

The Effects of Group Size on Cognitive Effort and Evaluation

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Abstract. Students rated a poem and an editorial believing that they alone were responsible, that they were one of four persons responsible, or that they were one of sixteen persons responsible for evaluating the communications. As predicted, group members reported putting less effort into the assessment than individuals, and this diffusion of effort followed an inverse power function. In addition, individuals evaluated the communications more favorably than persons who thought they shared the evaluation responsibility.

Members of a group are less likely than individuals to render help in emergencies (Latané & Darley, 1976) and non-emergencies (Wicker, 1969) alike. When other persons are present, people are less likely to help pull hard on a rope (Ingham, Levinger, Graves & Peckham, 1974), pick up coins in an elevator (Latané & Dabbs, 1975), make noise for an experimenter, (Latané, Williams & Harkins, 1976), or answer an intercom call for someone else (Levy, Lundgren, Ansel, Fell & McGrath, 1972) than when alone. In 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. Latané and Darley (1976) suggest that individuals in groups may avoid engaging in costly activities by diffusing responsibility for the task. When other people are present and available to respond, each individual may feel less personal responsibility and may feel it appropriate to reduce physical effort accordingly.

In the present experiment, we test whether being a member of a group can also lead to a reduction in cognitive effort. Often, groups are assigned responsibility for cognitive rather than physical tasks. To the extent that cognitive effort is seen as costly and others are available to share the load, each individual may be tempted to reduce his own share.

As part of a more general theory of social impact, Latané (1973) has suggested that division of responsibility should lead to an inverse power relationship between group size and the responsibility assumed by any given member. Thus, the impact (I) of a task on an individual should equal a scaling parameter (s) reflecting the seriousness of the task, divided by the number (N) of people available to respond raised to some power (t) with a value less than one (resulting in marginally decreasing effect of increasing N), or $I = sN^{-t}$. Such an inverse power function would imply that the relationship between group size and individual effort should be linear when expressed in logarithmic coordinates.

We asked Ohio State undergraduates to evaluate a poem and an editorial ostensibly written by fellow students. Evaluators were led to believe they would either be the only person evaluating the communication, one of four, or one of sixteen evaluators. We predicted that evaluators who believed that they were the only person evaluating the works would put more cognitive effort into their evaluations than those who felt they were but one member of a group of evaluators, and that this reduction would take the form of an inverse power function.

Method. Seventy-five introductory psychology students of mixed sex received course credit for participating in an experiment as part of their regular class session. Told the Journalism school was evaluating its programs and needed feedback on the writing ability of its students, participants were asked to rate editorials and poems produced by majors. The instructor passed out booklets containing an editorial and a poem, rating scales, and written instructions which informed the participant, "Your task is to critically evaluate the poem (editorial). You are the only (one of four) (one of sixteen) person(s) who will be reading this particular poem (editorial). Thus, you alone (the four of you) (the sixteen of you) have (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 three (fifteen) persons to form one overall rating for the poem (editorial) all of you read."

All participants actually read and rated the same two communications; a 16-line poem on life's unanswered questions written in high school yearbook style (which began, "I ask the stars, 'What means it all?' The stars, they do not answer . . .") and a two-page editorial containing a number of rather specious arguments in favor of reducing tuition. To enhance the credibility of the manipulations, for individual evaluators, the poem and editorial were original typescripts; for group evaluators, they were high quality mimeograph copies.² Order of presentation of the communications was counterbalanced across the two participating classes.

After reading each communication, participants answered seven questions on 11-point scales. One set of three questions measured perceived effortful involvement in the task: 1) "To what extent were you trying hard to evaluate the communication?"; 2) "How much effort did you put into evaluating the communication?"; and 3) "How involved were you in this task?" Since answers to these three questions were highly intercorrelated, (average correlation = .82, $p < .01$), they were averaged and multiplied by 10, resulting in an overall effort index which could range from 1 to 100.

A second set of four questions constituted a general evaluation of the communication: 1) "To what extent do you feel the communication made its point effectively?"; 2) "To what extent do you feel the communication was convincing?"; 3) "To what extent did you like the communication?"; and 4) "Considering both content and style, how well written was the communication?" Answers to the four general evaluation questions (average correlation = .65, $p < .01$) were also averaged and multiplied by 10.

Results. Since the existence of a power law implied that the relationship between group size and effort should be linear in log-log coordinates, group sizes and scores on the effort index were transformed into logarithmic units and subjected to trend analysis. As predicted, the group size effect showed a significant linear trend, $F(1, 72) = 4.49$, $p < .05$, accounting for 91% of the variance, while deviations from linearity (i.e., from a power function) were non-significant.³ The exponent for the power function implied by this linear trend was $-.10$. Thus, as predicted by social impact theory, perceived effort decreased as an inverse power function of group size with an exponent of less than one.

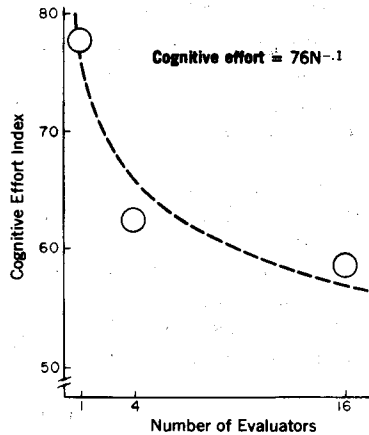
Planned orthogonal contrasts performed on the normal units showed that individuals felt they put in more effort than did subjects in groups ($F(1, 72) = 4.65$,

$p < .05$) who did not differ significantly according to group size. These data indicate that persons in groups felt less compelled to work at assessing the communications than individuals and provide support for our hypothesis that responsibility diffusion should lead to reduced cognitive effort.

Individuals who thought they alone were responsible for rating a given communication were significantly more favorable ($M = 67$, $F(1, 72) = 6.01$, $p < .05$) than readers who thought they were rating in groups, but groups of sixteen ($M = 59$) did not differ from groups of four ($M = 54$). This ancillary result parallels the finding that individuals reported putting more effort into their evaluations than did group members. It is consistent with dissonance "effort justification" interpretations (e.g., Linder & Worchel, 1970) or Brock's (1968) commodity theory, as is the average within-cell correlation of .48 between the effort and evaluation indices ($p < .001$), showing that with number of evaluators and communication type held constant, as effort increased, liking increased. Another interpretation would suggest that increasing cognitive effort accentuates the perceived merits of a communication, leading to discovery and increased liking of a good communications's virtues and disliking of a poor communication's flaws. In the present experiment, of course, students tended to perceive the communications favorably, with evaluation means above the midpoint on the liking scale. However, since effort was not manipulated directly in this experiment, the relationship between effort and evaluation is only correlational. Thus it is possible that liking mediated effort or that effort and liking were affected independently as would be the case if group evaluators exerted less effort and were less inhibited in derogating the work of a fellow student due to diffusion of responsibility.

Surprisingly, given the rather sappy nature of the poem, participants liked it more (65) than the editorial (54, $F(1, 72) = 13.5$, $p < .001$) even though they reported no difference in the amount of effort they put into reading it. This result argues against the notion that liking mediated effort. There were no interactions between communication type and group size for either measure. The fact that the relationships held for both poems and editorials, two relatively different stimuli, points to the generality of the effects.

Discussion. It has been hypothesized that subjects in groups may feel less personally responsible for their behavior (Latané & Darley, 1976). This "diffusion of responsibility" hypothesis has led to research showing that subjects in groups are less willing to exert physical effort in the task at hand whether it be helping a victim, reporting an emergency, answering the door, engaging in church activities, or pulling a rope. The current experiment extends this finding into the important



Cognitive Effort is a Power Function of Number of Evaluators

domain of cognitive activity. Subjects are apparently less willing to engage in effortful cognitive activity when they share the responsibility for a cognitive task with others than when they alone are responsible for the cognitive work, and this diffusion of effort follows an inverse power function as predicted by social impact theory.

In order for diffusion of cognitive effort, as found in the present study to occur, we suspect several conditions must obtain: the task should be clearly identified and involve costly effort, responsibility should inhere in the group as a whole and not in specific members, rewards to individuals should not be contingent on identifiable individual output, and group interaction should be minimal. Group interaction may cause other processes instead of or in addition to diffusion of responsibility also to operate. For example, group interaction may lead to increased cohesiveness or heightened competition, and thus to extra efforts. In the present study, rewards were few, individuals did not identify themselves and thus were unable to receive individual feedback, and there was no group interaction.

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Footnotes

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²Pilot testing revealed that the mimeographed-typed distinction did not affect effort or evaluation ratings $F_s(1, 18) < 1$.

³A linear trend on the raw data $F(1, 72) = 3.38$, though not significant, accounted for 68% of the variance.