The effects of expected shock and expected payment on incidental retention

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The present research investigated both an arousal and an avoidance of negative affect explanation of incidental retention data reported by Pallak (1969). Ss performed a paired-associate copying task after learning that they would receive either (1) painful electric shock (high shock) or visual stimulation (low shock) in a subsequent experiment or (2) $4.50 (high payment) or $1.00 (low payment) in a subsequent experiment. Incidental retention was greater in both the high shock and high payment than it was in the low shock and low payment conditions, consistent with the arousal explanation.

Theoretically, the performance of behavior inconsistent with one's attitude arouses dissonance (Festinger, 1957). One may reduce dissonance by changing the attitude to be consistent with the behavior (Festinger & Carlsmith, 1959). For example, when Ss are induced to perform a dull task with little justification, dissonance may be reduced by favorably reevaluating the task (Freedman, 1963). However, Pallak, Brock, & Kiesler (1967) suggested that one might avoid dissonance by concentrating on a dull task rather than reduce dissonance by reevaluating the dull task. Dissonance was manipulated by offering Ss high or low choice to perform a dull paired-associates copying task. The authors suggested that Ss might concentrate more fully on the copying task, thereby lessening the salience of the dissonant cognitions ("I chose to do this task" and "This task is dull and boring"), rather than attempt to change either cognition. Increased concentration on the copying task would produce increased incidental retention of the paired associates but would not produce positive task reevaluation. The data were as predicted: Incidental retention was greater in the high-choice than in the low-choice condition with no reevaluation of the copying task, in line with the dissonance-avoidance hypothesis.

Recently, Pallak (1969) suggested that a process based on arousal rather than dissonance could account for the incidental retention above. Spence & Spence (1966) suggest that drive or arousal facilitates responses present in the repertory of the S. For simple tasks, involving minimal response competition, arousal facilitates the dominant response and enhances task performance. For complex tasks, involving greater response competition, arousal increases the probability of an incorrect response and depresses task performance. If one assumes both that dissonance has motivational properties similar to drive or arousal, and that the copying task employed by Pallak et al involved minimal response competition, the arousal hypothesis accounts neatly for the incidental retention data.

Pallak (1969) investigated the arousal explanation by manipulating task-relevant and task-irrelevant dissonance as well as anxiety about impending electric shock. Task-relevant dissonance was manipulated by offering Ss high or low choice to perform the dull copying task, while task-irrelevant dissonance was manipulated by offering Ss high or low choice to write a counter-attitudinal essay (cf. Brehm & Cohen, 1962) before performing the copying task. Anxiety was manipulated by informing Ss that they would receive either intense electric shock (high shock) or visual stimulation (low shock) following the copying task. Greater incidental retention was obtained in both high-choice conditions (relevant and irrelevant dissonance) than in both low-choice conditions. In addition, greater incidental retention was obtained in the high-shock than in the low-shock condition. These data suggested that the arousal hypothesis could account for the retention data more parsimoniously than could the dissonance-avoidance hypothesis.

The incidental retention data were also compatible with a more general cognitive avoidance hypothesis proposed by Singer (1967). Singer suggested that one lessens the salience of unpleasant affective states, such as anxiety (or dissonance), by seeking cognitive distraction from the unpleasant affective state. One implication is that Ss in the Pallak (1969) study sought distraction from their respective unpleasant states, anxiety or dissonance, by concentrating more fully on the paired-associate copying task. Increased task concentration would facilitate incidental retention regardless of the source of unpleasant affect and would reduce the salience of either the dissonance or the anxiety. Thus, Singer's hypothesis as well as the arousal hypothesis account for the incidental retention data described above. Both views offer more parsimonious explanations of the retention data than that of dissonance avoidance but rely on quite distinct theoretical processes.

The present research was conducted to assess the applicability of both the arousal and general avoidance explanations to the incidental retention data. Singer's analysis implies that Ss experiencing pleasant affect or arousal would not seek distraction from their internal state by concentrating on the copying task. On the other hand, the arousal framework implies that arousal, whether pleasant or unpleasant, would facilitate incidental retention. Two situational variations were employed in the present experiment. In the shock variation, Ss were led to expect either painful electric shock (high shock) or visual stimulation (low shock) in an experiment following the copying task. In the payment variation, Ss were led to expect either $4.50 (high payment) or $1.00 (low payment) for participating in the second experiment. The arousal framework predicts greater incidental retention in the high-shock and high-payment than in the low-shock and low-payment conditions. The avoidance of unpleasant affect hypothesis also predicts greater incidental retention in the high- than in the low-shock condition, but predicts either no difference between payment conditions or greater incidental retention in the low- than in the high-payment condition. The latter might be expected if Ss sought distraction from the dull copying task by concentrating on the expected payment.

SUBJECTS

A total of 122 female introductory psychology students participated individually in the experiment for research participation credit. Of these, 14 Ss were eliminated from the experiment for suspicion (N = 8) or because they suspected that there would be a recall test (N = 6), leaving a final experimental sample of 108 Ss.

PROCEDURE

The procedure employed closely follows that of Pallak et al (1967) and Pallak (1969) and is briefly summarized here. Upon arrival, all Ss were told that they would participate in two unrelated experiments, the copying task and a motor-skills task 30 min later.

The Expected Shock Manipulation

In the high-shock condition, the S was told that the second experiment dealt with the effects of electric shock on motor-task performance, that she would receive a series of painful electric shocks while performing standard motor tasks, and that her performance as a function of the shocks would be monitored. In the low-shock condition, the S was told that the second experiment dealt with the effects of visual stimulation on motor-task

performance, and that she would receive patterns of visual stimulation while her performance was monitored on the motor tasks. These two conditions provided a replication of the shock conditions included by Pallak (1969).

The Expected Payment Manipulation

In both payment conditions, the S was also told that the second experiment dealt with the effects of visual stimulation on motor-task performance, and that she would receive various patterns of visual stimulation while her motor-task performance was monitored. In the high-payment condition, the E told the S that she would receive $4.50 for the second experiment; in the low-payment condition, the S was told that she would receive $1.00 for the second experiment. In both conditions, the E explained that payment for the second experiment was customary since the second experiment was funded directly from a research grant.

The Copying Task

Following the shock or payment manipulation, all Ss received a booklet that contained, in order, a brief introduction, a sample copying task, a research participation form, and copying pages. The E elaborated briefly on the introduction and explained that Ss were in a control condition for previous research dealing with verbal behavior. After the sample copying task, all Ss filled out the research participation form on the next page. The E explained that the copying task was somewhat dull, and that students sometimes asked if they had to do the copying task, but that all Ss had to complete the copying task in order to receive participation credit. Thus, Ss in all four conditions in the design performed the copying task under the low-choice procedure employed by Pallak et al (1967) and Pallak (1969). The S read the form and signed it, indicating that she understood its contents.

All Ss then began the actual copying task. The projector presented each slide for 4 sec with 1 sec between slides. The 10 slides each consisted of two paired consonant-vowel-consonant trigrams of 60%-65% association value (Archer, 1960). Each slide was presented a total of 14 times and Ss copied each slide as it was presented. All Ss were explicitly cautioned not to memorize the slides.

Dependent Measures

All Ss received a second booklet that contained the recall test. The first trigram of each pair was presented with instructions to complete each pair from memory. This retention measure provided the main dependent measure. A third booklet contained a series of 101-point scales designed to evaluate the effectiveness of the manipulations and evaluations of the copying task: anxiety ("How much anxiety do you feel about being in the next study on motor skills?"), eagerness ("How eager are you to be in the next study on motor skills?"), and task enjoyment ("How much did you enjoy the copying task?"). In addition, Ss in the payment conditions were asked to write down the amount they were to receive for the second experiment and to fill out an additional scale: perception of payment ("Please indicate how you feel about the amount you are to receive for the motor skills study"; points were labeled from "extremely high payment" to "extremely low payment"). All Ss were completely debriefed and excused.

RESULTS

The Effectiveness of the Manipulations

The Ss in the high-shock condition reported greater anxiety about the second experiment than did Ss in the low-shock condition (40.51 vs 18.19, respectively; $t = 4.33$; $df = 51$; $p < .01$).[2] Ss in the payment conditions were not different in anxiety (28.85 vs 28.45, respectively; $t < 1.00$) about the second experiment, as expected. All Ss in the payment conditions correctly remembered the amount of money to be received for the second experiment and high-payment Ss rated their expected payment more highly than did Ss in the low-payment condition (80.25 vs 68.29, respectively; $t = 2.31$; $df = 53$; $p < .05$). Payment Ss also were more eager to participate in the second experiment than were shock Ss ($F = 10.35$; $df = 1,104$; $p < .01$). A subsample of Ss in both the high- and low-payment conditions ($N = 11$, 10, respectively) were asked to complete an additional measure assessing motivation to participate in the motor skills study. High-payment Ss reported greater motivation than did low-payment Ss (80.90 vs 64.80, respectively; $t = 2.80$; $df = 19$; $p < .05$). Taken together, these verbal report measures suggest that two levels of negative and positive affect were induced by the high-low shock and high-low payment manipulations.

Dependent Measures

A 2 by 2 analysis of variance of the incidental retention data presented in Table 1 indicated a strong main effect for level of the manipulation (high vs low: $F = 14.90$; $df = 1,104$; $p < .01$), a weak main effect for shock vs payment ($F = 2.76$; $df = 1,104$; $p < .10$), and no interaction effect ($F < 1.00$). High-shock Ss retained more paired associates than did low-shock Ss (3.18 vs 1.85, respectively; $t = 2.46$; $df = 51$; $p < .02$), replicating the effect reported by Pallak (1969). In addition, Ss in the high-payment condition also retained more paired associates than did Ss in the low-payment condition (2.64 vs 1.22, respectively; $t = 3.08$; $df = 53$; $p < .01$). Recall that the hypothesis based on arousal suggested that arousal, whether manipulated by anxiety about impending shock or by anticipation of remuneration, would facilitate incidental retention. On the other hand, the hypothesis based on the avoidance of unpleasant affect did not predict greater incidental retention in the high- than in the low-payment condition. Thus, the incidental retention data are consistent with the arousal framework. The weak shock-payment main effect suggested that expected electric shock was perhaps a more powerful manipulation than that of expected payment. Finally, there were no differences in perception of the copying task, the E, or of choice to perform the copying task.

Table 1
The Effects of Expected Shock and Expected Payment on Incidental Retention (the Greater the Mean, the More Paired Associates Retained)

Level of Manipulation	Shock	Payment
High	3.18 (27)	2.64 (28)
Low	1.85 (26)	1.22 (27)

DISCUSSION

The incidental retention data from the present study indicated that both negative (shock) and positive (payment) arousal facilitated incidental retention. These results supported the arousal analysis based on Spence & Spence (1966) rather than the avoidance of unpleasant affect suggested by Singer (1967). The present data, together with the incidental retention data reported by Pallak (1969) indicate that the arousal interpretation more parsimoniously accounts for the incidental retention data reported (Pallak et al, 1967; Pallak & Kiesler, 1968; Pallak, 1969) than either the dissonance avoidance explanation or the avoidance of unpleasant affect (Singer, 1967) explanation. The arousal interpretation also assumed that dissonance had motivation properties similar to those of anxiety or drive. However, this assumption is not strictly necessary for the arousal framework to apply. One could assume instead that the manipulation employed by Pallak et al either inadvertently elevated arousal or manipulated both arousal and dissonance together. Thus, whether or not dissonance may be viewed as a motivational state similar to that of drive or arousal remains an empirical question. However, the present data clearly suggest that the arousal analysis accounts for all the incidental retention data reported in several studies and allows us to rule out several alternative

explanations based on other theoretical processes.

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NOTES

1. The present research was supported by a faculty research grant awarded by the Graduate College (University of Iowa) from NIH Biomedical Sciences Research Support Program funds.

2. All t tests are two-tailed.

Hand preference as a factor in the perception of lines displaced from the vertical

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Two experiments were conducted to establish hand preference as a factor in the finding that line orientation influences apparent length of a line. In one experiment, left- and right-handed Ss reproduced by drawing the lengths of stimulus lines displaced from the vertical. In a second experiment, left- and right-handed Ss perceptually compared the displaced lines by the method of adjustment. Data from the second experiment show that hand preference is related to line-length estimation; the first experiment yielded similar conclusions only when interpreted on the basis of motor and cultural phenomena.

Studies on the effect of the orientation of a line on its apparent length have established that lines tilted left of vertical appear longer than lines tilted right of vertical. Although this has been demonstrated to be a reliable finding (Pollock & Chapanis, 1952; Underwood, 1966), no explanations have been offered for it.

Since no mention was made of the hand preference of Ss in the above studies, it can be assumed that the majority were right-handed. As it seems logical to expect a general predisposition of right handers towards the right, it is possible that they perceived left-tilted lines as resisting their natural inclination and, therefore, as extending further away from them than right-tilted lines. If this hypothesis is true, hand preference constitutes a bias precisely in the direction of the findings and should be just the opposite when left handers are used.

The purpose of the following experiments was to test this hypothesis of hand preference as a factor related to the judgment of apparent length of lines displaced to either side of vertical.

EXPERIMENT 1

Method

Slightly varying Underwood's (1966) design, eight principle stimulus lines were used: 1-, 2-, 3-, and 4-in. lengths, all 1/8 in. wide, displaced 45 deg to the left of vertical *(left stimuli)*, and four lines of the same dimensions, displaced 45 deg to the right of vertical *(right stimuli)*; each line was shown on a standard sheet of white paper. Each of the four lengths was presented three times, for a total of 12 left and 12 right stimuli which were presented in random order.

The Ss were required to reproduce the lengths of the stimuli by drawing horizontal lines on standard sheets of white paper, one reproduction on each sheet. Ss, tested individually, sat at a table placed 10 ft from and directly in front of the stimulus display. Ss were cautioned to remain seated erectly and stationary so that their line of regard would be on an even level with and perpendicular to the stimulus display. The experiment was conducted in a medium-bright, matte-finished, phosphorescent lighted room.

Results were assessed in terms of mean constant error, measured to the nearest 1/16 in. Mean constant error was defined as the average of all deviations of the reproduced lengths from the four lengths of the stimulus lines.

Male and female undergraduates volunteered to serve as Ss, 26 left-handed and 29 right-handed. Handedness of Ss was self-designated.

Results

Table 1 indicates that the left-handed group tended to reproduce shorter lengths for the left stimuli than for the right stimuli, while the opposite tendency was noted in the right-handed group. Although these tendencies were as predicted by the hypothesis, the differences in reproduced lengths were not significant. However, when the two groups were subdivided with respect to sex, confirmatory data did obtain for left-handed females ($t = 2.84 > 2.22$ at .05). Further computations disclosed no other effects or significant differences.

EXPERIMENT 2

Method

The task of Ss was to judge equality between standard and variable stimuli according to the method of adjustment. Standard stimuli consisted of 5-, 8-, and 10-cm lines, all 3 mm wide, drawn diagonally on 8½-in. squares of white cardboard, one line on each square. By rotating the squares 90 deg, each diagonal line could be presented four times, for a total of 12 right and 12 left standard stimuli, presented randomly.

Table 1
Positive Mean Constant Errors (1/16 in.) for Right Stimuli (RS) and Left Stimuli (LS) Reproduced by Right- (RG) and Left- (LG) Groups and Left-Handed Females (LF)

	RS	LS
LG	3.89	3.29
RG	6.15	7.63
LF (N = 11)	4.22	2.60