

## Autonomy Support as an Interpersonal Motivating Style: Is It Teachable?

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Students benefit when teachers support their autonomy. Recognizing this, the present study examined the motivating styles of beginning preservice teachers by asking two questions: (1) Do personality characteristics orient preservice teachers toward either an autonomy-supportive or controlling motivating style? and (2) Is the autonomy-supportive style teachable to preservice teachers? Study 1, which addressed the first question, relied on self-determination theory to identify and confirm causality orientation as one personality characteristic related to motivating style. Study 2, which addressed the second question, randomly assigned preservice teachers to receive training in either autonomy-supportive, controlling, or neutral instructional strategies. Results showed that the autonomy-supportive style was teachable. Autonomy-oriented preservice teachers (as measured by causality orientation) assimilated the information rather easily, while control-oriented preservice teachers accommodated the information only in proportion to the extent that they perceived it to be highly plausible and classroom applicable. The discussion relies on self-determination theory and the conceptual change literature to recommend how teacher certification programs can assist teachers-in-training develop an autonomy-supportive motivating style. © 1998 Academic Press

Teachers motivate students using interpersonal styles that range from highly controlling to highly autonomy supportive. Relatively controlling teachers generally set an agenda for students to follow and then use directives and extrinsic motivators to encourage students toward that agenda. This approach is controlling because the teacher's goal is to control students' goals and behaviors toward a prescribed end. Relatively autonomy-supportive teachers generally encourage students to pursue self-determined agendas and then support students' initiatives and intrinsic motivation. This approach is autonomy-supportive because the teacher's goal is to strengthen students' autonomous self-regulation. From this perspective, a teacher's motivating style exists within a continuum that ranges from highly controlling to highly

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autonomy supportive (Deci, Schwartz, Sheinman, & Ryan, 1981; Rigby, Deci, Patrick, & Ryan, 1992).

Teachers differ widely in their use of control versus autonomy support to motivate students (Deci *et al.*, 1981; Ryan & Grolnick, 1986), and the style a teacher uses is relatively stable throughout the academic year (Deci *et al.*, 1981). The reason motivating style is an important educational construct is because a teacher's style affects students' developmental and academic outcomes (for reviews, see Deci & Ryan, 1987; Deci, Vallerand, Pelletier, & Ryan, 1991; Reeve, 1996). That is, compared to students with controlling teachers, students with autonomy-supportive teachers report greater perceived academic competence (Deci *et al.*, 1981; Ryan & Grolnick, 1986), higher academic intrinsic motivation (Deci, Nezlek, & Sheinman, 1981), greater creativity (Amabile, 1979; Koestner, Ryan, Bernieri, & Holt, 1984), more mastery motivation (Ryan & Grolnick, 1986), a preference for optimal challenge (Harter, 1978; Pittman, Emery, & Boggiano, 1982; Shapira, 1976), greater conceptual understanding (Benware & Deci, 1984; Flink, Boggiano, & Barrett, 1990; Boggiano, Flink, Shields, Seelbach, & Barrett, 1993; Grolnick & Ryan, 1987), positive emotionality (Ryan & Connell, 1989; Patrick, Skinner, & Connell, 1993; Williams, Weiner, Markakis, Reeve, & Deci, 1994), lower dropout rates (Vallerand, Fortier, & Guay, 1997), as well as higher academic performance (Boggiano *et al.*, 1993) and achievement (deCharms, 1976; Flink, Boggiano, Main, Barrett, & Katz, 1992). Recognizing that students benefit when teachers support their autonomy, the present study examined the self-reported motivating styles of beginning preservice teachers by asking two questions: (1) Do personality characteristics orient preservice teachers toward either an autonomy-supportive or controlling motivating style? and (2) Is the autonomy-supportive style teachable to preservice teachers?

In addressing the first question, self-determination theory identifies three sources of influence on a person's interpersonal motivating style (Deci, 1995; Deci & Ryan, 1991, 1985a). First, motivating style is partly a matter of personality. Deci (1995) argues that some people have personalities oriented toward controlling others, and he cites the authoritarian personality as one example. He reasons that autonomy support "is a personal orientation you take toward other people. This orientation flavors every aspect of your interactions with them" (Deci, 1995, p. 142). Second, autonomy support is an interpersonal style composed of acquired skills. Just as behavior modification (a controlling style) requires practiced skill, supporting the autonomy of others also requires deliberate practice. Requisite skills include, for instance, taking the other person's perspective, acknowledging feelings, using noncontrolling language, making information available for decision-making, and so on (Deci, 1995). Third, motivating style partly depends on the social context. When teachers feel pressured, they often react by pressuring (i.e., exerting

control over) their students (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982; Flink *et al.*, 1990; Ryan, Mims, & Koestner, 1983). For instance, teachers are more likely to use directives and ask students for compliance when others (i.e., administrators, experimenters) impose restrictions on teachers' autonomy (Boggiano *et al.*, 1993; Connell & Ryan, 1984; Deci *et al.*, 1982; Lortie, 1977; Maehr & Anderman, 1993). Thus, self-determination theory leads to the prediction that preservice teachers do possess personality characteristics that orient them toward an autonomy-supportive or controlling style, though the theory adds that interpersonal skills and socio-contextual forces further influence motivating style.

The second question asks whether the autonomy-supportive motivating style is teachable. Research suggests that it is. One study in medical education found when interns were supervised by autonomy-supportive instructors, the interns developed a language and interpersonal style that allowed them to become autonomy-supportive physicians themselves (Williams & Deci, 1996). Additionally, deCharms (1976) developed an extensive training program to show inner-city school teachers how to be autonomy supportive with their students. The training was a success, as evidenced not only in the students' enhanced intrinsic motivation and academic achievement but also in the teachers' changed motivating styles. Therefore, research with both medical residents and experienced public school teachers suggests that an autonomy-supportive motivating style may be teachable to preservice teachers.

Teaching preservice teachers about autonomy support is not, however, a straightforward endeavor. The conceptual change literature shows that learners' prior beliefs about what they are learning affect how new information is attend to, processed and, eventually, whether it is accepted or rejected (Pintrich, Marx, & Boyle, 1993; Posner, Strike, Hewson, & Gertzog, 1982). That teachers find autonomy and autonomy support to be largely new and unfamiliar motivational constructs has been shown by Skinner and Belmont (1993). Whether exposure to such a new, alternative framework for understanding motivation leads to conceptual change depends, in one way, on how plausible, useful, and credible that new information is perceived to be, and, in another way, on the learner's prior knowledge or existing framework for understanding motivation (e.g., Posner *et al.*, 1982). Given preexisting autonomy-oriented beliefs about motivation, preservice teachers should experience relatively little cognitive resistance to information about autonomy-supportive instructional strategies; however, given control-oriented prior beliefs about motivation, preservice teachers should experience relatively much cognitive resistance to that same information. Whether control-oriented preservice teachers overcome their initial resistance to supporting students' autonomy will depend mostly on whether they perceive information about autonomy support to be more plausible, useful, and credible than is their

preexisting control-oriented understanding of motivation (Nussbaum & Novick, 1982).

In overview, the investigation asked two questions—do personality characteristics orient preservice teachers toward either an autonomy-supportive or a controlling motivating style? and Is the autonomy-supportive motivating style teachable to preservice teachers? Study 1, which addressed the first question, examined the relationship between preservice teachers' causality orientations and their self-reported motivating styles. Study 1 focused on causality orientations because this individual difference best characterizes people's understanding of the motivational causation of behavior (Deci & Ryan, 1985b). Study 2, which addressed the second question, provided preservice teachers with a formal training experience that exposed them to autonomy-supportive instructional strategies as a plausible, useful, and credible approach to motivating students. The prediction was that preservice teachers with autonomy-oriented causality orientations would rather easily integrate the new information about autonomy support into their prior beliefs about motivation, whereas preservice teachers with control-oriented causality orientations would accommodate the new information only to the extent that they perceived it to be highly plausible and classroom applicable.

### STUDY 1

Motivation research focuses on how behavior becomes energized and why it persists. For instance, events like tests and curiosity-provoking questions initiate reading behavior while events like deadlines and perceived competence determine how long it persists. Over time, people gain an understanding of the factors that energize and direct behavior, and this understanding has been called a causality orientation (e.g., Heider, 1958). When people adopt a general orientation that their behavior is caused primarily by self-determined guides, such as interests, then an autonomy causality orientation characterizes their understanding of the motivational causes of behavior; when people come to expect and rely on external guides, such as social incentives, then a control causality orientation characterizes their understanding of the motivational causes of behavior (Deci & Ryan, 1985b). The autonomy causality orientation involves a high degree of choice and flexibility in the initiation and regulation of one's behavior, and behavior is often intrinsically motivated and self-determined; the control causality orientation involves people organizing their behavior with respect to environmental events and doing things because they think they "should" or because external controls such as adult surveillance are salient (Deci & Ryan, 1985b; Koestner, Bernieri, & Zuckerman, 1992; Williams, Grow, Freedman, Ryan, & Deci, 1996).

Since autonomy-oriented individuals recognize the motivational importance of developing autonomy and since control-oriented individuals recognize the motivational importance of extrinsic events, autonomy-oriented pre-

service teachers should report that they would approach their students' motivational problems by nurturing autonomy. Control-oriented preservice teachers, on the other hand, should report that they would approach the same problems by providing extrinsic events. If self-determination theory is correct in asserting that motivating style emanates, in part, from personality differences, then causality orientation should correlate significantly with interpersonal motivating style.

## Method

### *Participants*

Participants were 142 students (110 females, 32 males) enrolled in the teacher certification program at a large urban university in the Midwest. Participants included 66 juniors (46%), 42 seniors (30%), and 34 post-baccalaureates (24%). All but 4 (3%) had some experience in the local school district, and the extent of that experience ranged from classroom observations (31, 22%) and student-teaching (61, 43%) to teaching with part-time (33, 23%) or full-time (13, 9%) responsibilities. One hundred twenty-one participants were White (85%), 11 were African-American, 6 were Asian-American, and 4 were Hispanic-American. Twenty-eight (20%) of the preservice teachers had children. As to the type of teacher they were preparing to become, participants classified themselves as follows: Preschool (18, 13%), primary grades (40, 28%), secondary grades (53, 37%), adult education (6, 4%), or exceptional education (25, 18%).

### *Instruments*

*Problems in schools questionnaire.* Motivating style was assessed with the Problems in Schools Questionnaire (Deci *et al.*, 1981). The questionnaire features eight brief vignettes describing motivation-based problems children face in school (e.g., Susie has been getting poor grades and you would like to see her improve, a useful approach to do so might be to . . .). Each vignette lists four ways a teacher might approach the problem, and each way represents a point along a continuum that extends from highly controlling (HC) through moderately controlling (MC) and moderately autonomy supportive (MA) to highly autonomy supportive (HA). For the HC response, the teacher proposes a solution and uses an extrinsic motivator to gain the student's collaboration. For the MC response, the teacher proposes a solution and appeals to the child's internalized controls ("do what you should") to gain collaboration. For the MA response, the adult encourages the child to empathize with how his or her peers understand, diagnose, and cope with the same problem. For the HA response, the adult supports the child's efforts to diagnose the problem, generate its solution, and try that plan out for himself or herself. For each vignette, respondents rate the appropriateness of each response on a separate 1–7 scale. Each of the four scale scores is computed by averaging its eight responses, and the four scores are combined as follows: Motivating Style = + 2 (HA) + 1 (MA) – 1 (MC) – 2 (HC). The higher the score, the more autonomy-supportive the style. Scale alpha coefficients were similar to those reported in previous investigations (e.g., .69 for HC, .74 for MC, .75 for MA, and .65 for HA; Cai, 1994; Deci, Nezlek, & Sheinman, 1981; Deci *et al.*, 1981; Flink *et al.*, 1990). On average, the 142 teachers reported a motivating style of 3.84 ( $SD = 2.18$ ).

*General causality orientations scale.* The General Causality Orientations Scale (GCOS; Deci & Ryan, 1985b) consists of 12 vignettes describing a typical achievement or social event that is followed by three possible responses, one representing each of the three causality orientations of autonomy, control, and impersonal. Using 1–7 response scales, participants rate

how likely it is they would respond to the particular event in that way. Higher scores on each subscale reflect higher amounts of that particular orientation in the personality. The present research used only the data from the autonomy and control orientations and, after standardizing them, subtracted the control-oriented score from the autonomy-oriented score (following past research showing that using the GCOS in this way produces scores that are both reliable and valid: Koestner, Bernieri, & Zuckerman, 1992; Bober & Grolnick, 1995). Hence, positive scores reflect a relatively autonomy-oriented understanding of motivation, whereas negative scores reflect a relatively control-oriented understanding. Descriptive statistics were as follows:  $M = 1.17$ ,  $s = 1.28$ ; coefficient  $\alpha$ s were .67 for autonomy and .71 for control.

*General information.* A final questionnaire assessed general information. Specific items asked respondents to report their gender, ethnicity, number of children, current grade level, grade level of students they planned to teach, and years of teaching experience.

### *Procedure*

Preservice teachers were recruited at the beginning of their second teacher education class. Their first class, Introduction to Teaching, allows them to gain observational experience in the local school district, and this second class is a course in Educational Psychology. Volunteers attended an hour long session in which they completed a packet of questionnaires in the context of a small group (between three and eight participants). After the investigator introduced the procedure, each preservice teacher completed a consent form and the questionnaire packet. The order of the questionnaires was counterbalanced, except that all preservice teachers completed the General Information questionnaire last. After everyone in the group finished the General Information questionnaire, the investigator debriefed the group.

### Results

Study 1 examined the zero-order correlation between causality orientation and motivating style to assess the extent to which preservice teachers with a relatively autonomy-oriented understanding of motivation reported relatively autonomy-supportive motivating styles while preservice teachers with a relatively control-oriented understanding of motivation reported relatively controlling motivating styles. As expected, causality orientation correlated significantly with motivating style,  $r(142) = .24$ ,  $p < .01$ .

The preservice teachers reported additional personal characteristics on the General Information questionnaire. For gender and parenthood,  $t$  tests tested for an association with motivating style; for ethnicity, grade level of the preservice teacher and grade level of students they planned to teach, one-way analyses of variance (ANOVAs) tested for an association between each measure and motivating style; and for years of teaching experience, a zero-order correlation was used. Only gender was associated with motivating style. Females self-reported a relatively more autonomy-supportive motivating style than did males ( $M$ s = 4.08 vs. 2.87,  $t(140) = 2.93$ ,  $p < .01$ ). A final analysis estimated the magnitude of association between motivating style and personal characteristics by regressing motivating style simultaneously on both causality orientation and gender. The two-term regression model was significant overall,  $F(2, 139) = 6.76$ ,  $p < .01$  ( $R^2 = .09$ ), and

significant individually effects emerged for both causality orientation,  $F(1, 139) = 4.70, p < .05$ , and gender  $F(1, 139) = 5.03, p < .05$ .

### Discussion

The correlation between causality orientation and motivating style confirmed that at least one motivationally relevant personality characteristic that preservice teachers possess covaries with their motivating style. While significant, the magnitude of the correlation was low, and therefore might suggest that the relationship between personality and motivating style is trivial. Focusing little on the correlation's significance and much on its magnitude, however, would misrepresent the relationship between personality and motivating style, because an easy way to bolster the relationship would be simply to include additional personality characteristics in the analysis. For instance, others have shown that each of the following personality characteristics also relate to the autonomy-control distinction: type A behavior pattern, locus of control, ego-development, self-actualization, public self-consciousness, and self-esteem (Deci & Ryan, 1985b) as well as teacher efficacy and pupil control ideology (Barfield & Burlingame, 1974). As a point of illustration, just adding gender in the analyses, for instance, doubled the variance in motivating style accounted for by person variables. The point driving Study 1, therefore, is that preservice teachers' motivationally relevant personality characteristics do relate to their motivating style.

### STUDY 2

Study 2 examined the investigation's second question, namely whether the autonomy-supportive motivating style was teachable. Toward this end, a training booklet was developed for beginning preservice teachers that discussed autonomy and autonomy support as motivational constructs. The booklet also introduced the how-to of an autonomy-supportive style, and it posed scenarios preservice teachers could use to apply its strategies to classroom settings. The study's primary hypothesis, therefore, was that if beginning preservice teachers were exposed to autonomy support as a motivational construct, and if the booklets were constructed to be highly plausible, useful, and credible, then preservice teachers given such training would report a significantly more autonomy-supportive motivating style than would preservice teachers not given such training. In addition, however, preservice teachers' prior beliefs about motivation should also affect their post-training motivating style scores. Thus, the study's second hypothesis was that, following training in autonomy-supportive instructional strategies, autonomy-oriented preservice teachers would rather easily integrate this new information into their prior beliefs about motivation while control-oriented preservice teachers would integrate the new information only to the extent that they perceived it to be clearly valid and readily applicable to the classroom.

Study 2 addressed motivating styles in general, rather than the autonomy-supportive style in specific. If motivating style is malleable, then preservice teachers exposed to information and rationale underlying controlling instructional strategies (i.e., the ideology and how-to of behavior modification) should consequently become increasingly controlling in motivating style. To make this determination, Study 2 added a control group as a third condition in which preservice teachers were exposed to instructional strategies that were of a nonmotivational nature. The motivating styles reported by preservice teachers in the control group were important because they provided a baseline comparison for motivating styles following the two motivational trainings. By adding a control group, it became possible to determine whether teachers receiving training in the autonomy-supportive style became significantly more autonomy supportive (compared to the control group) and whether teachers receiving training in controlling instructional strategies became significantly more controlling (compared to the control group).

## Method

### *Participants*

Participants were 159 students (114 females, 45 males) enrolled in the teacher certification program at a large urban university in the Midwest. Participants included 73 juniors (46%), 55 seniors (34%), and 31 post-baccalaureates (20%). Thirty-one students (19%) had no formal experience as a teacher, while 128 had some experience in the local school district, which ranged from classroom observations (37, 24%) and student-teaching (53, 33%) to teaching with part-time (28, 18%) or full-time (10, 6%) responsibilities. One hundred thirty-seven participants were White (86%), while 12 were African-American (8%), 6 were Hispanic-American (4%), 3 were Asian-American, and 1 was Native-American. Thirty-eight participants (24%) had children. As to the type of teacher they were preparing to become, participants classified themselves as follows: Preschool (25, 16%), primary grades (58, 36%), secondary grades (50, 32%), adult education (1, 1%), or exceptional education (26, 16%).

### *Instruments*

Study 2 used the same GCOS, Problems in Schools, and General Information questionnaires as those used in Study 1. Study 2 also included two new instruments: a post-experimental questionnaire that asked preservice teachers to report their reactions to the information they encountered in the training booklet, and a second modified version of the Problems in Schools questionnaire.

*Post-experimental questionnaire.* Ten items assessed the various conditions necessary for conceptual change by asking preservice teachers how intelligible (i.e., understandable), plausible (in terms of classroom application), fruitful, credible, and agreeable they found the information to be. Sample items to assess intelligibility, plausibility, fruitfulness, credibility, and agreeability, respectively, were as follows: I understood the ideas that were discussed in the instructional material; As I read the instructional material, I found myself thinking about how I might use and apply the information in the days when I am a teacher; The instructional material will be useful for me as a teacher; In my opinion, the information in the instructional material is valid and true; and, I found myself arguing and disagreeing with much of the information I read in the instructional material (reverse scored). A principal-components factor

analysis with varimax rotation was performed on the 10 items. The first factor extracted accounted 44.4% of the variance and was interpreted as measuring *conceptual agreement versus conceptual resistance*. Eight items had factor loadings greater than .60 (all but the two items measuring intelligibility), so the scores for the eight items assessing plausibility, fruitfulness, credibility, and agreeability were combined with a simple average ( $\alpha = .89$ ).

*Modified problems in schools questionnaire.* All preservice teachers completed the Problems in Schools questionnaire following the training experience, and all preservice teachers were also asked to complete a second, modified Problems in Schools questionnaire one month later. The modified questionnaire extended the Problems in Schools questionnaire to add three new and unfamiliar vignettes. To create new vignettes with HC, MC, MA, and HA response options, I followed the operational definitions reviewed earlier. Once created, pilot work refined the vignettes and response options. The three new vignettes were placed at the beginning of the modified Problems in Schools questionnaire to overcome any tendency preservice teachers might otherwise have had to try to recall and reproduce their answers from 1 month earlier. Scores on the modified questionnaire were scored as two separate dependent measures, using responses to the three new vignettes to produce one score and using responses to the eight original vignettes to produce a second score. Due to the success of the pilot work, the correlation between the two measures was high,  $r(108) = .91, p < .001$ . Given the high correlation, it made more conceptual sense to average the two scores into a single motivating style score rather than analyze them separately.

### *Training Booklets*

Three training booklets were created. Each booklet was six pages in length and followed the same format. Page 1 introduced the motivational concept and strategy, and it provided key definitions, goals, and classroom objectives. Page 2 explained what the motivational strategy would look like when applied in a classroom setting. Page 3 summarized the research listing and testifying to the strategy's educational benefits. Page 4 explained why experts in educational psychology value the strategy by providing the rationale underlying how and why the strategy produces the benefits outlined on the previous page. Page 5 presented an extended case study to illustrate how the strategy has been and can be implemented in the classroom. Page 6 presented another case study, but instead of providing an analysis and critique of the strategy (as on page 5), it asked the preservice teacher to write a one-page essay that put the strategy into practice.

The content for the autonomy-supportive booklet came from published research (Deci & Ryan, 1985a, 1987; Deci, Vallerand, Pelletier, & Ryan, 1991; Reeve, 1996). Page 2, for example, offered the following five teaching behaviors as the essential core of classroom autonomy support: (1) Teacher acknowledges and emphasizes the students' points of view; (2) Teacher encourages students' choices and initiatives; (3) Teacher communicates the rationale underlying requests and constraints; (4) Teacher promotes students' interest in learning, valuing of education, and confidence in abilities; and (5) Teacher uses a noncontrolling communication style.

The content of the controlling booklet centered on the behavior management practices of shaping and differential reinforcement. Its content also came from published research (Baldwin & Baldwin, 1986; Lahey & Drabman, 1981; Schunk, 1991). Page 2, for example, offered the following five teaching behaviors as the essential core of classroom behavior management: (1) Teacher communicates that there is a right and a wrong way to do something; (2) Teacher provides attractive consequences following desirable behavior and unattractive or no consequences following undesirable behavior; (3) Teacher watches for variations in students' behavior and gives positive feedback for desirable variations and reinforces successive approxima-

tions to the desired final performance; (4) Teacher is quick to discriminate when a student is making progress versus slipping back; and (5) Verbal feedback is an opportunity for differential reinforcement.

The third training booklet addressed an approach to teaching that featured neither autonomy-supportive nor controlling instructional strategies. This booklet featured instructional strategies to help students build organized and well-articulated cognitive schemas. It followed the same design, format, and structure as did the two motivation-related booklets.

### *Prior Knowledge and Manipulation Checks*

Each training booklet ended with a question asking how familiar versus unfamiliar the preservice teacher was with the featured instructional strategy before being exposed to it in the booklet. Prior knowledge was assessed using a 1–7 response scale that ranged from “not at all familiar” through “somewhat familiar” to “very much familiar.” To check that each booklet presented instructional strategies that were clearly autonomy supportive, neutral, or controlling, each booklet’s final page asked the preservice teacher to write an essay to demonstrate a practical understanding of how to implement the strategy in the classroom. Two independent raters scored each essay using a 1–5 response scale that ranged from a “highly controlling” to “highly autonomy-supportive” approach. Interrater reliability on this manipulation check was high ( $r = .85, p < .001$ ).

### *Procedure*

As in Study 1, preservice teachers were recruited at the beginning of their second teacher education class. Volunteers attended an 80-min session in which they were exposed to one of the three training programs and completed four questionnaires. Each volunteer participated in a small group of between two and eight participants. Upon arrival, each preservice teacher completed a consent form, the GCOS, and the General Information questionnaire. Using random assignment, the experimenter then handed each preservice teacher one of the three training booklets. Each preservice teacher read and worked with the booklet for 45 min. The experimenter next asked each participant to complete the post-experimental questionnaire. A 10-min break (without discussion) followed. After the break, each preservice teacher completed the Problems in Schools questionnaire to assess motivating style. Last, the investigator asked each preservice teacher to provide a mailing address and to consider a permission request to mail back a follow-up questionnaire 1 month later. The investigator did not conduct a debriefing at this time but, instead, promised to (and did) make available detailed explanatory information about the study to all the participants.

## Results

### *Manipulation Check and Prior Knowledge*

After their exposure to one of the training booklets, preservice teachers wrote an essay to demonstrate how they might put the instructional strategy into practice. How autonomy-supportive versus controlling a narrative each preservice teacher wrote served as a manipulation check for the content of each booklet (possible range, 1–5). Following exposure to the autonomy-supportive instructional strategies, preservice teachers wrote highly autonomy-supportive narratives ( $M = 4.5, SD = 0.7$ ); following exposure to the neutral instructional strategies, preservice teachers wrote neither autonomy-

TABLE 1

Post-training Motivating Style as a Function of Causality Orientation and Type of Training

		Type of training received		
		Autonomy-supportive instructional strategies ( <i>n</i> = 56)	Neutral instructional strategies ( <i>n</i> = 50)	Controlling instructional strategies ( <i>n</i> = 53)
Preexisting causality orientation				
Autonomy-oriented	<i>M</i>	6.46 <sub>a</sub>	4.88 <sub>b</sub>	2.55 <sub>c</sub>
	( <i>SD</i> )	(2.72)	(2.63)	(4.35)
Control-oriented	<i>M</i>	5.59 <sub>a</sub>	3.59 <sub>b</sub>	1.32 <sub>c</sub>
	( <i>SD</i> )	(3.53)	(2.00)	(2.96)

*Note.* *N* = 159. Within rows, means with different subscripts are significantly different at  $p < .05$ . Higher numbers indicate relatively autonomy-supportive motivating styles; lower scores indicate relatively controlling styles. Range of scores was  $-7.00$  to  $+12.00$ .

supportive nor controlling narratives ( $M = 3.3$ ,  $SD = 0.5$ ); and following exposure to the controlling instructional strategies, preservice teachers wrote highly controlling narratives ( $M = 1.8$ ,  $SD = 1.1$ ),  $F(2, 156) = 149.8$ ,  $p < .001$ . In regard to prior knowledge (possible range, 1–7), familiarity varied by type of booklet,  $F(2, 156) = 5.66$ ,  $p < .01$ . Preservice teachers reported being significantly more familiar with controlling instructional strategies than they were with the autonomy-supportive strategies ( $M_{BM} = 4.26$ ,  $M_{Schema} = 3.90$ ,  $M_{AS} = 3.36$ ).

#### *Effects of Training Booklets and Causality Orientation on Motivating Style*

Self-reported motivating styles were analyzed with a two-way ANOVA in which type of training booklet (autonomy supportive, neutral, controlling) and causality orientation (autonomy-oriented, control-oriented) served as independent variables. In the ANOVA, causality orientation scores were standardized and subjected to a median split such that positive scores represented autonomy-oriented causality orientations while negative scores represented control-oriented causality orientations. Table 1 shows the means and standard deviations for post-training motivating style broken down by type of training booklet and causality orientation. Motivating style varied by type of training booklet,  $F(2, 153) = 23.28$ ,  $p < .001$ , and by causality orientation,  $F(1, 153) = 5.20$ ,  $p < .05$ . The two-way interaction was not significant,  $F(2, 153) = 0.69$ , n.s. Scheffé *post hoc* comparisons ( $p < .05$ ) showed that preservice teachers exposed to the autonomy-supportive instructional booklet ( $M = 6.09$ ) scored as more autonomy supportive than did preservice teachers exposed to the neutral instructional booklet ( $M = 4.36$ ), who, in turn, scored as more autonomy supportive than did preservice teachers ex-

posed to the controlling instructional booklet ( $M = 1.76$ ). For causality orientation, autonomy-oriented preservice teachers scored as more autonomy supportive than did control-oriented preservice teachers ( $M$ s, 4.96 vs. 3.22), a finding that essentially replicates the results from Study 1.

#### *Assimilation of and Accommodation to the Autonomy-Supportive Training*

In general, the 56 preservice teachers exposed to the autonomy-supportive instructional strategies reported more unfamiliarity than familiarity with the information ( $M = 3.3$  on a 7-point scale), greater conceptual agreement than resistance ( $M = 6.1$  on a 7-point scale), and a post-training motivating style that was significantly more autonomy-supportive than it was for the 50 preservice teachers in the control group. In general, the results show that autonomy support as an interpersonal motivating style is teachable, but post-training motivating style scores further depend on causality orientation, as the prior beliefs of autonomy-oriented preservice teachers were largely consistent with the autonomy-supportive training while the prior beliefs of control-oriented preservice teachers were largely inconsistent with the same training information. Among the preservice teachers with a preexisting autonomy-oriented causality orientation, the learning process of assimilation best describes their experience during the training exposure; among the preservice teachers with a preexisting control-oriented causality orientation, however, the learning process of accommodation best describes their experience. With this reasoning in mind, I correlated the post-training cognitive agreement versus cognitive resistance scores (from the post-experimental questionnaire) with the self-reported motivating style scores for the 32 autonomy-oriented and 24 control-oriented preservice teachers who received autonomy-supportive training. For the autonomy-oriented preservice teachers, extent of cognitive agreement did not correlate with motivating style,  $r(32) = .11$ , n.s. Presumably, assimilation of the new information was easy and readily occurred. For the control-oriented preservice teachers, extent of cognitive agreement did correlate with motivating style,  $r(24) = .65$ ,  $p$ 's  $< .001$ . Presumably, accommodation of the information occurred only for those control-oriented preservice teachers who were able to overcome their initial resistance to find value, utility, and credibility in the information about autonomy support.

#### *Did Post-training Motivating Style Endure over Time?*

One month after their initial exposure to one of the training booklets, 108 of the 159 preservice teachers (response rate = 68%) returned the second Problems in Schools questionnaire to again assess motivating style. A two-way ANOVA with type of training and causality orientation as independent variables showed that, after 1 month, motivating style continued to vary by type of training booklet,  $F(2, 102) = 5.78$ ,  $p < .01$ , and by causality orienta-

tion,  $F(1, 102) = 17.71, p < .01$ . The two-way interaction effect was not significant,  $F(2, 102) = 1.49, n.s.$  *Post hoc* comparisons showed that preservice teachers exposed to the autonomy-supportive instructional strategies 1 month earlier continued to report a significantly more autonomy-supportive motivating style than did preservice teachers exposed to the controlling instructional strategies ( $M$ s, 5.90 vs. 3.16), and that autonomy-oriented preservice teachers continued to report a significantly more autonomy-supportive motivating style than did control-oriented preservice teachers ( $M$ s, 5.74 vs. 2.78). So, the training effect on motivation style did endure one month later.

A repeated measures ANOVA with motivating style serving as the repeated dependent measure (measured first immediately after training and second 1 month later) tested whether the initial training-induced changes in motivating style endured. In addition, zero-order correlations tested whether the conceptual change effect endured one month later by testing for the association between conceptual agreement versus resistance (measured immediately after the training) and motivating style (measured 1 month later). Twenty-nine of the 32 autonomy-oriented preservice teachers exposed to the autonomy-supportive instructional strategies returned the follow-up measure of motivating style, and their motivating styles were essentially unchanged from one month later (initial motivating style,  $M = 6.55$ ; follow-up motivating style,  $M = 6.17$ ),  $F(1, 28) = 0.51, n.s.$  As before, their cognitive agreement scores did not correlate with their motivating style scores one month later,  $r(29) = .07, n.s.$  Thirteen of the 24 control-oriented preservice teachers returned the follow-up measure of motivating style, and their motivating styles decreased significantly from one month later (initial motivating style,  $M = 6.34$ ; follow-up motivating style,  $M = 3.89$ ),  $F(1, 12) = 12.61, p < .01$ . As before, their cognitive agreement scores did correlate with their motivating style scores one month later,  $r(13) = .53, p = .06$ . So, the training effect on motivating style did endure over time, except that control-oriented preservice teachers who reported an immediate conceptual resistance to the autonomy-supportive instructional strategies reported follow-up motivating style scores that were more consistent with their prior beliefs about motivation.

## GENERAL DISCUSSION

In addressing the investigation's first question—do personality characteristics orient preservice teachers toward one motivating style or the other, Study 1 showed that causality orientation correlated with motivating style while Study 2 replicated this finding. The significance of the association between causality orientation and motivating style is to reveal that preservice teachers bring prior beliefs about the motivational cause of behavior with them into their teacher certification training programs and these beliefs establish a cognitive foundation to agree with or to resist against the information

they encounter in their teacher training program about motivating students. Even so, the association was modest in its magnitude, and this was true for two reasons: (1) Study 1 included only one theoretically-based personality characteristic rather than a fuller range of personality characteristics related to beliefs about motivation, and (2) motivating style is only partly a function of a personality characteristics, as motivating style further depends on acquired interpersonal skills and on the social context in which one teaches, as discussed earlier.

In addressing the investigation's second question—Is the autonomy-supportive style teachable to beginning preservice teachers? Study 2 showed that it was. More precisely, Study 2 showed that motivating style in general, rather than autonomy support in particular, was teachable to beginning preservice teachers. Exposure to either approach to motivating students led preservice teachers to report a significant and corresponding change in their interpersonal motivating style, as compared to the motivating style reported by beginning preservice teachers in the control group.<sup>1</sup> In some respects, it is striking that an 80-min training session could affect preservice teachers' motivating styles in an enduring way. Not only did motivating styles change following the training, but they changed in an enduring way. The conceptual change literature helps to understand how this otherwise striking effect can occur by explaining why exposure to information such as that encountered in Study 2 can affect preservice teachers' motivating styles in a meaningful way. Most of the beginning preservice teachers found the information about autonomy support to be largely unfamiliar yet highly useful. Understandably, most preservice teachers therefore experienced the autonomy-supportive approach as a viable, alternative conceptualization of how to motivate students. Under these conditions and presuming that motivation is an issue preservice teachers very much care about, it is less striking than intelligible, plausible, fruitful, and credible information about autonomy support could affect mean-

<sup>1</sup> An alternative interpretation might argue that the training booklets simply told participants how they were supposed to answer the vignettes from the Problems in Schools (PS) questionnaire. I am skeptical of this alternative interpretation for six reasons: (1) respondents, when asked, rarely identify the actual purpose of the PS questionnaire; (2) even if the respondent is aware of the instrument's purpose, the response options offer relatively low face validity (i.e., is the following option controlling or autonomy supportive?: "Continue to emphasize that she has to work hard to get better grades"); (3) a special methodological effort was made to keep the reading of the training booklet and the completing of the PS questionnaire separate parts of the study; (4) the investigator made no recommendation for participants to use the information in the booklets to guide their answers to the PS questionnaire; (5) one-month follow-up scores for motivating style correlated highly with the post-training scores; and (6) the effect of causality orientations on motivating style in Study 2 was essentially the same as the effect found in Study 1, which did not include any potential demand characteristics as to how to answer the PS questionnaire's vignettes. It seems most likely that motivating style, rather than demand characteristics, formed the basis of the responses to the PS questionnaire.

ingful change in how preservice teachers think about motivating students (following, Pintrich *et al.*, 1993; Posner *et al.*, 1982).

Following autonomy-supportive training, learning about motivating students was of a qualitatively different nature for autonomy-oriented and control-oriented teachers. For autonomy-oriented preservice teachers, the new information was consistent with their understanding of motivation, so it met with little cognitive resistance. Autonomy-oriented preservice teachers assimilated the information and integrated it into their self-reported motivating style, and the terms assimilation and conceptual integration best characterize their learning experience. For control-oriented preservice teachers, the new information was more likely to conflict and be contrary to what they understood to be true about motivation. Overcoming control-oriented prior beliefs about motivation and adopting the alternative framework of supporting autonomy required a more radical conceptual transformation, and the terms accommodation and conceptual change best characterize their learning experience, at least among the subset of control-oriented preservice teachers who did experience conceptual change.

Our findings speak to educators as they attempt to structure their teacher certification programs to support an autonomy-supportive motivating style within their teachers-in-training. While motivating style is associated with individual difference characteristics that are relatively stable and enduring (i.e., causality orientations show high test-retest reliability; Deci & Ryan, 1985b), motivating style is nonetheless malleable, at least to the extent that training and new information offers the possibility for conceptual change (i.e., the training and new information is perceived to be highly useful and endorsed by experts). Thus, the picture that emerges is that a beginning preservice teacher's motivating style is associated with his or her prior beliefs about motivation. As the preservice teacher makes his or her way through a teacher-training program, those prior beliefs may agree with or conflict against new information learned about motivating students. When the alternative way of thinking about motivating students is intelligible, useful, fruitful, and credible, then a preservice teacher's preexisting beliefs about motivation can be expected to undergo some developmental change as he or she reflects on, evaluates, and perhaps refines his or her interpersonal motivating style.

What these studies do not show is that exposure to brief training experiences will change preservice teachers' actual, in-class ways of motivating students.<sup>2</sup> Optimistically, other research does show that motivating style pre-

<sup>2</sup> Another question to ask is, "Which specific component of the autonomy-supportive training was responsible for changes in motivating style?" For instance, did participants become increasingly autonomy supportive because they were more willing to adopt the students' points of view? Because they were more willing to encourage initiative? Did change occur because of the persuasiveness of the literature review on the educational benefits of autonomy support?

dicts actual instructional behaviors (Reeve, Bolt, & Cai, 1997; Williams & Deci, 1996), but actually *changing* teachers' classroom behaviors probably requires adding extended, skill-based training. Such additional training would necessarily begin with the conceptualization, rationale for, and how-to of autonomy support, as featured in Study 2, but it would need to continue into classroom-specific efforts to practice supporting the autonomy of others. Extended training is necessary partly because teachers are unfamiliar with autonomy support as a motivational strategy (Skinner & Belmont, 1993) and partly because teachers generally adopt only those classroom strategies that they see as plausible and useful (Kazdin, 1981) as well as familiar and practiced (Kurita & Zabatany, 1991). Just as many beginning preservice teachers find autonomy to be an unfamiliar motivational concept, those same preservice teachers might also find autonomy-supportive ways of interacting (i.e., taking the perspective of others, acknowledging feelings, using noncontrolling language) to be unfamiliar, though useful, interpersonal skills. Like other skills developed within the context of teacher education (see Ashton, 1996), supporting the autonomy of others requires first a conceptual understanding but also modeling, practice, advice and feedback, and interactive experience with both students and the profession.

For a conclusion, I wish to make salient the potential importance of the findings. The past proliferation of research on behavior modification techniques led educators to embrace practices, such as the token economy, as an optimal way to motivate students, and the popularity of such research explains much of the reason why the use of controlling instructional strategies permeates classrooms nationwide (Kazdin & Bootzin, 1972; Kazdin & Wilson, 1978). In addition, both parents (Boggiano *et al.*, 1987) and students (Boggiano *et al.*, 1993) subscribe to the idea that extrinsic incentives are not only favorable, but are also optimal, motivators (i.e., "the larger the incentive, the more highly motivated the child"; Boggiano *et al.*, 1987). However, such beliefs are erroneous (Boggiano *et al.*, 1993). Unfortunately, the belief that controlling instructional strategies are superior to autonomy-supportive ones persists in the minds of practitioners even after they are exposed to disconfirming evidence (Boggiano *et al.*, 1987). Clearly, interventions are needed to communicate the benefits (and superiority) of autonomy-supportive instructional strategies. At the least, the present study demonstrates that interventions at the preservice teacher level can communicate the benefits of autonomy-supportive instructional strategies sufficiently well to change motivating style toward a more autonomy-supportive orientation.

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Or, did change follow from analysis and practice with the case studies? I did not focus on this molecular approach, because past studies (e.g., Deci, Eghrari, Patrick, & Leone, 1994) showed rather convincingly that the various elements of the autonomy-supportive style complement and depend on one another in a way that suggests a synergy or gestalt effect.

More ambitiously, the present findings show that educators' (and, specifically, control-oriented preservice teachers') ideas about how best to motivate students is malleable—if the research on autonomy-supportive strategies can prove itself to be not only intelligible, useful, fruitful, and credible but also a superior alternative to the now-popular controlling strategies.

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