Autonomy-Supportive Teachers: How They Teach and Motivate Students

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The authors examined motivating style in terms of a teacher's disposition to control students or support their autonomy. In Study 1, 4 independent samples of preservice teachers completed the Problems in Schools (PS) questionnaire so the authors could critically evaluate the instrument to assess motivating style as an individual difference characteristic. In Study 2, preservice teachers taught a 10-min instructional episode as raters judged their language and style. In Study 3, elementary and high school teachers self-reported a recent attempt to teach and motivate one of their students. Compared with their controlling counterparts, autonomy-supportive teachers showed a distinctive motivating style as measured by their conversational behaviors, interpersonal style, and attempts to support students' intrinsic motivational and internalization processes.

Teachers vary in the interpersonal styles they rely on to teach and motivate students (Deci, Schwartz, Sheinman, & Ryan, 1981; Rigby, Deci, Patrick, & Ryan, 1992; Ryan & Grolnick, 1986). Some teachers target a way of thinking, feeling, or behaving and then offer extrinsic incentives and consequences for progress that their students show toward that way of thinking, feeling, or behaving. This style is relatively controlling, because the teacher's goal is to control students' behavior so desirable states occur more frequently and undesirable ones occur less frequently. Other teachers teach and motivate by identifying and supporting students' interests and by supporting their internalization of the school's values and agenda. This style is relatively autonomy supportive, because the teacher's goal is to support students' interest in and valuing of education.

The motivating style a teacher relies on—controlling versus autonomy supportive—is relatively stable over the course of the academic year (Deci, Schwartz, et al., 1981) and is important because a teacher's style influences students' school-related motivation, emotion, and performance (for reviews, see Deci & Ryan, 1987; Deci, Vallerand, Pelletier, & Ryan, 1991; Reeve, 1996). In particular, students in classrooms with autonomy-supportive teachers, as compared with students in classrooms with controlling teachers, are more likely to stay in school (Vallerand, Fortier, & Guay, 1997) and are more likely to show greater perceived academic competence (Deci, Schwartz, et al., 1981), enhanced creativity (Koestner, Ryan, Bernieri, & Holt, 1984), a preference for optimal challenge (Shapira, 1976), greater conceptual understanding (Benware & Deci, 1984; Grolnick & Ryan, 1987), more positive emotionality (Patrick, Skinner, & Connell, 1993), higher academic intrinsic motivation (Deci, Nezlek, & Sheinman, 1981), better academic performance (Boggiano, Flink, Shields, Seelbach, & Barrett, 1993), and higher academic achievement (Flink, Boggiano, Main, Barrett, & Katz, 1992). Students show these benefits, according to self-determination theory (Deci & Ryan, 1985b, 1987, 1991; Rigby et al., 1992), because autonomy support from a teacher enables the self-determined motivation in students that facilitates these benefits.

Research on teachers' motivating styles has closely tracked research on the quality of students' motivation, largely because of the assumption that the quality of a student's motivation depends in part on the quality of a teacher's instructional style (deCharms, 1976; Deci et al., 1991; Eccles & Midgley, 1989; Goodenow, 1993; Midgley, Feldlaufer, & Eccles, 1989; Rogers, 1969). Highlighting the distinction between intrinsic and extrinsic motivation, early investigators (deCharms, 1972, 1976; Rogers, 1969; Ryan & Grolnick, 1986) showed how a flexible, resource-providing, and student-centered instructor was able to facilitate students the motivational orientation of being an "origin" (i.e., active, having an internal locus of causality) rather than a "pawn" (i.e., passive, reactive). Later, concerned over the motivational downturn students show during the middle school transition, several researchers highlighted the importance of the fit between the educational context provided by teachers and the socioemotional needs brought to the classroom by early adolescents (Eccles & Midgley, 1989; Feldlaufer, Midgley, & Eccles, 1988; Ryan & Powelson, 1991). A teacher's supportive style that respected and valued, rather than neglected or frustrated, these needs nurtured high interest, motivation, and achievement (Goodenow, 1993; Midgley et al., 1989; Ryan & Grolnick, 1986).

In subsequent research, three needs were identified as especially sensitive to a teacher's motivating style: Relatedness was nurtured by teacher-provided involvement (care, acceptance), competence was nurtured by teacher-provided...
structure (optimal challenge, performance feedback), and self-determination was nurtured by teacher-provided autonomy support (choices, shared decision making; Connell & Wellborn, 1991; Deci et al., 1991; Skinner & Belmont, 1993). Reflecting on this research history, Weiner (1990) concluded that "school motivation cannot be divorced from the social fabric in which it is embedded" (p. 621). That is, the quality of a student's motivation does indeed depend, in part, on the quality of a teacher's interpersonal motivating style.

One instrument for assessing motivating style is the Problems in Schools (PS) questionnaire (Deci, Schwartz, et al., 1981). The questionnaire features eight vignettes that describe the motivation-related problems children face in school. Each vignette lists four ways a teacher might respond to the child's problem, and each way represents a point along a continuum that extends from highly controlling (HC) to highly autonomy supportive (HA). For the HC response, the teacher identifies a solution and uses tangible extrinsic motivators to encourage appropriate behaviors. For the moderately controlling (MC) response, the teacher identifies a solution and encourages its implementation by appealing to the child's internalized sense of obligation ("do what you should") or to what others think is right ("it's for your own good"). For the moderately autonomy-supportive (MA) response, the teacher encourages the child to empathize with how his or her peers understand, diagnose, and solve the same problem. For the HA response, the teacher encourages the child to diagnose the problem, generate a solution, and try it out for himself or herself. For each vignette, respondents rate the appropriateness of each of the four responses on a separate 1-7 Likert scale. Each scale's score is computed by averaging its eight responses, and the four scores are combined as follows: Motivating style = 2(HA) + MA - MC - 2(HC). The possible range of scores is -18 to 18, with negative scores reflecting a relatively controlling motivating style and positive scores reflecting a relatively autonomy-supportive style. For purposes of illustration, one of the questionnaire's vignettes is as follows:

Jim is an average student who has been working at grade level. During the past two weeks, he has appeared listless and has not been participating during reading group. The work he does is accurate, but he has not been completing assignments. A phone conversation with his mother revealed no useful information. The most appropriate thing for Jim's teacher to do is:

MC: She should impress upon him the importance of finishing his assignments since he needs to learn this material for his own good.

HA: Let him know that he doesn't have to finish all of his work now and see if she can help him work out the cause of the listlessness.

HC: Make him stay after school until the day's assignments are done.

MA: Let him see how he compares with the other children in terms of his assignments and encourage him to catch up with the others.

The instrument's designers validated each response option as a representative of its scale through its face validity (i.e., the item's wording matched the scale's operational definition) and by showing that its score correlated higher with the other seven response options from that scale than it did with any of the 24 response options from the other three scales (Deci, Schwartz, et al., 1981). But the investigators stopped short of establishing criterion validity for each scale and, instead, validated only the questionnaire's total score. Teachers who scored as relatively autonomy supportive overall—that is, using 2(HA) + MA - MC - 2(HC)—had students who (a) rated that teacher as relatively autonomy supportive and (b) scored high on a measure of intrinsic motivation toward school (Deci, Nezlek, et al., 1981; Deci, Schwartz, et al., 1981).

After 15 years of productive research with the PS questionnaire, two important gaps remain in understanding autonomy-supportive and controlling teachers. The first gap is an assessment issue and concerns a potential shortcoming of the PS instrument. Solving this problem was the goal of Study 1, which we focused on testing the questionnaire's conceptual validity. The second gap is that no study has yet confirmed that teachers who score as autonomy supportive (or controlling) on the questionnaire actually interact with students in more autonomy-supportive (or controlling) ways. We therefore focused Studies 2 and 3 on testing the questionnaire's predictive validity. In Study 2, a laboratory study, preservice teachers first completed the PS questionnaire and then taught a student during an actual instructional episode, which we videotaped to later judge the language and style used by each teacher as relatively autonomy supportive or controlling. In Study 3, a field study, practicing teachers first completed the questionnaire and then self-reported a recent, actual classroom episode in which they attempted to teach and motivate a disengaged student. Reading these essays, raters judged each teacher's language and style as relatively autonomy supportive or controlling.

Study 1

In Study 1, we critically examined the conceptual validity of the PS questionnaire. Despite the questionnaire's demonstrated utility (e.g., see Deci, Nezlek, et al., 1981; Deci, Schwartz, et al., 1981; Flink, Boggiano, & Barrett, 1990), a validity concern has emerged regarding one of its four scales. Although the HC, MC, and HA scales have consistently shown impressive conceptual validity, critical examination of the MA scale has cast psychometric doubt on its validity (see, e.g., Deci, Schwartz, et al.'s [1981] Table 4, p. 646). If invalid, then the MA scale should be either revised or deleted from the instrument altogether. We therefore applied data from four independent samples to examine critically the validity of each scale.

Method: The Samples and Normative Data

Four independent samples of preservice teachers enrolled in a teacher certification program at one of two large, public universities in the midwest completed the PS questionnaire. Sample sizes for the four groups were as follows: Sample 1, 134; Sample 2, 141; Sample 3, 191; and Sample 4, 84. Respondents in Samples 1, 2, and 3 completed a battery of questionnaires, one of which was the PS questionnaire. Respondents in Sample 4 completed the PS question-
naire both before and after their participation in a training session that featured either autonomy-supportive or controlling (i.e., behavior-modification) instructional strategies. Demographic characteristics were highly similar across the four samples. Of the 550 participants, 74% were women. Academic classifications included 13% sophomores, 39% juniors, 28% seniors, and 20% postbaccalaureates. The preservice teachers classified themselves into the following specializations: early childhood, 11%; primary grades, 41%; secondary grades, 37%; adult education, 1%; and exceptional education, 10%. Seventy-four percent had some classroom experience in the local school district ranging from classroom observations to teaching with full-time responsibilities. Most participants were Caucasian White (85%), with 6% African American, 5% Caucasian Hispanic, 3% Asian, and 1% Native American.

The descriptive statistics for each scale—its mean, standard deviation, and coefficient alpha—appear in Table 1. These normative data correspond closely to those reported in other data sets (e.g., Cai, 1994; Deci, Schwartz, et al., 1981).

Results

Our question was whether each individual scale on the PS questionnaire showed strong conceptual validity. If valid, each scale measuring autonomy support (i.e., HA, MA) should covary with other indicators of interpersonal autonomy support, whereas each scale measuring control (i.e., HC, MC) should covary with other indicators of interpersonal control. To make this determination, we applied three validity-testing criteria to each scale. The data for (and results from) each validity test appear in Table 2.

For the first validity test, we computed mean interscale correlations. How each scale correlated with the other three appears in the top third of Table 2. Presumably, the two autonomy-support scales should have correlated positively with one another but negatively or not at all with the two control scales, just as the two control scales should have correlated positively with one another but negatively or not at all with the two autonomy-support scales. Scores from the two control scales, HC and MC, did correlate highly with one another (mean $r = .62$), whereas scores from the two autonomy-support scales, HA and MA, did not (mean $r = .00$). Instead of correlating with HA scores, the MA scores actually correlated with the two control scale scores (mean $rs = .50$ and .39).

### Table 1

<table>
<thead>
<tr>
<th>PS questionnaire scale</th>
<th>$M$</th>
<th>$SD$</th>
<th>$\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA</td>
<td>5.70</td>
<td>0.78</td>
<td>.69</td>
</tr>
<tr>
<td>MA</td>
<td>4.15</td>
<td>1.10</td>
<td>.78</td>
</tr>
<tr>
<td>MC</td>
<td>3.95</td>
<td>1.03</td>
<td>.77</td>
</tr>
<tr>
<td>HC</td>
<td>3.30</td>
<td>1.11</td>
<td>.79</td>
</tr>
</tbody>
</table>

*Note. Each statistic above represents an average score across the four independent samples. For instance, the descriptive statistics for the HC scale in the four samples were as follows ($M$, $SD$, $\alpha$, respectively): Sample 1, 3.33, 0.99, .74; Sample 2, 3.29, 1.10, .79; Sample 3, 3.30, 1.06, .78; and Sample 4, 3.26, 1.30, .84. HA = highly autonomy supportive; MA = moderately autonomy supportive; MC = moderately controlling; HC = highly controlling.*

For the second validity test, we used only the data from Sample 1 to assess each scale’s correlation with the Causality Orientations Scale (COS; Deci & Ryan, 1985a), an often-used personality measure for assessing individuals’ orientations toward autonomy and control. We expected preservice teachers who scored as autonomy oriented on the COS to score high on the two autonomy-supportive scales (HA, MA) and preservice teachers who scored as control oriented on the COS to score high on the two control scales (HC, MC). The correlations between preservice teachers’ scores on the COS and their scores on the PS questionnaire’s four scales appear in the middle third of Table 2. Autonomy-oriented individuals scored relatively high on the HA scale, $r(134) = .44, p < .01$, whereas control-oriented individuals scored relatively high on the MA, MC, and HC scales, $r(134) = .24, .37,$ and .49, respectively, all $p < .01$.

For the third validity test, we used only the data from Sample 4 in which preservice teachers were randomly assigned to receive training in either autonomy-supportive or controlling instructional strategies. We expected that exposure to the information, rationale, and how-to of autonomy-supportive instruction would influence preservice teachers’ posttraining motivating style scores to become more autonomy supportive (and that exposure to behavior-modification instruction would influence their posttraining motivating style scores to become more controlling). These difference scores (posttraining PS score minus pretraining PS score) appear in the lower third of Table 2. Posttraining HA scores changed as expected: They increased following autonomy-supportive training and decreased following behavior-modification training, $Ms$: 0.57 versus $-0.40$, $t(82) = 8.85, p < .01$. MA scores, however, decreased following autonomy-supportive training and increased fol-
lowing behavior-modification training, $M$s: $-0.18$ versus $0.17$, $t(82) = 2.16$, $p < .05$. Posttraining MC and HC scores changed as expected: MC scores increased following behav-
ior-modification training and decreased following autonomy-
supportive training, $M$s: $-0.64$ versus $0.35$, $t(82) = 6.85$, $p < .01$, just as did HC scores, $M$s: $-0.85$ versus $0.68$, $t(82) = 8.55$, $p < .01$.

Discussion

The validity of scores produced by the HA, MC, and HC scales was confirmed, whereas the validity of scores produced by the MA scale was not. MA scores did not correlate with HA scores but instead correlated with the MC and HC scores (Validity Test 1). MA scores did not correlate with an autonomy orientation but instead correlated with a control orientation (Validity Test 2). Finally, MA scores decreased following autonomy-supportive training but increased following behavior-modification training (Validity Test 3).

To increase the validity of the PS questionnaire, three possibilities present themselves. The first possibility is to retain the MA scale but reinterpret its scores to reflect a slightly controlling (SC) motivating style. The scoring system for the PS questionnaire could be modified as follows: Motivating style $= 6(HA) - SC - 2(MC) - 3(HC)$. Although such a modification maintains the continuum of self-determination within the PS questionnaire’s scoring system, it also includes a scale (SC) without an underlying theoretical rationale. The second possibility is to delete the MA scale altogether and modify the question-
naire’s scoring system accordingly, as follows: Motivating style $= 2(HA) + 0(MA) - MC - 2(HC)$. This solution improves on the first one because each scale score remains closely allied with self-determination theory, the theory on which the questionnaire was based. The third possibility is to revise the content of the MA scale and maintain the questionnaire’s original scoring system. Although this solution offers the most promise, it takes us too far from the purpose of the present investigation. (The data showed that the MA scale was problematic, but they did not provide the basis for constructing a valid alternative.) In the spirit of encouraging the revision of the MA scale, we offer our recommendations on how this might be accomplished in the General Discussion below. For Studies 2 and 3, we adopted the second solution and zero weighted the MA scores, a strategy that allowed us to use three reliable and valid scale scores to compute the PS total score we needed to identify autonomy-supportive (and controlling) teachers.

Study 2

Past research on interpersonal motivating styles has relied on a social psychological approach by creating environ-
mental conditions that led teachers to adopt one motivating style or the other (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982; Flink et al., 1990). For instance, to orient teachers toward interpersonal control, researchers stressed that the teachers were responsible for their students being able to perform up to standards. Following this directive, research-
ers looked for behavioral differences among teachers pres-
sured by the experimenter-imposed mandate and a control group of teachers without such pressure in terms of their conversation (e.g., time teacher spent talking), utterances (e.g., frequency of directives, controlling questions), and interpersonal style (e.g., to what extent the teacher seemed involved and enthusiastic). Generally speaking, pressured teachers gave more hints, used directive language, and offered their students little choice or autonomy.

In contrast with this social psychological tradition, the present study followed a dispositional, or personality-based, approach to investigating motivating style. The purpose of the PS questionnaire is to identify autonomy-supportive teachers. So, in Study 2, we investigated how an autonomy-
supportive teacher, once identified by the PS questionnaire, teaches and motivates during an instructional episode. Though our approach was personality-based, we benefited from the social psychological research by adopting many of the same methodological features, dependent measures, and theoretical predictions. In terms of methodological similarities, we used a one-on-one instructional context, a laboratory setting, and an unfamiliar but potentially enjoyable task, as well as videotaping each teaching session for later coding; in terms of dependent measures, we assessed many of the same measures of conversation, utterances, and interpersonal style; and in terms of theoretical predictions, we hypoth-
езized that relatively autonomy-supportive teachers would display a student-centered conversational approach, nondi-
rective utterances, and a flexible interpersonal style that afforded students rich autonomy.

Method

Participants

Participants were 51 pairs of junior, senior, or postbaccalaureate preservice teachers (49 female dyads, 12 male dyads) enrolled in a teacher certification program at a large, urban midwestern university.

Procedure

Three hundred seventy preservice teachers enrolled in different sections of the same educational psychology class completed the PS questionnaire at the beginning of the semester. One month later, an investigator recruited volunteers from this sample into same-sex pairs. On arrival at the laboratory setting, participants were randomly assigned into the role of either the teacher or the student. The investigator escorted the teacher to the experimental room and asked him or her to take 10 min to gain familiarity with the task, the Happy Cubes puzzle. In past studies, participants have reported Happy Cubes to be both unfamiliar and potentially enjoyable (see, e.g., Reeve, 1989). Just before sitting the teacher, the investigator escorted the student down the hallway to a room where he or she waited for 10 min reading through magazines. After 10 min of the student waiting and the teacher preparing, the investigator escorted the student to the experimental room to join the teacher. The pair sat side by side at a large table with the puzzle and seven patterns to solve. The investigator told the student that his or her role was to learn how the puzzle worked and how to derive its solutions. The investigator told the teacher that his or her role was to help the
Dependent Measures

We organized the dependent measures into objective and subjective categories, following Deci et al. (1982) and Flink et al. (1990). Some of our measures of the teacher’s behavior were the same as those used in these two previous investigations, but we also included new measures. Overall, we investigated 14 objective behaviors and 22 subjective ratings. Two trained raters, who were unaware of the teacher’s PS score, scored each measure from independent viewings of the videotapes. Each rater viewed each videotaped session three times. On the first viewing, the rater coded the conversation measures; on the second viewing, the rater coded the objective categories, following Deci et al. (1982) and Flink et al. (1990).

Objective measures. The raters scored three conversation measures and 11 utterances. In the parentheses below, the first number corresponds to the intrarater reliability estimate, and the second number corresponds to the interrater reliability estimate.

The operational definitions for the three conversation measures were as follows: time spent talking, cumulative number of seconds the teacher talked (\(r_{intrarater} = .79, r_{interrater} = .95\)); time spent listening, cumulative number of seconds the teacher attended to the student’s speech as evidenced by the teacher’s verbal or nonverbal signals of active, contingent information processing (\(r = .50, .88\)); and time spent holding instructional materials, cumulative number of seconds the teacher physically held, manipulated, or otherwise possessed the puzzle, the solutions, or both (\(r = .96, .97\)). Each measure had a possible range of 0 to 600 s, and more than one category could occur at the same time (e.g., the teacher could be talking and holding the instructional materials at the same time).

The decisions (a) to use an actual student in the role of the student, rather than a confederate, and (b) to announce the video camera’s presence were made after weighing the pros and cons. As to using actual students, we reasoned that although a confederate would provide greater consistency in the student’s behavior, the repetition required from the confederate would sacrifice spontaneity and realism. In emphasizing spontaneity and realism, we nonetheless recognized the importance of consistency from one student to the next. We took the precaution of assessing each student’s puzzle-solving motivation so we could statistically control for any differences in the quality of the student’s motivation from one pair to the next. As to announcing the video camera (on the opposite side of the room), we reasoned that although secretive recording of the interaction would provide greater realism, any such gain was too small to warrant what we considered to be a substantial and unnecessary invasion of privacy. Also, pilot work and our previous studies using a visible video camera had shown us that it was not the presence of a video camera or even surveillance itself that put privacy and motivation at risk (e.g., see Lepper & Rogers, 1985b, p. 64). Anticipating this, the investigator made a deliberate effort to present the video camera in a noncontrolling and noninvasive context.

Subjective measures. Raters used 1–7 scales to score 22 subjective aspects of the teacher’s interpersonal style. To select our subjective measures, we relied on published theory and research as to what teachers do to support students’ autonomy (deCharmes, 1976; Deci, 1995; Deci et al., 1982; Flink et al., 1990; Reeve, 1996; Rogers, 1969). Interrater and intrarater reliabilities were estimated for all 22 ratings, and any rating with less than .60 on either reliability coefficient was dropped from further consideration as unreliable. Three ratings were excluded on this basis. We then performed a principal-components factor analysis with varimax rotation on the remaining 19 measures. Two factors emerged (based on the number of factors with eigenvalues greater than 1). The first factor extracted accounted for 68% of the variance and was interpreted as Supported Intrinsic Motivation. Thirteen items had factor loadings greater than .80; treated student as origin, gave choices, supported initiative, was student centered, understood student’s perspective, created opportunities for choice, not demanding, not directive, encouraged student decision making, allowed student to work in own way, supported student’s agenda, pursued student’s goals, and was in sync with student. The second factor accounted for 18% of the variance, was interpreted as Supported Internalization, and included the following 6 items: negative feelings okay, provided rationale, promoted a valuing of task, promoted interest in puzzle, supported confidence, and encouraged questions. To compute the factor score for Supported Intrinsic Motivation, we averaged the first factor’s 13 items (because the factor loadings were all so high and because averaging allowed us to interpret the factor score on a 1–7 scale); to compute the factor score for Supported Internalization, we averaged the second factor’s 6 items (for the same reasons).

In addition to the 22 subjective impressions, raters judged three general impressions of the teacher: showed enthusiasm (\(r_{intrarater} = .75, r_{interrater} = .87\)), showed interest (\(r = .70, .75\)), and showed expertise...
(rs = .79, .77). Following the instructional episode, the teacher and student both completed a four-item postsession questionnaire asking about interest, enjoyment, importance of doing well, and puzzle-solving expertise of the teacher.

Performance

Raters scored two performance outcomes for each student: number of puzzles solved singly (r_{interclass} = .87, r_{intraclass} = .96), operationally defined as the number of solutions the student solved successfully by himself or herself without the teacher’s guiding hands or words; and number of puzzles solved by student with teacher’s assistance (rs = .73, .95), operationally defined as the number of solutions the student solved successfully with the teacher’s guidance, collaboration, or intervention. These two measures were scored as mutually exclusive categories. The possible range for each performance measure was 0–7 solutions.

Results

The descriptive statistics and intercorrelation matrix for the teachers’ PS scores and 16 behaviors appear in Table 3. To test the hypotheses about how autonomy-supportive teachers teach and motivate students, we relied on partial correlations rather than on the zero-order correlations reported in Table 3. We report the results from the partial correlations (rather than from the zero-order correlations) because we wanted to control for differences in the quality of the student’s motivation from one teacher to the next. To construct this covariate, we averaged the student’s responses on the postsession questionnaire measuring interest, enjoyment, and importance of doing well to reflect extent of self-determined motivation (i.e., intrinsic motivation and identified regulation: Ryan & Connell, 1989). In actuality, the covariate had little effect on the teacher’s behavior, so the magnitude of the hypothesis-testing partial correlations was very similar in all cases to the magnitude of the zero-order correlations shown in Table 3.

To conduct 16 independent tests and still protect against Type I error, we first calculated what each testwise alpha level must be to produce an overall experimentwise (exp) alpha level of .05. The problem was that the 16 tests (using $\alpha_{test} = .05$, one-tailed) inflated our experimentwise alpha to .56 (based on the formula from Hays, 1994: $\alpha_{exp} = 1 - (1 - .05)^{16}$). So, to readjust the inflated .56 experimentwise alpha level back down to .05, we computed what each testwise alpha needed to be for each partial correlation test. This value was .006 (based on Hays’ formula: $\alpha_{test}/\text{number of tests, or .05 one-tailed/16}$).

Teachers’ Behaviors

Conversation measures. Motivating style correlated significantly with two of the three conversation measures (see Table 3). After controlling for the quality of the student’s motivation, both measures continued to correlate significantly with motivating style, as relatively autonomy-supportive teachers were more likely to listen to the student ($pr = .34, p < .01$) and less likely to hold or possess the instructional materials ($pr = -.34, p < .01$). Using $\alpha < .006$, motivating style continued to predict both time spent listening and time holding materials.

Utterances. Motivating style correlated significantly with five utterances (see Table 3). After controlling for the quality of the student’s motivation, all five utterances continued to correlate significantly with motivating style, as relatively autonomy-supportive teachers were more likely to ask about the student’s wants ($pr = .32, p < .05$), to respond to student-generated questions ($pr = .28, p < .05$), and to volunteer perspective-taking statements ($pr = .27, p < .05$), and were less likely to use directives ($pr = -.30, p < .05$) and to reveal the puzzle’s solutions ($pr = -.37, p < .01$). Using $\alpha < .006$, motivating style continued to predict only one utterance: solutions given.

Subjective impressions. Motivating style correlated significantly with both factors representing the raters’ subjective impressions of the teacher’s interpersonal style (see Table 3). After controlling for the quality of the student’s motivation, raters judged the relatively autonomy-supportive teachers as significantly more supportive of students’ intrinsic motivation ($pr = .36, p < .01$) and internalization ($pr = .42, p < .01$). Using $\alpha < .006$, motivating style continued to predict both Supported Intrinsic Motivation and Supported Internalization.

Supplemental Analyses

In addition to analyzing how motivating style related to the teacher’s behavioral ways of teaching and motivating, we also assessed the effect of motivating style on how enthusiastic and interested the teacher appeared to be and on how well the student performed. Motivating style correlated with how enthusiastic (but not with how interested) the teacher appeared to be, as relatively autonomy-supportive teachers were rated as showing the greater enthusiasm ($r = .26, p < .05$). Motivating style did not correlate with any of the teacher’s or with any of the student’s self-reported interest, enjoyment, importance of doing well, or perceived expertise of the teacher. Motivating style did not correlate with how many puzzles the student solved with the teacher’s assistance ($r = .05$), but it did correlate significantly with how many puzzles the student solved singly ($r = .26, p < .05$), as students with autonomy-supportive teachers outperformed students with controlling teachers.

Discussion

We found that teachers who said they were autonomy supportive (on the PS questionnaire) actually taught in ways that supported student autonomy. Compared with their relatively controlling counterparts, autonomy-supportive teachers listened more, held the instructional materials less, resisted giving the puzzle’s solutions, and supported the student’s intrinsic motivation and internalization. Autonomy-supportive teachers also showed a tendency to verbalize fewer directives, ask more questions about what the student wanted to do, respond more to student-generated questions, and volunteer more perspective-taking statements.
Table 3  
Descriptive Statistics and Intercorrelation Matrix for Motivating Style and All Dependent Measures in Study 2

| Variable                          | M       | SD      | Range       | 1  | 2   | 3  | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  |
|----------------------------------|---------|---------|-------------|----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. Motivating style (PS score)   | 0.28    | 3.28    | -6.99 to 8.15 | -0.03 | .34* | -3.3* | -0.29* | -0.14 | -0.00 | .32* | .28* | .21 | .11 | .07 | -0.34* | .15 | .27* | .36* | .42* |
| 2. Time spent talking            | 173.2   | 101.2   | 23 to 565    | -0.19 | .67* | .56* | .50* | .63* | .19 | -0.08 | 0.04 | -0.04 | .69* | .47* | .17 | .13 | -0.49* | .09 |
| 3. Time spent listening          | 47.7    | 54.3    | 1 to 284     | -0.41* | -0.31* | -0.23 | -0.29* | .43* | .48* | .21 | .27* | -0.16 | -0.18 | .03 | .16 | .55* | .43* |
| 4. Time holding materials        | 191.0   | 120.7   | 25 to 541    | -0.46* | .48* | .30* | -0.09 | -0.34* | -0.22* | -0.18 | .56* | .63* | .12 | .04 | -0.67* | -0.23 |
| 5. Directives/commands           | 5.64    | 6.34    | 0 to 25      | -0.52* | .66* | -0.16 | -0.21 | 0.11 | 0.10 | .47* | .48* | -0.09 | -0.20 | -0.69* | -0.45* |
| 6. Should statements             | 1.54    | 2.08    | 0 to 9       | -0.33* | -0.11 | -0.12 | -0.06 | 0.04 | .48* | .37* | -0.04 | 0.12 | -0.47* | -0.16 |
| 7. Controlling questions         | 1.25    | 1.80    | 0 to 9       | -0.03 | -0.16 | .26* | 0.05 | .47* | .32* | .06 | -0.05 | -0.50* | -0.16 |
| 8. Questions about wants         | 1.36    | 1.68    | 0 to 8       | -0.41* | .16 | .26* | .22 | -0.12 | 0.10 | .37* | .33* | .49* |
| 9. Responses to questions        | 2.66    | 2.34    | 0 to 11      | -0.18 | .34* | 0.06 | -0.13 | 0.18 | 0.11 | .40* | .43* |
| 10. Praises                       | 2.87    | 2.91    | 0 to 15      | -0.39* | -0.04 | -0.12 | -0.29* | 0.00 | 0.15 | .20 |
| 11. Encouragements               | 3.41    | 3.19    | 0 to 17      | -0.04 | -0.19 | 0.01 | 0.11 | .27* | .18 |
| 12. Hints given                  | 6.08    | 5.47    | 1 to 29      | -0.62* | 0.08 | 0.10 | -0.35* | -0.05 |
| 13. Solutions given              | 0.82    | 1.80    | 0 to 8       | -0.02 | -0.06 | -0.51* | -0.17 |
| 14. Self-disclosures              | 2.77    | 2.36    | 0 to 10      | -0.22 | -0.03 | 0.05 |
| 15. Perspective statements       | 0.84    | 1.19    | 0 to 15      | -0.20 | .50* |
| 16. Supported intrinsic motivation| 4.20    | 0.95    | 2.23 to 5.62 | -0.65* |
| 17. Supported internalization    | 3.14    | 1.35    | 1.00 to 6.67 | - |

Note. Items 2–4 were scored in seconds, Items 5–15 were scored in frequencies, and Items 16–17 were scored on a 1–7 scale with high numbers denoting high support. N = 61; PS = Problems in Schools questionnaire.

*p < .05, two-tailed.
To gain these insights, we used preservice teachers who taught a peer in a well-controlled laboratory setting. This procedure allowed us to make a careful test of our hypotheses concerning how autonomy-supportive and controlling teachers teach and motivate. Not using a naturalistic setting with actual teachers and their students, however, raised concerns about the external validity of the findings. So, for Study 3, our goal was to assess the extent to which we could generalize to practicing teachers in an actual classroom setting our findings in Study 2 with preservice teachers in a laboratory setting. We initiated Study 3 with optimism, because Flink et al.'s (1990) naturalistic study with actual teachers and their students had previously and convincingly replicated the findings from Deci et al.'s (1982) laboratory study with college students (i.e., fourth-grade teachers made responsible for their students performing up to standards taught in the same controlling way as college students with the same responsibility—by relying on hints, solutions, pressure, and on ways observers judged to be controlling).

**Study 3**

We asked separate samples of elementary and high school teachers first to complete the PS questionnaire and then to describe in detail an actual classroom episode from that week in which they attempted to teach and motivate a student. Although our data in Study 2 assessed actual teaching behaviors, we designed Study 3 to assess teachers' self-reports of their actual teaching behaviors. Trained, independent raters then scored each teacher's written essay on six dimensions of autonomy support (described below). We predicted that teachers who scored as relatively autonomy supportive on the PS questionnaire would self-report an interpersonal style that revolved around supporting students' intrinsic motivation and internalization (i.e., the two factors from Study 2). Our prediction recognized, however, that teachers relate to students in controlling or autonomy-supportive ways for reasons in addition to their personal disposition, including how engaged versus disengaged teachers perceive their students to be (Skinner & Belmont, 1993), how pressured teachers feel by administrators (Lortie, 1977), the salience of ability assessments (Maehr & Anderman, 1993), a push for performance outcomes (Deci et al., 1982; Flink et al., 1990), a tendency to imitate instructional role models (Williams & Deci, 1996), and a host of additional factors including class size, gender, political ideology, years of teaching experience, and grade level taught (Cai, 1994). Recognizing these sociocontextual influences on a teacher's motivating style, we asked teachers to self-report a number of control variables that enabled us to partial out statistically some of these confounding influences on a teacher's classroom approach to teaching and motivating.

**Method**

**Participants**

We collected data from two independent samples of teachers in a large midwestern city. The sample of elementary teachers consisted of 32 teachers (27 women, 5 men) who had full-time teaching responsibilities for kindergarten through sixth grade. The sample of high school teachers consisted of 14 teachers (7 women, 7 men) who had full-time teaching responsibilities for 9th through 12th grades.

**Procedure**

Each school's faculty met together in a large hall, and the investigator administered, in sequence, the PS questionnaire, the How I Teach and Motivate a Disengaged Student questionnaire (described below), and a survey to assess the control variables. The survey included items for gender, race/ethnicity, years of professional experience, class size, grade level taught, political ideology (liberal-conservative), and a rating of how engaged versus disengaged the teacher perceived his or her students to be (highly disengaged—highly engaged). Each teacher answered the questions individually, and the testing session lasted 25 min. After collecting the set of questionnaires, the investigator debriefed the group as a whole.

**Measures**

**How I Teach and Motivate a Disengaged Student questionnaire.** The How I Teach and Motivate a Disengaged Student questionnaire was a one-page instrument that began with the following instruction:

Recall an actual classroom experience from this week in which you attempted to teach and motivate a disengaged student. A disengaged student is one who is behaviorally passive or who shows negative emotion such as boredom. Picture in your mind one specific, recent teacher-student interaction, and in a sentence or two please describe below the disengaged student you have in mind.

The teacher described the student, and then the instructions continued:

In a paragraph or two, outline the approach you took. In doing so, include answers to the following questions: How did you approach and interact with the student? What did you do? What did you say? What did you try to accomplish?

**Subjective impressions of the teacher's style.** Two trained raters independently scored each of the 46 essays on six dimensions of an autonomy-supportive style. We focused on these six dimensions because others have argued that they constitute the essence of "how to promote autonomy" (Deci, 1995, p. 141; see also Deci, 1995, chapters 11-12; and Reeve, 1996, chapter 2). Interrater reliabilities were as follows: student centered (r = .92), encouraged initiative (r = .88), provided rationale (r = .96), nurtured competence (r = .85), relied on a noncontrolling communication style (r = .84), and promoted a valuing of task (r = .83). Using the average score of the two raters, we entered the six subjective impressions into a principal-components factor analysis with varimax rotation, and two factors emerged. The first factor extracted accounted for 60% of the variance, was interpreted as Supported Intrinsic Motivation, and included four items with factor loadings greater than .80: student centered, encouraged initiative, nurtured competence, and relied on a noncontrolling communication style. The second factor accounted for 23% of the variance, was interpreted as Supported Internalization, and included two items with factor loadings greater than .80: provided rationale and promoted a valuing of task. To compute our two dependent measures, we averaged the four items from Factor 1 into the measure Supported Intrinsic Motivation (M = 4.47, SD = 1.73,
range = 1–7), and we averaged the two items from Factor 2 into the measure Supported Internalization (M = 3.52, SD = 1.55, range = 1–7; r between Factors 1 and 2 = .36, p < .05).

Results

All teachers described a one-on-one interaction at the top of the How I Teach and Motivate a Disengaged Student questionnaire. One elementary teacher, for instance, wrote, “He does not engage himself to his intellectual level. Does the minimum work and does not want to do more than that.” A high school teacher described a disengaged student this way: “Does not take notes, gets up and walks to other parts of room, sleeps or reads a book instead of participating in class discussion, has sloppy, poorly done assignments.” Teachers then wrote a short essay to self-report what they said and did to teach and motivate that student. One elementary teacher, for instance, wrote:

During class discussion when the student was talking to an excess, I did in a matter-of-fact tone say that, “F., that conversation is not acceptable at this time.” Later, when we had a break before recess, talked to F. about what is acceptable conversation in the class, and also how his talking is not showing respect for his classmates. I tried to help F. see that by disrupting the class, he is not showing respect.

A high school teacher wrote:

I talked to the student individually in a neutral setting before school. I checked his schedule to see if my preparation time matched with a study hall. I went over the material with the student—he had difficulty reading. He wasn’t as disinterested as he appeared—he wasn’t understanding the material. I hoped to interest the student in the subject matter.

It was these essays that the raters judged to score the six dimensions of an autonomy-supportive style.

We collapsed the data from the elementary and high school teachers into a single sample after we found in our preliminary analyses (using t tests) that the two groups of teachers did not differ on the predictor variable (motivating style) or on either dependent measure (Supported Intrinsic Motivation, Supported Internalization). The two groups of teachers did, however, differ on two of the control variables: gender, χ²(1, N = 46) = 18.00, p < .05, and years of teaching experience, t(44) = 2.95, p < .01, as the elementary teachers were more likely to be women and to have less experience. Most teachers (43 of 46, 93%) were Caucasian White, so we could not conduct meaningful analyses on the race/ethnicity variable. Also, grade level taught was difficult to determine accurately because many teachers taught multiple grade levels, especially among the high school teachers. For these reasons, we dropped race/ethnicity and grade level taught from our list of control variables. As a group, the 46 teachers scored as somewhat autonomy supportive on the PS questionnaire (M = 1.89, SD = 3.24, range = −3.50–10.33).

Motivating style correlated with both dependent measures: Supported Intrinsic Motivation, r(46) = .45, p < .01, and Supported Internalization, r(46) = .34, p < .05. To test the hypotheses, we computed partial correlations between motivating style and the two dependent measures by first removing the variance in motivating style attributable to gender, years of teaching experience, class size, political ideology, and perceived student engagement. Gender (being female), r(46) = .37, p < .01, and political ideology (being liberal), r(46) = −.32, p < .05, both correlated with (an autonomy-supportive) motivating style, but no control variable correlated significantly with either dependent measure. After controlling for these five variables, motivating style continued to predict both impressions of the teacher’s self-reported style: Supported Intrinsic Motivation, pr(39) = .52, p < .01, and Supported Internalization, pr(39) = .34, p < .05.

General Discussion

On the basis of our findings, we draw two conclusions. First, the validity of the PS questionnaire was confirmed by all three studies. We found it necessary to modify the questionnaire’s scoring system in Study 1, but, once done, we were able to confirm its conceptual validity. We confirmed the questionnaire’s predictive validity in Studies 2 and 3. Specifically, in Study 2, preservice teachers who scored as autonomy supportive on the PS questionnaire distinguished themselves by listening, allowing the student to work in his or her own way, not giving the solution, and supporting the student’s intrinsic motivation and internalization. In Study 3, actual teachers who scored as autonomy supportive on the PS questionnaire distinguished themselves by self-reporting that they teach and motivate by supporting students’ intrinsic motivation and internalization. Although we find these data encouraging and are able to provide support for the questionnaire’s predictive validity, the ultimate validity test of the PS questionnaire remains to be demonstrated, namely, whether it can predict teachers’ actual ways of interacting with a classroom full of motivationally diverse students.

Second, we are now in a position to say what autonomy-supportive teachers say and do during moment-to-moment, person-to-person interaction. We can use the findings from Study 2 to offer classroom teachers concrete answers to their questions about what they can say and do if they are interested in teaching and motivating students in an autonomy-supportive way. Conceivably, this information can be used either as a guiding benchmark or as prescriptive advice as to what it means to support students’ autonomy. Using the findings as a benchmark, we can offer a behavioral point of reference to a teacher so that he or she can diagnose his or her motivating style as relatively autonomy supportive or not. Using the findings as prescriptive advice, we can illuminate what a teacher can do (or not do) in the effort to develop a more autonomy-supportive motivating style, assuming that the teacher has an interest in doing so.

Validating the PS questionnaire and articulating what it means to be autonomy supportive during interaction are only two uses of our findings. We can go further and offer a promising theoretical lead that begins to explain why students benefit when teachers support their autonomy. Others have shown convincingly that students benefit developmentally and academically when teachers support their
These studies have researchers yet identified any specific interpersonal and instructional behavior that might serve as a possible mediating variable to explain just what autonomy-supportive teachers are doing (and what controlling teachers are not doing) to contribute to students' developmental and academic welfare. As a case in point, when teachers support students' autonomy, then students' perceptions of competence and self-determination increase (see, e.g., Vallerand et al., 1997; Williams, Weiner, Markakis, Reeve, & Deci, 1994). Although researchers have been successful in replicating this effect, it remains unclear just what these autonomy-supportive teachers are doing day in and day out that somehow nurtures students' perceptions of competence and self-determination. On the basis of the correlations reported in Table 2, it appears reasonable to advance each of the following behaviors as a possible candidate for explaining why students benefit from autonomy-supportive teachers: time spent listening, time spent holding instructional materials, frequency of directives, frequency of questions about what the student wants, frequency of contingent responses to the student's questions, number of solutions verbalized, number of perspective-taking empathic statements, extent of support for intrinsic motivation (supports initiative, is student centered), and extent of support for internalization (provides rationale, promotes value of education).

Identifying autonomy-supportive teachers' specific ways of teaching and motivating might be a more important and a more practical program of research than it first appears. Until specific ways of interacting with students can be linked to students' positive outcomes, then teachers have little reason to embrace specific autonomy-supportive instructional strategies. Although research finds that students generally benefit when teachers support their autonomy, the utility of engaging in specific behaviors such as asking students what they want, providing rationales for requests, and listening carefully to students' agendas remains unproven. If teachers are to embrace the behavioral particulars of an autonomy-supportive motivating style, then they must be able to see benefits in doing so.

One limitation of our investigation is that our findings fell short of documenting how much the student learned about the puzzle or how much skill the student acquired. We focused so much on the instruction teachers were providing that we did not stop to assess students' learning or acquired skill. We recommend that future research focus on how specific autonomy-supportive behaviors (e.g., questions about what the student wants) contribute to students' performances and skill development. Such a program of research can benefit both from past studies and from our present findings. As to past studies, others have assessed how autonomy-supportive and controlling instruction affects students' learning and performing as measured with a follow-up, postinstructional assessment. In these studies, students of autonomy-supportive teachers showed relative gains in performance (Boggiano et al., 1993) and in conceptual understanding of what they had learned (Benware & Deci, 1984; Flink et al., 1990; Grolnick & Ryan, 1987; McGraw & McCullers, 1979). In our Study 2, students of autonomy-supportive teachers solved more puzzles by themselves during the instructional episode than did students of controlling teachers (see number of puzzles solved singly). We interpret this finding as a confirmation that students used the time allocated to them by autonomy-supportive teachers in ways that were productive (i.e., they learned about and solved the puzzle).

In addition to describing how autonomy-supportive teachers teach and motivate students, a second driving purpose for the present investigation was to improve our understanding of why teachers are autonomy supportive or controlling with students. To date, researchers have confirmed how situational pressures (Deci et al., 1982; Flink et al., 1990), exposure to autonomy-supportive and controlling models (Williams & Deci, 1996), and the disengagement of one's students (Skinner & Belmont, 1993) affect a teacher's motivating style. Here, we illustrated how personality based, dispositional influences further affect motivating style. As might be expected, some ways of motivating students emerged as common to teachers influenced both by situational pressures and by disposition, as both relied more on directives and solutions and less on promoting conceptual understanding and time for independent work. But what is of particular importance is that a situationally induced controlling motivating style (as studied in past research) also brought out additional controlling behaviors not necessarily found among the controlling teachers we identified through personality assessment, as situationally pressured teachers talked more, communicated with should statements, used frequent praise and criticism, asked controlling questions, stated deadlines, and generally created an atmosphere characterized by pressure. What these behaviors have in common is the teacher's emphasis on directing students toward a right answer. Although not absent from the teaching and motivating of our personality-assessed controlling teachers, such a performance-driven pressure was less salient. On the other hand, when we identified motivating style as emanating from the personality, our autonomy-supportive teachers showed autonomy-supportive ways of relating to students that nonpressured teachers in earlier studies did not show, as they listened more, encouraged student initiative with the instructional materials, asked questions about the student's wants, replied to questions, and offered empathic perspective-taking statements. What these behaviors have in common is a flexible, student-centered approach to teaching and motivating.

Thus, whether it emanates from the personality or from the situation, motivating style has a core set of behaviors associated with its controlling and autonomy-supportive manifestations. Situational induced pressures, however, bring out additional aspects of interpersonal control (i.e., those associated with performance pressures toward a predetermined answer), whereas dispositionally rooted autonomy support brings out additional aspects of interpersonal autonomy support (i.e., those associated with a flexible, student-centered approach to instruction). The characterization of an autonomy-supportive style that emerges from our list of autonomy-supportive behaviors might lead some to take our findings with a grain of salt,
because it seems to endorse a passive, even laissez-faire, approach to teaching (e.g., listen a lot, allow students time to work in their own way). But our autonomy-supportive teachers were not passive and were in fact judged by the raters as significantly more enthusiastic during instruction than were their controlling counterparts. Instead of showing that autonomy-supportive teachers adopted a passive approach, our findings lead us to conclude that these teachers invested their attention and effort in a qualitatively different way and with a qualitatively different purpose than did the controlling teachers. That is, in the classroom, autonomy-supportive and controlling teachers engage in many of the same instructional behaviors—gaining students’ attention, asking questions, giving feedback, setting and enforcing limits, encouraging persistence, demonstrating procedures and skills, assessing learning, and so on. But autonomy-supportive teachers seek a student’s initiative in these endeavors by supporting intrinsic motivation and internalization, whereas controlling teachers seek a student’s compliance in these endeavors by introducing consequences and verbal directives. To the extent that autonomy-supportive teachers support students’ intrinsic motivation and internalization, they choose to teach and motivate by listening, allowing time for independent work, and asking questions about what the students want to do. Instructional behaviors such as showing and telling how to do something are active, but they do not fit with an autonomy-supportive style. These are not so much differences in how actively or passively a teacher teaches as they are differences in the quality of a teacher’s instructional style.

A final point for discussion concerns the possibility of revising the PS questionnaire’s MA scale. In Study 1, we found that the current version of the MA scale reflects an SC motivating style. An effort to revise the MA scale would therefore revolve around constructing solutions that truly support students’ autonomy. Conceptually, autonomy support revolves around the teacher’s effort to identify and support students’ interests and volitional internalization of the school’s values and agenda. Translated into self-determination theory (e.g., Deci et al., 1991), autonomy support therefore revolves around supporting not only students’ intrinsic motivational processes but also their “identified regulation,” which means that the student comes to internalize or “to value the behavior” (p. 329). The HA scale certainly shows strong respect for the student’s agenda, as the scale’s operational definition revolves around asking the student to diagnose the problem, generate a solution, and try it out. It would make sense, then, to provide an MA scale that showed an equally strong respect for and valuing of the school’s agenda (within a context of the student’s self-determination). As such, a revised MA scale might revolve around (a) providing students with the rationale underlying the school’s agenda and (b) promoting their internalization and valuing of tasks or ways of behaving. In this spirit, we propose the following MA solution to the vignette featured in the introduction ("Jim is an average student. . . ."): “Put the lesson aside for the moment and explain why participating in class and completing assignments is important to developing his reading skills.” This revision of the MA scale should position the questionnaire particularly well to apply to supporting not only the autonomy (i.e., intrinsic motivation) of highly engaged, skilled students but also the autonomy (i.e., internalization or identified regulation) of less engaged students exhibiting behavioral problems or large skill deficiencies.

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