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Controlling Teaching Strategies: Undermining Children's Self-Determination and Performance

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The present study examined the hypothesis that students would show performance impairment when they were exposed to teachers who were pressured to maximize student performance level and who used controlling strategies. For this purpose, 4th-grade teachers and their students participated in a field experiment in which teachers either were pressured to maximize student performance or were told simply to help their students learn. In addition, the teaching sessions were videotaped to assess teachers' use of controlling strategies, as rated by blind coders. Following the teaching sessions, student performance on tasks initially taught by teachers as well as on a generalization task was assessed by blind experimenters. As predicted, the data indicated that students evidenced performance impairment during the subsequent testing session only when they were exposed to pressured teachers using controlling strategies. The results are discussed within the context of self-determination theory.

Recent evidence accumulated from a wide variety of research approaches demonstrates that controlling strategies (e.g., directives, evaluation, avoidance of providing choice options) negatively affect not only intrinsic motivation (Deci & Ryan, 1985, 1987), but other achievement-related behaviors, such as creativity (Amabile & Hennessey, in press) and preference for challenge (Boggiano, Main, & Katz, 1988; Boggiano, Pittman, & Ruble, 1982; Boggiano & Ruble, 1986; Harter, 1981). The most widely cited theory to account for these findings is self-determination theory (Deci, 1980; Deci & Ryan, 1985, 1987), which proposes that controlling strategies reduce students' feelings of self-determination—that is, a sense of control over initiation and regulation of activities—which may undermine both intrinsic motivation and performance (see also Deci & Ryan, in press). From the perspective of self-determination theory, whether students feel compelled to achieve a given outcome (an internally controlling motivation) or whether students experience controlling behaviors used by others to achieve a given standard, self-determination is reduced; consequently, intrinsic motivation and performance level decrease (Boggiano & Pittman, in press; Deci & Ryan, 1987; Ryan, 1982; Ryan, Mims, & Koestner, 1983).

The present study examined conditions moderating impaired performance—an important theoretical question that has received little empirical attention. The basic proposition examined was that the functional significance of controlling strategies used by teachers may depend on whether students construe teacher behaviors as an attempt to control and regulate their performance level or simply as methods of providing guidance or directives. To the extent that students feel controlled to achieve a given performance standard, their sense of self-determination should be lowered, thereby producing performance deterioration (Deci & Ryan, 1987). We assumed that a pressure manipulation placed on teachers to maximize their students' performance would affect students' interpretations of teacher behaviors (such as directives), so that these behaviors would be viewed as controlling.

Our major hypothesis, then, was that students' performance decrement would be evidenced under conditions in which teachers who were pressured to increase students' performance level also used strategies such as directives communicated in a controlling manner, as rated by blind coders. Conversely, we hypothesized that in the absence of pressure on students to perform well, the same strategies would have minimal impact on performance because children's sense of self-determination would not be affected. Indirect support for the hypothesis that directives or limit setting per se do not negatively affect student performance is provided by Koestner, Ryan, Bernieri, and Holt (1984). Thus, teacher styles (controlling or not) should moderate the impact of a pressure induction on students' task performance.

A second major purpose of the present study was to address several limitations of previous research examining the effects of controlling strategies on performance level. The few experiments examining this issue indicate that controlling strategies (e.g., reward or evaluation) impair the ability to avoid functional fixedness (McGraw & McCullers, 1979) as well as creativity (Amabile, 1982; Amabile, Hennessey, & Grossman, 1986; Koestner et al., 1984) and conceptual learning (Benware & Deci, 1984; Boggiano & Katz, in press; Grolnick & Ryan, 1987; Garbarino, 1975; however, see also Hennessey, Amabile & Mar-

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tinage, 1989). Data from correlational studies are consistent with the experimental work: Teachers' reported use of controlling strategies correlate with negative self-cognitions such as low perceptions of competence in elementary-school-age children (Deci, Schwartz, Sheinman, & Ryan, 1981; Ryan & Grolnick, 1986), lowered self-determination in children, and poor achievement, as indexed by national test scores (Boggiano, Barrett, & Judd, 1990; Boggiano et al., 1989). However, this body of research is limited in two important respects and raises a number of important issues.

The first major limitation of research examining the effect of controlling strategies on students' performance is the timing of performance assessment. In contrast to research examining intrinsic motivation as a function of exposure to controlling strategies, performance level has not been assessed after the controlling strategies are no longer operative. Thus, extraneous factors occurring during the manipulation phase may affect subsequent performance level. For example, distraction about obtaining the target reward (Smith & Pittman, 1978) or from being evaluated, as opposed to lowered feelings of self-determination, may account for performance decrement. Concern over such alternative explanations has led intrinsic-motivation researchers to examine task persistence after the controlling strategy is no longer present (Deci & Ryan, 1987; Lepper & Greene, 1978). Researchers examining preference for challenge also have assessed children's choices for varying levels of a challenging activity in subsequent sessions when the controlling technique is no longer in effect (Boggiano, Main, & Katz, in press; Pittman, Boggiano, & Ruble, 1983; Pittman, Emery, & Boggiano, 1982; see also Boggiano et al. 1988). Using this methodology, researchers can make a more confident inference that avoidance of challenge or decreased task persistence reflects lowered intrinsic motivation, as opposed to other factors, such as concern over grades.

A similar issue has been raised by researchers studying learned helplessness. If the cognitive affective process producing performance deterioration after failure feedback is due to feelings of helplessness, as opposed to an alternative process, then performance impairment should generalize to a task not undertaken during the initial experimental session (Boggiano & Barrett, 1985; Maier & Seligman, 1976). We assumed, then, that if children's performance impairment, as a result of controlling strategies, is accounted for by their lowered feelings of self-determination, then performance decrement would be demonstrated with a new experimenter blind to condition and would even generalize to a transfer task.

To sum, in contrast to research in the areas of intrinsic motivation and learned helplessness, researchers examining controlling strategies and performance have not yet addressed the extent to which performance decrement generalizes across tasks and situations. More specifically, the effects of controlling strategies on performance level have not been assessed outside of a context in which controlling strategies are present. For example, both Deci, Spiegel, Ryan, Koestner, and Kauffman (1982) and Garbarino (1975) assessed performance within a teaching session.

Interestingly, although Garbarino (1975) found that students exposed to controlling strategies solved fewer problems than those not exposed to these strategies, Deci et al., (1982) found that students subjected to teachers using controlling strategies solved more problems than other students taught by teachers not using such strategies. However, Deci et al. (1982) also found that students who worked with noncontrolling teachers solved more problems without assistance than those exposed to controlling strategies, thus the pattern of data from these studies shows somewhat discrepant effects of controlling strategies on students' performance.

Although the researchers assessed performance within the teaching session, they did not assess performance outside of the teaching session, nor did they include a generalization task. In addition, students of controlling teachers received a great deal of instruction (including hints) that may have facilitated their problem-solving skills. Whether the number of problems correctly solved was a result of student effort, as opposed to teachers providing the answer. Garbarino (1975) noted that controlling tutors often provided answers to students, and Deci et al. (1982), using a pressure induction on teachers, also acknowledged that it is difficult to determine the effect of controlling behaviors on performance level when performance is assessed in the presence of such behaviors. By using a generalization task, the present study may shed some light on reasons for conflicting findings from previous studies.

A second limitation of previous work is that the relation between controlling strategies and performance has not been examined in a naturalistic setting with actual teachers and their students, thereby raising concerns about external validity. Moreover, previous experimental work tended to use only one operationalization of controlling strategies, for example, reward or evaluation. Assuming that actual teachers draw from a large repertoire of teaching strategies in their classrooms, the present research addressed the effect of a wide range of controlling strategies on students' performance, using an experimental methodology in a field setting.

Although our primary focus was to examine factors moderating student performance level, taking into account limitations of relevant previous studies, an additional question of interest concerned the impact of controlling versus noncontrolling feedback (e.g., praise or criticism) on task performance. According to Deci and Ryan (1985), when feedback is presented in a controlling manner, intrinsic motivation decreases. Two studies (Pittman, Davey, Alafat, Wetherill, & Kramer, 1980; Ryan, 1982) support the contention that intrinsic motivation decreases when feedback is presented in a controlling (but not noncontrolling) manner. In the present study, we examined whether performance deteriorates when feedback is presented using controlling strategies, particularly when teachers are pressured.

To summarize, our primary prediction was that controlling strategies used by teachers pressured to have their students perform well within real classrooms would impair their students' subsequent performance. In other words, only when pressured teachers taught in a controlling manner (and thus reduced children's feelings of self-determination) would performance deterioration be evidenced. We also assessed the extent to which feedback about performance might exacerbate this effect. For this purpose, we randomly assigned fourth-grade teachers to either a pressure manipulation or not (as in the Deci et al., 1982, experiment) and then videotaped their teaching sessions with groups

of their students to assess the teachers' use of controlling strategies. After the teaching session, students were tested on tasks both taught and not taught by the teacher to assess generalization effects.

Method

Subjects

Fifteen 4th-grade teachers (11 women and 4 men) and their 267 students (126 female and 134 male fourth-grade students) from seven schools in a single Colorado school district volunteered to participate in the study. (Seven children failed to record their gender on their materials.) Of the 15 teachers, 8 were randomly assigned to the pressure condition, 7 to the nonpressure condition, with the constraint that half of the teachers from each school received the pressure manipulation, and half the nonpressure manipulation. The entire experiment, including all sessions, took place between the 3rd week of September and the 1st week of November.

Instruments

Teachers completed the Problems in School questionnaire (Deci et al., 1981), designed to assess teaching strategies. The questionnaire consists of eight vignettes depicting problems that might arise in school. For each vignette, teachers rated the appropriateness of four possible strategies, using a scale ranging from 1 to 7. These strategies are highly autonomous, moderately autonomous, highly controlling, or moderately controlling. Reported reliabilities, as measured by Cronbach's alpha, range from .73 to .80 for the subscales (Deci et al., 1981).

Children completed Harter's (1981) In the Classroom questionnaire during the experimental session. This 30-item questionnaire assesses children's motivational orientations (intrinsic vs. extrinsic) and has been shown to be reliable and valid.

Procedure

Approximately 1 week prior to the actual experiment, teachers completed the Problems in School questionnaire. On the day of the experimental session, two experimenters entered the classroom and divided the children into groups of approximately 5 children each (ranging from 4 to 7 children per group). The number of groups for each classroom varied from 2 to 5 (only 1 teacher taught 5 groups).

The experimenter assured the children of the anonymity of their responses and encouraged honest answers in filling out the motivational orientation questionnaire. The experimenter then gave them instructions for filling out the questionnaire and went over several examples.

While children received questionnaire instructions from the first experimenter, the second experimenter presented the experimental manipulation to the teacher. The teacher was told that he or she would teach each group of children two tasks: an anagrams task and a sequencing task, in which pictures would be put in order so they told a story. Teachers randomly assigned to the nonpressure condition were told the following:

> Your role will be to facilitate the children's learning how to solve the anagrams and sequencing problems. Your job is simply to help the students learn how to solve the problems.

Teachers randomly assigned to the pressure condition were told the following:

> Your role will be to ensure that the children perform well on the anagrams and sequencing problems. It is a teacher's responsibility to make sure that students perform up to standards. If, for example, your students were tested on the problems, they should be able to do well.

(Note that these instructions closely parallel those used by Deci et al., 1982.) After receiving the instructions, teachers were given time to solve the anagram and sequencing tasks themselves.

When the teacher completed the tasks, the second experimenter asked the teacher to sit at an empty table where the video camera equipment had been placed. The first group of children then joined the teacher and received copies of the tasks. Each group-teaching session lasted 10 min, and all were videotaped. Children in the other groups continued to work on their questionnaires; both experimenters answered questions and otherwise monitored the class.

When the first group completed the teaching session, the children returned to their desks, where the first experimenter (blind to the teacher nonpressure/pressure manipulation) told them they would complete several new tasks. These tasks consisted of a new set of anagrams (2 min allowed for completion), a new set of sequences (3 min allowed for completion), and a spatial relations task, which they had not been taught (30 s allowed for completion); these tasks were presented in random order to each group. After completing these tasks, the children filled out a questionnaire asking them how much they liked the various tasks, whether they would be willing to stay after school to do some more problems, and their rankings, from *most liked* to *least liked,* of the various tasks.

While the first group worked on the dependent variables described in the previous paragraph, the second group began its session with the teacher. Timing was arranged so that the completion of the teaching sessions would coincide with the completion of the performance-assessment session. Therefore, children were at all times occupied with either answering their questionnaires, working with the teacher, or completing the performance tasks. Care was taken to impress on children the importance of working on their own projects and of remaining as quiet as possible.

Once all groups had completed all phases of the experiment, the children were thanked for their participation and were given bookmarks as gifts (all children received the bookmarks, whether or not they participated). The second experimenter then fully debriefed the teacher—explaining the experimental hypotheses, implications, and uses for the study. Additionally, teachers were assured that they had done well in the group sessions.

Results

Performance Analyses

The experiment used a hierarchical design: Children were nested under groups, groups were nested under teachers, and teachers were nested under schools. The experimental manipulation (pressuring instructions vs. nonpressuring instructions) was randomly assigned at the level of teacher. We averaged children's scores within teachers to use teacher as the unit of analysis. Unless reported otherwise, all significance values were less than .05.

Performance on Tasks

We examined the effect of the manipulation on children's performance, while we controlled for the effects of teacher orientation. The analysis included the interaction of the covariate

(teacher orientation) and the manipulation, in which the covariate was in mean-deviation form (Judd & McClelland, 1988). The teacher-orientation covariate was included in the analysis to control for initial differences in teachers' controlling versus autonomous teaching styles. Clear differences in performance emerged between the two manipulation groups. Multiple analysis of variance on all three performance variables (anagrams, spatial relations task, and sequences) indicated that children taught by nonpressured teachers performed significantly better than children taught by pressured teachers, $F(1, 11) = 6.62$, adjusted Ms = 4.45 and 3.97, respectively. Neither teacher orientation nor its interaction with the manipulation affected performance, $F(1, 11) = .45$ and .63, respectively.

Univariate analyses of both the anagrams and the spatial relations task (the generalization task) replicated this pattern, again so that children taught by nonpressured teachers performed better than those taught by pressured teachers, $F(1, 11) = 10.31$ and 4.61, respectively; adjusted Ms for anagrams = 2.42 and 1.82, respectively; adjusted Ms for spatial relations task = 4.74 and 4.39, respectively. Although the means for the sequences displayed the predicted pattern, the manipulation did not significantly affect performance on the sequences, $F(1, 11) = .40$, adjusted means = 6.16 (nonpressured group) and 5.70 (pressured group).[1]

Liking for Tasks

Children taught by pressured as opposed to nonpressured, teachers did not differ in their average liking for the three tasks, $F(1, 8) = .69$.[2] Again, neither teacher orientation, $F(1, 8) = 2.32$, nor the interaction, $F(1, 8) = .80$, affected liking.

We also asked children whether, provided arrangements could be made, they would be willing to stay after school to work on some problems like the ones they had completed. Although more children in the noncontrolling condition (54%) than in the controlling condition (46%) said they would stay, this difference was not significant, $\chi^2(1, N = 200) = .157$.[3]

Videotape Analyses

We first divided the videotape information into objective and subjective categories, as in Deci et al. (1982). Coding proceeded as follows: Three sets of two coders were used; all coders were blind to the manipulation. Each set of coders rated one set of objective information and one set of subjective information. Thus, each set of coders rated each teacher twice. We coded the first 5 min of the first two groups for any given teacher. (All teachers taught at least two groups.) Coding therefore included 10 min of information for any given teacher. (Thirteen teachers were coded. Two were dropped because the microphone had been accidentally disconnected from the camera and no sound was audible. These 2 teachers were subsequently dropped from the analyses, leaving 7 teachers in the nonpressured condition and 6 in the pressured condition.)

Each coding team rated several pieces of information simultaneously. For instance, Set 1 rated the frequency of four teaching behaviors at the same time: feedback, criticism, praise, and self-disclosures. (Pretesting ensured that this was not too great a burden on the coders' abilities to attend to the information.) While coding the objective information, coders observed the teaching session in 15-s blocks, tallying the number of behaviors that occurred in that particular time block. One coder ran a stopwatch while the other stopped and started the videotape with a remote control. Stopping after 15 s allowed coders to complete their tallying and write down any questions or comments they had about what they had seen. It also ensured that coders remained on the same time block on the rating sheets. Only one set of coders observed the tapes at any one time, and both coders were asked not to converse with one another during coding.

When all the objective information had been coded, the same coders subsequently rated their assigned set of tapes on subjective information, giving their ratings after observing for 30-s blocks.

Three constructs were not measured by this procedure. These were the amount of time the teacher spent talking, the amount of time allowed for independent work, and the amount of time the children spent on the task. One coder, blind to condition, simply recorded the total times for these variables.[4]

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[1] We repeated the performance analyses, using a simple one-way multiple analysis of variance, and obtained essentially the same result. Only one univariate analysis differed: The difference in performance on the spatial relations task between the two conditions was slightly less significant, $F(1, 11) = 4.33$, $p = .058$. We also conducted the performance analysis by treating the children's motivational orientation questionnaire (Harter, 1981) as a covariate. With teacher as the unit of analysis, results were essentially the same as when teacher orientation was covaried out, producing a highly significant effect for performance and no effect for motivational orientation or the interaction. In addition, when we regressed performance onto children's motivational orientation, teacher orientation, and their interaction, no significant effects occurred.

However, we also wished to examine the effects of both motivational orientation and gender, using individual children as the unit of analysis. To do so, we adjusted each child's score by subtracting the mean of the group. The analysis of covariance used a 2 (gender: male vs. female) × 2 (manipulation: pressured vs. nonpressured) factorial design and included interactions with the covariate (Judd & McClelland, 1988). Again, the manipulation effect was significant, $F(1, 204) = 9.83$. Intrinsically motivated children performed marginally better than extrinsically motivated children $F(1, 204) = 3.81$, $p < .06$. No gender effects emerged, $F(1, 204) = .38$.

[2] We did not implement the liking judgments in the experimental design until after the first three teachers had been tested. Thus, data from 12 teachers' classrooms were included in the analysis.

[3] Although we had initially intended to ask students about the extent to which their experience during the teaching session evoked feelings of being controlled, this question was deemed as not appropriate out of concern that making salient these feelings might affect the relationship students had with their teacher over the school year.

[4] Time on task was coded in response to a reviewer's specific concern that the effect of the manipulation was to make teachers more interfering, thus preventing children from working on the task. The camera was oriented toward the teacher when the experimental sessions were run. Therefore, children were not always clearly visible, and children could not be randomly selected. We therefore chose the first child to the camera's left that could be seen during the entire coding

Reliability Analysis

The nested design of this study precluded the use of simple interrater reliability scores. Therefore, we examined the between-subjects effects of manipulation and teacher nested within manipulation, the within-subjects effects of rater and block, and all interactions for these variables, using group as the unit of analysis. For any given coded question, we computed the interrater reliability coefficients for all nested and crossed effects. Thus, the analysis of variance computed five effects: The manipulation effect, teacher's differential responses to the manipulation, changes in the behavior over time, the interaction of time with the manipulation, and the three-way interaction of time, teacher, and the manipulation.[5]

Those items with interrater reliabilities of at least .50 or greater for all five effects were considered reliable. Of the 14 objective behaviors initially coded, 8 met the reliability criteria: the number of hints, criticisms, and praise the teacher gave, the number of times the teacher attempted to involve a child in the task, the number of times either the teacher or the children laughed, children's spontaneous verbalizations (e.g., "Oh, I get it!"), and the number of self-disclosures. These self-disclosures included such things as teachers' affective reactions toward the task, "I really enjoyed working out the sequences," and admissions of difficulty, "I got that one wrong too; it was really hard for me."

Of the 13 subjective behaviors initially coded, 8 met the reliability criteria: the teacher's interest, enthusiasm, competence, and pressure/tension; how controlling teachers were, and how much choice/autonomy they allowed; and children's pressure/tension and their liking for the teacher. Subjective items were rated on a 7-point scale ranging from *least positive* (1) to *most positive* (7).

Table 1 displays each behavior divided by subjective and objective information. It includes both the mean values and significance tests for the manipulation conditions. (The means are presented by 30-s block for both objective and subjective data.)

Manipulation Effects on Behavior

The data indicated that teaching behaviors differed as a function of the pressure manipulation. Pressured teachers gave significantly more hints, and their students verbalized more; pressured teachers also gave somewhat more criticism and praise. In contrast, nonpressured teachers made more self-disclosures and displayed a marginal tendency to allow more independent work.

In addition, as predicted, the subjective data indicated that pressured teachers were significantly more controlling and pressured/tense than nonpressured teachers. Surprisingly, pressured teachers appeared significantly more interested, enthusiastic, and competent than their nonpressured counterparts. Finally, children taught by pressured teachers were rated as liking the teacher more and as being somewhat more pressured/tense than children taught by nonpressured teachers.

session. We coded the number of minutes that child spent looking at his or her paper. We coded 1 child per group, or 26 children.

Relationship Between Teaching Behaviors and Performance

The next series of analyses focused on the relationship between teaching strategies and performance. We correlated performance with each of the items listed in Table 1, treating teacher as the unit of analysis. Only two effects emerged; these both were related to children's behaviors: Children's laughter and children's pressure/tension correlated negatively with performance ($r = -.58$, $p < .05$, and $r = -.51$, $p < .10$, respectively). No single teaching strategy affected performance, arguing against any mediational effects.[6]

Effects of Pressure and Controlling Strategies on Performance

Our primary prediction was that performance would be impaired under a condition in which controlling strategies were used by pressured teachers (theoretically evoking low feelings of self-determination in their students). In addition, we anticipated that high amounts of evaluative feedback might exacerbate this effect.

To test these hypotheses, we created two new indices. The first was averaged over the number of hints, criticism, and praise teachers gave, thus producing a feedback variable. We also conducted a factor analysis, treating children as the unit to verify the structure of the controlling teaching strategies in Table 1.[7] Four items loaded together that have theoretically and empirically been construed as indices or correlates of controlling strategies: teacher's use of control, pressure/tension (both teachers' and children's), and the absence of choice. Whereas control and choice clearly constitute indices of self-determina-

[5] Again, the exceptions to this procedure were the amount of time teachers spent talking, the amount of time allowed for independent work, and the amount of time children spent on the task. These items were recorded by a single coder and were not divided into 15-s blocks but were collapsed across the entire 5 min. Therefore, there were no nested or crossed coding effects for these variables.

[6] We also correlated the teacher orientation questionnaire with the behaviors. With only 13 cases, none of the correlations were significant, although the pattern of the means was in the predicted direction. For example, an autonomous orientation correlated positively with performance ($r = .34$) and the amount of choice given ($r = .24$) and negatively with how controlling a teacher appeared ($r = -.32$).

[7] All behaviors listed in Table 1 were submitted to a principal-components varimax rotation factor analysis. Five factors emerged; eigenvalues equaled 4.83, 3.86, 2.02, 1.82, and 1.51. We repeated the analysis, constraining the number of factors to two. The first factor contained variables relating to the teachers' appearance of involvement: the amount of independent work allowed (−.91361), teacher enthusiasm (.94795), teacher interest (.89318), teacher competence (.79993), and the amount of time the teacher talked (.84547). This factor accounted for 26% of the variance. The second factor accounted for 21% of the variance and contained variables relating to self-determination: choice (−.78944), teachers' pressure/tension (.79592), children's pressure/tension (.80870), and how controlling the teacher was (.93323). Only one other item loaded above .50 on this factor: liking for the teacher (−.72955). Note that choice was reverse scored when the four variables were averaged to create the self-determination index.

Table 1
F and p Values for the Objective and Subjective Behaviors, With Means for the Manipulation Effect by 30-s Block

Behavior	*F*	*p*	*M* for manipulation effect: Nonpressured	*M* for manipulation effect: Pressured
Objective behavior				
Teacher's laughter	1.15	*ns*	0.043	0.017
Number of hints	6.93	.021	0.325	0.521
Number of criticisms	3.51	.084	0.043	0.108
Number of self-disclosures	36.46	.000	0.271	0.054
Number of praises	2.95	.110	0.121	0.238
Number times involve child	0.61	*ns*	0.200	0.135
Children's laughter	1.47	*ns*	0.340	0.490
Children's verbalizations	5.19	.040	0.500	1.050
Total time teacher spent talking	2.18	*ns*	2.512	2.798
Total time allowed for independent work	3.15	.104	2.380	1.310
Total time on task	0.05	*ns*	2.518	2.685
Subjective behavior				
Teacher's interest	20.02	.000	4.47	5.61
Teacher's enthusiasm	18.52	.001	4.75	5.35
Teacher's competence	4.58	.052	6.21	6.39
Children's liking for teacher	12.72	.003	4.60	5.65
Choice/autonomy	2.36	.150	4.80	4.50
How controlling teacher appeared	6.19	.027	2.69	3.07
Teacher's pressure and tension	9.09	.010	2.13	2.58
Children's pressure and tension	3.40	.088	2.17	2.35

Note. *F* values are based on 13 cases; $df = 1, 11$. Times are in minutes. The means are the total number of minutes the teacher spoke during the 5 min coded for each group.

tion and thus were examined as a separate index, previous studies demonstrated that pressure and tension result from a controlling manipulation (Ryan, 1982; Ryan et al., 1983) and are thus theoretically concomitants of low self-determination. We were consequently interested in the extent to which the inclusion of empirically demonstrated concomitants of self-determination (i.e., pressure and tension in students and teachers, along with teachers' control and the absence of choice) would affect performance. Our first analysis, then, averaged across control and choice (weighted by their factor scores), two traditional determinants of self-determination. (Note that choice was reverse scored.) In our second analysis, we combined the four components (control, choice, children's and teachers' feelings of pressure/tension) into a new index and repeated the analysis.

The analysis regressed children's performance onto the manipulation, feedback, the choice/control index, and their interactions. Again, teacher was treated as the unit of analysis. The data provided support for the interaction hypothesis: Performance impairment was evidenced only when the pressure manipulation was coupled with high control/low choice. This interaction was marginally significant, $F(1, 5) = 5.70$, $p = .06$. (See Figure 1; note that control did not produce a main effect on performance, $F < 1$.) When we repeated the analysis by combining children's and teachers' feelings of pressure/tension with control and choice, the results were essentially equivalent to the control/choice analysis; a significant interaction occurred between the variable (control/choice/pressure) and the pressure manipulation, $F(1, 5) = 8.24$, $p < .035$. (See Figure 1.)

Although our third hypothesis anticipated that the performance impairment in the pressured, high-control condition might be exacerbated by evaluative feedback, the three-way analysis was not significant, $F(1, 5) = 2.65$. The only other effect emerging from the analysis was a marginally significant interaction between amount of feedback and the four-component index, $F(1, 5) = 4.77$, $p = .08$. Performance was lowest given high feedback and high control ($M = 3.79$), compared with the other conditions: low feedback, low control ($M = 4.22$); low feedback, high control ($M = 4.26$); and high feedback, low control ($M = 4.39$). We also examined this interaction using the two-component index. In this case, however, the analysis was no longer significant, $F(1, 5) = 2.79$.

Discussion

Our primary prediction was that when teachers were pressured to produce high student performance, and they used controlling teaching strategies, student performance would be impaired. In addition, we assessed the hypothesis that given the pressure induction in conjunction with controlling behaviors, feedback to students would impair later performance further because evaluative statements would be construed as controlling by students. Finally, we conducted the experiment in a school setting to observe the effect of controlling strategies used by real teachers on students' performance after the strategies were no longer present.

The pattern of data obtained indicated that, as predicted, the pressure induction interacted with level of controlling strategies used by teachers to affect student performance. More spe-

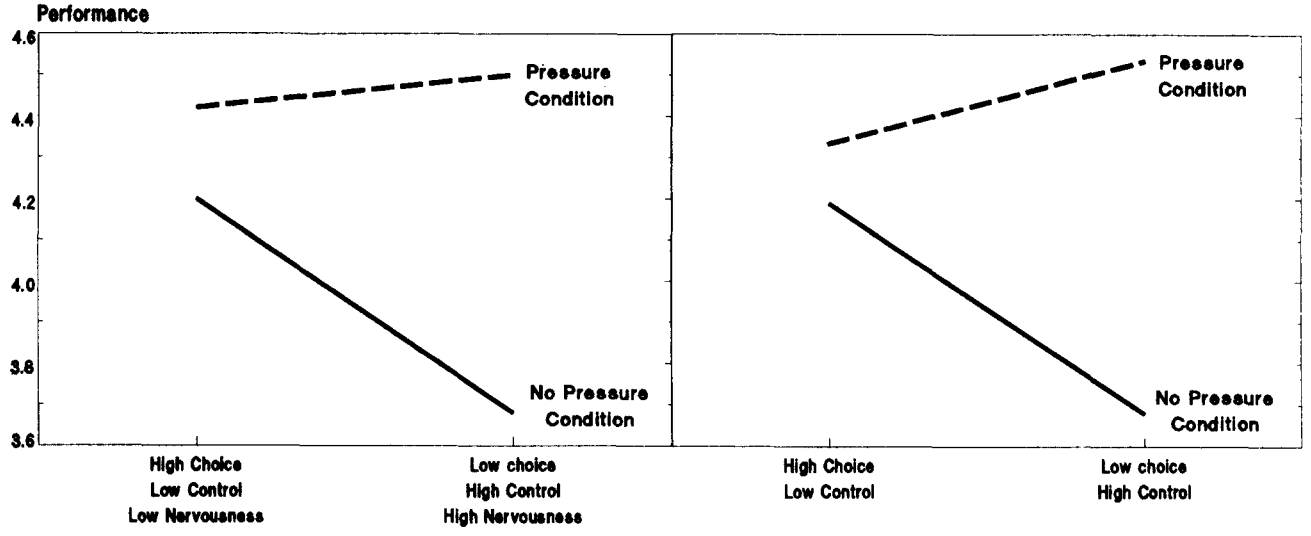

Figure 1. Panel for the interaction of the pressure manipulation and the four- and two-component indexes of control, respectively.

cifically, performance impairment was evidenced when children were taught by pressured teachers who used controlling strategies and the absence of choice options. Similarly, given the pressure manipulation, when teacher and student feelings of tension (shown in previous studies to covary with controlling behaviors) were combined with teacher behaviors (control and the absence of choice), students' performance deteriorated. We also expected high evaluative feedback to affect performance by interacting with both the pressure induction and level of use of controlling strategies. Although this three-way interaction was not significant, the pattern of means in the marginal two-way interaction between feedback and control suggested that feedback is most detrimental when provided in the context of controlling behaviors.

Although our observers rated pressured teachers as more controlling than nonpressured teachers, controlling strategies per se affected student's performance only when teachers were pressured. In fact, under conditions in which controlling strategies such as directives were used in the absence of pressure on students to perform well, students' performance showed a minor increment. These findings are consistent with the proposition that the effect of controlling strategies may depend largely on children's interpretation of the purpose of using directives, and so on. Thus, pressure on teachers that directs their goals—either to enhance performance level or to facilitate learning per se—may well influence the functional significance for children of teachers' statements and strategies, thereby affecting children's performance level.

Several findings in the intrinsic-motivation literature are consistent with this explanation for the present data. First, the effect of competence information on students' achievement behaviors has been found to be determined by whether the information is perceived as an attempt to control behaviors versus providing information about skill level (Boggiano, Harackiewicz, Bessette, & Main, 1985; Boggiano & Ruble, 1979; Deci et al., 1982; Harackiewicz, 1989; Harackiewicz, Abrahams, & Wageman, 1987; Harackiewicz & Larson, 1986; Ryan et al., 1983). In addition, students' intrinsic motivation and quality of artistic work decrease when limits and directives are presented in a controlling manner as opposed to providing information about how to perform a task (Koestner et al., 1984). Thus, praise, information about competence, limit setting, and directives can either decrease or enhance students' achievement-related behaviors such as intrinsic motivation and performance level, depending on children's interpretation of whether such statements are provided to control achievement behaviors or provide information.

The present findings also are consistent with Dweck and Leggett's (1988) hypothesis that performance goals in comparison with learning goals have dramatically different effects on children's achievement-related behaviors. Dweck and Leggett demonstrated that children's adoption of performance goals leads to deterioration of problem-solving strategies, presumably because children's feelings of self-determination are lowered. Similarly, making salient to students' their performance level also decreases their intrinsic motivation and increases feelings of tension (Grolnick & Ryan, 1987). In the present study, it seems likely that the pressure manipulation caused teachers to adopt different goals for the teaching sessions. Pressured teachers were told they should ensure the children's good performance; nonpressured teachers were told to help the children learn. Thus, pressured teachers may have adopted performance goals, but nonpressured teachers adopted learning goals. These goals may have been communicated to children in subtle ways, perhaps relayed not only in the manner in which directives were provided, but nonverbally as well.

One unexpected finding was pressured teachers' appearance of being more enthusiastic, interested, and competent. Previous findings coincide with the pattern of data obtained here. In Deci et al., 1982, the pattern of means for female, but not male, student "teachers" suggested that controlling teachers were rated as being more competent, involved, and

interested. Although it may seem paradoxical that teachers who used controlling behaviors and whose students performed poorly were evaluated as more competent, previous theoretical and empirical analyses shed some light on this intriguing issue. The belief that extrinsic incentives and other controlling teaching strategies are beneficial to learning, as suggested by researchers in the area of token economy systems (Kazdin, 1982; Kazdin & Bootzin, 1972; O'Leary & Drabman, 1971), is undoubtedly communicated to teachers, and these techniques probably are extolled by teachers as optimal techniques to motivate students to produce maximal performance. Indeed, parents subscribe to a *maximal operant* principle, so that more controlling techniques are viewed as more effective for promoting learning than less controlling ones (Barrett & Boggiano, 1988; Boggiano, Barrett, Weiher, McClelland, & Lusk, 1987). In support of this assumption, larger rewards are believed to be significantly more effective than smaller ones to enhance academic efforts and achievement (Boggiano et al., 1987) and can enhance motivation for uninteresting activities (Boggiano & Hertel, 1983). Moreover, children who adopt an extrinsic set as a function of pervasive use of controlling teaching strategies on the part of teachers are viewed as being more mastery oriented than children who adopt an intrinsic set—for example, showing greater effort following failure—in direct contrast to previous findings (Barrett & Boggiano, 1988; Boggiano & Barrett, 1985). Thus, it may not be particularly surprising to find that the layperson highly regards and evaluates teachers who push students to learn, as opposed to teachers who promote autonomy by using a more Socratic method. Put another way, the layperson's assessment of competent teachers may be misguided because of the current pervasive belief that pressuring students to achieve enhances students' motivation and learning.

From an applied perspective, this tendency for controlling teachers to receive high ratings has important implications. Even though controlling strategies produce performance decrement, administrators and parents may highly evaluate teachers using such techniques because teachers' pushing students may give the appearance of optimal teaching. Such positive evaluation would then reinforce pressuring students to perform maximally by using controlling strategies. This reasoning may explain why some teachers continue to use pressure and controlling strategies, despite evidence that these techniques are not conducive to children's learning.

Although we anticipated that children taught by pressured teachers would like the performance tasks less than children taught by nonpressured teachers, thereby reflecting lowered intrinsic motivation, this was not the case. However, Quattrone (1985) argues that children's attitudinal assessments are less congruent with activities than are adults' assessments. A different operationalization of intrinsic motivation from that used in the present study—for example, questions assessing children's interest, fun, or enjoyment of the activity—may have yielded different results. In addition, the small number of children completing this measure may have impaired our ability to detect differences. Future research is clearly needed to assess intrinsic motivation as a process affecting task performance.

Although the data provide evidence supporting assumptions related to self-determination theory, several questions deserve further attention. Given the current "back to basics" trend in education, the effects of chronically exposing teachers to administrative pressure demanding improved standardized test scores merit further research efforts. In addition, the very interesting finding that pressured teachers appeared more enthusiastic, interested, and competent suggests a second line of research: Perceptions of teachers may vary greatly as well as the extent to which particular instructional styles are viewed as promoting learning. We are currently pursuing this notion. It also seems important to construct a taxonomy of teaching behaviors in which the effects (and in what contexts these effects occur) are clearly understood.

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