

Productivity Loss in Performance Groups: A Motivation Analysis

James A. Shepperd

This article presents a framework derived from expectancy theory for organizing the research on productivity loss among individuals combining their efforts into a common pool (i.e., the research on social loafing, free riding, and the sucker effect). Lost productivity is characterized as a problem of low motivation arising when individuals perceive no value to contributing, perceive no contingency between their contributions and achieving a desirable outcome, or perceive the costs of contributing to be excessive. Three broad categories of solutions, corresponding to each of the 3 sources of low productivity, are discussed: (a) providing incentives for contributing, (b) making contributions indispensable, and (c) decreasing the cost of contributing. Each of these solutions is examined, and directions for future research and the application of this framework to social dilemmas are discussed.

For close to a century, psychologists and other social scientists have been interested in performance in groups. Traditionally, the topic of group performance has been dominated by social facilitation: the process whereby the presence of others enhances the performance of well-learned, dominant behaviors yet impairs the performance of novel, nondominant behaviors (Zajonc, 1965). The study of social facilitation can be traced back to an investigation by Triplett in 1898. Triplett demonstrated that children turned a fishing reel faster if they worked against a live competitor than if they worked alone. In the 9 decades since the initial demonstration by Triplett, hundreds of studies have investigated social facilitation, and numerous theories have been proposed to account for the phenomenon (see Geen, 1989, for a review).

Considerable recent attention has focused on a second group performance phenomenon: *social loafing*. Social loafing refers to the finding that individuals exert less effort when their efforts are combined than when they are considered individually (Latané, Williams, & Harkins, 1979). Research on social loafing originated in the work of a French agricultural engineer named Max Ringelmann (1913; cited in Kravitz & Martin, 1986). In a series of experiments conducted in the latter half of the 19th century, Ringelmann demonstrated that individuals working alone exerted more effort on a physical task involving pulling a rope or pulling a two-wheeled cart than did individuals working in combinations of two or more (see Kravitz & Martin, 1986; Moede, 1927). Ringelmann's findings can reasonably be explained in terms of coordination loss. However, subsequent researchers, controlling for coordination loss, have demonstrated performance decrements on other physical tasks

—such as clapping and cheering (Harkins, Latané, & Williams, 1980; Jackson & Harkins, 1985; Latané et al., 1979), pulling a tug-of-war rope (Ingham, Levinger, Graves, & Peckham, 1974), swimming in a relay race (Williams, Nida, Baca, & Latané, 1989), and pumping air (Kerr, 1983; Kerr & Bruun, 1981)—and on cognitive tasks—such as evaluating a poem, editorial, or job (Petty, Harkins, Williams, & Latané, 1977; Weldon & Gargano, 1988), visual vigilance (Harkins & Petty, 1982; Harkins & Szymanski, 1988, 1989), solving mazes (Jackson & Williams, 1985), making paper moons (Zaccaro, 1984), and generating uses for objects (Harkins & Petty, 1982).

Much of the research examining productivity loss in performance groups (social loafing in particular) has focused on identifying parameters under which individuals will and will not exert high effort.¹ Among the parameters investigated have been identifiability of contributions (Williams, Harkins, & Latané, 1981), task uniqueness and task difficulty (Harkins & Petty, 1982), task attractiveness (Zaccaro, 1984), and personal involvement in the task (Brickner, Harkins, & Ostrom, 1986). No attempt has been made to organize the growing number of parameters into a single framework. Nor has any attempt been made to identify communalities among known parameters. For example, do personal involvement and identifiability diminish social loafing by appealing to or satisfying the same psychological motive? Are task characteristics such as difficulty, uniqueness, and attractiveness distinguishable parameters?

There are at least two reasons why no unifying framework has been proposed to organize the research examining lower productivity among contributors pooling their efforts. First, the amount of effort individuals contribute in a collective is multidetermined. Several factors including coordination of efforts, fatigue, and ability influence the magnitude of individual contributions. Second, with few exceptions (e.g., Harkins & Szy-

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Correspondence concerning this article should be addressed to James A. Shepperd, Department of Psychology, University of Florida, Gainesville, Florida 32611. Electronic mail may be sent to shepperd@webb.psych.ufl.edu.

¹ The term *productivity loss* primarily refers to the difference in productivity between people who are pooling their efforts and people whose efforts are considered individually (Steiner, 1972). It does not necessarily mean a change in productivity for a single aggregate of individuals across time.

manski, 1988, 1989; Kerr, 1986; Szymanski & Harkins, 1987), much of the research has focused on characteristics of the task that affect productivity rather than on the phenomenology of the individual members of the collective.

This article offers a theoretical framework for organizing the literature on productivity loss among individuals combining their efforts into a common pool. It begins by defining such situations as a type of social dilemma, one in which effort rather than some other commodity (e.g., money, air, a commons) is needed to realize the public good or desired outcome. I then propose that diminished productivity stems from lost motivation and that the research is best organized around solutions to the motivation loss derived from expectancy theory (Tolman, 1932; Vroom, 1964). As will become apparent, the conditions that have successfully remedied low productivity in past research have done so by appealing to one or more of the three proposed solutions.

Although until now no comprehensive review of the literature has been published, two other articles have offered some initial insights in this direction—insights on which the present article builds. Specifically, Stroebe and Frey (1982) and Kerr (1986) have characterized contributing effort in a collective as a type of social dilemma (see also Kerr, 1983). In addition, both have linked, at least implicitly, low productivity in performance groups to expectancy theory. However, both articles are narrow in the literature they examine; Kerr (1986) focuses almost exclusively on his own research on the free-rider and sucker effects, whereas Stroebe and Frey examine only research on the loafing effect. Both articles offer solutions to low productivity, yet neither organizes the literature around these solutions. Moreover, scant attention is paid to how these solutions have been manipulated in past research or how they might be realized outside the psychology laboratory. The present article goes beyond these previous discussions by proposing that each of the literatures examining lower productivity in groups (i.e., the literature on social loafing and the free-rider and sucker effects), as well as the larger literature on social dilemmas, can be organized around solutions to the problem of low motivation.

This article is limited to a review of research examining diminished productivity arising from low motivation. Excluded is research examining reduced productivity attributable to coordination loss (Diehl & Stroebe, 1987) or to other nonmotivation factors. In addition, this article focuses primarily on low motivation and productivity occurring when individuals pool their efforts to form a collective product. Often the term *group product* is used to refer to the collective product, and the term *performance group* is used to refer to the aggregate of individuals who contribute to the collective (e.g., Kerr, 1986). Admittedly, the aggregates of individuals typically examined in this research represent groups in a very minimal sense: They have no history, are limited in their communication, and are unlikely to have future interactions (McGrath, 1984). Nevertheless, because the research addressed is applicable to more traditional groups outside the psychology laboratory, these terms are retained in the present article.

Contributing in Performance Groups as a Social Dilemma

A social dilemma arises when the choice or behavior that is best for the individual results in undesirable consequences for

the group or society, should all members behave similarly (Orbell & Dawes, 1981). A familiar example of a social dilemma is Garret Hardin's (1968) "Tragedy of the Commons." Hardin described the conflict that exists when a number of shepherds graze their herds on a common pasture. Each shepherd realizes that it is to his or her benefit to increase his or her herd size. That is, he or she stands to profit from having a larger herd while sharing the cost, measured in terms of grazing the livestock, with the other shepherds. However, if every shepherd increases the size of his or her herd, then the pasture will be damaged from overgrazing. Thus, the behavior that is most beneficial for the individual shepherd (i.e., increasing the size of his or her herd) is harmful for the community as a whole, should every shepherd act similarly. There now are numerous reviews of social dilemma research by economists, political scientists, and psychologists (e.g., Kerr, in press; Lynn & Oldenquist, 1986; Messick & Brewer, 1983; Orbell & Dawes, 1981; Wilke, Messick, & Rutte, 1986).

Investigations of social dilemmas typically have focused on the problem of overtaxing some finite public resource, such as the commons, or the problem of providing some public good, such as public television or radio or clean water or air. Investigations of productivity loss in performance groups, by contrast, have emphasized factors that influence the amount of effort individuals contribute to some collective venture. More generally, this body of research is concerned primarily with the loss in motivation and subsequent reduction in productivity found among individuals working collectively in relation to individuals working alone (Kerr, 1986). The distinguishing feature is that the latter focuses on effort rather than on some other commodity that influences the collective welfare.

The two phenomena are similar, however, in that participants face a task in which it is in their best interests to withhold contributions from the collective. For example, in a typical social loafing study (Latané et al., 1979), subjects are instructed to shout and clap as loudly as they can either alone or with others. If everyone shouts and claps as loudly as he or she can, the collective performance will be better. Thus, the collective stands to benefit (in terms of a better performance) if its members contribute. But shouting and clapping are tiring tasks, requiring participants to expend considerable energy. Thus, there is a cost associated with shouting and clapping as loudly as one can. In addition, subjects in the collective conditions, particularly in larger collectives, are likely to believe that their individual contributions will have little effect on the collective's overall performance. Consistent with social dilemma research, subjects working together exert less effort than subjects working alone.

Of note, participants in many social loafing studies are instructed to produce as much sound, speed, uses for an object, and so forth, as possible. If participants accept this maximum performance as their goal, then a lone individual can undermine the collective performance by loafing. Because a characteristic of some social dilemmas is that no one individual can ruin the public good, one might argue that this situation is not truly a social dilemma. In most experiments, however, it is unlikely that participants accept the maximum performance as their goal but rather redefine the task for themselves as one of performing well enough to satisfy the experimenter. As such,

many social loafing tasks are social dilemmas in fact, if not in intent.

Kerr (1983, 1986) notes that performance groups (including many of those examined in social loafing studies) often share two characteristics with traditional social dilemmas that can undermine motivation to contribute to the collective. First, other group members may exert enough effort to achieve the desired outcome (or public good), thereby making one's own efforts seem unnecessary or dispensable. When personal efforts are perceived as dispensable, individuals often reduce their contributions, presumably because they reason that they can enjoy the benefits of the group's success without having to contribute. This characteristic of social dilemmas, called the *free-rider effect* (Olson, 1965), has received empirical support (e.g., Kerr & Bruun, 1983; Williams & Karau, 1991).

Second, participants in performance groups who work hard run the risk that others will free ride on their efforts. In the words of Orbell and Dawes (1981), in performance groups there is "the possibility of being a 'sucker,' contributing to the collective good when nobody else does" (p. 39). This potential inequity in contributions may lead individuals to withhold efforts in performance groups as a means of restoring equity and avoiding being a sucker to others' free riding.

Kerr (1983) demonstrated this *sucker effect* by having subjects work toward a preestablished criterion on a physical task (pumping air) either (a) individually (control condition), (b) with a capable partner who worked hard in all conditions, (c) with a capable partner who appeared to free ride on their efforts, or (d) individually, but in the presence of a capable coactor who nevertheless exerted low effort. Consistent with the free-riding hypothesis, subjects working with a capable, hardworking partner exerted less effort than did control subjects, thereby free riding on their partner's high efforts. In addition, consistent with the sucker effect, subjects working with a capable partner who attempted to free ride on the subject's high efforts also exerted less effort than control subjects, apparently in an attempt to avoid the free riding attempts of their partner. Finally, subjects working individually but in the presence of a capable yet poor performing coactor (a confederate who modeled low effort) exerted high effort, equaling the effort exerted by control subjects. This final finding is important because it reveals that subjects in the sucker condition were not merely modeling the behavior of their partner. Instead, these subjects lowered their effort to avoid being the sucker of their partner's free-riding attempts. These findings suggest that having a capable partner free ride on one's own efforts is aversive and may lead individuals to exert less effort in an attempt to reestablish equity.

It should be apparent that both the free-rider effect and the sucker effect can lead to defection from the group choice, but for different reasons. With the free-rider effect, the tendency to defect arises from the perception that one's own contributions are unnecessary to achieve the collective good. With the sucker effect, the tendency to defect arises from the desire to avoid being the victim of free riding on the part of other group members.

In summary, low productivity in performance groups can be viewed as a type of social dilemma, in that the behavior that is in the best interest of the individual conflicts with the behavior that is in the best interest of the group. In addition, the settings in which reductions in productivity occur often share two char-

acteristics with social dilemmas: (a) the potential to free ride on the efforts of others (the free-rider effect) and (b) the threat that others will free ride on one's own efforts (the sucker effect). Research on low productivity in performance groups, however, is distinct from social dilemma research, in that it focuses on individual effort rather than on maintaining, conserving, or producing some commodity (see Kerr, 1983, 1986; Stroebe & Frey, 1982, for additional discussion of low productivity in performance groups as a social dilemma).

Solutions to Low Productivity in Performance Groups

If low productivity in performance groups represents a type of social dilemma, then an obvious place to find insights into the mechanisms underlying lost productivity is the social dilemma literature. A review of this literature reveals a variety of solutions proposed to remedy social dilemmas. These solutions include changing the nature of the situation so that there no longer is a conflict between the interests of the individual and the interests of the society (Lynn & Oldenquist, 1986; Messick & Brewer, 1983; Orbell & Dawes, 1981), opening avenues for communication (Messick & Brewer, 1983; Orbell, van de Kragt, & Dawes, 1988), establishing or emphasizing norms for appropriate behavior (Kerr, 1986, in press), establishing a superordinate authority to punish defection from and reward maintenance of the public good (Messick & Brewer, 1983; Samuelson, Messick, Rutte, & Wilke, 1984), promoting a sense of group cohesiveness or group identity (Kramer & Brewer, 1984, 1986; Messick & Brewer, 1983), making individual contributions indispensable (Kerr & Bruun, 1983; Lynn & Oldenquist, 1986; Stroebe & Frey, 1982; van de Kragt, Dawes, Orbell, Braver, & Wilson, 1986), and appealing to altruistic concerns (Orbell & Dawes, 1981) and concerns with duty (van de Kragt et al., 1986).

Not surprisingly, many of the solutions proposed by social dilemma researchers can be applied to the problem of low productivity in performance groups. Yet, given the sheer number of solutions suggested, it is likely that many are redundant, appealing to the same motivational concern. Moreover, it is unclear why some of the solutions are effective in solving social dilemmas. For example, is the solution of opening avenues for communication effective because it elicits normative pressures to contribute, reduces fear of being a sucker, elicits a sense of group identity, induces members to make a commitment or because of some other reason? In short, the social dilemma literature provides few insights into organizing the literature on low productivity in performance groups and seems itself in need of an organizational framework.

Fortunately, an alternative source of insights for organizing the productivity loss literature comes from expectancy theory. Expectancy theory first appeared in the 1930s in the work of Tolman (1932) and subsequently became popular in the 1960s among industrial and organizational psychologists following the work of Vroom (1964). Although the theory has witnessed various modifications and revisions over the years (Porter & Lawler, 1968), the basic premise remains the same. Individuals can be expected to work toward a particular outcome (a) if they value the behavior or the outcome (high value) and (b) if they perceive a contingency between their behavior and the outcome (high expectancy). If the behavior or its outcome is not

valued or if no contingency is perceived between behavior and the outcome, then motivation and subsequent effort should be low.

The two conditions leading to reduced contributions (low value and low expectancy) can occur, of course, among people working individually. However, performance groups, in which individuals combine their efforts into a common pool, seem particularly likely to foster these conditions. Indeed, if we examine the sources of low productivity identified by performance group researchers, we find that each influences productivity by affecting either the value of contributions or the expectation that contributions are consequential. Specifically, three potential sources of low productivity in performance groups have been identified (Kerr, 1983). First, individuals may perceive no benefit to working hard either because the group product is perceived as unimportant or because hard work is likely to go unnoticed and thus unrewarded. Second, individuals may perceive their personal efforts as unnecessary or dispensable in achieving the collective good and thus feel no compulsion to work hard. As noted earlier, perceptions of this sort can lead individuals to free ride on the contributions of their fellow participants. Third, individuals may perceive the physical costs of contributing (in terms of depletion of personal resources or lost opportunity) or the psychological costs of contributing (in terms of inequity of contributions resulting from being the victim of the free-riding attempts of others, the sucker effect) to be excessive, exceeding any benefit obtained from achieving the collective good.

Each of these three sources of low productivity adversely affects contributing either by decreasing the value associated with contributing or by decreasing the perceived contingency between behavior (i.e., contributing) and the outcome. Regarding the first source, when the group product is unimportant and efforts are unrewarded, there is no value associated with contributing. Regarding the second source, when the group product is unattainable or contributions are perceived as unnecessary or dispensable, there is no perceived contingency between performance and outcomes. Achieving or not achieving the collective product is irrelevant to the magnitude of one's personal contributions. Finally, regarding the third source, when the physical or psychological demands of contributing are excessive, the costs of contributing exceed the value associated with achieving the collective good. That is, the excessive cost of contributing functions as a barrier or disincentive to contributing.

Expectancy theory offers a useful way of thinking about the sources of low motivation in performance groups. It also suggests a framework for organizing the productivity loss literature, a framework centered around solutions to the problem of low motivation. What follows are three broad categories of solutions, derived from expectancy theory, to the problem of diminished productivity in performance groups, one solution corresponding to each of the three sources of low productivity. As will become apparent, the research on diminished productivity in performance groups as well as the bulk of the social dilemma research can be organized around these three solutions. The first solution remedies low productivity by increasing the benefits associated with contributing, thereby affecting the value component of behaving. The second solution remedies low productivity by increasing the perceived contingency

between contributing and achieving the collective good, thereby affecting the expectancy component of behaving. The third solution remedies low productivity by removing disincentives to contributing. This third solution also affects the value component of contributing, albeit indirectly, and thus can be thought of as a variation of the first solution. In summary, low productivity in performance groups can be reduced by (a) providing incentives for contributing, (b) making individual contributions indispensable, and (c) decreasing or eliminating the physical and psychological costs of contributing (see Table 1). Each of these solutions is discussed in turn.

Providing Incentives for Contributing

On the basis of expectancy theory, one way to remedy low productivity in performance groups is to increase the value associated with contributing or with achieving the collective good. This can be accomplished by providing an incentive for contributing. Providing an incentive addresses the problem that group members often perceive no benefits to contributing; either by design or by accident, it is the approach most investigators have used to address low productivity. However, the nature of the incentive (external vs. internal) and the target of the incentive (a good individual performance vs. a good collective performance) have varied. To simplify the presentation, external and internal incentives for individual performance are discussed first, followed by a discussion of external and internal incentives for the collective performance.

Incentives for a Good Individual Performance

External incentives. Perhaps the most obvious way to increase the value associated with contributing is to tie individual contributions to economic rewards. Economic rewards such as money and prizes can serve as powerful incentives for behavior, countering the reduction in effort typically exhibited by participants who are combining their efforts. There is considerable evidence that individuals generally will exert greater effort when they believe their efforts will be rewarded than when they believe their efforts will go unrewarded (Locke, 1975; Mitchell, 1979; Vroom, 1964).

Similar to economic rewards, the promise of social rewards, such as liking, approval, and status, for individual contributions (or social sanctions for failing to contribute) also can function as a powerful incentive for behavior, resulting in greater effort expenditure. However, social rewards need not be explicitly promised to be effective. Rather, the mere potential for gaining social rewards (or avoiding social sanctions) can serve as a motivation for greater effort. It is this potential, under the rubric of evaluation concerns, that has been studied most by psychologists. Other things being equal, the opportunity for (or risk of) evaluation can motivate individuals to exert greater effort.

The influence of evaluation concerns on individual productivity in performance groups traditionally has been investigated in social loafing research by manipulating the extent to which individual efforts are identifiable. Typically, participants work either individually, where inputs are identifiable, or collectively, where inputs are anonymous. The recurring finding is that par-

Table 1
Sources of and Solutions to Low Productivity in Performance Groups

Sources	Solutions
Contributions are unrewarded	Provide incentives for contributing External individual incentives Internal individual incentives External collective incentives Internal collective incentives
Contributions are unneeded	Make individual contributions indispensable Make contributions difficult Make contributions unique Make contributions essential
Contributions are too costly	Decrease or eliminate the costs of contributing Decrease the physical costs Decrease the psychological costs

Participants loaf when inputs are unidentifiable. For example, in a study by Williams et al. (1981, Experiment 1), subjects wearing blindfolds and headsets and placed in a soundproof room participated in an experiment that ostensibly examined the effects of sensory feedback on sound production. In the first part of the experiment, subjects believed that they were shouting alone in some trials and in combination with 1 or 5 other participants in other trials. All subjects actually shouted alone; however, the blindfolds and headphones concealed this fact from subjects. The results revealed less shouting in the combined conditions, in which efforts presumably were unidentifiable, than in the alone condition, in which efforts clearly were identifiable. In the second part of the experiment, subjects again believed that they shouted alone on some trials and in combination with 1 or 5 other participants on other trials. In addition, subjects were given individual microphones and were instructed that how loud they shouted could be identified across all trials. The results of the second part of the experiment revealed that subjects shouted equally loudly in all conditions. Taken together, these findings suggest that regardless of whether individuals are contributing alone or together with others, they exert greater effort when contributions are believed to be identifiable.

According to Latané et al. (1979), when persons pool their efforts, their individual contributions are less noticeable. Thus they are able to "hide in the crowd," a strategy unavailable to solo performers. Being less noticeable, these individuals experience less pressure to work hard, either because they cannot be held accountable for a poor performance or because they cannot enjoy the proper benefits deserved for an outstanding performance (Williams et al., 1981; see also Kerr & Bruun, 1981). By contrast, when individuals perform alone or when their inputs are identifiable, they can be associated more easily with their efforts: They can be evaluated negatively if they perform poorly or fail, or positively if they perform well or succeed.

It is evaluation concerns and not identifiability per se that elicits greater effort expenditure. In the absence of other motivational factors, if personal contributions cannot be evaluated, then individuals will not exert high effort regardless of whether contributions are identifiable. This point is illustrated in a study by Harkins and Jackson (1985), in which participants performing a brainstorming task were requested to generate as

many uses as they could for an object. Participants were instructed either that the uses they generated would be individually identifiable or that the uses they generated would be pooled with the uses generated by other participants, thereby making individual contributions anonymous. In addition, half of the participants believed that all subjects were generating uses for the same object, permitting a comparison of contributions, or that each subject was generating uses for a different object, making a comparison or evaluation of contributions impossible. In truth, all subjects generated uses for the same object, a knife. Harkins and Jackson found that participants with identifiable contributions exerted greater effort on the task than did participants with unidentifiable contributions, but only when they believed that their efforts could be evaluated in comparison with the efforts of coparticipants. When participants believed that their identifiable contributions could not be evaluated, they exerted no more effort than did participants with unidentifiable contributions.

In summary, linking individual contributions to external rewards (either economic or social) can increase the value associated with contributing and thereby can elicit greater productivity. Moreover, as seen in the case of evaluation concerns, when the external reward is social (e.g., social approval, liking, status), it need not be explicitly promised to be effective. The mere potential of attaining a social reward is sufficient to motivate behavior.

Internal incentives. Internal rewards tap the individual's capacity for self-reward and, similar to economic and social rewards, can be effective in addressing low productivity in performance groups. An examination of the literature on low productivity in performance groups reveals that internal rewards for task performance are present whenever the individual (a) personally values performing well on the task or (b) finds the task intrinsically interesting, either because the task itself is enjoyable or meaningful or because the outcome of the task is personally relevant.

Regarding the first condition, the value an individual places on performing well on a task is necessarily subjective and undoubtedly depends, to some extent, on the nature of the task itself. Nevertheless, there is reason to believe that individuals will value performance on even the most mundane tasks (e.g.,

generating uses for an object or visual vigilance) provided that they are able to evaluate their performance. When individuals can personally evaluate their performance (either against an objective standard, a social standard, or their own previous performances), they exert greater effort (Harkins & Szymanski, 1988; Szymanski & Harkins, 1987).

The effectiveness of self-evaluation in eliciting greater effort appears to capitalize on the principle that in addition to being concerned that others evaluate them favorably, people are concerned with evaluating themselves favorably. When individuals are provided an opportunity to evaluate their efforts, they will exert high effort to produce a favorable self-evaluation. Thus, establishing a favorable self-evaluation (or avoiding an unfavorable one) can function as an internal incentive.

Szymanski and Harkins (1987) illustrated the effectiveness of self-rewards in eliciting greater effort. Subjects in this study believed that the experimenter either would or would not be able to evaluate their performance on a forthcoming brainstorming task. In addition, half of the subjects believed that they would be able to evaluate their own performance on the task. That is, these subjects believed that they would be told the average performance of subjects who participated in the experiment in the previous term, thus providing a standard against which they could judge their own performance. The remaining subjects held no such belief. Not surprisingly, subjects were more productive when they believed that the experimenter was able to evaluate performances. More important, however, the opportunity for self-evaluation also elicited greater productivity even among subjects who believed that their individual inputs were anonymous.²

So far, this discussion of internal rewards has focused on the incentive value of self-evaluation in remedying low productivity in performance groups. A second internal reward is present when members of the collective perceive the task itself to be intrinsically interesting. Two studies have demonstrated that individuals who find a task intrinsically interesting will exert high effort regardless of whether their efforts can or cannot be externally evaluated. In the first study, intrinsic interest was measured dispositionally. Individuals who were pooling their contributions and who were dispositionally prone to find effortful, cognitive tasks intrinsically interesting (i.e., individuals high in need for cognition; Cacioppo & Petty, 1982) exerted higher effort on a cognitive task and lower effort on a physical task than did their counterparts, who were not dispositionally prone to like such tasks (Petty, Cacioppo, & Kasmer, 1985). Indeed, the efforts of participants in the pooled condition who were dispositionally interested in the task equaled the efforts of individual performers, demonstrating the effectiveness of intrinsic interest in countering low effort.

In the second study, intrinsic interest in the task was manipulated by varying the personal relevance or importance of the task to the individual. Specifically, students were requested to generate thoughts about senior comprehensive exams that had been proposed for their own school (high personal relevance), for another school (low personal relevance), or for their school 6 years from now (well after their own graduation; low personal relevance). In addition, subjects believed that they were working individually or in pairs. The results revealed that subjects generated more thoughts when they worked individually than

when they worked in pairs. Within the pair condition, however, subjects generated more thoughts when the task was personally relevant than when the task was not personally relevant (Brickner et al., 1986). Apparently, the perception that the task was personally relevant served as an internal incentive eliciting greater effort.

In summary, similar to external incentives, internal incentives for individual performance enhance productivity in performance groups by increasing the value associated with contributing. Internal incentives are present whenever individuals personally value the collective performance or whenever individuals find the task itself intrinsically interesting. Unlike external incentives, with internal incentives the motivation to contribute arises from personal benefits associated with performing the task or achieving the outcome and not from external benefits received for contributing.

Incentives for a Good Collective Performance

As noted previously, there now is ample evidence that providing incentives for individual contributions can counter the diminished effort typically found among individuals pooling their contributions. Providing incentives for individual efforts, however, requires that it be possible to evaluate individual contributions. In the real world, identifying and evaluating individual contributions in a collective are difficult at best and often impossible. This is particularly true on tasks in which individual contributions are inseparable or indistinguishable. Such a problem exists, for example, in a tug-of-war match in which, outside of the elaborately furnished experimental laboratory, it is virtually impossible to monitor the magnitude of effort expended by individual participants. As an alternative, some researchers have provided incentives for the collective performance rather than for individual performances, a strategy that is similar to the business practices of profit or gain sharing (Doyle, 1983). What follows is a discussion of external and internal incentives for good collective performances.

External incentives. At least two studies have demonstrated that providing a powerful incentive for a good collective performance is a solution to low productivity in performance groups. In the first study, the incentive was extra experimental credit (Zaccaro, 1984). In the second study, the incentive was avoidance of a tedious memorization task (Shepperd & Wright, 1989). Both studies demonstrated that individuals exerted greater effort when the collective incentive was present than when it was absent even though individual efforts presumably could not be evaluated. For example, in the Shepperd and Wright study, subjects generated uses for an object either alone or as part of an aggregate in which individual contributions would be anonymous. In addition, half of the subjects learned

² Although evaluation concerns can eliminate the loafing effect, resulting in an increase in the quantity of individual contributions, at the same time they can be aversive, impairing the quality of these contributions. This is particularly likely on tasks that demand originality or creativity (see Bartis, Szymanski, & Harkins, 1988). Yet, lower quality does not necessarily imply lower effort. Rather, it suggests that evaluation concerns may interfere with creativity (Amabile, 1979; McGraw, 1978).

that scores on a creativity test completed earlier could be used to determine whether individuals (or aggregate) performed as well as they could on the task. Half of the subjects were instructed that if they (or their aggregate) generated at least as many uses as their creativity score suggested (or as well as their combined creativity score suggested in the aggregate condition), they (or their aggregate) would be permitted to leave the experiment early and thereby avoid performing a tedious memorization task. The remaining subjects were given no such incentive for performing well. The results revealed that subjects generated fewer uses in the aggregate condition than in the individual condition, but only when no incentive was provided for a good collective performance. When an incentive was provided for a good collective performance, the efforts of aggregate members equaled the efforts of individual performers. Taken together, the studies by Shepperd and Wright and Zaccaro suggest that providing external incentives for a good collective performance is a solution to low productivity in performance groups.

Internal incentives. Internal incentives for achieving a good collective performance exist when individuals identify with, or feel a sense of pride in or duty toward, their group. These group qualities facilitate group cohesiveness and can evoke high-effort contributions from group members even when individual contributions may go unrewarded. The incentive value of these group qualities lies in the fact that individuals personally value the success of the group and are motivated to work hard to ensure the group's success. Unfortunately, these qualities often develop slowly over time (if at all) and thus are unlikely to occur among aggregates of strangers who meet once or only briefly for a psychology experiment. Consequently, the effects of internal incentives for a good collective performance in deterring productivity loss rarely have been studied.

A notable exception is a study investigating the effect of group cohesiveness on typing speed among students at a secretarial school. Participants in this study believed that their typing speed would be evaluated individually or would be combined with others and evaluated collectively. In the collective condition, participants believed the other participants would be three self-chosen friends or three participants chosen randomly. Participants in the randomly assigned (low cohesion) conditions typed slower than individual participants, whereas participants in the friend (high cohesion) conditions tended to type faster than individual participants (Williams, 1981). Apparently, being part of a cohesive group provided an incentive for exerting high effort, countering low productivity arising as a result of contributions being anonymous (see also Harkins & Szymanski, 1989).

Summary

According to expectancy theory, one means of enhancing productivity in performance groups is to increase the value associated with contributing, a solution accomplished by providing incentives for contributing. The incentives can be external or internal and can be based on a good individual or a good collective performance. Absent from this discussion of incentives is any mention of the effect of competition on individual performance. Actually, the effect of competition has received

considerable attention, but within the social facilitation literature (Geen, 1989) rather than the social loafing or productivity loss literature.³ The consistent finding is that a sense of competition (either intergroup or intragroup) elicits greater effort, though not necessarily better performance (see Geen, Beatty, & Arkin, 1984). Yet one reason competition elicits higher effort is that it provides the individual with an incentive to work hard: Performing better than co-workers is self-reinforcing, is reinforced externally, or both. Consequently, a discussion of competition is tantamount to a discussion of incentives.

This discussion of the use of incentives as a solution to productivity loss in performance groups reveals gaps in the research and important directions for future studies. For instance, although the evidence demonstrates the benefit of providing internal incentives for good individual performances, few studies have examined the utility of providing incentives (either internal or external) for a good collective performance. As a result, our understanding of the incentive value of group characteristics such as group cohesiveness and group identity is limited. Moreover, we know little about whether changes in these characteristics within a group result in corresponding changes in motivation and productivity among group members.

Likewise, important questions remain regarding the nature of the incentives. For example, can the desire to be or appear consistent function as an incentive to contribute? Consistency theory would suggest that other things being equal, individuals induced to make large contributions initially should continue to contribute heavily to the extent that such behavior is consistent with their self-image (Festinger, 1957; Heider, 1958; Lecky, 1945; McGuire, 1960). By contrast, equity theory would suggest that individuals who contribute heavily initially would reduce subsequent contributions, expecting others to contribute heavily to restore equity. Another question is whether linking benefits to productivity in performance groups increases productivity when others rather than oneself are the recipients of these benefits? There is some evidence that this is so in the social dilemma literature (van de Kragt et al., 1986). Moreover, one can imagine that this would be the case if the recipient(s) of the fruits of one's labor are disadvantaged, needy, or incapable of helping themselves. Here the incentive value might lie in reducing one's own arousal arising from an awareness that others are suffering or are in need. In the absence of empirical evidence, however, one can only speculate about whether individuals would exert high effort when they themselves would not enjoy the product of the contributions.

Making Individual Contributions Indispensable

On the basis of expectancy theory, a second way to remedy low effort in performance groups is to increase the contingency

³ Both social facilitation and social loafing focus on the performance of individuals working in groups. Nevertheless, the two phenomena have been investigated as separate lines of research. As suggested by Harkins (1987), the separate investigation of social loafing and social facilitation may explain why no attempt has been made to address the apparent contradictory nature of the two findings. Recent theorizing and research, however, suggest that the two lines of research are complementary, representing two closely related paradigms (see Harkins, 1987; Harkins & Szymanski, 1987).

between personal efforts and the achievement of a desired outcome. This can be accomplished by making individual contributions indispensable. This second solution addresses the problem arising when individuals regard their own contributions as unnecessary or inconsequential in achieving a desired outcome. When individuals perceive their contributions as dispensable, they may opt to free ride on the efforts of others, thereby enjoying the fruits of a good collective performance (if it is achieved) without suffering the costs associated with contributing. Of course, if everyone behaved according to self-interests rather than according to the interests of the collective, then a good collective performance would not be obtained. Making individual contributions indispensable increases the impact of any single member's contributions and, to the extent that the outcome is valued, should lead to increased contributing.

An examination of the literature revealed three different ways that researchers have convinced individuals that their contributions are indispensable in achieving a good collective performance. The first involved persuading individuals that because of the difficult, challenging nature of the task, their contributions were unlikely to be duplicated by fellow workers. Specifically, in a study by Harkins and Petty (1982, Experiment 1), subjects generated as many uses as they could for either an easy object with many possible uses (a knife) or a difficult object with relatively few possible uses (a detached door knob) while working alone (identifiable condition) or as part of a 9-person collective (anonymous condition). Harkins and Petty reasoned that participants working on the difficult task would perceive their contributions as needed and thus would work harder even when efforts were anonymous. The results revealed that more ideas were generated for the easy object than the difficult object. More important, although the number of uses generated for the easy object varied as a function of identifiability, the number of uses generated for the difficult object did not. That is, regardless of whether contributions could or could not be identified, individuals working on a difficult task exerted high effort.⁴

The second way researchers have made individual contributions seem indispensable has been by increasing the uniqueness (or apparent uniqueness) of contributions (Harkins & Petty, 1982, Experiment 3). Similar to task difficulty, when individuals perceive their contributions as unique or as nonredundant with the contributions of others, they are likely to view their efforts as needed. This, in turn, should lead them to expend greater effort to ensure the group's success. In Experiment 3 of the Harkins and Petty study, subjects performed a signal detection task on a television screen that was divided into four quadrants. Half of the subjects believed that they watched the same quadrant as three other participants (redundant contribution condition), whereas the remaining subjects believed that they watched a quadrant different from other participants (unique contribution condition). In addition, subjects were told that their inputs were identifiable or were anonymous. Productivity loss (defined as the number of errors made on the signal detection task) occurred only when inputs were both anonymous and redundant. When individual efforts were either identifiable or unique, participants made few errors.

The third way researchers have influenced the perceived in-

dispensability of contributions has been by leading individuals to infer that achieving a good collective performance is dependent on their personal efforts. As demonstrated by Kerr and Bruun (1983), when individuals believe that the success of the collective is determined largely by their own contributions, they exert greater effort. In the study by Kerr and Bruun (1983), subjects working in pairs believed that they were more or less able than their partner at an air-blowing task. In addition, subjects believed that the pair's performance would be equal to the performance of the least able member of the pair (a conjunctive task) or would equal the performance of the most able member of the pair (a disjunctive task). Kerr and Bruun (1983) found that high-ability subjects exerted greater effort on the disjunctive task than on the conjunctive task, whereas low-ability subjects exerted greater effort on the conjunctive task than on the disjunctive task (see van de Kragt, Orbell, & Dawes, 1983, for an example from the social dilemma literature).

Kerr and Bruun's (1983) findings suggest that individuals are likely to infer that a good collective performance is dependent on their contributions (and, consequently, are likely to contribute more) if the task is structured in a way that makes individual contributions seem uniquely essential. A recent study by Williams and Karau (1991) proposed that individuals will also draw this inference if they perceive that co-workers are unable or unwilling to make adequate contributions. Moreover, Williams and Karau demonstrated in three separate experiments that individuals anticipating a poor performance from a co-worker would compensate by exerting high effort themselves, provided they valued the collective performance. In the first experiment, subjects who were dispositionally inclined to believe that a co-worker would free ride on their efforts (i.e., low trusters) worked harder themselves in an effort to compensate for their co-workers' anticipated poor performance. In the second experiment, subjects who heard a co-worker announce that he would exert low effort on a forthcoming meaningful task (one that had implications for intelligence) compensated by working harder. Finally in the third experiment, subjects working with a partner whom they believed was incapable of making adequate contributions exerted higher effort to ensure a good collective performance, but only when they valued the collective performance. When subjects did not value the collective performance, they withheld effort. Taken together, these findings suggest that when individuals perceive that the performance of the collective is dependent on their personal contributions, they will exert greater effort.

The studies described thus far have manipulated indispensability indirectly, by convincing participants that either (a) their contributions are unique, (b) their particular skills are necessary to ensure a good collective performance, or (c) attaining a good collective performance is dependent on their personal performance. Of course, the belief that one's own contributions are indispensable or that they have consequences for the collective also can be manipulated directly. This is illustrated in the helping literature. When solicitors for money instruct potential

⁴ Although these findings may be interpreted as evidence of a "floor effect," Harkins and Petty (1982) have provided a compelling argument against such an interpretation.

contributors that even the smallest contributions will help, not only does the percentage of individuals contributing increase, but the average amount of contribution increases as well (Cialdini & Shroeder, 1976; Weyant, 1984). Thus, instructing individuals directly that their contributions are important can increase contributing. Of note, Cialdini (1984) has argued that this strategy is effective because contributing becomes necessary to maintain one's altruistic self-image. As such, some instances of contributing after direct appeals may capitalize on internal, individual incentives.

In summary, a second means of remedying low productivity is to increase the contingency between personal contributions and the performance of the collective. This can be accomplished by making individual contributions indispensable (or appear indispensable) in achieving the desired outcome. There are at least four ways that this might be done: (a) by increasing the difficulty of the task, (b) by increasing the uniqueness of individual contributions, (c) by leading individuals to infer that attaining the collective good is dependent on their personal contributions, and (d) by instructing individuals directly that their contributions are necessary.

Making the task difficult or challenging or increasing the uniqueness of individual contributions may increase the task's intrinsic value, which may (a) make performing well on the task internally rewarding or (b) increase the value placed on the performance of the collective. For example, members of a sports team are likely to place greater value on competition against a team that offers a greater challenge than a team that presents little challenge. In short, some strategies designed to remedy low productivity by making individual contributions indispensable may have the added effect of increasing the incentive value of performing well.

It is also possible that the reverse is true: Providing incentives for contributing may influence perceptions of indispensability. The Shepperd and Wright (1989) study is a case in point. In that study, subjects in the aggregate condition were provided an incentive for a good collective performance: Participants could avoid a tedious memorization task if their aggregate performed as well as predicted. Although this manipulation was intended to influence the incentive value of a good collective performance, it also may have influenced perceptions of indispensability. Subjects may have reasoned that their contributions were necessary if the collective incentive was to be realized.

These things notwithstanding, providing incentives and making contributions indispensable are presented as distinct solutions because they differ in emphasis. With incentive-based solutions, the emphasis is on increasing the value of contributing by providing inducements for high effort. In the typical study, individuals are rewarded for contributing and sanctioned for not contributing, but little or no attention is paid to the possibility that the desired outcome may be in jeopardy if contributions are withheld. With indispensability-based solutions, by contrast, the emphasis is shifted away from rewarding contributions to expectations regarding the consequences of contributing. Specifically, attention is given to the necessity of personal contributions in achieving the desired outcome and on the possibility that the collective good may be unfulfilled if personal contributions are withheld. Any added rewards that

individuals might accrue from viewing their contributions as important or necessary are secondary and serendipitous.

Similar to the discussion of incentive-based solutions, the discussion of indispensability-based solutions highlights gaps in the literature and raises questions for future research. For example, are there other ways of increasing the perceived contingency between contributing and achieving a desired outcome in addition to those discussed here? Likewise, are there circumstances in which increasing the difficulty of the task results in lower productivity? One can imagine, for example, that individuals might actually decrease effort if they believe the task to be too difficult (Brehm, Wright, Solomon, Silka, & Greenberg, 1983).

This discussion of indispensability-based solutions also reveals that no study to date has truly examined or manipulated the indispensability of contributions (i.e., the expectancy component of the model) independent of the value of contributing. Specifically, in the studies described in this section, the procedures were designed to make individuals perceive that their own efforts were unnecessary or inconsequential in achieving the desired outcome. These procedures may have inadvertently manipulated the benefits of contributing (albeit, the benefits for the collective rather than the individual). As a result, subjects may have withheld contributions not because they perceived their efforts as dispensable, but because they perceived that their efforts would not benefit the collective. To better probe the role that the behavior–outcome contingency plays in contributing to a collective, future studies would need to hold constant the value (both personal and collective) associated with contributing while varying the likelihood (expectancy) that an individual's contributions will benefit the collective, that is, the likelihood that the collective will obtain the benefit on the basis of the person's actions. This can be accomplished by manipulating the individual's performance efficacy or by varying the demands associated with achieving the desired outcome. Presumably, when the outcome value is high, the likelihood that individuals will withhold contributions from the collective will vary as a function of the likelihood that personal actions will affect the attainment of the outcome.

Decreasing the Costs of Contributing

Expectancy theory suggests a third way to remedy low productivity in performance groups, one that involves eliminating disincentives to contributing. This third solution is a variation on the first solution of increasing the value of contributing; however, rather than enhancing value, it focuses on eliminating barriers to contributing. The barriers are conditions that undermine the value of contributing or provide a motive to withhold contributions. In short, a third remedy to low productivity in performance groups is to decrease the cost of contributing.

As suggested earlier, two types of cost are associated with contributing high effort in a collective. The first cost can be thought of as a material one; it arises either from the depletion of personal energy or resources or from lost opportunity associated with time and energy having been diverted from more profitable ventures. The result of these material costs is less energy and resources available for personal use. One only need think of paying one's income tax to appreciate how the cost of

contributing to the public good can lead even the most altruistic individual to contemplate shortchanging the public good in favor of personal interests. The second cost is psychological, attributable to the inequity experienced when fellow workers are thought to be free riding on one's own contributions. The aversion of being the sucker of others' free-riding attempts can lead individuals to reduce or withhold contributions.

When the demands of contributing are defined in terms of cognitive or physical effort, there is no simple way to decrease the material cost of contributing. One might change the nature of the task, making individual contributions easier or less effortful. However, such a change, though perhaps resulting in greater output, is unlikely to result in greater motivation or greater effort. Moreover, there is reason to expect that making the task easier may actually decrease effort expenditure if the task is subsequently perceived as less challenging (Harkins & Petty, 1982). Thus decreasing the material costs of contributing does not appear to be a viable solution to productivity loss attributable to low motivation.

There are, however, at least three solutions for reducing the psychological costs arising when individuals perceive that others are free riding on their contributions. The first solution entails eliminating the collective goal and replacing it with individual goals. This solution represents a sort of privatization of the collective good in which the collective good is partitioned into individual, private portions (Edney, 1980; Lynn & Oldenquist, 1986; Samuelson & Messick, 1986). In the case of the tragedy of the commons, it is akin to dividing the commons into private sections and allotting each section to a single shepherd. By partitioning a resource into sections, individuals can no longer fall victim to the free-riding attempts of others. As a consequence, the cost arising from a perception of inequitable contributions is eliminated. With the collective good privatized, individuals enjoy the fruits (as well as suffer the consequences) of their personal contributions. In the social dilemma literature, solutions of this sort have been classified as structural solutions (Messick & Brewer, 1983), in that they change the structure of the task from a collective one to an individual one. Moreover, this solution eliminates the dilemma aspect of social dilemmas in that individuals no longer must choose between their self-interests and the collective interests of the group or community. In work settings, paying workers for piecework represents one means of privatizing of the collective good.

There is evidence that individuals contributing to a collective will opt for this solution if given the opportunity. Specifically, in a study by Yamagishi (1988), Japanese and American students working in triads performed several trials of a verbal recognition task for which free riding on the part of co-workers was a threat. At the beginning of each trial, subjects could choose to remain in the triad and thus share equally the rewards of the trial with other remaining participants or exit from the triad and thus be rewarded solely for their individual performance. The results revealed that when the cost of exiting was low (there was no financial penalty for choosing to work individually), both American and Japanese students opted to exit from the triad. In addition, regardless of the cost of exiting, students whose contributions to the triad were high (i.e., they performed well on the task) were more likely to exit from the triad than were students whose contributions were low. These findings

suggest that regardless of cultural background, individuals anticipating free riding from others, if given an opportunity with little cost, will change their reward structure from a collective one to an individual one.

Yamagishi (1988) also predicted and found a cultural difference in the decision to privatize the collective good: Japanese students, unlike American students, were more likely to exit from the triad even when the cost of exiting was high. In explaining this finding, Yamagishi cited the observations of Benedict (1946) that unlike in America, where collective systems tend to be sustained internally by feelings of obligation or duty, collective systems in Japan are sustained externally by "mutual monitoring and sanctioning" (Yamagishi, 1988, p. 534). According to Taylor (1976), a system that sanctions free riding externally escalates free riding when the sanctions are removed. The study by Yamagishi provided no opportunity for subjects to monitor and possibly sanction co-worker performance. This quite likely created a greater fear of co-worker free riding among Japanese students than among American students. As a result, the Japanese students chose more often to exit from the triad even when the cost was high so as to avoid being a victim of the free riding of co-workers. American students, by contrast, chose more often to remain in the triad rather than incur the financial cost associated with exiting.

In summary, privatizing the collective good can be an effective means of remedying low productivity arising from the fear that others are free riding on one's own efforts. Moreover, there is evidence that some individuals will opt for this solution if given the opportunity. Unfortunately, in real-world settings, it often is impossible or unfeasible to partition a public resource into individual portions. For instance, one cannot partition a river running through a community and say, "You do as you wish with your part, and I'll do as I wish with my part." What happens to one part of the river (e.g., polluting) generally affects the rest of the river. Likewise, on group performance tasks such as a tug-of-war game, dividing the task into individual, private portions is rarely a realistic or desirable solution.

An alternative solution is to manipulate the feedback that individuals receive regarding the efforts of their co-workers. This solution involves convincing individuals that co-workers are making (or will make) equitable contributions toward the collective good. Believing that co-workers are making equitable contributions, individuals are less likely to think that they are the victim of others' free-riding attempts. Indeed, they may even be motivated to exert higher effort to ensure that their own contributions are equitable. For example, in a study by Jackson and Harkins (1985), subjects participating in a sound production experiment who learned that their coparticipant shouted on a series of practice trials louder than expected on the basis of her lung capacity later shouted louder themselves even when their efforts were ostensibly unidentifiable. Apparently, the belief that one's own contributions may be inequitably low led participants to contribute more in an attempt to reestablish equity.

Aside from the ethical problems associated with providing feedback that may be false, one drawback of this solution is that the feedback may be impossible to produce in the short run or impossible to sustain in the long run. Unless all workers are contributing their share, individuals may quickly deduce, on

the basis of monitoring the collective product or the contributions of other workers, that some workers are withholding efforts and thereby playing them as a sucker. A second drawback is that this solution inadvertently may elicit free riding from the target of the feedback. If one believes that fellow workers are exerting high efforts, then one's own contributions may seem dispensable. This possibility was demonstrated in the study by Kerr (1983; see also Williams & Karau, 1991) described earlier. Kerr (1983) found that subjects working toward a preestablished criterion on a physical task with a capable, hardworking partner exerted less effort on the task than did control subjects, thereby free riding on their partner's high efforts. In short, the knowledge that a co-worker was working hard resulted in less effort on the part of the recipient of this knowledge.

A final solution to the psychological cost arising when individuals perceive that they are or will be the victims of the free-riding attempts of others is to provide assurance that others' free-riding attempts will be punished. Social dilemma researchers have noted that some group members, if permitted to communicate, will attempt this solution informally by threatening would-be free riders that defecting from the group goal (i.e., placing individual interests over the interests of the group) will be met with unpleasant consequences (Dawes, McTavish, & Shaklee, 1977). In addition, equity researchers have noted that some people may do this cognitively when they imagine that the "sins" of those who defect will visit them later (Walster, Walster, & Berscheid, 1978). Finally, parents, teachers, and religious leaders sometimes use this strategy when they inform would-be defectors that "God is watching." The knowledge that others who free ride on one's own efforts will suffer negative consequences can dampen the aversive experience of being a sucker. Moreover, to the extent that individuals infer that their own free-riding attempts also will be punished, this solution can eliminate the free-rider effect as well. As such, it can be thought of as a disincentive for withholding contributions from the collective. Perhaps the only limitation to this third approach is that instructing group members that reduced contributing will be punished may be difficult in settings in which individual efforts are unidentifiable.

In summary, there appear to be three ways to reduce the costs associated with being a sucker of the free-riding attempts of others. First, the nature of the task itself can be changed by privatizing the collective good. This entails changing the task from a collective one to an individual one. Second, individuals can be instructed that their co-workers will not reduce their efforts, a solution that may involve deception and that will be successful only to the extent that contributors are unable to monitor individual performances or the collective product and do not deduce that their own contributions are dispensable. Third, members can be instructed that defection, whether their own or that of others, will be punished. This final solution not only is likely to eliminate productivity loss resulting from the belief that one may be a sucker to the free-riding attempts of others but also is likely to eliminate productivity loss arising from the perception that one's personal efforts are dispensable.

The cost of contributing must be viewed in relation to its benefits. It is not necessary that all costs be eliminated, but that the costs not exceed the benefits. Thus, in situations where individuals withhold contributions to avoid being a sucker, an

alternative remedy would be to increase the value or benefit associated with achieving the collective good, a strategy discussed earlier under incentives. The utility of this alternative approach is illustrated in the research by Williams and Karau (1991) described earlier. In that research, subjects who anticipated that a co-worker would free ride on their contributions responded by exerting higher effort in an attempt to compensate for the co-worker's poor performance. This compensatory effort occurred, however, only when the collective performance was valued. When the collective performance was not valued, subjects did not exert higher effort. This research suggests that subjects who value the collective performance, although they may find it psychologically aversive, will compensate for a free-riding co-worker.

Note also that the second category of solutions (making individual contributions indispensable) can reduce the threat that others will free ride on one's own efforts. Specifically, to the extent that achieving a collective good depends on all workers exerting high effort, making contributions indispensable eliminates the utility of free riding and, by extension, the threat of being the sucker to the free-riding attempts of others. After all, if contributions are indispensable, then withholding contributions jeopardizes the collective good. In summary, the first two categories of solutions, though perhaps not directly reducing the psychological cost of contributing, can nevertheless minimize the risk that individuals will withhold contributions to avoid being a sucker to others' free-riding attempts.

The third category of solutions to diminished productivity in performance groups is the most speculative and the most in need of additional research. Although the costs of contributing can undermine the motivation to contribute, few studies have addressed ways these costs might be diminished. As a result, much of the discussion of the remedies in this section is based on a speculative analysis of the problem rather than on a synthesis of the existing literature. Admittedly, some of the remedies proposed in this section may be impractical or ineffective. For example, instructing individuals that their fellow workers are not withholding contributions may have little impact on individual performance. What is needed is a thorough, empirical test of the various remedies proposed in this section.

Applications to Real-World Settings

This three-part framework provides a useful organization of the literature on productivity loss in performance groups. It also can serve as a guideline for addressing low productivity in real-world settings. To illustrate, imagine that the manager of an assembly line of a stereo-manufacturing company wants to counter low motivation and productivity among workers. On the basis of the proposed framework, the manager could increase productivity by providing incentives for good individual or good collective performance. At the individual level, this might come in the form of external incentives such as recognition or financial awards for workers who exceed productivity expectations. For instance, workers assembling stereos might be paid on the basis of the number of stereos they individually assemble that meet quality standards. As such, a worker who assembled 25 stereos a day would receive greater pay (or perhaps greater recognition) than a worker who assembled 20 ste-

reos a day. Incentives could work similarly at the group level, with groups of workers being paid on the basis of the productivity level of the group. For example, the manager could provide teams of workers with a bonus for each week that the number of stereos assembled exceeded a preestablished criterion. Linking incentives to productivity has a long history in work settings and is evident in a broad range of situations, ranging from paying migrant workers on the basis of the number of bushels of cantaloupes, potatoes, or beans they pick to paying salesmen and saleswomen commission for the volume of sales they produce.

The manager of the assembly line also could increase productivity by tapping the individual's or group's capacity for self-reward. At the individual level, this might be accomplished by providing standards (e.g., the productivity of the average or perhaps best worker) by which workers could evaluate their performance. To the extent that individuals value a favorable self-evaluation, they should work hard to ensure that their performance meets or exceeds the established standard. Alternatively, the manager could increase the intrinsic interest of the job itself by making the tasks more demanding or challenging. It may even be possible to match workers to tasks that they find intrinsically interesting. For instance, in the stereo assembly line, it may be possible to find workers who enjoy soldering and to place them in soldering jobs. Likewise, workers who enjoy assembling machines could be placed in assembly jobs. Regarding the group level, it was noted earlier that internal incentives for achieving a good group performance exist whenever members identify with or feel a sense of pride in their group. The manager might be able to instill these group qualities by encouraging or facilitating socializing among workers outside work. Hosting picnics, organizing softball teams, or sponsoring other leisure activities for workers could be a step in this direction. To the extent that they come to value a good group performance, a group worker should be motivated to work hard to ensure that his or her group performs well.

In addition to providing incentives for a good individual or good group performance, the manager could raise productivity by increasing the perceived contingency between individual efforts and the disposition of the collective good. That is, the manager could increase the indispensability or perceived indispensability of contributions. In the stereo assembly plant, this might be accomplished by assigning different tasks to different workers, thereby reducing the redundancy and increasing the necessity of each worker's contribution. A single worker, for example, could be given responsibility for soldering parts; another could be given sole responsibility for testing transistors. So that workers would not view their contributions as negligible or inconsequential, the manager could assign greater responsibility to workers or provide workers with more difficult or demanding tasks. Finally, it undoubtedly would be useful for the manager to go to workers individually and describe the necessity of their contributions, including the positive consequences of their working hard and the negative consequences should they loaf. The underlying message to each worker would be that his or her contributions are essential.

Last, to the extent that workers in the assembly plant withhold contributions to avoid the threat of being sucker to the free-riding attempts of others, the manager could raise produc-

tivity by minimizing or eliminating this threat. One way to eliminate this threat, discussed earlier under incentives, is to pay workers piecewise for each stereo assembled, a strategy that entails privatizing the collective good. As noted earlier, this solution can be effective, but only insofar as individual contributions are distinguishable. When contributions are indistinguishable, an alternative strategy is to make achieving the collective good dependent on all workers exerting high effort, a solution discussed earlier under indispensability. For example, in the assembly plant, the manager could establish weekly quotas for assembling stereos that are sufficiently high as to require that all workers exert high effort. In addition, the manager could offer an attractive incentive for every stereo assembled above and beyond the quota. Because withholding contributions would result in a failure to reach the quota and potentially could mean the forfeit of incentives, this strategy would eliminate the utility of free riding and, by extension, the threat of being the sucker of the free-riding attempts of others. Finally, because the cost of contributing is meaningful only insofar as it exceeds any benefit derived from exerting high effort, the manager may be able to counter low productivity arising from the threat of being a sucker by ensuring that the value of contributing exceeds the cost.

This illustration having been given, two caveats are in order. First, literatures in psychology, sociology, and management address the effects of factors such as individual versus group incentives, piecework versus hourly wage, task stability versus flexibility, and so forth in industrial settings. Although a more thorough discussion of this research would be desirable, it falls well beyond the scope of this article. At the same time, this illustration raises the possibility of using this three-part framework to integrate what have been separate research literatures in experimental social psychology on the one hand and management and industrial psychology on the other. Second, the factors influencing motivation and productivity in work settings can be more complex than suggested by this simple illustration. For example, one problem with providing incentives is that informal groups may impose sanctions on group members who exceed informal group production norms. These informal group norms may have a greater impact on production than do formal organizational standards. Thus, this illustration of the applicability of this model to real-world settings should be interpreted with caution.

Clearly, the specific strategies an employer, manager, group leader, or team leader uses to remedy low productivity in a given situation should be tailored to the particular circumstances of that situation. Nevertheless, regardless of what strategy or combination of strategies is used, productivity loss should be diminished if (a) there is sufficient incentive to contribute, (b) individuals perceive their own efforts as consequential in achieving a desired outcome, and (c) the costs of contributing are not excessive, exceeding the benefits derived from contributing.

Summary and Conclusions

This article presents a framework derived from expectancy theory for organizing the research on productivity loss in performance groups. Rather than focusing on the growing number of

parameters that identify when individuals will and will not contribute, the present article characterizes lost productivity as a problem of low motivation arising when individuals perceive no value to contributing, perceive no contingency between their contributions and achieving a desired outcome, or perceive the costs of contributing to be excessive. Three broad categories of solutions, corresponding to each of the three sources of low productivity, are discussed: (a) providing incentives for contributing, (b) making contributions indispensable, and (c) decreasing the cost of contributing.

A question raised earlier was whether parameters such as personal involvement and identifiability enhance productivity by appealing to or satisfying the same psychological motive and whether task characteristics such as difficulty, uniqueness, and attractiveness represent distinct parameters. This three-part framework proposes that the answer to this question comes from examining which solution to low productivity each parameter addresses and by suggesting that parameters that appeal to the same solution are similar. As such, the parameters of task difficulty and task uniqueness are similar because they increase indispensability, appealing to the expectancy component of contributing. Likewise, the parameters of personal involvement and identifiability are similar because they provide incentives for contributing, appealing to the value component of contributing.

There is reason to expect that any one solution by itself will be insufficient to counter low productivity among individuals contributing to a collective. Specifically, making individual contributions indispensable is unlikely to be effective if contributors derive no value from contributing or view the cost of contributing to be excessive. Conversely, offering an incentive for achieving the desired outcome will have little impact on contributing if contributors perceive the desired outcome to be unattainable. Thus, consideration of all three solutions seems necessary before individuals will be motivated to contribute high effort to the collective.

Given the similarity between social dilemmas and the problem of low productivity in performance groups, the present framework may be applicable to the larger social dilemma literature. Indeed, many of the strategies proposed as solutions to social dilemmas fit within the present framework. For example, solutions proposed by social dilemmas researchers such as rewarding individual contributions (Messick & Brewer, 1983), promoting group identity (Kramer & Brewer, 1986), appealing to altruistic concerns (Orbell & Dawes, 1981), or appealing to concerns with duty (van de Kragt et al., 1986) can be viewed together as means of providing individuals with incentives that increase the value of contributing. Conversely, solutions such as making individual contributions necessary (van de Kragt et al., 1986) or consequential (Lynn & Oldenquist, 1986) can be regarded as ways of making contributions indispensable, thereby increasing the contingency between contributing and achieving a desired outcome. Finally, solutions such as punishing defection, privatizing the collective good, and promoting trust in others (Messick & Brewer, 1983) can be thought of as solutions that ultimately reduce the cost of contributing arising from viewing oneself as the sucker of the free-riding attempts of others.

Some may question the usefulness and fruitfulness of devel-

oping a framework organizing the literature on productivity loss in performance groups, suggesting that it may result in a confirmation bias and impede the progress of research (Greenwald & Pratkanis, 1988; Greenwald, Pratkanis, Leippe, & Baumgardner, 1986). Yet, given that investigators have been conducting research on productivity loss in performance groups in earnest for over 15 years, an organizational framework seems overdue. Rather than impeding the progress of research, this framework is designed to serve as a catalyst for new research, exposing gaps in the literature and revealing important questions and directions for future investigations. Moreover, this framework potentially has several additional benefits. One benefit is in providing a reference point for understanding and evaluating existing and future research, a point from which redundancy in parameters can be detected more readily. A second benefit is in stimulating thinking about other forms of social dilemmas and perhaps serving as an impetus for new research there as well. A third benefit is in providing an organization that can be used in applying the research on productivity loss in performance groups to nonresearch settings.

There perhaps are other ways to organize the productivity loss literature. For example, one could use a straight cost-benefit analysis to explain when individuals will and will not contribute. Accordingly, people would be expected to withhold contributions from the collective when the costs of contributing exceeded the benefits. Obviously, the first and third categories of solutions described in the present framework (i.e., providing incentives for contributing and reducing or eliminating costs of contributing) fit readily into a cost-benefit model. Moreover, one can make the case that the research described in the second category of solutions (making contributions indispensable) also can be placed within a cost-benefit model. Specifically, as noted earlier, no study to date has truly examined the dispensability of contributions independent of the value of contributing. As such, it can be argued that the procedures used to manipulate the dispensability of contributions were effective because they also inadvertently manipulated the value of those contributions: Workers who perceived their efforts as dispensable may have withheld contributions because they saw little value in contributing for the collective; likewise, workers who perceived their efforts as indispensable may have made substantial contributions because they saw great value in their contributions for the collective.

The unintended confounding of the value of contributing on the one hand and the dispensability of those contributions on the other makes it difficult to completely rule out a cost-benefit interpretation of the research on productivity loss in performance groups. However, it is not clear that one could ever completely rule out a cost-benefit interpretation. Even if there were indisputable evidence that individuals will withhold contributions when they perceive no contingency between contributing and obtaining the collective benefit regardless of the value for the collective, a cost-benefit purist could claim support for a cost-benefit model. This is because a purist can always recast the expectancy component of the present model in terms of costs and benefits. Specifically, the purist could argue that contributions were withheld because the costs of contributing, when weighed against the improbable likelihood of achieving the collective benefit, were excessive. Obviously, this sort of

post hoc, reductionist argument does little to guide thinking or to provide direction for future research. Explaining contributing in performance groups in terms of costs and benefits explains away the very processes that are of most interest.

The previous paragraphs notwithstanding, perhaps the most pressing goal for current researchers is to vary the likelihood that personal contributions will benefit the collective (i.e., the likelihood that the collective will obtain the benefit on the basis of the person's actions) while holding the value of those contributions constant. Presumably, such procedures would demonstrate the effectiveness of the indispensability of contributions in remedying low productivity independent of the value of those contributions.

In summary, the problem of low productivity, its sources and solutions, has held a central position in the study of performance groups for some time. The framework proposed here presents a tentative organization of this research, one that provides structure for thinking about the existing research and directions for future investigations.

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