

## The Effects of Group Diffusion of Cognitive Effort on Attitudes: An Information-Processing View

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Two experiments were conducted to test the hypothesis that persons process a stimulus less extensively when they are part of a group that is responsible for the task than when they are individually responsible. In addition to a group size manipulation, both studies varied the quality of the stimulus to be evaluated in an attempt to determine the mediator of the differing evaluations of stimuli provided by group and individual evaluators. When evaluating a high quality stimulus, individual evaluators generated more favorable thoughts and evaluated the stimulus more positively than did group evaluators (Experiments 1 and 2), but when evaluating a stimulus of low quality, individual evaluators generated more unfavorable thoughts and evaluated the stimulus more negatively than did group evaluators (Experiment 2). This result favored an information-processing view over dissonance, deindividuation, and commodity theory interpretations. Together the studies indicate that subjects will diffuse the responsibility for a cognitive task. The reduction in individual processing that accompanies an increase in the number of persons responsible can thus lead to either enhanced or reduced evaluations, depending on the subjective quality of the stimulus to be evaluated.

One of the most well-known findings in social psychology is that the real or implied presence of other people inhibits individuals from rendering help in emergencies (Latané & Darley, 1970). This social inhibition effect is not limited to emergency situations, however. Later research has documented that when other people are present or available to respond, individuals are less likely to help pull hard on a rope (Ingham, Levinger, Graves, & Peckham, 1974), pick up coins in

an elevator (Latané & Dabbs, 1975), answer an intercom for someone else (Levy, Lundgren, Ansel, Fell, Fink, & McGrath, 1972), or help themselves to a coupon for a free lunch (Petty, Williams, Harkins, & Latané, 1977). In addition, the social inhibition effect appears to be greater, the greater the cost to the individual of responding (Morgan, 1978). Thus, across a wide variety of situations, persons appear to reduce their physical efforts when they are members of a group faced with a task requiring time and energy. The tendency for individuals to reduce their own efforts when others are available to respond has been called "social loafing" (Latané, Williams, & Harkins, 1979).

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Recently, Petty, Harkins, Williams, & Latané (1977) suggested that social loafing was not confined to tasks requiring physical effort but might also extend to purely cognitive tasks. This is important because there are many situations in which groups are as-

signed responsibility for a cognitive rather than a physical task. Perhaps the most prominent example of this is the election of the president of the United States. If one person bore the full responsibility for selecting the president, undoubtedly a great deal of thought would precede the decision. However, when millions are responsible for the task, preparatory cognitive effort is minimal, and voter apathy and lack of awareness on important policy issues abound (cf. Campbell, Converse, Miller, & Stokes, 1964). To the extent that cognitive effort is seen as costly, and others are available to share in the workload, individuals may be tempted to reduce their own cognitive effort by diffusing the responsibility for the task (Latané & Darley, 1976).

In the Petty et al. (1977) experiment, undergraduates were asked to evaluate a poem and an editorial ostensibly written by another student. Subjects were led to believe that they were the only one, one of four, or one of 16 evaluators. Individual evaluators reported putting more thought into their evaluations than did group evaluators. In addition, individual evaluators rated the communications more favorably than did group evaluators. Unfortunately, only self-reported measures of "perceived" effort were taken in that initial investigation, and no measures of "actual" cognitive effort exerted were available. One goal of the present article was to include a more direct measure of cognitive effort and thus provide more definitive evidence for social loafing on cognitive tasks. The second and major goal of the present studies, however, was to determine the factors mediating the more favorable evaluations provided by individual evaluators.

There are at least four different ways to explain the tendency for individual evaluators to be more positive in their ratings than are group evaluators. First, a *deindividuation* explanation (Zimbardo, 1970) might contend that the group evaluators experienced a feeling of anonymity that made them more willing to provide deviant and derogatory feedback about the communications (see also Aderman, Brehm, & Katz, 1974, for this argument). Two other explanations link the increased evaluations provided by individual

evaluators directly to the increased effort individuals exert (or perceive themselves to exert). Jones and Gerard (1967) have advanced an "effort justification" hypothesis derived from Festinger's (1957) *dissonance theory*, which states, "If a person expends effort that is not readily justified by the amount of reinforcement received, he tends to create reinforcements out of the stimuli in the immediately surrounding environment" (p. 89). Thus individual evaluators may have justified their increased efforts by overvaluing the communications (see also Cohen, 1959; Wicklund, Cooper, & Linder, 1967). In a similar vein, Brock's (1968) *commodity theory* predicts that the more effort one exerts attending to a communication, the higher the subjective value it will have (see also Fromkin & Brock, 1973).

We favored the fourth explanation—that increasing cognitive effort accentuates the perceived features of a stimulus, leading to discovery and increased liking of a good communication's virtues and disliking of a poor communication's flaws. It has already been well documented that the cognitive elaboration of a stimulus may result in polarized affect (Cacioppo & Petty, 1979a, 1979b; Petty, Ostrom, & Brock, in press; Tesser & Leone, 1977; Vinokur & Burnstein, 1974). For example, Sadler & Tesser (1973) demonstrated that a positive stimulus (a confederate who complimented the subject) was evaluated more positively, and a negative stimulus (a confederate who insulted the subject) was evaluated more negatively, with increased time to think about the stimulus. Similar effects have been found with other manipulations of both *ability* (e.g., distraction; Petty, Wells, & Brock, 1976) and *motivation* (e.g., issue involvement; Petty & Cacioppo, 1979a, 1979b), to process the attributes of a persuasive communication. With greater ability and/or motivation to think about the arguments in a persuasive message, more favorable thoughts are generated to high quality arguments yielding more positive evaluations, but more unfavorable thoughts are generated to low quality arguments yielding more negative evaluations. In the initial investigation of the effects of group size on

cognitive effort and evaluation (Petty et al., 1977), group evaluators liked the communications (i.e., rated them above the midpoint on the evaluation scales) and individual evaluators liked them even more. This is the result that would be expected if individual evaluators were motivated to do more thinking about the positive stimulus than group evaluators were.

Thus, deindividuation, dissonance, commodity enhancement, or increased information processing are all possible mediators of the evaluation effect observed by Petty et al. Two experiments were conducted to distinguish among these alternative explanations. In each experiment, subjects were asked to evaluate some stimulus after being led to believe that they were either the only evaluator or one member of a team of evaluators. In Experiment 1, subjects were asked to evaluate the effectiveness of a graduate student therapist; in Experiment 2, subjects were asked to evaluate the quality of editorials taking counterattitudinal positions. In addition to the group size manipulation, the quality of the stimuli to be evaluated was also manipulated in each experiment. In Experiment 1 the competence of the graduate student therapist was varied, whereas in Experiment 2 the quality of the arguments employed in the editorials was manipulated.

### Experiment 1

Given that a successful manipulation of stimulus quality occurs, it becomes possible to evaluate the alternative explanations for the effects of group size on stimulus evaluation. The deindividuation, dissonance, and commodity theory explanations would all expect individual evaluators to rate all of the various materials more favorably than group evaluators, although the rationales differ, as noted earlier.<sup>1</sup> The information-processing hypothesis, on the other hand, would expect individual evaluators to rate the materials more favorably than group evaluators would only for the good quality stimuli. For stimuli of poor quality, individual evaluators should rate the materials less favorably than group evaluators would. In other words, if subjects

put more cognitive effort (thought) into their evaluations when they bear the sole responsibility, they should better recognize the flaws in the "bad" stimuli and the virtues in the "good."

Consistent with recent research documenting the importance of a person's idiosyncratic cognitive responses in producing attitudinal shifts (Cacioppo, 1979; Eagly & Himmelfarb, 1978; Petty et al., in press; Tesser, 1978) we expected the data to support the information-processing formulation over deindividuation, dissonance, and commodity theories. Specifically, we predicted that individual evaluators would generate more favorable thoughts about the good therapist and rate the good therapist more positively than would group evaluators but that individual evaluators would generate more unfavorable thoughts about the bad therapist and rate the bad therapist more negatively than would group evaluators.

### Method

#### Subjects

Fifty-two male and female undergraduates volunteered for an experiment entitled, "Therapist Evaluation," in return for extra credit in an introductory psychology course. The design was a 2 (Group Size 1 or 15)  $\times$  2 (Good or Bad Therapist) factorial with 13 subjects randomly assigned to each condition. All subjects participated in individual sessions conducted by a female experimenter.

#### Independent Variables

*Group size manipulation.* When subjects arrived at the experimental room, they were seated in front of a TV monitor and were instructed to read the front page of a booklet that had been placed before

<sup>1</sup> A more sophisticated dissonance interpretation for Experiment 2, employing counterattitudinal communications as stimuli, might contend that the difference between individual and group evaluators would be stronger for an editorial with good rather than bad arguments, since reading a counterattitudinal essay with good arguments should be more dissonance arousing than reading a counterattitudinal essay with poor arguments (Kleinbesselink & Edwards, 1975), but in any case, the dissonance interpretation never expects increased group size to be associated with more favorable evaluations.

them. All subjects read that the psychology department was soliciting their help in its semiannual evaluation of graduate students in clinical and counseling psychology. "Because there are so many students enrolled in the graduate program at Missouri, it is impossible for the faculty to evaluate each student every semester on his or her clinical skills." Subjects then read that they were either the only one or one of 15 undergraduates who would be evaluating a particular graduate student.

To enhance the salience of the manipulation, subjects in the *group evaluation* conditions were seated next to a table containing 11 stuffed envelopes all labeled "Tape 12," implying that at least 11 other persons had already evaluated the tape the subjects were about to see. In the *individual evaluation* conditions, subjects also saw 11 stuffed envelopes, but in this case they were numbered consecutively from "Tape 1" to "Tape 11," implying that there was only one evaluation per tape. After answering any questions that subjects had about the task, a videotape was played, ostensibly of a graduate student therapist conducting an interview with a client.

*Good/bad therapist manipulation.* Two roleplayed therapy sessions were taped specifically for the experiment. Both tapes depicted the initial therapist-client interview between a male graduate student therapist and a female undergraduate who was seeking help in order to overcome her fear of inoculations. In both tapes, the camera was focused on the therapist, who sat behind a desk and in front of a microphone. Although the voice of the female client was heard, she was not seen (presumably to protect her anonymity). The therapist role was played by an advanced graduate student in counseling psychology, and the client role was enacted by a female graduate student who had actually experienced a strong childhood fear of inoculations.

In the *good therapist* condition, the student therapist appeared genuinely concerned about the client's problem and established an almost immediate rapport. He spoke in a cheerful way, looking directly at the client. He also elicited the client's ideas about the problem and presented a favorable prognosis. In sharp contrast, in the *bad therapist* condition, the student therapist seemed unconcerned about the client's problem. He often looked away from the client, slumped in his chair, and picked his teeth. In the conversation, he was demeaning and trivialized the client's problem. A treatment program was suggested only at the client's insistence, and an unfavorable prognosis was given. Each tape was approximately 5 minutes in length. After viewing either the good or bad therapist, subjects were asked to turn to the next page in their booklets to complete the evaluation questions.

#### Dependent Variables

*Evaluation measures.* Two measures of evaluation were included. The first consisted of the sum of five 9-point semantic-differential scales on which the sub-

jects were to rate the therapist's behavior: good/bad, beneficial/harmful, foolish/wise, fair/unfair, and favorable/unfavorable. The second consisted of an 11-point scale on which subjects responded to the question "To what extent did you think the graduate student was effective as a therapist?" where 1 indicated "not at all effective" and 11 indicated "very effective." Subjects' responses to the two evaluation measures were converted to standard scores and were averaged prior to analysis.

*Cognitive effort measures.* Following the evaluation questions in the subjects' booklets were three measures employed previously by Petty et al. (1977) that were designed to assess perceived effortful involvement in the task: (a) To what extent were you trying hard to evaluate the student's performance as a therapist? (b) How much effort did you put into evaluating the tape? and (c) How involved were you in this task? The responses to these questions, made on 11-point scales, were averaged to form a "perceived effort index."

Next, subjects were informed that the psychology department was interested in what they had been thinking about while viewing the videotaped therapy session. They were given 3 minutes to list their thoughts about the therapist's performance (see Petty & Cacioppo, 1977, for details). When the time for thought listing had elapsed, subjects were instructed to go back and rate their thoughts. Ideas were rated as either + (something positive or good about the therapist), - (something negative or bad about the therapist), or 0 (neither in favor of nor opposed to the therapist). Examples of ideas scored as positive thoughts included "he seemed to honestly care about the patient" and "he found the right therapy quickly." Examples of ideas scored as negative thoughts included "I was annoyed because he wouldn't understand" and "he was blaming her for his own incompetence." Examples of neutral thoughts included: "I didn't know what to think" and "I wondered what the girl looked like." This measure was employed to reflect the "actual" in contrast to the "perceived" amount of cognitive involvement with the task.

After completion of all dependent measures, subjects were fully debriefed, thanked, and dismissed.

## Results

### Cognitive Effort Measures

Subjects who believed that they were individual evaluators scored higher on the "perceived effort index" indicating more cognitive involvement with the stimuli ( $M = 9.45$ ) than subjects who believed that they were part of an evaluation group ( $M = 8.57$ ),  $F(1, 48) = 4.43$ ,  $p < .04$ . Analyses of the measure of actual thoughts generated revealed the following: (a) In support of the effectiveness of

Table 1  
*Correlations Among Evaluation and Cognitive Effort Measures for Good and Bad Therapist Conditions*

Item	Good therapist			Bad therapist		
	Cognitive effort	Positive thoughts	Negative thoughts	Cognitive effort	Positive thoughts	Negative thoughts
Evaluation index	.53*	.08	-.47*	-.20	.21	-.63*
Cognitive effort	—	.36	-.04	—	-.01	.10
Positive thoughts	—	—	-.25	—	—	-.26

\*  $p < .05$ .

the therapist quality manipulation, subjects generated more positive thoughts relating to the good ( $M = 2.90$ ) than to the bad therapist ( $M = .26$ ),  $F(1, 48) = 72.5$ ,  $p < .001$ , but more negative thoughts relating to the bad ( $M = 4.65$ ) than to the good therapist ( $M = .88$ ),  $F(1, 48) = 42.4$ ,  $p < .001$ . (b) The information-processing prediction was only partially confirmed, however. Individual evaluators of the good therapist generated significantly more favorable thoughts ( $M = 3.85$ ) than did group evaluators of the good therapist ( $M = 2.15$ ),  $F(1, 48) = 14.79$ ,  $p < .01$ , but individual evaluators of the bad therapist did not differ from group evaluators in the number of negative thoughts generated ( $F < 1$ ).

#### *Evaluation Measure*

Subjects gave the good therapist significantly higher ratings on the evaluation index ( $M = .90$ ) than the bad therapist received ( $M = -.90$ ),  $F(1, 48) = 254.0$ ,  $p < .001$ , again attesting to the success of the manipulation. The information-processing hypothesis further predicted that individual evaluators would give more favorable ratings of the good therapist than would group evaluators, but more negative ratings of the bad therapist. The hypothesis was supported for the good therapist only; individual evaluators provided higher ratings ( $M = 1.05$ ) than did group evaluators ( $M = .75$ ),  $F(1, 48) = 3.75$ ,  $p < .05$ , one-tailed. Evaluations of the bad therapist did not vary with group size ( $M = -.9$  for both groups).

Table 1 presents average within-cell correlations among the evaluation and cognitive effort measures separately for the good and bad therapist cells. The pattern of correlations indicates that within the good therapist cells, the more cognitive effort subjects perceived themselves to exert, the more favorably they evaluated the therapist; within the bad therapist conditions, however, perceived cognitive effort tended to relate negatively to evaluations. Within both conditions, the more negative thoughts subjects actually generated, the more negatively they evaluated the therapist; favorable thoughts showed a slight positive relationship with evaluation, and the number of favorable thoughts generated was inversely related to the number of negative thoughts generated.

#### Experiment 2

The first experiment replicated the finding of Petty et al. (1977) that evaluators who are part of a group report exerting less cognitive effort on the task than do persons who are led to believe that they are solely responsible for the evaluation. In addition, it was again found that individual evaluators give more favorable ratings of good quality stimuli than do group evaluators. Unfortunately, no differences due to the group size manipulation were found for the poor quality stimuli. As explained previously, deindividuation, dissonance, and commodity theories would have expected individual evaluators to rate the poor quality stimuli more favorably than group evaluators would, whereas the informa-

tion-processing interpretation would have predicted the opposite. Neither effect emerged.

A possible explanation for this unexpected result may be obtained from an examination of the unstandardized evaluation scores. The mean rating of the good therapist on the semantic differential scale, which had a range of  $-20$  to  $+20$ , was  $14.25$ ; the mean rating of the bad therapist was  $-6.72$ . On the 11-point Likert-type scale, the average rating of the good therapist was  $9.57$ , whereas the average rating of the bad therapist was  $4.84$ . In both cases, the good therapist was seen as being substantially farther from the neutral point on the scales than was the bad therapist. This suggests that the bad therapist tape may not have had as many negative attributes as the good therapist tape had positive features. A primary purpose of the second experiment was to test the same hypotheses as in Experiment 1 but to employ a more clearly negative stimulus.

In the second experiment, all subjects were asked to evaluate an editorial ostensibly written by a fellow student. Three different editorials were employed. Each message argued that seniors should be required to pass a comprehensive exam in their declared major before being granted a degree. The editorials differed, however, in their presentation of eight key arguments. One message was designed to contain points that were logically sound, defensible, and compelling (strong arguments message), whereas another was designed to be more open to refutation and skepticism (weak arguments message). These messages were adapted from those used in previous research (Petty & Cacioppo, 1979b), where it was found that the strong message elicited predominantly favorable thoughts, whereas the weak message elicited predominantly counterarguments. A third message was pilot tested and constructed specifically for this study and was designed as an extremely negative stimulus; pilot testing revealed that it elicited more negative and fewer positive thoughts than the weak arguments message did.

As for Experiment 1, the deindividuation, dissonance, and commodity theory formulations predict that individual evaluators will

rate each of the editorials higher than group evaluators will. The information-processing hypothesis on the other hand, predicts that individual evaluators will yield higher ratings only when the stimulus to be evaluated has numerous positive features. Thus a message containing arguments that are compelling and difficult to counterargue should be evaluated more positively by individual than by group evaluators. A message containing weak and refutable arguments, however, should be rated more negatively by individual than by group evaluators. In other words, the information-processing explanation contends that the increased cognitive effort exerted by individual in comparison to group evaluators should result in individual evaluators processing the information contained in the communications more carefully than group evaluators would. Therefore, individual evaluators should ultimately better recognize the flaws in a weak communication and the virtues in a strong one.

### Method

#### Subjects

One hundred and eighty male and female introductory psychology students took part in the experiment in partial fulfillment of a course requirement. The design was a  $2$  (Group Size 1 or 10)  $\times$   $3$  (Strong, Weak, or Very Weak arguments editorial) factorial with 30 subjects randomly assigned to each condition. Subjects participated in group sessions of 7 to 15 members conducted by a male experimenter. Each of the experimental conditions was represented in each group session.

#### Independent Variables

*Group size manipulation.* When subjects arrived at the experimental room they were seated at a semi-circular table and were asked to avoid talking to each other. Each subject was given an envelope and was asked to extract and read the single sheet and then to replace it, leaving the other materials in the envelope. The subjects read that the journalism school at Northeastern was evaluating its programs and needed feedback on the writing abilities of its students. "Your task is to critically evaluate an editorial written by a journalism student. You are *the only* (one of 10) person(s) who will be reading this particular editorial. Thus, *you alone bear* (the 10 of you share) the full responsibility for the critical evaluation." In addition, the instructions for

group evaluators included the sentence, "Your reactions will be combined with those of the other 9 persons to form one overall rating for the editorial."

*Quality of editorial manipulation.* After reading the instructions, the subjects were asked to remove, carefully read, and then replace their editorials in the envelopes. Subjects read one of three editorials. Each editorial argued in favor of instituting senior comprehensive exams as a requirement for graduation; the exam would be a test of what the student had learned after completing the major, and a certain score would be required if the student was to graduate. The editorials were approximately the same length (two and one-half pages double spaced), and the command of grammar and writing style were roughly equivalent. As noted previously, however, the editorials differed greatly in the cogency of the arguments presented in support of the proposal. In brief, the *strong* version of the message provided persuasive evidence (statistics, relevant studies, etc.) in support of the following arguments: (a) Prestigious universities have comprehensive exams to maintain academic excellence; (b) institution of the exams has led to a reversal in the declining scores on standardized achievement tests at other universities; (c) graduate and professional schools show a preference for undergraduates who have passed a comprehensive exam; (d) average starting salaries are higher for graduates of schools with the exams; (e) schools with the exams attract larger and more well-known corporations to recruit students for jobs; (f) the quality of undergraduate teaching has improved at schools with the exams; (g) university alumni would increase financial support if the exams were instituted, allowing a tuition increase to be avoided; and (h) the (fictitious) National Accrediting Board of Higher Education would give the University its highest rating if the exams were instituted.

The *weak* version of the message also contained eight arguments but relied more on quotations and opinions than on statistics and data to support the following arguments: (a) Adopting the exams would allow the university to be at the forefront of a national trend; (b) graduate students have complained that since they have to take comprehensives, undergraduates should take them also; (c) by not administering the exams, a tradition dating back to the ancient Greeks was being violated; (d) parents had written to administrators in support of the plan; (e) the exams would increase student fear and anxiety enough to promote more studying; (f) the exams would help cut costs by eliminating the necessity for other tests that varied with instructor; (g) the exams would allow students to compare their performance with that of students at other schools; and (h) job prospects might be improved.

The *very weak* version of the message relied exclusively on personal opinion and personal examples. The following arguments were presented: (a) Most of the author's friends supported the proposal; (b) the author's major adviser took a comprehensive exam and now had a prestigious academic position; (c) whatever benefit the exams had for graduate

students would also accrue to undergraduates; (d) requiring graduate students but not undergraduates to take the exams was analogous to racial discrimination; (e) the risk of failing the exam was a challenge most students would welcome; (f) the difficulty of the exam would prepare one for later competitions in life; (g) the Educational Testing Service would not market the exams unless they had great educational value; and (h) if the exams were instituted, Northeastern would become the American Oxford.

### *Dependent Variables*

After everyone had finished reading the editorials, the subjects were asked to remove the questionnaire from the envelope and to respond to each of the questions. They were guided through the booklet by the experimenter.

*Evaluation measure.* The evaluation measure required subjects to respond to the four questions employed in the initial investigation of the effects of group size on cognitive effort (Petty et al., 1977). The questions were: (a) To what extent do you feel the communication made its point effectively? (b) To what extent did you like the communication? (c) To what extent do you feel that the communication was convincing? and (d) Considering both content and style, how well written was the communication? The responses to these questions, made on 11-point Likert-type scales, were averaged to form an evaluation index.

*Cognitive effort measures.* All subjects completed the same cognitive effort measures as those described for Experiment 1. The three questions designed to assess perceived effortful involvement were included. Also, subjects were given 2½ minutes to list the thoughts that occurred to them while reading the editorial; as in Experiment 1, the thoughts were subsequently rated by the subjects as +, -, or 0. After completion of the dependent measures, subjects were debriefed, thanked, and dismissed.

## *Results*

### *Cognitive Effort Measures*

The dependent measures were analyzed in a series of 2 (Group Size) × 3 (Editorial Quality) × 2 (Sex of Subject) analyses of variance.<sup>2</sup> As in Experiment 1, subjects who believed that they were the only evaluator of the editorial reported more cognitive involvement with the task on the "perceived effort index" ( $M = 8.40$ ) than did subjects who

<sup>2</sup> Sex of subject was not recorded in Experiment 1, and thus an analysis by sex could not be conducted for that study.

Table 2  
*Effects of Group Size and Stimulus Quality on Cognitive Effort and Evaluation in Experiment 2*

Item	Strong arguments		Weak arguments		Very weak arguments	
	Individual	Group	Individual	Group	Individual	Group
Perceived cognitive effort	8.81 <sub>a</sub>	7.63 <sub>b</sub>	7.81 <sub>ab</sub>	7.04 <sub>b</sub>	8.58 <sub>a</sub>	8.10 <sub>ab</sub>
Negative thoughts	.86 <sub>a</sub>	1.40 <sub>a</sub>	1.90 <sub>ab</sub>	1.86 <sub>a</sub>	3.80 <sub>c</sub>	2.53 <sub>b</sub>
Positive thoughts	3.76 <sub>a</sub>	2.83 <sub>b</sub>	2.00 <sub>b</sub>	2.20 <sub>b</sub>	.96 <sub>c</sub>	1.76 <sub>bc</sub>
Evaluation index	9.30 <sub>a</sub>	7.64 <sub>b</sub>	6.83 <sub>b</sub>	7.17 <sub>b</sub>	4.03 <sub>c</sub>	5.85 <sub>d</sub>

Note. Means in the same row without a common subscript are significantly different at the .05 level by the Newman-Keuls procedure.

believed that they were one of 10 evaluators ( $M = 7.59$ ),  $F(1, 168) = 9.66$ ,  $p < .002$ . In addition, a main effect for the editorial quality manipulation appeared on this measure,  $F(2, 168) = 5.03$ ,  $p < .008$ . This main effect was a result of subjects reporting less cognitive involvement with the message containing the weak arguments than with either the strong or very weak arguments messages. No significant effects for sex of subject were obtained on this measure.

Significant main effects for the editorial quality manipulation on the measures of positive thoughts,  $F(2, 168) = 20.08$ ,  $p < .001$ , and negative thoughts,  $F(2, 168) = 23.02$ ,  $p < .001$ , attested to the manipulation's success. Subjects generated more positive thoughts to the strong ( $M = 3.29$ ) than to the weak arguments ( $M = 2.10$ ,  $p < .05$  by the Dunn multiple comparison procedure), and more positive thoughts to the weak than to the very weak arguments ( $M = 1.33$ ,  $p < .10$ ). Also, subjects generated more negative thoughts to the very weak arguments ( $M = 3.16$ ) than to the weak arguments ( $M = 1.88$ ,  $p < .05$ ), and more negative thoughts to the weak than to the strong arguments ( $M = 1.13$ ,  $p < .10$ ).

Significant Editorial  $\times$  Group Size interactions on both the measure of positive thoughts,  $F(2, 168) = 4.45$ ,  $p < .02$ , and negative thoughts,  $F(2, 168) = 5.05$ ,  $p < .007$ , provided support for the information-processing hypothesis. A Newman-Keuls analysis (see Table 2) provided further support for the hypothesis. Increasing the number of evalua-

tors reduced the number of negative thoughts elicited by the very weak message and reduced the number of positive thoughts elicited by the strong message. The group size manipulation did not affect the number of negative thoughts elicited by the strong message nor the number of positive thoughts elicited by the very weak message. The group size manipulation also had no effect on the profile of thoughts elicited by the weak message.

Also, a marginally significant Editorial  $\times$  Sex of Subject interaction was obtained on the measure of positive thoughts,  $F(2, 168) = 2.40$ ,  $p < .09$ . This interaction indicated that although men and women generated the same number of favorable thoughts to the strong and to the very weak arguments, women generated more favorable thoughts to the weak arguments ( $M = 2.6$ ) than did men ( $M = 1.4$ ;  $p < .10$ ).

#### Evaluation Measure

The  $2 \times 3 \times 2$  analysis of variance (ANOVA) on the evaluation index yielded a main effect for the editorial quality manipulation,  $F(2, 168) = 53.93$ ,  $p < .001$ , an Editorial  $\times$  Group Size interaction,  $F(2, 168) = 16.11$ ,  $p < .001$  (see Figure 1), and an Editorial  $\times$  Sex of Subject interaction,  $F(2, 168) = 4.90$ ,  $p < .01$ . The main effect revealed that subjects reading the strong arguments gave higher evaluations ( $M = 8.47$ ) than subjects reading the weak arguments ( $M = 7.00$ ), who in turn gave higher evaluations than subjects reading the very weak arguments ( $M = 4.94$ ;  $ps < .05$  by the Dunn test). The argu-



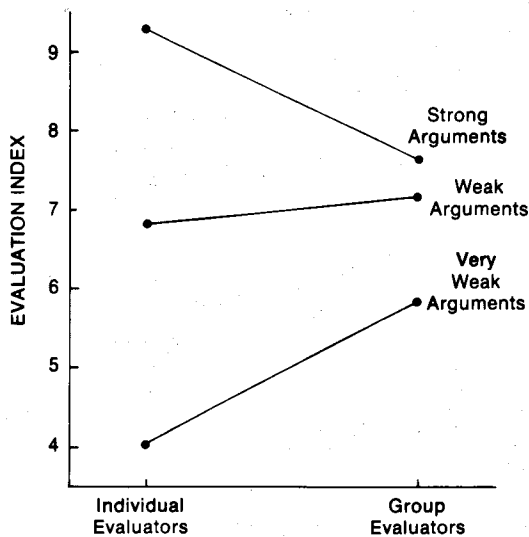


Figure 1. Mean evaluation scores in relation to stimulus quality and number of evaluators for Experiment 2.

ment quality manipulation was apparently successful.

The Editorial  $\times$  Group Size interaction provided strong support for the information-processing hypothesis, as did the Newman-Keuls analysis of this interaction reported in Table 2. Individual evaluators gave more favorable evaluations of the strong message than did group evaluators but less favorable evaluations of the very weak message ( $ps < .05$ ). The group size manipulation had no effect on the weak message, which fell between the strong and very weak message in the evaluations provided by subjects. This suggests that the number of persons responsible for an evaluation is least likely to affect the nature of the evaluation when the stimulus being judged is relatively ambiguous in quality.

Finally, the Editorial  $\times$  Sex of Subject interaction paralleled the same interaction found on the measure of positive thoughts. Both men and women evaluated the strong arguments quite positively and the very weak arguments quite negatively, but women ( $M = 7.5$ ) evaluated the weak arguments more positively than men did ( $M = 6.2$ ;  $p < .10$ ). This suggests that the often-reported sex differences in response to persuasive com-

munications (cf. Cooper, 1979) may be especially likely when the message arguments employed are neither particularly strong nor particularly weak. When the stimulus to be evaluated is relatively ambiguous, the greater interpersonal orientation of females (Eagly, 1978) may produce more favorable evaluations.<sup>3</sup>

Table 3 presents the average within-cell correlations among the evaluation and cognitive effort measures for each of the different editorial and sex-of-subject combinations. The correlations indicate that within the strong message cells, the more cognitive effort subjects perceived themselves to exert, the more favorably they evaluated the editorial. Within the very weak message cells, however, the more cognitive effort subjects perceived themselves to exert, the less favorably they evaluated the editorial. This replicates the pattern obtained in Experiment 1 and is consistent with the information-processing hypothesis. The relationship between these two measures for the more ambiguous weak arguments cells was positive. The pattern within all cells was that the more favorable thoughts actually generated by subjects, the more positively they evaluated the editorials; the more negative thoughts they generated, the more negatively they evaluated the editorials; and the number of favorable thoughts was inversely related to the number of negative thoughts generated.

### Discussion

The present experiments had two major goals: (a) to obtain more direct evidence for social loafing on cognitive tasks than that provided by previous research, which assessed

<sup>3</sup> Individual women evaluators actually rated the weak arguments as slightly above the midpoint on the evaluation index, whereas individual men evaluators rated them as slightly below. Also, consistent with the information-processing hypothesis, increasing the number of evaluators tended to decrease evaluations of the weak arguments for females but to increase them for males. These interesting but nonsignificant trends for the weak arguments did not of course produce an overall three-way interaction ( $F < 1$ ).

Table 3  
*Correlations Among Evaluation and Cognitive Effort Measures for Strong, Weak, and Very Weak Argument Conditions for Males and Females*

Item	Perceived cognitive effort	Positive thoughts	Negative thoughts
Strong arguments			
Evaluation index	.28 (.57*)	.32 (.20)	-.54* (-.36*)
Perceived cognitive effort		.24 (.13)	.05 (-.09)
Positive thoughts			-.52* (-.58*)
Weak arguments			
Evaluation index	.44* (.15)	.45* (.41*)	-.36* (-.32)
Perceived cognitive effort		.23 (-.25)	.04 (.20)
Positive thoughts			-.53* (-.58*)
Very weak arguments			
Evaluation index	-.16 (-.50*)	.23 (.48*)	-.25 (-.52*)
Perceived cognitive effort		.19 (-.29)	-.11 (.35*)
Positive thoughts			-.63* (-.65*)

Note. The correlation for females is reported first; the correlation for males is in parentheses.

\*  $p < .05$ .

only "perceived" cognitive involvement and (b) to determine the theoretical mediator of the different evaluations provided by individual and group evaluators.

The first goal was accomplished by providing subjects with a brief period of time to list their thoughts about the stimuli to be evaluated. Subjects who were part of a group that was responsible for the evaluation generated fewer positive thoughts about a very likable stimulus than did subjects who were solely responsible for the evaluation (Experiments 1 and 2) and fewer negative thoughts about a very disliked stimulus (Experiment 2). Thus, in addition to replicating the results of Petty et al. (1977) on a "perceived" cognitive effort measure, the present studies demonstrated that group evaluators *actually* generated fewer thoughts consistent with the quality of the stimulus than did individual evaluators. Subjects are apparently less willing to engage in the effortful cognitive processing of a stimulus when they share the responsibility for the task with others than when they alone are responsible for the cognitive work.

Subjects in groups, who were not processing the communication as diligently as individual evaluators, were less likely to generate a

thought that veridically delineated the nature of the stimulus. Thus, group evaluators rated a stimulus of very poor quality more favorably, and a stimulus of very high quality less favorably, than did individual evaluators. When the stimulus to be evaluated was neither clearly good nor bad, group size did not produce significant effects on thoughts or evaluations. Steiner (1972) has noted that a performance decrement in groups can result from two sources—coordination loss (an ability decrement) and reduction in individual effort (a motivational loss). Since all subjects in the present studies performed individually under the same objective conditions, coordination loss could not have contributed to the reduction in cognitive effort, and thus it must be attributed to a motivational impairment.

A second goal of the present research was to provide a rationale for the differing evaluations of group and individual evaluators. Although dissonance, deindividuation, and commodity theories expect individuals invariably to provide more favorable evaluations than group evaluators provide, the present studies showed that the opposite could also occur. Consistent with an information-processing view, individual evaluators provided more favorable evaluations of a likable stimulus

but more negative evaluations of a dislikable stimulus, than did group evaluators. Thus, the evaluations appeared to be tied to the amount of cognitive effort expended and the quality of the stimulus to be evaluated. As the pattern of within-cell correlations in Tables 1 and 3 documents, the more perceived effort expended, the more favorable the evaluation when the stimulus is of high quality, but the more negative the evaluation when the stimulus is of low quality. The added cognitive effort expended by individual evaluators apparently renders them better able to discover and appreciate the virtues of a positive stimulus and the flaws of a negative one.<sup>4</sup>

We suspect that several of the conditions found in the present studies are necessary for group diffusion of cognitive effort to occur: The task should be clearly identified as a group project and should involve costly effort, responsibility should inhere in the group as a whole and not in specific members, and rewards to individuals should not be contingent on identifiable individual output. Although future research will determine whether or not all of these restrictive conditions are necessary for diffusion of cognitive effort to occur, it is clear that there are important "real-world" instances in which these restrictive conditions are met. Jury deliberations, for example, appear to meet the criteria. Interestingly, there is some evidence that juries act as if diffusion of cognitive effort were operating. Kessler (1973) examined the participation rates of mock jurors in 6- and 12-member juries by dividing jurors into "silent" and "contributing" member categories. Her results revealed that although only 4% of jurors in 6-member juries were completely silent, 25% of jurors in 12-member juries said nothing.

One implication of the diffusion of cognitive effort notion for jury deliberations is that small juries should be more beneficial to defendants than should large juries when the evidence against the defendant is weak, since small juries will better realize how flawed the testimony is. On the other hand, when the evidence against the defendant is very strong, a large jury should be preferred, since it will

be less likely to realize the cogency of the testimony. Results consistent with this hypothesis have been obtained in an experimental investigation of mock juries by Valenti and Downing (1975). When the evidence against a defendant was weak, 80% of 6-member juries and 60% of 12-member juries voted for acquittal; when the evidence against the defendant was strong, however, 90% of 6-member juries voted for conviction, whereas only 20% of 12-member juries did so.

In summary, it appears that increasing the number of persons responsible for a cognitive task, such as an evaluation of some stimulus, decreases the amount of thought that enters into the evaluation. In this regard, mental work shows the same pattern as does physical work (cf. Ingham et al., 1974; Latané et al., 1979). The reduction in individual processing that accompanies an increase in the number of persons responsible for the task will most likely lead to enhanced evaluations when a stimulus is of low quality, since the flaws will not be recognized as readily, but to reduced evaluations when a stimulus is of excellent quality because the virtues will not be realized.

<sup>4</sup> Although only the information-processing hypothesis appears to be able to account for the evaluation effects observed in Experiment 2, the other theories might well provide reasonable explanations for the overall loss in motivation to process information when many others are also responsible for the cognitive work.

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