 1	.00	.00	.49*	2.24	.25	.06
Teachers' autonomy support (2nd observation)	.47*	< 1	.00	.00	.41	1.00	-.17	.03
Hypothesized predictor								
Teachers' autonomy support (3rd observation)	.77**	14.70**	.61	.37	.69**	10.04**	.54	.29
Overall <i>F</i> (3, 16) and overall <i>R</i> ²		7.86**		.60		6.27**		.54

* $p < .05$. ** $p < .01$.

DISCUSSION

This study investigated a theory-generated way to promote students' engagement during instruction. In doing so, we asked two related questions. First, we explored whether veteran teachers' motivating styles could be expanded to incorporate a greater use of autonomy-supportive behaviors. Second, we explored whether the students of these teachers would respond to this experimentally induced change in their teachers' motivating style by showing enhanced engagement during instruction. We found that teachers who participated in an informational session on how to support students' autonomy and who engaged themselves in independent study on the study-specific website were able to teach and motivate their students in more autonomy-supportive ways. We also found that the more teachers used autonomy-supportive instructional behaviors, the more engagement their students showed. This positive effect of autonomy support on students' engagement was found in four separate tests of Hypothesis 2 (for two groups of teachers and for two different measures of engagement). When taken as a whole, we found that veteran high school teachers can become more autonomy supportive and, to the extent that they are able to do so, their students show greater engagement.

Almost all previous studies on the relationship between teachers' motivating styles and students' engagement have relied on correlational designs with self-report measures. The data from these correlational studies leave open the directional influence question of whether teachers' motivating styles influence students' engagement or whether students' engagement influences teachers' motivating styles. By using an experimental design with appropriate control groups and random assignment to experimental conditions, we were able to generate the data necessary to conclude that teachers used more autonomy-supportive behaviors from one class to the next because they participated in the theory-based workshop with additional independent study. Students responded in kind to their teachers' more autonomy-supportive style with greater engagement. From this finding, we conclude that students' engagement is sensitive to changes in their teacher's motivating style.

Before we discuss the implications of these findings, we identify two limitations within the design of the study. One limitation was the study's sample size of 20 teachers at the high school level. To increase the study's external validity, a larger sample size would be desirable, as would a sample that included teachers in elementary schools or teachers in more ethnically diverse settings. Rather than pursuing external validity, however, we explicitly designed our study around the goal of attaining high internal validity (Mook, 1988). By limiting our sample to 20 teachers, we were able to keep attrition at zero (despite teachers' busy and demanding schedules) and we were able to carry out smoothly the logistics of the study (such as having raters score all 20 teachers during the same week).

To address the sample size limitation directly, we designed the study to provide multiple tests of our hypotheses. Results for the teachers in the delayed-treatment control group replicated those obtained for teachers in the experimental group. The consistently large magnitude of the observed effects also offset helped the sample size limitation.

A second limitation is that the large effect sizes we observed might be attributable, in part, to a possible rating artifact. One might say that once teachers saw the raters in their classrooms, they might have altered their instructional behaviors in a direction that would please the raters. While possible, we were careful to avoid telling teachers what the raters were doing in their class. Still, it is possible that the raters themselves might have inadvertently inflated the association between autonomy support and engagement. This might have occurred because the same raters scored both dependent measures (a problem of method variance). This is also a reasonable concern, but we offer two points to consider. First, our raters did not know what the “teacher influence” and “student influence” tallies were designed to assess. They also did not know that these scores would be converted into a proportion score. That raters did not know that this measure had anything to do with students’ engagement is important because the association between autonomy support and engagement was just as strong with this engagement measure # 2 as it was with the engagement measure # 1. Second, our cross-rater analyses in which the teacher ratings from one rater consistently predicted the student ratings of the second rater also argue against this rater inflation alternative interpretation. Given these considerations, we conclude that our findings reflect our hypotheses to a much greater extent than they reflect a rating artifact.

Our findings have implications for practitioners wrestling with the pressing question: How can I motivate others? Like so many other practitioners, our teachers generally relied on controlling motivational strategies at the beginning of the study to motivate their constituents (e.g., teachers in the control group scored a 2.72 on a 7-point scale before participating in the informational session; see Table I). This tendency toward a controlling motivating style is an unfortunate state of affairs in light of self-determination theory’s research that shows that an autonomy-supportive motivating style is more strongly associated with positive outcomes than is a controlling style (Ryan & Deci, 2000, 2002). To date, the how-to component of autonomy support has remained a bit of a mystery to practitioners. In the present study, however, we were able to extract from this literature a core set of autonomy-supportive behaviors so to create an intervention on how to promote autonomy in others. We found that the design and implementation of such an intervention is possible and, further, that teachers found the effort to translate these behaviors into their own classroom practice to be both straightforward and productive.

In the effort to motivate others (especially students in school settings), we recognize the current *Zeitgeist* is that controlling approaches (e.g., behavior modification programs) are more familiar (Boggiano et al., 1987), more endorsed

(Boggiano et al., 1987), and more frequently used (Newby, 1991). This Zeitegeist notwithstanding, our findings substantiate the benefits students gain (i.e., engagement) when practitioners incorporate a more autonomy-supportive motivating style. Few disagree with the goals of supporting other peoples' interests, developing their competencies, and promoting autonomous self-regulation (i.e., supporting autonomy). Instead, the difficult part of putting an autonomy-supportive style into practice is the question of how one might go about doing so (e.g., "Okay, fine, support autonomy; but what specifically could I do?"). The present findings confirm that when a group of practitioners (teachers) received concrete answers to this question, they were indeed able to motivate others in an autonomy-supportive way.

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