Comparison of Allocations by Individuals and Interacting Groups in an Escalation of Commitment Situation[1]

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In this study, individuals and interacting 3-person groups were asked to make a series of allocation decisions using a modified version of the A&S decision case (Staw, 1976). Based on the choice-shift effect, it was hypothesized that groups would allocate more to a failing course of action than would individuals, and that these differences would emerge only after repeated sequential decisions. Both hypotheses were supported. These findings suggest that processes unique to groups account for the greater allocations of groups, relative to individuals in escalation situations. The implications of these findings in applied settings are discussed.

Research has shown that individuals often will allocate resources to a course of action that has previously yielded poor results. In his seminal study, Staw (1976) showed that subjects who were responsible for an initial allocation decision that resulted in negative consequences committed more resources on a subsequent trial than did subjects who received positive consequences or who were not responsible for the initial decision. Staw labeled this phenomenon the *escalation of commitment to a failing course of action.*

Despite the extensive literature subsequently devoted to the topic of escalation, to date the majority of research has focused on individual decision makers (see reviews by Brockner, 1992; Staw, 1997; Staw & Ross, 1987). This is problematic on theoretical and practical grounds. On a theoretical level, it cannot be assumed that the escalation processes found to affect individual decision making will be the same factors to affect escalation in decision-making groups (Klein, Dansereau, & Hall, 1994; Rousseau, 1985). As a practical concern, escalation in decision-making groups is a phenomenon of considerable importance. Several

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cases of escalation that have been cited in the literature were products of group decision making, including the building of the Shoreham Nuclear Plant (Ross & Staw, 1993) and the London Stock Exchange's continued investment in a failing information-technology project (Drummond, 1996). A great deal of upper-level decision making in organizations is conducted by groups (Donaldson & Lorsch, 1983; Eisenhardt, 1989; Eisenstat & Cohen, 1990; Hambrick, 1987; Janis, 1982). Thus, a number of authors (e.g., Bazerman, Giuliano, & Appelman, 1984; Brockner & Rubin, 1985; Whyte, 1991) have noted the need to extend our understanding of the escalation phenomenon to group settings.

In addition to the neglect of decision-making groups, several shortcomings have been noted in the traditional escalation-of-commitment research paradigm. Perhaps the most important of these shortcomings is an overreliance on the self-justification explanation of escalation, originally proposed by Staw (1976), which suggests that individuals allocate additional resources to a failing course of action in hopes of justifying their previous decisions. Research has not always supported the self-justification explanation (e.g., Armstrong, Coviello, & Sanfranek, 1994; Goltz, 1993; Singer & Singer, 1986). A number of alternative and perhaps complementary psychological explanations for the escalation-of-commitment phenomenon have been developed, including information-processing effects (Conlon & Parks, 1987; Garland, 1990; Whyte, 1986), reinforcement theory (Goltz, 1992, 1993), and equivocality or uncertainty effects (Bowen, 1987; Bragger, Bragger, Hantula, & Kirnan, 1998; Hantula & Bragger, 1999). Recent reviews of the literature have suggested that escalation is a multiply determined phenomenon (e.g., Brockner, 1992; Staw, 1997).

Previous escalation research has also been criticized for failing to include a viable alternative course of action for subjects (Hantula & Crowell, 1994; McCain, 1986). Previous studies have found that decision makers may not escalate when such alternatives are present (Hantula & Crowell, 1994; McCain, 1986). These findings call into question the generalizability of the escalation phenomenon.

Finally, previous escalation research has not, with but a few exceptions (Bragger et al., 1998; Goltz, 1992, 1993; Hantula & Crowell, 1994; McCain, 1986; Staw & Fox, 1977), examined decision behavior across a series of decisions (Brockner, 1992; Hantula, DeNicolis, & Goltz, 1995; Staw, 1997). This is particularly problematic since decision making across time is an important component of definitions and models of escalation that have been offered in the literature. Thus, recent reviews of the literature have suggested that more studies examine escalation longitudinally (Brockner, 1992), such as through the use of interactive computer simulations (Staw, 1997). Results of studies that have examined escalation over a series of repeated decisions indicate that, with time, de-escalation can be expected to follow escalation (e.g., Goltz, 1992, 1993; Hantula & Crowell, 1994; McCain, 1986). Also, these studies confirm the

dynamic nature of escalation. They suggest that effects of factors interact with time to produce escalation (Brockner et al., 1982; Goltz, 1993; Hantula & Bragger, 1999; Staw & Fox, 1977), and that effects of some factors are transient, whereas effects of other factors are more enduring (Goltz, 1993).

Escalation in Groups

Only two published studies have directly compared the allocations of individuals and groups in an escalation situation. Bazerman et al. (1984) examined whether interacting groups were as prone to escalation as were individuals. Both individuals and groups who were responsible for an initial allocation that resulted in failure were found to allocate more resources following failure than did individuals and groups who were not responsible for the initial allocation. Bazerman et al.'s results suggest that interacting groups are as prone to escalation as are individuals.

Whyte (1991) led subjects to believe that they were part of a noninteracting decision-making group. He found that, relative to individuals, subjects in the noninteracting "group" condition reported experiencing less personal responsibility for the initial decision that resulted in failure and allocated less after failure than did subjects who made both decisions on their own. Thus, it appears that individuals who believe that they are making decisions as members of noninteracting groups are not as prone to escalation as are individual decision makers (Whyte, 1991), but interacting groups are as prone to escalation as are individuals (Bazerman et al., 1984). Taken together, these findings suggest that processes taking place during group interaction may have important effects on escalation.

The inclusion of group processes may be necessary to fully account for escalation in groups (Bazerman et al., 1984; Brockner & Rubin, 1985; Whyte, 1991); and for group processes to fully emerge and affect behavior, they require interactions of group members over time. The Whyte study did not examine interacting groups, and the Bazerman et al. study examined only one decision following failure. Thus, as Whyte suggested, there is a gap in our understanding of escalation, particularly concerning the possibility that group processes may lead interacting groups to escalate more than individuals over a series of decisions. The current study will address these issues by comparing the allocations of individuals and interacting groups in an escalation situation over repeated decisions.

Choice Shifts in Groups

The *choice-shift effect* refers to the tendency for a group decision to be more extreme in the initially favored direction than the mean of the individual group member's preferences before group discussion (e.g., Davis, 1992; Hinsz & Davis, 1984; Zuber, Crott, & Werner, 1992). *Group polarization*, in contrast,

refers to the tendency for the arithmetic mean of individuals' preferences after group discussion to be more extreme than they were before group discussion in the direction initially favored by the majority of group members (e.g., Lamm & Myers, 1978; Moscovici & Zavalloni, 1969; Myers & Lamm, 1976). Hundreds of studies have demonstrated the group-polarization and choice-shift effects on attitudes, factual judgments, decisions regarding courses of action, and risk-taking/gambling decisions using both within-subjects and between-subjects designs (Davis, Kerr, Sussman, & Rissman, 1974; Isenberg, 1986; Lamm & Myers, 1978; Myers & Lamm, 1976).

In the classic escalation-of-commitment situation, decision makers risk additional resources in a course of action that has resulted in failure. The choice-shift effect suggests that this initial preference among individuals will be more extreme when decisions are made in interacting groups (Bazerman et al., 1984; Brockner & Rubin, 1985; Whyte, 1991). Thus, our first hypothesis predicts that groups will allocate more resources to a failing course of action than will individuals acting alone.

Our second hypothesis concerns the timing with which individual/group differences emerge. Current research supports a number of interpersonal and group processes as explanations for the group-polarization and choice-shift effects, including social decision scheme theory (e.g., Davis, 1973; Zuber et al., 1992), self-categorization theory (e.g., Hogg, Turner, & Davidson, 1990; Mackie, 1986), and persuasive-arguments theory (e.g., Burnstein & Vinokur, 1973, 1977; Vinokur & Burnstein, 1974, 1978). Each of these explanatory processes arguably requires an extended period of group interaction in order to manifest effects (e.g., Zuber et al., 1992).

For example, the social decision scheme theory (Davis, 1973) suggests that a more elaborate scheme than the simple averaging or majority-vote decision rule may emerge if groups are given sufficient time to interact (Laughlin & Early, 1982; Zuber et al., 1992). Persuasive-arguments theory (Burnstein & Vinokur, 1973, 1977; Vinokur & Burnstein, 1974, 1978) suggests that the degree of polarization and choice shift depends not only on the number, but also on the validity and novelty of the arguments made in the group. As the group interacts over time, more valid and novel arguments may accumulate, resulting in greater choice shift. On the other hand, group shift would not occur indefinitely, since the pool of arguments that are both valid and novel is likely to be exhausted eventually. Self-categorization theory explains polarization and choice-shift phenomena as the result of individual identification with and conformity to perceived in-group norms (e.g., Hogg et al., 1990; Mackie, 1986). The strength of in-group identification and influence may be dependent on the amount of time spent interacting with the group.

The processes discussed in all of these theoretical perspectives suggest that the *timing* of allocation decisions should be an important consideration in group

escalation research. However, our literature search revealed no published studies that compared individual escalation to the escalation of interacting groups over repeated decisions. Bazerman et al. (1984) examined only one decision following failure, and Whyte (1991) examined only one post-failure decision using noninteracting groups. Studies that have examined escalation over repeated decisions have found that individuals' allocations decreased rapidly after the first post-failure allocation (e.g., Goltz, 1992, 1993; Hantula & Crowell, 1994; McCain, 1986; Staw & Fox, 1977). Our discussion of the group processes suggests that the choice-shift effect will emerge only after an extended period of interaction. Therefore, our second hypothesis predicts that differences between individual and group allocations in an escalation context will emerge only after repeated post-failure decisions. In other words, we expect a significant interaction of decision unit (groups vs. individuals) and decision rounds on allocations in an escalation situation.

Method

Participants

Participants for this study were 314 undergraduate students enrolled in the introductory management course at a midwestern university. Students participated in the experiment for course credit and were also provided with a $20 cash incentive to be awarded to those who had best maximized their outcomes on the task (as explained later). Males made up 59% of the sample. Incomplete questionnaire responses from an individual or one of the group members resulted in the elimination of 12 subjects from the analyses. The final analyses were conducted on 74 individuals and 76 three-person groups.

Task

The task was a computerized variation of the A&S decision case, which has been used in previous research (Staw, 1976). It included the following major elements found in escalation dilemmas, as specified by Staw and Ross (1987): (a) an initial investment resulting in costs or losses, (b) some continuity of the decision dilemma over time, and (c) uncertain outcomes for decisions to withdraw or persist in the course of action.

Subjects were asked to play the role of (a) new top financial officer(s) in a large company that has had a declining share of the market. Subjects were required to decide how to allocate $20 million (in $1 million increments) across two divisions, the consumer division and the industrial division, of a large conglomerated company over a series of 22 decision rounds. Each decision round represented one "quarter" of one "year." In each round, subjects were first asked

to choose the division to which they preferred to allocate at least half of the funds, and were then asked to indicate the actual amount of the allocation. Funds not allocated to the chosen division were automatically allocated to the other division.

After subjects confirmed that the amount entered into the computer was correct, two pieces of information for each division were presented back to the individual or group making the decision: (a) the percentage increases or decreases in market share per million dollars invested in that division during the preceding quarter (e.g., "During the previous quarter, the increase in market share for every million dollars invested in the Industrial Products division was 0.08"); and (b) the total increase or decrease in market share for each division during the preceding quarter (e.g., if $10 million was invested in the industrial division on the trial above, the feedback would read, "The total change in market share for the Industrial Products division during the last quarter was 0.80"). The task was completed during one experimental session.

Previous escalation research has been criticized as artificial in that it examines escalation effects in the absence of a viable alternative course of action (Hantula & Crowell, 1994; McCain, 1986). Thus, the present study included two divisions in which to make allocations. During the first 12 rounds of the study, termed the *success phase*, subjects were induced first to allocate and then escalate allocations to one of the two divisions. Previous research has shown that the allocation of resources to a failing course of action is greater when previous outcomes have been larger (Goltz, 1999) and when a variable pattern of positive outcomes has been experienced (Bragger et al., 1998; Goltz, 1992, 1993; Hantula & Crowell, 1994). Therefore, during the success phase, both divisions delivered positive outcomes, but one randomly assigned division (the escalation-induction division) delivered larger average market share increases per dollar invested than did the other division (the alternative division). The escalation-induction division also delivered its larger positive outcomes on a highly variable basis, whereas the positive outcomes in the alternative division occurred on a continuous basis. During the final 10 rounds of the task (the failure phase), outcomes from the escalation-induction division dropped to zero, while the alternative division continued to deliver small positive percentage increases for allocations made to research and development. In this way, outcome magnitude and outcome variability during the success phase of the task were used to induce escalation during the failure phase of the task. The failure phase of the task was used to collect the dependent variables of the study.

Independent Variable

Subjects were randomly assigned to either the individual or group condition (decision unit). Subjects in the individual condition completed all 22 allocation

decisions on their own. Subjects in the group condition completed the task as members of three-person groups (see the Procedure section).

Control Variables

In order to control for the possible influence of extraneous factors, three variables were manipulated as part of the experimental design. First, assignment of the label *consumer products* or *industrial products* to the escalation-induction division was varied randomly across subjects. This manipulation was conducted to ensure that there were no effects as a result of the label applied to the escalation-induction division. Second, gender was recorded for individuals and groups. Only single-gender groups were composed for consistency across units of analysis.

Two levels of average market share increase delivered by the escalation-induction division were varied randomly across subjects. That is, the magnitude of the outcomes delivered by the escalation-induction division were either 5 times the size (moderate magnitude) or 10 times the size (large magnitude) of those delivered by the alternative division during the success phase of the task. This magnitude manipulation was conducted to examine whether observed effects generalized across different levels of previous success.

Self-justification is the explanation of escalation given the most research attention (see reviews by Brockner, 1992; Staw, 1997; Staw & Ross, 1987). Because individuals acting alone and individuals acting in groups might be expected to differ in the extent to which they experience pressure for self-justification (Whyte, 1991), a questionnaire measure was included to assess subjects' levels of self-justification for possible inclusion as a control variable. Subjects were instructed to report the way they felt at the end of the success phase of the task. Two aspects of self-justification were assessed using a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*): commitment to one of the divisions, and desire to act in a manner consistent with past decisions (see the Appendix for items). Cronbach's alpha for the six-item scale was .73.

Dependent Variable

The amount of research and development (R&D) funds allocated to the escalation-induction division in each of the nine post-failure decision rounds was the dependent variable of the study. Note that while the task was designed so that 10 allocations resulted in a zero return from the escalation-induction division, only 9 of these allocations would be made after subjects received failure feedback. These nine allocations were examined for individual versus group differences.

Procedure

After subjects were assigned to one of the conditions, the experimenter (one of the authors or a trained graduate student) gave instructions for performing the task and answered any questions. Subjects in the individual condition were instructed to write down their individual allocation decision for each trial on the sheet provided, after which they were to enter it into the computer. Subjects in the group condition were also instructed to write down their individual allocation decisions, but were instructed then to reach a consensus decision with the other members of their group for each decision. The group decision was recorded on the sheet provided and then entered into the computer by the subjects. After performing the task, each subject individually completed a questionnaire that contained the self-justification and manipulation-check items. Subjects were thoroughly debriefed after completion of the experiment. After all data were collected, subjects' responses were evaluated to determine the winners of the monetary prizes, and the prizes were delivered to the winners through their regular class instructors.

Data Analysis

In order to examine the predictions of a main effect of decision unit and an interaction effect of decision unit and decision rounds, a 2 × 2 (Decision Unit: Individual vs. Group × Magnitude: Moderate vs. Large) repeated-measures ANOVA was conducted. The nine post-failure allocations were used as the repeated measures. In order to examine differences between individual and group allocations over time, a MANOVA was performed using decision unit and magnitude as independent variables and the nine post-failure allocations as the dependent variables. An alpha level of .05 was used for all statistical tests.

Note that the ANOVAs provide between-group (individual vs. group) comparisons. Between-group comparisons were examined for evidence of the group shift effect because of the sequential nature of the decision task. The individual decisions of subjects working in groups were not independent of the group decision on previous rounds. Thus, within-group comparisons are not appropriate. The between-subjects comparison is the most appropriate demonstration of the choice-shift effect on this task.

Results

Preliminary Analyses

Manipulation checks. Recall that, for all subjects, the escalation-induction division offered larger average rates of return than did the alternative division

during the success phase of the task. Half of the subjects were randomly assigned an average rate of return from the escalation-induction division that was 5 times that of the alternative division (the moderate magnitude condition), while the other half experienced an average rate of return that was 10 times that of the alternative division (the large magnitude condition). As a check on the effectiveness of these magnitude differences across divisions, subjects were asked to indicate which division had the higher average rate of return during the first 12 decision rounds of the task. Chi-square analyses indicate that subjects were significantly more likely to correctly choose the escalation-induction division, rather than the alternative division, $\chi^2(1, N = 302) = 57.6$, $p = .00$, $\Phi = .44$. Further, subjects were more likely to correctly choose the escalation-induction division when magnitude was large, rather than moderate, $\chi^2(1, N = 302) = 10.23$, $p = .00$, $\Phi = .18$. Thus, subjects were significantly more likely to choose the escalation-induction division as the one with the higher average return and were significantly more likely to choose the escalation-induction division when the rate was of large magnitude than when the rate was of moderate magnitude. This suggests that the manipulation was successful.

Control variables. Separate one-way repeated-measures ANOVAs were used to check for effects from the three manipulated control variables on allocations over the nine post-failure rounds. There were no significant effects for the label of consumer or industrial, $F(1, 148) = 1.99$, $p = .16$, $r = .12$, or for gender, $F(1, 148) = 0.26$, $p = .61$, $r = .04$. Therefore, data were pooled across levels of these two variables in subsequent analyses.

There was a significant effect for magnitude, $F(1, 148) = 6.15$, $p = .01$, $r = .20$, indicating that individuals and groups who received the large magnitude rate of return during the first 12 rounds allocated more during the nine post-failure rounds than did those who received the moderate magnitude rate of return. Magnitude was therefore included in subsequent analyses.

Subjects reported only moderate levels of self-justification in the individual ($M = 4.04$, $SD = 1.18$) and group ($M = 4.12$, $SD = 0.69$) conditions. The independent-sample t test revealed no differences between conditions, $t(148) = 0.52$, $p = .61$, $r = .04$; and self-justification was therefore not included as a control variable in subsequent analyses.

Dependent Measures

Figure 1 shows allocations by decision unit and magnitude over the nine post-failure rounds. To examine our first prediction, that groups would allocate more to a failing course of action than individuals, we performed a 2 × 2 (Decision Unit × Magnitude) repeated-measures ANOVA, using the nine post-failure allocations as the repeated dependent variables. Results for this analysis are presented in Table 1. The repeated-measures ANOVA revealed a significant

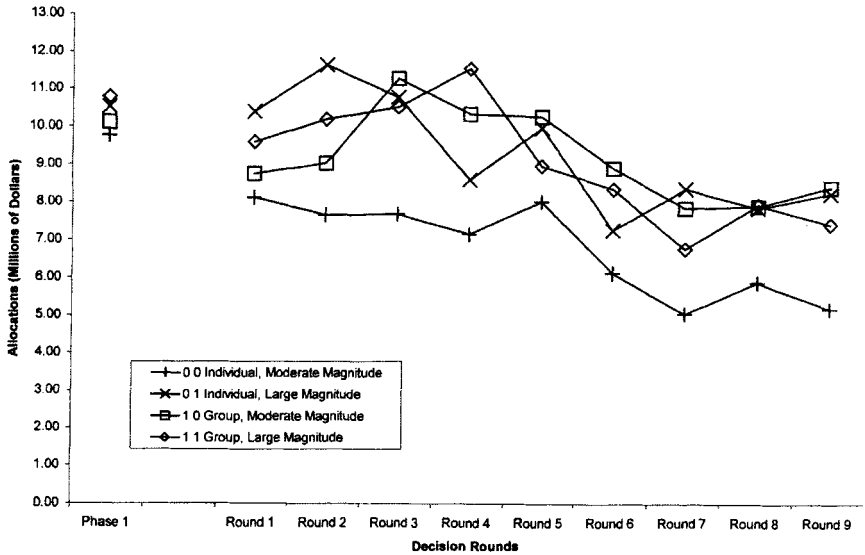

Figure 1. Mean dollar amounts allocated over rounds by decision unit and magnitude conditions for average of Rounds 1 through 13 (Phase 1) and for nine rounds after failure (Phase 2).

main effect for decision unit, $F(1, 146) = 6.46, p < .05$, supporting our first hypothesis.

Our second hypothesis predicted differences between individual and group allocations to emerge only over repeated post-failure allocations. A finding of a significant interaction effect of decision unit and decision round confirmed this prediction, $F(8, 139) = 2.29, p < .05$. In order to examine the nature of this interaction effect, we conducted a MANOVA using the allocations for each of the nine post-failure rounds as dependent variables. Results for this analysis are presented in Table 2. The multivariate test statistic was significant for decision unit, $F(9, 138) = 2.63, p < .01$, showing that the overall effect is significant and allowing confidence in the univariate tests. The univariate test approached significance for the third post-failure round and was significant for the fourth and sixth post-failure rounds. Thus, as expected, the decision unit main effect appeared to be strongest not immediately after failure, but only after several post-failure rounds.

The repeated-measures ANOVA also indicated a significant main effect for magnitude, $F(1, 146) = 6.91, p < .01$, and a significant interaction between magnitude and decision unit, $F(1, 146) = 8.99, p < .01$. The nature of these effects is shown in Figure 1. Overall, individuals and groups in the large magnitude condition allocated more after failure than did individuals and groups in the moderate magnitude condition. Regarding the interaction effect, Figure 1 shows that

Table 1

Results Summary of Repeated-Measures ANOVA

Source	*df*	*F*	η^2
Between subjects			
Decision unit (D)	1	6.46*	.04
Magnitude (M)	1	6.91**	.05
D × M	1	8.99**	.06
Error	146		
Within subjects			
Rounds	8	7.50**	.30
Rounds × D	8	2.29*	.11
Rounds × M	8	0.69	.04
Rounds × D × M	8	0.89	.05
Error	139		

*$p < .05$. **$p < .01$.

outcome magnitude affected the allocations made by individuals but not the allocations made by groups.

Again, the results of the MANOVA help us to understand the timing of these effects (Table 2). However, because the multivariate test statistics for the magnitude main effect, $F(9, 138) = 1.71$, $p = .09$, and the Decision Unit × Magnitude interaction, $F(9, 138) = 1.67$, $p = .10$, failed to reach significance, interpretation of the univariate tests must be accepted with caution. The univariate tests indicated a significant main effect of magnitude for the first and second rounds only. Thus, the magnitude effect appeared greatest in the early post-failure rounds. The univariate tests for the Decision Unit × Magnitude interaction indicated a significant effect in the third, seventh, and ninth rounds only, suggesting that this interaction effect was prevalent throughout the post-failure rounds.

Finally, the repeated-measures ANOVA revealed a significant effect for decision rounds, $F(8, 139) = 2.29$, $p < .05$. Polynomial contrasts indicated significant first-order, $F(1, 146) = 43.80$, $p < .01$, and third-order, $F(1, 146) = 13.56$, $p < .01$, trends over rounds. Thus, allocations decreased over rounds and displayed a smaller cubic trend over rounds.

Discussion

The purpose of this study was to examine the escalation-of-commitment phenomenon in decision-making groups. In this study, we paid explicit attention to

Table 2

Results Summary for Univariate Tests on Post-Failure Rounds (ANOVA)

Source	*df*	*F*	η^2
Between subjects			
Decision unit (D)			
Round 1	1	0.01	.00
Round 2	1	0.00	.00
Round 3	1	3.53	.02
Round 4	1	13.94**	.09
Round 5	1	0.47	.00
Round 6	1	4.06*	.03
Round 7	1	0.43	.00
Round 8	1	1.49	.01
Round 9	1	1.54	.01
Magnitude (M)			
Round 1	1	4.58*	.03
Round 2	1	12.08**	.08
Round 3	1	1.71	.01
Round 4	1	2.66	.02
Round 5	1	0.13	.00
Round 6	1	0.09	.00
Round 7	1	1.46	.01
Round 8	1	1.33	.01
Round 9	1	1.12	.01
D × M			
Round 1	1	0.97	.01
Round 2	1	3.60	.02
Round 3	1	4.70*	.03
Round 4	1	0.02	.00
Round 5	1	3.23	.02
Round 6	1	0.77	.01
Round 7	1	5.81*	.04
Round 8	1	1.26	.01
Round 9	1	4.31*	.03

(*table continues*)

Table 2 (Continued)

Source	*df*	*F*	η^2
Error			
Round 1	146		
Round 2	146		
Round 3	146		
Round 4	146		
Round 5	146		
Round 6	146		
Round 7	146		
Round 8	146		
Round 9	146		

*$p < .05$. **$p < .01$.

an effect unique to groups: choice shift. *Choice shift* refers to the tendency for interacting groups to make decisions that are more extreme than the average of the individual group members' prediscussion preferences. Since individuals in escalation situations favor continued investment in a failing course of action, we hypothesized that groups would invest more in a failing course of action than would individuals making allocation decisions on their own. Our primary hypothesis was supported. A repeated-measures ANOVA showed that three-person groups allocated significantly more resources to a failing course of action than did individuals. The finding of a between-subjects difference in the decisions of individuals and groups in the current study is, by definition, a demonstration of the choice-shift effect.

In our second hypothesis, we predicted a decision unit by decision round interaction effect. Based on the identification in previous research of several processes underlying the choice-shift effect, we expected that differences in the allocations of individuals and groups would emerge only after an extended period of group discussion. Our second hypothesis was supported by a significant decision unit (individual or group) by decision round interaction effect. A MANOVA showed that differences in the allocations of individuals and groups began to approach significance in the third post-failure round and were significant in the fourth and sixth rounds. Thus, differences emerged only after extended group discussion over repeated sequential decisions.

Two important observations follow from the support found for our second hypothesis. First, the current results help to reconcile the findings of Whyte (1991) and Bazerman et al. (1984) by suggesting that processes unique to groups occur over time to produce escalation. Whereas Whyte found lower levels of

escalation in groups relative to individuals because of decreased responsibility, Bazerman et al. found no significant differences between the allocations of individuals and groups in an escalation situation. In the Whyte study, group members did not interact with each other and were given no information regarding the preferences of their hypothetical group co-members. One should therefore not expect the choice-shift effect to occur. In the Bazerman et al. study, group members did interact, but only one post-failure decision was required. Consistent with Bazerman et al., the current study found no differences in the allocations of individuals and groups on the first post-failure decision. The results of the current study suggest that only after several decision rounds do differences emerge. Thus, the current results expand what is known about escalation in groups by suggesting that interacting groups are as prone to escalation as are individuals on their initial post-failure decision, but exhibit choice shift and become more prone to escalation over repeated sequential decisions.

The second observation is that the finding that differences emerged only after repeated rounds is support for the notion that processes unique to groups and group interaction account for the results. Our use of the self-justification questionnaire measure showed that, because levels of self-justification were virtually identical in the individual and group conditions, self-justification does not appear to explain our current results. However, several of the processes shown to underlie the group shift effect might account for these results, including social decision scheme theory (e.g., Davis, 1973; Zuber et al., 1992), self-categorization theory (e.g., Hogg et al., 1990; Mackie, 1986), and persuasive-arguments theory (e.g., Burnstein & Vinokur, 1973, 1977; Vinokur & Burnstein, 1974, 1978), since they all require time to emerge. Future research should devote more attention to discovering the role of these different processes in producing group escalation.

Our results also suggest that differences between the allocations of individuals and groups in escalation situations eventually disappear over repeated sequential decisions. The MANOVA indicated a lack of significant differences between individuals and groups in the seventh, eighth, and ninth decision rounds. Previous research examining individuals in escalation situations has consistently shown a pattern of escalation followed by de-escalation over repeated decisions (Bragger et al., 1998; Goltz, 1992, 1993; Hantula & Crowell, 1994; McCain, 1986; Staw & Fox, 1977). Central to theoretical explanations of this finding is the resolution of the uncertainty inherent in escalation situations (e.g., Bowen, 1987; Bragger et al., 1998; McCain, 1986). As continuing negative outcomes become more and more certain, individuals withdraw from the situation.

In terms of the theoretical model of group escalation used in the current study, we should expect the choice-shift effect in groups to disappear as the preponderance of individual group members no longer favors continued investment. Both theory and previous research indicate that group polarization and choice-shift effects are not likely to occur when no clear majority of group members

favors one extreme or the other (e.g., Isenberg, 1986; Lamm & Myers, 1978; Laughlin & Early, 1982; Myers & Lamm, 1976). Thus, at some point, group allocations should no longer be escalated, relative to individuals. We might also expect groups to eventually allocate less than individuals, as the preponderance of individuals begins to favor de-escalation and the choice-shift effect leads to more extreme group decisions in the direction of de-escalation. Although this was not found in the present study, decisions may not have been continued through enough rounds in this study. On the other hand, the effect of the group decisions in earlier rounds on subsequent individual decisions (i.e., essentially the group polarization effect) may slow or completely inhibit the emergence of a preponderance of individuals strongly in favor of and willing to argue for de-escalation. Future research is necessary to examine these conflicting predictions.

The current results also reveal unanticipated findings with respect to the magnitude manipulation. Participants' propensity to allocate to one of the two investment choices was built by assigning that division a higher average rate of return. That rate, always higher than the rate of return for the alternative division, was varied across conditions in order to assess whether the effect generalized across different levels of magnitude. Results show both a main effect for magnitude and an interaction between magnitude and decision unit. Inspection of the means shows that magnitude had an effect on the allocations of individuals only. While group allocations were virtually the same under moderate and large magnitude conditions, individuals in the large magnitude condition allocated more than did individuals in the moderate magnitude condition. In fact, when magnitude was large, individuals allocated as much as did groups over the nine post-failure rounds. The fact that individual versus group differences appeared at moderate but not large magnitude levels suggests that the threshold at which escalation begins may be lower for groups than it is for individuals.

Previous studies have found that subjects who had an option to allocate resources to either or both of two viable alternatives did not escalate significantly to the failing course of action (Hantula & Crowell, 1994; McCain, 1986). In contrast, in the present study, subjects in the group condition and subjects in the large magnitude condition did exhibit escalation to the escalation-induction division, despite the presence of an alternative division that continued to provide positive outcomes. These discrepant results appear to be a result of the very low amount of positive outcomes generated by the alternative division in the present study. The amounts used in the alternative division were intended to produce a low likelihood of escalation to that alternative, based on past research on magnitude effects on escalation (Goltz, 1999). In comparison, in past studies providing an alternative, the alternative yielded clearly larger positive outcomes than did the failing course of action (e.g., Hantula & Crowell, 1994). Thus, the results of the present study suggest that the mere presence of an alternative continuing to generate positive outcomes is not sufficient to temper escalation to a failing

course of action. Investment in the alternative must be perceived as resulting in large enough positive outcomes.

Interestingly, no significant effects were found for the gender of the subject, in contrast to Bateman's (1986) findings. When Bateman's study is compared to the present investigation, this difference in results appears to be a function of the different manipulations. In the Bateman study, gender interacted with the manipulation of the attributions provided for failure (internal vs. external). Female escalation behavior was found to be more strongly influenced by attribution processes (Brockner, 1988), in that females invested more than did males when failure was attributed to external causes and less than did males when failure was attributed to internal causes. Males' allocation behavior, on the other hand, was relatively unaffected by the attribution manipulation. No attribution manipulations were included in the present study; thus, these gender effects did not appear. In addition, the lack of a significant gender by decision unit interaction effect suggests that female escalation behavior is not affected by factors such as whether decisions are made individually or in groups.

Limitations

One limitation of the present study is similar to a limitation of much of the previous escalation research: It consisted of a laboratory experiment using an undergraduate sample. However, Locke (1986) noted that laboratory findings are similar to those from field investigations for research in a number of areas of organizational behavior. Also, past escalation research has found no significant differences in results for those with and without work and business experience (Armstrong et al., 1994; Fox & Staw, 1979; Garland & Newport, 1991; Garland, Sandefur, & Rogers, 1990). Thus, the use of students in the present escalation study is consistent with the criteria that have been suggested for the use of students: that the student sample be part of a stream of research, and that the population of interest be similar to the students (Gordon, Slade, & Schmitt, 1987).

A second limitation of the current study is that it did not include a noninteracting group condition. Future research might directly compare the escalation behavior of interacting and noninteracting groups in order to understand better the role of group processes in producing group escalation. In such a comparison, we would expect interacting groups to escalate relative to noninteracting groups as a result of choice shift arising from group processes.

A third limitation of the current study is our limited ability to draw inferences regarding the underlying group processes that produce group shift in the context of an escalation situation. A complete examination of the factors that produce choice shift was beyond the scope of the current study. Future research examining underlying processes would increase our understanding of escalation in groups. Observational methods, such as coding communications and persuasive

attempts during group interaction, could be used to collect evidence regarding the role of persuasive-arguments processes in group escalation. Better still would be experimental manipulation of factors such as number and type of arguments, knowledge of the distribution of member preferences free of persuasive communications, or level of in-group identification in order to test competing or complementary theories of choice-shift effects in the escalation context. Nevertheless, the ability of an empirical generalization, such as the choice-shift effect, to predict an outcome can be of considerable scientific usefulness, even if it does not provide a complete explanation (Kaplan, 1964).

Practical Implications

The Vietnam War, which is one of the most often cited examples of the danger of escalation in decision making (Staw, 1976), was in fact an example of escalated decision making by groups (Halberstam, 1972). Given that a great deal of decision making in organizations is conducted by groups, it is important to understand and anticipate the effect that the use of groups will have on decisions. The current findings indicate that groups are as prone to escalation as are individuals on their initial post-failure decision, and become more so over sequential decisions. Unanticipated findings suggest that groups may have a lower threshold of past success at which they begin to escalate, relative to individuals. Based on these results, one might recommend avoiding the use of groups for important sequential decisions, but the superiority of groups for problem solving and decision implementation (see McGrath, 1984, for a review) makes this an unattractive option. Group escalation may be avoided altogether if a different group, one not invested in the initial decision, is assigned to make decisions subsequent to a negative outcome. But the practicality of this suggestion will depend on the specific decision situation.

Bazerman et al. (1984) recommended changing one or more group members between successive decisions to reduce escalation. If persuasive arguments do indeed underlie the choice-shift effect found in the current study, this technique may not be effective unless more than half of the group is replaced. Alternatively, group decision techniques such as the Delphi method (Dalkey, 1968) and devil's advocacy (Herbert & Estes, 1977; Janis, 1982) may help to reduce escalation tendencies in groups. Although devil's advocacy has been found to be only marginally effective with individuals in escalation situations (Schwenk, 1988), these techniques may be more effective in groups because they are designed to reduce influence in the group that is not associated with individual accuracy (Schwenk, 1990). They may thus reduce the interpersonal influence pressures underlying group escalation.

Finally, techniques recommended to reduce escalation by individuals may also prove effective in reducing escalation in groups. These include making the

negative consequences of the initial decision less threatening, setting minimum decision outcome targets, and focusing evaluations on the decision process instead of the decision outcome (Simonson & Staw, 1992). The effectiveness of these group and individual techniques for reducing group escalation have not been empirically examined. This is a worthwhile direction for future applied research.

In summary, there has been a great deal of research on escalation of commitment, but little on escalation in groups. Although Bazerman et al. (1984) explicitly recognized that processes unique to interacting groups might influence group escalation, their results seem to suggest that escalation processes and outcomes are essentially the same for individuals and groups. In contrast, the current study indicated that groups display choice shift and are prone to allocate more in escalation situations than are individuals over sequential decisions. Our results suggest that this difference arises from processes occurring in groups as they interact over time. Further, our results indicate that groups may have a lower threshold at which escalation begins. Future research on the role of group processes in producing group escalation is clearly warranted.

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Appendix

Self-Justification Items

1. It was important for me to keep investing in the division I favored from early in the experiment.
2. Once I figured out which division to invest in, I thought it would be best to keep investing in that division.
3. After investing as much as I did in one of the divisions, I felt that I could not just give up on it.
4. Prior to the pause, I developed a favorite division to invest in.
5. At some point in the experiment, I felt that if I kept investing in my preferred division, my preference for that division would be proven right.
6. Once I figured out what seemed like a good investment pattern, I felt that deviating from that pattern was like admitting that I had made a mistake.