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The Interest-Enjoyment Distinction in Intrinsic Motivation[1]

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Contemporary research often presupposes intrinsic motivation to be a unitary construct. Two experiments tested whether interest and enjoyment could be distinguished on the basis of differential determinants. It was hypothesized that collative motivation (Berlyne, 1963a) predicts interest ratings, while performance evaluation predicts enjoyment ratings. In both experiments, participants saw either novel, changing, and variable or monotonous, repetitive, and redundant stimulus patterns. Following their performance, participants made competence performance appraisals and rated an anagram (Experiment 1) or a puzzle (Experiment 2) task in terms of interest and enjoyment. Regression analyses were used to construct separate path analytic models for interest and enjoyment. In both experiments, collative motivation predicted interest, while perceived performance predicted enjoyment. The discussion concluded that interest and enjoyment have differential determinants and differential contributions to intrinsically motivated behavior. Interest contributes to intrinsic motivation by arousing the initiation and direction of attention and exploratory behavior, while enjoyment contributes to intrinsic motivation by sustaining the willingness to continue and persist in the activity.

Present explanatory models of intrinsic motivation strongly emphasize competence (Arkes, 1978; Bandura, 1982; Deci & Ryan, 1985; Harter, 1981). Activities that promote appraisals of competence increase reported enjoyment (Harackiewicz, Sansone, & Manderlink, 1985) as well as subse-

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quent "free-choice" behavior with the activity (Rosenfield, Folger, & Adelman, 1980). So central to explanatory models of intrinsic motivation is the competence emphasis that there is a tendency to use the terms interchangeably (Harter, 1978; Kagan, 1972; White, 1959) and to define intrinsically motivated behavior as behavior motivated by a need for competence (Deci & Ryan, 1980). From this point of view, activities are intrinsically motivating if one's task performance produces a sense of mastery and competence.

While recognizing the importance of competence to intrinsic motivational processes, the present work examines the contribution of a second source of intrinsic motivation, collative motivation. Collative motivation is dependent on properties of stimuli such as novelty, complexity, change, and variability (Berlyne, 1961, 1963a, 1978). Novelty, complexity, change, and variability are referred to as collative properties because they depend on the collation, or comparison, of information from different sources (e.g., comparing recent stimuli with past stimuli, as in novelty). The theoretical assumption that links collative motivation to intrinsic motivational processes is that collative properties heighten electrodermal (as measured by the GSR) and cortical (as measured by the EEG) arousal (Berlyne, 1960, 1961, 1966). Thus, through their effects on arousal, collative properties are key determinants of the strength, direction, and duration of attention and exploratory behavior (Berlyne, 1960, 1961; Berlyne & Lawrence, 1964). From this point of view, activities are intrinsically motivating if their novelty attracts attention, curiosity, and interest.

From these two theoretical traditions, one might infer that competence appraisals and collative motivation affect intrinsic motivation through different mechanisms. More specifically competence appraisals from performance evaluations affect task enjoyment (Harackiewicz, 1979; Harackiewicz, Sansone, & Manderlink, 1985), suggesting that performance appraisals affect intrinsic motivation through an enjoyment process. Collative properties of a stimulus, on the other hand, affect task "interestingness" (e.g., Berlyne, 1960; Berlyne, Craw, Salapatek, & Lewis, 1963), suggesting that collative motivation affects intrinsic motivation through an interest process.

Such a theoretical position suggests that two processes might underlie intrinsic motivation, assuming that both interest and enjoyment contribute positively to intrinsic motivation. Berlyne (1963b; Berlyne & Lewis, 1963) has speculated about how these two processes might complement one another, suggesting that collative properties heighten arousal, hence interest, whereas the cancellation of such arousal produces pleasantness, hence enjoyment. Collative properties give rise to curiosity/interest, which is arousing, and motivates the individual towards exploration and investigation. Exploration of the stimuli leads to an arousal decrease (via the reduction of

uncertainty), and the arousal reduction gives rise to enjoyment. More recently, Condry (1987) reviewed the research traditions of intrinsic motivation as a function of interest via stimulus characteristics and intrinsic motivation as a function of enjoyment via performance appraisals.

The purpose of the present work was to test whether collative properties of stimulus patterns (but not performance evaluations) would enhance interest, while performance evaluations (but not collative motivation) would enhance enjoyment. Simply stated, the hypothesis under test was whether interest and enjoyment had different determinants. If interest and enjoyment have different determinants, then it is reasonable to infer that interest and enjoyment represent distinct phenomenological aspects of, or processes within, the intrinsic motivation construct. To provide a test of that hypothesis, regression analyses were used in two experiments to construct separate path models for interest and enjoyment to determine whether (1) collative motivation would, and perceived performance would not, predict interest and (2) perceived performance would, and collative motivation would not, predict enjoyment.

EXPERIMENT 1

Method

Participants

Fifty-nine participants, 35 females and 24 males, from a large introductory psychology course comprised the sample. Each participated in exchange for extra course credit.

Stimulus Materials

The experimental task involved solving five-letter anagrams of moderate difficulty, a task frequently used in studies in intrinsic motivation (Hom & Murphy, 1985; Matherly, 1986; Reeve, Cole, & Olson, 1986).

Collative motivation was not manipulated directly, but the novelty/variability of the anagram pattern was manipulated to produce either a high or low level of collative motivation. The task of quantifying collative properties of stimulus patterns is a difficult one (Berlyne, 1963a, 1978). Consequently, the stimulus pattern manipulation relied heavily on earlier work in the area such as Berlyne's (1958, 1960; Berlyne & Parham's, 1968; Berlyne & Lawrence's, 1964) categories to distinguish "more irregular" (MI; Berlyne *et al.*, 1963) from "less irregular" (LI) patterns. Each anagram appeared on a

separate page, and the following seven categories constituted the MI patterns: (1) varied position on page (anagram positioned on top-right of page, on bottom-left, etc.); (2) changing heights of the five letters (some anagrams 1 in. in height, others 0.5 in., etc.); (3) letter height variation within an anagram (some letters 1 in., others 0.5 in., etc.); (4) heterogeneity of letter color (red, blue, etc.); (5) variable widths of the anagram (some anagrams 1 in. in width, others 2 in., etc.); (6) changing angles of presentation (letters tilted slightly right or left from upright); and (7) irregularity of letter arrangement (some letters superscripted above and others subscripted below other letters).

For the LI patterns, each of the 25 anagrams appeared in capital letters in the center of an 8.5 × 11-in. page with an elite typeset. This presentation was chosen for its consistent and ordered spatial arrangements to characterize monotony, repetitiveness, and redundancy.

Questionnaires. A postanagram questionnaire assessed four measures: collative motivation, perceived performance, interest, and enjoyment. To assess collative motivation, participants rated six properties of the anagrams on 7-point Likert scales (Very little/Very much): "How complex are the anagrams?" (Complexity); "How novel is each anagram?" (Novelty); "How much do the anagrams change from one to the next?" (Extent of Change); "How irregular are the anagrams?" (Irregularity); "How unique is each anagram?" (Uniqueness); and "How monotonous are the anagrams?" (Monotony). Monotony was reverse scored, and the ratings from the six questions were combined into a single index of collative motivation (alpha = .80).

Following previous work (Olson, 1985; Reeve, Olson, & Cole, 1987), the question, "Would you rate your performance on the anagrams as a success, a failure, or something in between?" (0–10 Likert scale, A complete failure/A complete success), measured perceived performance. The criterion measures for interest and enjoyment were on 0–10 Likert scales: "How interesting are the anagrams?" (Not at all interesting/Extremely interesting); "How enjoyable are the anagrams?" (Not at all enjoyable/Extremely enjoyable).

Procedure

Fifty-nine volunteers participated as a single group in a large lecture hall. Each participant completed a test booklet with (1) instructions and three practice anagrams, (2) the list of 25 test anagrams, and (3) the postanagram questionnaire. The experimenter distributed the test booklets (LI or MI pattern) randomly. After participants read the cover page and instructions, the experimenter asked each participant to work through the

three (LI patterned) practice anagrams. After the practice, participants completed the 25 test anagrams and the postanagram questionnaire.[3] Finally, the experimenter debriefed the group as to the nature and purpose of the experiment.

Results

The reported analyses exclude data for two participants (one female and one male) because they left three of the 25 test anagrams uncompleted. Thus, the data reported include 57 participants, all of whom completed all 25 test anagrams.

Effects of Stimulus Pattern

Before testing the major hypothesis of the study, a preliminary concern was whether stimulus pattern predicted collative motivation. Participants assigned the MI patterns (M = 26.1) reported a significantly higher level of collative motivation than did participants assigned the LI patterns (M = 22.3) [$t(55) = 2.39$, $p < .05$, two-tailed].

Although no relationship was expected, it was necessary to test for an effect of stimulus pattern on perceived performance because perceived performance was measured after the manipulation of stimulus pattern. Participants assigned the MI (M = 6.12) and those assigned the LI (M = 6.80) patterns reported similar postperformance appraisals [$t(55) = 1.09$, n.s.], indicating that stimulus pattern had no consequential effect on perceived performance.

Mediation Models for Interest and Enjoyment

Overview of the Mediation Analysis. To test the major hypothesis, regression analyses were used to construct two path mediation models, one for interest and one for enjoyment. Mediation models were necessary because stimulus pattern was expected to have an indirect rather than direct effect on interest with stimulus pattern affecting collative motivation and collative motivation in turn affecting interest. Thus, the specific type of path models tested two direct predictors (stimulus pattern and perceived

[3]The postanagram questionnaire included filler material amended to it, the purpose of which was to prevent performance evaluations based on social comparison processes. The filler material minimized the likelihood of social comparison performance inferences since relatively quick or relatively slow performers would notice others still in the processes of working.

performance) and one indirect predictor (collative motivation) associated with one of the direct predictors (stimulus pattern) (Marascuilo & Levin, 1983).

Following the method used by Judd and Kenny (1981), two types of mediation models were tested, simple mediation and interactional mediation. In simple mediation, each criterion (interest and enjoyment) is regressed on the independent variable (stimulus pattern), perceived performance, and the hypothesized mediator (collative motivation). Simple mediation tests for an individual effect for each of these three predictors on the criterion. In interactional mediation, each criterion is regressed on the three variables included in simple mediation plus the interactions of both perceived performance and collative motivation with the independent variable, stimulus pattern. Interactional mediation, therefore, tests whether either perceived performance or collative motivation has its effect on the criterion in part, or entirely, through an interaction with stimulus pattern.

Interest. To test for simple mediation, interest was regressed on the three-term model comprised of stimulus pattern, perceived performance, and collative motivation. The three-term model was significant overall [$F(3, 53) = 9.20$, $p < .01$, $R^2 = .34$]. Stimulus pattern [$F(1, 53) = 4.38$, $p < .05$], collative motivation [$F(1, 53) = 14.22$, $p < .01$], and perceived performance [$F(1, 53) = 8.28$, $p < .01$] all emerged as significant individual predictors of interest.

Given the success of the simple mediation model, the interactional mediation model was tested to assess whether collative motivation or perceived performance further contributed to the prediction of interest via an interaction with stimulus pattern. To test for interactional mediation, two two-way interaction terms (collative motivation and perceived performance each multiplied by stimulus pattern) were added to the basic three-term simple mediation model. Neither interaction accounted for significantly more variance in interest than did the simple mediation model. Because the interactional mediation model failed to account for a significantly greater proportion of variance in interest than did the simple mediation model, the simple mediation model was used to construct the final path model for interest.

Enjoyment. To test for simple mediation, enjoyment was regressed on the same three-term simple mediation model used in the interest regression. The three-term simple mediation model was significant overall [$F(3, 53) = 10.61$, $p < .01$, $R^2 = .38$]. Perceived performance was the only predictor able to emerge as an individually significant predictor of enjoyment [$F(1, 53) = 30.53$, $p < .01$].

In the test for interactional mediation, neither two-way interaction term accounted for significantly more variance in enjoyment than the simple mediation model. Therefore, the effect of perceived performance on en-

Table I. Mediation Model Summaries for Interest and Enjoyment in Experiment 1[a]

	Interest				Enjoyment			
Predictor variable	$F(1,53)$	Beta	b	SE b	$F(1, 53)$	Beta	b	SE b
Stimulus pattern	4.38[b]	.25	.45	.22	1.42	.14	.30	.25
Collative motivation	14.22[c]	.45	.84	.22	3.17	.21	.47	.26
Perceived performance	8.28[c]	.33	.61	.21	30.53[c]	.62	1.39	.25
Constant			6.21	.21			6.18	.24

[a]Test of overall interest model: $F(3, 53) = 9.20, p < .01$ ($R^2 = .34$). Test of overall enjoyment model: $F(3, 53) = 10.61, p < .01$ ($R^2 = .38$).
[b]$p < .05$.
[c]$p < .01$.

joyment was a direct one, unaffected by its interaction with stimulus pattern.[4]

Table I provides a summary of the regression models used to construct the final two mediation models, one for interest and one for enjoyment. The F-ratios are a result of a series of hierarchical regressions in which each individual predictor was entered on a final step with all previous predictors previously entered. Thus, the F-ratio is the F change statistic for each predictor after the variance in the criterion explained by all other predictors was first removed. The final models in Table I (overall F's and beta weights), however, represent single regressions in which all predictors were entered on one step. Except for stimulus pattern, which was scored as +1 (MI patterns) and −1 (LI patterns), all variables were standardized before being entered into the regression equations, hence the similarity between the standardized and the unstandardized beta weights in Table I.

The final path models for interest and enjoyment are shown in Fig. 1. For the interest path model, collative motivation (beta = .45), stimulus pattern (beta = .25), and perceived performance (beta = .33) were individual predictors. Experiencing the anagrams as novel, complex, and variable (i.e., collative motivation), exposure to MI patterns, and a successful performance evaluation led to interest (and that collative motivation was anticipated by exposure to the MI patterns). For the enjoyment path model, perceived performance was the critical predictor (beta = .62). How successful one perceived his or her performance determined level of enjoyment.

[4]Incidentally, the two-way interaction of perceived performance and collative motivation and the three-way interaction of stimulus pattern, perceived performance, and collative motivation were tested in follow-up interactional mediation model analyses for both interest and enjoyment. Neither interaction term was significant for interest or enjoyment, and the significance levels of the other effects were unchanged when the interaction terms were controlled for. Therefore, these two terms were not reported in the above interactional mediation analyses.

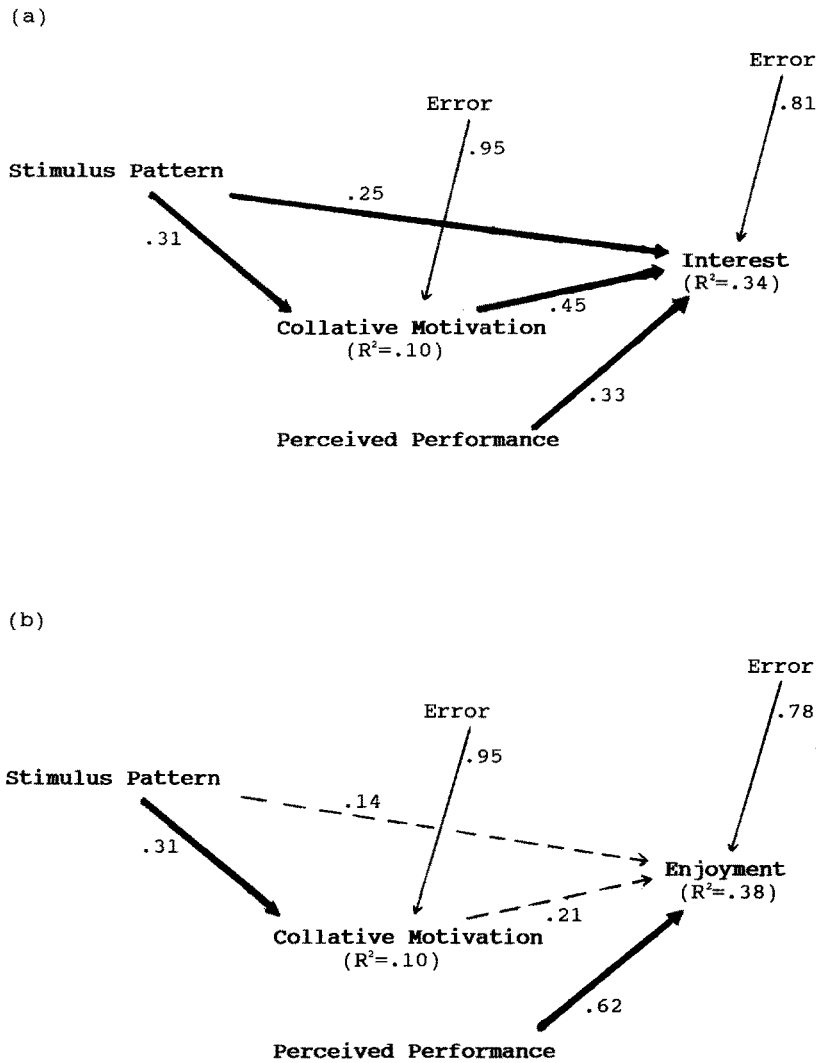

Fig. 1. Path models for interest (a) and enjoyment (b) for the anagram task in Experiment 1. Solid lines represent significant paths, $p < .05$; dashed lines represent nonsignificant paths.

To explore the unexpected finding that perceived performance predicted interest, the zero-order correlation coefficients among all measures used in the interest and enjoyment regressions were computed. The intercorrelation matrix for the five measures is shown in Table II. Table II shows the expected significant correlations between (1) stimulus pattern and colla-

Table II. Intercorrelation of All Measures in Experiment 1[a]

	M	SD	1	2	3	4	5
1. Stimulus pattern	−.09	1.01	—	.31[a]	−.15	.34[a]	.11
2. Collative motivation	24.02	6.20		—	−.26[a]	.44[a]	.09
3. Perceived performance	6.49	2.39			—	.18	.55[a]
4. Interest	6.18	1.84				—	.61[a]
5. Enjoyment	6.16	2.23					—

[a] $p < .01$.

tive motivation, (2) stimulus pattern and interest, (3) collative motivation and interest, (4) perceived performance and enjoyment, and (5) interest and enjoyment. In addition, Table II shows two revealing correlations: perceived performance was negatively correlated with collative motivation ($r = -.26$, $p < .05$), and perceived performance was not significantly correlated with interest ($r = .18$). Together, the latter two correlations indicate that the relationship between perceived performance and interest found in the path model in Fig. 1 is a precarious one.

Discussion

Figure 1 showed, as predicted, that perceived performance predicted enjoyment, while collative motivation accounted for very little variance in the enjoyment ratings. In addition, Fig. 1 showed, as expected, that stimulus pattern predicted collative motivation, and collative motivation, in turn, predicted interest. This pattern of findings provides support for the hypothesis that perceived performance predicts enjoyment, while collative motivation predicts interest.

Unexpectedly, stimulus pattern also had a direct (unmediated) effect on interest, suggesting a potential problem with the manipulation of the MI stimulus patterns. The strategy to manipulate the anagram patterns with varying placements, sizes, and angles might have been problematic because such a manipulation could affect not only collative motivation but some other arousing condition, such as distraction. If the varied sizes, colors, etc., of the MI patterns was distracting, then the interest ratings might be a function of both collative motivation and distraction arousal. To remedy this potential confound of the stimulus materials, Experiment 2 employed a different experimental task and varied the content rather than the appearance of the stimulus patterns.

That perceived performance predicted interest was a second unexpected result. There are, however, two good reasons to forward a skepticism that perceived performance is causally predictive of interest. First, because the data are correlational in nature, the direction of causation is un-

clear. Performance evaluation might have predicted interest or a developing interest in anagram-solving might have predicted the subsequent performance evaluation. Second, perceived performance and interest had a nonsignificant bivariate relationship (see Table II). An examination of the zero-order correlations between collative motivation and perceived performance (significant and negative), collative motivation and interest (significant and positive), and perceived performance and interest (not correlated), identifies collative motivation as a suppressor variable in the perceived performance-interest relationship (as described by Marascuilo & Levin, 1983). The finding that a suppressor variable augmented the perceived performance-interest relationship (mathematically speaking) discounts the conceptual link between perceived performance and interest.

A final concern from Experiment 1 was that single item questions measured interest and enjoyment. In Experiment 2, five-item scales rather than single-item questions assessed the critical dependent measures.

EXPERIMENT 2

In Experiment 1, the content of the experimental task was held constant across MI and LI patterns, while the visual appearance of the patterns was varied to affect collative motivation. In Experiment 2, and visual appearance of the patterns was held constant across the MI and LI patterns, while the content of the experimental task was varied to affect collative motivation. Thus, in Experiment 2, novelty, extent of change, uniqueness, etc., were incorporated into the content rather than the appearance of the stimulus materials.

Experiment 2 employed a puzzle task (described in the Method section). Participants in the MI condition worked on a series of nine unique forms of the puzzle. Participants in the LI condition worked on a series of repetitive forms of the puzzle (see Fig. 2). As shown in Fig. 2, participants in the MI condition always worked on a previously unencountered pattern of the puzzle. Participants in the LI condition repeated the same three solution sequence (Cube, T, and L) three consecutive times.

Method

Participants

Fifty participants, 25 females and 25 males, from various introductory psychology classes composed the sample. In exchange for participation, each participant received extra course credit.

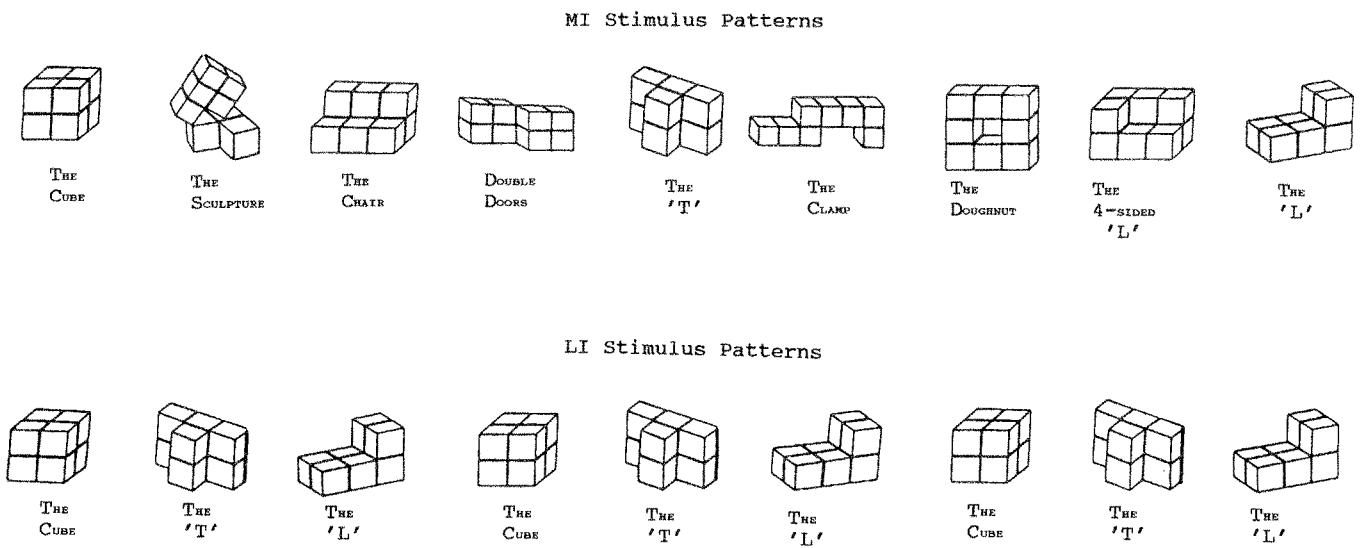

Fig. 2. Illustration of MI and LI stimulus patterns for the puzzle task used in Experiment 2.

Materials

Experimental Task. The experimental task was a three-dimensional, eight-cubed puzzle that shapes into a variety of forms. Previous empirical studies indicate that participants display intrinsically motivated behavior toward the puzzle and report it to be both interesting and enjoyable (Olson, 1985; Reeve *et al.,* 1986, 1987). To illustrate visually the requested solutions, each participant saw an 8.5 × 11- in. ink drawing and a scaled wooden replica of each solution.

Pilot work tested many different puzzle forms for mean solution times and perceived levels of difficulty, challenge, interestingness, and enjoyment. Two aspects of the stimulus materials led to the choice of the cube, T, and L forms of the puzzle for the LI condition. First, the cube, T, and L are visually similar. The T and L, for example, are one-step and two-step permutations from the cube solution. Second, the moderate level of difficulty of the cube, T, and L made it relatively easy to find matching MI forms in terms of level of difficulty, challenge, interest, enjoyment, and solution time.

Questionnaires. The postpuzzle questionnaire assessed four measures: collative motivation, perceived performance, interest, and enjoyment. The measures of collative motivation and perceived performance were the same as in Experiment 1. Collative motivation was assessed by the same six-item scale including novelty, extent of change, etc. (alpha = .76). Perceived performance was assessed by asking the participant to rate his/her performance as a complete success, a complete failure, or something in between.

The measures of interest and enjoyment were expanded into a 10-item scale, 5 items assessing interest and 5 items assessing enjoyment. The questions that measured interest on 0–10 Likert scales were as follows: "How interesting is the puzzle?" (Interest); "To what extent did the puzzle stimulate your curiosity?" (Stimulate Curiosity); "How curious do you feel about how the puzzle works?" (Curious); "Is this the type of task that you would like to explore further?" (Explore); and "How did you feel while you manipulated the puzzle into its different forms?" (Manipulate). The questions that measured enjoyment were as follows: "How enjoyable is the puzzle?" (Enjoyable); "How fun is the puzzle?" (Fun); "How willing would you be to come back and participate again in a study using the same puzzle?" (Willingness to Continue); "Are you glad that the puzzle-solving is over or would you like to continue to solve additional puzzles?" (Continued to Solve); "Did you experience the puzzle as work, as leisure, or as something in between?" (Leisure).

Procedure. Volunteers participated individually in either the MI or the LI condition, with equal numbers randomly assigned to each condition. The experimenter introduced the study as a problem-solving exercise and in-

formed the participant that nine forms of the puzzle were to be presented for solution. The experimenter told the participant that the object of the puzzle-solving was "to do your best," and the experimenter recorded the time it took the participant to solve each form.

The nine wooden block models were on a small table by the experimenter and hidden from the participant. At the start of each trial, the experimenter placed the appropriate wooden model in front of the participant. A maximum time allotment of 4 min was provided for each individual solution form. At the end of each trial, the experimenter returned the wooden block model to the out-of-sight table and began the next trial by placing another wooden model in front of the participant. After completing all nine trials, the experimenter announced that the time for the puzzle-solving phase of the experiment had ended. The participant then completed the postpuzzle questionnaire. After the participant completed the questionnaire, the experimenter conducted the debriefing.

Results

Preliminary Analyses

Four items of the postpuzzle questionnaire assessed the equivalence of the MI and LI puzzle series. The items asked participants to report how much effort they had put into the puzzle-solving, how difficult the solutions were, how easy they found the puzzles to solve, and how challenging the puzzles were. Participants solving the MI and LI series of puzzles did not differ significantly on any of these measures: effort [MI = 6.84, LI = 6.96, $t(48) = 0.20$], difficulty [MI = 5.68, LI = 5.92, $t(48) = 0.46$], easy, [MI = 5.76, LI = 5.84, $t(48) = 0.17$], and challenging [MI = 7.08, LI = 7.00, $t(48) = 0.17$]. The actual performance of the MI and LI participants was also compared by testing the total number of seconds required to solve all nine puzzles. Participants' performance on the MI ($M = 697.3$ sec) and LI ($M = 772.2$ sec) series of puzzles did not significantly differ [$t(48) = 1.00$, n.s.].

Effects of Stimulus Pattern. As in Experiment 1, the effect of stimulus pattern on collative motivation and perceived performance was tested. As expected, MI ($M = 27.4$) participants reported a significantly higher level of collative motivation than did LI ($M = 21.1$) participants [$t(48) = 4.62$, $p < .01$, two-tailed]. No relationship between stimulus pattern and perceived performance was expected, but it was necessary to test for such an effect because perceived performance was assessed after the stimulus pattern manipulation. MI ($M = 5.84$) and LI ($M = 5.08$) participants did not significantly differ on perceived performance [$t(48) = 1.37$, n.s.].

Measurement of Interest and Enjoyment. Factor analysis with oblique rotation was performed on the 10-item questionnaire assessing interest and enjoyment. As expected, two factors emerged. The first factor extracted accounted for 48.1% of the variance and was interpreted as measuring enjoyment. Six items had factor loadings greater than or equal to .30: enjoyment (.86), fun (.86), willingness to continue (.80), continue to solve (.78), leisure (.60), and, surprisingly, interest (.60). Scores on these six items were combined with a weighted formula to constitute the enjoyment measure (alpha = .86). The second factor extracted accounted for 20.3% of the variance and was interpreted as measuring interest. Five items had factor loadings greater than or equal to .30: curious (.94), stimulate curiosity (.91), explore (.71), manipulate (.68), and interest (.44). Scores on these five items were combined with a weighted formula to constitute the interest measure (alpha = .85).

Interest Mediation Model

Both simple and interactional mediation models were tested on the interest measure. To test for simple mediation, the interest measure was regressed on the three-term model composed of stimulus pattern, perceived performance, and collative motivation. The three-term model was significant overall [$F(3, 46) = 5.95, p < .01, R^2 = .28$]. Only collative motivation emerged as a significant individual predictor of interest [$F(1, 46) = 14.95, p < .01$]. In the tests for interactional mediation neither the two-way interaction terms nor the three-way interaction term accounted for a significantly greater proportion of the variance in interest than did the simple mediation model. Table III provides a summary of the regression models used to construct the final mediation models of the interest regression.

Table III. Mediation Model Summaries for Interest and Enjoyment in Experiment 2[a]

	Interest				Enjoyment			
Predictor variable	$F(1,46)$	Beta	b	SE b	$F(1,46)$	Beta	b	SE b
Stimulus pattern	1.99	−.22	−1.42	1.00	1.39	−.15	−1.39	1.18
Collative motivation	14.95[c]	.58	3.87	1.00	6.66[b]	.33	3.04	1.18
Perceived performance	1.84	.17	1.05	.77	14.94[c]	.65	5.50	.91
Constant			27.29	.84			28.40	.99

[a]Test of overall interest model: $F(3, 46) = 5.95, p < .01$ ($R^2 = .28$). Test of overall enjoyment model: $F(3, 46) = 14.94, p < .01$ ($R^2 = .49$).
[b]$p < .05$.
[c]$p < .01$.

Enjoyment Mediation Model

To test for simple mediation, the enjoyment measure was regressed on the same three-term model composed of stimulus pattern, perceived performance, and collative motivation. The three-term model was significant

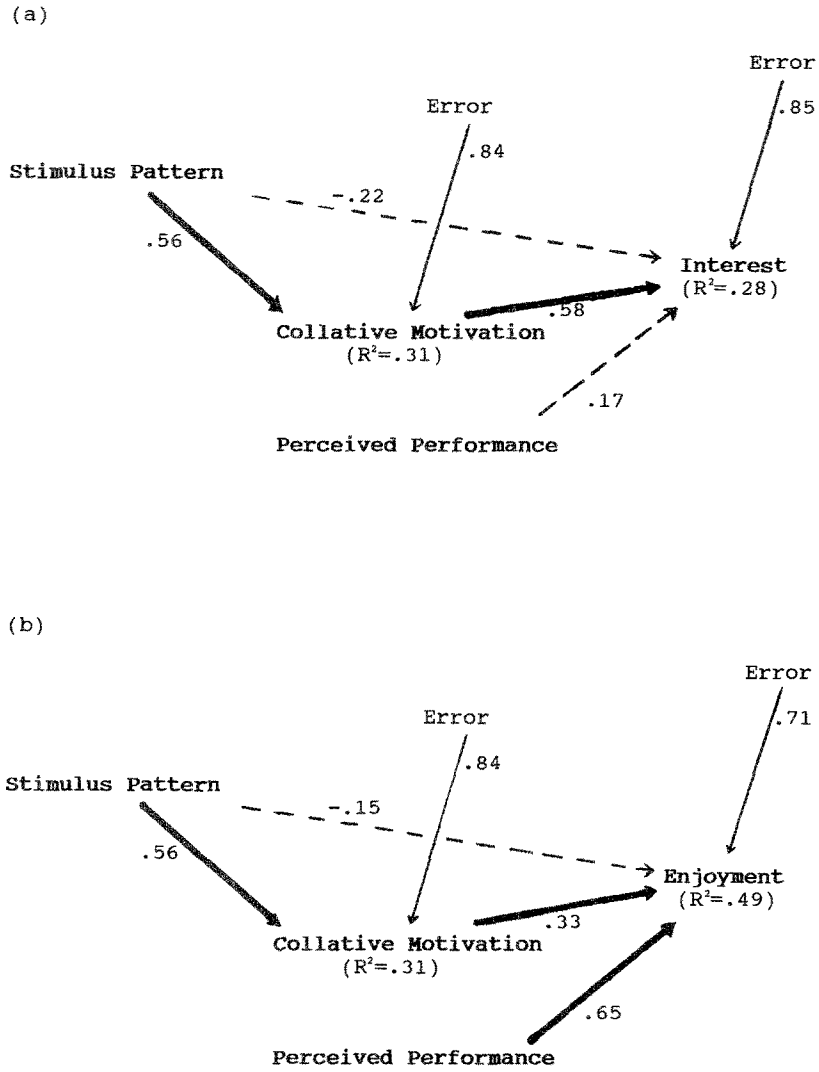

Fig. 3. Path models for interest (a) and enjoyment (b) for the puzzle task in Experiment 2. Solid lines represent significant paths, $p < .05$; dashed lines represent nonsignificant paths.

Table IV. Intercorrelation of All Measures in Experiment 2

	M	SD	1	2	3	4	5
1. Stimulus	.00	1.01	—	.56[b]	.19	.14	.16
2. Collative motivation	24.26	5.79		—	.09	.48[b]	.30[a]
3. Perceived performance	5.46	1.98			—	.18	.65[b]
4. Interest	27.71	6.64				—	.50[b]
5. Enjoyment	28.22	9.31					—

[a] $p < .05$.
[b] $p < .01$.

overall [$F(3, 46) = 14.94, p < .01, R^2 = .49$]. Perceived performance [$F(1, 46) = 14.94, p < .01$] and collative motivation [$F(1, 46) = 6.66, p < .05$] both emerged as significant individual predictors of enjoyment. In the test for interactional mediation, no interaction term accounted for a significant proportion of the variance beyond that accounted for by the three-term simple mediation model. A summary of the regression models for the final enjoyment mediation model is shown in Table III.

The final path models for interest and enjoyment are shown in Fig. 3. For the interest path model stimulus pattern (beta = .56) predicted collative motivation, and collative motivation (beta = .58) in turn predicted interest. Exposure to the MI series of puzzles heightened collative motivation, and experiencing the puzzles as novel, irregular, and changing heightened interest. For the enjoyment model perceived performance (beta = .65) and collative motivation (beta = .33) were the individual predictors. Evaluating one's performance as a success and experiencing the puzzles as novel, irregular, and changing heightened enjoyment.

The intercorrelation matrix for all measures used in the interest and enjoyment regressions is shown in Table IV. Five significant correlations were expected, four that materialized (stimulus pattern and collative motivation, collative motivation and interest, perceived performance and enjoyment, and interest and enjoyment) and one that did not (stimulus pattern and interest). The one unexpected correlation to emerge was between collative motivation and enjoyment.

Discussion

Experiment 2 eliminated the chief methodological problems from Experiment 1. First, the manipulation of collative motivation via stimulus pattern was improved and successful. Support for the improvement can be found in the relatively high correlation between stimulus pattern and collative motivation ($r = .56$) as well as in the nonsignificant path between stimulus pattern and interest. These results suggest that the stimulus pattern

manipulation affected collative motivation but did not contribute a secondary source of interest (i.e., a distraction effect). Second, the path from perceived performance to interest in Experiment 2 was nonsignificant. The nonsignificant perceived performance-interest path in Experiment 2 is noteworthy because the same zero-order correlation between the two variables occurred in both Experiment 1 and Experiment 2 ($r = .18$). The findings in Experiment 2 therefore support the interpretation that there is not a conceptual relationship between perceived performance and interest.

The findings in Experiment 2 raised two new questions. First, the correlational findings do not clarify whether the repetitious series of solutions (LI pattern) decreased collative motivation or whether the changing series of solutions (MI pattern) increased collative motivation. Random assignment to condition ensured that all participants in the MI and LI conditions started the puzzle-solving with comparable levels of interest. It is an interesting question for future research to test whether repetition decreases, or novelty increases, collative motivation.

Second, the factor analysis of the 10-item interest and enjoyment questionnaire produced a surprising result. The five a priori enjoyment items all had high loadings on the enjoyment factor and low loadings on the interest factor. The five a priori interest items, however, produced a different pattern of factor loadings. The two curiosity items, manipulation, and exploration items all loaded on the interest and not the enjoyment factors, but interest loaded on both the interest and the enjoyment factors. Too much weight should not be placed on a single factor analysis, but the factor analysis indicates that curiosity (rather than interest) is the phenomenological state distinct from enjoyment and that interest is enjoyable.

GENERAL DISCUSSION

Intrinsic motivation is an internal state characterized by interest and enjoyment that is responsible for the willingness to initiate and continue free-choice behavior. The present paper has attempted to contribute to the understanding of the nature of the internal conditions underlying intrinsic motivation by drawing a distinction between interest and enjoyment on the basis of differential determinants.

Contemporary research on intrinsic motivation often presupposes intrinsic motivation to be a unitary construct. The terms "intrinsic motivation," "intrinsic interest," "curiosity," "competence," and "enjoyment" are frequently used interchangeably as synonyms. Nonetheless, the data from the present study suggest merit for distinguishing between interest (or curiosity) and enjoyment within the study of intrinsic motivation.

In contrast to the idea that intrinsic motivation is a unitary construct, several theorists do distinguish between interest and enjoyment. Most notably, Carroll Izard (1977) proposed that interest is the emotion underlying curiosity, attention, stimulus selection, investigatory activity, and exploration. Enjoyment, on the other hand, is a separate emotion underlying satisfaction. Performance satisfaction that leads to feelings of mastery, efficacy, and competence relates enjoyment to intrinsic motivation, whereas satisfaction of a drive state or the receipt of tangible rewards relates enjoyment to extrinsic motivation. Thus, enjoyment can relate either to intrinsic or extrinsic motivation. Recent work by Scanlan and her colleagues confirms that enjoyment derives from both intrinsic (perceptions of mastery) and extrinsic (public recognition) sources (e.g., Scanlan, Stein, & Ravizza, 1989).

Interest is the primary emotion underlying intrinsic motivation, but Izard (1977) noted that enjoyment plays a secondary role. Izard also proposed that interest and enjoyment complement one another to produce intrinsic motivation. Interest occurs first, and the individual begins to attend selectively to a particular stimulus. The selective attention produces exploration, and the individual investigates and manipulates the stimulus. Following satisfactory consequences of such manipulation, joy emerges and attenuates, masks, and inhibits the interest emotion. Hence, a satisfaction-based joy follows an exploration-based interest.

Another theorist making an interest-enjoyment distinction is George Mandler (1982). Mandler, using a cognitive perspective, differentiates between interest and enjoyment by suggesting that "schema congruity" is a cognitive mechanism for enjoyment, while schema incongruity produces interest. A schema represents an individual's cognitive representation of his or her past experience with an event (e.g., organization of past puzzle-solving experiences). Any given interaction with an event provides information that either coincides and matches or contradicts and mismatches one's preexisting schema of how such interactions typically go. For Mandler, schema congruity (schema-experience match) is an inherently positive affective experience. For example, when a puzzle-solver expects to do well and then does well, then the schema-experience congruence produces enjoyment. Schema incongruity (schema-experience mismatch) is inherently attention-getting and interesting. For example, when a puzzle-solver expects to do well and then does poorly, the schema-experience incongruence produces interest. After schema incongruity, the person feels aroused from autonomic nervous system activity, and the state of arousal is inherently interest-provoking.

An interest-enjoyment distinction is also found implicity or explicitly in the writings of several other major theorists. Carl Rogers (1951) made a distinction between the excited feelings and the satisfied feelings. Excited feelings accompany the seeking efforts of the organism, while satisfied feelings correspond with the development of the self and the enhancement of

the organism. Finally, we make an interest-enjoyment distinction in our work (Reeve & Cole, 1987). We have previously proposed that interest and enjoyment are not a single organismic entity (i.e., an individual's intrinsic motivation), but rather interest and enjoyment are conceptually distinct, although correlated, phenomenological aspects of intrinsic motivation.

From each of the above perspectives, one might suppose that interest and enjoyment provide different contributions to intrinsically motivated behavior. Interest, which is largely a function of stimulus characteristics (Berlyne, 1966), contributes to intrinsically motivated behavior by arousing attention, attracting curiosity, and inviting exploration, investigation, and manipulation of the stimulus. Enjoyment, on the other hand, which is largely a function of performance evaluations (Harackiewicz *et al.,* 1985), contributes to intrinsically motivated behavior by encouraging future encounters with the activity and by increasing one's willingness to seek out and conquer task challenges.

Such a proposal does have support. Berlyne's (1963b) experimental efforts led to the finding that stimuli arousing collative motivation led to exploratory behaviors as measured by looking (visual stimuli) and listening (auditory stimuli) time as well as to the theoretical statement that the principal motivational effects of collative properties are the *initiation* and *direction* of exploratory behavior. Other experimental efforts (Csikszentmihalyi, 1975; Harter, 1974; Harackiewicz, 1979) led to the conclusion that competent performances on challenging tasks are enjoyed, and increased enjoyment increases one's willingness to continue the activity and to confront additional, similar challenges in the future. In other words, the principle motivational effects of enjoyment are the *willingness to continue* and *persist* in the activity.

Intrinsic motivation and intrinsically motivated behavior may be a two-step event. At first, various activities are explored, investigated, and manipulated (step 1). If a particular activity promises challenge or provides the individual with competence feedback (step 2), then the activity is likely to become intrinsically motivating for that person. Humans simply enjoy those activities in which they have performed well in the past, and they tend to persist in (i.e., show intrinsically motivated behavior toward) those activities for their own sake. If the activity does not provide competence feedback or loses its novelty, then its initial (step 1) appeal declines and the person explores and manipulates other activities that seem curious and worthy of investigation. Novel activities deemed worthy of investigation consequently provide new opportunities to explore and understand the world, opportunities that can be undertaken to test and to exercise personal skills and competencies (Gibson, 1988). When the outcome of such tests and exercises of personal skills provides competence information, the activity is likely to become an intrinsically motivating one.

From a more dynamic perspective, intrinsically motivated behavior can be viewed as an ongoing, cyclical sequence of behavior that includes exploration, investigation, manipulation, challenge confrontations, and after an experience of competence feedback, persistence and reengagement (e.g., Condry & Chambers, 1978). Together, these two processes—interest and enjoyment—explicate the full sequence of intrinsically motivated behavior better than does either process alone.

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