

Setting limits on children's behavior: The differential effects of controlling vs. informational styles on intrinsic motivation and creativity

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Abstract

The imposition of external constraints on an activity has frequently been shown to undermine intrinsic motivation. Given that limits must often be set upon peoples' activities, especially in parenting and education, the present study addressed the question of whether limits can be set *without* undermining intrinsic motivation for the activity being limited. Using cognitive evaluation theory, contrasting limit setting styles of either a controlling or informational nature, or no limits, were placed upon forty-four first- and second-grade children engaged in a painting activity. The intrinsic motivation, enjoyment, creativity, and quality of artistic production were expected to be decreased by controlling limits relative to informational and no-limits, which were not expected to differ from each other. The results provided substantial support for these predictions, suggesting that limits can be set without undermining intrinsic motivation if they are informational in nature. Support was also found for the consensual assessment of creativity method recently developed by Amabile (1982a). Results of the study are discussed along with the general relation between creativity and intrinsic motivation.

Recent findings in motivational research suggest that imposing external controls or constraints on an activity can have a deleterious effect on subsequent intrinsic motivation. Beginning with Deci's (1971) demonstration that tangible rewards for doing a task can negatively affect intrinsic motivation, many other factors that have a similar impact have been identified, including symbolic rewards (Lepper, Greene, & Nisbett, 1973), verbal praise (Deci, Cascio, &

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Krusell, 1975), avoidance of punishment (Deci & Cascio, 1972), deadlines (Amabile, DeJong, & Lepper, 1976), surveillance (Lepper & Greene, 1975), and explicit competition (Deci, Betley, Kahle, Abrams, & Porac, 1981).

Although such factors can detract from intrinsic motivation for an activity, recent reviews (e.g., Deci & Ryan, in press) suggest that this undermining occurs only under specific conditions. These conditions have been specified in cognitive evaluation theory (Deci, 1975; Deci & Ryan, 1980; Ryan, 1982), which suggests that whether an event will undermine or enhance intrinsic motivation depends on the "functional significance" of the event for the recipient. The argument advanced is that external events have two functional aspects: a *controlling* aspect and an *informational* aspect. The controlling aspect is salient if the event is experienced as pressure toward a specified outcome; in other words, if the event is perceived as an inducement or coercion to act in a specific manner or to reach a particular goal. If salient, the controlling aspect facilitates an external perceived locus of causality for behavior and thereby undermines intrinsic motivation. In contrast, informational events are defined as those that provide effectance-relevant information within the context of experienced autonomy or choice. When the informational aspect of an event is salient, it facilitates an internal locus of causality for behavior and can maintain or enhance intrinsic motivation. Thus, whether a person's intrinsic motivation will be enhanced, maintained, or undermined following an external event or communication depends on the relative salience of its informational or controlling aspects.

Several investigations have explicitly examined the utility of the information/control distinction. Pittman, Davey, Alafat, Wetherill, and Kramer (1980) and Ryan (1982) have shown that informationally administered feedback leads to greater intrinsic motivation for a target activity than does controllingly administered feedback. Similarly, Ryan, Mims, and Koestner (1983) found that performance-contingent rewards delivered in a controlling interpersonal context diminished intrinsic motivation relative to comparable rewards delivered in an informational context. These studies suggest that it is not the presence of an external constraint or feedback per se, but rather the way in which it is presented and perceived that determines its effect on intrinsic motivation.

The information/control distinction has important implications for education, parenting, and other socialization processes in which the use of external constraints, feedback, or limits with regard to children's behavior is often necessary (Ryan, Chandler, Connell, & Deci,

1983). Limits would seem to be conceptually similar to other constraint conditions previously shown to be deleterious to intrinsic motivation. The information/control distinction suggests that *how* these constraints are communicated should differentially affect children's intrinsic motivation for the activity in question.

Limits are used in child training because adults often see children's desires as unfulfillable, dangerous, or incompatible with adult values or needs. Since adults wish to promote acceptable actions by children, the challenge is how to foster such action without undermining self-determination or self-esteem. Prior research on "managing" children's behavior suggests that controlling styles have a negative impact on the child's intrinsic motivation and self-esteem (Deci, Nezlek, & Sheinman, 1980). However, there has been little investigation of whether constraints can be communicated *without* interfering with intrinsic motivation, and if so, how that might be accomplished.

Although research on varied limit-setting styles with children is itself limited in quantity, there is substantial clinical literature on this topic, especially in the field of play therapy. Ginott (1959, 1961), for example, discussed techniques designed to limit and redirect unacceptable behavior while preserving a child's self-respect. His approach consists of clear-cut, direct statements of limits for action, while at the same time conveying an acceptance of the child's associated feelings (Orgel, 1983). Ginott advocates a four-step sequence which, he feels, instantiates a positive limit-setting approach: (a) acknowledge the child's feelings or wishes; (b) state the limit clearly on a specified act; (c) where possible point out alternative channels for expression of feeling; and (d) help the child express feelings of resentment which are "bound to arise" when constraints are invoked. Ginott further suggests that the statement of limits be phrased in a manner that does not constitute a challenge to the child. Thus, limits should be stated succinctly and impersonally, e.g., "Walls are not for painting," rather than "You must not paint on the walls" (Ginott, 1959).

Ginott's technique can be fruitfully employed in the study of the effects of different types of limits on children's intrinsic motivation and affect, but in the present study it was modified to suit the demands of an experimental context. First, since a child's wishes and emotional reactions to limits cannot be known in advance (steps *a* and *d*), modified statements acknowledging the child's probable reaction were employed. Secondly, since the typical Ginottian strategy of offering alternative channels for behavior (step *c*) could not

be provided without introducing problematic between-group differences, this step was dropped.

With these two necessary modifications aside, aspects of Ginott's strategy offer an opportunity to explore the impact of an informational style of setting limits on children's motivation, affect, and behavior. By minimizing threat to self-determination, and conveying acceptance and respect, modified Ginottian limits fit the definition of "informational." Controlling statements, on the other hand, can be introduced using the active voice and words suggesting interpersonal control (Ryan, 1982) to convey an external pressure and locus of causality for the behavior that is regulated by the imposed limits.

In the present study, the impact on intrinsic motivation of the two limit-setting styles (informational and controlling) was evaluated in comparison with a no-limits control group. It was predicted that subjects in the controlling limits group would exhibit a decrease in intrinsic motivation, as measured by activity in a subsequent free-choice period, relative to subjects in the no-limits group. By contrast, it was predicted that subjects in the informational limits group would not differ from the no-limits group. It was also expected that controlling subjects would evidence less enjoyment than would subjects in the other two groups.

A secondary focus of the present study was to assess the impact of the different limit-setting styles on creativity and related qualitative aspects of performance. Of specific interest, since the experimental task involved children's art-work, were the judged creativity and technical goodness of the paintings in the three experimental conditions.

Several prior studies have suggested that extrinsic constraints can decrease creativity and/or quality of artistic productions. Greene and Lepper (1974) and Lepper, Greene, and Nisbett (1973) reported that children who expected rewards produced poorer quality drawings than did those who did not expect a reward. White and Owen (1970) found that the creative performance of elementary school boys in a self-evaluation group was significantly better than was that of boys in a peer-evaluation group. Amabile (1979, 1982b) showed that both the expectation of external evaluation and competition for prizes decreased the judged creativity of collages, relative to those of subjects who were not evaluated, or who did not compete. To date, however, there has been no direct study of the relative effects of controlling vs. informational communications or limits on the quality of children's performance at an intrinsically motivating activity. This would address whether constraints on an activity can be

communicated without undermining quality or creativity in performance.

Recent interest in the relation of motivation and creativity has been stimulated by Amabile (1982a). She has developed and refined a consensual measurement technique which provides a reliable criterion for assessing creativity within an experimental context, and she has emphasized the direct relation between intrinsic motivation and creativity (Amabile, 1979, 1982a).

The information/control distinction of cognitive evaluation theory seems particularly relevant to the phenomenon of creativity. Most descriptions of creativity highlight the importance of autonomy or self-determination (Cohen & Oden, 1974). Insofar as creativity is defined as the production of unique, effective formulations to problems (Wallach & Kogan, 1965) or "appropriate originality" (Newell, Shaw, & Simon, 1962) it necessarily represents a departure from heteronomy or conformity in action, and is dependent upon the potential, both in the person and in the situation, for organized, autonomous functioning to occur (Ryan, *in press*). Thus, the relative salience of controlling vs. informational aspects of a task situation ought to be a primary influence on the creativity of an individual's performance. Controlling conditions would, by this conceptualization, undermine autonomy and lead to less spontaneity and originality, and to more constriction. In sum, we hypothesize that controlling limits will result in a less expressive and creative product than will no-limits, but that the products of informational limits and no-limits will not differ.

In the present study, Amabile's consensual system was used as the criterion definition of creativity. In addition, two "objective" measures (the number of colors employed and the number of elaborations included in the children's paintings) were assessed. The rationale for selection of the number of colors as a dependent measure was based upon the suggestion derived from projective techniques that use of color reflects aspects of emotional expressiveness (Holtman, Thorpe, Swartz, & Herron, 1961; Klopfer, Ainsworth, Klopfer, & Holt, 1954). In this case, we hypothesized that color would index a dimension from constriction to expressiveness, with less color representing more constriction. Elsewhere it has been argued that controlling conditions can contribute to constriction (Deci & Ryan, *in press*). In addition, we hypothesized that the use of color would be highly correlated with rated creativity since both reflect expressiveness. The measure of elaborations was intended to reflect spontaneity, since such elaborations reflect the subjects' independent and spontaneous additions to the task. Elaborations were also pre-

dicted to be lower under controlling limits compared to informational or no-limit conditions.

Method

Overview

In this study six- and seven-year-old children were asked to engage in an intrinsically interesting painting activity under limit-setting conditions that varied in accord with the information/control distinction. The limits pertained to neatness at the task. A controlling limits group, which received verbal limits that were stated in terms of shoulds and musts, was contrasted with both a no-limits group and an informational-limits group. The informational group received a verbal communication conveying the same behavioral constraints in the absence of expressed external pressure and with an acknowledgment of possible contrary feelings about the imposition of limits.

Following the period in which the children did their paintings, they were left alone for a "free-choice" period. The amount of time they spent painting during this period was used as a measure of intrinsic motivation. Subsequently, the children were asked to rate how much they enjoyed the painting activity. Finally, the quality of their initial paintings was assessed using Amabile's consensual assessment procedure and the two additional "objective" measures.

Subjects

Subjects were 20 first-graders (11 boys and 9 girls) and 24 second-graders (13 boys and 11 girls) from a suburban Rochester public school. Their participation in the study was approved by school officials and the children's parents. Subjects were randomly assigned to one of three experimental conditions, with assignment balanced for sex of subject. One subject was withdrawn from the analysis because of failure to obtain parental permission.

Procedure

One of two male experimenters picked up the subject at the classroom and accompanied him/her to the experimental room. The child was seated at a table on which there was a paint brush, some watercolor paints, two sheets of drawing paper (a small white sheet centered on a much larger yellow sheet), and several strips of paper towel. After a brief orientation period the experimenter said:

I'm interested in how children paint things. So I'd like it if you would paint a picture. What I'd like is for you to paint a house that you would like to live in. You can make any kind of house you want and you can put anything at all in the picture. You might want to give your house a

yard, with trees and animals, for example. It can be as make-believe as you want it to be.

Children in the *informational-limits* group received the following instructions:

Before you begin, I want to tell you some things about the way painting is done here. I know that sometimes it's really fun to just slop the paint around, but here the materials and room need to be kept nice for the other children who will use them. The smaller sheet is for you to paint on, the larger sheet is a border to be kept clean. Also, the paints need to be kept clean, so the brush is to be washed and wiped in the paper towel before switching colors. I know that some kids don't like to be neat all the time, but now is a time for being neat.

Subjects in the *controlling-limits* group received the following instructions:

Before you begin, I want to tell you some things that you will have to do. They are rules that we have about painting. You have to keep the paints clean. You can paint only on this small sheet of paper, so don't spill any paint on the big sheet. And you must wash out your brush and wipe it with a paper towel before you switch to a new color of paint, so that you don't get the colors all mixed up. In general, I want you to be a good boy (girl) and don't make a mess with the paints.

The no-limits subjects received no limit-setting instructions. All subjects were told they would have 10 minutes to paint, and were asked after 8 minutes to finish up soon.

Intrinsic Motivation Measures

After 10 minutes, the experimenter asked subjects to finish. He then explained that he had to take the painting to another room and would return in a few minutes. He placed two other sheets of paper on the table and said: "You can paint some more on this piece of paper, if you like, or if you want you can play with the puzzles over on that table." The experimenter then left the room and closed the door. An assistant, blind to experimental condition, observed the subject surreptitiously for 8 minutes and timed how long the subject painted. The number of seconds of free-choice time spent painting was the behavioral measure of intrinsic motivation (maximum = 480). After the 8-minute free-choice period, the experimenter returned and asked the subject to indicate how much he/she enjoyed the painting activity, by pointing to one of six faces drawn on a piece of paper, ranging in expression from very sad to very happy. This 6-point ordinal scale represents a self-report measure of enjoyment rather than intrinsic motivation. Izard (1977) has, for example, argued that enjoyment is a secondary emotion in intrinsically motivated activity, and that interest-excitement are the key

affects. Following the enjoyment rating, subjects were thanked for their participation and escorted back to their classroom.

Painting Measures

Paintings done during the performance period were rated on 13 artistic dimensions, following procedures outlined by Amabile (1982a). These ratings were done by two types of judges who varied in artistic experience. Fifty introductory psychology students served as the first group of judges in partial fulfillment of course requirements. None of these judges had prior training or extensive experience as artists. Working in groups of five, each judge rated nine paintings independently of the others, and judges were instructed not to talk during the rating session. Amabile's procedure usually has each rater rate all productions; however, this was not done for our inexperienced rater group because of fatigue and time-constraint factors. Different random orderings of the paintings were used for each group of judges; however, each set of nine paintings included three each from subjects in the no-limits, informational, and controlling conditions. Thus each painting was rated by 10 different judges. Before each session started, an experimenter summarized the subjects' task instructions *without* mentioning the limit-setting inductions. These "inexperienced" judges were asked to examine all nine paintings before beginning ratings and were shown a sample of the 9-point rating scale to be used for each of 13 dimensions that constituted Amabile's (1982a) creativity and technical goodness factors: (a) expression of meaning, (b) detail, (c) creativity, (d) novel use of paints, (e) novel idea, (f) effort evident, (g) complexity, (h) technical goodness, (i) organization, (j) neatness, (k) planning, (l) symmetry, and (m) expression of meaning. A different random ordering of the 13 dimensions was used for each of the 50 judges. Reliability was calculated for each set of 10 raters on all 44 paintings using Cronbach's alpha procedure. The median reliability for each of the 13 dimensions was .86, (mean = .83), with a range of .69 to .90. These ratings were subsequently subjected to a principle components factor analysis with varimax rotation, based on the sets of ratings. It revealed two distinct factors: a *creativity* factor (eigenvalue = 3.4) consisting of judgements on creativity, novel use of colors, novel idea, variation in shapes, complexity, detail, and effort; and a *technical goodness* factor (eigenvalue = 8.1), composed of judgements on technical goodness, expression of meaning, organization, neatness, symmetry, and planning. A factor loading of .70 was used as the criterion for including an item in one of these factors. This factor structure concurs with that found by Amabile (1982a) in her analysis, and lends support to her consensual assessment model. The dependent measures of creativity and technical goodness were obtained by averaging the ratings of all items that loaded on these two factors, and the total quality index consisted of the sum of the factors.

A second group of "experienced" judges was formed by recruiting student subjects who reported one or more years of experience in studio art courses or other formal art training. These judges ($N = 7$) volunteered to rate all

forty-four children's paintings over a longer experimental session using a procedure that was in other respects identical to that used by the inexperienced judges. The median reliability for this smaller group of judges on the thirteen dimensions was .83 (mean = .82) with a range from .72 to .92. Thus, the reliability for "experienced" judges was comparable to that for inexperienced judges, again concurring with the findings of Amabile.

A separate factor analysis was performed on the "experienced" ratings and revealed two similar factors, one for creativity and one for technical goodness. However, this procedure revealed slight factor differences between experienced and inexperienced ratings. Briefly, the dimension of "expression of meaning," which loaded on the technical goodness factor for nonartists, was loaded on the creativity factor for artists. Additionally, the dimension of "symmetry" did not meet the criterion for inclusion on either factor for artists. Thus, artists may not see symmetry as a criterion of creativity in such paintings. Finally, it should be noted that for artists the creativity factor (eigenvalue = 7.0) captured more variance than did technical goodness (eigenvalue = 4.2), a reversal of the trend for nonartists. In sum, while both rater groups demonstrated adequate reliability on the 13 dimensions, there is some evidence that the meaning and weight given to these dimensions may differ somewhat for artists and nonartists.

Results

Differences between groups were assessed using a 3×2 (Condition \times Sex) ANOVA procedure for the following dependent variables: free-choice time (intrinsic motivation); self-report of enjoyment; the quality of performance ratings, which included creativity, technical goodness, and a total quality score; and objective ratings of the number of elaborations and colors. Cell means and standard deviations for the limit setting conditions are reported in Table 1.

Free Choice

The analysis of variance of the free choice data revealed a main effect for sex of subject, $F(1,38) = 16.43, p < .001$. This effect reflects the fact that, overall, females spent far more free-choice time painting than did males (Female $M = 302.4$ s vs. Male $M = 102.5$ s). Sex did not, however, interact with limit-setting conditions.

A main effect was also obtained for condition, $F(2,38) = 3.49, p < .05$. This effect supports the main experimental prediction, in that subjects in the no-limits and informational limits conditions spent more free-choice time painting than did controlling limits subjects. The planned contrast between conditions revealed no difference between no-limits and informational conditions $F(1,38) < 1, ns$ and a marginal difference between no-limits and controlling limits $F(1,38) = 3.12, p < .09$. Intrinsic motivation was significantly greater

Table 1. Cell means and standard deviations for the three limit-setting conditions on the seven dependent measures.

	No Limits	Informational	Controlling
Free choice	219.6 (204.5)	257.1 (212.6)	107.7 (166.0)
Enjoyment	5.27 (.80)	5.57 (.65)	4.87 (.99)
Creativity ^a	6.18 (.95)	5.34 (1.17)	4.80 (1.16)
Technical goodness ^a	6.04 (1.11)	5.90 (1.28)	4.88 (.87)
Quality (total) ^a	6.11 (.84)	5.62 (1.06)	4.84 (.68)
Number of colors	7.07 (1.44)	6.21 (1.48)	4.40 (1.84)
Number of elaborations	4.53 (2.29)	3.71 (1.68)	2.47 (1.64)

^a These data are derived from inexperienced raters only.

for subjects in informational conditions than for controlling condition subjects $F(1,38) = 6.65, p < .02$.

Enjoyment

There were no significant main effects or interactions for sex on the self-report measure of enjoyment. Only a marginal effect for limit-setting style emerged, $F(2,38) = 2.46, p < .10$. Despite the failure to reach overall significance, the planned comparison between informational and controlling limits did reveal a difference, $F(1,38) = 4.84, p < .04$, reflecting greater enjoyment for the informational subjects. However this comparison must be interpreted with caution in the absence of an overall effect.

Creativity Ratings

Three measures were derived from the ratings by both nonartist judges and those with formal art training. Based upon the previously discussed factor analysis, two factor scores, one labeled "creativity" and one called "technical goodness" (Amabile 1982a) were used as dependent measures from each group of judges. In addition, a combined total "quality" score was developed by averaging these two factor scores. Results derived from the inexperienced judges will be presented first, followed by results from the "artist" ratings.

The analyses evidenced no significant main effect or interaction of sex for any of the three variables. However significant effects for

limit-setting style were found for all three variables. Creativity, $F(2,38) = 6.87, p < .01$; technical goodness, $F(2,38) = 5.82, p < .01$; and the combined quality score, $F(2,38) = 9.85, p < .001$ all showed effects in the predicted direction. Planned comparisons show that no-limits resulted in markedly greater rated creativity, $F(1,38) = 13.09, p < .001$, technical goodness, $F(1,38) = 9.61, p < .01$, and quality, $F(1,38) = 19.07, p < .001$, than did the controlling limits condition. Informational limits evidenced improvements in technical goodness, $F(1,38) = 7.59, p < .01$, and quality, $F(1,38) = 7.97, p < .01$, over the controlling condition paintings but not significantly in creativity, $F(1,38) = 2.55, ns$. While the no-limits condition did not differ from the informational limits on any of these ratings, as predicted, the creativity factor score approached a significant difference in this comparison. Thus, children who experienced no-limits were given marginally higher creativity ratings than were informational subjects, $F(1,38) = 3.77, p < .06$.

The ratings derived from the experienced judges yielded a similar but slightly different pattern of results. As with the nonartists, there was no main effect or interaction for sex on the creativity factor. However, a main effect emerged for sex on both technical goodness and the combined quality score, $F(1,38) = 7.52, p < .01$, and $F(1,38) = 8.05, p < .01$ respectively. Females received higher ratings on technical goodness and quality than did males. There were no Sex \times Condition interactions for these variables.

Significant effects for limits conditions, similar to those for nonartist raters, were present for all three variables in this rating set: creativity, $F(2,38) = 3.28, p < .05$; technical goodness, $F(2,38) = 4.09, p < .03$; and the combined quality rating, $F(2,38) = 5.79, p < .01$. The planned comparisons between these conditions showed that creativity was significantly greater for the no-limits than for the controlling limits group ($p < .05$). However no-limits vs. informational, and informational vs. controlling conditions revealed no differences, although there were trends corresponding to the inexperienced rater results.

Objective Ratings

Objective ratings of the children's paintings were obtained in an effort to operationalize the constructs of spontaneity and absence of constriction. The latter was assessed by the number of elaborations included by the child, i.e. all nonhouse objects that were painted, while the former was assessed by the number of colors employed (maximum = 9). The interrater reliability was calculated as percent-

age agreement of raters within an absolute value of one. Reliability was .86 for color and .91 for elaborations. Initial Sex \times Condition ANOVAs revealed no main effects or interactions for sex. However, an overall main effect for conditions was obtained for both color $F(2,38) = 9.24, p < .001$ and elaborations, $F(2,38) = 6.24, p < .01$. Planned comparisons evidenced no differences in either variable between the informational and no-limits conditions. The comparison of no-limits with controlling limits showed effects both for colors, $F(1,38) = 17.0, p < .001$ and for elaborations, $F(1,38) = 2.40, p < .001$, with the no-limits greater for both. A similar pattern emerged for the comparison of informational vs. controlling conditions, with informational subjects employing more colors, $F(1,38) = 8.59, p < .01$ and marginally more elaborations, $F(1,38) = 3.48, p < .08$, supporting the hypotheses for these variables.

Relations Among Dependent Measures

Because the hypothesized relations between intrinsic motivation, quality of performance, spontaneity, and constriction are of interest in this investigation, the intercorrelations of these variables were computed to examine their shared variance (see Table 2). Only the nonartist ratings were included in this matrix for the quality, technical goodness, and creativity measures. Several of the performance-related variables were significantly correlated with intrinsic motivation, particularly number of colors ($r = .34, p < .03$), elaborations ($r = .32, p < .04$) and the total quality score ($r = .31, p < .05$). The number of colors and elaborations in the paintings were strongly related to each other ($r = .49, p < .001$) as were each of these

Table 2. Correlations among the seven dependent measures: Free choice, enjoyment, creativity, technical goodness, total quality rating, number of colors, and number of elaborations ($N = 44$).

	Free choice	Enjoyment	Creativity	Technical good- ness	Quality (total)	Colors
Enjoyment	.25					
Creativity	.28*	.07				
Technical goodness	.23	.02	.39***			
Quality (total)	.31**	.05	(N/A)	(N/A)		
Colors	.34**	.07	.57***	.31**	.53***	
Elaborations	.32**	.22	.56***	.26*	.50***	.49***

* $P < .10$

** $P < .05$

*** $P < .01$

variables to the total quality score, and particularly to its creativity component. Colors and elaborations correlated .57 ($p < .001$) and .56 ($p < .001$) respectively with the creativity dimension. In general, then, these correlations lend support to the hypothesized relation between intrinsic motivation, creativity, and the rated quality of the children's paintings. Of additional note is the absence of relation between the children's ratings of enjoyment with measures of quality or intrinsic motivation, supporting Izard's (1977) analysis.

Discussion

The present study tested the proposition, derived from cognitive evaluation theory, that controlling styles of communication would undermine intrinsic motivation relative to informational styles. The focus of communication in this study was limit-setting, i.e., the placing of constraints upon children's behavior. In the broadest terms, the study asked the question: Can limits be set in a way that does not represent a threat to intrinsic motivation or creativity for a task? It was felt that this question has significant theoretical implications as well as practical import for practices in education, parenting, and play therapy.

The results of the investigation suggest that limits *can* be conveyed without decreasing intrinsic motivation. In particular, limit-setting styles that were informational did not undermine intrinsic motivation relative to a no-limits control group. On the other hand, limits that were communicated in a controlling manner resulted in a significant decrease in intrinsic motivation relative to the no-limits and informational limits groups. Thus there was strong support for the prediction derived from cognitive evaluation theory.

Previous studies (Deci, et al., 1981; Deci, Schwartz, Sheinman, & Ryan, 1981) have shown that teachers' autonomy-oriented vs. controlling styles predicted significantly the intrinsic motivation, perceived competence, and self-esteem of children in their classrooms. The present study extends this literature by examining how specific informational vs. controlling communications can affect intrinsic motivation and related enjoyment. It would be of additional interest to employ home or classroom observations to assess whether controlling-oriented parents or teachers actually use communications such as those tested within this study, and what effects they have.

Another facet of this study was an examination of the impact of limit-setting styles on the quality of children's artistic performance. The results suggest that controlling limits can have a deleterious effect upon quality and creativity of artistic production. This negative

impact was reflected in judgements of the paintings' creativity and technical goodness. Further, the results suggested that informational limits can mitigate this negative effect of constraints, especially concerning organization or technical goodness variables. Further, the controlling limits resulted in marked decreases in the number of colors employed and the number of spontaneous elaborations, relative to both the informational and no-limits conditions. Interestingly, these two objective measures were in turn strongly related to creativity as defined by Amabile's system, and perhaps offer an alternative brief method for assessing some qualitative aspects of artistic performance.

The creativity findings, like those for intrinsic motivation, would seem to have important implications for education. They suggest that a controlling style of communication may interfere with the quality of children's performance on heuristic activities. One important question for future research would seem to be whether controlling communications will also undermine the quality of performance on activities other than artistic production. It would be especially interesting to examine the effects of the various limit-setting styles on school activities, such as math or reading, that are less clearly intrinsically motivated.

There are two important questions which remain unanswered by this investigation. First, the question of whether informational vs. controlling styles differentially affect intrinsic motivation fails to address the issue of which type of communication facilitates maintenance of the limits themselves in subsequent situations where they could be appropriately applied. While we suspect that informational styles may lead to more integrated and lasting internalization of the limits themselves (Ryan et al., 1983), that question awaits further study. Secondly, both the informational and controlling limit-setting procedures used herein were composed of several elements. For example, the controlling limits involved directive phrases (musts, have tos) and person praise (be a good boy/girl), both of which are theoretically linked to external control (Deci & Ryan, in press). Correspondingly, informational limits were both nondirective (passive voice) and used reflection of possible contrary feelings. In addition, despite our attempts to minimize such differences, the words employed in the two styles of limits may have created a different emotional tone. Further studies could differentiate the relative contribution of these components to the observed effects.

In summary, the present study has one overarching theme of importance. Insofar as limits must be conveyed to children as an aspect of socialization, it appears to be possible to communicate

them in a manner that does not undermine intrinsic motivation or self-determination and does not interfere with quality of task performance. The study suggests that it is not the fact of constraints per se but rather the psychological and affective meaning of those constraints that predicts their impact. The psychological or functional significance of limits can be captured in part through the information/control distinction of cognitive evaluation theory.

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