

Group decision process and incrementalism in organizational decision making

Henry Moon,^{a,*} Donald E. Conlon,^b Stephen E. Humphrey,^b Narda Quigley,^c
Cynthia E. Devers,^d and Jaclyn M. Nowakowski^b

^a Robert H. Smith School of Business, University of Maryland, College Park, MD 20742, USA

^b Michigan State University, USA

^c University of Maryland, USA

^d Texas A&M University, USA

Abstract

In two studies examining resource allocation, support is found for the notion that group decisions are affected in systematic ways depending on whether or not there was individual consideration of the problem before meeting as a group. Specifically, compared to no prior consideration groups, prior consideration groups (1) escalate their commitment more in progress (i.e., ongoing) decisions, and (2) are less willing to concentrate resources on a single project in adoption (i.e., resource utilization) decisions. The findings challenge the blanket assertion that promoting divergent views in a group decision context is always related to better decisions. © 2003 Elsevier Science (USA). All rights reserved.

Keywords: Escalation of commitment; Group decision making; Decision biases

Examples of “throwing good money after bad” are easy to find. In the construction industry, the Shoreham nuclear power plant was supposed to be completed in 4 years, cost \$75 million dollars, and provide much needed energy to New York. Instead, the project took 23 years, cost taxpayers over \$5 billion, and was ultimately mothballed without ever providing one megawatt of power (Ross & Staw, 1993). Still underway is a large-scale underground highway in the city of Boston (the “Big Dig”), which promises to alleviate traffic congestion. Originally estimated to cost \$3 billion, current expenditures have risen to \$14.5 billion with no certainty as to when the project will be finished (Dahl, 2001).

A common theme in the introductory examples is the inability of the responsible agent/s to abandon commitment to ongoing projects that had become financially irresponsible. However, much of the research on escalation of commitment and resource allocation has

ignored a key element of the decision process inherent in anecdotal examples: almost all of the research concerning escalation has been conducted at the *individual* level of analysis while the anecdotal examples entail decisions made by *groups*. Currently, only a few studies have explicitly examined escalation at the group level, with equivocal results (e.g., Bazerman, Giuliano, & Appleman, 1984; Smith, Tindale, & Steiner, 1998; Whyte, 1993).

This paper contributes to our understanding of group decision-making by testing the assertion that decisions made by groups whose members had given prior individual consideration to a problem are more susceptible to classic decision biases than are groups whose members had not considered the problem individually prior to meeting as a group. In our first study, we focus on the effect that the decision process of the group has on commitment in escalation dilemmas. Specifically, we find that groups who make decisions after each individual has staked an initial position tend to continue failing projects, whereas groups who consider project information only as a group tends to abandon the same projects, more than individual decision-makers would. We also elaborate on escalation behavior by considering

* Corresponding author. Present address: Goizueta Business School, Emory University, 1300 Clifton Road, Atlanta, GA 30322, USA.

E-mail addresses: hmoon@rsmith.umd.edu, Henry_Moon@bus.emory.edu (H. Moon).

a specific form of escalation, incremental investment behavior. We propose that the confidence level of the group mediates the relationship between group process and escalation behavior.

In our second study, we switch our context from an ongoing decision (also known as a progress decision) to an adoption (also referred to as resource utilization) decision, and replicate the tentativeness of prior consideration groups. Moreover, we find that prior consideration groups tend to change their risk allocation level due to performance information, whereas groups without prior individual consideration are unaffected by performance information when viewing risk allocation levels. In this regard, our second study expands the boundaries of our group process hypotheses developed in the first study beyond ongoing investment contexts into adoption decision contexts.

Groups and decision making

The use of groups and teams in organizations has grown significantly over the past several years (Cohen & Bailey, 1997). One organizational criterion that has received substantial attention by group researchers has been the influence that groups have on decisions and the decision process. In fact, Parks and Cowlin (1995) note that most of the important decisions within organizations are made by groups, or within a group context.

Research in group decision making has discovered that, compared to individuals, groups sometimes make better decisions (Libby, Trotman, & Zimmer, 1987; Snizek & Henry, 1989), and sometimes make worse decisions (Gigone & Hastie, 1997). Given this equivocality, we should not be surprised to find that similar ambiguity exists when comparing studies of how groups manage escalation dilemmas. However, a close examination of group decision-making studies reveals that differences in the process by which groups reached decisions may help explain the different findings, generally within the group decision making literature, and specifically within our focal area of escalation. In some cases, group members privately considered information about a problem and formed individual judgments before meeting as a group (e.g., Smith et al., 1998; Stasser, 1992; Whyte, 1993). In other cases, groups are exposed to problems for the first time as a group (Bazerman et al., 1984).

Thinking about a problem alone, prior to meeting in a group, has been shown to play a role in other areas of decision making. Consider a classic study by Sherif (1935). Using the autokinetic effect (the phenomenon that when an individual is shown a stationary point of light in a dark room, it appears to move), Sherif tested group agreement on perceived movement of the light. Groups making their decision without individual prior consideration were found to demonstrate greater levels

of convergence and agreement on how the light moved. In addition, they were more confident of their decision. However, groups whose members considered the stimulus before meeting as a group reached decisions that tended to fall *in between* the judgments of the various individuals. These findings, based on clinical experiments from over a half-century ago, may have direct present day organizational application.

Study 1—Group process and progress decisions

Escalation of commitment dilemmas are characterized as situations where a course of action toward a goal has not met expectations, and the decision maker is placed in a position to either abandon or continue to pursue the goal. Escalation of commitment research has established that decision-makers tend to continue on losing courses of action, even in the face of negative information. Recent escalation of commitment research has focused on ways that organizations might mitigate this decision bias (Kirby & Davis, 1998; Moon, 2001b; Simonson & Nye, 1992). One option organizations may use to increase the likelihood its members will abandon failing projects is to task the decision to groups (McNamara, Moon, & Bromiley, 2002; Simonson & Staw, 1992). Groups are thought to provide a means for mitigating the escalation bias by allowing members to diffuse blame and responsibility (Leatherwood & Conlon, 1987).

Bazerman et al. (1984) undertook the first empirical examination of group decision-making in escalation dilemmas. Building upon initial work by Staw (1976), it was thought that groups would exhibit similar escalation patterns as individuals to the extent that a “group” could feel similar pressure to justify past decisions (Brockner, 1992). Their results supported this logic, as similar escalation patterns were found for individuals and groups. However, Whyte (1993) found that while individuals and groups both escalated their commitment, groups actually engaged in *more* escalation than individuals. In contrast to the above findings, Leatherwood and Conlon (1987) proposed that the ability of groups to diffuse individual responsibility would lead to groups escalating *less* than individuals. Thus, the theory and results to date are inconclusive as to whether groups escalate more, the same, or perhaps less than individuals.

The group decision process, however, differed across the Bazerman et al. (1984) and Whyte (1993) studies. In the Whyte (1993) study, decision makers considered the problem individually before engagement in the group-based decision. Therefore, individuals may have had to publicly justify or defend their initial position, compete with other members to influence the ultimate group decision, and potentially lose face if the group chooses differently (Brockner, Rubin, & Lang, 1981; Brockner, Shaw, & Rubin, 1979). As Stasser (1992) noted, a person

may feel compelled to defend their initial preference, thereby holding back information from the group that contradicts their preference. Jehn, Northcraft, and Neale (1999) recently demonstrated that differences within a group (termed value diversity) are positively related to group conflict. Individuals who make a personal decision before meeting as a group must reconcile their opinions with other group members. This would be especially true in instances wherein some individuals within the group make personal decisions to abandon the project while others want its continuance. As Sherif (1935) demonstrated, this would lead the group to focus on compromise. The higher level of compromise will lower the ability to take drastic measures such as abandonment. Therefore, to the degree that group members individually consider an escalation dilemma before addressing it as a group, we hypothesize that:

Hypothesis 1. After receiving negative information, groups with prior individual decisions will be more likely than individuals to choose to continue (rather than terminate) the project.

In the Bazerman et al. (1984) study, the problem was initially presented and the decision was made wholly within the group context. In other words, groups convened to address the dilemma without giving prior individual consideration to the problem. Individuals in this group process have lower levels of personal responsibility (O'Connor, 1997). Although individuals might differ in their positions, because these differences have not been independently internalized, the members of the decision making group are not procedurally compelled to justify potentially divergent views.

As shown in previous work, a lack of perceived responsibility in an escalation scenario leads to less self-justification, which in turn, leads to lower levels of escalation. Members in a no prior consideration decision process enter a group discussion free of any previous commitments or positions. Consequently, the dynamics of the group decision may be markedly different. First, individuals are not “entrapped” into a prior personal decision that must be defended. Decisions on whether to abandon or continue the project are made solely within the group setting. Whyte (1991) theorized that this alleviates some of the internal pressure to continue. He demonstrated that individual respondents invested less money in escalation contexts when they felt that responsibility was shared (decision was made as a group) than when they evaluated the escalation dilemmas individually.

Hypothesis 2. After receiving negative information, groups without prior individual decisions will be less likely than individuals to choose to continue (rather than terminate) the project.

Progress-related decisions such as those we examine here provide a group with several potential courses of action. One possibility is to *completely abandon* the project by not committing more resources. Another option is to *fully commit* to a project, by either allocating the necessary resources to successfully complete the project, or allocating the maximum amount that the current budget allows. A third option is to *partially commit* to a project, providing less than the maximum amount allowed by a budget, and/or less than the amount required to complete the project. We refer to such funding behavior as *incrementalism*, and note that prior work on escalation from both an anecdotal and scholarly perspective has recognized the effect such allocation behavior has on project success or failure. For example, in discussing the Vietnam War, McNamara and VanDeMark (1995) argue that the US government continually invested incremental military resources into the war without providing enough resources to either fully win the war or admit defeat and withdraw. As Staw and Ross (1978) state, “it is sometimes possible for incremental resource-allocation schemes to be one of the most rather than least expensive forms of policy formation” (p. 40). From a real options perspective (Bowman & Hurray, 1993), incrementalism allows decision-makers to “keep their alternatives available” and potentially redirect some assets to other ventures. Thus, we differentiate incrementalism from other forms of escalation behavior to the extent that this investment strategy reflects a degree of hesitancy in resource allocation.

We expect that incremental investment strategies are more likely to occur in the group process when members engage in prior individual consideration. In such groups, members are likely to feel some resistance to moving from their initial positions, even if commitment to such positions occurred privately. However, awareness by group members that everyone has considered the situation before meeting as a group will compel members to seek information from each other via social comparison concerns (Festinger, 1954). Finally, a decision bias perspective (Neale, Bazerman, Northcraft, & Alperson, 1986) highlights that group have the capacity to view events using multiple frames. Given the group’s awareness that individuals have (potentially) different positions, it is plausible that consensus might more frequently form around compromises, involving partial allocation of resources, to gain the support of members with differing viewpoints. Compromise decisions allow individuals with different frames or representations of the problem to view the allocation decision as supportive of their position. Therefore, in addition to having difficulty abandoning losing propositions, we hypothesize that the nature of the decision making process of groups with prior individual decisions is such that it leads to less decisive outcomes.

Hypothesis 3. Groups whose members made prior individual decisions will more frequently allocate incremental amounts of money than groups whose members did not make prior individual decisions.

The compromising and accommodating nature of decisions made by groups whose members have first reached personal decisions should also affect the group's confidence in the ultimate decision. Sherif (1935) found this in his initial studies. Schwenk (1988) views devil's advocacy (defined as any structural means to introduce opposing viewpoints into their assumptions) as beneficial to the extent that it forces decision makers to question their assumptions. However, another outcome stemming from devil's advocacy is a reduction in the confidence of the group, as each member can easily think of alternative courses of action the group passed over by making their decision.

Hypothesis 4a. Groups whose members made prior individual decisions will be less confident in their decisions than groups whose members did not make prior individual decisions.

It is plausible that the benefits of tempered confidence inherent in prior consideration groups might serve as the mediating mechanism through which incrementalism occurs. The groupthink literature (Janis, 1982; Janis & Mann, 1977) argues that a cohesive group's striving for consensus will lead to more decision confidence and subsequently bolder decisions. Clearly, the group that has not made prior individual decisions can more easily reach consensus, as prior decisions about what to do have not been made. Therefore, the lower confidence in groups with prior individual decisions might actually serve as the mediating mechanism for increased incrementalism:

Hypothesis 4b. Decision confidence mediates differences in allocation behavior between groups whose members did or did not engage in prior individual decision-making, such that prior consideration will decrease group confidence, which will in turn increase incremental investment behavior.

A classic explanation of why escalation occurs has focused on sunk cost effects. Prior research in this area (e.g., Arkes & Blumer, 1985; Garland, 1990) argued that decision makers were unduly influenced by the amount they had already invested in the course of action: the greater the sunk costs, the more likely the course of action continued to be funded. However, Conlon and Garland (1993) pointed out that in many prior studies related to progress decisions, information about sunk costs was confounded with information about level of project completion. In a series of five studies (Conlon &

Garland, 1993; Garland & Conlon, 1998), these authors independently manipulated sunk costs and project completion and found that project completion was the key driver of escalation behavior—sunk costs had no effect.

Recent work by other scholars, some with the explicit goal of refuting the project completion hypothesis, has in fact provided more support. For example, Boehne and Paese (2000) argued that by providing decision makers with economic information about the value of a project, decision makers would make “rational” decisions and not be influenced by level of completion information. They independently manipulated sunk costs, project completion, and anticipated sales price of a real estate project. In spite of their modifications, decision makers continued to be influenced by level of completion, frequently recommending completing the project even when it was clearly unwise to do so.

To date, the impact of project completion has yet to be tested with groups. In addition, the impact of these two antecedents (sunk costs and project completion) has yet to be simultaneously examined at the group level of analysis. Building on the prior studies that independently manipulated project completion at the individual level, we expect the robust effects of completion will extend to the group level.

Hypothesis 5. As project completion increases, groups will allocate more money to failing projects.

Moon (2001a) demonstrated an interaction between sunk costs and level of completion, with high levels of both sunk costs and level of completion combining to produce the highest level of commitment. Consistent with this pattern, we feel that the interactive effects of situations where the project is both near completion and a significant amount of previous time and money have been invested extends to groups such that:

Hypothesis 6. Within groups, sunk costs will be related to higher investment levels under high completion conditions, but not under low completion conditions.

Method

Participants, research design, and decision task

Undergraduate students ($N = 561$) enrolled in a capstone management course at a large Midwestern university participated in this study. In return for their participation, participants earned class credit. A $2 \times 2 \times 3$ factorial design varied sunk costs (low versus high), project completion information (low versus high), and decision-making process (individual only, group with prior decisions, or group without prior decisions). Of the participants, 140 responded to the dilemma solely as individuals while 421 students participated in 135

decision making teams. (Most were three person teams, 16 were four person teams. The four person teams were random across conditions and did not affect the results.) There were 60 “prior decision” groups and 75 “no prior decision” groups.

Participants were asked to carefully read, evaluate, and answer questions related to a project already underway that they were initially responsible for. The scenario dealt with the dilemma of whether to continue funding research on a radar blank ship technology in light of news that competitors had produced a superior product that was lower cost and closer to market. Four different scenarios were created that included high or low sunk cost (Staw, 1976) and high or low project completion (Conlon & Garland, 1993; Garland & Conlon, 1998). The scenario was a modified version of the Arkes and Blumer (1985) “radar blank plane” escalation scenario (see Moon, 2001a for an example of the instrument).

Independent variables

For the sunk cost manipulation, respondents in the low (high) sunk cost condition were informed that the money already invested was \$1.5 (8.5) million dollars, that the time working on the project was 6 months (over two years), and that they had thus far expended a relatively small (large) amount of funds compared with what is normally invested in these type of projects. For the completion manipulation, respondents were informed that the project was either 15% or 85% complete. For the decision process manipulation, participants were randomly assigned to one of three conditions: an individual condition in which they completed the decision task alone, the “no prior decision” condition in which they read and completed the task as a group, or the “prior decision” condition in which they first completed the task as an individual and then completed the task again with a group. In the group only condition, one volunteer was asked to read the scenario out loud while the others listened and/or followed in their own copy of the scenario. In the prior decision condition, the participants individually evaluated the information and came to a personal decision before group interaction. Only after each individual evaluated the dilemma personally did the group form to make a group level decision.

Dependent variables

After reading the scenario, participants indicated the amount of money they would commit to the project, ranging from \$0 to \$1.5 million dollars. Because this paper is partly concerned with elucidating different forms of escalation, we measured escalation in terms of dollars invested (e.g., Staw, 1976) rather than by likelihood of continued investment (e.g., Conlon & Garland, 1993). Following the resource commitment

question, participants were asked to rate their level of confidence in the decision they had made on a scale from 0 to 100. We normalized the confidence scores following the procedures outlined in Tabachnick and Fidell (1996) to correct for skewness. All of the “no prior decision” groups completed their scenarios properly. Two participants in the individual condition and three teams in the “prior decision” condition were excluded from analyses due to missing data or responses outside the predetermined ranges which called into question whether they had understood the directions or made judgments as individuals prior to meeting in groups. Eliminating these respondents did not influence the results.

The hypotheses in Study 1 required that the dependent variable be conceptualized in several different ways (dichotomously, categorically, and continuously). For testing Hypotheses 1 and 2, we dichotomized the commitment measure into two categories, with 0 = termination of the project (i.e., allocating zero dollars) and 1 = continuation of the project (by allocating any amount of money to the project). For Hypotheses 3, 4a, and 4b, we created a categorical variable where 0 = incremental investment and 1 = “all-or-nothing” investment. Incremental decisions were decisions where the deciding party allocated an amount between the \$0 and \$1.5 million extremes. All-or-nothing decisions were those where the decision was to either fully fund (1.5 million) or completely abandon (zero) the project. We tested the incremental escalation hypotheses by using a dummy variable representing the two contrast categories in a logistic regression. Finally, for Hypotheses 5 and 6, we used the actual response in terms of dollar amounts recommended (which ranged from \$0 to \$1.5 million). Based on the directional nature of our hypotheses we used one-tailed significance tests.

Results

Test of hypotheses

Of those who made the decision only as individuals, 18% (25 of 138) chose to terminate the project by allocating no funds. The frequency of terminations for groups with and without prior individual decisions were 8% (5 of 60 groups) and 32% (24 of 75 groups) respectively. Hypothesis 1 predicted that “prior individual decision” groups would be significantly more likely to continue failing projects than individuals. This difference was significant $t(196) = -1.77, p < .05, \Delta R^2 = .02$, such that prior individual decision groups continued funding the project more than individuals. Hypothesis 2 predicted that “no prior individual decision” groups would be significantly less likely to continue the project than individual decision makers. This difference was also significant, $t(211) = 2.32, p < .05, \Delta R^2 = .03$ such that the no prior individual decision groups did continue

projects less often than did individuals. Thus, both H1 and H2 were supported.

The next set of hypotheses examined the degree to which different group processes would influence incremental versus “all-or-nothing” investment behavior. Hypothesis 3 predicted that there would be more instances of incremental escalation behavior in groups with prior individual decisions than in groups without prior individual decisions. Again, we tested this hypothesis with a *t* test. The results of this analysis demonstrated that the “prior decision” groups engaged in incremental investment behavior more often (29 of 60 groups, or 48%) than the “no prior decision” groups (26 of 75 groups, or 35%), $t(133) = 2.00, p < .05, \Delta R^2 = .03$.

Hypothesis 4a predicted that decision confidence would be lower in the prior individual decision groups than in the no prior decision groups. As predicted, we find that members in the former groups expressed less confidence in their group’s decision ($M = .59$) than did members in the latter groups ($M = .92$), $t(133) = 3.85, p < .01, \Delta R^2 = .10$. We next tested Hypothesis 4b, the assertion that decision confidence mediates the differences in propensities to incrementalize between the two groups. Testing mediation is a multi-step process (Baron & Kenny, 1986). In the first step, the mediator is regressed on the independent variable. In the second step, the dependent variable is regressed on the independent variable. In the final step, the dependent variable is regressed on both the independent variable and the mediator.

We support the first step in the test of Hypothesis 4a, such that decision process significantly predicts confidence. The second step was supported in our test of Hypothesis 3, such that process affected incremental investment behavior. In step three, we regressed incremental commitment on both confidence and decision process. As seen in Table 1, we found that although decision confidence remained a significant predictor of incremental commitment, $t(132) = -2.90, p < .05, \Delta R^2 = .09$ for step 1, the effect of decision process, $t(133) = -2.00, p < .05$, became non-significant $t(132) = -1.03, ns$, when regressed simultaneously with confidence. We then performed a direct test of the reduction in the path using a modified form of Sobel’s (1982) formula (see Baron & Kenny, 1986). The result of this test showed that the β coefficient for the path between decision process and incremental behavior was

significantly lower in the mediated condition than in the non-mediated condition, $t(132) = -8.85, p < .01$, thus supporting Hypothesis 4b.

Our final hypotheses extend our understanding of two commonly studied antecedents to commitment (completion and sunk costs) to the group level of analysis. We analyzed these relationships using the continuous measure of resource commitment (dollars allocated) to best mirror previous research (e.g., Conlon & Garland, 1993; Staw, 1976). Hierarchical regression was used to test for the predictive ability of completion, sunk costs, and their interaction on escalation of commitment at the group level of analysis.

Hypothesis 5 predicted that project completion would be related to the escalation of commitment at the group level of analysis. In Step 1, we simultaneously regressed level of commitment on the completion and sunk costs manipulations. As seen in Table 2, the regression results indicated that completion remained robust at the team level of analysis, $t(132) = 3.14, p < .01, \Delta R^2 = .07$ on step 1, with high project completion leading to greater escalation ($M = 1.02$ million dollars) than low project completion ($M = .72$ million dollars), supporting Hypothesis 5. In addition, sunk costs, when unconfounded from project completion, did not exert an independent effect on step 1, $t(132) = .97, ns, \Delta R^2 = .07$.

Hypothesis 6 predicted a sunk cost by project completion interaction, with sunk costs affecting commitment at high, but not low, levels of completion. In Step 2, we regressed the level of commitment on the interaction between project completion and sunk cost. As shown in Table 2, the regression results support the predicted interaction between sunk cost and completion on commitment for step 2, $t(131) = 2.13, p < .05$,

Table 1
Predicting incremental investment behavior from group decision process and confidence study 1 ($N = 135$)

	Predictor	β	ΔR^2		Predictor	β	ΔR^2
Step 1	Group process	-.17*	.03*	Step 1	Group process	-.09	
					Confidence	-.25**	.10**

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

Table 2
Hierarchical regression for the interaction between sunk costs and project completion on resource allocation study 1 ($N = 135$)

	Predictor	β	ΔR^2
Step 1	Project completion	.26**	.08
	Sunk costs	.08	
Step 2	Project completion \times sunk costs	.77*	.03

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

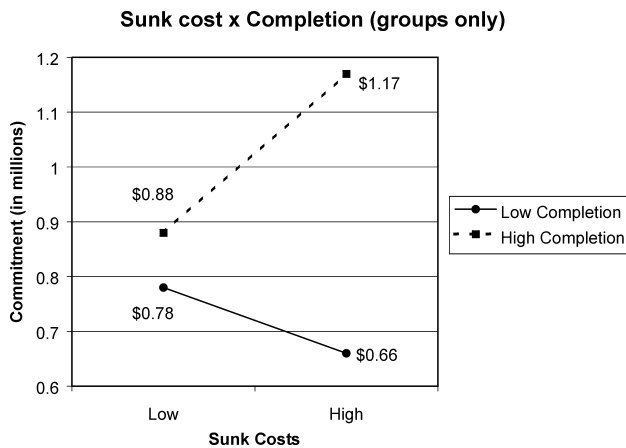


Fig. 1. Interaction between sunk cost and completion on allocation behavior within decision making groups—Study 1.

$\Delta R^2 = .03$. Further, the plot of the interaction supports the specific prediction that commitment would be highest in the high sunk cost, high project completion condition (see Fig. 1 for a depiction of the interaction). However, we also see high sunk costs leading to significantly less funding when project completion is low. Our general pattern suggests that high sunk costs interact with completion to create more *extreme* (high and low) levels of commitment.

Discussion

Study 1 sought to answer three questions: (1) Do groups escalate more than individuals? (2) Does group decision process lead to different forms of escalation? (3) Do antecedents of escalation found at the individual level extend to the group level? We use the consideration of each question as a framework for organizing our discussion section.

Do groups escalate more than individuals?

The answer to this question is a definitive “yes and no.” We proposed a resolution to this question by asserting that it depends upon process. Specifically, we argued that private consideration by group members prior to meeting as a group would make groups less likely to terminate escalation dilemmas than individuals. However, groups who only considered the dilemma as a group would be more likely to abandon projects than individuals. Our results confirm this pattern, and suggest that managers must pay attention to the implications of group decision process for influencing decision outcomes.

When compared to other studies, our results also highlight that different decision problems create different pressures to escalate. Awareness of group decision making processes that lead to less escalation can become even more critical in such contexts. For example, Whyte

(1993) noted that Bazerman et al. (1984) used sunk cost problems where only about 50% of the individuals made the error. Smith et al. (1998) used a task where only about 55% of the individuals made the error. However, 82% of the individuals made the error in the present study, which following a group polarization argument, would suggest that an even higher percentage of groups should make the error. However, we delineated a situation (no prior individual judgments) where polarization did not occur—in fact, depolarization occurred (or more accurately, the groups moved toward the more rational position).

To the degree that many group decisions and meetings encourage decision makers to spend time thinking about preferences and choices prior to meeting as a group, our findings suggest that such groups (1) have problems abandoning failing projects, (2) tend to be less confident in their decisions, and (3) tend to escalate their commitment in an incremental fashion. In the same way that the items on a meeting agenda can be ordered to make acceptance of a particular item more or less likely, we see here that tasking individuals to think about and make decisions about a course of action before convening as a group can influence the likelihood of a failing project being terminated or continued.

Does decision process lead to different forms of commitment?

We found that prior decision groups were less confident in their decisions, relative to no previous decision groups. We find incremental escalation (the act of committing some, but not all of the resources available) to be a consequence of the lower confidence. That is, decision confidence mediated the relationship between group process and incremental commitment.

Do antecedents of escalation found at the individual level extend to the group level?

A final contribution made by this study is our consideration of the influence of two often-studied antecedents to escalation of commitment (completion and sunk costs) at the group level of analysis. We found that completion had an independent effect, and that completion and sunk cost had an interactive effect on the escalation of commitment. In our study, sunk costs exerted an interactive effect with project completion on investment behavior. Moon (2001a) found that when completion was low, commitment remained the same, regardless of level of sunk cost. In contrast, we find in our study that commitment actually decreases in the low completion/high sunk cost condition.

Perhaps the reason for the different interaction patterns under low completion across this study and Moon (2001a) is that in our study commitment is measured as actual dollars allocated, rather than measured commitment in terms of likelihood to continue investing. In

other words, our study framed the dilemma more in economic and budgetary terms. Another hypothesis is that when a large sum of money has been spent on a project but the project is far from completion, the decision maker may realize that this project is horribly managed and thus the project should be terminated. The pattern we find is consistent with what would be predicted by Heath (1995), who proposed that as the budget situation became clear to the decision makers, they would be more willing to de-escalate their commitment (especially if the project was behind schedule).

We feel that Study 1 provides compelling evidence of one reason groups might sometimes escalate commitment more, and sometimes escalate commitment less, than individuals. Having established that group decision process can influence resource allocation in progress decisions, we now turned our attention to examining whether group decision process can influence allocation behavior in an adoption decision context. Demonstrating group differences in this context would further attest to the importance of considering the process by which groups make decisions.

Study 2

We designed Study 2 with the purpose of expanding the boundaries of Study 1 beyond the realm of progress decisions and into the realm of adoption decisions. Beach and Mitchell (1990) distinguished between two general types of decisions in organizations: adoption and progress. We considered progress decisions in Study 1. We consider adoption decisions, which are “about new plans and goals to replace failing plans and unattainable goals, or about adding additional plans and goals to the organization’s agenda” (p. 1) in this study. We examine how groups allocate resources to four new projects. Our expectation is that prior consideration will affect the ability of the group to converge on a specific decision when the group is provided with multiple choices in a budget allocation dilemma. Findings replicating the influence that group decision process has on group decisions on both general types of decisions found in organizations (Beach & Mitchell, 1990) would greatly increase our confidence in the generalizability of our findings.

Group process and budget allocation

Very few studies to date have examined escalation in the context of resource utilization (adoption) decisions (see Staw & Hoang, 1995 for a notable exception). The focus in almost all studies of escalation has been on the degree to which individuals chose to continue on a failing course of action or withdraw (Arkes & Blumer, 1985; Brockner et al., 1982; Heath, 1995). In this regard,

escalation of commitment literature moved away from choice decisions to progress decisions. This leaves the question of how group process might influence adoption decision behavior largely untested.

Options theory provides a heuristic through which to consider behavior in adoption decisions. Myers (1977, 1984) viewed organizational actions as bundles of real options requiring managers to make deliberative decisions on where to allocate investments across a multitude of different options. Bowman and Hurray (1993) integrated the strategy involved in these decisions along the dimensions of time orientation and either deliberative or emergent decision types. A common decision problem reflecting options theory and adoption decisions is how people distribute investment funds among a multitude of potential investments. One potential strategy involves diversifying the funds among all possible alternatives to minimize risk. Another strategy is to concentrate the funds toward a single alternative that might maximize potential returns. These are each rational options based on a focus on either risk or return.

Consistent with our findings from Study 1, we feel that groups with prior individual decisions will be less unified in their allocation behavior, in order to accommodate the different preferences committed to when the problem was considered individually. In Study 1, this leads to greater incremental investment behavior. In Study 2 (a budget allocation dilemma consisting of many alternatives), incremental behavior would be evidenced by the degree to which the group reaches a decision that distributes resources more evenly across outcomes rather than a decision that allocates greater resources to a single choice. Thus, we can view the dispersion versus concentration of a budget across multiple options as evidence of incremental investment behavior, leading us to hypothesize that:

Hypothesis 7. Groups whose members made prior individual decisions will allocate less of their total budget to any single alternative than will groups whose members did not make prior individual decisions.

Group process and past performance information

In addition to manipulating group process, we also manipulated the recent performance of the group as successful or unsuccessful. Many of the studies investigating escalation provide decision makers with negative feedback about the progress of the project, though some have provided positive feedback (e.g., Conlon & Garland, 1993). Awareness that past decisions have been successful or unsuccessful is likely to create a decision frame (Frisch, 1993; Kuhberger, 1998; Tversky & Kahneman, 1981) through which future investment decisions are evaluated. For example, prospect theory

(Kahneman & Tversky, 1979) has demonstrated that decision makers tend to be risk seeking in the face of negative performance and risk averse or cautious in the face of positive performance. That is, individuals tend toward risk in order to “get out of the red” and tend toward conservatism in order to “stay in the black.”

Kuhberger (1998) summarizes the difference between individuals and groups related to the influence of frames as a situation wherein similar results exist but the effect size for individuals is larger than that of groups. He supposes that it is unlikely that groups would exhibit higher levels of sensitivity to framing effects and actually proposes that “group discussion may render a framing manipulation ineffective” (p. 44). However, we feel that this assessment ignores the moderating influence of decision process.

The groupthink literature (Janis, 1971, 1982) provides support for our contention that groups whose members enter a discussion without making a previous individual decision will be less influenced by environmental information such as sunk costs, level of completion, or performance framing. Janis (1971) argues that groups with high levels of unanimity exhibit higher levels of invulnerability and tend to ignore warnings from the environment. Similarly, no prior consideration groups are consensus based. The insular nature of these groups might provide a buffer from the influence of previous performance.

Johnson (1992) provides several mechanisms by which teams might mitigate this tendency, including providing an open climate of discussion and actively seeking opposing positions. One other suggestion relates to allowing the individual group members time to study the problem independently and come up with their own solutions. This suggestion of individual consideration was positively related to the group exhibiting escalation in study 1. That is, individual consideration was related the group’s attentiveness to factors such as sunk costs and completion such that they were less able to abandon failing projects. We also expect individual consideration to influence how groups respond to performance information, such that prior consideration groups will react more strongly to information about past performance.

In this study, decision makers will be presented with investment options that vary in terms of their riskiness. Consistent with prospect theory (Kahneman & Tversky, 1979), we expect those whose recent past performance has been negative to frame their current situation in terms of a loss. In such circumstances, we expect these decision makers to behave in a more risk seeking fashion as they allocate resources across investment options (i.e., they will allocate greater resources to high risk options, to avoid coming in below projections). Conversely, we expect those whose recent past performance has been positive to frame their current situation in terms of a

gain and behave in a more risk averse fashion (i.e., they will allocate fewer resources to high risk options, to protect projected gains). We suggest this pattern will be exacerbated for groups whose members individually considered the situation before meeting as a group.

Hypothesis 8. Groups whose members made prior individual decisions will be more sensitive to performance information—they will allocate more money to high risk options when past performance has been negative, and less money to high risk options when past performance has been positive—relative to groups whose members did not make prior individual decisions.

Methods

Participants, research design, and decision task

Undergraduate students ($n = 421$) enrolled in a capstone management course at a large eastern university participated in this study. No participants in this study participated in Study 1. One hundred and twenty five teams (12 two-person teams, 66 three-person teams, 37 four-person teams, 9 five-person teams, and 1 six-person team) engaged in a 2×2 factorial design, which varied group process and previous performance.

Participants were asked to carefully read, evaluate, and answer questions related to a fictional company (Stateland) as if they were actually in this situation. The respondents were informed that Stateland is a publicly traded real estate investment trust (REIT) that was founded in 1991. The company’s primary business focus is property management that includes purchasing, renovating, and leasing office space. They were told that they were part of an executive team that was entrusted with allocating the annual budget among several different investment purchase options.

Independent variables

The decision process manipulation was conducted similarly to study one. In the prior individual consideration condition, each individual was given the scenario individually and asked to first evaluate the situation and come to a personal decision before group discussion. Only after each individual evaluated the dilemma personally did the group form to make a group level decision. In the group consideration condition, each individual was given the scenario and asked to immediately evaluate and discuss this dilemma in a group context. In both conditions, the teams were informed that they would be required to hand in one team decision form.

The performance manipulation was embedded in the initial information regarding the company. A separate section entitled “Performance” informed the reader of the performance over the past couple of years while they were part of the executive team. In the low performance

condition the respondent was informed that the “performance of the firm has been very disappointing.” We further stated, “You have fallen below expected projections by 25% each year. Therefore, at this point you are a total of 50% behind projections.” In the high performance condition the respondent was informed that the “performance of the firm has been outstanding.” We further stated, “You have exceeded expected projections by 25% each year. Therefore, at this point you are a total of 50% ahead of projections during your tenure.”

Dependent variables

After reading the scenario, the respondents were informed that they were responsible for allocating the investment budget for the upcoming year. They had to allocate the entire budget (\$25 million) among four alternatives. Specifically, the respondents were informed, “You are free to allocate the budget in any manner you choose. You may allocate any percentage of the funds to any of four investments (i.e. you can allocate the entire budget to one single area or split it among any of the options). The only restriction is that you must allocate the entire amount of the budget.”

Option One consisted of a focus on traditional Steland properties and was described as lower in risk with lower potential return. Option Two consisted of a focus on traditional properties described as higher in risk with higher potential return. Option Three consisted of a focus on nontraditional (novel) kinds of properties that are lower in risk with lower potential return. Option Four consisted of a focus on nontraditional properties that are higher in risk with a higher potential return.

The hypotheses in Study 2 required that we conceptualized the responses in two different ways. First, for testing Hypothesis 7 we created a continuous variable that represented the highest dollar amount among the four alternative investments. This provided us with the extent to which the team was energized around a single option. Second, for testing Hypothesis 8 we created a continuous variable that represented the amount of the budget that was allocated to Option Two and Option Four. This provided us with the extent to which the team enacted a more aggressive high risk/return strategy.

Manipulation check

We conducted a check of the performance manipulation. The respondents were asked two items (coefficient $\alpha = .98$) on whether they agreed or disagreed with the following statements using a 7-point likert scale: “The recent performance of my firm was positive,” and, “The recent performance of my firm was negative.” The response for teams in the high performance condition ($M = 11.02$) was significantly higher, $t(122) = 21.45$, $p < .01$, than the responses for teams in the low performance condition ($M = 5.13$). Moreover, we tested whether

the process of the group influenced the performance manipulation. Using hierarchical regression we found support for neither a process effect on the performance manipulation $t(121) = .43$, $p = ns$, nor an interaction between the process and performance manipulation on performance perception $t(120) = -.14$, $p = ns$.

Results

Hypothesis 7 predicted that groups whose members made prior individual decisions would allocate less of their total budget to any single alternative than groups whose members did not make prior individual decisions. We measured this by simply identifying the highest single dollar amount invested in any of the four options. Regression results revealed a main effect such that prior decision groups ($M = 9.44$ million) allocated a significantly lower amount to their highest option on average than did no prior decision groups ($M = 10.37$ million), $t(123) = 2.80$, $p < .01$, $\Delta R^2 = .06$. Therefore, Hypothesis 7 was supported.

Hypothesis 8 predicted an interaction such that groups whose members made prior individual decisions would be significantly more sensitive to performance information such that they seek risk (allocate more money) in negative performance situations and avoid risk (allocate less money) in positive performance situations than are groups without prior individual decisions. Table 3 demonstrates that the interaction term was indeed statistically significant, $t(120) = -2.21$, $p < .05$, $\Delta R^2 = .04$. Fig. 2 graphically presents the interaction. As we predicted, groups with prior individual consideration were more sensitive to performance information such that they allocated more money toward high risk investments in low performance conditions ($M = 13.59$ million) and less money toward high risk investments in high performance conditions ($M = 10.76$ million), $t(74) = -3.86$, $p < .01$, $\Delta R^2 = .17$. For group only conditions the performance information did not influence subsequent allocation behavior ($M = 12.62$ million in low performance conditions and $M = 12.19$ million in high performance conditions), $t(46) = -.009$,

Table 3

Hierarchical regression for the interaction between group decision process and performance information on risk allocation strategy study 2 ($N = 340$)

	Predictor	β	ΔR^2
Step 1			
	Process	-.06	.00
Step 2			
	Performance	.24	.06**
Step 3			
	Process \times performance	-.61	.04*

* $p < .05$.

** $p < .01$.

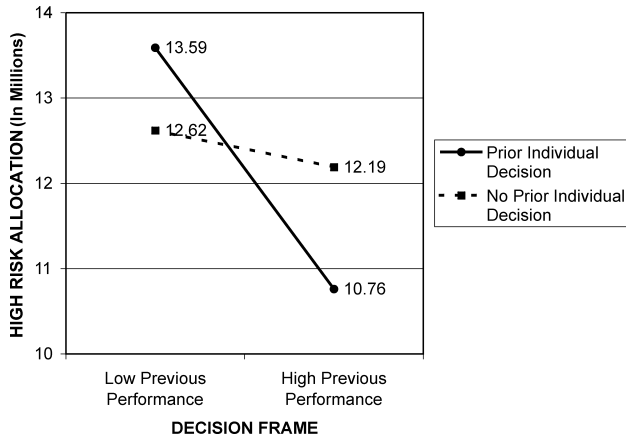


Fig. 2. Interaction between group process and the impact of performance frame on allocation behavior—Study 2.

$p = ns$, $\Delta R^2 = .00$). Therefore, Hypothesis 8 was supported, and in the direction predicted.

Discussion

Study 2 was designed with two purposes in mind. First, we wanted to examine whether the relationships found in Study 1 between group decision making process and incremental investment behavior could be extended into the domain of adoption (resource utilization) decisions. In Study 1, we found that groups with prior individual consideration had a more difficult time either fully abandoning or fully funding a progress related project. Similarly, in Study 2 we found that groups with prior individual consideration tended to hesitate investing their budget allocation dollars in any single option when compared to the budget allocation decisions of groups with no prior individual consideration. Second, we wanted to examine the influence of group process on the response to information viewed through a positive or negative decision frame. We found that prior individual consideration groups were more sensitive to performance information. When the previous performance of the firm was negative, the individual consideration groups tended to allocate a larger percentage of their budget to riskier options. In contrast, when the previous performance of the firm was positive, the individual consideration groups tended to allocate a larger percentage of their budget to safer options.

General discussion

Across two studies that employed a total of 982 individual respondents and 260 decision teams, we conclude that groups employing a structural process in which individuals make personal decisions prior to

group discussion are more prone to escalation of commitment and more sensitive to previous performance information than are groups in which the evaluation and decision are made solely in a group context. We add to the literature on group decision making and group decision making process, which has grown in prominence in the past two decades (cf. the literature on Group Decision Support Software, Lam & Schaubroeck, 2000, and the Nominal Group Technique or the Delphi Technique, Roth, 1994). Collectively, the two studies we present test our hypotheses in the context of the two major decision types that Beach and Mitchell (1990) argue exist in organizations.

Heretofore, group processes that did not advocate or promote differences in individual opinions have been viewed as dysfunctional. The benefits of having devil's advocates (Schwenk, 1988) and diversity of opinions (Jehn et al., 1999) have been advanced as benefiting the ultimate group decision. However, we find evidence that the benefits of diversity in opinion to group decision making might have unintended side effects. We find that a group decision process that does not allow prior individual consideration are *less* susceptible to decision biases and more willing to make strong decisions (through either stopping or fully funding a project). Conversely, we find that group processes wherein prior individual consideration occurs are *more* susceptible to decision biases and more confined to taking “baby steps,” or incremental allocation behavior.

Our findings are not without some contemporary support. Historically, groupthink has been advanced as an extreme case of the dangers of not having a diversity of opinions. It was introduced as the antecedent to some disastrous team decision making (Janis, 1971). However, Choi and Kim (1999) recently studied 30 organizational teams faced with a crisis. They found that the influence of groupthink, defined as a symptom of defective group decision making, was quite benign. Surprisingly, their results show the inverse of what historic assumptions of groupthink predict, indicating that “several groupthink symptoms (i.e., group identity), such as the illusion of invulnerability, belief in inherent group morality, and illusion of unanimity, produced unexpected results: (a) negative correlations with concurrence seeking and *defective decision making* and (b) positive correlations with both internal and external team activities and with reported team performance” (p. 302, emphasis added).

We feel that there are some potentially interesting applications of our findings to organizations and society. For example, our jury system is predicated on the belief that the best decisions come from each jurist individually evaluating the information and coming to a personal decision before group deliberation. Mutual funds, think tanks, or any top management team can employ either an individual consideration or group only

decision process. Future studies can extend our findings to these and other contexts.

The differences that exist between prior individual decisions and no prior individual decision groups might be differences in degree. That is, the two categories explored in this manuscript could be ends of a continuum. It may only require that people have not made a personal, explicit commitment to a decision. True naïveté may not be required. If we are to expect teams to become the predominant form of organizational structure, then we need to be aware of the potential influence that group construction has upon decision making. For instance, would the same patterns be found if individuals were only asked to consider the dilemma, and told explicitly not to reach a conclusion before meeting as a group? Alternatively, is actual decision choice necessary for the escalation effect to occur? Future research can help provide understanding on this issue.

In addition, the differences in levels of prior consideration may vary *within* any individual decision group. That is, some individuals may have made personal decisions while other individuals might not have been presented with any information. Therefore, the decision group could consist of a mix of people who have and have not made prior decisions. Similarly, Rogelberg, Barnes-Farrell, and Lowe (1992) introduced a step-ladder technique of group decision making wherein individual group members are sequentially integrated into the decision process. Future research can extend the theory and findings of this study to include how these mixed processes affect decision making.

We temper our findings and hope that more research is conducted in a variety of settings to test our general assertions that the process of the decision group matters, prior individual decision groups might be more susceptible to decision biases than group only processes, and prior individual decision groups might be more incrementalist than group only processes.

References

- Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Decision Processes*, 35, 124–140.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Bazerman, M. H., Giuliano, T., & Appleman, A. (1984). Escalation of commitment in individual and group decision making. *Organizational Behavior and Human Performance*, 33, 141–152.
- Beach, L. R., & Mitchell, T. R. (1990). Image theory: A behavioral theory of decision making in organizations. In L. L. Cummings, & B. M. Staw (Eds.), *Research in organizational behavior* (vol. 12, pp. 1–41). Greenwich, CT: JAI Press.
- Boehne, D. M., & Paese, P. W. (2000). Deciding whether to complete or terminate an unfinished project: A strong test of the project completion hypothesis. *Organizational Behavior and Human Decision Processes*, 81, 178–194.
- Bowman, E. H., & Hurray, D. (1993). Strategy through the option lens: An integrated view of resource investments and the incremental-choice process. *Academy of Management Review*, 18, 760–782.
- Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *Academy of Management Review*, 17, 39–61.
- Brockner, J., Rubin, J. Z., Fine, J., Hamilton, T. P., Thomas, B., & Turetsky, B. (1982). Factors affecting entrapment in escalating conflicts: The importance of timing. *Journal of Research in Personality*, 16, 247–266.
- Brockner, J., Rubin, J. Z., & Lang, E. (1981). Face-saving and entrapment. *Journal of Experimental Social Psychology*, 17, 68–79.
- Brockner, J., Shaw, M. C., & Rubin, J. Z. (1979). Factors affecting withdrawal from an escalating conflict: Quitting before it is too late. *Journal of Experimental Social Psychology*, 15, 492–503.
- Choi, J. N., & Kim, M. U. (1999). The organizational application of groupthink and its limitations in organizations. *Journal of Applied Psychology*, 84, 297–306.
- Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23, 239–290.
- Conlon, D. E., & Garland, H. (1993). The role of project completion information in resource allocation decisions. *Academy of Management Journal*, 36, 402–413.
- Dahl, D. (2001). The big finish. *Boston Business Journal*, 21.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140.
- Frisch, D. (1993). Reasons for framing effects. *Organizational Behavior and Human Decision Processes*, 54, 399–429.
- Garland, H. (1990). Throwing good money after bad: The effect of sunk costs on the decision to escalate commitment to an ongoing project. *Journal of Applied Psychology*, 75, 728–731.
- Garland, H., & Conlon, D. E. (1998). Too close to quit: The role of project completion in maintaining commitment. *Journal of Applied Social Psychology*, 28, 2025–2048.
- Gigone, D., & Hastie, R. (1997). Proper analysis of the accuracy of group judgements. *Psychological Bulletin*, 121, 149–167.
- Heath, C. (1995). Escalation and de-escalation of commitment in response to sunk costs: The role of budgeting in mental accounting. *Organizational Behavior and Human Decision Processes*, 62, 38–54.
- Janis, I. L. (1971). Groupthink. *Psychology Today*, 5, 43–46.
- Janis, I. L. (1982). *Groupthink*. Boston: Houghton Mifflin.
- Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict choice and commitment*. New York: Macmillan Publishing.
- Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly*, 44, 741–763.
- Johnson, V. (1992). The groupthink trap. *Successful Meetings*, 41, 145–146.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263–291.
- Kirby, S. L., & Davis, M. A. (1998). A study of escalating commitment in principal–agent relationships: Effects of monitoring and personal responsibility. *Journal of Applied Psychology*, 83, 206–217.
- Kuhberger, A. (1998). The influence of framing on risky decisions: A meta-analysis. *Organizational Behavior and Human Decision Processes*, 75, 23–55.
- Lam, S. S. K., & Schaubroeck, J. (2000). Improving group decisions by better pooling information: A comparative advantage of group decision support systems. *Journal of Applied Psychology*, 85, 565–573.

- Leatherwood, M. L., & Conlon, E. J. (1987). Diffusability of blame: Effects on persistence in a project. *Academy of Management Journal*, 30, 836–847.
- Libby, R., Trotman, K. T., & Zimmer, I. (1987). Member variation, recognition of expertise, and group performance. *Journal of Applied Psychology*, 72, 81–87.
- McNamara, G., Moon, H., & Bromiley, P. (2002). Banking on commitment: Intended and unintended consequences of an organization's attempt to attenuate escalation of commitment. *Academy of Management Journal*, 45, 443–452.
- McNamara, R. S., & VanDeMark, B. (1995). *In retrospect: The tragedy and lessons of Vietnam*. New York: Times Books.
- Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5, 147–176.
- Myers, S. C. (1984). Finance theory and financial strategy. *Interfaces*, 14, 126–137.
- Moon, H. (2001a). Looking forward and looking back: Integrating completion and sunk-cost effects within an escalation of commitment progress decision. *Journal of Applied Psychology*, 86, 104–113.
- Moon, H. (2001b). The two faces of conscientiousness: Duty and achievement striving in escalation of commitment dilemmas. *Journal of Applied Psychology*, 86, 533–540.
- Neale, M., Bazerman, M., Northcraft, G., & Alpers, C. (1986). “Choice shift” effects of group decisions: A decision bias perspective. *International Journal of Small Group Research*, 2, 33–41.
- O'Connor, K. M. (1997). Groups and solos in context: The effects of accountability on team negotiation. *Organizational Behavior and Human Decision Processes*, 72, 384–407.
- Parks, C. D., & Cowlin, R. (1995). Group discussion as affected by number of alternatives and by a time limit. *Organizational Behavior and Human Decision Processes*, 62, 267–275.
- Rogelberg, S. G., Barnes-Farrell, J. L., & Lowe, C. A. (1992). The stepladder technique: An alternative group structure facilitating effective group decision making. *Journal of Applied Psychology*, 77, 730–737.
- Ross, J., & Staw, B. M. (1993). Organizational escalation and exit: Lessons from the Shoreham nuclear power plant. *Academy of Management Journal*, 36, 701–732.
- Roth, P. L. (1994). Group approaches to the Schmidt–Hunter global estimation procedure. *Organizational Behavior and Human Decision Processes*, 59, 428–451.
- Schwenk, C. R. (1988). Effects of devil's advocacy on escalating commitment. *Human Relations*, 41, 769–782.
- Sherif, M. (1935). A study of some factors in social perception. *Archives of Psychology*, 27, 1–60.
- Simonson, I., & Nye, P. (1992). The effects of accountability on susceptibility to decision errors. *Organizational Behavior and Human Decision Processes*, 51, 416–446.
- Simonson, I., & Staw, B. M. (1992). De-escalation strategies: A comparison of techniques for reducing commitment to losing courses of action. *Journal of Applied Psychology*, 77, 419–426.
- Smith, C. M., Tindale, R. S., & Steiner, L. (1998). Investment decisions by individuals and groups in “sunk cost” situations: The potential impact of shared representations. *Group Process and Intergroup Relations*, 1, 175–189.
- Snizek, J. A., & Henry, R. A. (1989). Accuracy and confidence in group judgement. *Organizational Behavior and Human Decision Processes*, 43, 1–28.
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology* (pp. 290–312). Washington, DC: American Sociological Association.
- Stasser, G. (1992). Information salience and the discovery of hidden profiles by decision-making groups. *Organizational Behavior and Human Decision Processes*, 52, 156–181.
- Staw, B. M. (1976). Knee deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, 16, 27–44.
- Staw, B. M., & Hoang, H. (1995). Sunk costs in the NBA: Why draft order affects playing time and survival in professional basketball. *Administrative Science Quarterly*, 40, 474–494.
- Staw, B. M., & Ross, J. (1978). Commitment to a policy decision: A multi-theoretical perspective. *Administrative Science Quarterly*, 23, 40–64.
- Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics*. USA: HarperCollins College Publishers.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211, 453–458.
- Whyte, G. (1991). Diffusion of responsibility: Effects on the escalation tendency. *Journal of Applied Psychology*, 76, 408–415.
- Whyte, G. (1993). Escalating commitment in individual and group decision making: A prospect theory approach. *Organizational Behavior and Human Decision Processes*, 54, 430–455.

Received 31 October 2001