Collective Action Control by Goals and Plans: Applying a Self-Regulation Perspective to Group Performance

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In celebration of the 125th anniversary of *The American Journal of Psychology,* this article discusses a seminal publication by Marjorie Shaw (1932) on small group performance in the rational solution of complex problems. We then propose an approach for the effective regulation of group goal striving based on the collective action control perspective. From this perspective, group performance might be hindered by a collective intention–behavior gap: Groups fail to act on their intentions despite being strongly committed to the collective goal, knowing what the necessary actions are, and being capable of performing them. To reduce this gap, we suggest specific if–then plans (implementation intentions) in which groups specify when, where, and how to act toward their collective goal as an easily applicable self-regulation strategy to automate collective action control. Studies in which implementation intentions improved group performance in hidden profile, escalation of commitment, and cooperation task paradigms are reported and discussed.

With real-world applications ranging from corporate boardrooms to political decision making to scientific collaboration, group performance is a topic in social psychology that continues to be as relevant today as it was in its earliest years. On the occasion of the 125th anniversary of *The American Journal of Psychology,* this article showcases Marjorie Shaw's (1932) early contribution to research on small group performance and traces its continuing influence over time up to the present day. We present Shaw's small group study, place it in context by introducing other contemporary pioneering studies, and provide a necessarily selective review of the work on small groups that Shaw's work has influenced, including our own perspective on group performance, the collective action control perspective.

Group Performance: The Pioneering Work by Marjorie Shaw

Marjorie E. Shaw's article "A Comparison of Individuals and Small Groups in the Rational Solution of Complex Problems" (1932) was a highly influential social psychological empirical study on small group performance. In this study, two experimental conditions were realized: Participants worked either alone or together in a group of four on two sets of riddles. The riddles were complex, and participants had to find a correct solution for each riddle. Shaw reasoned

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that because each correct solution consisted of many steps and the answer would not be immediately apparent to any individual group member, the riddle tasks would encourage group members to interact. To report the group's solution and describe the discussion process, one member of the group was assigned the role of note taker. One of the riddles used in the study was "Three wives and three husbands want to cross a river in a boat that carries only three at a time. Only the men can row, and no husband will allow his wife to be in the presence of another man unless he is also present. How can they all cross the river?" Although Shaw revealed in her *Methods* section that seven steps are necessary (a fact of which participants were unaware), she did not provide the correct solution in her article. Because we do not want to deprive you of the fun of solving this riddle on your own (or in a group of four), we present our solution only at the end of this article. In our view, even after 80 years, Shaw's riddles are still challenging and seem well suited for the examination of group performance relative to individual performance. When they work on these riddles, participants' task-directed cognitions and motivational processes can be expected to differ between the group and the individual conditions for example, groups might bring together more ideas in comparison to individuals and might persist longer at trying to solve the riddles.

Shaw found that groups solved more riddles than individuals. For the second set of riddles, Shaw also investigated the mechanism underlying these group process gains, analyzing whether improved double-checking of solutions (leading to higher rejection rates of false solutions) could qualify as a potential mediator. To this end, she changed the task of the note taker: In addition to noting the suggested solutions and the final result, this participant was also asked to keep track of the checking of solutions for errors and the rejections made during group interaction. From the analysis of this data, Shaw concluded that the main benefits of working in a group on such tasks came from the checking of solutions for errors and the rejection of false solutions.

Shaw's Influence on Group Psychology

Before Shaw's study (1932), research had addressed either social influences on individual performance or individual performance versus group performance in rather simple motor tasks. For instance, Triplett (1898, also published in *The American Journal of Psychology*) observed that cyclists who competed with others outperformed those who raced individually, and Ringelmann (1913; see also Kravitz & Martin, 1986) showed that people who pulled a rope with others performed worse than those who pulled individually. However, not only did Shaw use an experimental approach to test her ideas, but she was also one of the first to systematically investigate the cooperation of participants in small groups (normally consisting of three to five participants who have the common goal of performing a given task) and to compare this group performance to individual performance. Moreover, rather than focusing on simple motor tasks, she examined the group's analytical abilities in the solution of complex problems. The combination of these factors—namely, the use of experimentation, the examination of small group interaction, and the application of complex cognitive tasks—allowed Shaw and subsequent researchers to gain insight into the processes by which group interaction affects group performance (e.g., hidden profile; Stasser & Titus, 1985, 2003; escalation of commitment; Dietz-Uhler, 1996; Staw, 1976).

As the field of group research has evolved, more sophisticated experimental and statistical methods have been developed that call into question Shaw's methods and findings (Lorge & Solomon, 1955; Marquart, 1955). Many researchers have criticized the method of comparing a group to single individuals, suggesting instead a comparison to an equal number of individuals (i.e., nominal groups). Although different control groups have been used (Hill, 1982) for the comparison of group and individual performance, performance aggregates such as nominal groups (Kerr & Tindale, 2004; Laughlin, 2011) are now largely considered the state of the art in research on group performance. In addition, in Shaw's experiments, one of the group participants (i.e., the note taker) recorded the time needed to reach a solution and took notes on the accepted and rejected solutions during the group discussion. Although coding qualitative group interactions for quantitative analysis is still standard procedure, modern devices now permit less intrusive record-

ing methods and the subsequent computation of interrater reliabilities

All in all, Shaw highlighted the investigation of small groups as an important field of research to social psychology, demonstrated the relevance of studying complex cognitive tasks, and worked hard to realize high experimental standards. These features have become the key elements of (social) psychological research on groups (Levine & Moreland, 2011). Considering these factors, it is hardly surprising that Shaw's article has been cited approximately 350 times (Google Scholar, December 1, 2011). Citations come not only from group researchers and social psychologists (Brodbeck & Greitemeyer, 2000; Dru, Rulence-Pâques, & Mullet, 2004; Laughlin, Bonner, & Altermatt, 1998; C. M. Smith, Bushouse, & Lord, 2010; Stasser, 1999; Thürmer, 2009) but also from scientists in neighboring disciplines, such as economics and organizational behavior (Cooper & Kagel, 2005; Milch, Weber, Appelt, Handgraaf, & Krantz, 2009), communication (Hollingshead, McGrath, & O'Connor, 1993; Keyton, 2010; Wittenbaum, 2003), sociology (Adejumo, Duimering, & Zhong, 2008), and law (Katyal, 2003; Seidenfeld, 2002). This evidence of Shaw's influence highlights that controlled laboratory experiments of small group researchers in the field of social psychology have significant spillovers to a variety of disciplines (e.g., industrial and organizational psychology, communication research, and sociology) and contribute to our understanding of a broad spectrum of phenomena (e.g., leadership; Lewin, Lippitt, & White, 1939; productivity; Mayo, 1949; consensus; Sherif, 1935) that necessitate a multimethod approach (e.g., field studies, questionnaires, interviews, simulations, and laboratory experiments).

Contemporary Perspectives on Group Performance

After Shaw's pioneering work on small groups, the research branched into a variety of subfields. Moreland, Hogg, and Hains (1994) suggested classifying these branches into five categories: (a) group composition, (b) group structure, (c) conflict in groups, (d) the ecology of groups, and (e) group performance. According to this classification, Shaw's research concerns group performance. *Group performance* refers to the outcome as well as the process by which groups attain a collective goal (Levine & Moreland, 1990). Examples of such collective goals are solving a riddle, deciding on the best possible alternative, or wisely investing a common budget over time (see Kerr & Tindale, 2004; McGrath, 1984). Research on group performance has found process gains in some contexts but has also consistently found process losses in other scenarios. For example, consistent with Shaw's findings, small groups have often been observed to outperform individuals in complex logic tasks (Laughlin, Bonner, & Miner, 2002; Laughlin, Hatch, Silver, & Boh, 2006; Laughlin, VanderStoep, & Hollingshead, 1991). However, group performance was inferior to individual performance when group members did not share or integrate all available information (Stasser & Titus, 1985, 2003), and when group members made decisions based on past investments rather than future prospects (Dietz-Uhler, 1996).

Groups Solving Complex Problems: Collective Information Processing

Researchers have further investigated group problem solving using logic tasks similar to Shaw's riddles. In such tasks, all members have access to complete information about the characteristics of the correct solution. In other words, finding the correct solution is difficult, but once it has been found, it can easily be verified. Shaw's main finding was that groups outperform individuals in such tasks: More solutions are suggested and subjected to verification, such that the correct solution is eventually determined. Laughlin and colleagues (Laughlin, 2011; Laughlin et al., 1991, 2002, 2006) extended Shaw's research by disentangling the other processes involved in the group advantage. They found that three-person, four-person, and five-person groups process more information in demanding letters-to-numbers problems than even the best individuals in comparable nominal groups. When it comes to solving complex task problems, the recognition and rejection of erroneous responses, the recognition and adoption of correct responses, and effective collective information processing have all been shown to contribute to the superiority of groups relative to individuals. However, under different circumstances and in different tasks, groups do not perform up to their potential.

Groups Making Informed Decisions: Suboptimal Information Sharing and Integration

Another task that groups perform is to make decisions about different alternatives (Hinsz, Tindale, & Vollrath, 1997; Stasser & Dietz-Uhler, 2001, 2008). For instance, choosing a new apartment for a relocation, selecting an applicant for a job, or diagnosing a disease—these problems require the integration of all the information available in order to make the best decision possible. Although it might seem that groups have the potential to make better decisions than individuals in such circumstances, this is often not the case when individuals already possess and correctly integrate all the information necessary to identify the best decision alternative.[1] A decision performance context in which groups can indeed outperform individuals is likely to possess two characteristics (Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt, 2007). First, group interaction can be beneficial if the group as a whole possesses more information than each individual, such that group members can learn from one another. This would be the case if some group members possess information that other members do not (i.e., *unshared information* exists). However, the existence of unshared information does not guarantee a benefit. The second requirement is that the unshared information should then lead to a different (and better) decision than would have been reached using only the information that all group members possessed individually at the outset (*shared information*). In other words, group discussions have the potential to result in better decisions when the full information available to the group points to a superior decision alternative than the partial information of the individual members would have. This implies that based only on individual information, a suboptimal alternative would have been preferred before the group discussion. Such group performance contexts are called *hidden profile* situations (Stasser & Titus, 1985, 2003).

Although hidden profile situations are performance contexts in which groups have an informational advantage over individuals, it has consistently been shown that groups fail to find the best solution, because unshared information is less likely to be mentioned and integrated. Two major mechanisms contribute to this process loss (Winquist & Larson, 1998). First, unshared information is less likely to be mentioned during a group discussion. This can be attributed to a quasiautomatic sampling bias: If three members possess an information item, it is more likely to be mentioned than an item possessed by just one member (Stasser, Taylor, & Hanna, 1989). Second, even if the unshared information is mentioned during the group discussion, it is less likely to be integrated into the decision, as it contradicts the suboptimal individual preferences that have been formed on the basis of individual information. New information is often processed in terms of existing preferences and can consequently fail to be successfully integrated, resulting in suboptimal decisions (Gigone & Hastie, 1993, 1997; Mojzisch & Schulz-Hardt, 2010). For instance, in a study by Christensen and colleagues (2000), medical team members individually watched different videotapes of a "patient" (a trained actor) describing his or her symptoms. The patient revealed some symptoms to all team members (shared information) but revealed other symptoms to one team member only (unshared information). For half the groups, the unshared information was crucial for an accurate diagnosis (hidden profile condition); for the other groups, the shared information was sufficient (control condition). After viewing the videos, the medical teams assembled to discuss the case and to diagnose the patient's disease. Whereas none of the control cases were misdiagnosed, about one third of the diagnoses in the hidden profile cases were incorrect—a mistake that could endanger a patient's life in a real-world scenario.

In sum, research has shown that groups often fail to capitalize on their informational advantage and consequently do not always outperform individuals (Gigone & Hastie, 1993, 1997; Greitemeyer & Schulz-Hardt, 2003; Greitemeyer, Schulz-Hardt, Brodbeck, & Frey, 2006; Stasser & Titus, 1985, 2003). Interestingly, this handicap persists even when group members are forewarned about the asymmetric information distribution in hidden profile situations (Stasser, Stewart, & Wittenbaum, 1995; Stasser, Vaughan, & Stewart, 2000). Although existing theories do not directly address this gap between group knowledge and behavior, the action control perspective can, as we will suggest later.

Groups Making Repeated Decisions: Escalating Commitment

In addition to making informed decisions about one-time events, groups are often required to make

a series of decisions in order to complete complex projects that extend over long periods of time. Real-world examples range from everyday work groups in the organizational context to the intricate coordination of planning committees crucial for highly ambitious projects, such as building the world's tallest building or putting a man on the moon. The situational context of such complex projects is often subject to extensive changes as time passes. As a result, not all the decisions needed to attain a goal can be made and implemented upfront. Instead, group members must regularly meet to decide on the next action step that should be taken toward their goal, in light of the current situational context. Such repeated decisions can be difficult in terms of the issues discussed earlier (i.e., because of the complexity of the problem or unfavorable information distribution). However, even without these obstacles (i.e., when complete information is available to each group member and the best decision is clear), the act of making repeated decisions itself imposes particular demands on a group: For each decision, the group must check the progress of its project and might need to adapt its strategy. Ideally, each decision should be based on the current status of the project and should not be influenced by previous decisions (Brockner, 1992). For example, at the start of a project, conditions might be perfect, calling for high levels of investment. However, over the course of the project, conditions could change and pursuit of the project might no longer be feasible. In this case, the project should be abandoned to save valuable resources (e.g., time, money, self-regulatory resources) for more promising endeavors. In other words, in such cases it is preferable to stop striving for a goal that is no longer achievable; commitment to such a goal must be terminated.

Surprisingly, both individuals and groups often fail in this regard; in fact, they escalate their commitment when they should instead disengage from their goal (Dietz-Uhler, 1996; Staw, 1976). In a now-classic study, Beth Dietz-Uhler invited students to act as a city's social council, charged with building a playground. In three rounds, the council received increasingly negative information items and made investment decisions based on this information. In light of the bleak outlook for the project, it would have been appropriate for the council to lower investment; nevertheless, groups consistently maintained and even increased their investment level.

For escalation of commitment to occur, decision makers must feel responsible for their initial decisions (Staw, 1976). In Staw's study, half of the participants made a repeated decision about the allocation of the budget of a fictitious company to different research and development (R&D) projects; the other half of the participants were presented with exactly the same information but only made a decision themselves at the very last stage. Before making the final decision, participants learned that the initially favorable projects had not lived up to their promise. Only those who had made all the decisions themselves escalated their commitment and invested in the failing R&D project. Importantly, it did not matter whether they had to justify their decision publicly (to others) or privately (only to oneself; Bobocel & Meyer, 1994). Other factors that contribute to the escalation of commitment include the effects of anticipated regret and the strength of members' identification with their group. The higher the possibility of future regret over withdrawal and the stronger the anticipation of future regret, the more likely participants were to escalate their commitment (Wong & Kwong, 2007). With regard to group identification, group members for whom the group was more important (i.e., high identifiers) were found to escalate their commitment more than those for whom it was not very important (i.e., low group identifiers; Haslam et al., 2006). This is unfortunate, as highly identified group members are very concerned about the performance of their group (Hogg, Abrams, Otten, & Hinkle, 2004).

In all, these findings have led to a thorough understanding of the phenomenon of escalation of commitment and its underlying processes. However, implementing measures to prevent escalating commitment, such as external oversight, divided responsibility techniques, or changes in group composition, can be difficult and limited in effectiveness. We will therefore propose the collective action control perspective as an easily applicable way to curb the inappropriate escalation of commitment.

When Knowing What to Do Is Not Enough to Improve Group Performance

Making repeated decisions and making decisions under conditions of unfavorable information dis-

tribution are both performance contexts that are challenging for groups. In both cases, assuming that group members share a collective performance goal and are sufficiently committed to it, prior research has identified factors contributing to suboptimal performance. These factors can be addressed in order to improve group performance. For example, building on Winquist and Larson (1998), groups can be expected to make more informed decisions when they exchange and comprehensively integrate all the information available. Similarly, according to Staw (1976), groups escalate their commitment less over the course of a failing project when the groups' perceived responsibility for prior decisions is reduced. From the perspective of action theory (Gollwitzer, 1993), even when group members know the appropriate strategies to reach their common goals and are motivated to apply them, they may often fail to use them effectively. Although this conclusion might at first appear counterintuitive, it is in line with observations of individual goal striving: We often do not reach our goals (e.g., wanting to lose weight), no matter how strongly we commit to them and how well informed we are about methods of achieving the goal (e.g., exercising more or changing our diet), simply because we are bad implementers. In the remainder of this article, we will explore the idea that the principles of individual goal striving could provide valuable insights into group-level phenomena such as those discussed earlier.

Introducing a Self-Regulation Perspective to Group Performance: Collective Action Control by Goals and Plans

As noted earlier, group performance has been defined as "the process and outcome of members' joint efforts to achieve a collective goal" (Levine & Moreland, 1990, p. 612). This definition clarifies two points: First, group performance concerns humans interacting as a group (rather than simply acting in parallel or in social contexts); second, group performance is about achieving collective goals. The second point is connected to the first by the fact that groups are commonly defined through their sharing of a common goal (see Levine & Moreland, 2011). Given the existence of this common goal, it seems appropriate to transfer the individual goal concept to groups and to apply the principles of individual goal setting and goal striving to group performance (see the last section of this article for a discussion of the limits of assuming such a common goal). This has been successfully achieved in the case of goal setting (Crown & Rosse, 1995; Locke & Latham, 2006; Weldon & Weingart, 1993), but research has only recently begun in the field of goal striving (Jonas, Sassenberg, & Scheepers, 2010; Sassenberg & Woltin, 2008).

Why should it be important for research on group performance to also consider goal striving? Setting goals and strongly committing to them is only the first step toward goal achievement. People often set goals but fail to achieve them despite their knowledge of the necessary goal-directed actions (Armitage & Conner, 2001; Webb & Sheeran, 2006). We believe that considering the processes underlying goal striving (action approach) can contribute to a thorough understanding of group performance and eventually to substantial improvements. Specifically, planning goal striving with if–then plans (implementation intentions; Gollwitzer, 1999) has been shown to alleviate many obstacles in goal striving, thus bridging the common intention–behavior gap. We therefore suggest applying implementation intention theory to the group level. We will lead into this by briefly reviewing the action approach, its origins, and implementation intention theory.

The Action Approach in Psychology

The action approach seeks to explain willful human behavior directed toward a subjectively desired end state (i.e., goal-directed behavior). Philosophers including Aristotle (384–322 b.c.e.) and René Descartes (1596–1650 c.e.) have long contemplated the limits of willful action control (Hofmann, Friese, Müller, & Strack, 2011; see also Martiny-Hünger, Thürmer, Issa, & Gollwitzer, 2011). Only in the late 1800s did pioneers in psychology (James, 1890; Wundt, 1896) begin to test and refine these theories using empirical methods. The cognitive revolution in psychology allowed developing the concept of motivation and its determinants in psychology. Edward Tolman, a neobehaviorist and social learning theorist, postulated that various mental processes mediate the relationship between environmental stimuli and observable behavior (Tolman, 1932, 1952). Building on this theory, goals are now defined as internal representations of desired states (Gollwitzer, 1999; see also

Bargh, Gollwitzer, & Oettingen, 2010). This definition facilitates explication of the processes involved in goal pursuit.

The psychology of action (e.g., Lewin, Dembo, Festinger, & Sears, 1944) distinguishes between two goal pursuit phenomena that are thought to be governed by different principles: goal setting and goal striving. Whereas goal setting is concerned with the choice of a desired end state for which to strive (what is being pursued?), goal striving is associated with moving toward the desired end state (how is it being pursued?). Using this distinction, the Rubicon model of action phases (Gollwitzer, 1990; Heckhausen & Gollwitzer, 1987; for an overview, see Gollwitzer, 2012) formalizes the goal-striving process in temporal order. According to this model, successful goal striving is carried out in four successive stages, called action phases: the pre-decision, pre-action, action, and post-action phase. The pre-action and the action phase are connected to goal implementation and are consequently considered to be volitional (i.e., related to goal striving). These stages are framed by the pre-decision phase and the post-action phase, which are concerned with goal choice and the evaluation of goal progress, respectively, and thus are considered motivational (i.e., related to goal setting).

As a descriptive theory, the Rubicon model of action phases has inspired two important process theories: mindset theory (Gollwitzer, 1990, 2012) and implementation intention theory (Gollwitzer, 1999). Implementation intentions are effective in improving action control at the individual level; we hypothesize that they can be applied at the group level as well. To provide the background for this argument, we will now introduce implementation intentions.

Individual Action Control by Goals and Implementation Intentions

Implementation intention theory distinguishes between goal intentions and implementation intentions. Goal intentions (e.g., "I want to attain outcome X") are said to relate to desired outcomes or behaviors (Gollwitzer, 1999): They direct and energize efforts to achieve desired end states. The effectiveness of action control by goal intentions is determined by the strength of one's commitment to the goal and by the specificity with which the goal outcome is defined. The more strongly a person is committed to a goal, the more effort he or she will exert to attain it (Fishbein & Ajzen, 2010; Oettingen, Pak, & Schnetter, 2001); moreover, the more specifically a goal (an outcome standard) is defined, the more easily a discrepancy between the current state and the desired outcome will be noticed and dealt with (Carver & Scheier, 1990; Locke & Latham, 1990, 2002). Action control by goal intentions is effortful in the sense that the environment must be continuously monitored to detect good opportunities to act and to select appropriate responses. But even when goal striving is initiated, distractions can bring the process to a halt, indicating the importance of staying on track with goals. If persistence is unsuccessful and goal striving comes to a halt, the process will need to be reinitiated. Moreover, once it is determined that a goal cannot be achieved, the goal must be abandoned. Lastly, during goal striving, self-regulatory resources should be used economically; otherwise, they can be unnecessarily depleted (e.g., ego depletion; Baumeister, Bratslavsky, Muraven, & Tice, 1998).

Implementation intentions should be distinguished from goal intentions, because these two types of intentions control actions by different processes. Using implementation intentions, people plan when, where, and how they will strive for a goal in an "If I encounter situation Y, then I will perform goal-directed response Z" format. By pre-deciding how to act in response to a specific situation, implementation intentions delegate the control over the initiation of goal-directed responses to critical situational cues. Implementation intentions have been observed to alleviate the typical problems of goal striving, such as failing to get started, losing focus, not calling a halt to futile striving, and overextending oneself (for a meta-analysis, see Gollwitzer & Sheeran, 2006).

Both the if-component and the then-component contribute to the beneficial effects that implementation intentions have on goal attainment. Making if–then plans (i.e., forming implementation intentions) heightens the state of activation of the mental representation of the specified cue in the if-component, which ensures easy cognitive accessibility of the cue (Aarts, Dijksterhuis, & Midden, 1999; Achtziger & Gollwitzer, 2010). In addition, implementation intentions forge a strong link between the anticipated situational cue specified in the if-component and the intended response in the then-component (Webb &

Sheeran, 2007, 2008), facilitating automatic response initiation. This automation is indicated by stimulus-driven attention to the specified cues (Wieber & Sassenberg, 2006), immediate as well as efficient initiation of the goal-directed response (Aarts & Dijksterhuis, 2000; Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 3 and 4; Gollwitzer & Brandstätter, 1997, Study 3), and the redundancy of conscious intent at the moment of response initiation (Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009).

Over the past 15 years (Gollwitzer & Sheeran, 2006), researchers have developed a thorough understanding of individual action control by implementation intentions. Implementation intentions have been found to be an effective self-regulatory tool that can be readily applied to improve individual performance. In addition to the effects of individual goals, a person's behavior can be guided by collective goals. However, the potential for action control by goal intentions and implementation intentions to improve collective goal striving has thus far remained unexplored. This is unfortunate, because implementation intentions may also be used successfully to promote collective goal striving. For instance, certain implementation intentions such as "If we are about to make an investment decision, we will judge the project as independent observers who are not responsible for earlier decisions" might be an effective means to escalation of commitment. Importantly, because both the detection of the situation specified in the if-component and the initiation of the action linked to the situation in the then-component are automated, group members do not have to consciously notice the presence of the relevant situation and effortfully initiate the goal-directed responses; rather, the presence of the situation should suffice to elicit the goal-directed actions (i.e., collective action control is delegated to the situation).

Collective Action Control by Goals and Implementation Intentions

In the remainder of this article, we will argue that addressing group behavior from an action psychology perspective allows new insights into the role of planning in collective goal striving. In our view, adapting the concepts from the action psychology approach for individuals to the group level has the potential to provide practical and useful answers to questions related to group performance. The goal intention concept has already been transferred from the individual level ("*I* want to attain outcome X") to the group level ("*We* want to attain outcome X") in prior research. Collective goal intentions relate to a desired outcome or behavior for the group (Locke & Latham, 2002; Weldon & Weingart, 1993). Groups are said to perform tasks by setting collective goals (i.e., committing to desired end states) and by then reducing the discrepancy between the actual state and the desired state (Carver & Scheier, 1982). This discrepancy reduction mechanism is analogous to individual goal pursuit; it requires the effortful regulation of one's behavior in order to approach the desired end state. At times, these desired end states can be quantitatively defined (e.g., we want to produce 500 units). However, as tasks become more complex, it becomes more likely that goals will involve qualitative end states (e.g., we want to invent a machine that produces 1,000 units). This second type of goal in particular requires both the knowledge that will enable groups to strive effectively toward the goal and the self-regulatory strategies to put this knowledge into action. From an action psychology perspective, the formation of collective goal intentions (i.e., setting common goals by spelling out goal standards or outcomes) might not always guarantee goal achievement, even when each group member knows the actions needed for attainment of the goal. Like individuals, groups might perform poorly despite sufficient knowledge and strong intentions to attain the goal. Thus, analogous to the intention–behavior gap at the individual level, we postulate a *collective intention–behavior gap*.

When we apply the intention–behavior gap concept from the action psychology approach to groups, new questions can be derived about the nature of group performance. First, because it seems plausible that collective goal striving faces obstacles similar to individual goal striving, one could ask whether and how the four problems identified in individual goal striving are also relevant for groups: Is group performance in a given situation hindered because groups have difficulties getting started (action initiation), continuing in the face of obstacles or temptations (goal shielding), stopping when the goal becomes unattainable (goal disengagement), or budgeting their resources for successful action control (avoiding depletion of self-regulatory resources)?

Second, adopting the action psychology approach concerning performance-inhibiting factors that are specific to groups, such as motivation losses (e.g., the sucker effect; Kerr, 1983) and coordination losses (e.g., diffusion of responsibility when no group member feels responsible for taking a necessary action; Steiner, 1972), may pave the way for new research on how collective and individual planning affects group performance. How should groups plan under specific conditions in order to overcome group-specific problems and thus promote rather than hinder group performance? For instance, can planning with implementation intentions promote cooperative behavior in groups? Research on collective action control should address performance-hindering factors that correspond to problems found in individual self-regulation as well as factors that relate to group-specific phenomena.

Having outlined certain questions that arise from the application of the action psychology perspective to group performance, one wonders about the mechanisms and limitations of collective action control by goal intentions and implementation intentions. One prerequisite for collective action control by goal intentions and implementation intentions is a person's ability to self-regulate as a member of a group rather than as an individual. Indeed, it has been argued that collective self-regulation possesses features similar to individual self-regulation (E. R. Smith, 2002), and an individual's social identity as a member of a group has successfully been used as a basis for self-regulation during collective goal striving (group-based self-regulation; Sassenberg & Woltin, 2008). To determine how collective goals are represented and regulated in individual group members, Sassenberg and Woltin made use of the distinction between the personal self (self-knowledge that derives from the individual's unique attributes) and the social self ("that part of an individual's self-concept which derives from his membership in a social group, together with the value and emotional significance attached to this"; Tajfel, 1981, p. 63), as suggested by social identity theory (SIT; Tajfel & Turner, 1986). By means of their social identity, individuals can think of themselves as members of a group (internalized membership). Thus, SIT allows for the idea that people self-regulate using goals and plans not only in terms of their individual goals (personal identity) but also in terms of their group goals (social identity).

The fact that, like personal selves, social selves can be used to self-regulate implies that the processes underlying the effectiveness of implementation intentions in individual contexts (i.e., the accessibility of the specified cue and automatic action initiation) should also pertain to collective goal striving. When acting as part of a group, individuals using implementation intentions are expected to recognize the specified opportunity to act toward the collective goal (if-component) and to readily initiate the necessary actions (then-component). Thus, the strategic automation of action control by implementation intentions should also be found in planning for collective goals. Because the automatic action control of implementation intentions differs from the effortful action control found with goal intentions, implementation intention research with groups should provide insight into whether groups might underperform because too much effortful processing is required in a given situation. Implementation intention research with groups could also be connected with research applying a dual-process perspective to the problems faced in group performance (see Evans, 2008).

Similarly, the moderators observed for implementation intention effects at the individual level may also apply to collective goal striving with implementation intentions (for an overview, see Gollwitzer, Wieber, Myers, & McCrea, 2010). For example, the goal dependence of implementation intention effects observed in individual goal striving (Sheeran, Webb, & Gollwitzer, 2005) should also be true for group goal striving, such that the effectiveness of implementation intentions in the service of collective goals would be expected only when group members are sufficiently committed to their collective goal (and when their respective social identity is activated). In addition, a strong commitment to one's plan was found to be a prerequisite for implementation intention effects (Achtziger, Bayer, & Gollwitzer, in press) and should therefore also be a prerequisite for effective plans in support of collective goals. Finally, high collective efficacy beliefs ("the belief in one's capabilities to organize and execute the courses of action required to produce given attainments"; Bandura, 1997, p. 3) can be expected to be a prerequisite for implementation intention effects at the group level, because imple-

mentation intentions have been shown to improve individual goal striving only when people hold high self-efficacy beliefs about their goals (Wieber, Odenthal, & Gollwitzer, 2010).

Collective Action Control With Goals and Implementation Intentions: Empirical Evidence

We hope we have made a compelling case that self-regulation of goal striving at the group level should be possible. However, the applicability and usefulness of the action psychology perspective for group behavior must be tested systematically. We therefore report first empirical findings on the usefulness of the collective action control approach regarding effective self-regulation by goals and plans.

GROUPS MAKING INFORMED DECISIONS: PROMOTING INFORMATION SHARING AND INTEGRATION

Two studies examined whether group decision making could be improved by the formation of implementation intentions (Thürmer, Wieber, & Gollwitzer, 2012). The participants' task was to identify the best of three alternatives in four different decision scenarios. Before they discussed the available information in groups of three, all groups were told how to make high-quality group decisions—namely, by reviewing the positive information about the nonpreferred alternatives before making the final decision. The participants then formed the goal, "I want to find the best alternative." Half of the participants additionally formed implementation intentions ("And when we finally take the decision sheet to note our preferred alternative, then we will go over the advantages of the nonpreferred alternatives again"). Participants in the implementation intention condition conducted more efficient group discussions and uncovered the best decision alternative more often in hidden profile performance contexts. We replicated this finding in a second study using a highly controlled setting: Participants followed a prescripted, computer-animated discussion instead of actually interacting. This procedure allowed us to hold constant the information mentioned and to randomize the order of the information. Again, participants who furnished their goal strategy with implementation intentions chose the best decision alternative more often than goal strategy participants. These results suggest that other group-level problems might also profit from a collective action control perspective, such as the need for groups to make repeated decisions in the course of completing a project.

GROUPS MAKING REPEATED DECISIONS: REDUCING THE ESCALATION OF COMMITMENT

A third study explored whether specific if–then plans could promote successful disengagement from futile group goals (Wieber, Thürmer, & Gollwitzer, 2012). Although persistence is needed to achieve valued goals, persisting in the face of failure needlessly depletes resources that could be invested in more promising endeavors. However, ending goal pursuit after initial investment has been shown to be difficult (Dietz-Uhler, 1996). We found that this problem can be circumvented by the use of if–then planning. Adapting a classic escalation-of-commitment paradigm (Haslam et al., 2006), groups of three acted as a city council, responsible for deciding the proportion of a set budget they wanted to invest in a kindergarten construction project. All groups were informed of how to make optimal investment decisions by adapting their investment to the actual pros and cons of the project rather than considering the investment history. The participants then formed the goal, "We want to make optimal investment decisions." Half the participants then added the implementation intention, "And when we are about to make an investment decision, we will judge the project as independent observers who are not responsible for earlier decisions." Across three project phases, the triads were asked to collectively decide how much to invest in the kindergarten project. The outlook in the first phase was encouraging: Citizens expressed the need for more childcare opportunities, land was given to the city to build the center, and an architect delivered a plan. Thus, the initial information called for a high level of investment. However, the two subsequent phases painted a gloomier picture: Union problems developed, environmental organizations warned that the land had not been carefully inspected, and oil was found in the sandpit, causing parents to threaten legal action. In other words, the circumstances rendered the project impracticable and called for disengagement. Although goal intentions were sufficient to prevent strong escalation of commitment (i.e., no increase in investment levels over the three phases), implementation intentions actually led to reduced engagement, as reflected in diminished investment

over the three investment phases. This finding demonstrates that implementation intentions can help groups disengage from a failing course of action, a common problem for groups in repeated decision-making situations. As with tasks involving group decision making, collective goal striving might also be impeded in performance tasks that require group members to engage in cooperative actions.

PROMOTING COOPERATION IN SCHOOL CHILDREN

A fourth study tested whether fourth-grade children's cooperative behavior in school can be increased by the use of implementation intentions. Wieber, Gollwitzer, et al. (2012) invited groups of four pupils to perform a cooperative puzzle task in which each pupil, having received a number of puzzle pieces, was allowed to work on his or her quadrant (individual pieces, 1 point) but not in anybody else's quadrant (cooperative pieces, 3 points). Instead, cooperative pieces had to be handed over to the respective pupil to be added to the puzzle. All groups were provided with a strategy for scoring more points: They learned that cooperative pieces should be given to the other group members and that these pieces were worth more points. Half of the participants then formed the goal, "I want to score as many points with my group as possible." The other half of the participants, in addition to forming this goal, added the implementation intention, "And if I see a part of the brown butterfly, then I will give it to the appropriate child immediately." (The brown butterfly thereby represented the one part of the puzzle that required cooperation to be completed; only when the pieces belonging to the brown butterfly had been exchanged were children able to add them to the puzzle.) Groups who had furnished their goal to perform well with an implementation intention scored higher overall, especially when only cooperative points were counted. In other words, forming an implementation intention supported collective goal achievement by increasing the cooperative behavior of group members. All in all, these four studies provide first evidence that implementation intentions can actually improve group performance.

Summary and Integration

Applying the action approach to groups, we reasoned that groups often do not reach their performance potential because of suboptimal goal striving (i.e., collective intention–behavior gap). In support of this reasoning, we discussed four studies showing that forming implementation intentions help groups improve their performance. In comparison with collective action control by goal intentions, collective action control by implementation intentions led to better group decisions in hidden profile situations, investment decisions in an escalation paradigm, and performance in a cooperation task. Notably, these studies used different conceptualizations of implementation intentions: Implementation intentions used in Wieber, Gollwitzer, et al. (2012) addressed whether individual planning for cooperation can benefit group performance by improving coordination within the group, using an "If I . . . , then I . . ." format. However, the implementation intentions used in Thürmer et al. (2012) and Wieber, Thürmer, et al. (2012) addressed whether collective planning will benefit group performance using an "If we . . ., then we . . ." (collective implementation intentions) format. It appears that even when implementation intentions target the group rather than the individual, they effectively improve group performance. The underlying mechanisms and limits of collective implementation and their individual and collective goal intentions thus remain a promising topic for future research. Addressing these questions should contribute to the investigation of the relationship between individual and collective self-regulation.

Conclusions

Beginning with an appreciative review of Marjorie E. Shaw's (1932) classic study on problem solving in small groups, we have traced her influence on small group research, with particular attention to the pitfalls of decision making under conditions of unfavorable information distribution and in repeated decisions when projects are doomed to failure. Next, we suggested a collective action control perspective that examines whether and how self-regulatory problems during group goal striving (i.e., difficulties in getting started, shielding from distractions, disengaging when goals become unattainable, and budgeting group resources for self-regulation) contribute to suboptimal group performance. More specifically, four studies found if–then planning to be an effective strategy for improving small group performance.

Groups made better decisions in hidden profile situations, refrained from escalating commitment to a failing project, and worked together more effectively on a cooperation task. The proposed collective action control approach is an example of the application of a self-regulation perspective to pressing social psychological questions. We hope it can contribute to the field of small group research and to research on the self-regulation of goal striving.

With regard to small group research on group performance, the present findings suggest that applying self-regulation approaches can offer new insights and methods for engineering group behavior by specifying when, where, and how groups should act in an if–then format (i.e., by forming implementation intentions). We have attempted to highlight that this collective action control approach can be readily used and combined with established approaches to small group performance. For instance, previous research on the escalation of commitment has established that responsibility for a prior investment decision can make it difficult for a group to later disengage from its goal when it becomes unattainable (Staw, 1976). Reducing the group's responsibility with the use of a behavioral strategy encouraging group members to assume the perspective of a neutral onlooker when making group decisions should thus be helpful in reducing the escalation of commitment. It was determined that this strategy was applied more effectively when the group addressed it in an implementation intention rather than in a goal intention. Thus, the collective action control approach helps groups to translate their knowledge and abilities into actions. The strongest implementation intention effects can be expected when groups choose representative situations for inclusion in the if-component and identify functional action strategies for inclusion in the then-component (Gollwitzer et al., 2010). For example, the increased ease with which "if" conditions of implementation intentions can be identified and linked actions can be implemented may be exploited to improve the effectiveness of basic coordination processes in small groups, such as the information handoff in a transactive memory system.

Regarding the implications for implementation intention theory (Gollwitzer, 1999), applying implementation intentions to group behavior expands previous work on action control from individual to group contexts. Implementation intentions are thought to strategically automate collective action control, and the present studies support this reasoning, as the information on useful strategies was held constant between groups, such that the if–then format was the only difference; however, a more direct investigation of the mediating processes (i.e., the cognitive accessibility of the specified situational cue in the if-part and the link to the action specified in the then-part) remains a task for future research. Another question concerns the limitations of collective action control by implementation intentions. For implementation intention effects to occur, a strong commitment to the respective goal is needed (Sheeran et al., 2005); however, this prerequisite might not always be fulfilled. Groups may face conflicting group goals or competing individual goals (De Dreu, Nijstad, & van Knippenberg, 2008; McGrath, 1984). For instance, individuals may defend their individual preferences in hidden profile situations (Mojzisch, Grouneva, & Schulz-Hardt, 2010). Although research on individual goal striving found that implementation intentions improve goal attainment even in situations of intra-individual goal conflict (e.g., hedonic vs. performance goals; Wieber, von Suchodoletz, Heikamp, Trommsdorff, & Gollwitzer, 2011), the effects in group settings are yet to be explored. In terms of the history of small group research, we believe our article indicates how much we owe to the pioneering researchers who laid the foundations for modern investigations. We cannot imagine the field of small group research without their inventive experiments and enlightening findings. We hope that the psychological study of groups will continue to flourish and that our collective action control perspective will add new insights. We are looking forward to the celebration of many anniversaries yet to come.

And finally, have you been trying to solve Shaw's riddle? Here is a possible solution: Wives are represented by the letter *x,* husbands by the letter *y,* and the three couples are coded as 1, 2, or 3. To move from side A to side B of the river: 1. x_1y_1 A → B; 2. y_1 A ← B; 3. $y_1x_2y_2$ A → B; 4. x_2y_2 A ← B; 5. $x_2y_2y_3$ A → B; 6. y_3 A ← B; 7. x_3y_3 A → B (see also Larson, 2010).

NOTES

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1. Of course, it cannot be taken for granted that individuals will always integrate all the information they possess. If individuals do not integrate their information successfully, group interaction can be beneficial even in situations without an informational advantage (e.g., equal information is available to groups and individuals; Laughlin et al., 2002).

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