13 Group Performance and Leadership

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KEY CONCEPTS

brainstorming
cognitive restriction
cognitive stimulation
contingency approaches
coordination losses
eureka effect
free-riding
group composition
group leadership
group learning
group-level learning (G–G transfer)
group performance management
group synchronization
group task type
group-to-individual (G–I) transfer
group-to-individual-in-group (G–IG) transfer
hidden profile
individual capability gains and losses
individual-to-individual (I–I) transfer
Köhler effect
laissez-faire leaders
leader traits
leaderless groups

CHAPTER OUTLINE

In this chapter we examine the question of how social interdependence and social interaction affect group performance. More specifically, we provide answers to the following questions: How can we identify group-level influences on performance? What are the major pitfalls and opportunities for performance when people work together in a group? What can we do to systematically optimize group performance? Why is leadership so critical for group performance, and how can it contribute to the optimization of group performance? We answer these questions by outlining the basic underlying principles, applying them to specific group tasks, with examples, and selectively illustrating them with empirical research.

leadership (in organizations)
leadership behaviour
leadership effectiveness
leadership style
motivation losses and gains
nominal group
potential group performance (group potential)
production blocking
Ringelmann effect
shared or team leadership
social compensation
social competition
social loafing
sucker effect
team awareness
transactional leaders
transformational/charismatic leaders

Introduction

We all often work in groups. Some of these groups are informal, as, for example, a group of students preparing for an exam. Other groups are more or less formal, for example, a work team on the production line, a personnel selection committee or a sports team. Thus, work in groups is an essential part of our society. Whereas in some cases groups are indispensable to perform a specific task (e.g., you can only play volleyball in a team), in many other cases groups are used because we expect them to raise performance on a specific task. For example, personnel selection might also be carried out by a single person, but we often believe that a group of people will make better selection decisions. To see whether such assumptions are correct, we have to find out what determines group performance and how group performance compares with performance in an individual setting.

The comparison of group vs. individual performance is a fundamental question in social psychology and actually triggered some of the earliest experiments in the field (e.g., Ringelmann, 1913; Triplett, 1898; see Chapter 1, this volume). As it has turned out, the relation between group and individual performance strongly depends on the type of task. For example, we would all expect that the more heads involved in solving a problem, the greater the chances of the problem being solved. However, most of us would not claim that a climbing team will climb a mountain faster the more people are involved.

In addition, simply comparing individual performance with group performance is often misleading. Imagine the following situation. You investigate weight pulling and find that individuals pull an average weight of 100 kg, whereas four-person groups pull an average weight of 105 kg. Here, group performance is superior to individual performance. Will this finding make you praise the benefits of group work? We suspect the answer is 'no'; instead, this result might make you wonder what has happened in these groups that led to their performance being only slightly above that of individuals. Thus, what is needed to determine whether group performance raises or lowers individual performance is an appropriate standard against which to compare this performance. As we

(a)

(b)

(c)

Plates 13.1a, b and c *Different kinds of groups: a work team on the production line, a sports team and a personnel selection committee.*

will see, the appropriate baseline is again strongly dependent on the type of task. For example, you might expect the four-person group to pull four times the weight of an individual, but you wouldn't expect them to climb a mountain four times faster or four times slower than one person.

With that in mind, we introduce the core concepts of actual group performance, potential group performance and different task types in the next section. In particular, we outline how potential group performance is defined for different types of tasks and how this potential changes with group size. In the third section, we deal with the psychological processes that determine how groups perform against the standard of their potential performance. In particular, we describe several *process losses* that make groups perform below their potential, and also outline several *process gains* that make them surpass their potential. As we further show, the relative prevalence of process losses vs. process gains in groups depends on how group performance is *managed*, that is, how groups are designed and how their process is being controlled. In the fourth section, we will describe three basic principles of group performance management, namely *group composition*, *group synchronization* and *group learning*, which facilitate process gains rather than process losses.

The extent to which these principles are realized depends on many factors. We highlight one factor – leadership – that is particularly important in this context. Therefore, in the fifth section we give a brief introduction to leadership concepts and leadership research, and in the sixth section we outline how leadership affects group performance via the principles of *group performance management*. In the final section we summarize the core messages of this chapter.

SOME CORE CONCEPTS: ACTUAL GROUP PERFORMANCE, GROUP POTENTIAL AND TASK TYPE

What performance potential do groups have for different types of task?
How does group size affect performance potential?

Actual and potential group performance

As outlined, a meaningful evaluation of group performance requires a baseline against which one can judge that performance. Naturally, group performance depends on individual performance: the better the group members are, the better – on average – group performance will be, and this also implies that what makes individual members better will – again on average – also make the group better. This individual component of group performance, however, is not what social psychologists are interested in. Instead, they are interested in the group component of group performance, that is, the question of how this performance is affected by group members' awareness that common outcomes also depend on what other group members do (social interdependence) and on their interaction with these other group members (social interaction).

To determine this group-specific component, we have to know what performance would have occurred if the same members had worked independently of each other (i.e., not as a group). This latter performance will be labelled ***potential group performance*** or (more simply) ***group potential***. The potential is contrasted with how the group actually performs, which is called *actual group performance*.

potential group performance (group potential) the performance that would have occurred if the members of a group had worked independently of each other and not as a group; a common benchmark to evaluate actual group performance

This group potential is determined in two steps. The first is to measure how the same group members or similar persons perform individually. The second is to combine these individual contributions into a (hypothetical) group product. As we will see, this second step depends strongly on the type of task under investigation.

Table 13.1 *Important types of unitary group tasks and their implications for group potential*

Task type	*Examples*	*Group potential*
Additive	Pulling a rope; brainstorming; shovelling snow	Sum of members' individual performance
Disjunctive	Problem solving; decision-making; mathematical calculations	Best member's individual performance
Conjunctive	Mountain climbing; precision work; keeping something confidential	Weakest member's individual performance

Basic types of group tasks and their implications for group potential

Dimensions of group tasks In his seminal classification of ***group task types***, Steiner (1972) distinguished three dimensions. The first refers to whether the task is *unitary* or *divisible*: divisible tasks allow for the assignment of different subtasks to different members, whereas for unitary tasks all members have to perform the same task. The second dimension consists of whether the ultimate focus of task fulfilment is quantity (*maximization tasks*) or quality (*optimization tasks*). Finally, the third dimension classifies tasks by how group performance is related to the performance of each individual member. Here, Steiner made an important distinction between *additive*, *disjunctive* and *conjunctive* tasks.[1] We describe each of these tasks in some detail and show how group potential is defined for them (see the overview in Table 13.1). To further illustrate how group potential

group task type distinguishes group tasks depending on whether the task is divisible between group members, whether the quality or quantity of the output is relevant, and how individual contributions are related to the group's performance

PIONEER

Ivan D. Steiner (1917–2001) graduated from Central Michigan University before receiving a master's degree and a doctorate from the University of Michigan. He was a PhD student of Ted Newcomb, and later on he also taught social psychology at the University of Illinois. He spent the last 10 years of his academic career at the University of Massachusetts (Amherst). Steiner contributed greatly to the research on group performance and became famous for his classification of group tasks. Depending on how the individual's effort contributes to the overall performance of the group, he distinguished between additive, conjunctive and disjunctive tasks, each of which are affected differently by process losses and process gains.

works for each task type, we also explain how group potential changes with group size.

Additive tasks Additive tasks are those in which the performance of a group is simply the sum of their members' individual performances. Additive tasks are usually maximization tasks. Weight pulling is an example: the weight pulled by the whole group should be the sum of the weights that the individual members pull in this situation. Another example is ***brainstorming***: if a group has the task of generating as many ideas as possible about a particular topic, group performance is the sum of the different ideas generated by the individual members.

brainstorming a group technique aimed at enhancing creativity in groups by means of the uninhibited generation of as many ideas as possible concerning a specified topic

Hence, potential group performance is defined by the sum of member performances measured in an individual situation. As a consequence, group potential is higher than the best group member's individual potential and – for groups consisting of members with identical individual performance – it increases linearly with group size. This means that if you double the number of members in a group, you get twice the group potential as before.

Disjunctive tasks In a disjunctive task, a group has to choose one of several judgements or proposals. A good example is problem solving, where a group has to decide on one particular solution to a problem. Here, actual group performance depends solely on the quality of the one particular proposal which is chosen by the group. Due to this restriction, disjunctive tasks are usually optimization tasks, where quality matters. Potential group performance in disjunctive tasks is determined by the best member's individual performance. As group size increases, group potential also increases, but the increase in potential gained if another member is added to the group becomes smaller the larger the size of the group. If, for example, the individual chances of solving a problem are 50 per cent, a relatively large increase in potential is obtained if there are three instead of two members. In contrast, if you already have 20 members, adding another person changes very little.

eureka effect describes the situation when the correct solution to a problem, once it is found, is immediately recognized as being correct by group members

Disjunctive tasks are often differentiated into tasks with or without a so-called ***eureka effect***, which means that the correct solution, once found, is immediately recognized as being correct. A eureka effect increases the chances that a group will realize its potential: if the best member in the group is able to solve the problem, but the group fails to realize the correctness of his or her solution (no eureka effect), the group might choose a different, suboptimal option.

Conjunctive tasks Whereas in disjunctive tasks one successful member can be enough to solve the problem, a conjunctive task requires all group members to be successful for the group to complete the task. An example is climbing a mountain as part of a roped team. Suppose that in order to reach the peak the climbers have to pass a difficult overhang. The climbing team will only reach the peak if all members are successful in passing the overhang. Or, if we use the speed of a climbing team as a continuous measure of performance, we can say that the group is only as fast as its slowest member. The group potential for conjunctive tasks is given by the individual performance of the group's weakest member. As a consequence, group potential *decreases* with increasing group size, because the larger the group gets, the more likely it is to have a very weak member in the group.

Plate 13.2 *This group is only as fast as its slowest member.*

Hence, it can be ineffective to have large groups for conjunctive tasks. This problem is lessened if the conjunctive task is divisible and specific subtasks can be matched to group members' abilities. For example, the climbing party might decide that for difficult passages it would be useful to have the better members going ahead, fixing ropes and then helping the weaker members over these passages. In this case, potential group performance is higher than the individual performance of the weakest member.

SUMMARY

To determine group-specific influences on the performance of groups, we have to establish what performance would have occurred in the absence of group processes. This is given by the group potential. Determining the group potential depends on the type of group task. For example, in additive tasks (e.g., brainstorming), the potential is given by the sum of the members' performances in an individual situation. The group potential in a disjunctive task (e.g., problem solving) is determined by the quality of the best proposal individually generated by a group member. In a conjunctive task (e.g., mountain climbing), the group potential is given by the weakest member's individual performance.

PROCESS LOSSES VS. PROCESS GAINS IN GROUP PERFORMANCE

What processes influence whether actual group performance remains below or surpasses potential group performance? How does the occurrence of these processes depend on task type?

Types of process losses and process gains

Group potential and actual group performance often diverge. This divergence is due to *process losses* and *process gains*, both of which occur due to social interdependence and social interaction in groups. This is expressed in the following formula by Hackman and Morris (1975):

$$\text{Actual group performance} = \text{Group potential} - \text{process losses} + \text{process gains}$$

Thus, when actual group performance is below group potential, process losses must have occurred. If, in contrast, actual group performance exceeds group potential, process gains must have been present.

Different types of process losses and process gains can occur. For a group to perform, its members have to make individual contributions, and these contributions have to be coordinated. As a result, group processes can affect performance by influencing either the coordination of individual contributions or the individual contributions themselves. With regard to individual contributions, they depend on how much the person *can* contribute and how much the person is *motivated* to contribute. Hence, group processes can influence both group members' ability and motivation to contribute to the group product. In sum, we have three levels of process losses and gains, namely *coordination*, *motivation* and *individual capability*.

Coordination losses By definition, coordination in groups can only lead to process losses, not to process gains. This is due to the fact that, as outlined, group potential is measured on the basis of an *optimal* combination of individual contributions.[2] Consequently, ***coordination losses*** are said to occur if a group fails to optimally coordinate its members' individual contributions. For example, in his classic investigations of group performance in physical tasks, Ringelmann (1913) found that the average individual weight that people pull when performing such a task in a group decreases as the size of the group increases, the so-called ***Ringelmann effect***. An illustration of one of his findings is given in Figure 13.1. Later investigations showed that this process loss is due to both insufficient coordination (members fail to exert their maximal effort at the same moment) and decreased motivation (individuals work less hard when they are part of a group) (Ingham, Levinger, Graves & Peckham, 1974). An experiment that disentangles coordination losses and motivation losses is described in Research close-up 13.1.

coordination losses describe the diminished performance of a group if it fails to optimally coordinate its members' individual contributions

Ringelmann effect describes the finding that in physical tasks such as weight pulling, the average performance of individual group members decreases with increasing group size

Another well-known coordination loss occurs in brainstorming. Osborn (1957) proposed that brainstorming in a group would lead to the generation of far more and better ideas than would be obtained if the same persons generated ideas individually. Experiments testing this assumption contain at least two conditions: in one condition, the participants come together in a group and conduct a brainstorming session. For example, the task could be to generate as many ideas as possible concerning ways to

PIONEER

Max Ringelmann (1861–1931) was professor of agricultural engineering at the French National Institute of Agronomy and director of the Machine Testing Station. His main field of research lay in determining the efficiency of work in agricultural applications. In what may be considered one of the first experiments in social psychology, he discovered a decrease in individual performance that occurs when the individual works in a group rather than alone. He also found that each group member's individual contribution to group performance decreases as group size increases. These findings are referred to as the Ringelmann effect.

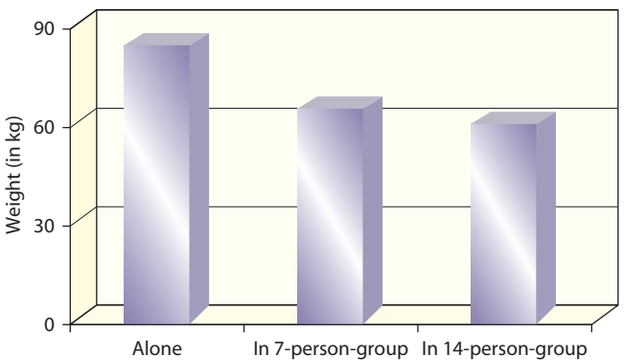
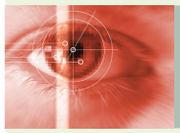


Figure 13.1 *Average individual weight pulled dependent on the number of persons pulling together (Ringelmann, 1913).*



RESEARCH CLOSE-UP 13.1

Why groups under-perform: separating coordination and motivation losses

Latané, B., Williams, K. & Harkins, S. (1979, Experiment 2). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, *37*, 822–832.

Introduction

The aim of this study was to replicate Ringelmann's findings of process losses in collective work using a different task, and to demonstrate to what extent the process losses are due to insufficient coordination vs. motivation losses in groups. Latané and his colleagues therefore conducted two experiments with a cheering and hand clapping task (see below). In the first experiment, they successfully replicated the Ringelmann effect by showing that the more people there were in a group, the less noise was produced per person. To distinguish between motivation and coordination, in Experiment 2, which we examine more closely below, Latané et al. used an elegant strategy, namely the introduction of 'pseudo-groups'. In a pseudo-group, participants are led to believe they are working in a group while actually working alone. Since no coordination losses are possible in this situation, all process losses found in pseudo-groups would have to be due to motivation losses (because individual capability losses are hardly possible with this type of task).

Method

Participants

Thirty-six male students participated in the experiment, with 6 participants per experimental session.

Design and procedure

The experimental design was a within-subjects design with five conditions. Each participant completed several trials (1) alone, (2) in actual two-person groups, (3) in actual six-person groups, (4) in two-person pseudo-groups and (5) in six-person pseudo-groups. The participants' task was to shout as loudly as possible when the experimenter gave a signal. They were blindfolded and wore headsets on which constant noise was played. This manipulation ensured that during the pseudo-group trials participants believed they were shouting with one or five other persons respectively, when in fact they were shouting alone.

Results

The data were analysed with two separate analyses of variance (ANOVAs), one comparing the individual trials with the actual two-person group and six-person group trials, the other doing the same for the pseudo-groups. Both analyses showed that the average noise produced per person decreased with the increasing number of persons. People shouted less loudly in the two-person groups than when alone, and they shouted less loudly in six-person groups than in two-person groups. This was true for actual groups as well as for pseudo-groups. However, the decrement in individual performance was about twice as high in the actual groups compared with the pseudo-groups (no statistical comparisons between these conditions were made). This relationship is illustrated in Figure 13.2. The decrements in sound intensity between shouting alone and shouting in a pseudo-group can be traced back to reduced effort, since no differences in coordination requirements exist between these conditions. In contrast, the differences between pseudo-groups and actual groups can be attributed to coordination losses such as, for example, group members not reaching their maximum sound intensity synchronously.

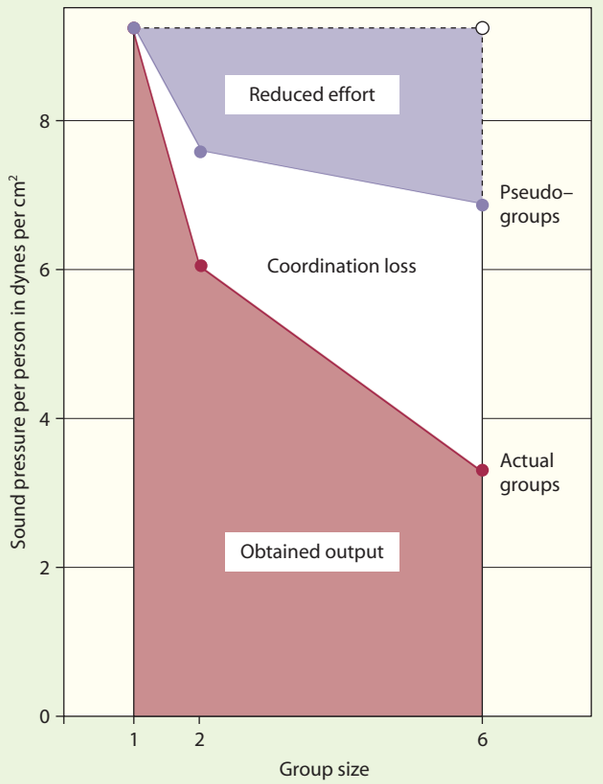


Figure 13.2 *Intensity of sound produced per person when cheering alone vs. in actual or pseudo-groups of two or six persons (Latané et al., 1979, p. 827).*

Discussion

The results demonstrate that, in accordance with the authors' hypotheses, coordination losses are not the only source of process losses when people perform a task collectively instead of individually or co-actively. Instead, reduced effort also contributes to this effect. Although one might object that no direct measures of motivation and coordination losses existed, it has to be conceded that the arrangement of the experimental setting and conditions hardly leaves room for alternative explanations of the observed performance decrements (e.g., cognitive interference among members is implausible). In sum, the study successfully demonstrates two reasons why groups may fail to realize their full potential.

nominal group a number of individuals who perform a task individually and work independently of each other. Nominal groups are used to determine the potential performance of groups

protect the environment. The other condition determines the group potential. This is done in ***nominal groups***. Nominal groups contain the same number of persons as the real groups do; however, each person is seated in a different room and asked to generate and write down ideas individually about the topic. The experimenter collects their lists and puts them together. Ideas that are mentioned by more than one member (redundant ideas) enter the list only once, because in a group the same idea would also be generated and counted only once.

In all of these experiments, brainstorming groups hardly ever reached the number of ideas generated by nominal groups; in most cases they were significantly below this group potential (for an overview see Mullen, Johnson & Salas, 1991). This disadvantage is not compensated by increased quality of ideas: on average, interactive brainstorming groups do not generate better (i.e., more creative or more practicable) ideas than nominal groups. As Diehl and Stroebe (1987) have shown in a series of experiments, the most important reason for this suboptimal performance in interactive brainstorming groups is a coordination loss called ***production blocking***: when people generate ideas in an interacting group, at any given time only one person can articulate her idea. During this time all other members are 'blocked' and are unable to express their own ideas.

production blocking a process loss typical of brainstorming tasks in face-to-face groups. Since in a group only one person can speak at a time, the other group members cannot express their own ideas at the same time

Coordination losses also occur in disjunctive or conjunctive tasks. For example, groups often fail to choose the best among their members' proposals, even if one member actually proposes the optimal solution. In a study by Torrance (1954), three-person groups were given several tasks, one of which was a problem-solving task with a definite answer. The participants were members of the US Airforce; each group consisted of a pilot, a navigator and a gunner. In a military aircrew, pilots have the highest status, whereas gunners are lowest in status. Torrance's results showed that if the pilot had found the correct solution prior to discussion, the group failed to choose this option in less than one out of ten cases. In contrast, when the gunner had found the correct solution, more than one-third of the groups failed to adopt this solution. Hence, the group's choice of one of their members' proposals was influenced by member status. Similarly, groups often prefer an incorrect solution proposed by the majority over a correct solution proposed by a minority (Smith, Tindale & Steiner, 1998; see also Chapter 11, this volume). In both of these examples the individual contributions would have allowed the groups to succeed, but successful coordination (choosing the right proposal) often did not occur.

Motivation losses and gains If actual group performance differs from group potential, this difference can be due to the fact that the group members' individual contributions become better or worse in a group setting compared to an individual situation. One reason for this is that working in a group can lower or increase people's motivation to contribute to task performance (***motivation losses and gains***). We first turn to motivation losses, three of which have so far been identified in group performance research:

motivation losses and gains decreases or increases in group members' motivation to contribute to group task performance

social loafing a motivation loss in groups that occurs when group members reduce their effort due to the fact that individual contributions to group performance are not identifiable

free-riding a reduction in group members' task-related effort because their individual contribution seems to have little impact on group performance

sucker effect a motivation loss in groups that occurs when group members perceive or anticipate that other group members will lower their effort. To avoid being exploited, they reduce their effort themselves

- ***Social loafing*** (Latané et al., 1979): Social loafing occurs if group members reduce their effort due to the fact that their individual contribution to the group product is not identifiable.
- ***Free-riding*** (Kerr & Bruun, 1983): In the case of free-riding, group members reduce their effort because their individual contribution seems to have little impact on group performance.
- ***Sucker effect*** (Kerr, 1983): The sucker effect occurs if group members perceive or anticipate that other group members lower their effort. To avoid being exploited (being the 'sucker'), they reduce their effort themselves.

Both the extent and type of motivation loss that occurs depend on task type. Additive tasks allow for all of the above-mentioned losses. For example, some members of the weight-pulling group could pull less hard because they believe that it is almost impossible to determine how hard each member has tried to pull (social loafing) or because they feel that – given the large number of group members – it will hardly make a difference how hard they pull (free-riding). At the same time, other group members might be aware of such tendencies and, thus, reduce their effort to avoid being the 'sucker'. These losses are typically stronger the larger the group size (Latané et al., 1979). Why is this the case? The larger the group, the more difficult it is to identify individual contributions, which gives rise to more social loafing and more suspicion that others will exploit one's performance. At the same time, the relative impact of each member's individual contribution becomes smaller with increasing group size.

In disjunctive and conjunctive tasks, social loafing is less of a problem because individual contributions in these tasks are normally visible: when a group solves a problem, it is more or less evident who came up with which proposal; and when a climbing team scales a mountain, it is evident who slows down the group. However, both free-riding and sucker effects can be a problem, especially if the group contains weaker and stronger members and the members are aware of these differences. In a disjunctive task, this awareness particularly pushes weak members towards free-riding, since they know that even if they invest a lot of effort, it is fairly unlikely that their contribution (e.g., their proposal) will be good enough to be chosen by the group. In contrast, stronger members know that they are expected to take responsibility for good performance and, thus, are particularly prone to feel they are

the 'sucker'. In conjunctive tasks, the opposite happens: here the stronger members are aware that their effort is not very important for group performance, because even if they invest less effort they should be able to perform at the level of the weaker members. Hence they tend to free-ride, which may cause problems if, by investing more effort, they could help the weaker members to perform better (Kerr & Bruun, 1983). If conjunctive tasks are divisible, such problems can be avoided by matching subtasks to members' abilities. However, since this means that stronger members get more to do than weaker members, this can also induce sucker effects among the stronger members, especially if their acceptance of the division of labour is low.

While most social psychological research on group performance has focused on motivation losses, more recent studies have established three motivation gains in groups:

social competition a motivation gain in groups that occurs if the group members want to outperform each other during group tasks in which the individual contributions are identifiable

social compensation a motivation gain in groups that occurs if stronger group members increase their effort in order to compensate for weaker members' suboptimal performance

Köhler effect a motivation gain in groups which involves weaker group members' working harder than they would do individually in order to avoid being responsible for a weak group performance

- ***Social competition*** (Stroebe, Diehl & Abakoumkin, 1996): If individual contributions are identifiable, group members can be more motivated during group performance compared to individual performance because they want to outperform other members. Social competition is particularly likely if group members have relatively equal abilities.
- ***Social compensation*** (Williams & Karau, 1991): Social compensation occurs if stronger members work harder in a group than they would do individually in order to compensate for a weaker member's suboptimal performance.
- ***Köhler effect*** (Köhler, 1926; Witte, 1989): The Köhler effect was discovered in the 1920s but remained largely unrecognized until Witte rediscovered it in 1989. A Köhler effect is said to occur if weaker members work harder than they would do individually in order to avoid being responsible for a weak group performance.

The occurrence of motivation gains also depends on the type of task. Social competition can operate within all task types as long as individual contributions are identifiable and comparable. As we have already pointed out, this is the case for most disjunctive and conjunctive tasks, but it is often not so in additive tasks. Hence, social competition is more likely to occur in disjunctive or conjunctive tasks than in additive tasks. In contrast, social compensation is mainly restricted to additive tasks because only in additive tasks can stronger group members really compensate for another member's weak performance. Finally, the Köhler effect is mainly restricted to conjunctive tasks, since only in conjunctive tasks can weaker members anticipate that an inferior group performance will be attributed to them by other group members (Hertel, Kerr & Messé, 2000). The effect is strongest if there are moderate discrepancies between group members' individual capabilities and they are aware of these differences (Messé, Hertel, Kerr, Lount & Park, 2002): if individual capabilities are almost equal, it is less clear who is to blame for an inferior performance. If, however, the discrepancies are very large, the weaker members hardly have any hope of being able to match the stronger members' performance.

In sum, within the same task type both motivation gains and motivation losses can occur. Thus, one of the challenges for group performance research is to find variables that determine whether gains or losses dominate. One key variable that has been found so far is the *importance of group goals*. Social compensation is particularly likely to occur if the common group goal is highly valued by members, otherwise motivation losses are more likely. This is well demonstrated in a series of experiments by Williams and Karau (1991). Participants performed an idea-generation task and were told that they were working with a partner (supposedly in another room) who, in fact, did not exist. The researchers manipulated whether participants expected their partner to show strong or weak performance and whether the performance goal (generating as many ideas as possible) was relevant to them or not. In addition, for half of the participants, the task was labelled a collective task (i.e., the number of collectively generated ideas would be counted), while for the other half the task was co-active (although performed with the other person, the number of individually generated ideas would be counted). The results are shown in Figure 13.3. When participants expected to work with a *strongly performing* partner, there was no need to compensate. In fact, those working on the collective task even engaged in a bit of social loafing: their performance was always below their potential (i.e., less than in the co-active situation) regardless of task relevance.

In contrast, if participants worked with a *weakly performing* partner, there was a need to compensate, but only when the task was both *relevant* (i.e., the outcome was important to them) and

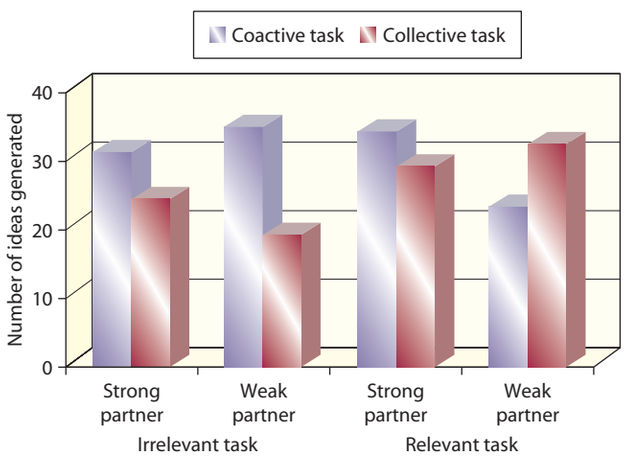


Figure 13.3 *Social loafing and social compensation as a function of task relevance and partner ability (Williams & Karau, 1991, Experiment 3).*

collective (i.e., joint productivity would be evaluated). In this condition, performance in the collective task was actually higher than in the co-active task: they performed beyond their potential. If, however, the group goal was irrelevant, there was a motivation loss instead of a motivation gain. Regardless of their co-worker's ability, participants produced fewer ideas in collective conditions than in co-active conditions. Similar effects can be expected for disjunctive and conjunctive tasks. For example, a Köhler effect should only occur if the group goal is important and, thus, the weaker members do not want to feel responsible for inferior performance.

Losses and gains in individual capability If group members contribute more or less than they would do in an individual setting, this can be due to the motivation losses and gains described above. However, the same effects can be due to the fact that the group setting influences their *ability* to make such contributions. Social interaction in a group may help members to make better contributions than they might have made individually, for example by other group members' providing intellectual stimulation or demonstrating effective strategies. However, social interaction may also have a detrimental effect on their individual capability, for example by restricting their attention or offering role models of ineffective strategies. Surprisingly, such ***individual capability gains and losses*** due to social interaction have so far been almost neglected in group performance research. As a consequence, compared to coordination and motivation losses or gains, there is a need for more research in this area.

individual capability gains and losses improvements or impairments in individual group members' ability to successfully perform a task due to social interaction with the group

Individual capability losses and capability gains, however, can be clearly illustrated in brainstorming tasks (e.g., Nijstad, Stroebe & Lodewijkx, 2002). If, for example, the task is to generate as many ideas as possible for promoting environmental protection, then hearing an idea from another group member about reducing traffic can make you focus on ideas for diminishing fuel consumption, whereas in the individual situation you might also have thought about sustainable development and other issues. Hence, if you fail to come up with ideas about sustainable development in the group situation, this is not due to the fact that you're not trying hard enough (motivation loss); rather, due to social influence, you simply aren't capable of producing these ideas at that moment. This socially determined capability loss can be termed ***cognitive restriction***. On the other hand, it is also possible that you would never have thought about reducing fuel consumption, and it was only after another group member came up with the idea of reducing traffic that you generated new ideas on this issue. Again, the reason for the difference between your contribution in an individual setting and in the group is not motivational: you don't try harder in the group setting, but stimulation from other group members makes you more capable of producing diverse ideas.

cognitive restriction a capability loss in group tasks that involve idea generation, which occurs when an idea mentioned by another group member makes people focus on the particular category this idea belongs to, at the expense of generating ideas from other categories

Plate 13.3 *Computer-mediated communication allows group members to brainstorm electronically.*

Thus, the corresponding socially determined capability gain can be termed ***cognitive stimulation***.

cognitive stimulation a capability gain in group tasks that involve idea generation, which occurs when an idea mentioned by another group member stimulates a cognitive category one would otherwise not have thought of

Since both cognitive restriction and cognitive stimulation effects can occur, brainstorming in groups can lead either to more uniformity (Ziegler, Diehl & Zijlstra, 2000) or to greater variety (Paulus & Yang, 2000) in idea generation. However, to demonstrate individual capability gains (stimulation), many of the well-known process losses in brainstorming – particularly production blocking – have to be eliminated first, otherwise they are so strong that individual capability gains are totally submerged. Such process losses can be eliminated, for example, by using computer-mediated communication (Dennis & Valacich, 1993): instead of brainstorming in face-to-face interaction, group members are linked together via a chat system. Since each member is free to type in ideas at the same time as other members, production blocking cannot occur and, hence, there are better conditions for cognitive stimulation.

For an overview of the different process losses and process gains discussed in this chapter, see Table 13.2.

Table 13.2 *Overview of process losses and process gains in group performance that have been documented in research so far*

Level of process	*Process losses*	*Process gains*
Coordination	Ringelmann effect Production blocking	–
Motivation	Social loafing Free-riding Sucker effect	Social compensation Social competition Köhler effect
Individual capability	Cognitive restriction	Cognitive stimulation

SUMMARY

If group performance is below group potential, process losses have occurred. If, instead, group performance exceeds group potential, then process gains have taken place. Process losses and gains are possible at three different theoretical levels: motivation, individual capability and coordination. Three types of motivation loss (social loafing, free-riding and the sucker effect) and three types of motivation gain (social competition, social compensation and the Köhler effect) have been shown so far. Far less frequently, research has demonstrated that individual capabilities can be restricted (capability loss) as well as stimulated (capability gain) in a group. Studies have focused almost exclusively on coordination losses so far, due to the fact that group potential is usually defined in terms of the optimal combination of group members' individual efforts.

GROUP PERFORMANCE MANAGEMENT

Why do process losses seem to be more frequent than process gains? How can group performance be optimized?

Three basic principles of group performance management

Over the last century, social psychological research on group performance has provided impressive evidence for process losses but far less evidence for process gains. This might suggest that negative aspects dominate when people work together in a group. In our view this conclusion is unjustified. Social psychological experiments on group performance predominantly use randomly composed ad hoc groups, with no further means or techniques of support accompanying the group process. Furthermore, experiments are usually restricted to one or, in some cases, two task trials. While these restrictions are useful for certain types of research questions (and often also have pragmatic reasons), they systematically disfavour groups in the evaluation of group performance. If you're comparing a car with a unicycle on speed or safety criteria, you would hardly use a car that had four randomly composed wheels with no means to synchronize them. In addition, you would hardly restrict your comparison to the first 10 metres. Unfortunately, this is analogous to what usually happens in group performance research.

Gaining insight into factors that disfavour groups is not only interesting for research purposes (e.g., to develop new research programs on group performance), it also provides a key to solving the problem of how to optimize group performance. If group performance is underestimated because no systematic ***group composition*** and support of group functioning take place, and because the time frame is too limited, then systematically optimizing these aspects should provide a promising way to optimize group performance. Accordingly, Schulz-Hardt, Hertel and Brodbeck (in press) term the sum of activities aimed at improving the group-specific component of group performance (i.e., maximizing process gains and minimizing process losses) ***group performance management*** and propose three basic underlying principles:

group composition specifies how certain characteristics are distributed within a group

group performance management the sum of activities aimed at maximizing (or improving) the group-specific component of group performance

1. Groups should be composed according to the requirements of task structure.
2. Group processes during performance should be specifically synchronized.
3. Groups should be given the opportunity to perform multiple similar tasks to allow for group learning to occur.

In the following sections, we briefly explain each of the three principles and give examples of how they can be applied to specific group tasks.

Group composition Group performance depends on the kind of people who are brought together in a group. This is true in a trivial sense, in that the more capable group members are of performing the task, the better the group will perform (in general). It is, however, also true in a non-trivial sense, in that certain compositions make it more likely than others that a group will fully realize or even surpass its potential, thereby realizing process gains.

To illustrate this principle, we take a look at an important task in group decision-making research, the ***hidden profile*** task. Consider the following situation. A personnel selection committee consisting of group members X, Y and Z has to decide which of the three candidates, A, B and C, should be chosen for a sales management position. The information about the candidates (advantages and disadvantages) and the way it is distributed among the committee is illustrated in Table 13.3.

hidden profile a group decision situation in which task-relevant information is distributed among group members in such a way that no individual group member can detect the best solution based on his or her own information. Only by sharing information within the group can the optimal solution to the task become evident

If the full information (the 'whole group' column in Table 13.3) is considered, candidate A is the best choice, with three advantages and two disadvantages, compared to candidates B and C (two advantages, three disadvantages). However, as becomes apparent from the first three columns, none of the committee members individually possesses this full information set. The advantages of candidates B and C as well as the disadvantages of candidate A are held by all group members prior to discussion; they are termed *shared information*. In contrast, each disadvantage of candidates B

Table 13.3 *Information distribution in a hidden profile task*

	Group member X	*Group member Y*	*Group member Z*	*Whole group (X + Y + Z)*
Candidate A	Good analytical expertise (+) **Lacks humour (–)** **Not very creative (–)**	Stays calm under pressure (+) **Lacks humour (–)** **Not very creative (–)**	Works well with the team (+) **Lacks humour (–)** **Not very creative (–)**	Good analytic expertise (+) Stays calm under pressure (+) Works well with the team (+) **Lacks humour (–)** **Not very creative (–)**
Candidate B	**Good communication skills (+)** **Known to be very reliable (+)** Tends to be short-tempered (–)	**Good communication skills (+)** **Known to be very reliable (+)** Often resentful in conflicts (–)	**Good communication skills (+)** **Known to be very reliable (+)** Refuses to do overtime (–)	**Good communication skills (+)** **Known to be very reliable (+)** Tends to be short-tempered (–) Often resentful in conflicts (–) Refuses to do overtime (–)
Candidate C	**Knows the market inside out (+)** **Works well with the team (+)** Inattentive in meetings (–)	**Knows the market inside out (+)** **Works well with the team (+)** Delays uncomfortable tasks (–)	**Knows the market inside out (+)** **Works well with the team (+)** Said to be arrogant (–)	**Knows the market inside out (+)** **Works well with the team (+)** Inattentive in meetings (–) Delays uncomfortable tasks (–) Said to be arrogant (–)
Implied choice	Either B or C	Either B or C	Either B or C	A

+ candidate's advantages; – candidate's disadvantages; shared information is indicated in bold.

and C as well as each advantage of candidate A is held by only one group member; these items are termed *unshared information*. Due to this distribution, prior to discussion none of the group members can detect that A is the best choice – it is 'hidden' from the group members, which is why this situation is called a hidden profile. This task is particularly important for group decision-making research, because it constitutes the prototype of situations where groups can make better decisions than individual members can. If, in contrast, the committee in our example had representative individual information that already implied candidate A to be the best choice (in which case it is called a *manifest profile*), making the decision in a group could hardly yield any surplus in decision quality.

Unfortunately, research has shown that most groups fail to solve hidden profiles (Stasser & Birchmeier, 2003). As Brodbeck, Kerschreiter, Mojzisch and Schulz-Hardt (2007) and Mojzisch and Schulz-Hardt (2006) have outlined, this failure is caused by three different processes, summarized in Figure 13.4. (To date, there is no solid evidence to indicate whether these processes

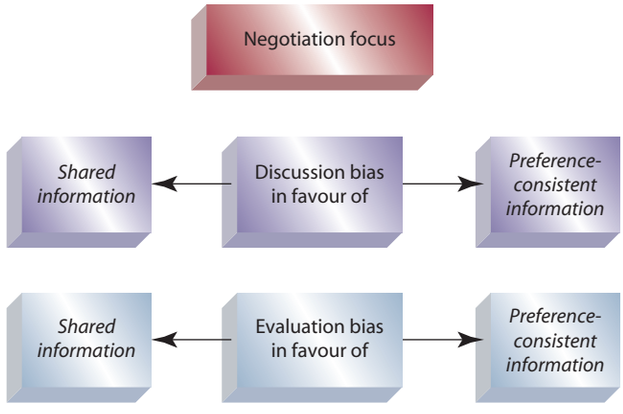


Figure 13.4 *Explanations for the failure of groups to discover hidden profiles (adapted from Brodbeck et al., 2007, and Mojzisch & Schulz-Hardt, 2006).*

constitute coordination losses, motivation losses or individual capability losses, so we do not categorize them as such.)

(1) *Negotiation focus*: Groups tend to negotiate the decision on the basis of their members' pre-discussion preferences rather than openly exchanging the relevant information (Gigone & Hastie, 1993). Because no member can individually detect the best alternative in a hidden profile prior to discussion, pre-discussion preferences are usually in favour of suboptimal alternatives (in our example, candidates B or C). Thus, one of the suboptimal alternatives is chosen by the group.

(2) *Discussion bias*: Even if the relevant information is exchanged in the group, this discussion is typically biased. Groups spend more time discussing shared than unshared information (Larson, Foster-Fishman & Keys, 1994), because shared information can be introduced by more members than unshared information. Furthermore, group members predominantly introduce or repeat information that is consistent with their initial preferences (Dennis, 1996; Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter & Frey, 2006), which can be due to a perceived 'advocacy role' (Stasser & Titus, 1985), that is, group members believe that their primary task in a discussion is to explain why they prefer a particular alternative. However, most of the critical information for solving the hidden profile is both unshared and inconsistent with the members' initial preferences (in our example, the advantages of candidate A and the disadvantages of candidates B and C). As a consequence, the group does not exchange enough of this critical information to detect the best alternative.

(3) *Evaluation bias*: The evaluation of information in the group is also biased in favour of shared and preference-consistent information: group members judge shared information to be more credible and valid than unshared information, because each member individually 'owns' the shared information (Chernyshenko, Miner, Baumann & Sniezek, 2003) – so one can be relatively sure that this information is correct – and shared information can also be socially validated by other group members (Wittenbaum, Hubbell & Zuckerman, 1999). Furthermore, they judge information that is consistent with their preferences to be more credible and important than information that is inconsistent with their preferences (Greitemeyer & Schulz-Hardt, 2003), because preference-consistent information is accepted at face value, whereas preference-inconsistent information is critically tested. As a consequence, even if all information is exchanged in the group, group members often undervalue the critical information and, thus, fail to detect the best alternative.

As recent studies have demonstrated, these processes and, thus, the chances of groups' solving hidden profiles depend substantially on a particular aspect of group composition, namely, consent vs. dissent in group members' individual pre-discussion preferences (see Brodbeck, Kerschreiter, Mojzisch, Frey & Schulz-Hardt, 2002; Schulz-Hardt, Brodbeck et al., 2006). Imagine you had two three-person groups in our personnel selection case. In one group, all three group members prefer candidate B (consent group). In another group, two members prefer B, whereas one member prefers candidate C (dissent group). With regard to group potential, neither group differs – in both groups, no member individually prefers the correct choice (candidate A). However, the dissent group should be less likely than the consent group to reach a premature consensus via negotiation. Furthermore, due to minority influence, there should be less bias in gathering information (Schulz-Hardt, Frey, Lüthgens & Moscovici, 2000) and its evaluation (Nemeth, 1986) in the dissent group (see also Chapter 11, this volume). To test these ideas experimentally, Schulz-Hardt, Brodbeck et al. (2006) first gave participants individual information about a hidden profile case. Groups with pre-discussion consent or dissent were then formed, based on the participants' individual preferences. Dissent groups were more likely to solve the hidden profile than were consent groups, even if none of the dissenting opinions was correct (i.e., in favour of the best candidate). This facilitative effect of pre-discussion dissent was mediated by a more intensive information exchange (less negotiation focus) and by less discussion bias.

Whereas composing groups with pre-discussion dissent is facilitative for performance in decision-making tasks, other tasks require other methods of group composition. For example, in a conjunctive task such as mountain climbing, it should be facilitative to have groups with moderate discrepancies among members' abilities, because this increases the likelihood of motivation gains among the weaker members (Messé et al., 2002) – and the weakest member determines group performance in a conjunctive task. So, if you had four climbers and had to split them into two two-person teams, teams of mixed ability should give better performance than teams of similar ability, in terms of facilitating process gains. Generally, whenever there is freedom to compose groups for particular tasks, the type of task should first be classified and then a group composition chosen that counteracts process losses and facilitates process gains for this task type.

Group synchronization Working together in a group requires generating or modifying individual contributions (e.g., physical effort, thoughts and ideas) collaboratively and integrating these different individual contributions in a way that is functional for high performance. For many tasks, we do not 'naturally' know how to do this or might even hold misleading preconceptions. For instance, for many people making a group decision means that everybody offers his or her preferred solution and states the arguments in its favour; finally the group chooses the solution with the most convincing arguments. As we have seen above, a group will hardly ever solve a hidden profile in this way.

group synchronization the sum of activities aimed at optimizing the collaborative generation, modification and integration of individual contributions in a group

Hence, just as four wheels need a differential in the axis to enable the vehicle to drive around corners, groups need synchronization to perform well. By ***group synchronization*** we mean the sum of activities aimed at optimizing the collaborative generation, modification and integration of individual contributions in a group. Means promoting group synchronization can vary from very simple tools (e.g., feedback about members' individual contributions) to rather complex procedures (e.g., group decision-making techniques).

As in the case of group composition, optimal synchronization depends on the type of task at hand. However, some means of group synchronization can be applied across a wide range of group

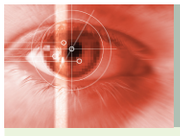
tasks. One of these is the *continuous visibility of individual contributions*. In a physical task such as pulling a weight, this can simply mean providing group members with feedback about their own as well as other group members' individual performance. In a cognitive task such as brainstorming or making a group decision based on distributed information, this can take the form of documenting group members' ideas and informational input on a documentation board or, as often used for these and other purposes, on an information board during computer-mediated group communication. In all cases, such permanent visibility of individual contributions counteracts motivation losses like social loafing or sucker effects and facilitates motivation gains due to social competition or Köhler effects (DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004; Hoeksema-van Orden, Gaillard & Buunk, 1998). It also facilitates coordination within the group, for instance by making it easier to identify the best proposal in a disjunctive task (Henry, Strickland, Yorges & Ladd, 1996) or by helping group members to match their own contributions to the contributions of other group members. Finally, in cognitive tasks, continuous visibility promotes individual capability gains by facilitating cognitive stimulation (Brodbeck, Mojzisch, Kerschreiter & Schulz-Hardt, 2006).

In contrast, some methods of group synchronization are unique for specific tasks such as group decision-making. As already outlined, our 'normal' preconceptions about how to make a decision in a group run counter to the way in which high-quality group decisions are actually made. Therefore, it can be useful to 'guide' group discussion on a decision problem by means of specific techniques. Some of these techniques are rather simple, such as dividing the decision process into an information collection phase and an information evaluation/decision-making phase. Even such simple guidance for the discussion process facilitates the solution of hidden profiles (Brodbeck et al., 2006). Other techniques are more complex. For example, dialectical techniques divide a decision-making group into two subgroups that are given different roles. Based on these roles, they act out a controversial debate independent of the members' real opinions. This facilitates stimulation by including arguments or information that hardly anyone in the group would have mentioned if group members had, as they usually do, acted on their own preferences. Indeed, such dialectical techniques raise the quality of group decisions (see Katzenstein, 1996).

Group learning The use of groups for a particular task is an investment, and the return on this investment often takes time to be realized. At the beginning, groups have considerably high costs, for example coordination losses due to the fact that group members are not used to working together on this particular task, or the effort of synchronizing the group adequately. If the group gains experience with the task over time, these costs should decrease and the chance of process gains should increase. Of course, individuals also increase their own performance if they repeatedly perform similar tasks. However, repeatedly performing similar tasks *in a group* allows for further learning processes (***group learning***) that cannot occur if people perform individually.

group learning a generic term for several learning processes that can only occur if several people co-actively or cooperatively work on the same task

That the group collaborative context can stimulate learning processes which result in improved performance on the part of both individual members *and* the whole group has been demonstrated by Brodbeck and Greitemeyer (2000a, b; see Research close-up 13.2). They identified four different learning processes within group collaborative settings.



RESEARCH CLOSE-UP 13.2

Different components of group learning

Brodbeck, F.C. & Greitemeyer, T. (2000a). A dynamic model of group performance: Considering the group members' capacity to learn. *Group Processes and Intergroup Relations*, *3*, 159–182.

Brodbeck, F.C. & Greitemeyer, T. (2000b). Effects of individual versus mixed individual and group experience in rule induction on group member learning and group performance. *Journal of Experimental Social Psychology*, *36*, 621–648.

Introduction

In two experimental studies Brodbeck and Greitemeyer investigated the effects of individual experience vs. mixed individual and group experience on individual and group learning (performance increments) in rule induction tasks. Rule induction is the search for descriptive, predictive and explanatory generalizations, rules or principles. Individuals or members of a group observe patterns and regularities in a particular domain and propose hypotheses to account for them. They then evaluate the hypotheses by observation and experiment and revise them accordingly. The experimental design allowed for the measurement of change in individual and group performance over consecutive task trials and various related variables, such as the exchange of hypotheses, error detection and error correction, the use of strategies for testing hypotheses, and so on. The level of task difficulty was manipulated across the two experiments in order to account for potential ceiling effects (i.e., maximum performance levels have been reached and thus no improvement in performance is possible).

Method

Participants

One hundred and thirty-two students (44 three-person groups) took part in the first experiment and 174 students (58 three-person groups) in the second experiment.

Design and procedure

Random series of eight and ten rule induction tasks were performed by sets of three participants randomly assigned to either *individual training* (performing all tasks in a nominal group) or to *mixed training* (alternating nominal and collaborative group task performance). Individual and group performance measures were taken across all tasks. For each task, a rule had to be induced that partitioned a deck of 52 playing cards with four suits (clubs = C, diamonds = D, hearts = H, spades = S) of 13 cards (ace = 1, two = 2, . . . , jack = 11, queen = 12, king = 13) into examples and non-examples of the rule. The instructions indicated that the rule could be based on suit, number, colour (red = r, black = b) or any combination of numerical and logical operations on these attributes (e.g., odd = o, even = e). The rule sequence length consisted of either three or four cards. First, the experimenter demonstrated a correct instance of the rule. Participants could then conduct a series of up to 10 'experiments', by presenting one card per experiment that they assumed constituted a correct continuation of the card(s) already on the table. For each card presented, they received feedback as to whether the card played was 'correct' (in line with the rule to be discovered) or 'wrong' (not in line with the rule to be discovered). Before presenting each card, participants formulated a hypothesis by writing down the rule that they thought plausible at the stage of their experimental sequence. There were four types of rules: (1) combination of suits (e.g., S-S-H-C), (2) combination of colours (e.g., r-r-b), (3) combination of odd and even numbers (e.g., e-o-e) and (4) combination of colour and odd vs. even numbers (e.g., ro-bo-re). The most difficult rule was S-S-H-C (32 per cent solution rate) and the easiest rule was r-r-b-b (71 per cent solution rate).

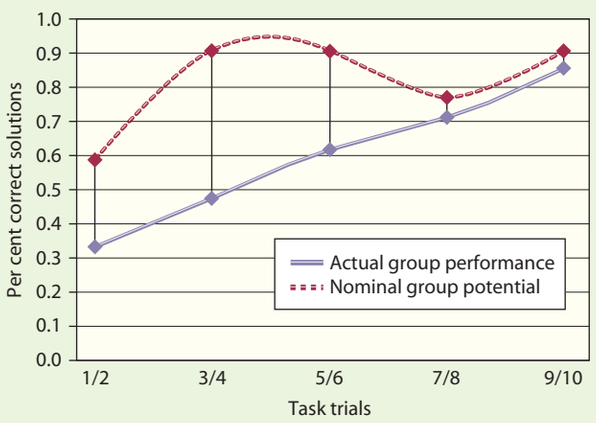


Figure 13.5 *Development of potential and actual group performance over consecutive task trials (Brodbeck & Greitemeyer, 2000a, Experiment 1:* ***Simple*** *rule induction tasks).*

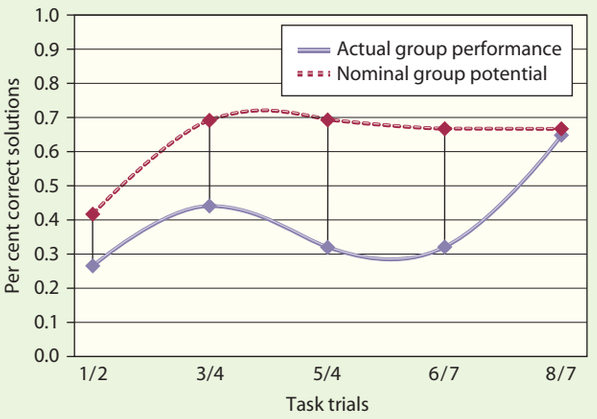


Figure 13.6 *Development of potential and actual group performance over consecutive task trials (Brodbeck & Greitemeyer, 2000a, Experiment 2:* ***Difficult*** *rule induction tasks).*

Results

As predicted, in both experiments nominal group performance improved as a function of improved individual resources for performing the task individually and (with some time lag) collective group performance improved as a function of collaboratively working in groups, thereby reducing or even eliminating process losses completely (see Figures 13.5 and 13.6, the last two task trials). In Experiment 1 a *ceiling effect* could have caused group performance to catch up with respective levels of individual performance in later trials. Thus, in the second experiment, more difficult tasks were used; there was no evidence of a ceiling effect due to nominal group performance reaching 100 per cent solution rates (see Figure 13.6).

Brodbeck and Greitemeyer (2000b) analysed in more detail the participants' formation of hypotheses about rules, their error-checking strategies and their success in finding correct rules. For example, in individual post-tests it was found that mixed training participants performed error checking more promptly and as a result generated fewer non-plausible hypotheses than did individual training participants. In the group post-test, mixed training groups were superior in collective error checking and more effective in collective truth detection than were individual training groups.

Discussion

The results demonstrated that group learning is a function of various sources of learning: (1) improvements in individual resources for performing the task individually (individual-to-individual (I–I) transfer); (2) improvements in individual resources as a consequence of prior collaboration (group-to-individual (G–I) transfer); and (3) individual learning to collaborate more smoothly and more effectively during collective task performance (group-to-individual-in-group (G–IG) transfer). Furthermore, the research demonstrated that process loss can be reduced or even eliminated when participants performed several task trials ($n = 5$) in a group collaborative context. The different learning processes identified by these experiments are further described and illustrated with examples in the main body of the chapter.

(1) *Individual-to-individual (I–I) transfer.* By repeatedly and individually performing similar tasks, individual learning takes place, that is, a relatively permanent change in individual behaviour or cognition, which usually results in performance increments. A performing group can profit from ***individual-to-individual (I–I) transfer*** because the group potential increases when the individual group members improve their abilities and skills in a way that affects their individual performance. For example, the level of potential performance of a party of climbers depends on the climbers' training, which they perform individually in order to be physically and mentally up to speed with the challenges on their next mountain tour.

individual-to-individual (I–I) transfer denotes individual learning processes whereby a group member's ability to perform a task on his or her own improves as a result of repeated individual task performance

(2) *Group-to-individual (G–I) transfer.* When individual resources for performing a task *individually* improve as a function of social interaction between group members during repeated collective task performance, this is termed '***group-to-individual (G–I) transfer***' (cf. Laughlin & Sweeney, 1977). G–I transfer comes about when, for example, the effectiveness of a task performance strategy becomes evident (demonstrable to others) in the group collaborative context. The strategy can be adopted by other group members who are not using it already, and thus can be profitably transferred to later individual task performance contexts. Imagine our party of climbers again. Sometimes the climbers perform parts of their training together so that they can exchange ideas about strategies to better 'read the wall', that is, to identify grips and holes and potential slips. In doing so, they increase their repertoire of technical skills individually, which comes in handy when they are up the mountain as a team.

group-to-individual (G–I) transfer denotes a group learning process whereby a group member's ability to perform a task *on his or her own* changes as a result of social interaction between group members during repeated collective task performance

(3) *Group-to-individual-in-group (G–IG) transfer.* If the individuals' resources for performing a task *collectively* improve as a function of prior collaborative task performance, then ***group-to-individual-in-group (G–IG) transfer*** takes place. With this type of transfer group-specific skills are learned that can be used in subsequent group performance situations. In the mountain climbing team this could, for example, mean that the members learn to support each other in finding the best possible grips and avoiding potential slips via communication, or to proactively correct each other's technical faults in climbing difficult overhangs. These individual skills for collaborative mountain climbing are transferable to a large extent to climbing as part of other teams as well.

group-to-individual-in-group (G–IG) transfer denotes a group learning process whereby a group member's ability to perform a task *within groups* changes as a result of social interaction between group members during repeated collective task performance

(4) *Group-level learning or group-to-group (G–G) transfer.* ***Group-level learning (G–G transfer)*** is a relatively permanent change of collective behaviour resulting in performance increments for a particular group. Although the term group-level learning suggests that the group as a whole learns, this does not imply that there is a 'group mind' or something similar that would be capable of such learning. Instead, and in accordance with the previous terminology, group learning might also be called group-to-individual-in-same-group (G–IsG) transfer. By repeatedly performing similar tasks in the *same* group, group members learn how to optimally match subtasks to their specific capabilities and how to coordinate with particular other group members.

group-level learning (G–G transfer) denotes a group learning process whereby a *particular* whole group's capability to perform a group task changes as a result of social interaction between its group members during repeated collective task performance

Only one group-level learning phenomenon in accordance with this criterion has been demonstrated so far: transactive memory in groups (Moreland, Argote & Krishnan, 1996; Wegner, 1987; see also Chapter 12, this volume). Transactive memory refers to a system of knowledge possessed by particular group members with shared awareness of each other's expertise, strengths and weaknesses ('knowing who knows what'). In the mountain climbing example, such group-to-group transfer would occur if the members had specialized in specific subtasks such as fixing ropes, helping weaker members during difficult passages or finding passages in unknown terrain, and if each member were aware of this specialization.

Due to these four group-learning processes, group performance should benefit more from repeated trials than individual performance does. In addition, over time it should become more likely that groups (1) increase their potential, (2) use their potential more optimally (reduce process losses), (3) perform at the level of their potential (no process loss, or process losses and process gains balance out) or (4) surpass their potential (process gains are larger than process losses). Direct empirical evidence for (1), (2) and (3) has been provided by Brodbeck and Greitemeyer (2000a, b). Solid replicable experimental evidence for (4) is not yet available.

The experiments on the dynamic model of group performance described in Research close-up 13.2 capture individual capability gains and reduction of coordination losses as a consequence of learning in groups. It is, however, plausible that the reduction of motivation losses and the development of motivation gains can also be 'learned' in groups. If the same group repeatedly performs similar tasks, group members become more familiar with each other and develop interpersonal trust. Interpersonal trust facilitates the pursuit of collective instead of individual goals (Dirks, 1999). As a consequence, group members should be less prone to social loafing or sucker effects, and should be more likely to show social compensation. Indirect evidence for this comes from a study by Erez and Somech (1996) showing that hardly any social loafing occurs in groups whose members have known each other for at least six months.

SUMMARY

In sum, our consideration of group performance and group learning has shown that effective group performance management requires an analysis of the task structure, followed by careful group composition and choice of adequate synchronization measures, both with regard to task structure. Furthermore, group learning should be facilitated by using the same group for a range of structurally similar tasks. As we have illustrated, these three basic principles affect all three categories of process losses and process gains by optimizing group coordination as well as stimulating individual motivation and capabilities during collective work. Figure 13.7 summarizes these effects.

So far we have investigated basic aspects of group performance, namely task types, group process gains and losses, and principles for the management of group performance, without referring to the structure of natural groups at work (i.e., work groups within their social settings, e.g., in organizations). We therefore turn next to a fundamental process for structuring group activity: leadership.

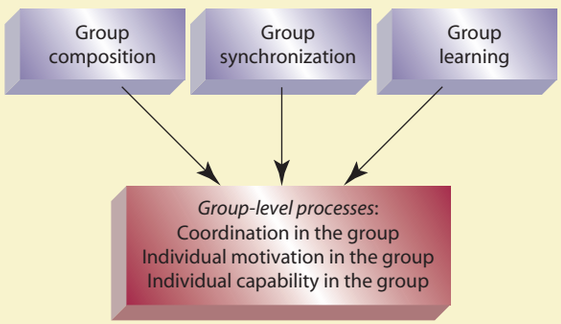


Figure 13.7 *The three basic elements of group performance management as affecting all three levels of performance-related group processes.*

LEADERSHIP

What makes leadership effective?
What are the major approaches to the study of leadership?

Leadership is about *influencing others*. This admittedly very short and broad definition is the only common denominator of the many definitions that exist in the leadership literature (e.g., Bass, 1990; Yukl, 2005). We define leadership in accordance with researchers from Project GLOBE, an international research program of some 170 scholars from more than 60 different countries, who study leadership across cultures (Chhokar, Brodbeck & House, 2007; House, Hanges, Javidan, Dorfman & Gupta, 2004). GLOBE researchers have developed a definition of leadership which specifies what is meant by 'influencing' others within organizational settings: ***leadership (in organizations)*** means *influencing, motivating, or enabling others to contribute towards the effectiveness of work units and organizations*.

leadership (in organizations) influencing, motivating or enabling others to contribute towards the effectiveness of work units and organizations

leadership effectiveness the impact of leadership on the accomplishment of group and organizational objectives, on the behaviour, perceptions, attitudes, values, motivation or well-being of followers and peers, and on the accomplishments of those who lead

The central questions that have received and continue to receive attention in leadership research are: How can we identify effective leaders? What makes leaders effective? How do leaders influence others? How are leaders perceived by others? How do leaders emerge and develop? Therefore, most leadership research focuses on at least one of the following criteria of ***leadership effectiveness***: (1) the impact of leadership on the accomplishment of group and organizational objectives (e.g., high-quality decisions, solutions to problems); (2) the extent of influence on followers that can be exerted via leadership (e.g., change in behaviour, attitudes, values, motivation, well-being); (3) the perception of a person as a leader in the 'eye of the beholder'; and (4) the emergence of a person as a leader and how quickly leaders are promoted to higher ranks in an organization. Here we focus on a specific question: How can leadership help to improve group performance? This question relates mainly to the first two classes of criteria of leadership effectiveness.

In this section we describe approaches to the study of leadership which cover major developments in the history of leadership research. For reasons of space, only a small selection of theories and research can be described. For broader coverage see Pierce and Newstrom (2003), and for comprehensive reviews see Bass (1990) and Yukl (2005). Thereafter, we develop a group performance perspective on leadership that integrates the research on group functioning described in the first part of this chapter with findings from leadership research.

Approaches to the study of leadership

The systematic study of leadership has been dominated by *leader-oriented approaches*, many of which were developed in the first half of the twentieth century. They focus on personality characteristics and behaviours of leaders in order to distinguish leaders from non-leaders and to identify effective leaders in organizations. From about the 1960s, *contingency approaches* were developed which incorporate relevant situational factors (e.g., characteristics of the organization, the task or the followers) for predicting the success of certain leader characteristics and leadership behaviours. The latest developments in leadership research emphasize the nature and dynamics of leader–follower relationships (e.g., *transformational-transactional leadership*) as well as *shared leadership* within work groups. For effective leadership in groups there is something to learn from all approaches described here.

Leader-oriented approaches The view of the leader as a 'hero' or a 'great person' has dominated leadership research for a

long time, and thus the study of leadership has mainly been the study of *leaders*, that is, their characteristics, skills and behaviours, on the one hand, and their effects on followers, groups and organizations, on the other.

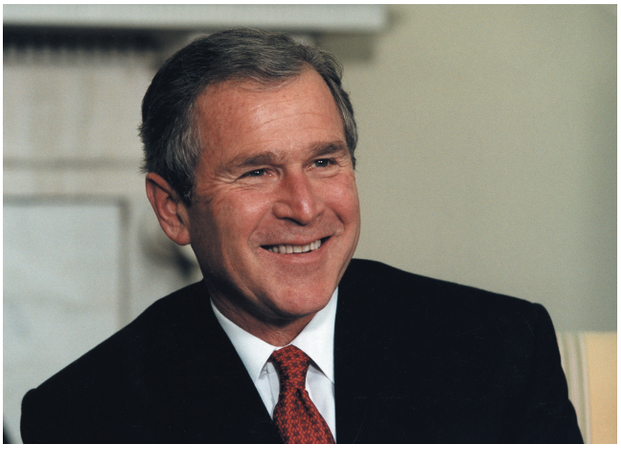
Leader traits. Since the pioneering systematic studies of leadership in the first half of the last century, a major proportion of research have focused on stable ***leader traits*** (e.g., personality, intelligence, motivational dispositions), on the basis of which leader emergence and leadership effectiveness may be predicted – following the idea that 'a leader is born, not made'. Today, relatively small but consistent correlations between effective or emergent leaders and the so-called 'Big Five' personality characteristics are reported (Judge, Bono, Ilies & Gerhard, 2002): for example, with Extraversion ($r = .31$), Openness to Experience ($r = .24$), Conscientiousness ($r = .28$) and Neuroticism ($r = -.24$) (the correlation with the fifth personality dimension, Agreeableness, is lower, $r = .08$). Intelligence was also found to relate positively to leader effectiveness ($r = .27$; Judge, Colbert & Ilies, 2004).

leader traits relatively stable person characteristics (e.g., personality, intelligence, motivational dispositions) which are thought to predict leader emergence and leadership effectiveness

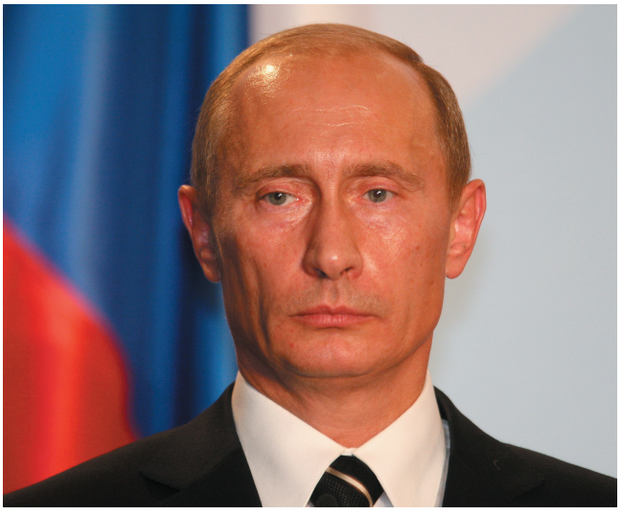
Only a few empirical studies have rigorously tested the assumption that personality traits have a causal impact on leader effectiveness or the emergence of an individual as a leader in an organization. The commonly used cross-sectional designs, by which measures of leader personality and performance are taken at about the same point in time, cannot test directional causal assumptions. With such correlational designs, the possibility remains that the commonly implied causal relationship (i.e., that personality has an influence on leadership success) may work the other way around. Individuals who find themselves in leadership positions more often than others, by being pushed into them by chance or because of their technical expertise (at school, in higher education, at work), may learn and develop the sets of skills, attitudes and behaviours necessary to succeed – or just to maintain their leadership position. By trying to satisfy respective role expectations and social norms typically applied to leaders, individuals are likely to develop or exhibit those personal characteristics that match expectations.

(a)

(b)



(c)



Plates 13.4a, b and c *What stable traits are characteristic of leaders?*

A general critique of leader-trait approaches is that they don't explain in sufficient detail how the link between person characteristics and leadership success is established: what are the variables that *mediate* this relationship?

Leadership behaviour. The search for variables that can predict leadership success better than personality traits shifted the focus of interest towards what leaders actually do – ***leadership behaviour***. During the late 1940s, two research programs began to work in this area independently of each other. They have shaped our understanding of leadership behaviour up to the present day. One was established at Ohio State University (e.g., Hemphill, Stogdill), the other at the University of Michigan (e.g., Likert, Katz). The two programs identified a large number of leader behaviours and grouped these into quite similar categorization schemes.

leadership behaviour observable acts that are meant to influence, motivate or enable others to contribute towards the effectiveness of a work unit or organization

The *Ohio group* sought to classify relevant aspects of leadership behaviours by assembling about 1,800 leader behaviour descriptions, which were subsequently reduced to about 150 items. A preliminary questionnaire was administered to thousands of employees in civic and military organizations, who indicated the extent to which their supervisors displayed these behaviours. The final questionnaire, called the Leader Behaviour Description Questionnaire (LBDQ), is a hallmark in the history of leadership research. By using factor-analytic methods to analyse patterns of relationships among all the LBDQ items, two independent dimensions emerged: *initiating structure* (i.e., task-oriented behaviours) and *consideration* (i.e., people-oriented behaviours).

Judge, Piccolo and Ilies (2004) conducted a meta-analysis of 200 studies, with 300 samples. They found that both consideration ($r = .49$) and initiating structure ($r = .29$) have moderately strong relations with leadership outcomes. Consideration was more strongly related to leader effectiveness ($r = .39$), followers' motivation ($r = .40$), satisfaction with leaders ($r = .68$) and job satisfaction ($r = .40$) than was initiating structure ($r = .28$, $r = .26$, $r = .27$, $r = .19$ respectively), and both were equally strongly ($r = .23$) related to group/organizational performance (see Judge, Piccolo & Ilies, 2004, p. 40, Table 3). The literature published prior to this meta-analysis indicated that initiating structure is more susceptible to situational differences than is consideration; for example, in some situations task orientation is positively associated with satisfaction, in others it even has negative effects (cf. Pierce & Newstrom, 2003). This may explain why in the meta-analysis reported above, where correlations were sampled across a whole range of different situations, correlations were weaker for initiating structure than for consideration.

The *Michigan group* characterized the four dimensions of leadership behaviour they identified – interaction facilitation, work facilitation, goal emphasis and individual support – as the 'basic structure of what one may term "leadership"' (Bowers & Seashore, 1966, p. 247). Their understanding of 'leadership' provides the foundation for a leadership perspective which differs considerably from leader-oriented approaches. While the Ohio group's research clearly focused on the individual (formal) leader, the Michigan group stated that effective work groups require the presence of each of the four classes of behaviours they identified, but *anyone* in a group can provide them successfully. These behaviours need not all be shown by one and the same (formal) leader as long as they are present in the work group to a sufficient extent. Because this view is of particular interest to our chapter's focus on group performance, we elaborate on it later in this section.

Cross-sectional designs are also commonly used for the empirical study of leadership behaviour. As was noted above, such designs do not allow us to make causal inferences about the direction of relationship between leadership behaviour and leadership success. Again, the true causal pathways may go in the opposite direction. For example, leaders may show more consideration behaviour because followers are already motivated and high-performing (Greene, 1975). Another threat to the correct interpretation of results from cross-sectional studies is the so called 'third variable problem'. For example, mutual sympathy between leader and followers, due to a match in personal values or sociocultural backgrounds, may have a similar positive impact on both leader behaviour and follower behaviour. Equally, mutual trust can lead to more consideration on the leader's part and to higher performance on the follower's part. Thus, an apparent correlation between consideration on the part of leaders and high performance on the part of followers can be caused by a third variable (mutual sympathy or mutual trust) that makes leader behaviour and follower performance *appear to be directly* linked with each other, when in fact they are not.

Problems with correctly interpreting results from cross-sectional studies are aggravated when relying on followers' self-report measures for leader behaviours (as occurs, for example, in the LBDQ) in conjunction with followers' perceptions of leadership effectiveness (e.g., their motivation, satisfaction with the leader or job satisfaction). In the worst case all these variables are assessed by asking the same followers (*common source effect*) and by using the same questionnaire as measurement instrument (*common method effect*). Under these circumstances, the strengths of relationships between leader behaviour and leader effectiveness are likely to be overestimated.

Contingency approaches Leader-oriented approaches which focus solely on leaders' traits and behaviours have a tendency to look for simple answers to complex problems. They can account for only a limited proportion of the variance in leadership effectiveness, because the effects of leader traits and behaviours are likely to average out across different situations that may require different types of leaders or different leader behaviours. ***Contingency approaches*** emphasize the role of situational factors and how these moderate the relationship between leadership traits or behaviours and leadership effectiveness, such as task characteristics (e.g., task structure, task complexity), followers' characteristics (e.g., their level of motivation, competencies, maturity) or characteristics of the social context (e.g., quality of social relationships, group cohesion, group size).

contingency approaches emphasize the role of situational factors in the study of leadership (e.g., characteristics of the task, the followers or the social context) and how these moderate the relationship between leader traits or leadership behaviours and leadership effectiveness

Many contingency theories have been proposed, each of which stresses the importance of a particular array of situational factors and different leadership characteristics (for reviews, see Bass, 1990; Yukl, 2005). One message contained in all contingency approaches is that leaders must be able to recognize, adapt to or change different situational circumstances, otherwise they may lose their influence on followers. To date, there is no unified theory from which we can derive the most critical situational factors that moderate relationships between leader characteristics and behaviours, on the one hand, and leadership effectiveness, on the other. We therefore describe here only one of the more widely cited contingency theories, *path-goal theory*, which has been presented by House and his colleagues (House, 1971, 1996; House & Mitchell, 1974).

Path-goal theory. Leaders are considered effective when their behaviour impacts on the subordinates' motivation, satisfaction and ability to perform effectively. A major concern of path-goal theory is how a leader influences the followers' perceptions of their work goals, their personal goals and the paths to goal attainment. To maximize their impact in these aspects, leaders need to master a range of leadership behaviours and use them flexibly depending on certain situational contingencies. Five classes of leadership behaviours are distinguished in newer versions of path-goal theory (House, 1996). *Clarifying behaviour* (e.g., about rewards and punishments, performance goals and means to achieve them) reduces role ambiguity and increases follower beliefs that effort in a certain direction will result in good performance, and that performance will be rewarded. *Work facilitation behaviour* (e.g., planning, scheduling, coordinating, guiding, coaching, counselling and giving feedback) eliminates roadblocks and bottlenecks, provides resources, stimulates self-development and helps to delegate authority to subordinates. *Participative behaviour* (e.g., consulting with subordinates, incorporating subordinate opinions in decision-making) increases followers' self-confidence and the personal value of job-related effort. *Supportive behaviour* (e.g., creating a friendly and psychologically supportive environment, displaying concern for subordinates' welfare) increases the followers' involvement with the work group and both organizational and goal commitment. *Achievement-oriented behaviour* (e.g., setting high goals and seeking improvement, emphasizing excellence, showing confidence in subordinates, stressing pride in work) increases subordinate confidence and the personal value of goal-directed effort.

The extent to which the described leadership behaviours are successful depends on two classes of contingency factors. (1) *Personal characteristics of the followers* (e.g., internal vs. external locus of control, self-efficacy beliefs, knowledge, skills and abilities) influence the degree to which followers see the leadership behaviour as a source of satisfaction or as instrumental to future satisfaction. (2) *Characteristics of the environment* (e.g., task structure, formal authority system of the organization, primary work group) are not within the direct control of followers but are important to satisfy their needs or their ability to perform well. For example, followers with an internal locus of control, high self-efficacy beliefs or high competence in their job respond more positively to participative leadership behaviour than do followers with external locus of control (who need more work facilitation behaviour), low self-efficacy (who need more supportive behaviour) or low job competence (who need more clarifying behaviour). Examples of leadership behaviour contingencies with characteristics of the primary work group are described in detail in the section below on group leadership.

Despite inconclusive research results and some conceptual deficiencies (e.g., House, 1996; Wofford & Liska, 1993), path-goal theory is still in use because it provides a valuable conceptual framework for identifying situational factors relevant to leadership effectiveness. The theory's underlying idea, that certain leadership behaviours are helpful and successful under certain circumstances, has been adopted in several newer leadership theories (cf. Pierce & Newstrom, 2003). Another idea that path-goal theory has infused into leadership research and practice is that the followers and their characteristics matter in the leadership process. Not only is their performance-related behaviour important, so too are their perceptions, cognitions and beliefs about work-related issues.

Transactional, transformational and charismatic leadership In the past 25 years a substantial amount of research evidence has been accumulated about what leaders and followers offer one another. ***Transactional leaders*** focus on the proper exchange of resources. They give followers something they want in exchange for something the leader wants (cf. Burns, 1978; Conger & Kanungo, 1998). ***Transformational and charismatic leaders***, in contrast, develop an appealing vision and focus on the alignment of the group or organizational goals with the followers' needs and aspirations in order to influence them to make sacrifices and put the needs of the organization above their own interests. ***Laissez-faire leaders*** offer very little to followers ('non-leadership'). They avoid making decisions, hesitate in taking action and are often absent when needed.

transactional leaders leaders who focus on the proper exchange of resources: they give followers something in exchange for something the leaders want

transformational/charismatic leaders leaders who focus on aligning the group or organizational goals with the followers' needs and aspirations by developing an appealing vision. The goal is to influence followers to make sacrifices and put the needs of the organization above their self-interest

laissez-faire leaders leaders who engage in 'non-leadership', e.g., they avoid making decisions, hesitate in taking action and are often absent when needed

Bass (1985) has refined the concept of transformational leadership into four subdimensions (known as the 4 Is of transformational leadership, because all dimensions begin with the letter 'I').

1. *Idealized influence*: Leaders behave in admirable ways (e.g., display conviction, display role-modelling behaviours consistent with the vision, appeal on an emotional level) so that followers tend to identify with them.
2. *Inspirational motivation*: Leaders articulate a vision (e.g., provide meaning for the work task, set high standards, communicate optimism about the achievability of the vision) which is appealing and inspiring to followers.
3. *Intellectual stimulation*: Leaders stimulate and encourage creativity in their followers (e.g., challenge assumptions, take risks, ask followers to put into practice their own ideas).

4 *Individualized consideration*: Leaders attend to each follower individually (e.g., act as a mentor or coach, listen to their concerns and needs).

The concepts of transformational leadership and *charismatic leadership* (Conger & Kanungo, 1987, 1998) have much in common (Judge & Piccolo, 2004). Charismatic leaders can be described as self-confident, enthusiastic leaders able to win followers' respect and support for their vision. They also show role-modelling behaviours consistent with the vision, take personal risks and express strong confidence in their followers. On the part of the followers, charismatic leadership results in, for example, *internalization* (i.e., followers adopt the leader's ideals and goals and become inspired to attain them because they are inherently satisfying) and *social identification* (i.e., followers create a connection in their minds between their self-concepts and the shared values and identities of their group or organization). For ease of description, our use of the term transformational leadership includes charismatic leadership, although we acknowledge that the different theories underlying each concept do make a clear distinction between them (e.g., Conger & Kanungo, 1998).

Transactional leadership consists of three dimensions underlying leaders' behaviour:

1 *Contingent reward*: Leaders set up constructive transactions or exchanges with followers (e.g., clarify expectations, establish rewards for meeting expectations).
2 *Active management by exception*: Leaders monitor follower behaviour, anticipate problems and take corrective action before serious difficulties occur.
3 *Passive management by exception*: Leaders wait until the followers' behaviour has created problems before taking action (cf. Avolio, 1999). Laissez-faire leadership represents the absence of leadership and thus can be differentiated from passive management by exception, where at least some leadership influence is exerted, although often after the damage is done.

The research on theories of transformational, transactional and laissez-faire leadership combines and complements the leadership-oriented and contingency approaches described above in four ways. First, it proposes that leadership is a process that is partially determined by leader traits, trainable behaviours and skills. Second, it identifies situational factors under which the different types of leadership vary in effectiveness. Third, it proposes a bidirectional influence between leader characteristics, on the one hand, and attributions of followers and how they react to the leader's characteristics, on the other. Fourth, it proposes that followers' responses to leadership are moderated and mediated by their needs, self-concepts, interpretations of goals and events, motivations and emotions.

Transformational and transactional theories of leadership have been tested with a whole variety of methods, including longitudinal studies, field studies and laboratory experiments. In a meta-analysis of 87 studies (total N > 38,000), Judge and Piccolo (2004) determined the contribution of transformational, transactional and laissez-faire leadership to the prediction of organizational criteria relevant to leadership effectiveness (follower job satisfaction, satisfaction with leader, motivation, leader job performance, effectiveness and group/organization performance). Overall, by combining the different effectiveness criteria, this analysis revealed that three leadership dimensions were positively related to outcome variables: transformational leadership ($r = .44$), transactional–contingent reward leadership ($r = .39$) and transactional–active management by exception ($r = .15$). In contrast, two of the leadership dimensions were negatively related to leadership outcomes: transactional–passive management by exception ($r = -.15$) and laissez-faire leadership ($r = -.37$). The authors conclude that contingent reward (transactional) leadership and transformational leadership predict outcome variables to a similar extent. This is troublesome considering that transformational–transactional leadership theory predicts that contingent reward will be reasonably effective, but not as effective as any of the transformational leadership dimensions (Bass & Avolio, 1994, p. 6). The superiority of one theory relative to the other seems to depend on the context. For example, Judge and Piccolo (2004) note that contingent reward leadership works best in business settings. Perhaps it is the resource-dependent nature of this kind of setting that is crucial, that is, business leaders are more able to reward followers tangibly (e.g., via financial incentives) in exchange for their efforts than are leaders in the other domains studied (universities/colleges, military settings, public sector). In situations in which leaders have access to fewer or no resources, contingent reward leadership may be less effective because it is more difficult for leaders to meet their side of the bargain. Thus, transformational leadership may be more robust in these settings than is contingent reward leadership.

Another observation from Judge and Piccolo's (2004) meta-analysis is that transformational and contingent reward leadership predicted leadership outcomes about equally strongly under weak research designs (leadership and outcomes were measured at the same time and with the same source). In contrast, under strong research designs (longitudinal designs and designs in which the leadership and the criterion were measured with different sources of data), transformational leadership predicted leadership outcomes more strongly than did contingent reward leadership.

SUMMARY

In this section we have reviewed various approaches to the study of leadership: leader-oriented approaches, which focus on traits; contingency approaches, which emphasize both situational factors and traits; and approaches to transactional, transformational and charismatic leadership, which combine and complement the trait and contingency approaches, conceptualizing leadership as 'a quality attributed to people as a result of their interrelations with others' (Smith, 1995, p. 358). This implies that leadership is inherent neither solely in people nor solely in the situational context. Instead, both categories of variables can be seen as conditions that facilitate or inhibit the expression of effective leadership processes. This view is in accord with Kurt Lewin's famous formula, $b = f$ (P, E), which identifies human behaviour (b) as a function of person characteristics (P) *and* characteristics of the environment (E). Note that both leaders and followers are to be seen in Lewin's formula as

person (P) and as part of the environment (E) within which they interact with each other. This is part of the reason why leadership is a complex social phenomenon and the scientific study of it is a very complex task.

Most of the approaches to the study of leadership focus on the leader as a person and less on 'leadership' as a process. For an exception, the leadership perspective taken by the Michigan group explicitly suggests that *anyone* in a work group can provide leadership functions. The more of the necessary leadership behaviours are effectively provided by group members, the less a (formal) leader needs to infuse them into the work group (and the less harmful are passive or laissez-faire leaders). We believe that it is in an organization's interest for their leaders to develop employees and whole work groups such that the group members facilitate each other's performance by also engaging in effective leadership behaviour. This comes very close to modern concepts of shared or team leadership, which are discussed in the next section.

LEADERSHIP IN GROUPS

Why is leadership critical for group performance?
How can leadership help to improve group performance?

The first researchers to turn their attention to how leadership can affect groups as a whole were Kurt Lewin and his co-workers, Lippitt and White. In a series of experiments they observed in detail how different leadership behaviours of adult leaders affected the 'social climates' of after-school clubs of 10-year-old boys (e.g., Lewin, Lippitt & White, 1939; White & Lippitt, 1976). They implemented three different ***leadership styles*** (i.e., a repeatedly shown pattern of leadership behaviour evident across a variety of situations): *autocratic leadership* (directive, non-participative, domineering behaviours), *democratic leadership* (participative, communicative, egalitarian) and *laissez-faire leadership* ('hands-off' leadership, with few attempts made to influence others at all). Not surprisingly, democratic leaders were liked more than autocratic or laissez-faire leaders. They created a group-minded, friendly and task-oriented atmosphere. In contrast, autocratic leadership resulted in more frequent hostile behaviours, but also in 'apathetic' patterns of behaviour with no instances of smiling or joking. Although the quantity of work done in autocracy was somewhat greater than in democracy, there were indications that work motivation was greater in democracy. There was more 'work-minded' conversation in democratically led groups and members continued to work hard, even when the group leader was temporarily absent. In contrast, members of autocratically led groups often stopped working when the leader left the room. Finally, there was some informal evidence that the work produced in democratically led groups showed higher levels of originality than under either of the other types of leadership. Note that laissez-faire was not the same as democracy: there was less work done, the work was poorer and less satisfaction with the laissez-faire leader was expressed. These findings show that leadership has an impact on how groups function as a whole, that there are more or less effective ways to manage groups, and that absence of leadership (laissez-faire) can seriously disrupt group activity.

leadership style a pattern of leadership behaviour which is repeatedly shown and evident across a variety of situations

Because we focus on characteristics of group functioning and how these can be facilitated by leadership, we define ***group leadership*** as influencing, motivating or enabling (oneself and) others to contribute towards the effectiveness and viability of work groups. This definition is also meant to comprise ***leaderless groups*** (e.g., self-managed work groups), which may be led by agents external to the group as well as by ***shared or team leadership***. The latter two concepts have recently been introduced into the leadership literature.

group leadership influencing, motivating or enabling (oneself and) others to contribute towards the effectiveness and viability of work groups

leaderless groups groups that have no appointed leader (e.g., self-managed work groups) but which may be led by agents external to the group or by shared or team leadership

shared or team leadership responsibility for leadership functions, the exercise of leadership behaviour and perceptions about leadership roles are shared among group members

Bradford and Cohen (1984) argued that the predominant conception of a 'heroic leader' undermines the principally positive effects of shared responsibility for leadership functions and empowerment of followers on leadership effectiveness. In contrast, *shared leadership* (e.g., Pearce & Sims, 2000) and *team leadership* (e.g., Sivasubramaniam, Murry, Avolio & Jung, 2002) denote group-level leadership concepts that go beyond the commonly held concept of a single leader, in that the responsibility for leadership functions, the exercise of leadership behaviour and the perceptions of leadership roles are shared among group members. These concepts complement the view of a singular leader who is more informed and confident than others with the view that leadership is a mutual influence process (e.g., Smith, 1995).

Based on the propositions about group functioning and performance described in the first part of this chapter, we argue that effective group leadership needs to ensure that the functions critical to (1) group and task design, (2) group synchronization and (3) group learning are taken care of. Note that there are further tasks that should be addressed by leadership in groups (Zaccaro, Rittman & Marks, 2001) which are not reviewed here. To our knowledge, these have, however, not yet been explicitly linked to social psychological theorizing and research about group performance and group decision-making.

Group and task design

According to the first principle of group performance management, group leadership requires that groups are composed in accordance with the requirements of the task structure (group design). At the same time, group leaders should attempt to (re)structure tasks in accordance with group composition (task design).

Wageman's (2001) study of self-managed teams demonstrated that effective group leadership is indeed a group and task design activity. The author measured the extent to which group leaders made sure that their work group was a 'real team', with clear membership, stable over time, and group members working in close physical proximity to each other. Furthermore, she measured whether leaders infused a clear direction, with few, memorable objectives that focused on the ends to be achieved rather than on the details of the means for achieving them. This study also measured to what extent leaders enabled an effective team structure, with adequate group size, sufficient skill variety (not too much heterogeneity so that coordination problems remained manageable), high task interdependence, challenging task goals, challenging performance targets, and clearly articulated strategies and norms for planning and decision-making. Finally, it measured the degree to which organizational context factors (e.g., quality of reward and feedback systems, adequacy of training offered and availability of resources needed) supported effective group functioning. Wageman (2001) used a sample of 34 self-managed teams to test the extent to which the desired leadership activities were linked with objective group performance criteria, obtained from company records. The more leaders engaged in the above-described task/group design activities, the higher was group performance and the more self-management was practised within groups.

A similar point highlighting the importance of a proactive team design in relation to team task objectives and leadership was made by Erez, Lepine and Elms (2002). These authors investigated learning groups of students whose purpose it was to share information and views freely for group discussion and group task performance. They found that teams that rotated leadership among their members had higher levels of voice (participation), cooperation and performance relative to teams that relied on leader emergence (usually the most dominant group member emerges as a leader in such groups). This is an example of how the way in which leadership comes about and is practised directly influences the manner in which the group members' resources are used.

Group synchronization

Group leadership implies the monitoring and management of ongoing group processes, for example the exchange of information, views and opinions and the social dynamics involved. The contribution of leadership to group synchronization has been most extensively demonstrated for information management during group decision-making. Via information management, effective leadership keeps the group focused on the problem at hand, facilitates communication, stimulates decision-relevant contributions and keeps them alive during discussion (e.g., Larson & Christensen, 1993; Maier, 1967). In a study on medical diagnostic teams, Larson, Christensen, Abbott and Franz (1996) investigated how designated leaders (the most experienced medical doctor per group) manage the processing of distributed information during group decision-making. They observed that

Plate 13.5 *How does the designated leader in a group such as this manage the processing of distributed information during group decision-making?*

leaders repeated unshared information (i.e., information held by only one group member) at a steadily increasing rate over time and raised more questions concerning concrete factual information than other group members did. In a follow-up study, again in the domain of medical decision-making, Larson, Christensen, Franz and Abbott (1998) replicated the above results and found positive correlations between information management behaviour and group decision quality. This is an example of how information management behaviours can counteract 'asymmetries' in the discussion and evaluation of information that were identified as a weakness of group decision-making (see Figure 13.4).

Larson, Foster-Fishman and Franz (1998) also explored the effects of leadership style on group decision-making. They trained individuals to display either directive or participative leadership behaviours. Directive leadership groups outperformed participative leadership groups only when their leaders possessed sufficient information favouring the best decision alternative. In contrast, when directive leaders possessed information that favoured a suboptimal choice (as did the information held by other group members), group decision quality deteriorated considerably. This was not the case in groups with a participative leader who managed the group in a way that encouraged more (shared *and* unshared) information to surface. In contrast, directive leaders tend to 'sell' their opinion by emphasizing their own unshared information that is consistent with their decision preference. Likewise, Cruz, Henningsen and Smith (1999) concluded from their hidden profile study that the quality of the group's choice depends on the quality of a directive leader's preferred decision alternative. Overall, these findings are in line with Vroom and Jago's (1988) notion that autocratic forms of decision-making are feasible only when leaders possess sufficient information to make a high-quality decision. Considering that in situations of a hidden profile most or all group members (including the leader) are likely to hold information that does not imply the best possible decision alternative, a directive

leadership style seems less functional for high-quality decision-making than does a participative leadership style. However, Larson, Foster-Fishman and Franz's (1998) study also demonstrates that a participative leadership style does not guarantee high-quality decision-making under all conditions of distributed knowledge. When the leader indeed knows best, directive leadership results in better group decisions than participative leadership does. Thus, wise leaders should know when they know best and when not and adjust their leadership style accordingly.

Group development and learning

Group leadership implies supporting group learning and development. For example, effective group leadership seeks to further the development of transactive memory systems by fostering a team learning orientation (Bunderson & Sutcliffe, 2003). This can be established by promoting mutual collaboration among group members and developing a decentralized communication structure instead of using directive leadership, which is associated with a communication structure that centres around the leader. In a decentralized transactive memory system, a large proportion of group members hold significant parts of the group knowledge. If knowledge is distributed, not centralized, a transactive memory system is less subject to disruption when, for instance, a centrally positioned leader is overloaded with work, cannot communicate with adequate frequency and thus is not able to transmit the group's knowledge adequately.

Interdependent work in groups entails uncertainty about others' motivation, competency and behaviours: will they do the work they said they would do? Will they perform to the standards set? Will they deliver their part in time? Especially in geographically dispersed groups, the continuous communication essential for sharing group knowledge and information about individual activities related to the task is difficult to maintain. This leaves members of geographically dispersed groups to cope with particularly high levels of uncertainty. Delays in remote communication make feedback about others' activities difficult to obtain. Delayed or inaccurate feedback requires several iterations for clarification. In face-to-face groups, feedback about others' activities is more immediate and can be obtained more easily, for example by observing who attends meetings or who participates in hallway communications. In contrast, members in distributed groups (called *virtual groups* because they mainly communicate electronically) may go for long periods without feedback about each other's activities.

team awareness understanding of the ongoing activities of others which provides a context for one's own activity

Team awareness is the group members' understanding of the ongoing activities of others which provides a context for their own activity. It reduces the effort needed to coordinate tasks and resources by providing a context to interpret communications and others' actions more adequately (Weisband, 2002). Leadership can foster the development of team awareness, for example by taking actions to monitor the progress of others and to include everyone by sharing the respective information. This helps to better cope with individual group members' work overload. Weisband (2002) studied leadership influence on team awareness with geographically dispersed student project teams working on a four-week project (writing a consensus policy document) via email and a web-based conferencing system. The more the above-described leadership actions were *shared* (i.e., several group members engaged in the leadership activities), the more team awareness individual group members developed (i.e., they were better informed about others' activities) and the better was overall project performance. Developing team awareness among group members takes effort and time. It is an investment that becomes profitable after longer or repeated group task performance and under certain conditions, for example in distributed or virtual work teams.

In general, leadership for group learning not only means providing the training resources for each group member to learn to perform the job better individually (I–I transfer), it also involves developing a collaborative learning orientation where group members can discuss and improve each others' task performance strategies and behaviours (G–I transfer). Furthermore, the development of transactive memory systems and team awareness benefits from encouraging group members to reflect and constantly improve the ways they collaborate and interact with each other (G–IG transfer), and to learn about other group members' areas of expertise, strengths and weaknesses (G–G transfer). The more this knowledge and awareness are developed and leadership functions are shared within the group, the more likely it is that group members can support each other, fill gaps for each other, correct and manage each other's errors and anticipate and cope with capacity shortages on the part of particular group members before problems arise. All this improves group performance over time.

SUMMARY

In sum, group leadership means careful composition of work groups, proactive design of task structures and active synchronization of group decision-making processes and task execution in groups. Apart from an active coaching of individual group members (e.g., via transformational leadership), leadership functions in groups also comprise the systematic development of effective transactive memory systems and team awareness among group members (which may take some time). As the Michigan group has already shown, all these leadership functions do not necessarily need to be performed by just one (formal) leader. Especially when high task interdependence and geographically distributed virtual teamwork is involved, the shared performance of leadership functions seems to work best.

SUMMARY AND CONCLUSIONS

In this chapter we have reviewed basic group processes and leadership that influence group performance. With regard to the specific questions outlined in the introduction, the following conclusions can be derived from this review.

- *How can we identify group-level effects on performance?* Group performance is, first and foremost, influenced by individual performance. Group members' individual performances (or abilities) constitute the basis for the definition of potential group performance. Potential group performance differs based on task type (e.g., additive, disjunctive and conjunctive tasks) because individual contributions are differently related to group performance for these different task types.
- *What are the major pitfalls and opportunities when people work together in a group?* Actual group performance diverges from potential group performance due to process losses and process gains. Process losses are coordination losses, motivation losses and individual capability losses; process gains are motivation gains and individual capability gains. These processes constitute the group-level influences on group performance.
- *What can we do to systematically optimize group performance?* Process losses can be reduced and process gains can be facilitated if three basic principles of group leadership are applied: composing groups in accordance with task requirements, synchronizing group members' efforts during collective performance and allowing for group learning across multiple task trials.
- *What makes leadership effective?* Leadership effectiveness depends on many factors: leader traits, leadership behaviour, situational factors (e.g., task, followers, social context) and whether leader–follower relationships are transformational, transactional or non-existent (laissez-faire leadership). Note that focusing solely on the leader as the focal point of leadership limits our understanding of the complex nature of leadership, which is a mutual influence process that can also be shared among group members.
- *Why is leadership so critical for group performance, and how can it contribute to the optimization of group performance?* Leadership, be it in the form of an individual leader or shared leadership, is about influencing others for the benefit of individual, group and organizational goals. Group leadership helps (or hinders) groups to optimize their performance.
- *How can leadership help to improve group performance?* Derived from the basic principles of group leadership, we identified three categories of situational contingencies that are important: composition (e.g., align group and task structure), synchronization (e.g., manage information and activity for reducing process loss and increasing process gain) and group learning (e.g., foster individual and group development by supporting all learning processes within groups).

As we mentioned at the beginning of this chapter, research on group performance was one of the very first topics that social psychology investigated. Some of the most intriguing current directions in this field include the systematic detection of process gains, the analysis of collective information processing in groups and the optimization of group performance via basic principles of group and shared leadership. We are confident that group performance and leadership will remain central topics of social psychology at the interface between basic research, applied research and the application of social psychological findings in organizations.

Notes

1 Steiner also included a fourth task type, the 'discretionary' task, but since this has not been a focus of empirical work we will not discuss it here.
2 It is debatable whether this approach leads to an overestimation of group potential and, thus, disfavours groups in the evaluation of their actual performance. Some authors actually discuss the possibility of coordination gains on the basis of different conceptions of group potential; however, this lies outside the scope of this introductory chapter.

Suggestions for further reading

Baron, R.S. & Kerr, N. (2003). *Group process, group decision, group action* (2nd edn). Buckingham: Open University Press. One of the best and most comprehensive introductions to the diverse facets of performance and performance-related processes in groups.

Pierce, J.L. & Newstrom, J.W. (2003). *Leaders and the leadership process: Readings, self-assessments and applications*. Boston: McGraw-Hill Irwin. In addition to concise descriptions of leadership theory and practice, this textbook contains many excerpts of classic theoretical and research-oriented papers, as well as self-assessments, practical applications and useful further readings in the domain of leadership.

Steiner, I.D. (1972). *Group processes and productivity*. New York: Academic Press. Steiner's book remains *the* classic and pioneering analysis of group performance on various tasks. Although more than 30 years old, many insights from this book are still highly relevant, and some of them still await their realization in group performance research.

Turner, M.E. (2001). *Groups at work: Theory and research*. Mahwah, NJ: Lawrence Erlbaum. This book's social psychological and organizational perspectives on the fundamental topics of group performance research are a useful tool for students and researchers who are interested in the organizational application of group performance research, and for practitioners who want to learn more about the theoretical basis of groups and group performance.

Witte, E.H. & Davis, J.H. (Eds.) (1996). *Understanding group behavior* (Vols. 1 and 2). Mahwah, NJ: Lawrence Erlbaum. These two volumes contain a series of insightful papers from well-known group researchers. They are particularly valuable to readers who would like to broaden the scope from 'pure' group performance research to many other facets of intragroup and intergroup behaviour that are nevertheless relevant for group performance.

Yukl, G. (2005). *Leadership in organizations* (6th edn). Upper Saddle River, NJ: Prentice-Hall. This classic book contains a comprehensive review of leadership theories and research. New editions appear regularly.