

Directed but Reflecting: Guided Team Reflexivity as an Intervention to Foster Team Performance Improvement Under Directive Leadership

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Abstract

Guided reflexivity interventions (i.e., formal and structured interventions to induce teams to engage in team reflexivity) have been touted as being beneficial in terms of team processes and team performance. However, it is less well known under what conditions a guided team reflexivity intervention is beneficial for team performance *improvement*. Importantly, the leadership

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style employed by the team leader, i.e. directive versus empowering, may determine under what conditions guided team reflexivity is more beneficial for team performance over time. Drawing on the motivated information processing in groups (MIP-G) theory and on reflexivity theory, we argue that a guided team reflexivity intervention is particularly helpful for teams with directive leaders because those leaders do not foster team reflexivity. To test this, we conducted two experimental studies manipulating leadership style (directive vs empowering) and guided team reflexivity (reflexivity vs no-reflexivity). In Study 1, 37 three-person teams composed of aspirant army officers performed the Virtual Battle Space simulation. In Study 2, 77 three-person teams composed of undergraduate students performed an emergency management simulation. Random coefficient modelling was used to test the hypotheses. Across both studies, and in line with our hypotheses, we found that the positive effect of guided team reflexivity on team performance improvement is higher in teams with directive leaders than in teams with empowering leaders. Thus, we found support for the idea that teams led by directive leaders benefit from guided team reflexivity for improving performance over time.

Keywords

team reflexivity, guided reflexivity, directive leadership, empowering leadership, longitudinal

Team reflexivity has been argued to benefit team performance as team members can discuss, reconsider and revise their strategies and processes while they reflect upon the task (e.g., Gurtner et al., 2007; Schippers et al., 2018; West, 2000). Indeed, several meta-analyses have shown a net benefit in terms of team performance (e.g., Ceri Booms et al., 2023; Leblanc et al., 2024; Lines et al., 2021). However, while in some teams the members consciously and intentionally engage in this information-processing activity by reflecting upon and communicating about the team's objectives, strategies, and processes, and implementing changes accordingly (Schippers et al., 2015; West, 2000), in other teams, members do not engage in these behaviors spontaneously. Accordingly, researchers have developed team reflexivity interventions to foster reflection and discussion within teams (e.g., Gabelica et al., 2014; Gurtner et al., 2007) as such interventions are considered as one of the best methods of generating desirable outcomes for teams (Lines et al., 2021).

A commonly used intervention to foster team reflexivity is guided team reflexivity (e.g., Eddy et al., 2013; Konradt et al., 2015; Vashdi et al., 2013) – a “formal

and structured intervention [that] provides teams with 1) devoted time (time-out from action), 2) space, and 3) specific guidelines (or prompts) about how to collaboratively extract meaning from the provided feedback and set new goals and strategies for future performance” (Gabelica et al., 2014, p. 88). Empirical studies have shown that guided team reflexivity enhances team reflexivity, leading teams to adapt and improve performance (Gabelica et al., 2014; Gurtner et al., 2007; Konradt et al., 2015). At the same time, team reflexivity can be time-consuming and without a clear benefit, it can cost more than it yields in terms of team outcomes (Schippers et al., 2003). Specifically, team reflexivity may be costly in terms of cognitive resources (Hobfoll, 1989), and may be more prevalent in environments fostering team reflexivity, such as under conditions of supportive leadership (Leblanc et al., 2024; Schippers et al., 2003). A recent meta-analysis points to the role of team leaders who support members’ participation in group discussion in fostering team reflexivity (Leblanc et al., 2024). Next to this, this meta-analysis concluded that the incremental contribution of each of the different leadership approaches could not be assessed, due to a low number of studies addressing this relationship (Leblanc et al., 2024). It is thus imperative to unravel under what type of leadership conditions a guided team reflexivity intervention is beneficial for team performance improvement (i.e., the trajectory of team performance over time from the beginning until the end of the team lifecycle; Mathieu & Rapp, 2009).

Drawing on the motivated information processing in groups (MIP-G) theory (De Dreu et al., 2008), we assert that the leadership style employed by the team leader may determine under what conditions guided team reflexivity is more beneficial for team performance improvement. The MIP-G theory posits that in order for teams to accomplish their tasks and improve their performance, it is vital that team members actively and systematically process the information that is exchanged and use it to make decisions and accomplish tasks, which is fostered by certain situational factors, such as team reflexivity or empowering leadership (De Dreu, 2007; De Dreu et al., 2011). Thereby, in this study, we argue that teams with directive leaders benefit more from a guided team reflexivity intervention for team performance improvement than teams with an empowering leader. Empowering leaders create a warm and inclusive team environment that encourages information sharing and elaboration, and participative decision making, meaning that team reflexivity is likely to occur spontaneously (Schippers et al., 2018). Contrarily, directive leaders provide the team members with a structure to accomplish the tasks that is aligned with their vision (Martin et al., 2013; Somech, 2006). Under directive leadership, team members are less likely to process relevant and available information, and discuss team goals, processes and/or outcomes to accomplish their tasks throughout the team lifecycle. Therefore, we propose that a guided team reflexivity intervention is particularly helpful for teams

whose leaders do not promote team reflexivity, as such an intervention can foster team members' willingness to reflect upon their tasks and decision problems, strategies, and processes and implement changes that improve team performance over time.

In the current study we use an experimental setup to test the interaction effect of guided team reflexivity and leadership style (directive vs. empowering) on team performance improvement. We compare directive and empowering leadership as "team leaders predominantly exhibit these leadership behaviors in leading the team" (Post et al., 2022, p. 4) and research has suggested that these leadership behaviors influence team decision-making and performance differently (e.g., Lorinkova et al., 2013; Rico et al., 2022). In addition, by comparing directive and empowering leadership, we aim to contribute to the ongoing discussion about the effect of these leadership behaviors on team functioning (e.g., Li et al., 2018; Lorinkova et al., 2013; Rico et al., 2022; Sanchez-Manzanares et al., 2020).

Our study makes important contributions to the literature on teamwork. Firstly, we advance the current knowledge on team reflexivity, by showing that a guided team reflexivity intervention promotes team performance *improvement*. Although a number of studies have suggested a positive relationship between team reflexivity and team performance (e.g., Grossman et al., 2017; Gurtner et al., 2007; Schippers et al., 2013; for meta-analyses see Ceri Booms et al., 2023; Leblanc et al., 2024; Lines et al., 2021), research on the role of a guided team reflexivity *intervention* on team performance *improvement* is limited in terms of the number of studies addressing this relationship (for an exception see Konradt et al., 2015; Kneisel, 2020). Research addressing how teams can improve performance over time is important in the sense that while subpar performance can happen to any team, learning from past mistakes and improving future team performance is important, but often easier said than done (Edmondson, 1996). Thus, this study contributes to the scarce research that has analyzed the relevance of this intervention for teams' development, by analyzing the role of the context, i.e. leadership style.

Thereby, we contribute to the literature on team dynamics by employing a temporal approach to understand the influence of guided team reflexivity and leadership style on team performance improvement. Although teams are dynamic rather than static entities (e.g., McGrath et al., 2000), "dynamics are still largely missing from the study of groups" (Cronin et al., 2011, p. 573). The few studies that have analyzed the antecedents of team performance improvement have suggested that factors such as shared leadership (D'Innocenzo et al., 2021), participative leadership (Dionne et al., 2010), team mental models (Kneisel, 2020; Santos et al., 2015), team mental model

complexity, team information search (Uitdewilligen et al., 2021), and team charters and performance strategies (Mathieu & Rapp, 2009) contribute to team performance improvement, while team average Machiavellianism and sadism have detrimental effects on team performance over time (Dierdorff & Fisher, 2022). Our study, therefore, responds to the calls for more research on team dynamics (e.g., Arrow et al., 2004; Cronin et al., 2011; Kozlowski, 2015; Mathieu et al., 2014; Roe, 2008; Roe et al., 2012) and advances the current knowledge on how teams function and perform over time.

Secondly, we contribute to the team leadership literature by showing that teams led by directive leaders benefit more from guided team reflexivity than teams led by empowering leaders. We follow up on calls to elucidate the role of team leadership as a contextual variable and in terms of incremental contribution (Leblanc et al., 2024; Schippers et al., 2017). Drawing on the MIP-G theory (De Dreu et al., 2008) and learning curve literature (Edmondson et al., 2007), we argue that under the context of directive leadership, guided team reflexivity can foster the exchange, discussion and integration of knowledge, and learning – behaviors that are likely to be employed by an empowering leader (Lorinkova et al., 2013). Under directive leadership, such an intervention can translate a situation that is expected to hinder team reflexivity into a situation that fosters team members' willingness to engage in behaviors that allow them to achieve a thorough understanding of their tasks and problems. As it may not always be viable or optimal for a team leader to apply an empowering leadership style (Sommer & Pearson, 2007), guided team reflexivity is a viable solution that may be used by team members and team leaders as a way to leverage team processes that can help them to boost team performance improvement.

The Effect of Guided Team Reflexivity on Team Performance Improvement

Guided team reflexivity is a structured intervention to induce reflection in teams (Gurtner et al., 2007). This intervention is based on the three-stage process of reflexivity identified by West (2000): reflection, planning, and implementation. In the first stage, teams reflect on their past performance and consider possible improvements. In the second stage, teams develop new strategies and plans that can be implemented. In the third stage, teams implement the new strategies (Gurtner et al., 2007; Konradt et al., 2015; West, 2000). Guided team reflexivity aims to help teams to improve performance over time by encouraging discussion and the formulation of novel task strategies based on the experience and knowledge acquired during previous task episodes (Gurtner et al., 2007).

Drawing on the MIP-G theory (De Dreu et al., 2008) and reflexivity theory (West, 1996, 2000), we argue that guided team reflexivity fosters team performance improvement. The MIP-G theory builds on the teams-as-information-processors perspective (Hinsz et al., 1997), and both perspectives posit that individual team members search and process information, and that together, through communication, team members share, discuss, and integrate their ideas effectively to make decisions and generate responses to accomplish tasks (De Dreu et al., 2008, 2002; Hinsz et al., 1997). The MIP-G increases the granularity of this perspective by positing that information processing at both the individual and team levels can be more systematic, depending on the team members' epistemic motivation – their “willingness to expend effort to achieve a thorough, rich, and accurate understanding of the world, including the group task or decision problem at hand” – and social motivation – their “individual preference for outcome distributions between oneself and other group members and can be prosocial (i.e., the individual is concerned with own outcomes only) or prosocial (i.e., the individual is concerned with joint outcomes and fairness)” (De Dreu et al., 2008, p. 23). In this study, we specifically focus on epistemic motivation. Individual factors (e.g., personality) and situational factors (e.g., team reflexivity, leadership) influence team members' epistemic motivation (for a review see Nijstad & De Dreu, 2012). Under high team reflexivity, team members openly reflect on the team's objectives, strategies, and adapt them accordingly. Team members understand the need to integrate information and knowledge of others into combined solutions, and weigh available information carefully (De Dreu, 2007; Leblanc et al., 2024). Thus, team reflexivity promotes team members' ability to process information systematically and effectively (Leblanc et al., 2024; Schippers et al., 2014), which helps them to improve team performance over time.

We focus on the dynamic trajectory of team performance as literature on the learning curves (Edmondson et al., 2007) has suggested that “when experience with the task accumulates, teams develop routines and procedures that enable them to reduce the time required to complete their tasks and improve the quality of their performance” (Uitdewilligen et al., 2021, p. 5). Thus, on average, teams improve their performance over time. Nevertheless, this improvement in performance tends to follow an inverted U-shape pattern, where performance increases rapidly at first but gradually slows down, eventually leveling off or stabilizing. This plateau occurs because after an initial phase of rapid growth the opportunities for further improvement diminish (Argote, 1993; Kanfer & Ackerman, 1989; Uitdewilligen et al., 2021).

The guided team reflexivity intervention is designed to take place during transition phases (i.e., periods of time that occur between performance

episodes; Marks et al., 2001) when team members evaluate their performance, reflect and review past events, actions, and objectives, and discuss problems (Konradt et al., 2016; Schippers et al., 2013). Reflecting on those aspects, enables team members to use their knowledge, skills, and insights, and invest their effort in order to achieve a thorough and complete understanding of the tasks (Nijstad & De Dreu, 2012). Thus, they share, process, and integrate information in their teams to find the causes and solutions as well as prepare actions and strategies to guide task accomplishment in the future (De Dreu et al., 2008; Marks et al., 2001; Schippers et al., 2013). Therefore, over time, teams in which members reflect together about the team's objectives, strategies, and processes, develop routines that allow them to achieve high quality decisions and outcomes, and, therefore, are likely to continuously improve performance. While team members reflect on their past performance, they have the opportunity to discuss about important issues, consider new points of view, learn from failures and successes, and plan strategy improvements (Ellis et al., 2014; Gurtner et al., 2007; Müller et al., 2009; Schippers et al., 2008). Importantly, when team members play an active role in the reflection process by revising the strategies they have adopted previously and developing strategies adapted to the task on their own (rather than being informed on how to react to problems), they easily internalize those strategies and implement them over time (Gurtner et al., 2007). Furthermore, by engaging in a group discussion among team members and the leader, the team leader may learn about problems and difficulties the team members have faced, and, when they are performing consecutive tasks over time, provide information, and communicate the strategies they have discussed during the reflection moment (Gurtner et al., 2007). We, therefore, argue that a guided team reflexivity intervention is likely to influence the development of team performance over time. Thus, we propose that:

Hypothesis 1. A guided team reflexivity intervention has a positive effect on team performance improvement.

Guided Team Reflexivity, Leadership, and Team Performance Improvement

We propose that a guided team reflexivity intervention fosters team performance improvement. Drawing on the MIP-G theory (De Dreu et al., 2008), we further propose that teams led by directive leaders benefit more from a guided team reflexivity intervention in which the leader participates, compared to

teams led by empowering leaders. Such an intervention boosts team members' willingness to share and integrate knowledge and engage in critical thinking – behaviors in which team members led by a directive leader may not engage spontaneously and easily (Li et al., 2018; Lorinkova et al., 2013).

According to the MIP-G theory, team leaders who employ supportive behaviors – i.e. empowering leaders – foster the conditions to team members' systematic information processing (De Dreu et al., 2008) and thereby to team performance improvement. Empowering leadership refers to the process by which leaders share power with team members by giving autonomy and responsibility in the decision-making process, expressing confidence in team members' capabilities and improving the significance of their work (Ahearne et al., 2005; Lorinkova et al., 2013; Zhang & Bartol, 2010). Empowering leaders encourage team members to express opinions and ideas, and share information. These leadership behaviors intend to develop team members' self-management, self-leadership skills, adaptability, autonomy, and improve internal motivation and work performance (Cheong et al., 2019; Pearce et al., 2003; Tang et al., 2020). Consequently, team members are motivated to work together, to integrate and discuss the information they share, and propose changes which promotes synergetic outcomes (Post et al., 2022; Tang et al., 2020). That means that team members are likely to engage on reflexivity behaviors while working together. Therefore, when led by an empowering leader, team members may have less need for a guided team reflexivity intervention as the leader stimulates reflection and learning during the ongoing team action processes (cf. Carmeli et al., 2014; Schippers et al., 2018). Empowering leaders create a warm and inclusive team environment that encourages information sharing and elaboration, and participative decision making (De Dreu et al., 2008; Leblanc et al., 2024). Team members, therefore, are willing to expend effort in achieving a thorough and accurate understanding of their tasks (i.e., epistemic motivation; De Dreu et al., 2008), which means that team reflexivity is likely to occur spontaneously (Schippers et al., 2018).

Contrarily, directive leadership comprises behaviors that structure the team's work through clear directions, guidelines, expectations, and assigned goals (Lorinkova et al., 2013; Martin et al., 2013; Pearce et al., 2003). Directive leaders guide team members' participation, provide specific directions to accomplish tasks, focus the team attention on specific tasks, monitor team members' performance, and seek obedience of team members (Kahai et al., 2004; Martin et al., 2013). Directive leaders help team members to quickly become aware of their role, thereby, reducing the time spent in building work routines, and reducing role ambiguity and process loss especially when teams

are exposed to a new task (Espinosa et al., 2004; Post et al., 2022). Thus, directive leadership acts as an explicit coordination mechanism, overseeing the execution of the complete process.

When leading their teams, directive leaders “undermine the degree to which followers think independently and deliberately about their tasks” (De Dreu et al., 2008, p. 28) and signal a “preference for compliance and conformity” (Leblanc et al., 2024, p. 2). This reduces members’ willingness to search for and generate information that could foster an accurate understanding of the work themselves (i.e., team members have low epistemic motivation) and reduces the likelihood that team members engage in team reflexivity behaviors (De Dreu et al., 2008; Leblanc et al., 2024). When led by a directive leader, team members are less involved in decision-making processes, may feel less empowered (Lorinkova et al., 2013), and are more likely to adopt a passive follower role orientation (Uhl-Bien et al., 2014). Furthermore, team members interact less and focus on their own tasks, share less insights and knowledge, and use less information to make decisions (Cruz et al., 1999; Rico et al., 2022). As a result, they are less likely to be engaged in processes aimed at improving team functioning, such as experimentation and reflection during task performance (Schmutz et al., 2018), and hence they may benefit more from an intervention that explicitly encourages them to engage in reflexivity processes. During the intervention, in which the leader participates, the explicit instructions to reflect, signals that team members are also responsible for thinking about, discussing how they can improve their performance, and voice reflective comments they could otherwise consider to be inappropriate or detracting from direct task performance (Detert & Burris, 2007). Thus, we argue that in teams that are led by a directive leader, a guided team reflexivity intervention fosters epistemic motivation (De Dreu et al., 2008), which means that team members feel more willing and empowered to work together in order to exchange, discuss, and integrate knowledge (Nijstad & De Dreu, 2012; van Ginkel et al., 2009).

Hence, we integrate the MIP-G theory (De Dreu et al., 2008) and the learning curve literature (Brodbeck & Greitemeyer, 2000; Edmondson et al., 2007) to posit that the effect of the guided team reflexivity intervention, in which the team leader is involved, on team performance improvement differs depending on the behaviors employed by the team leader. As empowering leaders take time to involve team members in decision-making, team learning, and coordination processes, empowered teams take longer to achieve high levels of performance (Lorinkova et al., 2013; Post et al., 2022). Nevertheless, teams with empowering leaders show steeper learning curves than teams with directive leaders because, in these teams, members share information, and develop cognitive structures that help them to improve their effectiveness in

the long run (Lorinkova et al., 2013). Contrarily, as directive leaders structure the work of the team and give specific directions, teams that are led by such leaders and do not follow a guided team reflexivity intervention are likely to achieve high performance at the beginning of the lifecycle. Over time, however, their performance do not improve as team members do not have opportunities to learn and consequently improve their processes and actions (Argote, 1993; Post et al., 2022), unless they are instructed to reflect. Prior research has indeed shown that teams with directive leaders experience lower levels of learning and performance improvement over time than teams with empowering leaders (Lorinkova et al., 2013). If those teams led by directive leaders follow a guided team reflexivity intervention they can indeed improve their performance over time, because team members exchange and integrate information, learn, reflect, and propose changes. In short, separating the reflection phase from the action phase in teams with directive leadership may be an efficient strategy for facilitating performance improvement over time. Therefore, we propose that:

Hypothesis 2. The effect of guided team reflexivity on team performance improvement is moderated by team leadership style, in such a way that the effect is stronger for teams with directive leaders than for teams with empowering leaders.

To test our research model and hypotheses, we conducted two experimental studies manipulating leadership style (directive vs empowering) and guided team reflexivity (reflexivity vs no-reflexivity), with different samples and different team tasks. While Study 1 was conducted with teams composed of aspirant army officers who performed the Virtual Battle Space simulation, Study 2 was conducted with teams composed of undergraduate students who performed an emergency management simulation. These two studies allow for the testing of the research model in different contexts and the replication of the findings.

Study 1

Method

Participants and Design. Thirty-seven three-person teams participated in Study 1 (mean age = 22.1 years, $SD = 1.8$ years; 90.1% male). Teams were composed of cadets (i.e., aspirant army officers) who were trained and educated at a European Defense Academy to lead military operations. The cadets originated from four platoons corresponding with their year of attendance at the Academy: 27 first-year, 24 second-year, 30 third-year, and 30 fourth-year cadets. We used a longitudinal 2 (guided team reflexivity vs. no guided team

reflexivity) X 2 (directive leadership vs. empowering leadership) between-subjects design. The 37 teams were divided in four experimental groups: directive leadership – guided reflexivity ($N = 8$ teams), directive leadership – no guided reflexivity ($N = 9$ teams), empowering leadership – guided reflexivity ($N = 10$ teams), empowering leadership – no guided reflexivity ($N = 10$ teams).

Task and Procedure. We used a computer-based first-person simulation of high graphical quality – Virtual Battle Space. This simulation is used by defense forces of multiple NATO countries to train military units ranging from a squad (four people) up to a platoon (thirty people). The scenarios used in this simulation were developed at the simulation center of the Dutch Ministry of Defense, and the design was tested thoroughly in close cooperation with the third author of this paper. The teams consisted of three members tasked with an assignment of a small reconnaissance squad: infiltrate a hostile area, evade security units of the enemy, and target a designated enemy objective. To accomplish the assigned task goals, teams needed to communicate and cooperate intensively while processing information rapidly. Cooperating in ad-hoc teams with an unprepared mission, participants had to perform under time-critical circumstances with an abundance of information to analyze. Teams performed three consecutive task scenarios.

In each task, the team had to: (1) infiltrate the hostile area, (2) find a local contact that provided additional information, (3) identify the target consistent with the provided information, (4) neutralize the target, and (5) move to a point where the team was picked up by a helicopter. In each task, all team members had to decide which equipment to select for the mission (e.g., night-vision goggles, hand grenades, a machine gun, or a sniper rifle) the teams were handed only two maps and two assignments in hard copy. As team members were not allowed to look on each other's screen they were dependent on their level of interaction. Information sheets for the controls of their keyboards were provided to each participant at the beginning of the assignment.

The experimental session lasted approximately three hours and fifteen minutes and took place in a laboratory setting. The teams carried out the experiment separately in different moments. Therefore, the teams did not intervene in each other's process. The members of each team were in the same room and spoke out to each other during the experimental process. While the team leader was not randomly assigned to the leadership condition (see below under Leadership Manipulation), it was to the reflexivity condition. All the other team members were randomly assigned to the leadership and reflexivity conditions. The team leader was asked to arrive to the laboratory 20 minutes before the other team members in order to receive the leadership training (see

Leadership Manipulation). When the participants arrived in the laboratory, they were provided with a 30-minute instruction course to familiarize themselves with the task.

The teams performed on three consecutive 45-minute task scenarios. Before each scenario, teams received footage of a drone flying over the area of their assignment, which provided them with an impression of the terrain and possible enemy positions. Then teams had to make a plan including route planning, movement techniques, and military tactics. After that, they had to select their weapons and other equipment and, once ready, start their assignment. After each scenario, the team leader was taken apart and received instructions for the following assignment, while the other team members were asked to complete a questionnaire on the perceived leadership style of the team leader. Each scenario followed the same procedure.

Measures and Manipulations

Leadership Manipulation. We followed the two-step procedure of [Durham et al. \(1997\)](#) and [Lorinkova et al. \(2013\)](#) to manipulate leadership style. In the first step, four weeks prior to the experiment, all participants filled in an online survey containing questions on their leadership predisposition measures and demographic variables. To measure participants' predisposition for directive leadership, we used seven items adapted from the Directive Leader Scale ([Durham et al., 1997](#)). To measure participants' predisposition for empowering leadership, we used five items adapted from the Empowering Leadership Questionnaire ([Arnold et al., 2000](#)). We asked participants whether they would feel comfortable performing specific behaviors on a 10-point scale (1 = *extremely uncomfortable* to 10 = *extremely comfortable*). Examples of directive leadership include "take charge of a group", "give instructions to other group members", and "define tasks and responsibilities of group members". Examples of empowering leadership include "encourage work group members to express ideas/suggestions", "give subordinates autonomy and freedom of action", and "listen to and consider ideas and suggestions even when you disagree with them".

After the teams were randomly assigned to the respective leadership conditions, from within those teams the leaders was selected based on the leadership predisposition results. We selected as the team leaders, those participants with the largest difference in scores between the predisposition for the style of the condition (directive vs. empowering) relative to their predisposition score on the other style.

In the second step, before the start of the experiment, team leaders were individually trained to exhibit specific directive or empowering leadership behaviors. The experimenter explained the basic principles and behaviors of directive or empowering leaders and presented an instruction sheet containing a list of key sentences they could use in communicating with their team during

the simulation. After that, they were shown an eight-minute movie clip that exemplified the specific leadership style. Participants in the directive condition watched a movie clip containing fragments of the film *Apollo 13*, and participants in the empowering condition watched a movie clip of the film *The Cube*. While watching the movie-scene the experimenter pointed out leadership behaviors displayed in the movie.

Reflexivity Manipulation. Teams in the guided team reflexivity condition reflected upon their performance after the team training and after the first scenario. The team leaders received written instructions to encourage their team members to participate actively and to make sure all team members had a chance to speak. Teams had five minutes to reflect. Following the guidelines of Gurtner et al. (2007), teams were asked to (1) reflect on how they performed (e.g., how they received and passed information within the team), (2) consider potential improvements and alternative procedures, and (3) develop new plans accordingly. Teams in the control condition were asked to fill in a two-fold survey about the training and education program of aspirant officers: one part after the team training, and the other part (with different questions) after the first scenario (i.e., at the same time the other teams engaged in reflexivity).

Manipulation Check. To check whether the leader behaviors were consistent with their experimental condition, we measured team members' perception of directive and empowering leadership. Directive leadership was measured with three-items adapted from Durham et al. (1997). Empowering leadership was measured with three-items adapted from Pearce et al. (2003). For both measures the participants rated, on a seven-point scale (1 = *strongly disagree* to 7 = *strongly agree*), the extent to which they agreed with the sentences (e.g., directive leadership: "The team leader required team members to follow his/her instructions"; empowering leadership: "The team leader encouraged team members to exchange information with one another"). The results indicated that the participants in the directive leadership condition perceived their leader to be significantly more directive, $M = 5.80$; $SD = 0.56$, 95% CI [5.54; 6.06], $n = 17$, than those in the empowering condition, $M = 4.78$; $SD = 0.89$, 95% CI [4.38; 5.14], $n = 20$, $F(35) = 3.15$, $p < .001$, $d = 1.37$. The participants in the empowering leadership condition perceived their leader to be more empowering, $M = 6.23$; $SD = 0.49$, 95% CI [6.00; 6.42], $n = 20$, than those in the directive condition, $M = 5.76$; $SD = 0.55$; 95% CI [5.50; 6.01], $n = 17$, $F(35) = 0.47$, $p = .012$, $d = 0.90$. These results provide support for the effectiveness of the manipulation on directive and empowering leadership.

To assess the within-group agreement of the ratings of leadership, we computed the $r_{\text{wg}(j)}$ (James et al., 1993) and the intraclass correlation

coefficients (ICCs; Bliese, 2000) for both styles. The mean values of $r_{wg(j)}$ were in accordance with the widely-applied cut-off criterion (i.e., $\geq .70$; James et al., 1993; Biemann et al., 2012): directive leadership = .78; empowering leadership = .82. The ICC(1) and ICC(2) values are for directive leadership: ICC(1) = .48, $F(36,72) = 3.75$, $p < .001$; ICC(2) = .73; empowering leadership: ICC(1) = .01, $F(36,72) = 1.04$, $p = .460$; ICC(2) = .03. These ICC(1) values seem to indicate that whereas team members did agree on the extent of directive leadership of their leaders, they did not appear to agree clearly on the level of empowering leadership of their leader (Bliese, 2000). This suggests that individuals may have more divergent perceptions on what empowering leadership behaviors entail. In line with other scholars (Chen & Bliese, 2002), we nevertheless treated empowering leadership as a group level construct in the manipulation check, because it showed reasonable $r_{wg(j)}$ values and we theoretically defined empowering leadership as a group-level construct.

Team Performance. The quality of team performance was calculated as the total number of points the teams collected in each of the three scenarios. The three performance scores were used to capture team performance improvement. Teams received points for completing different aspects of the scenario. For instance, they received 50 points for neutralizing the main target, 50 points for reaching the pick-up area, and 10 points for neutralizing additional enemies. In addition, they could incur penalty points, for instance when a team member was spotted by an enemy unit or when they opened fire during an infiltration. Finally, we grand level standardized the scores in order to ease interpretation and comparison with Study 2.

Control Variables. We controlled for game experience and military experience. To assess game experience, we asked participants to indicate how often they played computer games on average during the last year (in hours per week). To assess military experience, we asked participants to indicate the year of attendance at the military academy.

Data Analysis. To analyze our data and test our longitudinal hypotheses, we conducted random coefficient modelling with the nlme package (Pinheiro et al., 2020) in RStudio (Posit team, 2023), following the steps proposed by Bliese and Ployhart (2002). First, we established the fixed function for time using orthogonal polynomials (e.g., Mathieu & Rapp, 2009). Second, we added predictors (guided team reflexivity and leadership) as interaction variables of the time-related polynomial to test our hypotheses for the between-team differences in the intercept and linear trends. We modeled the linear and quadratic trend of team performance as such an approach is in line with the learning curves theory that suggests that teams improve their

performance over time followed by negative acceleration (Argote, 1993; Edmondson et al., 2007; Kanfer & Ackerman, 1989). Guided reflexivity condition is a dichotomous variable comparing the intervention (coded as 1) with the control condition (coded as 0). Leadership condition is also a dichotomous variable comparing directive leadership (coded as 1) with empowering leadership (coded as 0).

Results

Table 1 provides the means, standard deviations, and correlations for all team-level variables. The analyses showed that there was significant variability among teams in performance improvement over time, $\Delta 2LL = 6.37, p = .026$. Moreover, neither controlling for autocorrelation, $\Delta 2LL = 0.00, p = .99$, nor for heteroscedasticity, $\Delta 2LL = 0.00, p = .99$, improved model fit.

The results revealed that the guided team reflexivity intervention was not significantly related to performance improvement neither for the linear function for time, $\gamma = 1.26, p = .50$, nor for the quadratic function for time, $\gamma = -0.64, p = .62$ (see Table 2, Model 2). These results do not support hypothesis 1. The interaction term between the guided team reflexivity intervention and leadership condition was significant and positive for the linear function for time, $\gamma = 7.34, p = .04$ and not significant for the quadratic function for $\gamma = -1.79, p = .50$ (see Table 2, Model 4). This interaction is depicted in Figure 1. The results suggest that the effect of guided team reflexivity on team performance improvements depends on the leadership style. These results support hypothesis 2.

Table 1. Means, Standard Deviations, and Correlations for all Team–Level Variables in Study 1.

	M	SD	1	2	3	4	5	6
1. Leadership	0.46	0.51						
2. Guided team reflexivity	0.49	0.51						
3. Game experience	2.46	1.14	.12	–.01				
4. Military experience	2.57	1.14	.02	.04	.79***			
5. Team performance 1	–0.47	0.86	.33*	–.02	.06	–.09		
6. Team performance 2	0.48	0.84	.13	.15	–.06	–.09	.59***	
7. Team performance 3	–0.01	1.07	.01	.13	.03	.12	.09	.22

Note. $n = 37$ teams, *** $p < .001$, * $p < .05$. Leadership condition is a dichotomous variable comparing directive (coded as 1) with empowering (coded as 0). Guided team reflexivity condition is a dichotomous variable comparing intervention (coded as 1) with no-intervention (coded as 0).

Table 2. Random Coefficient Model Predicting Change in Team Performance as a Function of Leadership and Guided Team Reflexivity in Study 1.

	Model 1		Model 2		Model 3		Model 4	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Level 1 model								
Intercept	0.00	0.29						
Military experience	−0.06	0.16						
Game experience	0.06	0.16						
Linear trend	1.95*	0.93						
Quadratic trend	−3.56***	0.63						
Level 2 model								
Intercept			−0.07	0.31	−0.18	0.32	−0.10	0.33
Military experience			−0.06	0.17	−0.05	0.16	−0.02	0.17
Game experience			0.06	0.16	0.04	0.17	0.02	0.17
Linear trend			1.33	1.31	2.43	1.57	4.12*	1.71
Quadratic trend			−3.25***	0.89	−3.41**	1.09	−3.82**	1.25
Guided team reflexivity			0.17	0.23	0.17	0.23	−0.02	0.31
Linear trend x guided team reflexivity			1.26	1.88	1.20	1.86	−2.17	2.42
Quadratic trend x guided team reflexivity			−0.64	1.27	−0.63	1.29	0.19	1.77
Leadership					0.26	0.23	0.07	0.32
Linear trend x leadership					−2.33	1.87	−5.88*	2.49
Quadratic trend x leadership					0.33	1.29	1.20	1.81
Leadership x guided team reflexivity							0.42	0.46
Linear trend x leadership x guided team reflexivity							7.34*	3.57
Quadratic trend x leadership x guided team reflexivity							−1.79	2.61
Goodness of fit								
Log likelihood	−140.09		−137.22		−133.15		−124.92	
AIC	304.18		304.44		302.29		291.84	
BIC	336.14		343.96		349.19		345.91	
Pseudo R2								
Intercept			0.00		0.01		0.00	
Linear trend			0.00		0.02		0.10	
Quadratic trend			0.00		0.00		0.00	

Note. $n = 37$ teams, * $p < .05$, ** $p < .01$, *** $p < .001$. SE = standard error. AIC = Akaike's information criterion. BIC = Bayesian information criterion. The model was tested with a polynomial function for time, which includes a linear and quadratic time functions.

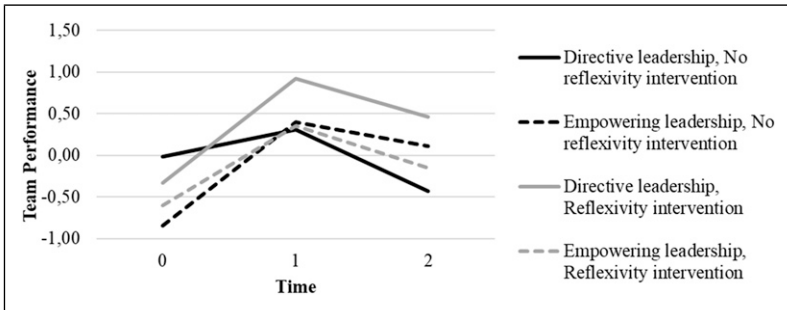


Figure 1. Predicted team performance as a function of the guided team reflexivity intervention and leadership (study 1).

The findings of Study 1 suggest that guided team reflexivity is more helpful for teams under directive leadership as fostered team performance improvement. As this study took place in a specific context (military setting), it might be argued that directive leadership is more prevalent and prototypical in this context, and would also be more aligned with the task requirements of the computer-based simulation. In addition, as teams needed to work intensively and process information rapidly in a time critical way, it might be argued that directive leadership would be a better predictor of team performance, per se. Therefore, in Study 2, we aimed to analyze our research idea with a different sample and a different team task, in order to understand if we can replicate the findings of Study 1.

Study 2

Method

Participants and Design. A total of 231 participants randomly assigned to 77 three-person teams participated in this study (mean age = 22.18 years, $SD = 1.88$ years; 76.5% female). The participants were third-year bachelor psychology students at a University from a European country. The study was integrated in a course, but the participation was not mandatory to pass the course and the students did not receive course credits. We used a longitudinal 2 (guided reflexivity vs. no guided reflexivity) X 2 (directive leadership vs. empowering leadership) between-subjects design. The 77 teams were divided in four experimental groups: directive leadership – guided reflexivity ($N = 19$ teams), directive leadership – no guided reflexivity ($N = 19$ teams), empowering leadership – guided reflexivity ($N = 20$ teams), empowering leadership – no guided reflexivity ($N = 19$ teams).

Task and Procedure. The team task used is the MUEMS, which consists of a complex paper-and-pencil decision making task representing an emergency management simulation with distributed roles (Santos et al., 2021; Thommes & Uitdewilligen, 2019). The goal of the teams was to minimize costs and damage due to fires in buildings over four consecutive fire scenarios. In order to do this, the team needed to make a number of decisions, such as deciding how many units they would dispatch to each fire, whether they would enter a burning building, which buildings would be evacuated, and which roads they would close. They were instructed to indicate their decisions on an answer sheet.

Team members were assigned to the role of fire brigade commander (team leader), police officer, or chemical expert. At the start of the experiment, each member received a role-specific training. For instance, the fire commander learned how to calculate the number of units required for extinguishing a fire, the police officers received information on the costs and possibilities of closing roads, and the chemical expert received information on the effect of different chemicals that could be involved in the fires. After this training, teams performed on four separate scenarios, involving varying numbers of fires and different chemicals. Although the team members received the same information about each scenario, they needed to apply and exchange their role-specific knowledge in order to make decisions. For instance, based on the chemicals involved, the chemical expert could calculate the chance that adjacent buildings would catch fire, which was information needed by the police officer for deciding whether these buildings should be evacuated.

Experimental sessions lasted approximately two hours and thirty minutes and took place in a laboratory setting. As in Study 1, the teams carried out the experiment separately in different moments. Therefore, the teams did not intervene in each other's process. The members of each team were in the same room and spoke out to each other during the experimental process. As in Study 1, teams were randomly assigned to the leadership and reflexivity condition, yet within teams leaders were selected based on their propensity to lead in the respective style. All the other team members were randomly assigned to the leadership and reflexivity conditions. The leader was invited to arrive at the lab 20 minutes before the other team members. In this time, the leader received the leadership training described below. Then, participants received their individual role information and were given 30 minutes to familiarize themselves with their role and answer practice questions regarding their assigned expertise. Then, the team worked on a practice scenario to familiarize themselves with the task. Subsequently they completed four experimental scenarios, for which they were given 10 minutes each to make the required decisions. After the second scenario they completed an online questionnaire.

Measures and Manipulations

Leadership Manipulation. We used the same two-step procedure of [Durham et al. \(1997\)](#) and [Lorinkova et al. \(2013\)](#) to manipulate leadership as we used in Study 1. First, four weeks prior to the experiment, all participants filled in an online survey containing questions on their leadership predisposition measures and demographic variables. Before the teams were formed, leaders were selected and assigned to one of the two leadership conditions based on the leadership predisposition results. In the second step, before the start of the experiment, team leaders were individually trained to exhibit directive or empowering leadership behaviors.

Reflexivity Manipulation. Reflexivity was manipulated as described in Study 1. Teams in the control condition were instructed to discuss for five minutes how to achieve successful performance in their academic program.

Manipulation Check. As in Study 1, to check whether the leader behaviors were consistent with their experimental condition, we measured team members' perception of directive ([Durham et al., 1997](#)) and empowering leadership ([Pearce et al., 2003](#)). The results indicate that the participants in the directive leadership condition perceived their leader to be significantly more directive, $M = 3.72$; $SD = 0.68$, 95% CI [3.50; 3.95], $n = 38$, than those in the empowering condition, $M = 3.42$; $SD = 0.61$, 95% CI [3.22; 3.61], $n = 39$, $F(75) = 0.38$, $t = 2.05$, $p = .044$, $d = 0.468$. However, the participants in the empowering leadership condition did not perceive their leader to be more empowering, $M = 3.66$; $SD = 0.62$, 95% CI [3.47; 3.86], $n = 39$, than those in the directive condition, $M = 3.74$; $SD = 0.60$; 95% CI [3.55; 3.93], $n = 38$, $F(75) = 0.15$, $p = .594$, $d = 0.122$. Thus, our results provided partial support for the effectiveness of the manipulation. We will discuss the implications of this in the limitation section of the paper.

To assess the within-group agreement of the ratings of leadership, we computed the $r_{wg(j)}$ ([James et al., 1993](#)) and the intraclass correlation coefficients (ICCs; [Bliese, 2000](#)) for both styles. The mean values of $r_{wg(j)}$ were in accordance with the widely-applied cut-off criterion (i.e., $\geq .70$; [James et al., 1993](#); [Biemann et al., 2012](#)): directive leadership = .88; empowering leadership = .88. The ICC(1) and ICC(2) values are in accordance with the required criteria and the F-test is statistically significant ([Bliese, 2000](#)): directive leadership: ICC(1) = .24, $F(76,150) = 1.95$, $p = .002$; ICC(2) = .49; empowering leadership: ICC(1) = .23, $F(76,150) = 1.88$, $p = .004$; ICC(2) = .47.

To check whether team reflexivity behaviors were consistent with their experimental condition, we measured team members' perception of team reflexivity with four items adapted from [Schippers et al. \(2007\)](#); e.g., "We reflected on what

we can learn from prior decisions we made”) after the guided team reflexivity intervention. The results after the team training indicated that the team members in the reflexivity condition perceived that they reflected significantly more ($M = 3.92$; $SD = 0.44$, 95% CI [3.77; 4.06], $n = 39$) than those in the non-reflexivity condition ($M = 2.90$; $SD = 0.65$, 95% CI [2.70; 3.09], $n = 38$), $F(75) = 7.55$, $p < .001$, $d = 1.84$. The results after the first scenario indicated that the team members in the reflexivity condition perceived that they reflected significantly more ($M = 4.05$; $SD = 0.37$, 95% CI [3.93; 4.16], $n = 39$) than those in the non-reflexivity condition ($M = 3.01$; $SD = 0.56$, 95% CI [2.83; 3.19], $n = 38$), $F(75) = 6.08$, $p < .001$, $d = 2.19$. These results provide support for the effectiveness of the guided reflexivity intervention in increasing team reflexivity.

Team Performance. All decisions the teams made were associated with costs representing the panic, safety, damage, and environmental costs associated with the emergency and the team’s response to it. All these different costs were represented in one overall cost score per scenario. The overall score in each of the four scenarios was used to capture team performance improvement. For instance, if a building burnt down this resulted in 3000 cost points, and closing a specific road incurred 350 cost points. The quality of team decision-making performance was calculated as the amount of costs that the could maximally make minus the costs that the team made in the respective scenario. For instance, if the maximum cost that could be made in a scenario were 3500 but the team made 2000 costs than team performance was 1500. We applied this correction because scenarios differed in the minimal amount of costs that had to be made. For instance, a scenario during rush hour would automatically require making more costs as it was more costly to close roads. Finally, we grand level standardized the scores in order to ease interpretation and comparison with Study 1.

Data Analysis. As in Study 1, to analyze our data and test our longitudinal hypotheses, we conducted random coefficient modelling with the nlme package (Pinheiro et al., 2020) in RStudio. In order to calculate the Pseudo R^2 we followed the procedure described by Singer and Willett (2003) and Aguinis et al. (2013). We calculated the variance left unexplained of the different model components (intercept, linear, and quadratic trend) for each model. In order to derive the incremental variance explained, we detracted the residual variance from the current model of that of the previous model, and divided this by that of the previous model. This provides us with an estimation of the total across-team variance in the specific model component explained specifically by the variables in the respective model.

Results

Table 3 provides the means, standard deviations, and correlations for all team-level variables. Comparison of a random-slope model with the baseline model showed that there was significant variability among teams in the rate of change in performance, $\Delta 2LL = 10.52$, $p < .001$. In addition, we tested for autocorrelation and heteroscedasticity. The results revealed that the model in which we controlled for autocorrelation, $\Delta 2LL = 89.91$, $p < .001$, improved model fit, whereas the model with heteroscedasticity failed to converge.

As can be seen in Table 4 (Model 2), guided reflexivity was not significantly related to performance improvement neither for the linear function, $\gamma = 1.01$, $p = .58$, nor for the quadratic function for time, $\gamma = -0.88$, $p = .44$. These results do not support hypothesis 1. The interaction term involving time, guided reflexivity, and leadership style was positive and statistically significant for the linear function, $\gamma = 9.56$, $p < .01$, and negative and non-significant for the quadratic function of time, $\gamma = -3.94$, $p = .08$ (see Table 4, Model 4). This interaction is depicted in Figure 2. The Pseudo R^2 indicates that 10% of additional variance in the slopes is explained by the inclusion of the interaction between the guided reflexivity intervention, leadership style, and the linear trend. An additional analysis on the effect of the guided reflexivity intervention only in the directive leadership condition suggests that teams with directive leaders improved performance over time faster if they received the guided reflexivity intervention than if they did not (γ interaction: slope $\times$ guided reflexivity = 4.08, $p < .05$). In contrast, additional analyses on the effect of guided reflexivity intervention only for the teams with empowering leadership, did not show

Table 3. Means, Standard Deviations, and Correlations for all Team-Level Variables in Study 2.

	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Leadership	0.49	0.50					
2. Guided team reflexivity	0.51	0.50	-.01				
3. Team performance 1	4363.64	1552.58	-.08	.16			
4. Team performance 2	3456.43	2391.76	.00	.12	.07		
5. Team performance 3	15,233.31	9116.09	-.17	.11	.00	.64***	
6. Team performance 4	8116.75	4887.39	-.42***	.06	-.03	.56***	.72***

Note. $n = 77$ teams, *** $p < .001$. Leadership condition is a dichotomous variable comparing directive (coded as 1) with empowering (coded as 0). Guided team reflexivity condition is a dichotomous variable comparing intervention (coded as 1) with no-intervention (coded as 0).

Table 4. Random Coefficient Model Predicting Change in Team Performance as a Function of Leadership and Guided Team Reflexivity in Study 2.

	Model 1		Model 2		Model 3		Model 4	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Level 1 model								
Intercept								
Linear trend	0.00	0.06						
Quadratic trend	6.39***	0.90						
Level 2 model								
Intercept	−3.85***	0.83						
Linear trend			−0.07***	0.09	0.07	0.10	0.20†	0.11
Quadratic trend			9.96***	1.31	12.39***	1.54	14.81***	1.71
Guided team reflexivity			−3.40***	0.81	−3.03**	1.00	−4.02***	1.14
Linear trend x guided team reflexivity			0.13	0.12	0.13	0.12	−0.14	0.16
Quadratic trend x guided team reflexivity			1.01	1.84	0.96	1.77	−3.76	2.38
Leadership			−0.88	1.14	−0.89	1.14	1.05	1.59
Linear trend x leadership					−0.26*	0.12	−0.53**	0.16
Quadratic trend x leadership					−4.78**	1.77	−9.62***	2.41
Leadership x guided team reflexivity					−0.75	1.14	1.24	1.61
Linear trend x leadership x guided team reflexivity							0.54*	0.23
Quadratic trend x leadership x guided team reflexivity							9.56**	3.39
Quadratic trend x leadership x guided team reflexivity							−3.94†	2.26
Goodness of fit								
Log likelihood	−385.11		−293.93		−282.26		−276.32	
AIC	790.22		615.86		598.52		592.65	
BIC	827.43		667.81		661.42		666.45	
Pseudo R2								
Intercept			0.00		0.05		0.06	
Linear trend			0.00		0.07		0.10	
Quadratic trend			0.00		0.00		0.04	

Note. $n = 77$ teams, † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. SE = standard error. AIC = Akaike's information criterion. BIC = Bayesian information criterion. The model was tested with a polynomial function for time, which includes a linear and quadratic time functions.

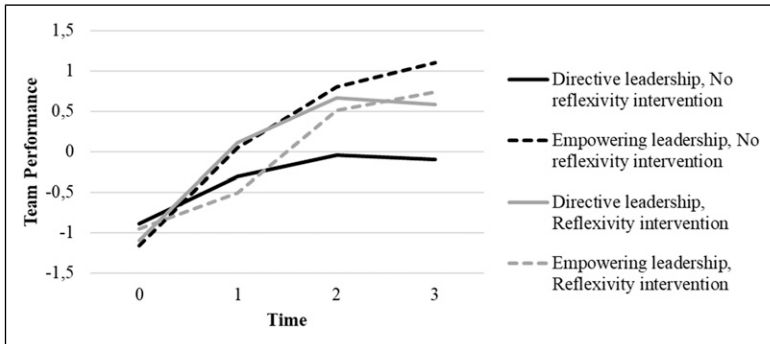


Figure 2. Predicted team performance as a function of the guided team reflexivity intervention and leadership (study 2).

a significant difference between the two conditions (γ interaction: slope $\times$ guided reflexivity = -2.12 , $p = .24$). These results provide support for hypothesis 2.

Discussion

In this study, we investigated the interaction effect between a guided team reflexivity intervention and leadership style on team performance improvement. In two longitudinal experimental studies, conducted in different settings, we found that teams led by directive leaders benefit more from a guided team reflexivity for team performance improvement than teams led by empowering leaders. Our study provides important theoretical and practical implications, as well as suggestions for future research that deserve discussion.

Theoretical Implications

Our research presents two major contributions to the team literature. Firstly, by showing that a guided team reflexivity intervention fosters team performance improvement, our study contributes to the current knowledge on the potential of team reflexivity. Empirical studies have shown that team reflexivity (interventions) help teams to achieve higher performance (e.g., Gurtner et al., 2007; Konradt et al., 2015; Schippers et al., 2013; for reviews see Ceri Booms et al., 2023; Leblanc et al., 2024; Lines et al., 2021). Research has also suggested that debriefings (i.e., reflection moments in which individuals or teams reflect on recent experience to improve performance) improve individual and team performance by approximately 20% to 25%

(Tannenbaum & Cerasoli, 2013). However, so far, it was unknown whether the effect of team reflexivity would sustain over time in order to improve team performance, as well as under what leadership style it would be more effective to implement guided team reflexivity. Our results contribute to team reflexivity theory, by suggesting that, indeed, teams in which team members and leaders discuss and reflect on the team's objectives, strategies, and processes can revise and improve them over time, resulting in better performance in the tasks they continuously face and solve. These findings are in line with the MIP-G theory, that suggests team reflexivity as a situational factor that fosters team members' epistemic motivation and consequently team performance improvement. Thus, our findings underscore the importance of engaging in team reflexivity moments as it benefits team performance continuously.

By employing a temporal approach to examine the influence of a guided team reflexivity and leadership style on team performance improvement, our study contributes to the (still) scarce literature on team dynamics. Although teams are dynamic entities as they change and evolve over time, they are most often studied as static entities (e.g., Cronin, 2015). However, it is crucial to understand how teams function, change, and perform over time in order to best study and inform teams on what they need to do to continuously and successfully accomplish their outcomes (e.g., Cronin et al., 2011; Kolbe & Boos, 2019). By taking a longitudinal approach in this study, we provide more nuanced insights on the combined effect of a guided team reflexivity intervention and leadership in improving team performance over time. In doing so, our study highlights the importance of considering the temporal element in team research to understand how teams function and perform over time (e.g., Roe et al., 2012).

Secondly, by showing that teams led by directive leaders benefit more from a guided team reflexivity intervention than by empowering leaders, we contribute to team leadership literature. Researchers have theoretically argued and empirically shown that supportive leadership behaviors foster team reflexivity and performance (e.g., Ceri Booms et al., 2023; Lines et al., 2021; Lyubovnikova et al., 2017; Schippers et al., 2008), while directive leadership behaviors do not foster such processes and outcomes (e.g., Lorinkova et al., 2013). In line with the MIP-G theory (De Dreu et al., 2008) and learning curve literature (Edmondson et al., 2007), our findings show that a guided reflexivity intervention is particularly relevant for teams with directive leaders as such leaders do not foster team reflection moments. The MIP-G theory posits that both team reflexivity and supportive leadership behaviors (i.e., empowering leadership) are situational factors that influence epistemic motivation and team performance. We extend the MIP-G theory by suggesting that a guided team reflexivity intervention is also a situational factor that fosters epistemic motivation. As team members and leaders are instructed to reflect, they are

more willing and able to systematically process information, openly discuss their previous strategies and actions, and voice ideas to improve their behaviors contributing to the successful accomplishment of their tasks. In the absence of a supportive leadership environment that promotes discussion and team reflexivity, a guided team reflexivity intervention may be a solution to foster such a discussion and reflection. Thereby, we extend the directive leadership theory and provide teams led by directive leaders with a viable intervention to boost team performance improvement when reflection moments are not encouraged by the leaders.

Practical Implications

As performance improvement is increasingly important in team environments, this study provides important implications for teams that may not have sufficient opportunity to engage in the depth of information processing required for team development during their regular action episodes. Whereas empowering leadership may have beneficial effects for team development over directive leadership (Lorinkova et al., 2013), directive leadership may still be the optimal approach in specific situational context, particularly those requiring in-role or routine performance under time pressure (Post et al., 2022; Somech, 2006). For teams operating in such a context, guided team reflexivity may be particularly beneficial to stimulate reflection and discussion among team members, in order to facilitate team learning and development over time. Such, temporal differentiation in team processing between periods of constrained information processing during critical action episodes and heightened information processing, facilitated through guided team reflexivity exercises during transition processes, may enable teams to manage the tensions inherent in functioning in critical and dynamic environments (Thommes et al., 2024). This may be particularly important, as spontaneous reflexivity can be costly in terms of time and energy (Schippers et al., 2013), and it is thus imperative to know under which conditions guided team reflexivity is more effective. Yet, paradoxically, it may be the case that directive leaders, by their (directive) nature, may not be willing to advocate and employ guided team reflexivity exercises in their teams relinquishing their own control. Therefore, organizations should build structural practices in such a way that the implementation of guided team reflexivity does not only rely on the discretion of the team leader.

Several protocols have been developed for facilitating team reflexivity, including brief guided reflexivity protocols developed for short term action teams (e.g., Gurtner et al., 2007) as well as more elaborate debriefing protocols designed for teams in a variety of applied settings (Ellis & Davidi, 2005; Ron

et al., 2006). Such protocols have been shown to lead to positive outcomes, including in military (Ellis & Davidi; Smith-Jentsch et al., 2008) and surgical teams (e.g., Vashdi et al., 2013). In an elaborate field experiment, Chen et al. (2018) tested a debriefing intervention aimed at fostering reflexivity in a large production facility. They showed that this intervention consisting both of a debriefing training and a shift-end debriefing protocol had a number of positive effects on well-being outcomes as well.

Limitations and Directions for Future Research

This study has a few potential limitations. Firstly, the composition of the teams (cadets and undergraduate students; preponderance of males in Study 1 and females in Study 2) may pose a threat to the generalization of the findings. Laboratory experiments have various strengths, such as the manipulation of the independent variables and the control for confounding variables (which is a necessary condition for establishing causality), and the increase of the internal validity of the findings (Podsakoff & Podsakoff, 2019). Despite these strengths, one of the potential limitations of such a design is the generalizability of the findings to field settings as the samples may not properly represent all the teams in all industries and sectors. However, researchers have argued that “criticisms of the use of students demonstrates a misunderstanding of the goals of laboratory experiments, and are often flawed” and that “studies conducted in field settings are as narrow as laboratory studies in terms of the types of actors, behaviors, and settings sampled” (Podsakoff & Podsakoff, 2019, p. 24). Nevertheless, in the future, studies should be conducted with teams in various work environments to evaluate the effectiveness of the guided team reflexivity intervention on team performance improvement. Future research should also be conducted with teams of various compositions, such as mix-gender teams. Gender composition of teams plays a role on team dynamics and performance because males and females show differences in, for example, skills, psychological traits, and preferences (Fenoll & Zaccagni, 2022). Research has indeed shown that mixed-gender teams perform better at problem-solving tasks and produce more novel outputs than all-women or all-men teams (Yang et al., 2022), because women improve information-sharing processes on teams (Woolley et al., 2010). It is therefore important to examine our research model in mixed-gender teams.

Secondly, although it is a strength of the experimental design that teams were randomly assigned to one of the leadership style conditions, within the teams, leaders were not randomly selected, but the leadership role was assigned to the team member with the highest score on the leadership style tendency of that respective condition. Although this procedure keeps the randomization regarding the levels of team characteristics intact, it may have

shifted the distribution of characteristics among the team members (from the leader to the other members).

Thirdly, in Study 2, we found support for the effectiveness of the manipulation on directive leadership, but the manipulation check for empowering leadership was not significant. This was surprising given the proven effectiveness of the manipulation in previous studies (Lorinkova et al., 2013; Sanchez-Manzanares et al., 2020) as well as in Study 1. Given that our manipulation check was based on perceptions of the team members, it is possible that our participants were not able to perceive these perhaps subtle differences in leadership behaviors. However, it may also be possible that the leadership manipulation did not actually lead to more empowering behaviors, and only to less directive behaviors. This implies that we have to be cautious in interpreting the results of this study. Nevertheless, we can conclude that teams with highly directive leaders benefit more from the guided team reflexivity intervention than less directive leaders.

Fourthly, we did not analyze any mediating mechanisms that could explain why guided team reflexivity was particularly beneficial to teams with directive leaders. Emergent cognitive states (e.g., team mental models, transactive memory systems) and team processes (e.g., team learning, team communication) might have accounted for this finding. For example, research has suggested that team reflexivity leads to team performance via team mental models as by reflecting upon their strategies and actions, team members identify differences in their organization of knowledge, discuss and resolve those differences, which enable them to develop a similar understanding of important aspects of work (e.g., Gurtner et al., 2007; Konradt et al., 2015, 2016, 2021; Van Ginkel et al., 2009), and achieve higher performance. Research has also shown that guided team debriefings facilitate team processes (transition, action, and interpersonal processes), which in turn result in greater team performance (Eddy et al., 2013). Thus, future studies should analyze the (psychological) mechanisms that explain the effect of the guided team reflexivity intervention on team performance improvement.

Fifthly, we did not consider the team members' perception of the team climate and its influence on the effectiveness of the guided team reflexivity intervention. Studies have found that leaders behaviors influence the climate within the team (e.g., Meng et al., 2023; Orekoya, 2024; Pirola-Merlo et al., 2002). As directive leaders monitor team members' performance and seek obedience by team members (Kahai et al., 2004; Martin et al., 2013), team members may perceive the team environment as hostile and not psychologically safe. Those perceptions may thus have implications on how the team members participate and contribute to the discussion of the strategies and actions, which may in turn influence team performance. Hence, future studies

should examine the role team climate plays on team members involvement on a guided team reflexivity intervention, and consequently on team performance improvement.

Finally, consistent with recent findings of [Bradley and Aguinis \(2023\)](#) on non-normality of team performance distributions, a check of the distributional assumptions indicated that our team performance outcomes were indeed not fully normally distributed. Our data showed some skewness ($s = 0.72$), as well as kurtosis ($k = 3.59$). Although the literature indicates that mixed-level analyses are usually robust to minor to moderate violations of distributional assumptions, estimates may become less precise ([Schielzeth, et al., 2020](#)).

Conclusion

Several meta-analyses have now shown that team reflexivity has a positive effect on team performance. However, there are still questions as to what under leadership conditions guided team reflexivity is more beneficial (directive versus empowering leadership). Moreover, the effect of guided team reflexivity on team performance improvement is less well-known. Across two experimental studies we showed that the leadership style employed by the team leader determines under what conditions a team reflexivity intervention – guided team reflexivity – is more beneficial for team performance improvement. Our findings suggest that teams with directive leaders benefit more from a guided team reflexivity intervention than teams with empowering leaders. This study provides teams led by directive leaders with a viable intervention to boost team performance improvement.

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