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Engaging Students in Learning Activities: It Is Not Autonomy Support or Structure but Autonomy Support and Structure

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We investigated 2 engagement-fostering aspects of teachers' instructional styles—autonomy support and structure—and hypothesized that students' engagement would be highest when teachers provided high levels of both. Trained observers rated teachers' instructional styles and students' behavioral engagement in 133 public high school classrooms in the Midwest, and 1,584 students in Grades 9–11 reported their subjective engagement. Correlational and hierarchical linear modeling analyses showed 3 results: (a) Autonomy support and structure were positively correlated, (b) autonomy support and structure both predicted students' behavioral engagement, and (c) only autonomy support was a unique predictor of students' self-reported engagement. We discuss, first, how these findings help illuminate the relations between autonomy support and structure as 2 complementary, rather than antagonistic or curvilinear, engagement-fostering aspects of teachers' instructional styles and, second, the somewhat different results obtained for the behavioral versus self-report measures of students' classroom engagement.

Keywords: autonomy support, structure, engagement, self-determination theory, teacher behavior

Engagement expresses the behavioral intensity and emotional quality of a student's active involvement during a learning activity (Fredricks, Blumenfeld, & Paris, 2004; Skinner, Furrer, Marchand, & Kindermann, 2008; Wellborn, 1991). In classroom settings, engagement is particularly important because it functions as a behavioral pathway through which students' motivational processes contribute to their subsequent learning and development (Connell & Wellborn, 1991), including the skills they develop (Skinner & Belmont, 1993) and the grades they make (Finn & Rock, 1997). In contrast, disengaged students are distracted, passive, do not try hard, give up easily in the face of challenge or difficulty, express negative emotions, fail to plan or monitor their work, and generally withdraw (e.g., "When I am in class, I usually think about other things"; Skinner & Belmont, 1993).

When students engage in classroom learning, there is almost always some aspect of the teacher's behavior that plays a role in the initiation and regulation of the engagement. To better understand students' academic engagement, many researchers have investigated supportive sociocontextual factors (Skinner et al., 2008), such as teachers' instructional style, which is generally conceptualized as a stable pattern in a teacher's methods of instruction, classroom management, and interpersonal style with students (Schultz, 1982). In the present study, we examined two particular engagement-promoting aspects of teachers' instructional style: provision of autonomy support (vs. being controlling) and provision of structure (vs. chaos). According to the existing literature, when teachers focus on supporting students' autonomous motives (e.g., interests, needs, preferences, personal goals) to guide their learning and activity, these instructional acts support students' engagement by presenting interesting and relevant learning activities, providing optimal challenges, highlighting meaningful learning goals, and supporting students' volitional endorsement of classroom behaviors (Assor, Kaplan, & Roth, 2002; Reeve & Jang, 2006; Reeve, Jang, Carrell, Jeon, & Barch, 2004). Further, when teachers provide high structure by communicating clear expectations and framing students' learning activity with explicit directions and guidance, these instructional acts support students' engagement by keeping students on task, managing their behavior, and avoiding chaos during transitions (Skinner & Belmont, 1993; Tucker et al., 2002).

While both autonomy support and structure make important contributions to supporting students' classroom engagement, the nature of the relation between them has been portrayed rather confusingly in the literature in at least three different ways—as being antagonistic, curvilinear, and independent. These differing portrayals of the relation between provision of autonomy support and provision of structure call for a deeper understanding of their interrelation as the multiple portrayals mislead and confuse teachers and researchers alike. To shed light on the relation between

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teacher-provided autonomy support and teacher-provided structure, we pursued two research questions. First, how do these two engagement-fostering aspects of a teacher's instructional style relate to one another in teachers' naturally occurring instruction? Second, do both autonomy support and structure contribute positively and uniquely to the support of students' engagement during learning activities? Before presenting our hypotheses, we, in the following sections, discuss autonomy support and structure as two different engagement-fostering aspects of teachers' instructional styles and then discuss their potential interrelation.

Autonomy Support

Self-determination theory (Ryan & Deci, 2000, 2002) proposes that a teacher's instructional style can be conceptualized along a continuum that ranges from highly controlling to highly autonomy supportive (Deci, Schwartz, Sheinman, & Ryan, 1981). In general, teachers who adopt an autonomy-supportive style engage students by facilitating an on-going congruence between students' autonomous sources of motivation and their moment-to-moment classroom activity. Autonomy-supportive teachers facilitate students' personal autonomy by taking the students' perspective; identifying and nurturing the students' needs, interests, and preferences; providing optimal challenges; highlighting meaningful learning goals; and presenting interesting, relevant, and enriched activities.

More specifically, what autonomy-supportive teachers say and do to engage students during learning activities can be characterized by three categories of instructional behavior: (a) nurture inner motivational resources, (b) rely on noncontrolling informational language, and (c) acknowledge the students' perspective and feelings (Deci, Eghrari, Patrick, & Leone, 1994; Mageau & Vallerand, 2003; Reeve & Jang, 2006; Reeve, Jang, et al., 2004; Ryan & La Guardia, 1999). When autonomy-supportive teachers nurture students' inner motivational resources, they create opportunities for students to take the initiative during learning activities by building instruction around students' interests, preferences, personal goals, choice making, and sense of challenge and curiosity, rather than relying on external sources of motivation such as incentives, consequences, directives, and deadlines. When autonomy-supportive teachers rely on noncontrolling informational language, they provide explanatory rationales for requested tasks and communicate through messages that are informative, flexible, and rich in competence-related information, rather than neglecting rationales and by communicating through messages that are evaluative, controlling, pressuring, or even rigidly coercive. When autonomy-supportive teachers acknowledge the students' perspectives and feelings, they consider and communicate a valuing of the students' perspectives during learning activities, inquire about and acknowledge students' feelings, and accept students' expressions of negative affect as a potentially valid reaction to classroom demands, imposed structures, and the presentation of uninteresting or devalued activities.

Each of these aspects of what autonomy-supportive teachers say and do during instruction is important because empirical research shows that students with autonomy-supportive teachers, compared to students' with controlling teachers, display an impressive and wide range of positive educational outcomes (Reeve, 2009; Reeve, Deci, & Ryan, 2004), including enhanced classroom engagement (Jang, 2008; Reeve, Jang, et al., 2004). For instance, Reeve, Jang, and colleagues (2004) showed that raters' scoring of high school students' engagement increased markedly after their teachers participated in a training program on how to nurture inner motivational resources, rely on informational language, provide explanatory rationales, and acknowledge and accept negative feelings. A series of laboratory studies with college students showed that both students' self-reported engagement and rater-scored engagement were greater when tutors or teachers relied on informational language, provided explanatory rationales, and acknowledged negative feelings (Deci et al., 1994; Jang, 2008; Reeve, Jang, Hardre, & Omura, 2002). The reason students benefit so widely and so substantially (e.g., engagement, preference for optimal challenge, conceptual understanding, grades, psychological well-being) from their exposure to teachers with an autonomy-supportive motivating style is because such a style supports students' internal perceived locus of causality, experience of volition, and sense of choice during learning activities (i.e., it supports students' autonomous motivation; Reeve, 2009).

Structure

Another aspect of a teacher's instructional style that has been used to promote students' engagement is structure (Connell & Wellborn, 1991; Skinner & Belmont, 1993; Skinner et al., 2008; Skinner, Zimmer-Gembeck, & Connell, 1998). Structure refers to the amount and clarity of information that teachers provide to students about expectations and ways of effectively achieving desired educational outcomes (Skinner & Belmont, 1993; Skinner et al., 1998). Its opposite is chaos in which teachers are confusing or contradictory, fail to communicate clear expectations and directions, and ask for outcomes without articulating the means to attain them.

Teacher-provided structure has been studied extensively within the classroom management literature as establishing order (Doyle, 1986), introducing procedures (Emmer, Evertson, & Anderson, 1980), communicating policies about how to get things done (e.g., how to give completed work to the teacher; Carter & Doyle, 2006), and minimizing misbehavior while encouraging engagement and achievement (Brophy, 2006). It has also been examined in the literature on promoting students' social and cognitive development (Huston-Stein, Friedrich-Cofer, & Susman, 1977) and on implementing "structured conversations" within peer learning (O'Donnell, 2006). For those who study structure from a motivational point of view, teacher-provided structure further helps students to develop a sense of perceived control over school outcomes—that is, to develop perceived competence, an internal locus of control, mastery motivation rather than helplessness, self-efficacy, and an optimistic attributional style (Skinner, 1995; Skinner et al., 2008). Hence, when taken as a whole, teachers provide structure by clearly communicating expectations and directions, taking the lead during some instructional activities, providing strong guidance during the lesson, providing step-by-step directions when needed, scheduling student activities, marking the boundaries of activities and orchestrating the transitions between them, offering task-focused and personal control-enhancing feed-

back, and providing consistency in the lesson (Brophy, 2006; Doyle, 2006; Huston-Stein et al., 1977; Skinner & Belmont, 1993).

More specifically, what structured teachers say and do can be characterized by three categories of instructional behavior: (a) present clear, understandable, explicit, and detailed directions; (b) offer a program of action to guide students' ongoing activity; and (c) offer constructive feedback on how students can gain control over valued outcomes (Brophy, 1986; Skinner, 1995; Skinner & Belmont, 1993; Skinner et al., 1998). When teachers establish clear and understandable directions, they establish clear expectations with respect to students' future behavior and prescribe ways for students to manage their moment-to-moment activity during a forthcoming learning activity. When teachers offer strong guidance, they provide students with the leadership and the scaffolding needed for students to instigate and maintain effort toward achieving their plans, goals, and learning objectives. When teachers offer constructive feedback, they help students diagnose and build on their skills and sense of competence. In these ways, teachers can prescribe to students what is expected of them and help them come to understand "what it takes to do well in school and whether I've got it" (Skinner, Wellborn, & Connell, 1990, p. 22).

These aspects of what structured teachers say and do during instruction are important because empirical research shows that students with structured teachers, compared to chaotic or laissez-faire ones, display positive educational outcomes (Brooks, 1985; Brophy, 1986, 2006; Brophy & Good, 1986; Evertson & Weinstein, 2006; Huston-Stein et al., 1977), including enhanced classroom engagement (Skinner & Belmont, 1993; Tucker et al., 2002). For instance, Skinner and Belmont (1999) conducted time-lagged analyses to show that elementary school students (Grades 3–5) showed enhanced engagement in the fall when their teachers provided highly structured learning environments in the spring. Skinner and her colleagues (2008) showed a similar result with older children (Grades 4–7). Sierens, Vansteenkiste, Goossens, Soenens, and Dochy (2009) showed that teacher-provided structure was associated with high levels of high school students' self-regulating management of their classroom engagement. The reason students benefit from their exposure to teachers with a structured instructional style is because such a style supports students' perceptions of competence, perceived control over valued outcomes, and self-regulated learning strategies (Skinner et al., 1998; Sierens et al., 2009).

The term *structure* is often used in discussions of education generally and of education of students with special needs in particular. However, in many cases, there is a confluence between the concepts of structure and control. That is, people use the term structure to refer to demands, insistences, sanctions, and rigid rules. We emphasize, in contrast, that whereas structure can be used in controlling ways and often is, control is by no means essential to structure. Indeed, we hypothesized that when structure is used in controlling ways, it will be detrimental to, rather than facilitative of, student engagement; whereas when it is used in autonomy-supportive ways, it will be facilitative of engagement.

As an illustration of the confluence between structure and control—and of the more general point that structure can be provided in either controlling or autonomy-supportive ways—Koestner, Ryan, Bernieri, and Holt (1984) introduced rules to structure children's painting activity. When the rules were imposed in a controlling way (without explanatory rationale, without acknowledging the children's perspective and feelings), children's engagement in the painting activity was lower than it was for children randomly assigned to a control group without the rules. When these same rules were provided to the children in an autonomy-supportive way (with explanatory rationales, with the acknowledgment of the children's perceptive and feelings), however, children showed no decrease in engagement compared to the children in the control group and greater engagement than children who received the rules presented in a controlling way. Beyond rules, other research has shown essentially the same effects for other elements of structure—including communications, goals, expectations, rewards, and feedback (Deci, Koestner, & Ryan, 1999; Grolnick & Ryan, 1987; Jang, 2009; Ryan, Mims, & Koestner, 1983; Schuh, 2004)—namely, that any element of structure can be presented in either an autonomy-supportive or controlling way and, also, that student outcomes are enhanced when the element of structure is presented in an autonomy-supportive way, yet diminished when the element of structure is presented in a controlling way (Sierens et al., 2009).

Relation Between Autonomy Support and Structure

Teacher-provided autonomy support and structure both make important contributions to supporting students' classroom engagement. The nature of their relation with each other, however, has been portrayed in the literature in at least three different ways.

First, autonomy support and structure have been conceptualized as being both antagonistic to each other and opposites in their effects on students' engagement. Some argue that the various elements of classroom structure, such as rules, interfere with teachers' provision of choice, spontaneity, and the cultivation of personal responsibility (Daniels & Bizar, 1998). This view of the relation between structure and autonomy support proposes that a greater implementation of one aspect of a teacher's style necessarily leads to a lesser implementation of the other. Our view, however, is that this supposed antagonism between autonomy support and structure is not inherent in the concepts, but rather results from the implicit inclusion of control in some approaches to using structure.

Second, some have proposed that there is a curvilinear relation between structure and autonomy support, with teachers moderate in structure being highest in autonomy support, and also that high autonomy support with moderate structure yields optimal engagement (deCharms, 1984). According to deCharms (1984), when teachers provide too little structure, students fail to develop the prerequisite skills they need to experience engagement-fostering personal causation (i.e., high perceived autonomy, high perceived competence). When teachers provide too much structure, students may learn task-relevant skills but come to hate the experience if it is overly scripted and hence void of a sense of personal causation. It is only with moderate structure—some supervision but not totalitarian supervision—that students learn both prerequisite skills and the experience of personal causation that promotes engagement.

Here too we believe there may be some confusion between structure and control. Specifically, to provide structure when it is not needed, to be continually reiterating instructions and guidelines

that are already understood, is not to be high in structure but is, instead, to be controlling and intrusive.[1]

Third, autonomy support and structure have been conceptualized as two independent aspects of teachers' instructional styles, each of which can contribute support to students' motivation and engagement (Connell & Wellborn, 1991; Skinner & Belmont, 1993; Tucker et al., 2002). Although this has not been empirically tested, the authors speculated that teachers' provision of high structure (i.e., regulations and guidelines) can be combined with either freedom and encouragement (i.e., high autonomy support) or with pressure and coercion (i.e., low autonomy support). Thus, autonomy support and structure can be viewed as two conceptually distinct aspects of teachers' styles such that some teachers will display high levels of both styles, other teachers will display low levels of both styles, while still others will display a high level of one style with a low level of the other.

As mentioned earlier, structure and control have often been confused, but we herein suggest that, although they are separate concepts, the optimal learning environment for classroom engagement involves structure provided in an autonomy supportive way. Thus, we predicted that engagement would be highest when teachers provide high levels of both autonomy support and structure.

Purpose of the Study and Hypotheses

Although it is interesting to understand how different theoretical perspectives approach the integration of autonomy support and structure in teachers' classroom practices, it is important to use an empirical approach to examine how they relate both to one another and to students' classroom engagement. Teachers' instructional styles differ, with some teachers being high on both autonomy support and structure, some being low on both, and some being high on one and low on the other. In the present study, we examined the relation between these two aspects of teachers' instructional styles and the relations of each to students' classroom engagement. Specifically, we investigated (a) whether these two aspects of teachers' instructional styles are either positively or negatively correlated, relate to one another in a linear or curvilinear way, or are independent of one another, and (b) how each of these aspects of teachers' styles predicts students' engagement. In line with Skinner and Belmont (1993), we hypothesized that both aspects of teachers' instructional styles would function as unique, positive supports for students' engagement. To understand how teacher-provided autonomy support and structure relate to students' classroom engagement, we assessed engagement with both an objective behavioral measure (scored by trained raters) and a subjective self-report measure (self-reported by students). By implementing both measures, we consciously focused on testing the extent to which both autonomy support and structure might uniquely predict various indicators of students' classroom engagement. Further, acknowledging that there is some controversy in the literature as to which is the better and more meaningful way to assess students' engagement (e.g., Rosenholtz & Simpson, 1984), we also hoped our findings would shed light on this issue, as none of the studies reviewed above assessed both self-report and rater-scored engagement.

Method

Participants

Participants were 133 teachers and their 2,523 students from nine public high schools in the Midwest. Of the 133 observed classrooms, 38% were ninth grade, 32% were 10th grade, and 30% were 11th grade. Observed teachers were teaching either English, math, science, or social studies. Teachers included 48% female and 52% male; they were 75% Caucasian, 13% Hispanic, 8% African American, and 4% Asian American; this was comparable to the gender and ethnic makeup of teachers at the nine schools and in the school district. On average, teachers had 13.1 years of teaching experience, and they taught to a class size of 19.0 students who attended class on the day of our classroom visit. In each school, at least 95% of the teachers were certified. The nine schools had an average student body of 1,272 students (range = 579–1,971), a teacher–student ratio of 1:17.2 (range = 1:15–1:19), and 20% of students who received free lunch (range = 1%–44%). Students included 54% female and 46% male; they were 47% Caucasian, 45% African American, 6% Hispanic, and 2% Asian American. No teacher was rated on more than one occasion, and any student who completed the engagement questionnaire in a previous class did not complete the questionnaire on a second occasion.

Procedure

After gaining the school principal's permission to observe classrooms and also the teachers' permission to visit one of their classrooms, we preannounced to teachers only that graduate students (i.e., raters) associated with the local university would come to one of their classes to observe the classroom dynamics. While teachers gave a priori permission to visit their classrooms, they did not know which regularly scheduled class would be visited. This feature of the study was included so that we could maximize the raters' opportunity to observe each teacher's naturally occurring instructional style. Which teachers were visited and during which class periods they were visited were determined at the beginning of the day by a schedule prepared by an assistant to the school principal. When the raters arrived minutes before the beginning of a class session, they asked teachers to reserve, if possible, the last 2 min of class time so the raters could administer to students a questionnaire with four briefly worded items. Each class lasted between 52 and 55 min. Eighty-four of the 133 teachers (63%) were able to allocate the last 2 min of class time to the questionnaire, while the rest of the teachers ran out of available class time due to events such as extended question-and-answer periods, homework assignments, or achieving adequate closure on the learning session. In the 84 classrooms that were able to allocate the time, the questionnaires were introduced, administered, and collected by the raters. Students were instructed to remain anonymous

[1] We recognize that there may be some circumstances in which educational settings are overstructured, leading to less engagement. In a setting where all students are highly autonomously motivated and interesting activities are available to them, for instance, low structure may be optimal to facilitate engagement and creativity. Still, as a general principle in most classroom settings, we expected high levels of structure to be associated with greater engagement.

(i.e., not to write their name anywhere on the questionnaire), and they were informed that their responses were confidential. On the questionnaire, students were asked to rate their class experience during the just-completed lesson.

Raters

Five raters who were trained with classroom observational skills and who were blind to the study's purpose and hypotheses rated teachers' provision of autonomy support, teachers' provision of structure, and students' collective engagement (and a few additional items to help disguise the purpose of the rating sheet). For 56 (42%) of the classroom visits, raters worked in pairs. In doing so, they sat nonintrusively in the back of the classroom and made independent ratings. We included a pair of raters within 56 classroom visits to estimate interrater reliabilities for each measure. For 77 (58%) of the classroom visits, only one rater scored the ratings.

Rating Sheet

The rating sheet featured three clusters of items to assess the measures of teacher's autonomy support, teacher's structure, and students' behavioral engagement. Each item was scored using a 1–7 Likert scale. Items were taken and slightly modified from an existing measure that was used and validated previously in high school classrooms by Reeve, Jang, and colleagues (2004).

Autonomy support. As shown in Figure 1, raters scored three autonomy-supportive instructional behaviors—nurtures inner motivational resources, relies on informational language, and acknowledges and accepts students' negative affect (range of interrater *r*s = .72–.88). The bipolar descriptors for these three behaviors were as follows: relies on extrinsic sources of motivation versus nurtures inner motivational resources, controlling language versus informational language, and counters and tries to change students' negative affect versus acknowledges and accepts students' negative affect. Collectively, these behaviors reflect self-determination theory's conceptualization of autonomy support (Ryan & Deci, 2000), and each instructional behavior has been validated as an act of autonomy support in prior classroom use (Reeve, Jang, et al., 2004). As found in previous research, the three autonomy-supportive acts of instruction were positively intercorrelated, and we therefore averaged them into a single overall teacher-provided autonomy support score ($\alpha = .81$).

Structure. As shown in Figure 2, raters scored three instructional behaviors to represent teacher-provided structure—clear and explicit directions, strong guidance during the lesson, and constructive feedback (range of interrater *r*s = .84–.88). The bipolar descriptors for these three behaviors were as follows: during the introduction, absent, unclear, ambiguous, confusing directions versus clear, understandable, explicit, detailed directions; during the lesson, weak guidance versus strong guidance; and during feedback, no feedback or ambiguous feedback versus skill-building and instructive feedback. Collectively, these behaviors reflect Skinner's motivation-based conceptualization of structure, and each instructional behavior has been validated as an act of structure in prior classroom use (Skinner & Belmont, 1993). As has been found in previous research, the three structure-providing acts of instruction were positively intercorrelated, and we therefore averaged them into a single overall teacher-provided structure score ($\alpha = .85$).

Differentiating autonomy support from structure. This study was based on the premise that the construct of teacher-provided autonomy support was distinct from the construct of teacher-provided structure. To test the validity of this assumption, we used structural equation modeling (using LISREL 8.51; Jöreskog & Sörbom, 1993) to conduct a confirmatory factor analysis that tested the extent to which the measured indicators adequately and uniquely related to their associated latent variables. To evaluate model fit, we relied on the chi-square test statistic and the standardized root-mean-square residual (SRMR). A nonsignificant chi-square serves as the basic test of whether a hypothesized model adequately describes the data (Bollen & Long, 1993), though Hu and Bentler (1999) recommend priority be given to the SRMR

Teacher's Autonomy Support

Relies on Extrinsic Sources of Motivation * Offers Incentives, Consequences, Directives * Makes Assignments, Seeks Compliance	1 2 3 **4** 5 6 7	**Nurtures Inner Motivational Resources** * Interest, Enjoyment, Sense of Challenge * Creates Opportunities for Initiative
Controlling Language * Pressuring, Ego-Involving * Should, Must, Have to, Got to * Neglects Value, Meaning, Use, Benefit, Importance of Requests	1 2 3 **4** 5 6 7	**Informational Language** * Informational, Flexible * Provides Choices, Options * Identifies Value, Meaning, Use, Benefit, Importance of Requests
Counters & Tries to Change Students' Negative Affect * Blocks/Counters Expressions of Negative Affect * Negative Affect is Not OK, Is Unacceptable, Is Something to be Changed/Fixed	1 2 3 **4** 5 6 7	**Acknowledges & Accepts Students' Negative Affect** * Listens Carefully, Openly, Understandingly * Accepts Negative Affect, Complaints are OK

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

Figure 1. Rating sheet to score the three teacher-provided autonomy support items.

Teacher's Structure

During Introduction:

Absent, Unclear, Ambiguous, Confusing Directions * "What to do" is Absent, Confusing * Poorly Organized * No Clear Frame for Upcoming Lesson	1	2	3	**4**	5	6	7	**Clear, Understandable, Explicit, Detailed Directions** * "What to do" is Clear * Well Organized * Frames Upcoming Lesson Well

During Lesson:

Weak Guidance * Little Guidance, Leadership * No Action Plan, No Goal * Few Control-Establishing Hints	1	2	3	**4**	5	6	7	**Strong Guidance** * Much Guidance, Leadership * Clear Action Plan, Clear Goal * Many Control-Establishing Hints

During Feedback:

Feedback: None, Ambiguous * None, Off-Task, Rambling * Competence-Irrelevant Information	1	2	3	**4**	5	6	7	**Feedback: Skill-Building, Instructive** * Constructive, Informative * Competence-Relevant Information

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

Figure 2. Rating sheet to score the three teacher-provided structure items.

when evaluating the fit of a measurement model (i.e., a confirmatory factor analysis), with a value of .08 or lower for the SRMR considered indicative of a good model fit. The hypothesized two-factor model fit the data reasonably well, as the chi-square statistic was significant, $\chi^2(8) = 20.19$, $p = .01$, while the SRMR fit index suggested a good model fit of .04 (also comparative fit index = .98, nonnormed fit index = .97). We also compared our hypothesized two-factor model to a one-factor model, and the two-factor model fit the data significantly better than did the one-factor model, $\Delta\chi^2(1) = 173.67$, $p < .01$. For the two-factor model, each of the six individual indicators loaded positively and significantly ($p < .01$) on its associated latent factor, including the three indicators for autonomy support (informational language, $\beta = .94$; nurture inner resources, $\beta = .89$; and acknowledge feelings, $\beta = .75$) and the three indicators for structure (strong guidance, $\beta = .96$; clear directions, $\beta = .95$; and instructive feedback, $\beta = .78$). The two latent factors intercorrelated positively and significantly ($\beta = .59$, $p < .01$).

Students' collective behavioral engagement. Raters scored six engagement-related aspects of students' behaviors at the classroom level—attention, effort, verbal participation, persistence, positive emotion, and voice (interrater *r*s ranged from .63 to .92). The bipolar descriptors for the first five of these behaviors were as follows: dispersed attention versus focused attention; passive, slow, or minimal effort versus active, quick, and intense effort; students don't talk, ask questions, or discuss versus students talk, ask questions, and discuss; during challenge, failure, or confusion students give up easily and decrease effort over time versus maintain or increase effort over time; bored, disinterested, and flat emotional tone versus enjoyment, interested, and fun. These five indicators reflect Skinner's conceptualization of engagement (e.g., Skinner & Belmont, 1993; Skinner et al., 2008). The sixth engagement measure, voice, was based on deCharms conceptualization of engagement and was calculated as a ratio to index students' attempts to influence the flow of instruction in a constructive way (voice = frequency of students' influence attempts, divided by frequency of students' influence attempts + frequency of the teacher's influence attempts; Koenigs, Fiedler, & deCharms, 1977). Each of these six expressions of students' collective behavioral engagement has been validated in prior classroom research (Reeve, Jang, et al., 2004), as each rating has been shown to produce high interrater reliability, to intercorrelate highly and positively with the other five engagement ratings (i.e., high reliability), and to be sensitive to teaching variables known to affect students' engagement (i.e., high validity). As has been found in these previous studies, the six indicators of classroom engagement were positively intercorrelated, so we converted the classroom rating on each indicator into a *z* score and averaged them (equally weighted) to form a single overall collective engagement score for the group of students in each classroom ($\alpha = .92$).

Students' Individual Self-Report Engagement (Student Questionnaire)

The student questionnaire included four briefly worded items to assess the extent to which students were engaged during the class period. We developed the measure to reflect Fredricks et al.'s (2004) three-component conceptualization of engagement, which features behavioral, cognitive, and emotional aspects. The questionnaire began with the stem, "During this class. . ." and included the following four items: "I paid attention" "I worked very hard" "I tried to learn as much as I could" and "I enjoyed today's class." The first two items were designed to reflect the behavioral aspects of engagement, the third item was designed to reflect the cognitive aspect of engagement, and the fourth item was designed to assess the emotional aspect of engagement. Each item was scored on a unipolar 7-point Likert scale that ranged from 1 (*not at all true*) to 7 (*extremely true*). To create a single score for each student, we averaged the four items into an individual self-report engagement score ($\alpha = .88$).

Statistical Analyses

We used two engagement measures—students' collective behavioral engagement and students' individual self-report engagement. For students' collective behavioral engagement, raters scored the average engagement of groups of students (class size averaged 19.0 students) sitting in the classrooms of 133 different teachers. These 133 classrooms were nested within nine schools. Multilevel modeling (using hierarchical linear modeling [HLM]) was therefore ideally suited to our research question. For some analyses, on the first level of the multilevel model (between-teachers level), regression equations were modeled for characteristics that differed between teachers (autonomy support, structure). Level 1 predictor variables were centered around their means. At the second level (between-schools level), regression equations were modeled for the different schools in which the teachers taught.

For students' individual self-report engagement, 1,584 students individually completed the self-report engagement questionnaire. These 1,584 responses were nested within 84 classrooms (recall that students did not complete the questionnaire in the remaining 49 classrooms). Further, the 84 classrooms were nested within the nine schools. As a check, we compared the rater-scored instructional styles of the 84 teachers who allocated 2 min for the student questionnaires at the end of the class time to the 49 teachers who did not, and these two groups of teachers did not differ in terms of their provision of either autonomy support ($t < 1$) or structure ($t = 1.15$). For analyses of these data, on the first level (between-students level), regression equations were modeled to detect engagement differences among students sitting in the same classroom. At the second level (between-teachers level), regression equations were modeled for characteristics that differed between teachers (autonomy support, structure) and these Level 2 predictor variables were centered around their means. At the third level (between-schools level), regression equations were modeled for the different schools in which the teachers taught. A detailed presentation of multilevel modeling can be found in Raudenbush and Bryk (2002), and all analyses were conducted with HLM 6 (Raudenbush, Bryk, Cheong, & Congdon, 2004).

Results

Preliminary analyses were conducted to investigate school-level differences in all the variables. Overall means for the pair of engagement measures appear in Table 1. School-based means ranged from −0.48 to 0.32 for students' collective behavioral engagement (scored with *z* scores) and from 5.38 to 5.88 for students' individual self-report engagement (scored on a 1–7 scale). HLM analyses were used to investigate the between-schools effects on the engagement measures. Interclass correlation coefficients indicated that between-school differences accounted for 7% of the total variance in students' collective behavioral engagement and for less than 1% of the total variance in students' individual self-report engagement. These figures suggest that most of the variance in both engagement measures was not due to systematic school differences. We therefore turned our attention to investigating between-teachers (i.e., between-classrooms) differences in the engagement measures. Interclass correlation coefficients indicated that between-teachers differences accounted for 93% of the total variance in students' collective behavioral engagement. For students' individual self-report engagement, interclass correlation coefficients indicated that between-teachers differences accounted for 14% of the total variance, while within-classroom variance accounted for the remaining (unexamined) 86% of the variance.

Table 1 shows the descriptive statistics and correlation matrix for the four measures expressed at the classroom level. The two teacher ratings (autonomy support, structure) intercorrelated positively and significantly with one another, as did the two student engagement measures. Further, teacher-provided autonomy support and teacher-provided structure both individually and positively correlated with both students' collective behavioral and students' individual self-report engagement (all *p*s $< .01$).

Table 1
Descriptive Statistics and Correlation Matrix for the Measures of Teachers' Instructional Styles and Students' Classroom Engagement

Measure	1	2	3	4
1. Teacher-provided autonomy support	—	.60**	.70**	.36**
2. Teacher-provided structure		—	.76**	.30**
3. Students' collective behavioral engagement			—	.41**
4. Students' individual self-report engagement				—
M	4.59	5.04	0.00	5.41
SD	1.17	1.06	0.84	0.59
Range of scores	1.33 to 6.83	1.40 to 7.00	−2.86 to 1.78	3.88 to 6.78
Skewness	−0.38	−0.61	−0.39	−0.24
Kurtosis	−0.40	0.62	0.42	0.06
Sample size	133	133	133	84[a]

[a] Our primary unit of analysis was at the teacher level. Hence, the statistics for students' self-report engagement are expressed at the classroom (teacher) level. That is, the data points above for students' individual self-report engagement represent the class mean of the students in that class. When students' self-report engagement responses are expressed at the individual level, sample size increases from 84 to 1,582, range of scores increases to 1.00 to 7.00, and standard deviation increases to 1.33, while the remaining statistics (mean, skewness, kurtosis) remain largely unchanged.
** $p < .01$.

Predicting Students' Collective Behavioral Engagement

HLM was used to examine whether students' collective behavioral engagement could be predicted by the two teacher-level variables of autonomy support and structure. The HLM equations were constructed to simultaneously test the teacher-level variables as joint predictors of students' collective behavioral engagement. Hypothesis testing for fixed effects revealed significant *t* statistics for both teacher variables as individually significant predictors of students' collective behavioral engagement (see Table 2). Hence, the more teachers were rated by observers as providing autonomy support and the more teachers were rated by observers as providing structure, the greater collective engagement the observers reported seeing in their students.

Predicting Students' Individual Self-Report Engagement

HLM was also used to examine whether students' individual self-report engagement could be predicted by the two teacher-level variables of autonomy support and structure. The HLM equations were again constructed to simultaneously test the teacher-level variables as joint predictors of students' individual self-report engagement. Hypothesis testing for fixed effects revealed a significant *t* statistic for teacher-provided autonomy support as an individually significant predictor of students' individual self-reported engagement but a nonsignificant *t* statistic for teacher-provided structure (see Table 2). Hence, the more teachers were rated by observes as providing autonomy support (but not necessarily structure), the greater individual engagement their students reported experiencing.

Relation Between Autonomy Support and Structure

The zero-order correlation between autonomy support and structure reported in Table 1 was significant and positive, $r(133) = .60$, $p < .01$.

As to the curvilinear hypothesis, we used raters' scores to divide the 133 teachers into three equal groups of providing low ($n = 46$), moderate ($n = 43$), or high ($n = 44$) levels of structure so that we could perform a one-way analysis of variance with tests for both linear and quadratic trend effects on teacher-provided autonomy support. In the prediction of autonomy support, the quadratic trend was not significant, $F(1, 130) < 1$, while the linear trend was significant, $F(1, 130) = 60.92$, $p < .01$, based on the following means: low = 3.81; moderate = 4.57; high = 5.42. Hence, the effect that higher levels of structure had on teachers' provision of autonomy support was linear, not curvilinear (i.e., quadratic). In addition, we tested whether the effect of structure on students' collective behavioral engagement was linear or quadratic. Again, the quadratic trend was not significant, $F(1, 130) < 1$, while the linear trend was significant, $F(1, 130) = 117.03$, $p < .01$ (low, $M = -0.70$; moderate, $M = -0.04$; and high, $M = 0.70$). Finally, we tested whether the effect of structure on students' self-report engagement was linear or quadratic. Again, the quadratic trend was not significant, $F(1, 81) < 1$, while the linear trend was significant, $F(1, 81) = 13.20$, $p < .01$ (low, $M = 5.24$; moderate, $M = 5.49$; high, $M = 5.81$). Overall, these data show strong support for the idea that the relation between structure and autonomy support (and the relation between structure and both types of engagement) are linear; there was no support for the idea that the relations are curvilinear.

Discussion

In the present study, we focused on two aspects of teachers' instructional styles—autonomy support and structure—to assess their association with each other and with students' classroom engagement. Specifically, we investigated the interrelation between autonomy support and structure (Was it antagonistic, curvilinear, or independent?) and the relation of each to student engagement. We found that teacher-provided autonomy support and structure positively covaried rather than being antagonistic, curvilinear, or independent. Further, correlational analyses showed that students' classroom engagement was quite strongly and positively associated with both aspects of teachers' instructional styles. Finally, the regression-based HLM analysis (capable of controlling for the effect of the other predictor variable) showed that autonomy support uniquely predicted both measures of students' engagement, while structure uniquely predicted students'

Table 2
Results From Hierarchical Analyses Predicting Students' Collective Behavioral Engagement and Students' Individual Self-Report Engagement

	Students' collective behavioral engagement (133 classrooms)					Students' individual self-report engagement (1,582 students in 84 classrooms)				
Variable	Coefficient	*SE*	*t*(130)	Variance	*SD*	Coefficient	*SE*	*t*(81)	Variance	*SD*
Fixed effects										
Intercept[a]	0.02	.08	0.23			5.50	.06	87.34*		
Teacher autonomy support	0.36*	.05	7.31*			0.19*	.07	2.54*		
Teacher structure	0.38*	.05	7.78*			0.06	.08	0.80		
Random effects										
Level 1 (*R*)				.21	.46				.23	.48
Intercept (U_0)				.04*	.20				.00	.01

[a] Raw scores for students' collective behavioral engagement are expressed in *z* scores; raw scores for students' individual self-reported engagement are expressed on a 1–7 Likert scale.
* $p < .05$.

collective behavioral engagement but not students' individual self-report engagement. When taken as a whole, these findings have implications that speak to the nature of the relation between autonomy support and structure, to explaining students' classroom engagement, to classroom climate and teacher behavior, and to classroom practices.

Relation Between Autonomy Support and Structure

From our review of the literature, we identified three possible ways that teacher-provided autonomy support and structure might relate both to each other and to students' high classroom engagement. We return to these possible relations here to examine whether the current findings support these possible relations.

Are autonomy support and structure antagonists? One view of the relation between autonomy support and structure is that they are antagonists, such that the provision of one interferes with the provision of the other. While both anecdotal and empirical examples can be offered to illustrate how a specific element of structure might suppress a specific element of autonomy support (e.g., Perlmuter & Monty, 1979), the correlations reported in Table 1 indicated that autonomy support and structure were positively correlated. In fact, autonomy support and structure shared a common variance of 36%, based on the $r = .60$ reported in Table 1. That is, the high school teachers in our study who nurtured students' inner motivational resources, used informational language, and accepted expression of students negative affect were more likely, not less likely, to communicate clear and explicit directions, display strong guidance, and offer constructive feedback. Further, as shown in the HLM regression-based analyses, the variance in students' engagement accounted for by autonomy support and structure together was greater than was the variance accounted for by either autonomy support alone or structure alone. This suggests that autonomy support and structure functioned in a complementary, not in an antagonistic, way.

The curvilinear hypothesis. A second view of the relation between autonomy support and structure is the curvilinear hypothesis. Providing too much structure conceivably undermines both teacher-provided autonomy support and students' engagement because it tends to create a rigid, compliance-based, and personal causation-depleting environment. Providing too little structure does not interfere with a teacher's provision of autonomy support, though it does conceivably undermine students' engagement because it tends to create a chaos-inviting laissez-faire environment and neglects the development of students' personal control beliefs. Thus, the optimal amount of structure to support teacher-provided autonomy support and students' classroom engagement is, conceivably, a moderate amount: "too much is bad—too little is chaos" (deCharms, 1984, p. 287). Importantly, the curvilinear hypothesis applies only to teacher-provided structure, as deCharms (1984) argued that high autonomy support was always better than low autonomy support. The reason deCharms (1984) cautioned that high structure was problematic for student engagement was that it too often undermined teacher-provided autonomy support (implying that, at high levels, structure could be antagonistic to autonomy support, as discussed above). The trend analyses for how structure affected teacher-provided autonomy support and how structure affected the pair of student engagement measures showed no support for the curvilinear hypothesis among low, moderate, and high levels of teacher-provided structure. Instead, these analyses showed only strong support for the linear hypothesis, as teacher-provided autonomy support was highest with the provision of a highly structured instructional style and student engagement was also at its highest with the provision of a highly structured instructional style.

Two independent aspects of instructional style. A third view of the relation between autonomy support and structure is that they are separate and independent aspects of teachers' instructional styles, each contributing its own unique role to support students' motivation and engagement. Rather than supporting the conclusion that the two instructional styles were independent and uniquely predictive of students' engagement, our data supported the conceptualization that the two styles are complementary and uniquely predictive. By complementary, we mean that the two styles are both positively correlated and contribute to the prediction of students' engagement. That is, both aspects of teachers' styles correlated positively and strongly with one another and with students' engagement (see Table 1), and both aspects produced a significant main effect that explained unique variance in students' collective behavioral engagement (see Table 2). Following the thinking outlined by Skinner and Belmont (1993), we believe that both autonomy support and structure support students' engagement but that they likely do so in somewhat different ways. That is, the two aspects of teachers' instructional styles support different aspects of students' underlying motivation, as autonomy support primarily enriches students' perceived autonomy and sense of personal causation, while structure primarily enriches students' perceived competence and perceptions of control over outcomes. While both aspects of teachers' instructional styles appear to contribute positive support to students' engagement, the two aspects may not contribute equally, as autonomy support accounted for unique variance in both students' collective behavioral engagement and students' individual self-report engagement, while structure accounted for unique variance only in students' collective behavioral engagement. This pattern of findings suggests that teacher-provided autonomy support may be associated with the full range of students' engagement, while teacher-provided structure may be associated more narrowly with the on-task behavioral aspects of engagement (e.g., attention, effort, persistence).

Explaining Students' Classroom Engagement

For the purposes of the present study, we distinguished between students' behavioral (objective) and self-reported (subjective) engagement. Behavioral/objective engagement is what raters (and teachers) publicly see during the lesson—students' on-task attention, effort investment, persistence in the face of difficulty, and so forth. Self-reported/subjective engagement, on the other hand, is what students privately experience during the lesson—intentional learning, positive feelings, deep information processing, and general proactivity to contribute their sense of voice to the ongoing flow of instruction. Teacher-provided autonomy support was associated with both of these aspects of students' engagement, while teacher-provided structure was more narrowly associated only with the behavioral/objective aspect.

In practice, this pattern of findings suggests that structure-based instructional strategies might be insufficient to support the full range of students' engagement. When provided with a highly

structured learning environment, students do generally display high levels of attention, effort, and persistence (i.e., behavioral engagement). Our findings suggest that to further support students' subjective engagement in the lesson, however, teachers need to find ways to administer elements of classroom structure that not only structure the lessons but also support students' autonomy while doing so, as it was teacher-provided autonomy support, not teacher-provided structure, that was uniquely associated with students' subjective engagement. Hence, elements of structure might guide students' behavioral engagement, but these elements (e.g., communications, goals, feedback) need to be offered in autonomy-supportive ways if they are to support both overt behavioral displays of engagement and private subjective experiences of engagement.

This study was designed to examine between-classes rather than within-class effects on students' engagement. That is, our focus was on how different aspects of teachers' instructional styles affected students' engagement. This focus on between-classes effects, however, is a different focus from the majority of existing research investigating students' motivation and engagement, which tends to focus on within-class effects (Anderman & Maehr, 1994; Church, Elliot, & Gable, 2001; Kaplan & Midgley, 1999; Roeser, Midgley, & Urdan, 1996). The logic in an emphasis on within-class effects is that students' perceptions of the classroom climate are the key factors predicting students' motivation and engagement. We agree that students' perceptions of their teachers' behaviors and their perceptions of their own engagement are important variables. In fact, our HLM analyses of students' individual self-report engagement showed that within-class effects constituted 86% of the variance, while between-classes effects constituted only 14% of the variance (with between-schools effects constituting $<$ 1%). Clearly, student individual differences such as perceived competence, goal orientation, and various motivational beliefs account for substantial within-class differences in students' motivation (Wolters, 2004) and engagement (Skinner & Belmont, 1993). Still, we focused on objective differences between teachers rather than on subjective differences between students. In doing so, it is our hope to confirm the important sociocontextual contribution added by examining between-classes (between-teachers) effects to what researchers already know are important within-class (between-students) effects. This between-classes and between-teachers focus allows us rather uniquely to speak to research on classroom climate and teacher behavior.

Classroom Climate and Teacher Behavior Research

The approach taken in the present study parallels research on classroom climate (Fraser, 1994) and teacher behavior (see Wubbels, Brekelmans, den Brok, & van Tartwijk, 2006). While different researchers tend to use somewhat different terminology, most studies of teaching behavior emphasizes the two teacher dimensions of *influence* (submission to dominance) and *proximity* (opposition to cooperation) (Wubbels, Creton, Levy, & Hooymayers, 1993). These dimensions represent two orthogonal axes within a coordinate system that features eight categories of teacher behavior: leadership, friendliness, understanding, student responsibility, uncertain, dissatisfied, admonishing, and strict (Wubbels et al., 2006; Wubbels & Levy, 1991). The category of teacher behavior that corresponds most closely to our conceptualization of structure is leadership ("lead, organize, give orders, set tasks, determine procedure, structure the classroom situation"); the opposite of which is uncertain ("keep a low profile, apologize, wait and see how the wind blows"). The category of teacher behavior that corresponds most closely to our conceptualization of autonomy support is understanding ("listen with interest, empathize, show confidence and understanding, accept apologies, look for ways to settle differences, be patient, be open"); the opposite of which is admonishing ("get angry, take pupils to task, express irritation and anger, forbid, correct, punish"; quotes from Wubbels et al., 2006, p. 1166). In research based on this model, students' classroom effort and enjoyment (i.e., engagement) is highest when teachers show high leadership and high understanding and lowest when teachers show high uncertainty and high admonishing (Brekelmans, 1989; Goh & Fraser, 1996; den Brok, Brekelmans, & Wubbels, 2004).[2]

Prior research on classroom climate and teacher behavior offers a potential insight as to how autonomy support and structure might combine during the ongoing flow of instruction to enhance students' engagement. By analyzing teacher behavior from one moment to the next, researchers found that teaching at central moments in the lesson (e.g., when the teacher was in front of the class and introducing a new learning activity) was crucial to predicting students' subsequent classroom engagement (Brekelmans, Sleegers, & Fraser, 2000; van Tartwijk, Brekelmans, Wubbels, Fisher, & Fraser, 1998). To set the conditions under which students could later regulate their own learning in an autonomous and responsible way—especially during less supervised group and individual work—it was helpful for a teacher to first display a strong sense of leadership (i.e., high structure) during these central lesson segments. Notice that our rating sheet to score structure (see Figure 2) was partitioned into three lesson segments—during introduction, during lesson, and during feedback. Perhaps student engagement thrives when teachers provide consistently high autonomy support (high understanding, low admonishing) and especially well-timed high structure (high leadership, low uncertainty).

Implications for Classroom Practice

The current findings have implications for teachers wrestling with the daily goal of supporting students' engagement during learning activities. We found that teacher-provided autonomy support and teacher-provided structure functioned as rather important predictors of students' collective classroom engagement. The implication that comes from testing the antagonistic, curvilinear, independent, and complementary hypotheses on the relation that autonomy support and structure have on each other and on students' engagement is that teachers seeking engagement-fostering instructional strategies need not choose between providing autonomy support or structure but, instead, can focus their instructional energies on providing autonomy support and structure.

[2] Some of these research studies also merge multiple categories of teacher behavior into distinct teacher profiles. The profiles most strongly associated with students' classroom engagement are directive (moderately high influence, moderately high proximity), authoritative (moderately high influence, very high proximity), and tolerant (moderate influence, very high proximity; Brekelmans, 1989).

As to the quality of just what teachers would say and do to provide students with an autonomy-supportive, structured learning environment, our goal was to conceptualize and operationally define autonomy support and structure in a comprehensive way. That is, for the provision of autonomy support, we suggest that teachers might want to initiate learning activities by involving students' inner motivational resources, communicating in noncontrolling and informational ways and acknowledging students' perspectives and negative feelings when motivational (e.g., listlessness) and behavioral (e.g., disrespectful language) problems arise. For the provision of structure, we suggest that teachers might want to initiate learning activities by offering clear and detailed expectations and instructions, offering helpful guidance and scaffolding as students try to profit from the lesson, and providing feedback to enhance perceptions of competence and perceived personal control during a reflective postperformance period.

We view our conceptualization of teacher-provided autonomy support and structure as a comprehensive framework, and this belief in the comprehensiveness of our conceptual and operational definitions is based on the conceptual models, instructional recommendations, and empirical assessments of past research (Skinner & Belmont, 1993; Reeve, Jang, et al., 2004). That said, we recognize that our conceptual and operational definitions might capture only the essential, rather than the comprehensive, elements of teacher-provided autonomy support and structure. We recognize that others—especially those with behavioral or sociocultural (rather than motivational) perspectives—may emphasize aspects of autonomy support or structure that we did not include in this investigation. Hence, future researchers might want to make it a priority to answer the question of whether our conceptualization of these two characteristics of instructional style includes the comprehensive, versus the merely essential, elements of teacher-provided autonomy support and teacher-provided structure.

Limitations

In interpreting the current findings, we recognize four potential methodological limitations. One was that the sample included only high school students and their teachers. In high school, teachers expect greater personal responsibility and self-regulation from their students, at least compared to what is expected from elementary school students (Martinez-Pons, 2002). Also, student motivation and engagement are generally lower in secondary school classrooms than they are in elementary school classrooms (Gottfried, Fleming, & Gottfried, 2001; Tucker et al., 2002). These grade-related baseline differences in teachers' expectations and demands on students might have important implications for our findings. Hence, it seems important for future research to test the generalizability of the findings to elementary and middle-school classrooms.

A second limitation is that we do not know to what extent observed teachers might have altered their instructional styles upon seeing the raters enter their classroom. While our efforts to provide teachers with minimal forewarning helped minimize this effect (by preventing nontypical preparation), it is unknown to what extent such on-the-spot alteration of a teacher's instructional style might have occurred. In support of the idea that teachers probably did not alter their instructional styles is research on teacher behavior that shows strong consistency in any one teacher's instructional style from one assessment period to the next (Brekelmans, 1989; Deci et al., 1981). Brekelmans (1989) found that any one assessment of a teacher's instructional style during the year is a valid representation of that teacher's year-long instructional style. In addition, because our observed teachers taught English, math, science, and social studies, we do not know the extent to which our 133 teachers are representative of the population of teachers in other subject areas (e.g., art, music, physical education).

A third limitation is the possibility of observer bias in the behavior ratings. While raters were blind to the experimental hypotheses and while raters' scores of teachers' instructional style did predict students' self-reported engagement, observer bias may still have occurred when raters scored both the teacher's instructional style and the students' collective behavioral engagement. It is possible that, when raters gave teachers generally good scores on their instructional style, they were also inclined to see the students as collectively engaged (and vice versa). To the extent that such observer bias occurred, this shared method variance confound could be expected to inflate the positive correlation between teachers' instructional behaviors and students' behavioral (but not subjective) engagement. The way that past researchers have dealt with this concern is to use teacher ratings from one rater to predict the student ratings of a second rater (and also to use teacher ratings from the second rater to predict the student ratings of the first rater). When this methodological correction has been applied (see Reeve, Jang, et al., 2004, p. 163), the cross-rater analyses replicated the findings from the single-rater analyses. We performed these same cross-rater analyses with our data and found that the cross-rater analyses replicated the single-rater analyses, though the sample size was reduce from 133 classroom observations (classes with at least one rater) to only 56 classroom observations (classes with two raters). While potential rating artifacts are always a concern, we conclude that our findings reflect a real association between teachers' instructional styles and students' engagement.

A fourth limitation is that the data are correlational and cross-sectional. While we generally framed the research questions around asking how teachers influence students, we recognize that engagement serves as an important social signal from students to elicit supportive reactions from teachers (Furrer & Skinner, 2003). For instance, when students show signs of engagement, teachers are more likely to provide instructional support and hence to display greater autonomy support and structure (Skinner & Belmont, 1993); similarly, when students show signs of disengagement, teachers are less likely to provide this same sort of instructional support (Skinner et al., 2008). To disentangle the effect that teachers have on students from the effect that students have on teachers and also to substantiate an interpretation that teachers' instructional styles have a directional influence on students' engagement, experimental and longitudinal designs are needed. Fortunately, past research allows us a measure of confidence in our hypothesized directional effect (that teachers' styles affect students' engagement) because the beneficial effects of teacher-provided autonomy support on students' engagement have been shown both in longitudinal (deCharms, 1976) and in longitudinal/experimental (Reeve, Jang, et al., 2004) studies, just as the beneficial effect of teacher-provided structure on students' engagement has been shown in longitudinal/experimental research (Evertson & Emmer, 1982).

References

Anderman, E. M., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64,* 287–309.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teaching behaviors predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 27,* 261–278.

Bollen, K. A., & Long, J. S. (Eds.). (1993). *Testing structural equation models.* Newbury Park, CA: Sage.

Brekelmans, M. (1989). *Interpersonal teacher behavior in the classroom.* Utrecht, the Netherlands: W. C. C.

Brekelmans, M., Sleegers, P., & Fraser, B. J. (2000). Teaching for active learning. In R. J. Simons, J. van der Linden, & T. Duffy (Eds.), *New learning* (pp. 227–242). Dordrecht, the Netherlands: Kluwer Academic.

Brooks, D. (1985). The teacher's communicative competence: The first day of school. *Theory into Practice, 24,* 63–70.

Brophy, J. (1986). Teacher influences on student achievement. *American Psychologist, 41,* 1069–1077.

Brophy, J. (2006). Observational research on generic aspects of classroom teaching. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 755–780). Mahwah, NJ: Erlbaum.

Brophy, J., & Good, T. (1986). Teacher behavior and student achievement. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 328–375). New York, NY: Macmillan.

Carter, K., & Doyle, W. (2006). Classroom management in early childhood and elementary classrooms. In C. M. Evertson & C. S. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary issues* (pp. 373–406). Mahwah, NJ: Erlbaum.

Church, M. A., Elliot, A. J., & Gable, S. L. (2001). Perceptions of classroom environment, achievement goals, and achievement outcomes. *Journal of Educational Psychology, 93,* 43–54.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *Self processes in development: Minnesota symposium on child psychology* (Vol. 23, pp. 167–216). Chicago, IL: University of Chicago Press.

Daniels, H., & Bizar, M. (1998). *Methods that matter: Six structures for best practice classrooms.* Portland, ME: Stenhouse.

deCharms, R. (1976). *Enhancing motivation: Change in the classroom.* New York, NY: Irvington.

deCharms, R. (1984). Motivation enhancement in educational settings. In R. Ames & C. Ames (Eds.), *Research on motivation in education: Student motivation* (Vol. 1, pp. 275–310). Orlando, FL: Academic Press.

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality, 62,* 119–142.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125,* 627–668.

Deci, E. L., Schwartz, A., Sheinman, L., & Ryan, R. M. (1981). An instrument to assess adult's orientations toward control versus autonomy in children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology, 73,* 642–650.

den Brok, P., Brekelmans, M., & Wubbels, T. (2004). Interpersonal teacher behavior and student outcomes. *School Effectiveness and School Improvement: An International Journal of Research, Policy and Practice, 15,* 407–442.

Doyle, W. (1986). Classroom organization and management. In M. C. Witrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 432–463). New York, NY: Macmillan.

Doyle, W. (2006). Ecological approaches to classroom management. In C. M. Evertson & C. S. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary issues* (pp. 97–125). Mahwah, NJ: Erlbaum.

Emmer, E., Evertson, C., & Anderson, L. (1980). Effective classroom management at the beginning of the school year. *Elementary School Journal, 80,* 219–231.

Evertson, C. M., & Emmer, E. T. (1982). Effective management at the beginning of the year in junior high school classes. *Journal of Educational Psychology, 74,* 485–498.

Evertson, C. M., & Weinstein C. S. (Eds.). (2006). *Handbook of classroom management: Research, practice, and contemporary issues.* Mahwah, NJ: Erlbaum.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology, 82,* 221–234.

Fraser, B. J. (1994). Research on classroom and school climate. In D. Gabel (Ed.), *Handbook of research on science teaching and learning* (pp. 493–541). New York, NY: Macmillan.

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.

Furrer, C., & Skinner, E. A. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95,* 148–162.

Goh, S. C., & Fraser, B. J. (1996). Validation of an elementary school version of the Questionnaire on Teacher Interaction. *Psychological Reports, 79,* 515–521.

Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93,* 3–13.

Grolnick, W., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual difference investigation. *Journal of Personality and Social Psychology, 52,* 890–898.

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

Huston-Stein, A., Friedrich-Cofer, L., & Susman, E. J. (1977). The relation of classroom structures to social behavior, imaginative play, and self-regulation of economically disadvantaged children. *Child Development, 48,* 908–916.

Jang, H. (2008). Supporting students' motivation, engagement, and learning during an uninteresting activity. *Journal of Educational Psychology, 100,* 798–811.

Jang, H. (2009). *Preserving and enhancing students' autonomy by delivering directed instruction in an autonomy-supportive way.* Unpublished manuscript, University of Wisconsin—Milwaukee.

Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language.* Hillsdale, NJ: Scientific Software International.

Kaplan, A., & Midgley, C. (1999). The relationship between perceptions of the classroom goal structure and early adolescents' affect in school: The mediating role of coping strategies. *Learning and Individual Differences, 11,* 187–212.

Koenigs, S. S., Fiedler, M. L., & deCharms, R. (1977). Teacher beliefs, classroom interaction and personal causation. *Journal of Applied Social Psychology, 7,* 95–114.

Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling versus informational styles on intrinsic motivation and creativity. *Journal of Personality, 52,* 233–248.

Mageau, G. A., & Vallerand, R. J. (2003). The coach–athlete relationship: A motivational model. *Journal of Sports Sciences, 21,* 883–904.

Martinez-Pons, M. (2002). Parental influences on children's academic self-regulatory development. *Theory into Action, 41,* 126–131.

O'Donnell, A. M. (2006). The role of peers and group learning. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 781–802). Mahwah, NJ: Erlbaum.

Perlmuter, L. C., & Monty, R. A. (1979). *Choice and perceived control.* Hillsdale, NJ: Erlbaum.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models* (2nd ed.). Thousand Oaks, CA: Sage.

Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., & Congdon, R. T. (2004). *HLM 6: Hierarchical linear and nonlinear modeling.* Lincolnwood, IL: Scientific Software International.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44,* 159–175.

Reeve, J., Deci, E. L., & Ryan, R. M. (2004). Self-determination theory: A dialectical framework for understanding the sociocultural influences on student motivation. In D. M. McInerney & S. Van Etten (Eds.), *Research on sociocultural influences on motivation and learning: Big theories revisited* (Vol. 4, pp. 31–59). Greenwich, CT: Information Age Press.

Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98,* 209–218.

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support. *Motivation and Emotion, 28,* 147–169.

Reeve, J., Jang, H., Hardre, P., & Omura, M. (2002). Providing a rationale in an autonomy-supportive way as a strategy to motivate others during an uninteresting activity. *Motivation and Emotion, 26,* 183–207.

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

Rosenholtz, S. J., & Simpson, C. (1984). Classroom organization and student stratification. *Elementary School Journal, 85,* 21–37.

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.

Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3–33). Rochester, NY: University of Rochester Press.

Ryan, R. M., & La Guardia, J. G. (1999). Achievement motivation within a pressured society: Intrinsic and extrinsic motivation to learn and the politics of school reform. In T. Urdan (Ed.), *Advances in motivation and achievement* (Vol. 11, pp. 45–85). Greenwich, CT: JAI Press.

Ryan, R. M., Mims, V., & Koestner, R. (1983). Relation of reward contingency and interpersonal context to intrinsic motivation: A review and test using cognitive evaluation theory. *Journal of Personality and Social Psychology, 45,* 736–750.

Schuh, K. L. (2004). Learner-centered principles in teacher-centered practices? *Teaching and Teacher Education, 20,* 833–846.

Schultz, R. A. (1982). Teaching style and sociopsychological climates. *The Alberta Journal of Educational Research, 18,* 9–18.

Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. (2009). The synergistic relationship of perceived autonomy support and structure in the prediction of self-regulated learning. *British Journal of Educational Psychology, 79,* 57–68.

Skinner, E. A. (1995). *Perceived control, motivation, and coping.* Newbury Park, CA: Sage.

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.

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

Skinner, E. A., Zimmer-Gembeck, M. J., & Connell, J. P. (1998). Individual differences and the development of perceived control. *Monographs of the Society for Research in Child Development, 63*(2–3, Whole No. 204).

Tucker, C. M., Zayco, R. A., Herman, K. C., Reinke, W. M., Trujillo, M., Carraway, K., . . . Ivery, P. D. (2002). Teacher and child variables as predictors of academic engagement among low-income African American children. *Psychology in the Schools, 39,* 477–488.

van Tartwijk, J., Brekelmans, M., Wubbels, T., Fisher, D. L., & Fraser, B. J. (1998). Students perceptions of teacher interpersonal style: The front of the classroom as the teacher's stage. *Teaching and Teacher Education, 14,* 607–617.

Wellborn, J. G. (1991). *Engaged and disaffected action: The conceptualization and measurement of motivation in the academic domain.* Unpublished doctoral dissertation, University of Rochester.

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96,* 236–250.

Wubbels, T., Brekelmans, M., den Brok, P., & van Tartwijk, J. (2006). An interpersonal perspective on classroom management in secondary classrooms in the Netherlands. In C. M. Evertson & C. S. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary issues* (pp. 1161–1191). Mahwah, NJ: Erlbaum.

Wubbels, T., Creton, H. A., Levy, J., & Hooymayers, H. P. (1993). The model for interpersonal teacher behavior. In T. Wubbels & J. Levy (Eds.), *Do you know what you look like? Interpersonal relations in education* (pp. 13–28). London, England: The Falmer Press.

Wubbels, T., & Levy, J. (1991). A comparison of interpersonal behavior of Dutch and American teachers. *International Journal of Intercultural Relations, 15,* 1–18.

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