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The Zeigarnik Effect and Intrinsic Motivation: Are They the Same?[1]

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The present study focused on delineating the parameters under which intrinsic motivation leads an individual to reengage an activity from those that result in the Zeigarnik effect. In a posttask free-choice period, participants not completing the experimental task displayed more reengagement behavior than participants completing the task (the Zeigarnik effect). When participants were also provided self-efficacious performance feedback via a prearranged competitive outcome manipulation, there was no evidence of the Zeigarnik effect, while there was support for intrinsic motivation from competent self-efficacious performance feedback. Results were discussed in terms of distinguishing between intrinsic motivation and the Zeigarnik effect as sources of reengagement motivation. It was concluded that, in the presence of self-efficacious performance feedback, the competent–incompetent impression was more salient than task-completion feedback.

Two sources of motivation to reengage an activity are the fact that it was left unfinished and the fact that it is intrinsically motivating. The motivation to reengage unfinished, interrupted activities is referred to as "the resumption drive" (Marrow, 1938, p. 11) and is discussed as the Zeigarnik effect (Green, 1963; Kruglanski, Friedman, & Zeevi, 1971). The motivation to

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reengage enjoyable, challenging activities is referred to as intrinsic motivation (Deci, 1975; Deci & Ryan, 1980, 1985). The purpose of the present study was to identify the relative contributions of the Zeigarnik effect and intrinsic motivation to the tendency to reengage an activity.

In examining the detrimental effects that extrinsic rewards have on reengagement motivation, McGraw and Fiala (1982) asked participants to solve a *T* puzzle, and the participants either were promised a reward (expected reward condition) or were later given the reward unexpectedly (unexpected reward condition). The puzzle was sufficiently difficult so that no participant was able to complete it, thus rendering the participants liable to the Zeigarnik effect. After a 3-minute mock-experimental session, the experimenter administered the reward and left the room with a promise to return; a free-choice period ensued. These authors noted that 18 of 21 (86%) unexpected reward participants reengaged the *T* puzzle, while only 11 of 19 (58%) expected reward participants did so. On the basis of the significance of that difference, McGraw and Fiala hypothesized that the anticipation of receiving the reward "undermined" the Zeigarnik effect. That is, the process of thinking about the reward served to transfer participants' attention away from the puzzle and toward the reward, thereby inhibiting reengagement motivation resulting from the Zeigarnik effect. A second analysis, the number of seconds spent playing with the puzzle in the 5-minute free-choice period, also indicated that unexpected reward participants spent significantly more time playing with the puzzle than did expected reward participants. McGraw and Fiala (1982) noted that the anticipation of receiving a reward undermined the Zeigarnik effect "regardless of whether the data are analyzed by percent of reengagement (the Zeigarnik effect) or extent of reengagement (intrinsic motivation index)" (p. 63). These data supported McGraw and Fiala's belief that the Zeigarnik effect is "very much an instance of intrinsic motivation" (1982, p. 60), and they concluded that much of what has been called "intrinsic motivation" by other researchers may actually be a manifestation of the Zeigarnik effect.

It is proposed, regardless of the McGraw and Fiala (1982) results, that there are three good reasons why it would be an error to equate intrinsic motivation with the Zeigarnik effect. First, intrinsically motivated behaviors are readily displayed after completed tasks as well as after uncompleted tasks. If intrinsic motivation was a manifestation of the Zeigarnik effect, then intrinsically motivated behaviors would cease following the completion of a task. In many studies, however (e.g., Harlow, 1950; Olson, 1985; Reeve, Olson, & Cole, 1985; Sorensen & Maehr, 1976), participants reengaged activities they had successfully completed and had no extrinsic incentive to do so. Investigations that show intrinsically motivated behaviors after successful, completed tasks demonstrate two principles relative to intrinsic motivation that distinguish it from the Zeigarnik effect: (1) Intrinsically motivated

behaviors are potentially operative with completed activities (e.g., Harlow, 1950), and (2) competence feedback, i.e., a performance perceived to be successful, enhances an individual's motivation to reengage an activity (e.g., Reeve et al., 1985).

Second, whether a task is reengaged because it is interrupted or because it is intrinsically motivating is often equivocal. McGraw and Fiala (1982) demonstrated that with an enjoyable and interrupted activity, a majority of participants reengaged the task. What is not clear is whether participants chose to reengage the task because it was intrinsically motivating or because it was interrupted. To answer this question, additional experimental conditions are necessary. It will be necessary to isolate the contribution of the Zeigarnik effect to reengagement behavior on intrinsically motivating activities as well as the contribution of intrinsic motivation to reengagement behavior on non-completed activities.

A final reason to differentiate between the Zeigarnik effect and intrinsic motivation is that intrinsically motivated behaviors are susceptible to influence by self-efficacious information from task involvement (Bandura, 1982a, 1982b; Bandura & Schunk, 1981). Persons receiving competent feedback display more reengagement behavior than persons receiving incompetent feedback (Arkes, 1978, 1979; Reeve et al., 1985; Rosenfield, Folger, & Adelman, 1980).

The plan of the present study used the same two indices of reengagement motivation used by McGraw and Fiala (1982): the all-or-none reengaging of the task (the Zeigarnik index) and the extent of interest displayed toward the task in a free-choice period (the intrinsic motivation index). Self-efficacious feedback was selected to manipulate intrinsic motivation. In order to contrast the differential roles of self-efficacious feedback and task completion feedback it was necessary to employ a task with a possible completion point. In selecting an experimental task that has a completion point, one of three options seemed obvious. The first option would be to employ two tasks: one that is easily solvable, and therefore readily completed, and one that is unsolvable, and therefore not readily completed. The problem with this approach is that a researcher cannot compare the two tasks in terms of difficulty, interest, or enjoyability. If one task is easy and the other is difficult, then participants may reengage the difficult task for the challenge and ignore the easy one due to boredom (e.g., Arkes, 1979). The second option would be to use the same task. Some participants could be given a short amount of time to discover the solution and others a longer time, thereby biasing who does and does not complete the task. Unfortunately, the second option would result in a serious exposure time confound. In our opinion, the most reasonable approach to the selection of an experimental task designed to answer the questions addressed was to use a task that was unrelated to ability factors, i.e., one that is consistently solved only by chance. On

the basis of our previous research, a solution to the puzzle (the experimental task) that had been typically solved by chance was selected. While we acknowledge that such a procedure may have some of the problems associated with self-selection, it is proposed that the chance solution is the closest approximation to a random assignment that also allows a manipulation of self-efficacious feedback. The experimental task selected is detailed in the method section.

When an actor is not allowed self-efficacious performance feedback, the Zeigarnik effect is a powerful source of reengagement motivation (Marrow, 1938). But it was hypothesized that what is central to the motivation to reengage a task when the actor *does* receive self-efficacious performance feedback is not whether the task is or is not completed but, rather, whether the actor receives competent or incompetent self-efficacious performance feedback. To begin to demarcate the parameters of the Zeigarnik effect and intrinsic motivation, and to evaluate the experimental hypothesis, six conditions were studied: a completed task with either competent or incompetent feedback, a noncompleted task with either competent or incompetent feedback, and two control conditions without self-efficacious feedback but with either a completed or a noncompleted task.

The purpose of the two control conditions was to evaluate the capability of the experimental task to elicit the Zeigarnik effect. Since, in the two control tasks, self-efficacious performance feedback is nullified as a contributor to reengagement motivation, any reengagement behavior observed in the control/noncompleted condition that is not observed in the control/completed condition should evidence the traditional Zeigarnik effect.

The purpose of the experimental conditions was to answer the question: Are reengagement behaviors of individuals who consider themselves competent at a task attributable to intrinsic motivation or to the fact that the task was not completed? If reengagement behavior is attributable to noncompletion feedback, then participants who do not complete the task should display more reengagement behavior than participants who complete the task, regardless of competence feedback. Alternatively, if reengagement behavior is attributable to competent performance feedback, then participants who receive competent feedback should display more reengagement behavior than participants who receive incompetent feedback, regardless of whether the task was completed or not. Certainly, it is possible that both sources of motivation contribute to reengagement behavior. If this is the case, then the competence/noncompleted condition should show greater reengagement behavior than both the competence/completed and the incompetence/noncompleted conditions, and much more reengagement behavior than the incompetence/completed condition.

METHOD

Subjects

Participants were 181 undergraduate students, 105 females and 76 males, enrolled in various psychology courses at Texas Christian University. Each participated either for partial fulfillment of a course requirement or for extra course credit.

Procedure

Previous experiments (Olson, 1985; Jones, Reeve, Olson, & Cole, 1985; Reeve et al., 1985) have found that manipulating whether a participant wins or loses in a competitive situation involving an unfamiliar task is an effective way to send a message of competence or incompetence to a participant. Hence, participants were randomly assigned to one of three self-efficacious performance feedback groups: participants who were allowed to beat a confederate, i.e., to win a competition (competent feedback); participants who were prearranged to lose to a confederate, i.e., to lose a competition (incompetent feedback); and participants who did not compete against a confederate, i.e., a noncompetitive situation (no performance feedback). In addition, each of the three types of self-efficacious feedback groups was further divided into those participants who completed the task and those participants who did not complete the task. Thus, there was a total of four experimental groups and two control groups. All participants worked on an identical task, which was a three-dimensional, eight-cubed puzzle that could be shaped into a wide variety of forms. Participants worked through a series of five forms of the puzzle with a maximum time allotment of 3 minutes for the first two practice forms and 5 minutes for the last three.

For the experimental groups, the participant and a same-gender confederate were escorted by a same-gender experimenter to the experimental room, where they were informed that the experiment involved puzzle solving in a competitive situation, and the object of the task was to complete the puzzle before the other person. Participants were told that five trials were to be conducted, two practice and three competitive. The confederate never completed the first practice form, thereby allowing the participant to "win" while the confederate, who had memorized the necessary solutions a priori, always completed the second practice form quickly (less than 1 minute) and consequently "beat" the participant. The matching of outcomes on the two practice trials was designed to impress the participant that the pair was of

equal ability. For the win–lose manipulation (competent–incompetent impression), the confederate either won or lost all three competitive trials.

For the completion/noncompletion manipulation, a form of the puzzle was selected on the basis of testing that showed it to have a probability of solution of approximately .25, and that suggested the solution had no significant relationship to ability; i.e., it seemed to be solved by chance rather than by skill. This form of the puzzle was included as the second practice trial. The remaining four forms were selected because their probabilities of solution were virtually 1.00, on the basis of previous testing. Thus, for the present study, noncompletion meant not completing the second practice form in the 3 minutes allowed.

After all five trials were conducted, the experimenter announced that the time for the puzzle-solving phase of the experiment had ended. The experimenter requested a private interview with each participant and always chose the confederate first. As the experimenter and the confederate left the room, the experimenter promised to return in "about five or ten minutes." The participant was left alone for 8 minutes in the room, which, in addition to the puzzles, had a number of alternative activities, such as a television, several magazines, and a newspaper. To allow an accurate rating of the participant's puzzle-playing time, the 8-minute free-choice period was videotaped through a two-way mirror. When the time interval had elapsed, the experimenter reentered the experimental room and the participant was debriefed.

Since previous research (Jones et al., 1985) has shown that individuals who work on the puzzle-solving task in a competitive situation display virtually identical levels of intrinsic motivation as individuals who work singly, the controls in the present experiment worked on the puzzle singly. With that one exception, the participants in the control groups were treated exactly as those in the experimental groups. They were informed that there were two practice trials and three test trials and that the object was to complete the puzzle solutions as quickly as possible. The control groups had the same time constraints as the experimental groups. After five trials were conducted, the experimenter announced that the time for the puzzle-solving phase of the experiment had ended. The experimenter, feigning an unforeseen occurrence, announced a need to leave to retrieve some forgotten questionnaires, and promised to return in "about five or ten minutes". Again, the free-choice period was videotaped and the participant debriefed.

The experimenters and confederates employed in the experiment were thoroughly trained prior to their participation in the experiment. Their task, besides administering the experimental manipulation, was to convince the participants of the authenticity of the competition. The confederate, whether the puzzle forms were solved quickly or not at all, maintained a high level

of interest and effort throughout the competition. The experimenter, in both the competition and control conditions, also maintained a high level of interest and involvement. From the debriefings, by the senior author, it was clear that the outcome of the competition was quite meaningful to the participants, and each reported being unaware that the posttask interval was monitored through the two-way mirror.

RESULTS

Task-Completion Feedback Manipulation

The first question of the present investigation concerned the utility of the task-completion feedback manipulation. If the solution to the second puzzle form was attributable to some performance factor, such as ability, and not to chance, then the task-completion manipulation would be confounded and the results would consequently be difficult to interpret. To assess if the participants who solved (i.e., did complete) puzzle form two differed in puzzle-solving ability from the participants who did not solve it, the performance times of the two groups on puzzle forms one, three, four, and five were compared. Those data are shown in Table I as the mean number of seconds required to solve each solution. Table I compares the puzzle-solving performance of the participants who were prearranged to win the competition (competence/completed vs. competence/noncompleted), the puzzle-solving performance of the participants who were prearranged to lose the competition (incompetence/completed vs. incompetence/noncompleted), and the puzzle-solving performance of the participants who worked singly (control/completed vs. control/noncompleted). Each comparison was assessed by a t test, and the t ratio is shown below each comparison. In every comparison, the performance of participants who completed puzzle form two was not significantly different from the performance of participants who did not complete it. Since the participants who completed puzzle form two did not significantly outperform the participants who did not complete it on any of the other puzzle forms, it is reasonable to conclude that participants' self-assignment to one of the task-completion feedback conditions was attributable to chance and not to a performance factor such as ability.

Zeigarnik Effect and Intrinsic Motivation Analyses

In order to contrast the differential roles of self-efficacious performance feedback with task-completion feedback in reengagement motivation, both

Table I. Means and Standard Deviations (in Parentheses) of the Number of Seconds Required to Solve Each Puzzle Form with *T* Ratios by Experimental Condition

Condition						
Self-efficacious performance feedback	Task-completion feedback		Puzzle form[a]			
			1	3	4	5
Competence	Completed[b] (n = 12)	$\bar{X}$	69.7	155.7	84.7	140.6
		(SD)	(50.8)	(88.0)	(63.8)	(50.0)
Competence	Noncompleted (n = 59)	$\bar{X}$	69.7	102.2	116.0	161.4
		(SD)	(48.4)	(80.4)	(77.3)	(91.1)
		t ratio	−.01	+1.62	−1.02	−.59
Incompetence	Completed (n = 13)	$\bar{X}$	58.3	141.1	126.5	118.5
		(SD)	(26.9)	(95.0)	(92.3)	(84.2)
Incompetence	Noncompleted (n = 58)	$\bar{X}$	77.1	135.8	163.3	147.9
		(SD)	(50.5)	(89.0)	(94.4)	(96.1)
		t ratio	−1.19	+.17	−1.17	−.93
Control	Completed (n = 6)	$\bar{X}$	108.3	183.1	127.3	135.3
		(SD)	(72.9)	(88.2)	(105.7)	(118.6)
Control	Noncompleted (n = 33)	$\bar{X}$	91.8	137.1	145.1	151.2
		(SD)	(53.0)	(92.8)	(97.7)	(94.7)
		t ratio	+.71	+1.22	−.44	−.39

[a]Data concerning the second puzzle form were unnecessary since, by definition, participants in the Completed groups solved it while those in the Noncompleted groups did not.

[b]A completed task was tantamount to solving all five puzzle forms; a noncompleted task was tantamount to not solving the second puzzle form.

the percentage of participants who reengaged the puzzle and the extent of time that participants reengaged the puzzle were recorded as dependent measures. Two raters independently viewed the participants' free-choice period videotapes and scored both dependent measures. The raters' judgments concerning whether the participant reengaged the puzzle and concerning the number of seconds spent playing with the puzzle were virtually identical. For the analyses relevant to the Zeigarnik index, a Z^2 test (Darlington, 1975, p. 476) was used. For task-completion feedback, the Z^2 test compared the proportion of participants who reengaged the puzzle in the completion group with those in the noncompletion group; for self-efficacious performance feedback, the Z^2 test compared the proportion of participants who reengaged the puzzle in the competence group with those in the incompetence group. This test statistic yields a z score, and its level of significance corresponds to the standard normal distribution. Since the set of scores corresponding to the intrinsic motivation index was positively skewed, the number of seconds participants spent playing with the puzzle was subjected to a logarithmic transformation (i.e., $Y' = \log_{10}(Y + 1)$, where Y = the number of seconds in the free-choice period and Y' = the transformed score; Kirk, 1982, p. 83). For the analyses relevant to the intrinsic motivation index, the transformed scores pertaining to the free-choice period, an independent t test (two-tailed) compared the two control groups while a 2 × 2 analysis of variance (competence/incompetence × completed/noncompleted) compared the experimental groups.

Control Groups Analyses

The control groups were included in the experimental design for the purpose of assessing the capacity of the experimental task to elicit the Zeigarnik effect. The lower third of Table II reports the percentage of participants who reengaged the puzzle and the mean logarithmic transformed scores for the free-choice puzzle-playing time of participants in the control groups by task-completion feedback. Of the 39 participants in the control groups, 6 completed puzzle form two and 33 did not. One of the participants in the control/completed condition (17%) reengaged the puzzle for 78 seconds ($\overline{Y}'$ = .32) in the free choice period. Conversely, 27 of 33 participants (82%) who did not solve solution two reengaged the puzzle with a mean of 200.2 seconds ($\overline{Y}'$ = 1.73). Since both the percentage of reengagement (Z = 3.26, $p < .01$) and the extent of reengagement ($t(39)$ = 3.31, $p < .01$) differed significantly, one can conclude that, when performance feedback was unavailable, the act of not completing form two yielded the traditional Zeigarnik effect.

Table II. Reengagement Behaviors as Measured by the Zeigarnik Index and the Intrinsic Motivation Index for the Experimental and Control Conditions

Condition			Dependent measure			
			Zeigarnik index[a]		Intrinsic motivation index[b]	
Self-efficacious performance feedback	Task-completion feedback	N	n	Percentage	$\bar{X}$	SD
Experimental groups						
Competence	Completed	12	9	75%	1.80	1.11
Competence	Noncompleted	59	43	73%	1.71	1.08
Incompetence	Completed	13	6	46%	1.12	1.27
Incompetence	Noncompleted	58	28	48%	1.06	1.14
Control groups						
None	Completed	6	1	17%	.32	.77
None	Noncompleted	33	27	82%	1.73	1.06

[a]Number and percentage of participants reengaging the puzzle.
[b]Logarithmic transformed scores for the number of seconds playing with the puzzle in the free-choice period.

Experimental Groups Analyses

The remainder of Table II reports the percentage of participants who returned to the puzzle and the mean logarithmic transformed scores from the free-choice time for the experimental groups by self-efficacious performance feedback and task-completion feedback. It was hypothesized that if reengagement motivation was attributable to noncompletion feedback, then participants not completing the task would show significantly more reengagement behavior than would participants completing the task, irrespective of self-efficacious performance feedback. Alternatively, if reengagement motivation was due to competent self-efficacious feedback, then participants receiving competent self-efficacious performance feedback should show significantly more reengagement behavior than participants receiving incompetent self-efficacious performance feedback, irrespective of task-completion feedback. A third outcome was possible—namely, that self-efficacious performance feedback and task-noncompletion feedback collectively contribute to reengagement motivation. Such an outcome would be evidenced if participants who received both competent self-efficacious performance feedback and task-noncompletion feedback displayed more reengagement behavior than participants in the other three experimental conditions.

To determine the contributions of self-efficacious performance feedback and task-completion feedback in reengagement motivation, the data in Table II for the experimental conditions corresponding to the Zeigarnik index were analyzed by a Z^2 test while the data corresponding to the intrin-

sic motivation index were analyzed by a 2 × 2 ANOVA. There was no significant effect for task-completion feedback on the percentage of reengagement when the Zeigarnik index was collapsed across the competence feedback conditions (completed, 15 of 25, 60%; noncompleted, 71 of 117, 61%: $Z = .06$, n.s.). Moreover, the ANOVA computed on the intrinsic motivation index data revealed no significant effect for task-completion feedback (completed, $\bar{Y} = 1.45$; noncompleted, $\bar{Y} = 1.39$: $F(1, 138) = .08$, n.s.). There was a significant effect, however, for self-efficacious performance feedback for both the percentage of reengagement (competence, 52 of 71, 73%; incompetence, 34 of 71, 48%: $Z = 3.09$, $p < .01$) and the extent of reengagement (competence, $\bar{Y} = 1.73$; incompetence, $\bar{Y} = 1.07$: $F(1, 138) = 12.02$ $p < .001$). Participants receiving competent performance feedback showed more reengagement behaviors than participants receiving incompetent self-efficacious performance feedback, regardless of the completion feedback. The interaction between self-efficacious performance feedback and task-completion feedback did not approach significance for the intrinsic motivation index ($F(1, 138) = .002$, n.s.). Therefore, the task-noncompletion feedback did not increment reengagement motivation in either of the self-efficacious performance feedback conditions.

DISCUSSION

The purpose of the present study was to identify the relative contributions of the Zeigarnik effect and intrinsic motivation to the tendency to reengage an activity. The results made it clear that when only the knowledge that a task is not completed is salient, as in the control groups for the present study, the Zeigarnik effect is a significant source of reengagement motivation. For the participants who had no performance feedback, the control groups, those who completed the task were significantly less likely to reengage the puzzle than were those who did not complete the task. However, with the presence of self-efficacious performance feedback, the resumption drive appeared to lose its salience and was replaced by competency-related intrinsic motivation. With competent feedback, reengagement behavior was observed whether the task was previously completed or not.

The results of the present study, coupled with the results reported in the literature (Kruglanski et al., 1971; Deci & Ryan, 1980), make it clear that, under appropriate conditions, noncompletion feedback results in the Zeigarnik effect and competent self-efficacious feedback results in intrinsic motivation. What is notable in the present data is the fact that self-efficacious performance feedback served as a powerful source of reengagement motivation that overshadowed and replaced the Zeigarnik effect.

We propose that there are two plausible interpretations of the unexpected strength of the self-efficacious feedback. The first interpretation is that it was an artifact of the experimental design. Because of the nature of the manipulation, the task-noncompletion feedback always occurred first and the self-efficacious feedback was manipulated second. Perhaps reengagement motivation attributable to the resumption drive was aroused after the failure to complete the second puzzle form, but because of the timing and intensity of the performance feedback its effect replaced, rather than added to, the Zeigarnik effect. The fact that the noncompletion feedback was manipulated first and on only one trial, as compared to the competent feedback, which was manipulated second and on three trials, would lend credibility to the interpretation.

It is also possible that a second interpretation based on the relative importance of noncompletion feedback and performance feedback would explain the data. It may be that, lacking information about performance, the noncompletion feedback is salient for all the reasons primarily attributed to the Zeigarnik effect. Alternatively, the performance feedback may be more important to an individual. As a result, once feedback about performance is received, it becomes the major information on which reengagement motivation is based.

Unfortunately, the data from the present study do not allow an empirical test of the proposed interpretations. However, they clearly support the contention that the Zeigarnik effect and intrinsic motivation are not the same. Without either source of motivation to reengage the task, reengagement behavior was minimal. With noncompletion feedback only, reengagement behavior was substantial. Thus, it is clear that the Zeigarnik effect was replicated. The support for the argument that the Zeigarnik effect and intrinsic motivation are different follows from the fact that noncompletion feedback had no effect on reengagement behavior in the presence of self-efficacious performance feedback.

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