

Control and Information in the Intrapersonal Sphere: An Extension of Cognitive Evaluation Theory

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Previous studies have supported cognitive evaluation theory (Deci & Ryan, 1980) by demonstrating that *controlling* rewards and communications tend to undermine intrinsic motivation relative to *informational* rewards and communications. The present study extended these findings to intrapersonal processes by exploring the effects of informational versus controlling feedback, when self-selected and administered versus other administered, and in conditions of task-involvement (intended to create an informational orientation in relation to the activity) versus ego-involvement (intended to create a controlling orientation in relation to the activity). Results confirmed that controlling feedback, whether self-administered or other administered, undermined intrinsic motivation relative to informational feedback. Further, ego-involvement undermined intrinsic motivation relative to task-involvement. These results are discussed in terms of the application of cognitive evaluation theory to intrapersonal processes and self-control theories.

Recent research has suggested that the use of salient extrinsic rewards to strengthen or elicit a behavior may have unintended, deleterious effects on intrinsic motivation for that behavior (Deci & Ryan, 1980). Several studies have shown that subjects who engaged in activities in order to obtain tangible rewards such as money (Deci, 1971, 1972), good player awards (Lepper, Greene, & Nisbett, 1973), food (Ross, 1975), toys (Lepper & Greene, 1975), and prizes (Harcakiewicz, 1979), or to avoid punishments (Deci & Cascio, Note 1) subsequently displayed less intrinsic motivation and interest in the task than control subjects who did not receive rewards or threats of punishment. Other extrinsic factors such as surveillance (Lepper & Greene, 1975; Pittman, Davey, Alafat, Wetherill, & Kramer, 1980), dead-

lines (Amabile, DeJong, & Lepper, 1976), evaluation (Smith, 1974), and explicit competition (Deci, Betley, Kahle, Abrams, & Porac, 1981) have also been shown to decrease intrinsic motivation. On the other hand, the absence of salient external constraints and the presence of choice have been shown to increase intrinsic motivation (e.g., Swann & Pittman, 1978; Zuckerman, Porac, Lathin, Smith, & Deci, 1978).

These various results can be interpreted in terms of cognitive evaluation theory (Deci, 1975; Deci & Ryan, 1980). The theory suggests that the presence of a salient external reward or constraint can induce a change in the perceived locus of causality from internal to external, resulting in decreased intrinsic motivation, whereas the absence of a salient reward or constraint and the presence of choice can induce a change in the perceived locus of causality from external to internal resulting in increased intrinsic motivation (Deci & Ryan, in press).

The theory also points to a second process through which intrinsic motivation can be affected: a change in perceived competence. If an environmental event enhances people's perceptions of competence, their intrinsic motivation will increase (Arnold, 1976; Blanck, Reis, & Jackson, in press; Deci, 1971); if it diminishes their perceptions of competence, their intrinsic motivation will

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decrease (Deci, Cascio, & Krusell, Note 2). This means that an environmental event can decrease intrinsic motivation by making the perceived locus of causality more external or by deflating one's perceptions of competence and, conversely, an event can increase intrinsic motivation by making the perceived locus of causality more internal or by bolstering one's perceptions of competence.

According to cognitive evaluation theory, all external events can be viewed as having two functional aspects: a *controlling* aspect and an *informational* or feedback aspect. An environmental event that is perceived as controlling is one that is interpreted by the recipient as pressure to attain a particular behavioral outcome; in other words, one that is interpreted as attempting to induce or coerce the recipient into acting in a specific manner. When this aspect is salient it facilitates the perception of an external locus of causality for behavior and tends to undermine intrinsic motivation. When the event is not seen as controlling, it provides the opportunity for intrinsic motivation to be maintained or enhanced. An environmental event that is perceived as informational is one that provides people with behaviorally relevant information in the absence of pressure for a particular outcome. A salient informational event increases intrinsic motivation if it signifies competence and decreases intrinsic motivation if it signifies incompetence. It is important to note that the informational aspect will have an impact on intrinsic motivation *only* in situations in which the controlling aspect is relatively nonsalient (Fisher, 1978).

The importance of the information-control distinction for determining the motivational impact of environmental events has been demonstrated by several studies. Enzle and Ross (1978) made tangible rewards either task contingent (given simply for doing the task) or criterion contingent (awarded only upon attainment of an ostensible level of skilled performance). Results indicated that task-contingent (controlling) rewards decreased intrinsic interest in the task relative to criterion-contingent (informational) rewards. Similar results were also obtained by Rosenfeld, Folger, and Adelman (1980). These findings underscore the importance of

understanding the functional significance of the reward for the recipient.

The information-control distinction is often interpreted in terms of whether the rewards are made contingent upon a specified level of performance (Karniol & Ross, 1977; Lepper & Greene, 1978); however, the two concepts are not the same, for performance-contingent rewards have been shown both to increase (Enzle & Ross, 1978) and to decrease (Harackiewicz, 1979) intrinsic motivation. Performance-contingent rewards can be interpreted as either informational or controlling depending on the situation (Ryan, Mims, & Koestner, Note 3). Although it does not deal with performance-contingent rewards, the present study attempts to specify factors that cause rewards or communications to be interpreted as either informational or controlling and hence to either increase or decrease intrinsic motivation.

Performance Feedback

Several studies have investigated the effects of positive performance feedback on intrinsic motivation. Verbal rewards (positive feedback), like performance-contingent rewards, have been shown both to decrease (Smith, 1974) and to increase (Blanck, Reis, & Jackson, in press) intrinsic motivation. I suggest that positive feedback can be seen as *either* informational or controlling, again depending on other factors, and that this will determine whether the feedback increases or decreases intrinsic motivation. Stated generally and in common terminology, the more we interpret what someone says as pressure to achieve a particular outcome (e.g., because we are being evaluated) the less likely we are to be intrinsically motivated to perform that activity. On the other hand, verbalizations that do not imply pressure to attain particular outcomes and that convey positive effectance information are likely to enhance interest in the activity.

Pittman et al. (1980) used informational and controlling feedback and provided evidence in support of these predictions. In their study, subjects were given positive verbal feedback after 6 and 15 minutes of target activity. In the informational-feedback con-

dition, after 6 minutes they were told, "compared to most of my subjects, you're doing really well." After 15 minutes they were told, "you did really well." In the controlling-feedback condition subjects were told after 6 minutes, "I haven't been able to use most of the data I've gotten so far, but you're doing really well, and if you keep it up I'll be able to use yours." At 15 minutes they were told, "you did really well; I'll be able to use your data." Here, the feedback in the controlling condition specifies the experimenter's investment in a specific behavioral outcome by the subject, fitting with our previous definition of control. As predicted, during a subsequent free-choice period subjects given the controlling communication showed significantly less task engagement than subjects given the informational communication.

In the present study, moderately positive feedback was also given to subjects in a controlling versus informational (noncontrolling) fashion, though here the nature of the control was different. Feedback was made controlling by invoking the concept of *should*. Controlling feedback always related subjects' performance to what they should be doing; for example, "Good, you're doing as you should." It was predicted that the controlling feedback would lead to a lower level of intrinsic motivation than the informational feedback that did not involve the concept of *should*.

Self-Administered Feedback

In the previous research on intrinsic motivation, attention has been focused on the effects of factors such as feedback that were provided "interpersonally" (e.g., by an experimenter, a teacher, or a confederate). In the same way that interpersonally administered feedback can be interpreted as either informational or controlling, I suggest that self-administered feedback can also be either informational or controlling. Here again, the feedback is thought to be controlling in so far as it implies pressure to attain a specified outcome; a typical example of this is self-administered feedback that involves ideas of what the person should do. For example, a self-statement like, "Good, I'm doing as I

should," would be considered relatively controlling, for the *should* implies investment in a particular outcome and therefore connotes control rather than choice.

Although previous research has indicated that other-administered controlling feedback undermines intrinsic motivation relative to other-administered informational feedback (Pittman et al., 1980), no study has been reported contrasting the effects of self-administered controlling feedback with self-administered informational feedback. This was explored in the present study through a procedure in which subjects were asked to self-select and self-administer controlling versus informational feedback using printed forms provided by the experimenter.

It was hypothesized that evaluative controlling feedback, whether self-administered or other administered, would decrease intrinsic motivation relative to the informational feedback, though it was further hypothesized that the administration of either type of feedback by another would tend to promote an external perceived locus of causality, thereby lowering the intrinsic motivation of other-administered subjects relative to self-administered subjects.

Intrapersonal Feedback

In the self-administered feedback discussed previously, the self-administration of feedback involved the use of feedback procedures that had been provided by the experimenter. One could imagine taking this one step further by attempting to create circumstances within which a person would self-administer informational versus controlling feedback wholly intrapersonally, without any materials or suggestions provided by another. It is suggested that people sometimes use internally controlling versus internally informational feedback and that these different types of messages can have a differential effect on their intrinsic motivation in relation to the activity.

To illustrate, consider the following. A person with overeating problems could use either internally controlling or internally informational methods for altering his or her eating patterns. An internally controlling style might entail applying verbal (and

emotional) self-rewards and/or self-punishments contingent upon specified levels of food abstinence. For example, the person might say to him- or herself, "I ate only what I should, I'm a good person," after appropriate abstinence and "I ate too much, I've been bad again," after failures to abstain. In contrast, an internally-informational style would involve an interested though nonpressured monitoring of progress. Evaluative statements to reward or punish oneself would not be used, for the "rewards" of this approach would simply be the feelings of self-determination and competence that follow appropriate abstinence, just as is the case with other intrinsically motivated activities. With the informational approach, failures do not bring self-evaluation and self-derogation, they provide useful information. Although both the informational and controlling approaches might effect behavior change, a motivational analysis would suggest that the controlling approach, which is dependent on continued self-coercion and seduction, is less likely to produce persistent abstinence when the controlling statements stop.

The idea that persons can reward or punish themselves internally as a way of controlling their own behavior has long been recognized within psychoanalytic theory. The superego often functions to control behavior by rewarding and punishing the person with internal praise and criticism (Freud, 1960; Schafer, 1968). These internal controlling communications have been distinguished from internal informational communications in which the ego (as opposed to the critical component of the superego) assesses one's performance and provides effectiveness feedback (White, 1959). The current hypothesis suggests that the kind of feedback provided through one's critical superego would have a deleterious effect on one's intrinsic motivation relative to the effects of feedback from one's ego.

Theorizing in a quite different vein, deCharms (1968) made a point similar to that made by psychoanalytic theorists. He suggested that conditions of "ego-involvement," like those used in many early studies (see Iverson & Reuder, 1956; Sherif & Cantil, 1947), create a type of internal but extrinsic motivational set. Studies using ego-

involving inductions typically create conditions in which failure to obtain specific behavioral outcomes represents a significant threat to self-esteem. Thus, ego-involving inductions (which, incidentally, are more related to the superego than the ego of psychoanalytic theory) seem to create an investment in behavioral outcomes and would therefore be considered controlling. The self-debasement following failure and the self-aggrandizement following success are internal, but quite extrinsic, consequences of performance and may be accompanied by tension and pressure (Frank, 1941).

deCharms (1968) contrasted ego-involvement with task-involvement, in which the motivation for a high level of involvement in the activity stems from its intrinsic properties rather than extrinsic (albeit internal), self-esteem-based pressure for particular outcomes. Factors that create task-involvement include task interest, challenge, and novelty. Thus, deCharms associated task-involvement with intrinsic or "origin" motivation and ego-involvement with extrinsic or "pawn" motivation, even though the evaluations and communications are all internal to the actor.

In this investigation, an ego-involving induction was used to create an internally controlling motivational orientation, and a task-involving induction was used to create an internally-informational (i.e., a noncontrolling) motivational orientation. It was predicted that task-involved subjects should display a higher level of intrinsic motivation for the target activity in a subsequent free-choice period than ego-involved subjects. In contrast, ego-involved subjects were expected to remain motivated while their esteem was "on the line" but to display significantly less intrinsic motivation during the subsequent free-choice period.

Overview

Informational and controlling feedback were explored in the present study through interpersonal feedback, self-administered feedback, and intrapersonal feedback. In each case, the feedback was made controlling by in some way, referring to or implying how subjects *should* be doing to live up to

expectations or to maintain self-esteem. The overall design of the study was a $2 \times 2 \times 2$ factorial in which task-involvement versus ego-involvement was crossed with informational evaluations versus controlling evaluations, and these four cells were crossed with self-administration versus other administration. It was predicted that controlling feedback would decrease intrinsic motivation relative to informational feedback, whether self-administered or other administered, and that ego-involvement (intrapersonal control) would decrease intrinsic motivation relative to task-involvement (intrapersonal information). Finally, it was predicted that other-administered feedback would lead to less intrinsic motivation than self-administered feedback.

Method

Subjects in this study worked on an interesting hidden figures task. First, they received either an ego- or task-involving induction. Then, they were given a series of three puzzle problems and received some type of feedback after each one. Half the subjects received informational feedback and half received controlling feedback. Crossed with the type of feedback was the administration variable, so half the subjects receiving each type of feedback self-administered it and half had it administered by the experimenter. Following this puzzle solving and feedback period, subjects were left alone in the experimental room for a period of 6 minutes with three remaining puzzles as well as some recent magazines. During this period they were surreptitiously observed to determine what amount of this free-choice time they spent working on the additional puzzles. Finally, subjects were asked to complete a questionnaire assessing their interest and attitudes toward the target activity.

Subjects

Subjects in this study were 128 introductory psychology students who participated in partial fulfillment of the course requirements. Equal numbers of each sex were randomly assigned to the conditions of the $2 \times 2 \times 2$ factorial design.

Procedure

Upon reporting to the experiment, subjects were seated at a table on which a file folder containing a hidden figure puzzle and a box containing an object assembly puzzle were placed. The experimenter then went to the next room from which he observed subjects through a one-way window and communicated via an intercom. Subjects were given each sample puzzle to work on for 2 minutes, and following completion of both they were asked to rate their familiarity with the puzzle

types and their interest in and enjoyment of each. The purpose of this was to obtain a measure of their initial interest in the hidden figures task. The puzzles were then removed and subjects were told that they would be working on hidden figure puzzles for the rest of the experiment.

The puzzles were cartoon style drawings by Al Hirschfeld in which the name *Nina* was embedded several times. These puzzles were used in a previous study and were shown to have a high level of intrinsic interest (Harackiewicz, 1979).

Involvement induction. Half the subjects were assigned to ego-involvement and half to task-involvement. Ego-involvement was created by leading subjects to believe that performance on the target activity was a reflection of "creative intelligence." These subjects were told that hidden figure tasks involve the ability to break down and reorganize a perceptual field. This ability requires a flexibility of cognitive capacities that has been shown in previous studies to be highly associated with creative intelligence; in fact, it was said, such puzzles are even used as one component of many IQ tests. Task-involvement was created simply by drawing subjects' attention to the activity without mentioning its relation to creative intelligence. The description of the activity was the same length as the ego-involving description, but it addressed the background of the task rather than the ego-involving properties of the task.

Feedback induction. Subjects in the informational-feedback condition got feedback that simply compared their performance (i.e., the number of hidden Ninas that they found) on each of the three puzzles with what was said to be the average performance and what was said to be the maximum performance. The actual averages had been obtained from administration of the puzzles to a large undergraduate class in motivation; however, the printed averages were adjusted so that subjects would have a variety of feedback experiences. The pilot administration indicated that the variability in performance was very low, so by adjusting one printed average to be well below the actual average, one to be somewhat above the actual average, and one to be somewhat below the actual average, there was a strong tendency for subjects to get one piece of quite positive feedback, one piece of slightly negative feedback, and one piece of slightly positive feedback. Thus, subjects got varied feedback that was moderately biased in the "success" direction. This was done so that failure feedback would not be a salient element in the subjects' experiences. The number of Ninas that was said to represent the actual number in the puzzle and thus represented maximum performance was set slightly higher than the actual number in the puzzle. This was done so that subjects would not believe that they performed perfectly, though, as mentioned previously, they did tend to perform somewhat above average.

Subjects in the controlling-feedback condition got the same feedback as the informational-feedback subjects; however, they also got an evaluative statement following each puzzle. The five evaluative statements were the following: "Excellent. You (I) should keep up the good work." "Good. You're (I'm) doing as you (I) should." "Fair. You're (I'm) performing just adequately." "Poor. You (I) should do better." and "Very poor. You (I) should try much harder." These controlling evaluative

statements, whether self-administered or other administered, were intended to create a pressure toward specific outcomes.

Administration induction. The final independent variable was self-administration versus other administration. Subjects in the informational-feedback conditions either obtained the feedback from printed norms available with the puzzles (self-administered) or had it provided to them verbally by the experimenter (other administered). Subjects in the controlling-feedback conditions did the same. In addition, however, the self-administered controlling-feedback subjects selected the one evaluative statement of the five available that they thought best applied to their performance and then read it to themselves, whereas the other-administered controlling-feedback subjects were told one of the five evaluative statements by the experimenter; they had no opportunity for selection. Subjects in the other-administered conditions were yoked to subjects in self-administered conditions so that the evaluation was constant across groups. The yoking also took account of sex, so that males were yoked to males and females to females. Because of the adjusted averages, the controlling feedback tended to range from slightly negative to highly positive, with a moderately positive average.

Subjects in the self-administered informational feedback condition (whether task or ego involved) were provided with 12 file folders (numbered 1 to 6 and 1A to 6A). Six of the folders contained the Nina puzzles, the first three of which were used in the puzzle-solving period and the remaining three of which were left for the free-choice period. The other six folders contained six norm sheets, only three of which were used, corresponding to the three puzzles that were used. To ensure that subjects would compare their performance to the stated averages and maximums, they checked the number of Ninas they had found in the appropriate spaces on the norm sheet.

Subjects in the self-administered controlling-feedback groups (whether task or ego involved) engaged in a procedure identical to that used for the self-administered informational-feedback group. In addition, however, a second printed sheet containing a list of the five self-evaluative statements was placed in the feedback folders (labeled 1A to 6A) beneath the informational sheet. After they completed the informational sheet, these subjects were asked to read over these statements and to select the statement they felt was the most appropriate evaluation of their performance. They placed a check in the space next to the selected statement and were then asked to read it over to themselves a couple of times.

Subjects in the other-administered informational-feedback conditions were told by the experimenter how their performance compared to the average and the maximum scores. This information, read to them by the experimenter, was the same information the self-administered informational-feedback subjects saw on the norm sheet. The other-administered informational-feedback subjects had only the six folders with the puzzles on their table, since the feedback information was other administered.

Each subject in the other-administered controlling-feedback condition was "yoked" to the previous same-sex subject in the self-administered controlling-feedback

group. The experimenter read the same information about the puzzle over the intercom and, in addition, made an evaluative statement about the subject's performance that was identical to the one chosen by the yoked self-administered subject on that puzzle. Thus the feedback received was balanced across the self- versus other-administered conditions.

Puzzle-solving period. The $2 \times 2 \times 2$ factorial design resulted in eight separate conditions representing all combinations of the above groups. In all conditions subjects were given 3 minutes to work on each puzzle, during which time they circled with a red marker each embedded Nina that they found. Following each 3-minute task was a feedback period, in which the subjects counted the number of Ninas found and then either gave feedback to themselves or received it from the experimenter, depending on the condition.

Dependent measures. After the completion of three puzzles, subjects were told that there would be no more puzzle solving required of them. The experimenter then stated that he needed a few minutes to compile the data and obtain some questionnaires, so he took the three puzzles they had worked on (and all the feedback sheets from self-administered subjects). The three unused puzzles were left in the room with the subject. Curtains were closed tightly over the one-way window and the subject was then left alone for 6 minutes. Two recent popular magazines were also available in the room. Subjects were observed unobtrusively through a slight opening in a different curtain by a second experimenter who was blind to experimental treatments and hypothesis. The amount of time spent working on the puzzles during this 6-minute free-choice period was recorded. The number of seconds spent by the subjects working on the puzzles during this free-choice period provided the behavioral measure of intrinsic motivation, as in most prior intrinsic motivation studies.

Following the 6-minute free-choice period, the experimenter entered the subject's room with the postexperimental attitude questionnaire. Subjects were asked to rate their interest and enjoyment of the puzzles on scales of 1 to 7. They were also asked to rate their assessment of the levels of tension and pressure experienced, their degree of effort, and the extent to which they felt the task was important and worthwhile, also on 1-7 scales. Several other puzzle-related questions were asked to maintain the cover story.

Following completion of the questionnaire, subjects were asked to give their perceptions of the experiment and then were debriefed.

Results

Initial Interest Measure

In order to determine whether subjects would find the Nina puzzles intrinsically motivating, a comparison was made between the mean interest and enjoyment ratings on the two sample puzzles. The measure was created by adding subjects' ratings on two 7-point scales of puzzle interest and enjoyment. The mean for the Nina puzzle of 10.03

Table 1
Cell Means and Standard Deviations for the
Intrinsic Motivation Free-Choice Measure
(in Seconds) for the Eight Experimental
Conditions (Maximum Value = 360)

Involvement	Self-administered feedback		Other-administered feedback	
	Informa- tional	Control- ling	Informa- tional	Control- ling
Task				
<i>M</i>	305.1	158.0	269.5	125.4
<i>SD</i>	100.1	150.9	116.4	153.0
Ego				
<i>M</i>	139.5	146.9	196.8	107.5
<i>SD</i>	138.4	149.0	142.1	134.9

was significantly higher than that of 9.01 for the object assembly puzzle, $F(1, 27) = 19.33$, $p < .001$, and well above the midpoint of 8.0. This finding is consistent with the previous report of Harackiewicz (1979), who found Nina puzzles to be an intrinsically motivating activity for her high school population.

Furthermore, an analysis was performed to check for group differences in initial intrinsic motivation for the Nina puzzle activity using this interest-enjoyment rating. The analysis of variance performed on this pretest measure showed no significant differences among groups.

Treatment Effects on Intrinsic Motivation

The significance of treatment effects on the dependent measure of intrinsic motivation was tested in a $2 \times 2 \times 2$ factorial design. However, a $2 \times 2 \times 2 \times 2$ analysis of variance (Treatments \times Sex) was initially performed to check for possible treatment interactions with sex of subject. This analysis resulted in a nonsignificant but marginal main effect for sex of subject, $F(1, 112) = 3.26$, $p < .08$. This marginal effect reflected that, overall, males spent more free-choice time working with the puzzles ($M = 203.0$ seconds) than did females ($M = 159.2$ seconds). However, subjects' sex did not interact in any way with the treatments, so all subsequent analyses were collapsed across sex.

The primary analysis was a three-way

analysis of variance (Involvement \times Administration \times Feedback) on the free-choice measure of intrinsic motivation. It was hypothesized that both involvement and feedback treatments would result in significant main effects, and it was suggested that a main effect might also emerge for administration. The cell means for the free-choice measure in the eight conditions are reported in Table 1, and the marginals are presented separately in Table 2 to make the differences more readily apparent. The source table for the analysis of variance appears as Table 3. Type of feedback resulted in a highly significant difference in intrinsic motivation, $F(1, 120) = 14.90$, $p < .002$. Intrinsic motivation was significantly less for subjects who received controlling feedback than for subjects who received informational feedback, regardless of whether the feedback was self-selected and self-administered or administered by the experimenter. Similarly, the main effect for type of involvement (ego versus task) also achieved significance, $F(1, 120) = 7.64$, $p < .007$. This predicted effect reflects the fact that subjects in the ego-involvement treatment were significantly less intrinsically motivated than subjects in the task-involvement treatment. The third possible main effect for self-administration versus other administration was nonsignificant, $F(1, 120) < 1$.

There was only one significant interaction among the three independent variables. Type of feedback interacted significantly with involvement, $F(1, 120) = 4.692$, $p < .04$. An

Table 2
Marginal Means (Main Effects) and Standard
Deviations of the Three Independent Variables
for the Free-Choice Dependent Measure

Variable	<i>M</i>	<i>SD</i>
Involvement		
Task	214.5	149.3
Ego	147.7	141.1
Feedback		
Informational	227.7	138.4
Controlling	134.5	144.9
Administration		
Self	187.4	149.6
Other	174.8	148.7

Table 3
 Source Table for Analysis of Variance on the Intrinsic Motivation Free-Choice Measure

Source	df	SS	F	p<
Involvement (I)	1	142845.1	7.64	.007**
Administration (A)	1	5075.3	<1	ns
Feedback (F)	1	278444.5	14.90	.0002**
I × A	1	14835.0	<1	ns
I × F	1	87675.8	4.69	.04*
F × A	1	17578.1	<1	ns
I × A × F	1	19900.1	1.07	ns
Error	120	2242438.9	—	—

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

inspection of the means for this interaction (Table 4) suggests that, in addition to the main effects yielding greater intrinsic motivation for informational-feedback and task-involvement conditions, the unique combination of these two conditions results in a markedly increased level of intrinsic motivation.

Subjects in the self-administered controlling-feedback conditions selected and administered evaluations of themselves. A yoking procedure assured that the evaluations received by the other-administered controlling-feedback subjects were the same. However, it would be interesting to know whether the ego-involved subjects who self-selected controlling statements evaluated themselves differently from the task-involved subjects who self-selected controlling statements. To explore this, the five statements, which ranged from "Excellent. I should keep up the good work." to "Very poor. I should try much harder." were numbered 1 to 5 and the averages that reflected the selections of evaluations were compared. The mean for ego-involved subjects was 3.67 (just below "Good") and for task-involved subjects was 3.58. There was no difference between the two groups, $F(1, 30) < 1$.

Performance

Subjects in all conditions worked on three puzzles and circled the Ninas they found in each. The average number they found in the three puzzles was used as their performance score. No predictions were made about performance; indeed, it was hoped that there would be no performance differences so these

would not mediate between treatments and intrinsic motivation.

A three-way analysis of variance on performance score revealed no differences at conventional significance levels; however, there was a marginally significant main effect for feedback. Subjects who received controlling feedback (from self or others) tended to perform worse ($M = 8.40$) than subjects who received informational feedback ($M = 8.67$). Given this tendency toward differences in performance, the free-choice data were reanalyzed using an analysis of covariance with performance scores as the covariate. In this analysis the same main effects and interaction emerged as in the analysis of variance, and the significance levels were not changed.

Supplemental Analyses

Postexperimental questionnaire data were also subjected to a three-way analysis of

Table 4
 Cell Means (Collapsed Across Administration) and Standard Deviations Showing the Significant Interaction for Feedback × Involvement on the Free-Choice Dependent Measure

Involvement	Feedback	
	Informational	Controlling
Task		
M	287.3	141.7
SD	108.3	150.4
Ego		
M	168.2	127.2
SD	141.0	141.2

Table 5
Marginal Means Showing Significant Main Effects and Interactions for the Effort Variable From the Postexperimental Attitude Questionnaire

Main effect or interaction	Feedback	
	Informational	Controlling
Main effect	5.77	5.30
Interaction		
Self-administered	5.53	5.59
Other administered	6.00	5.00

variance to determine whether the three independent variables had a significant impact on the subjects' postexperimental attitudes.

As expected, due to the counterbalanced feedback procedure there were no main effects or interaction for subjects' ratings of competence. Unexpected, however, was an absence of effects for subjective ratings of interest and enjoyment.

In the introduction it was suggested that ego-involvement creates a kind of internal pressure to perform well because it ties subjects' self-esteem to their performance at the activity. Congruent with this assertion, a main effect emerged from the analysis indicating that ego-involved subjects rated themselves as experiencing more tension than task-involved subjects, $F(1, 120) = 8.41, p < .005$; the mean for ego-involved subjects was 3.16, for task-involved subjects, 2.44. Additionally, ego-involved subjects seemed to experience greater pressure than task-involved subjects, although this difference did not reach significance, $F(1, 120) = 1.86, p < .18$.

An unexpected result from the postexperimental questionnaire was a significant main effect for feedback on ratings of effort expended, $F(1, 120) = 7.29, p < .008$. Controlling-feedback subjects rated themselves as trying less hard on the puzzle activity than informational-feedback subjects. The interaction of Feedback \times Administration on effort ratings was also significant, $F(1, 120) = 9.361, p < .003$ (see Table 5). This interaction indicates that the differences in effort expended in controlling- versus informational-feedback conditions occurred only

when the feedback was other administered. This difference in effort expended (less in controlling-feedback conditions, particularly if other administered) is congruent with the performance data showing that controlling-feedback subjects' performance was somewhat lower.

Discussion

The present investigation explored the effects of informational versus controlling feedback on intrinsic motivation. This was done with interpersonal feedback, self-administered feedback, and intrapersonal feedback. Control is understood in terms of pressure toward a particular outcome, and in this study control was operationalized through the use of the idea of how subjects *should* perform. In the ego-involved (versus task-involved) conditions, the pressure was assumed to come from the fact that people's self-esteem was dependent on their doing well, causing them to feel that they should do well.

Any attempt to manipulate an internal variable creates practical difficulties. To instantiate specific internal orientations, an experimenter can only create the conditions that can be expected on the basis of theory to create the desired internal states. One then hopes that these conditions are salient enough to infect the subjects' dispositions and experiences. In the present study, this was especially true for the internally controlling versus internally informational conditions that were created through the ego-versus task-involvement manipulation. For the manipulation to be effective, ego-involved subjects really had to invest some self-esteem in the outcome. Supplementary data suggest that they had indeed done so. Congruent with the psychological meaning of ego-involvement (deCharms, 1968; Frank, 1941), subjects in this condition experienced more tension and somewhat more pressure. Most important, ego-involved subjects were less intrinsically motivated for the target activity than task-involved subjects, despite the fact that both groups received equivalent competence feedback balanced toward success. Thus, the results support deCharms's (1968) notion that ego-involvement is a kind

of internal but extrinsic motivational set. Further, they support cognitive evaluation theory suggesting that ego-involvement would be an internally controlling (as opposed to internally informational) condition.

Cognitive evaluation theory was also supported by the results of the informational- versus controlling-feedback conditions. Whether feedback was self-administered or other administered, controlling evaluative feedback undermined intrinsic motivation relative to informational feedback. The data suggest that the fact of self-administration per se is not sufficient to guarantee the absence of detrimental motivational effects. That is, to facilitate intrinsic motivation, feedback needs to be noncontrolling even when it is self-administered.

In this experiment, the self-administered controlling feedback not only was administered by the subjects to themselves but was actually selected by them as being appropriate to their performance. Still, the entire procedure was imposed by the experimenter, and the materials were provided by the experimenter; for example, the statements from which the subjects selected were fixed. Thus, one might argue that this technique was somewhat unreal and therefore contributed to the undermining. Indeed, it may well have done so. Nonetheless, from a practical point of view, the use of self-control and self-evaluation procedures in applied settings is typically initiated by someone equivalent to the experimenter—a therapist, teacher, or counselor, for example. And although their procedures may be somewhat less artificial, the present study points to the importance of using such procedures in a way that will not lead subjects to perceive them as controlling.

Behavioral researchers have recently been directing their attention to self-reinforcement and self-control procedures (e.g., Kanfer, 1971). In these procedures, people evaluate their own performance and self-administer verbal (or tangible) rewards when they have performed adequately. These may involve the use of specific procedures by the therapist or teacher and thereby are comparable to the so-called self-administered conditions in this study, or they may be

wholly self-generated and thereby more comparable to the so-called internally administered conditions. Although the administration of feedback (or rewards) by oneself may be preferable in many ways to the comparable administration by another, behavioral and cognitive-behavioral theories (e.g., Bandura, 1977) have failed to distinguish between the informational and controlling nature of the procedures. The present study points to the importance of doing so, for the evidence suggests that self-administration is not enough to ensure persistence of change.

This point is underscored by inconsistent results reported from other laboratories. Dollinger and Thelen (1978) found that a self-reward procedure undermined subjects' intrinsic motivation for an activity relative to no-reward subjects and even to subjects who received other-administered rewards. They suggested that their self-reward procedure may have highlighted the extrinsic salience (i.e., the controlling aspect) of the reward. In contrast, Enzle and Look (Note 4) found evidence that self-reinforcement procedures averted the undermining effects of rewards, relative to other reinforcement conditions, presumably by facilitating perceptions of self-determination. The results of the present study may mediate these apparently discrepant findings; this study emphasizes that it is not simply the fact of self-administration but rather *how* one self-administers that determines the effects of the procedures on intrinsic motivation.

The focus of this and many previous studies has been on decreases in intrinsic motivation following various experiences with controlling rewards and communications. Past studies have tended to focus less attention on performance while the control procedures are in effect. It is interesting to note that in this study there was indication that subjects receiving controlling feedback (particularly when other administered) exerted less effort and performed worse. This tentative finding is nicely explained by reactance theory (Brehm, 1966). That theory suggests that when people feel controlled by some external agent they will react against the attempted control by deliberately doing the opposite. Thus, in this study when sub-

jects' performance was being controlled they subjectively exerted *less* effort, as evidenced by postexperimental ratings. Doing this could help them reestablish their perceived freedom.

I have interpreted the present investigation as support for the information-control distinction of cognitive evaluation theory (Deci & Ryan, 1980; Ryan & Deci, Note 5). It was derived from the theory, and the results support the predictions. Nonetheless, there are both limitations to the study and alternative interpretations that deserve to be mentioned.

The entire discussion in this article has been in terms of the relative effects of information versus control, and all results were considered in this relative sense. That fails to determine whether the informational-feedback condition increases or the controlling-feedback condition decreases intrinsic motivation or, for that matter, whether both increase or decrease intrinsic motivation, but to significantly different degrees. One can see, therefore, that a no-feedback control group would have allowed a clearer understanding of exactly where the effects occurred.

Finally, one might suggest that the controlling feedback set up evaluation apprehension in subjects, so the decreased intrinsic motivation may have been caused by this rather than the perception of causation. Indeed, this could have occurred, though I suggest that evaluation apprehension is one of the factors that accompanies people's perceptions of being controlled (i.e., external causality). This was supported in a study by Garbarino (1975) in which subjects who were rewarded took on a more negative emotional tone and became more critical. The point, of course, is that some negative affective states such as anxiety over evaluation may very well accompany people's perceptions of external causality.

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