Cross-Task Generalization of Intrinsic Motivation Effects

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Abstract

Two experiments examined the hypothesis that prior autonomy-supporting and externally-controlling experiences can affect reactions to new activities. In Experiment 1, adult participants received self-determining (i.e., autonomy-supporting) pretreatment experience, an externally-controlling pretreatment, or no pretreatment experience with an initial activity and then received an expected task-contingent reward or an unexpected reward after engaging in a new activity. In Experiment 2, adult participants received high competency feedback (i.e., autonomy-supporting) or average competency feedback following performance of an initial activity, and then received an expected or unexpected reward after engaging in a new activity. The studies showed that initial autonomy-supporting experiences led to heightened intrinsic motivation to pursue new activities, whereas initial externally-controlling experiences produced relatively lower intrinsic motivation to engage in the new activities. As well, participants' experiences with prior activities interacted with subsequent reward variations to affect their reactions to new activities. Significant interaction effects in the two studies showed that prior autonomy-supporting experiences averted negative motivational effects of expected rewards on new activities, whereas prior externally-controlling experiences suppressed subsequent intrinsic motivation even when reward contingencies were not imposed on the new activities.

Résumé

Deux expériences ont eu pour objet d'examiner l'hypothèse selon laquelle les expériences de renforcement d'autonomie et les expériences de contrôle externe peuvent influer les réactions à l'égard de nouvelles activités. Dans la première expérience, des participants adultes ont été soumis à une expérience préalable d'autodétermination (c.-à-d. de renforcement d'autonomie), une expérience préalable de contrôle externe, ou encore aucune expérience préalable à une activité initiale. Puis, ils ont reçu une gratification inattendue liée à une tâche ou une gratification inattendue après avoir entrepris une nouvelle activité. Dans la deuxième expérience, des participants adultes ont reçu des commentaires validant un haut degré de compétence ou un degré de compétence moyen après avoir exécuté une activité initiale, puis ont reçu une gratification inattendue après avoir entrepris une nouvelle activité. Les études ont démontré que les expériences initiales de renforcement de l'autonomie ont mené à une motivation intrinsèque accrue à poursuivre de nouvelles activités, alors que les expériences initiales de contrôle externe ont eu un effet moindre sur la motivation à entreprendre de nouvelles activités. De plus, les expériences des participants avec des activités antérieures interagissaient avec des variations subséquentes des gratifications et influaient sur leurs réactions à l'égard de nouvelles activités. Des effets d'interaction importants, dans les deux études, ont montré que des expériences préalables de renforcement d'autonomie prévenaient des effets motivationnels négatifs envers les gratifications inattendues pour les nouvelles activités, alors que les expériences préalables de contrôle externe étouffaient la motivation intrinsèque ultérieure, même lorsque les contingences de gratification n'étaient pas imposées sur les nouvelles activités.

A central focus of Deci and Ryan's (1987) cognitive evaluation theory is the impact of contextual variables on motivation. Their model has been successfully used to predict and explain how events associated with the performance of a particular activity affect motivation to pursue the *same* activity again. We describe here an extension of Deci and Ryan's model, integrated with

notions adapted from deCharms' (1968) discussion of Origin and Pawn states. This extension and integration provides a model for predicting the generalization of motivational effects across *different* activities.

Deci and Ryan (1987) proposed that intrinsic motivation stems from drive-like human needs to be self-determining and competent, i.e., to be *autonomous* rather than externally-controlled. In concrete terms, an intrinsically motivated behaviour is that which appears to be spontaneously initiated by the person in pursuit of no other goal than the activity itself. According to Deci and Ryan, events that foster self-determination or competence will enhance or maintain intrinsic motivation, whereas events that weaken self-determination or competence will decrease intrinsic motivation.[1] Supporting research evidence shows that events that enhance self-perceived autonomous functioning produce increased intrinsic motivation for the target activity. The ability to make choices about how to pursue an activity, for example, has been shown to enhance or maintain intrinsic motivation (Enzle, Roggeveen, & Look, 1991; Zuckerman, Porac, Lathin, Smith, & Deci, 1978), as has positive performance feedback (e.g., Enzle & Ross, 1978; Vallerand & Reid, 1988). Externally-controlling events that are antagonistic to self-perceived autonomy, on the other hand, result in decreased intrinsic motivation and perceptions of external causality. Thus, task-contingent rewards (e.g., Lepper, Greene, & Nisbett, 1973), negative performance feedback (e.g., Enzle & Ross, 1978), and controlling forms of surveillance (e.g., Enzle & Anderson, 1993) have been shown to undermine intrinsic motivation.

The same body of research that supports Deci and Ryan's model also highlights what may be an artificial limit on the generality of intrinsic motivation effects. Because of the way hypotheses have been framed, the dependent variable in all research to date has been intrinsic motivation to pursue the same activity with which the autonomy-supporting and externally-controlling variables were associated. This makes good sense, of course, when the point of the investigation is to learn how people develop or lose intrinsic motivation to pursue particular activities. Deci and Ryan's theory, however, is not necessarily restricted to this level of specificity. When a person exercises choice with respect to some activity, is the person's sense of self-determination enhanced only as it relates to that activity, or does the effect also contribute to the individual's overall sense of personal autonomy? When a person learns that he or she has performed a task competently, is the person's enhanced sense of competence limited to the original activity, or does the effect also influence the person's level of general self-perceived competence? Because the needs for self-determination and competence discussed by Deci and Ryan are general ones, we believe that the answers to these questions should be that both types of change occur. Experience with a particular activity should provide information about self-determination and competence specific to the activity. As well, self-determination and competence information from the specific experience should contribute to the person's general self-perceptions of autonomy. Parallel considerations apply to the impact of externally-controlling events on motivation to pursue specific activities and on the person's general self-perceived autonomy. If specific experiences do contribute to changes in general levels of self-determination and competency, then it follows that general changes in intrinsic motivation should also occur, changes that should be manifested behaviourally when the person encounters a new activity.

Experiment 1

The present formulation yields the general prediction that self-determination experiences during the pursuit of one activity will produce enhanced intrinsic motivation to engage in new activities, whereas externally-controlling experiences during one activity will undermine intrinsic motivation to engage in new activities. Experiment 1 provides a test of the cross-activity generalization prediction by producing intrinsic and extrinsic motivational states with one activity and testing intrinsic motivation to engage in a new activity.

The experiment was also designed to assess another potential quality of intrinsically and extrinsically motivated states. According to deCharms (1968), once an intrinsically ("Origin") or extrinsically ("Pawn") motivated state is established, the person meets new activities, at least in the short-run, from that same motivational orientation.[2] Moreover, deCharms claims

1 This general hypothesis is also consistent with the attributional approaches of Bem (1972) and Lepper and Greene (1978). Behaviours that occur in the absence of extrinsic constraint should be attributed to qualities of the self (e.g., attitudes, motivation), whereas behaviours that occur in the presence of plausible external causes are unlikely to produce congruent self-perceptions. Our choice of Deci and Ryan's model was influenced by the proposed underlying drive-like need for autonomy. This feature of cognitive evaluation theory provides a mechanism with which to understand behavioural generalization effects. As Bem (1972) himself points out, the link between self-perceptions and behaviour is ill-explained conceptually by attributional models.

2 Rotter's (1966) social learning theory converges on some of the same ideas as deCharms' (1968) theory, although there is an important difference. Whereas deCharms emphasizes relatively transient motivational states within persons, Rotter's theory of internality-externality is primarily concerned with stable individual trait differences among people.

that Origin and Pawn states perseverate, and are capable of overwhelming contemporaneous contextual influences. This perseveration occurs, according to deCharms, because intrinsically and extrinsically motivated states are associated with expectancies about the person's causal capabilities. A person in the Pawn state because of prior experiences of external control will expect to be externally controlled in subsequent situations, even if the objective characteristics of those new situations would permit autonomous functioning with the new activity. Likewise, deCharms suggested that once an Origin state is established, the person will expect to be autonomous, will tend to disregard evidence of external control, and will proceed as if he or she were in fact an autonomous agent. Our experimental investigation includes a test of this integration of Deci and Ryan's (1987) and deCharms' (1968) theoretical frameworks.

Participants in Experiment 1 were initially given (a) an intensive period of autonomous functioning with one activity, (b) an intensive period of external control during the same activity, or (c) no prior activity experience. Participants were then either offered and given an extrinsic reward for engaging in a new activity, or they unexpectedly received the same reward after the new activity. All participants then had a free-play period with the new activity. We predicted, overall, that participants who had a recent autonomous experience would show greater behavioural involvement in the new activity during the free-play period than would participants who had no prior activity experience and than participants who had had the prior externally-controlling experience. Those who had been subjected to the external control pretreatment were expected to show less behavioural interest in the new activity during the free-play period than were participants in the other two groups.

An interaction between prior and later control experiences was expected to be manifest in terms of the conditions under which extrinsic rewards would undermine intrinsic motivation. The extrinsic reward manipulation was expected to produce decreased involvement in the new activity during the free-play period only for people who had had no pretreatment. As a group, these nonpretreated individuals theoretically should be most influenced by the immediate qualities of autonomy or external constraint in their environment: Participants who contracted to engage in the target activity for the reward were expected to show less subsequent interest in the activity than were participants who unexpectedly received the same reward. Very different results were anticipated for the two pretreatment groups. Autonomy pretreated subjects were expected to maintain a relatively high level of intrinsic motivation to pursue the target activity during the free-play period even when they had previously engaged in the activity in exchange for the extrinsic reward. External control pretreated subjects, on the other hand, were expected to show little intrinsic interest in the new target activity during the free-play period, even when their first engagement with the activity had been unconstrained by extrinsic reward.

The autonomy-control pretreatment effects we have hypothesized refer to generalization from one well-defined activity to another activity. There is reason to speculate that generalization of self-determination effects might also occur from a limited feature of a particular activity to the entire activity, comprising a *within-activity* generalization effect. Our rationale stems from Langer's (1975) proposition that people have such a strong need to believe that they control their lives and their environments that they use quite flimsy evidence to maintain that belief. Langer (1975) reported a study in which subjects in one condition selected their own lottery tickets from an array, whereas those in a second condition were given tickets. Although the lottery was described as an entirely random draw, subjects who selected their own tickets believed they had a greater chance of winning the lottery than did the other participants. Langer concluded that when people exercise personal control over peripheral, noncausal, aspects of events they often develop a generalized sense of personal control over the outcomes of those events.

In the lottery study, participants supposedly generalized from control over the ticket selection process to control over the lottery outcome. We think that peripheral control experiences such as these can also produce motivational effects. Deci and Ryan (1987) point out that belief in personal control over outcomes can converge with self-determination when the person arrives at the belief as a consequence of acting freely to implement personal choices and intentions. Our Experiment 1 included a test of whether apparently exercising influence over a peripheral aspect of an activity, the local environmental conditions under which it was performed initially, would affect intrinsic motivation to pursue the same activity in the future when no peripheral control was exercised. People were or were not given an illusory opportunity to calibrate the background noise and illumination levels in the laboratory during their initial experience with the second of the two play activities. If perceptions of self-determination for the entire play activity were to result from this type of illusory peripheral control experience, then people should show enhanced intrinsic motivation toward the play activity just as if they had been self-determining with all aspects of the activity.

METHOD

Subjects and Design

Subjects were 152 university students who received credit toward an introductory psychology course requirement. They were randomly assigned to the conditions of a 3 (autonomy pretreatment vs. external constraint pretreatment vs. no pretreatment) × 2 (illusory vs. no illusory peripheral control) × 2 (expected vs. unexpected reward) between-subjects factorial design. Data from eight participants who suspected the purpose of the experiment were excluded from the analyses. Incidence of suspiciousness was unrelated to conditions.

Materials and Laboratory

Materials included a switch-light device for manipulating the pretreatment independent variable, a 60-min timer, a video camcorder, a floor lamp with illumination rheostat, and a *Lego* kit. The pretreatment manipulation device consisted of a 30 × 45 cm tabletop switchboard connected to an upright 30 × 30 cm light display panel. The switchboard housed an 8 × 8 array of 64 switches that controlled 64 display panel LEDs that were arranged in a corresponding array. *Lego* is a construction toy that consists of multicoloured interlocking bricks, and was used because it has a relatively high free-play base rate for adults (e.g., Enzle & Anderson, 1993).

The experimental setting consisted of two rooms that shared an adjoining wall in which was mounted a one-way mirror. The rooms were accessed by separate doors from a common hallway. The mirror in the subject's cubicle was disguised as a bulletin board. Subjects' activities could be viewed clearly through the burlap covering of the ersatz bulletin board.

Procedure

Subjects participated individually. They were told that during the main part of the study they would be asked to engage in one or more visuo-spatial activities, and that they would later be asked questions about their reactions. A second supposed goal of the research was to prepare materials for a study of children's observational learning. Participants were informed that a sample of their activity would be videotaped for use in the developmental research. This second ostensible purpose of the research established the groundwork for the experimenter to leave the laboratory with the camcorder during a later free-play period.

Autonomy-constraint manipulation. Two-thirds of the subjects were told that they would perform a visual pattern creation task for 12 min. Of these subjects, those assigned to the autonomy pretreatment condition were asked to make as many designs, of their own invention, with the switch-light mechanism as they wished during the 12 min period. Subjects in the constraint pretreatment condition were given a sheet that listed 49 ordered commands for the switch-light mechanism. Participants were told to watch the timer on their table and to execute one command every 15 s during the 12 min period. The commands simply required subjects to turn on the lights, one by one in left-to-right and top-to-bottom progression, until the entire matrix of 49 lights was illuminated. The experimenter exited the subject cubicle and entered the adjoining observation room to verify that all subjects followed instructions. The experimenter returned to the subject cubicle at the end of the 12 min period. Subjects in these two pre-treatment conditions were then seated at a second table which contained the *Lego* building kit, as were subjects in the no-pretreatment condition. The latter subjects had no experience with the switch-light device.

Peripheral control. The experimenter explained that it was important to sample different laboratory environment variables such as light levels and background sound. All subjects were then given a folder, the contents of which had been prepared in advance by an assistant so that the experimenter could remain blind to conditions. The experimenter feigned being busy in another part of the room while subjects examined the contents of the folder. For subjects in the peripheral-control condition, the first sheet in the folder indicated that participants were being asked to select for themselves the levels of illumination and sound that they would like to be implemented during the next task (*Lego*). The form was constructed so that subjects could ostensibly choose between high, medium and low lighting conditions and among high, medium and low sound levels. No sheet regarding noise and lighting was included in the folders given to subjects in the no-peripheral control condition.

Reward expectancy manipulation. All subjects had in their folders a sheet that manipulated reward expectancy. In the unexpected-reward conditions, this sheet was merely an agreement form that subjects signed to give their consent to build an object with the *Lego* kit. No payment was mentioned in the agreement. For subjects in the expected-reward condition, however, the form asked them to sign if they agreed to build the *Lego* object in order to receive payment of $3. The experimenter was unaware of which reward form subjects had signed.

The experimenter collected the folder once subjects had completed the forms, turned his(her) back, and appeared to open and examine the contents of the folder, although he(she) did not in fact do so. The

experimenter then adjusted the unmarked rheostat on the floor lamp to a standard setting, and then switched on the lamp. He(she) also selected a numerically coded audio cassette from three available cassettes, mounted it on a tape-player, and activated the machine. The tape was blank and emitted, in all cases, constant tape hiss at an audible but not aversive level. Although the same lighting and sound levels were established for all subjects, the procedure was designed to produce the appearance, for subjects in the peripheral-control condition, that the experimenter had implemented their personal selections.

The experimenter then arranged a camcorder mounted on a tripod so that it appeared to be focussed on the subjects' table top. He(she) then activated the camcorder, instructed subjects to construct a small castle, and announced that he(she) would wait in the hallway for 5 min.

The experimenter reentered the subject cubicle at the conclusion of the 5 min period, and explained that he(she) needed to return the camcorder to another researcher. The experimenter then gave subjects an envelope, which had been prepared in advance by an assistant, and asked them to remove the contents and to follow the printed instructions inside. The experimenter removed the camcorder from the tripod, and placed the components on a small cart. He(she) also turned off both the floor lamp and the audiocassette player. The envelope that subjects received contained $3 and a receipt. In expected-reward conditions, the printed instructions indicated that subjects had fulfilled their agreement and that they should sign the receipt and return it to the envelope. Subjects in the unexpected-reward condition learned from the receipt that they were being given excess grant monies that had accumulated in trust accounts, and that the funds were being disbursed to participants in several studies according to granting agency requirements. The experimenter maintained blindness to conditions by not looking at the receipt forms. After subjects had signed the receipt, the experimenter left the room with the cart.

Free-play period. The experimenter's exit marked the beginning of an 8 min free-play period. An observer who was blind to conditions recorded subjects' free-play activity with the *Lego* kit via the one-way mirror. Play was operationally defined as any active manipulation of the *Lego* building materials. A current newspaper and newsmagazine were present on a small side-table positioned near the subjects' table, and served as alternative activities in which subjects could engage. The experimenter entered the subject cubicle at the end of the free-play period, and conducted an oral suspiciousness probe and a full debriefing.

TABLE 1
Experiment 1: Mean Free Play Time Measure of Intrinsic Motivation

	Reward expectancy		
Pretreatment	Unexpected	Expected	(Total)
Constraint	165.13_{a}	164.96_{a}	(165.05)
None	255.58_{b}	170.46_{a}	(213.02)
Autonomy	219.17_{ab}	266.79_{b}	(242.98)

Note: Time scores are in seconds from a possible total of 480 s. Means in the main body of the table that do not share a common subscript differ significantly at $p < .05$ by Duncan's multiple range test.

RESULTS[3]

Scores for total free-play time with the *Lego* kit, in seconds, were submitted to a 2 × 2 × 3 analysis of variance. This analysis produced the anticipated significant main effect for the Autonomy-Constraint variable, F (2,132) = 5.00, $p < .01$, and the predicted Autonomy-Constraint × Reward Expectancy interaction effect, F (2,132) = 3.65, $p < .05$. The Autonomy-Constraint main effect reflects the fact that, overall, subjects in the autonomy-pretreatment condition spent significantly more time playing with the *Lego* kit (M = 242.98) than did subjects in the external constraint-pretreatment condition (M = 165.05), $p < .05$ by Duncan's multiple range test. The amount of time subjects in the no-pretreatment condition spent playing (M = 213.02) was intermediate between the autonomy- and external constraint-pretreatment conditions, and did not differ significantly from either.

Table 1 shows the means for the Autonomy-Constraint × Reward Expectancy interaction. A useful reference point is the row of means for the no-pretreatment conditions. Intrinsic motivation was affected strongly by the reward manipulation in these conditions. Subjects in the expected-reward condition (M = 170.46) spent significantly less free time playing with the *Lego* materials than did subjects in the unexpected-reward condition (M = 255.58) when there had previously been neither autonomy- nor external constraint-pretreatment experience. This is the typical undermining effect of task-contingent reward on intrinsic motivation.

Within the external constraint-pretreatment conditions, however, there is a general decline in free-play activity. The reward contingency manipulation had no impact, and the level of free-play in both expected *and* unexpected reward conditions (joint M = 165.05) is comparable to that shown by subjects in the no-pre-

3 Preliminary analyses were conducted including subject gender as a variable in both Experiment 1 and 2. Neither gender main effects nor interactions of gender with the manipulated variables were found.

treatment/expected reward condition (M = 170.46). Pretreatment with external constraint led these subjects to act as though their unconstrained activity with the *Lego* kit had in fact been externally controlled.

Within the autonomy-pretreatment conditions, there is once again no difference between expected and unexpected rewards. But in this case, the level of free-play is relatively high in both reward contingency conditions (joint M = 242.98), comparable to the no-pretreatment/unexpected-reward condition (M = 255.58). Subjects with an immediate history of personal control thus behaved as though their activity with the *Lego* kit was unconstrained, even when they had in fact received a contingent reward for playing with it.

The analysis of variance also yielded the anticipated significant peripheral control main effect, F (1,132) = 13.32, $p < .001$. Subjects in the peripheral-control condition spent more time playing with the *Lego* materials (M = 244.07) than did subjects in the no-peripheral-control condition (M = 169.97). No other effects in the analysis reached significance.

Experiment 2

The results of the first study are consistent with the cross-activity generalization hypothesis that autonomy-supporting and externally-controlling experiences with one activity promote like approaches to new activities. As well, the results supported our within-activity generalization hypothesis that perceived self-determining experiences with a peripheral aspect of an activity will increase intrinsic motivation for that activity.

The second experiment was designed to again assess the generalization hypothesis, but this time with respect to competence. Heightened perceptions of competence at one activity should enhance intrinsic motivation for new activities. Our second study also provided another test of deCharms' (1968) speculation that Origin experiences, those which are autonomy-supporting in one domain, bias people's reactions to freedom and environmental constraint in other domains. When people believe that they have conducted themselves competently at one activity, they should be relatively unaffected by extrinsic constraints that would otherwise dampen enjoyment of new activities.

Subjects in the second study received either positive competence feedback or average competence feedback following one activity,[4] and then engaged in a second activity for which receipt of an extrinsic reward was either expected or was unexpected. We predicted that subjects would show greater free-play involvement in the second activity when they had previously received positive competence feedback than when they had not. Subjects who previously received average competence feedback were expected to lose interest in the second activity as a result of the expected reward. Those who had experienced enhanced perceptions of competence for the first activity, however, were expected to maintain a relatively high degree of motivation to pursue the second activity, regardless of whether they were extrinsically constrained or not.

METHOD

Subjects and Design

Subjects were 53 university students who received credit toward an introductory psychology course requirement. They were randomly assigned to the conditions of a 2 (high vs. average competence pretreatment) × 2 (expected vs. unexpected reward) between-subjects factorial design. Data from 5 participants who expressed suspiciousness were excluded from the analyses. Incidence of suspiciousness was about equally distributed among conditions.

Materials

Rubic's Cube was the initial activity. The puzzle is composed of 27 multicoloured blocks measuring 2.5 cm on each side that are internally connected by a linkage mechanism to form a 7.5 cm cube. The object of the puzzle is to rotate cube sections about the internal axes until each cube face consists of a single color. The second activity was a *Lego* kit. The same laboratory arrangement was used as in Experiment 1.

Procedure

Competence manipulation. Subjects participated individually, and were told that the study was an investigation of adult reactions to recreational activities. The experimenter demonstrated the *Rubic's Cube,* and instructed subjects to arrange as much of one face in a single colour as possible during a 5 min period. The experimenter left the room for the duration of this period. Before re-entering the room, he(she) consulted a note prepared by an assistant that indicated the competence condition to which subjects had been randomly assigned. The experimenter examined the *Rubic's Cube,* and said, "Okay, I see you got (x) sections all of the same colour," where × was the number that subjects had aligned on one face of the cube. The experimenter went on to tell subjects in the high-competence feedback condition that they had performed "... a lot better than most participants", and said, "I'm really impressed. It's quite difficult to get the (xth)

4 A negative competence feedback condition was contemplated, but was rejected on ethical grounds. Our judgment was that the combined impact of Experiments 1 and 2 as tests of the cross-activity generalization hypothesis would not be substantially strengthened or weakened by the presence or absence of this condition.

TABLE 2
Experiment 2: Mean Free Play Time Measure of Intrinsic Motivation

Competence feedback for first activity	Reward expectancy for second activity		
	Unexpected	Expected	(Total)
Average performance	252.17_a	111.75_b	(181.96)
High performance	255.33_a	292.83_a	(274.08)

Note: Time scores are in seconds from a possible total of 480 s. Means in the main body of the table that do not share a common subscript differ significantly at $p < .05$ by Duncan's multiple range test.

one." As well, the experimenter took a sheet bearing the title "Evaluation Form" from a desk, placed it in plain view of subjects and wrote "unusually good" in an appropriately labelled space. The experimenter told subjects assigned to the average-competency condition that "... that's about what everyone has been getting, somewhere between (X − 1) and (X + 1)", and wrote "usual, normal" on the evaluation form. The *Rubic's Cube* was then placed in a storage box.

Reward expectancy manipulation. After delivering the competence feedback, subjects were seated at another table on which the *Lego* materials were arranged. The reward expectancy manipulation was implemented exactly as in Experiment 1. The experimenter was blind to these condition assignments throughout the session.

A confederate who was blind to conditions observed subjects through the disguised one-way mirror during the payment phase of the reward expectancy manipulation. When the confederate saw that subjects had completed the receipt, he(she) entered the hallway and knocked on the subject cubicle door. When the experimenter opened the door, a staged conversation commenced, in which it emerged that water from a broken drain pipe was flooding several laboratories elsewhere in the building, including one of the experimenter's facilities. The experimenter explained to subjects that he needed to check his(her) other laboratory and left the subject cubicle. The confederate entered the observation cubicle via the hallway door, stationed himself(herself) behind the one-way mirror, and recorded subjects' *Lego* kit activity during an 8 min free-play period. The alternative activities used in Experiment 1 were available to subjects. At the conclusion of this period, the experimenter returned and conducted a suspiciousness probe and full debriefing.

RESULTS

Time scores for the free-play period were submitted to a 2 × 2 analysis of variance. As expected, there was a significant Competence Feedback main effect, $F(1,44) = 4.62, p < .05$. Overall, subjects spent more time playing with the *Lego* kit if they believed they had performed well earlier on the *Rubic's Cube* ($M = 274.08$) than if they thought their *Rubic's Cube* performance was unremarkable ($M = 181.96$).

The anticipated Competence Feedback × Reward Expectancy interaction effect was also significant, $F(1,44) = 4.31, p < .05$. Table 2 shows the means for this effect. Duncan's multiple range test reveals a pattern of differences among these means that is very similar to that observed in Experiment 1. Within the average-competency feedback conditions, the reward expectancy manipulation had a significant undermining effect. Subjects spent less time playing with the *Lego* kit in the expected-reward ($M = 111.75$) than in the unexpected-reward ($M = 252.17$) condition, $p < .05$. Believing that they had earlier performed in a skillful manner on another task, however, insulated subjects from the detrimental influence of expected rewards. Mean free-play time in the high competency feedback/expected-reward condition (M 292.83) does not differ from that in the high competency/unexpected-reward condition ($M = 255.33$). As well, the two high competency condition means do not differ from the average competency/unexpected reward condition, but are both significantly different from the average competency/expected reward condition mean ($ps < .05$).

DISCUSSION

Our experiments provide good evidence that both autonomy-supporting and externally-controlling experiences with one activity (deCharms, 1968; Deci & Ryan, 1987) can affect people's reactions to new activities. In Experiment 1, subjects who spent an initial period of time engaged in free choice activity with the autonomy-constraint device subsequently showed greater intrinsic interest in a new leisure activity than did subjects whose activity with the device was guided by external commands. Experiment 2 showed that positive feedback about competence at one activity promoted intrinsically motivated engagement in the next, new, activity. Each of these effects is consistent with intrinsic motivation studies in which the effect of choice and competence are observed on the original activity. The current studies show that such effects are not confined to just the activities that give rise in the first instance to perceptions of autonomy versus extrinsic control, or to self-assessments of competence. Subjects approached *new* activities with intrinsically or extrinsically motivated orientations, depending on the nature of their experiences with other activities in the immediate past.

Perhaps the most striking feature of the current investigation is the consistent support across the two studies for deCharms' (1968) suggestion that previously

established expectancies about autonomy or constraint can override or supplant subsequent objective situational states of personal freedom and situational constraint. In Experiment 1, the negative influence of extrinsic reward contingencies on intrinsic motivation, shown for the nonpretreated group of participants, did not occur for the autonomy-pretreatment subjects. Similarly, subjects pretreated with external constraint continued to act as though they were extrinsically constrained even when they were not. External control-pretreatment subjects were just as unmotivated in the unexpected-reward condition as they were in the expected-reward condition when introduced to the new activity. A similar pattern emerged in Experiment 2. Subjects who believed that they had performed within average limits on the *Rubic's Cube* task were susceptible to the effects of contingent extrinsic rewards. Expected-reward participants in these conditions showed less intrinsic motivation to pursue the *Lego* activity than did those who unexpectedly received the reward. Subjects who were pretreated with positive competence feedback for the *Rubic's Cube*, however, showed equivalent and relatively high levels of interest for the *Lego* kit in the expected- and unexpected-reward conditions.

Another intriguing aspect of the current findings is the fact that apparent personal choice about peripheral conditions under which an activity was engaged led to enhanced intrinsic motivation for that activity. In Experiment 1, subjects who merely believed that they had chosen their own illumination and background noise levels showed greater intrinsic interest in a contemporary activity than did people for whom these choices were ostensibly made by the experimenter. Here is direct evidence that apparent influence over peripheral contextual features of activity engagement affects people's intrinsic motivation for the activity itself.

An important practical issue that guides much intrinsic motivation research is the possibility that parents, teachers, and other behaviour managers may unintentionally undermine intrinsic motivation. The use of extrinsic task contingent incentives, when applied to behaviours that are already intrinsically motivated, may lead to reduced motivation in the long run when the incentives are no longer available. The current results should deepen concern over the use of extrinsic incentives. Not only can these constraints undermine the specific interests that they were meant to encourage, but they may also subvert intrinsic motivation to pursue *other* activities that were never intended to fall under the influence of the extrinsic constraint.

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