

Team adaptation in dynamic environments

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Team adaptation in dynamic environments

How team members effectively
adjust their behaviors
to changing conditions

Marie S. Thommes

Team adaptation in dynamic environments

**How team members effectively adjust their behaviors
to changing conditions**

DISSERTATION

To obtain the degree of Doctor at Maastricht University,
on the authority of the Rector Magnificus, Prof. Dr. Rianne M. Letschert,
in accordance with the decision of the Board of Deans,
to be defended in public
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CHAPTER 1

General introduction

On March 29, 2005, Elaine Bromiley attended hospital for routine sinus surgery. Elaine was an otherwise healthy, 37-year old woman who had two children.¹ Shortly after inducing anesthesia, Elaine experienced breathing difficulties. The anesthetist tried to secure her airways by intubating, but was unable to insert the tube. After repeated unsuccessful trials, the situation turned into a 'can't intubate, can't ventilate' situation, a recognized emergency situation for which medical guidelines are available. To provide necessary assistance, two other highly experienced doctors present in the operating room, unsuccessfully attempted to intubate Elaine for another 15 minutes; throughout this whole period, she had dangerously low levels of oxygen saturation. The nurses informed the team that they had brought a surgical airway kit into the operating room and had called for a bed at the intensive care unit, but neither was used. At 9.10 am, 35 minutes after Elaine received anesthetic, the doctors decided to stop the procedure and to transfer Elaine to the recovery unit where she should wake up naturally. When Elaine failed to regain consciousness, she was transferred to the intensive care unit. Although she survived, she suffered severe brain damage resulting from the prolonged period of insufficient oxygen saturation and passed away 13 days later in the hospital.

On the surface, Elaine's case could appear as an unavoidable tragedy resulting from an unexpected complication during a routine sinus surgery. However, an independent review of the case commissioned by Elaine's husband Martin Bromiley revealed that Elaine's death was at least partly caused by a lack of clear communication between surgery team members present in the operating room. Instead of realizing that the situation has quickly turned into a 'can't intubate, can't ventilate' emergency, the physicians were focused on repeated attempts of trying to secure Elaine's airways through intubation; they did not seem to notice the amount of time passing by during these attempts. When several nurses sensed the urgency of the situation, their attempts to alert the doctors by bringing an emergency medical kit to the operating room and reserving a bed at the intensive care unit, remained unheard. It later turned out that when Elaine was subsequently admitted to the recovery room instead of to the intensive care unit, nursing staff doubted this decision but did not know how to broach their concerns with the doctors. The final independent report on the case of Elaine Bromiley concludes that "this was a tragic case from which many lessons can and need to be learnt" (Bromiley, 2005, p. 16).

The question how team members can effectively communicate and coordinate their actions to successfully manage acute or ongoing change is critical for many of today's organizations. Complex global challenges, such as the current COVID-19 pandemic, technological advancements, demographic change or globalization, frequently require organizations to abandon 'yesterday's logic' and to adapt to arising complexities (Ford & Foster-Fishman, 2012; Sonenshein, 2010). In order to deal with this complexity and to remain competitive in such environments, organizations often employ teams (Burke, Stagl, Salas, Pierce, & Kendall, 2006; LePine, 2003). In the scientific literature, teams are defined as "a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission, who have each been assigned specific roles or functions to perform, and who have a limited life-span of membership" (Salas, Dickinson, Converse, & Tannenbaum, 1992, p.4). As such, teams typically consist of skilled experts that work interdependently together and that need to share and integrate information in order to coordinate their interdependent action. In comparison to individuals, teams can build on a wider repertoire of knowledge, capacities and experiences and thereby increase organizations'

¹ The following description of incidents is based on an anonymous version of the independent report on the death of Elaine Bromiley, published by M. Bromiley (2005).

1 ability to identify and to quickly react to fast paced changes (Burke et al., 2006). Teams are therefore often employed by organizations when the task environment is ambiguous, ill-defined, and quickly changing.

When working in such uncertain, dynamic contexts, teams typically face a dual challenge that often entails opposing requirements. On the one hand, during well-defined, routine episodes, team members need to increase efficiency by optimally coordinating their actions and by attaining goals as quickly and as precisely as possible (Gersick & Hackman, 1990; Pentland & Hærem, 2015; Rico, Sánchez-Manzanares, Gil, & Gibson, 2008). On the other hand, when complexities arise, teams must remain flexible in their thoughts and actions in order to respond effectively to new environmental demands (Stachowski, Kaplan, & Waller, 2009; Uitdewilligen, Waller, & Pitariu, 2013). For example, in the above outlined case, the medical surgery team should have sensed the urgency of the situation and should have remained flexible in their actions when complications occurred. At the same time, during routine episodes, a surgery team must increase efficiency to quickly and effectively treat their patient. Growing scientific evidence demonstrates the presence of this dual challenge by showing that performance of today's agile teams increases if high flexibility is accompanied with stabilizing processes (Bresman & Zellmer-Bruhn, 2013; Grote, Kolbe, & Waller, 2018; Uitdewilligen, Rico, & Waller, 2018).

In order to effectively balance demands for efficiency and flexibility, teams need to recognize when to adjust their actions in appropriate ways as the situation changes. Team adaptation -- defined as team process modifications made in response to the demands of a new or changing environment or event (Baard, Rench, & Kozlowski, 2014) -- has therefore been identified as central to team and organizational effectiveness and received increasing scientific attention in the past decades (e.g., Burke et al., 2006; Maynard, Kennedy, & Sommer, 2015; Stagl, Burke, Salas, & Pierce, 2006). Numerous studies to date have investigated antecedents and outcomes of team adaptation (e.g., LePine, 2003; Marks, Zaccaro, & Mathieu, 2000), as well as factors mediating the relation between team adaptation and adaptive outcomes (e.g., Stachowski et al., 2009; Uitdewilligen et al., 2013). However, despite this accumulating research, knowledge on the actual process of adaptation remains limited to date.

1 Recent literature reviews and theoretical papers on team adaptation note three main shortcomings in the current literature that hinder a comprehensive understanding of how team members effectively adapt their behaviors to situational changes (e.g., Baard et al., 2014; Grote et al., 2018; Maynard et al., 2015). First, research predominantly infer team adaptive processes retrospectively, rather than measuring adaptive processes as they unfold over time. For instance, as pointed out by Grote and colleagues (2018), many studies have introduced a task change, measured team performance and concluded that an increase in team performance resulted from successful adaptation (e.g., Han & Williams, 2008; Klein, Ziegert, Knight, & Xiao, 2006). Other studies examined differences between well and poor performing teams post hoc (e.g., Uitdewilligen & Waller, 2018; Waller, 1999). And still other studies relied on self-reports and generic perceptions of behavioral agglomerates to measure adaptive processes post-hoc, rather than in situ (e.g., "To what extent did your team smoothly synchronize joint actions"; DeChurch & Haas, 2008, p.553; cf., Grote et al., 2018).

While this previous work has advanced our understanding of team adaptation and underlying processes, there is still much to be learned about *actual* team member behaviors that increase team effectiveness in dynamic environments. For instance, recent conceptual work suggests that team leaders and members can facilitate team adaptation by changing their leader-follower interactions in alignment with changes in situational demands (e.g., DeRue, 2011; Waller, Uitdewilligen, Rico, & Thommes, 2020; Yukl & Mahsud, 2010). Yet, empirical investigations concerning what constitutes effective changes in leader-follower interactions remain scarce. As Maynard et al. (2015) point out "while adaptation is an often-discussed construct, it is too often viewed as occurring within a "black box" that goes unmeasured" (p. 659).

Another reason for why little is yet known about how team members effectively adjust their interaction to situational changes, is that research on team adaptation has primarily focused on examining how teams can increase their flexibility to adapt to changes, at the expense of examining how teams can increase their efficiency to adapt to stability demands (Grote et al., 2018). This skewness is grounded in the assumption that adaptation requires flexibility, such that organizations can successfully respond to unexpected complexities (e.g., Burke et al., 2006; Kozlowski & Bell, 2008). Yet, sustained team performance in dynamic environments not only depends on teams' ability to flexibly adjust to changes but also to increase

1 efficiency in managing their processes during more routine, well-defined episodes (Uitdewilligen et al., 2018). Recent conceptual work therefore suggests that team adaptive performance in complex environments, iterating between routine and non-routine situations, may benefit from the adaptive application of team processes in order to increase flexibility and stability when needed (e.g., Rico, Gibson, Sánchez-Manzanares, & Clark, 2019). As such, team research to date largely neglects that adaptation often entails the dual challenge of effectively responding to both, flexibility and stability demands (Grote et al., 2018).

Finally, although a substantial amount of research has investigated the impact of task and team characteristics on team adaptation (e.g., LePine, 2003; LePine, 2005), empirical research exploring how characteristics of the situational change affects adaptive behavioral processes remains surprisingly scarce. Among the reasons for this is that research designs often consist of studies in which cues triggering the need for adaptation (i.e., adaptive stimuli) are not explicitly introduced but rather retrospectively inferred when a change in team interaction has been observed. And those studies that did introduce an adaptive stimuli often do not provide a clear theoretical rationale for why this specific trigger was chosen (Baard et al., 2014; Christian, Christian, Pearsall, & Long, 2017). As such, “most research is vague in its description of what elements of the task changed and how that change creates a need for adaptation” (Baard et al., 2014, p.77). Yet, team members interdependently work on changing tasks while continuously and actively processing information about them (Hinsz, Tindale, & Vollrath, 1997; Rico et al., 2019). Thus, understanding what type of adaptive stimuli requires adaptive responding and how team members interpret and react to adaptation triggers, provides important insights into specific adaptation requirements and how teams meet such requirements.

In this dissertation, I aim to address these shortcomings in order to advance research on team adaptation and team effectiveness in dynamic environments. To gain knowledge into team processes that require adaptation, it is important to apply scientific research methods that allow exploring how team members actually interact and what specific behaviors increase team adaptive performance. Thus, the three empirical chapters in this dissertation apply behavioral observation methods (i.e., behavioral coding based on video recordings of team interaction) in order to provide insights into how team members effectively interact to modify their team processes when facing environmental changes. The insights presented in

1 this dissertation aim to broaden and enrich the existing body of knowledge on the team adaptation process and thus, the central guiding question for the research conducted in this dissertation is:

How can team members effectively adjust their behaviors to changing conditions?

In the remainder of this introductory chapter, I will first review pertinent work in the team adaptation literature and develop a conceptual input – mediator – output (IMO) model of team adaptation that provides the background for the studies presented in this dissertation – a framework that is frequently used for the study of teams (see Ilgen, Hollenbeck, Johnson, & Jundt, 2005). In the interest of advancing team adaptation research, the presented model specifically focuses on how the team adaptation process unfolds, which factors contribute to teams’ capacity to adapt, and how change characteristics impact team adaptation and adaptive outcomes. Finally, I provide an overview of the aim and following chapters of this dissertation and I close with an outline of their main contributions.

Team adaptation: A conceptual model

In the scientific literature, several definitions and conceptualizations of team adaptation exist; yet, scholars seem to have different views on the nature of the concept. Whereas more prominent and recent conceptualizations refer to team adaptation as the *process* of modifying existing structures and behaviors (Burke et al., 2006; Maynard et al., 2015), other researchers have defined team adaptation as the *ability* or *capacity* to change coordinated activates in response to environmental changes (e.g., Burtscher, Wacker, Grote, & Manser, 2010; Kozlowski, Gully, Nason, & Smith, 1999), and still others conceptualize team adaptation as the extent to which a team achieves a desirable *outcome* (e.g., adaptive performance) in response to changing environmental requirements (e.g., LePine, 2005; Shoss, Witt, & Vera, 2012). In an attempt to synthesize prior team adaptation research, Maynard and colleagues (2015) recently proposed an input-mediator-outcome (IMO) framework of team adaptation to group definitions in terms of whether they have an input focus, process / mediator focus or outcome focus.

Within this framework, Maynard et al. (2015) distinguished between teams' adaptability or capacity to adapt as the input factor or starting conditions of a team. In other words, a group may be more or less capable to adapt, which will impact the actual process of adapting, but should not be equated with that. Following the input, there are mediators, which comprise the process of adaptation and emergent states. The process of adaptation is represented by the dynamic interactions between team members and emergent states include teams' motivational, cognitive or affective states that follow from this interaction (Marks, Mathieu, & Zaccaro, 2001). Finally, adaptive outcomes represent the consequences that follow the team adaptation process and may include task related (e.g., performance) or non-task related outcomes (e.g., well-being). The authors conclude that in order for team adaptation research to advance, researchers should not necessarily prioritize one category over another but instead, acknowledge the distinction between each category and "come to a shared understanding of the actual process of adaptation (process or mediator), and what factors give rise to it [...] and finally, what are the consequences of adaptation (outcome)" (Maynard et al., 2015, p. 654).

In response to this call and in line with the proposed conceptualization, in this dissertation I refer to *team adaptation* as the process of adjusting to situational changes, whereas I use the term *team adaptability* to refer to the inherent ability or capacity of a team to adjust, and *team adaptive outcomes* to refer to the consequences of adaptation. In the following section, I present a conceptual model of team adaptation that is organized within the IMO framework, as shown in Figure 1.1.

Team adaptation process

Rather than being a singular process, researchers mostly agree that team adaptation consists of several phases or sub processes, suggesting that a series of responses need to be made in order for the team to effectively adapt to environmental changes. Yet, the literature lacks consistency regarding what these sub processes - or modifications in such sub processes - include. For instance, researchers propose that for adaptation to occur, teams have to go through an 'adaptive cycle' consisting of different phases; for instance, situation assessment, plan formulation, plan execution, and team learning (Burke et al., 2006) or noticing, interpreting and acting on stimuli (Kiesler & Sproull, 1982). Others argued that team adaptation comprises the alteration of team members' role structure in response to a change (e.g., LePine, 2003; LePine, 2005), and still others suggest

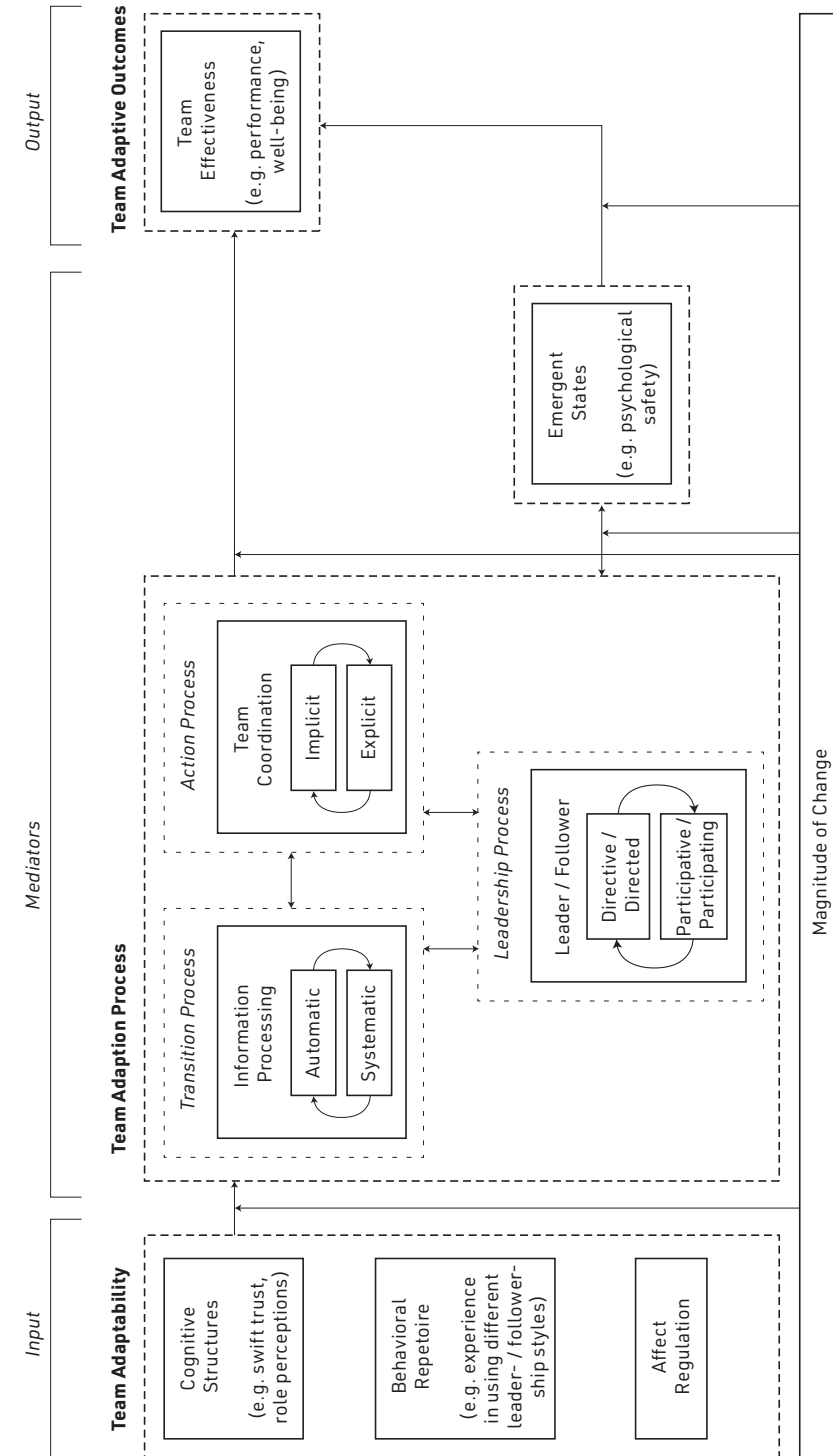


Figure 1.1. Conceptual input-mediator-output (IMO) model of team adaptation

1 team adaptation consists of the modification of strategies within the team (e.g., Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Marks et al., 2000). More recently, scholars have stressed the importance identifying leadership as a key adaptive process that increases team adaptive outcomes (e.g., DeRue, 2011; Uhl-Bien, Marion, & McKelvey, 2007). Thereby, it is argued that teams are adaptive to the extent that teams vary their leading-following interactions as necessitated by situational changes. In sum, while a variety of processes have been related to team adaptation, and while the literature offers many ideas regarding what needs to be adjusted during the adaptation process, recent reviews argue that “the literature currently lacks consistency regarding the content area or focus of team adaptation” (Maynard et al., 2015, p. 655; Baard et al., 2014).

The conceptual model outlined in this dissertation comprises a taxonomy of three generic, key subprocesses of team adaptation that have consistently appeared in conceptual models of team adaptation (e.g., Burke et al., 2006; Marks et al., 2001; Maynard et al., 2015; Rico et al., 2019): (1) the *transition process*, comprising activities directly addressing the environmental change (e.g., collective sensemaking, plan formulation) (2) the *action process*, comprising activities directly addressing goal-directed action (e.g., sequencing and timing team member behavior when performing a task) and finally, (3) the *leadership process*, consisting of recurring patterns of leading-following interactions.

Transition process (information processing). During the transition process, team members engage in activities that directly address the change by assessing the situation and by modifying existing strategies. These activities may include information search (e.g., Burke et al., 2006), collective sense-making (e.g., Klein, Wiggins, & Dominguez, 2010), and planning or strategy formulation (e.g., Marks et al., 2001). The transition process is therefore closely related to collective information processing. Collective information processing is based on individual members’ tendencies to “search for, attend to, select, encode and retrieve information” and refers to the process of disseminating, combining and integrating information at the group level (De Dreu & Beersma, 2010, p. 1111). At the individual level, dual process models suggests that information processing can occur at two different levels (Evans, 2008). For instance, Shiffrin and Schneider (1977) distinguished between automatic and controlled information processing. Automatic information processing is a rigid, fast and effortless way of processing based on previous training and past experiences in similar

1 situations. On the other hand, controlled information processing is slow and effortful as it is based on controlled analytical processing of available information. Controlled information processing therefore provides more flexibility, while at the same time it puts high demands on attentional and cognitive capacity.

At the group level, research similarly suggests that groups can share, combine and integrate information either in a heuristic, automatic or in a controlled, systematic way. For instance, research on motivated information processing in groups (see De Dreu, Nijstad, & van Knippenberg, 2008) shows that groups may rely on heuristics and routine-based interaction when processing information or may search for and process information in a systematic, elaborate and in-depth way. Routine-based information processing is cognitively efficient, as team members rely on pre-established and well-learned associations and make judgments in a quick, effortless way. Research therefore suggests that this type of interaction is beneficial in predictable, non-ambiguous situations, in which the deliberate and effortful scrutiny of the environment is not needed and may, in fact, hinder quick and timely goal attainment (De Dreu & Beersma, 2010). However, when the task is complex and novel, an overreliance on previous established routines and simplified strategies may lead to suboptimal, and at times disastrous, decisions. Instead, in such situations, team members’ need each other’s inputs to assess the situation accurately, to form new routines and to reach high quality decisions (De Dreu & Beersma, 2010). Thus, as the environmental situation changes, groups may need to change their mode of information processing.

Based on this notion, adaptive strategy selection models suggests that not one mode of functioning is superior to the other, but that it is important to adaptively switch between the two information processing strategies depending on situational requirements (Beach & Mitchell, 1978; Payne, Bettman, & Johnson, 1988). For instance, Louis and Sutton (1991) argue that it is important for individuals and teams to be able to sense when a change occurs in their environment to an extent that pre-established routines have become suboptimal, and to flexibly adjust their interactions to maintain high performance levels (see also Stachowski et al., 2009; Uitdewilligen et al., 2018; Uitdewilligen et al., 2013). This however, does not only imply that teams are able to switch to a deliberate mode of information

processing when they encounter unexpected complexities, but also, that they switch back to an automatic mode of functioning when new routines have been developed that fit the novel task situation.

Action process (implicit / explicit coordination). After team members made sense of the situation and formulated a plan on how to perform a task during the transition process, they need to coordinate their goal directed activity during the action phase or action process. The action process comprises activities directly leading to goal accomplishment; for instance, monitoring the progress towards goal attainment, providing back up behavior to other team members while performing the task, or managing interdependent action (Marks et al., 2001). Such activities typically occur through team coordination, defined as “an emergent phenomenon involving the use of strategies and behavior patterns aimed at integrating and aligning the actions, knowledge, and objectives of interdependent members, with a view to attaining common goals” (Rico et al., 2008, p. 163). In the team adaptation literature, scholars have distinguished between implicit and explicit coordination (e.g., Burke et al., 2006; Espinosa, Lerch, & Kraut, 2004; Rico et al., 2019). Implicit coordination occurs when team members anticipate each other’s actions without having to communicate about planning or adjusting their interaction (Rico et al., 2008). This type of coordination thus relies on the existence of a shared understanding of the task requirement and the involved teamwork (i.e., shared mental models; see Utidewilligen, Waller, & Zijlstra, 2010) and is therefore closely related to automatic information processing and habitual patterns of behavior (i.e., routines; Uitdewilligen et al., 2018). Explicit coordination on the other hand, refers to the active management of mutual interdependencies which requires team members to actively communicate about how to execute a common task; for instance, by explicitly articulating plans or defining responsibilities (Espinosa et al., 2004; Rico et al., 2019).

Similar to group information processing activities, recent theorizing suggests that for adaptation to occur, team members need to adapt their joint coordination efforts to match the requirements of a given situation (Grote et al., 2018; Rico et al., 2019). Put differently, as the environment changes, task interdependencies change and as such, coordination mechanisms also need to change. Implicit coordination allows teams to increase the timely and efficient execution of actions during routine, well-defined episodes, as resources do not have to be spend on actively managing interactions. Explicit coordination, on the other hand, is crucial

to effectively handle unexpected complexities, as it allows team members to abandon established routines and find new innovative solutions on how to execute a common task (Rico et al., 2019). Once new solutions have been found and new shared mental models have been established, teams may switch back to implicit coordination until new complexities arise. Adaptive coordination, defined as the adaptive switch between explicit and implicit coordination activities, has thus been argued to be central to team adaptation (Burke et al., 2006; Grote et al., 2018; Rico et al., 2019)

Even though most conceptual models of team adaptation assume a timely sequence of transition and action processes, they generally acknowledge that teams often cycle between transition and action phases when performing a task. For instance, Marks et al. (2001) argue that when teams perform a task, “transition and action phases are not always separate periods and frequently blend into one another” (Marks et al., 2001, p.361). The authors further suggest that although a theoretical distinction between periods in which teams assess the situation and decide how to make decisions and periods in which teams engage in actual decision-making or action activities is possible, a clear delimitation is often difficult in practice. Similarly, Maynard and colleagues (2015) suggest that particularly under severe changes, team members may start acting after an initial transition phase, but may have to go back and revisit their transition process at several stages throughout task execution. As such, information processing tendencies and coordinative activities often go together ‘hand in hand’ and a change in teams’ mode of information processing (i.e., from automatic to systematic or systematic to automatic) is typically accompanied with an equivalent switch in coordinative functioning (i.e. from implicit to explicit and explicit to implicit).

Leadership process. A key role in sensing when a change in teams’ mode of functioning is required and in initiating a switch in team processes is reserved for the team leader. Research on leadership shows that leader behavior directly influences team members’ actions and is therefore often discussed as an important factor in team adaptation and effectiveness (e.g., Burke et al., 2006; Kozłowski, Gully, Salas, & Cannon-Bowers, 1996). Leadership is typically studied in terms of leadership styles, referring to a certain behavioral approach that leaders use to interact with their followers. Two common leadership styles that are often discussed in a contrasting way in the literature, are directive and participative leadership (e.g., Lorinkova, Pearsall, & Sims, 2013; Martin, Liao, & Campbell, 2013;

1 Yun, Faraj, & Sims, 2005). Directive leadership is typically characterized by a hierarchical command structure and associated with behavior aimed at providing followers with clear directions, feedback and expectations to structure their work (Judge, Piccolo, & Ilies, 2004). On the other hand, participative leadership involves empowering followers by involving them in the sense- and decision-making process, which manifests in behavior such as encouraging followers to share information, to express ideas or to raise concerns (Yun et al., 2005).

Contingency theories of leadership have stressed the notion that the effectiveness of a certain leadership style for team functioning and performance may depend on the environmental context (e.g., Bass, 2008; Fiedler, 1978; Vroom & Yetton, 1973). For instance, when teams perform routine tasks under time pressure, directive leadership has been found to facilitate quick and efficient goal attainment by initiating structure, reducing role ambiguity and providing procedural clarity (e.g., Kahai, Sosik, & Avolio, 2004; Lorinkova et al., 2013). As such, directive leadership supports the development of habitual routines and facilitates efficiency in team information processing and coordination activities. In more complex, non-routine situations, on the other hand, research suggests that performance benefits from a participative style of leading, in which team members are encouraged to share their inputs and become involved in identifying and solving problems (e.g., De Dreu & Michael, 2001; Srivastava, Bartol, & Locke, 2006). Participative leadership encourages team members to search for and combine available information in a systematic way and to explicitly articulate how to execute their tasks (i.e., explicit coordination) -- both of which is crucial to generate new ideas and to effectively deal with complexities.

Although traditional leadership theories (e.g., contingency models) emphasize the importance of leader behavior for team effectiveness, scholars increasingly acknowledge that followership is equally important in the leadership process. For instance, a directive leadership can only be effective if followers are willing to defer autonomy to the leader and to obediently execute instructions. Similarly, a participative style of leading requires followers to become actively involved in sense- and decision-making, that is, to share and combine their unique knowledge and to voice suggestions and concerns. Therefore, more recent conceptualizations of leadership regard followers as equivalently active agents that together with their leaders, *co-construct* leadership (Carsten, Harms, & Uhl-Bien,

2014; Uhl-Bien, Riggio, Lowe, & Carsten, 2014). Yet, although leaders and followers may be optimally trained in functioning under a specific leadership style, the question still remains what effective leader- and followership entails in dynamic environments, cycling between simple and complex task situations.

Consistent with the idea that the adaptive application of team processes, rather than one particular mode of operation, is optimal for team effectiveness in dynamic environments (e.g., Grote et al., 2018; Louis & Sutton, 1991), recent theorizing suggests that effective leader- and followership depends on leaders' and followers' ability to adaptively switch between different behavioral styles as the situation changes (Waller et al., 2020). Both, leaders and followers, must therefore understand and decide when a change in behaviors is necessary and transition to a different mode of functioning. During simple, well-known episodes, leaders may adopt a directive leadership style, while followers may obediently follow their leaders' instructions, in order to ensure the efficient and timely execution of standardized procedures. However, when complexities arise, a single individual leader may not have all the skills and knowledge necessary to make optimal decisions. Team effectiveness in such situations is therefore likely to benefit from a participative style of leading, whereby followers share their unique expertise and become actively involved in making decisions and in developing new routines. Similarly, when complex episodes are followed by simple, routine episodes, leaders may switch back to a directive style of leading and followers may switch back to a passive style of following, where team members defer autonomy and authority to their leader.

A directive leader – directed follower dynamic is thus closely related to an automatic mode of information processing and implicit coordination, in which team members rely on information provided by the leader and efficiently execute standardized procedures. On the other hand, a participative leader – participating follower dynamic is reflected in team members' active involvement in systematically processing available information and in articulating how to execute the task. As such, a switch in respective leading-following interaction is likely to facilitate a switch in teams' mode of information processing and coordinated action. This switch in leadership may not only be initiated by the formal team leader, but rather is a dynamic, reciprocal process that stems from the interactions of all team members (DeRue, 2011). For instance, a change in followers'

mode of functioning in response to a situational change (e.g., a switch from passive to active followership due to unexpected hindrances in executing a standardized protocol) may signal to the leader that a transition from directive to participative behavior is required. At the same time, a transition in the behavioral style of the team leader can only be effective if it is matched with a compatible transition in the behaviors of the team members and vice versa (DeRue, 2011; Uhl-Bien et al., 2014; Waller et al., 2020).

Emergent states. Next to team processes, emergent states serve as an important mediator in the team adaptability – team adaptive outcome relation. Emergent states are generally defined as cognitive, motivational, and affective states of the team that result from team member interaction (Burke et al., 2006; Christian et al., 2017; Marks et al., 2001). As they do not represent interaction, emergent states are not processes in themselves but rather a product of the experiences that *result from* team member interaction (e.g., communication) (Marks et al., 2001). Emergent states are therefore not only direct outcomes of team processes but can also serve as direct inputs to subsequent processes. For instance, when team cohesion is low, team members may be less likely to share their unique information, which in turn, may further lower the team cohesion and willingness to engage in subsequent information exchange.

Among the variables that consistently appear as a central emergent state in theoretical and empirical research on team adaptation, is psychological safety. Psychological safety is generally defined as the shared belief among team members that it is safe to take interpersonal risks (Edmondson, 1999). Research suggests that psychological safety facilitates adaptive performance by providing team members with the necessary confidence to take appropriate action (Burke et al., 2006). In fact, much of the behaviors that are required from team members to effectively adapt to changing situational demands comprise interpersonal risks (Edmondson & Lei, 2014). For instance, when complexities arise, team leaders may need to admit own uncertainties about how to proceed, while team members may need to raise concerns about ongoing procedures and offer new suggestions -- all of which includes the risk of being rejected or perceived as incompetent by others. As such, psychological safety seems crucial in enabling team leaders and members to adaptively transition in their mode of interaction as the situation changes, while there exists a reciprocal relation between adaptive processes and psychological safety.

Team Adaptability

In order to effectively make required adjustments in interactions during the team adaptation process, teams need to have the ability to make such changes. Team adaptability -- defined as the teams' capacity to adapt in response to a change -- is therefore an important antecedent or input factor of team adaptation. This conceptualization is consistent with previous theoretical work, which argues that team adaptation and adaptive outcomes depend on teams' ability to cope with an event that demands adaptation (Maynard et al., 2015; Rico et al., 2019). Although many variables have been discussed in the context of team adaptability, in this dissertation I introduce three critical subcomponents of team adaptability, that have been previously discussed in the extant team effectiveness literature and that represent key principles of social interaction: Cognition, behavior and affect (cf., Breckler, 1984).

Cognitive structures. In the team adaptation literature, cognitive structures are often characterized as important antecedents of team adaptation (Burke et al., 2006; Marks et al., 2000; Stagl et al., 2006). They are generally defined as knowledge structures that team members possess regarding their team or task and thus, represent individuals' understanding about the task requirements or team interactions that are associated with a specific task situation (Uitdewilligen, 2011). Based on previous experiences or past interactions in similar task situations, each team member enters the team task with their own cognitive schema regarding their task or team. The compilation of individual team members' knowledge structures in turn, shapes subsequent interaction patterns between members (Cannon-Bowers et al., 1993). Cognitive structures may thus hinder or facilitate the adaptation process and often need to flexibly change in order for the team to respond effectively to changing demands (Marks et al., 2000; Uitdewilligen, 2011).

Cognitive structures generally relate to team adaptation by influencing which cues team members pick up, how they interpret these cues and how they react in response to them. For instance, as explored in Chapter 2 of this dissertation, team members' swift trust -- defined as an initial, cognitive form of trust (Crisp & Jarvenpaa, 2013) -- may influence how systematically team members' search for, encode and integrate information provided by others. Additionally, as shown in Chapter 3 and 4, based on team members' perception of their follower role in relation to their leader, individuals form a mental representation of leader- and followership that

1 result in expectations and implicit assumptions about prototypical leader and follower behavior (cf., Epitropaki, Sy, Martin, Tram-Quon, & Topakas, 2013; Shondrick & Lord, 2010). These mental representations shape individuals interaction; for example, if team members are well experienced in functioning under a specific leadership style, they may be reluctant or have difficulties switching to a different form of leading and following. In sum, cognitive structures serve as an important input factor to team adaptation, but may also be updated or change over time as a function of team members repeated interaction.

Behavioral repertoire. Next to cognitive structures, another input factor that adds to the teams' capacity to adapt is team members' behavioral repertoire. As previously outlined, effective adaptation does not so much depend on one mode of team interaction but instead, is based on teams' ability to switch between different modes of functioning in response to changing environmental demands. With behavioral repertoire, I thus refer to the compilation of behaviors that team members have used in the past, which comprise and influence their capability of using these behaviors in the future. For instance, as shown in Chapter 3 and 4 and in line with recent developments in the training literature (Marks et al., 2000), effective training interventions aimed at enabling and facilitating team adaptation, comprise the development of a wide repertoire of team member behavior. That means, team members must not only learn to recognize that a change in behaviors is required, but must also possess the behavioral repertoire needed to select and adopt those behaviors that are appropriate in a given situation (e.g., obediently following leaders' commands or becoming actively engaged in identifying problems and finding solutions).

Affect regulation. Another factor underlying team adaptability comprises team members' ability to regulate their initial tendencies in appropriate ways. For instance, threat-rigidity theory assumes that when teams face a threat (e.g., an unexpected event), they become more rigid and narrow their focus (Staw, Sandelands, & Dutton, 1981). In line with these propositions, previous research has shown that when individuals experience stress, team members are more restrictive in their information processing, adopt a hierarchical leadership structure, engage in less group discussion and reduce explicit coordination (Kamphuis, Gaillard, & Vogelaar, 2011). Yet, as previously outlined, it often is detrimental for team effectiveness if teams do not take the time to integrate their distributed expertise and to plan and strategize when unexpected events occur (De Dreu & Michael,

2001; Srivastava et al., 2006). Thus, team members need to recognize and potentially overrule initial cognitive and behavioral tendencies in order to enable and facilitate team adaptation. It therefore seems important that team members possess high levels of self-awareness and self-regulation abilities (cf., emotional intelligence, Wong & Law, 2002).

Team Adaptive Outcomes

Team adaptive outcomes can broadly be defined as the consequences of team adaptation, and more specifically, as the impact of team adaptation on team effectiveness. What team effectiveness entails may differ depending on the business sector, the level of analysis (i.e., individual-, team-, organizational level), or the team type. Although performance is one of the most studied outcomes of team adaptation and often equated with team effectiveness (e.g., Baard et al., 2014; LePine, 2003), team effectiveness may also comprise other outcomes, such as team member affective reactions (e.g., satisfaction, well-being, turnover intentions), or a combination of such outcomes (Maynard et al., 2015). As team adaptive outcomes represent the consequences of team adaptation, they are based on the effective modification of team processes over time. Thus, team adaptive outcomes can only be effectively studied by applying longitudinal research designs with multiple measurement occasions. Measuring team adaptive outcomes cross-sectionally provides limited information regarding teams' sustainable effectiveness in dynamic environments.

Magnitude of change

Recent theorizing suggests that while prior research has predominantly focused on examining the characteristics of the task and the team on adaptation, surprisingly empirical research has examined how the nature of the change impacts team adaptation processes and outcomes (Baard et al., 2014; Christian et al., 2017; Maynard et al., 2015). Most commonly, scholars have characterized changes by their magnitude. For instance, Kozlowski et al. (1999) suggested that changes can vary in the magnitude of their disruption, ranging from incremental or low (e.g., a change in client requirements) to radical or high (e.g., severe downsizing due to a loss in resources). Additionally, Maynard and colleagues (2015) argued that change severity may comprise different factors, including change importance or the extent to which the change disrupts existing structures across situations and time (e.g., change frequency, change duration, at what point within the team's lifecycle the change occurs). More recently,

1 Sanchez-Manzanares, Rico, Antino, and Uitdewilligen (2020) suggested that changes may vary in the extent to which the characteristics of a team's environment are modified over time.

In addition to the magnitude of change, scholars have discussed changes in terms of other features, including their complexity, ambiguity and novelty (Baard et al., 2014), whether they affect factors within (internal) or outside (external) the team (Maynard et al., 2015), and their duration (temporary vs. sustained) (Christian et al., 2017). Yet, in their recent conceptual paper, Rico et al. (2019) argue that the most parsimonious way of understanding and conceptualizing task changes is to characterize them in terms of task complexity variations. The reason for this is that focusing exclusively on the nature of the change does not explain why teams respond and adapt in different ways to the same change. In order to understand why change characteristics differently impact adaptive processes and outcomes, it is therefore important to explore how teams make sense of and interpret task changes.

In an attempt to explore how teams understand tasks (and task changes), Hærem, Pentland, and Miller (2015) argue that task features can and should not be separated from team member behavior and the team context. Team members interact with their tasks (e.g., processing information, coordinating interdependent actions) when performing them; as such, it seems important to examine the interdependent nature between task changes and team members' cognitions and actions, rather than characterizing task changes independently. Hærem et al. (2015) therefore conceptualize tasks as networks of information cues and required actions, processed or carried out by team members. The number of pathways in the task networks thereby provide an index of task complexity, such that the more information needs to be processed and the more action is required by members (i.e., the more pathways exist), the more complex the task. Following this conceptualization, task changes essentially alter the number of pathways in the task network. Thus, in accordance with Rico et al. (2019) and Hærem et al. (2015), I regard the magnitude of change as the most parsimonious way to characterize a change, which I define as the extent to which the change influences the complexity of the task (i.e., increasing or decreasing the number of pathways in the task network).

1 The extent to which a task change alters the task complexity in turn, is likely to moderate the relation between teams' ability to adapt and the actual process of team adaptation, as well as the relation between team adaptation, emergent states and team adaptive outcomes. First, the more a change alters the complexity of the task, the less likely it will be that teams with a lower adaptability are able to successfully initiate and facilitate the team adaptation process. That is, when task complexity is altered to a lesser extent, less modification in team interaction is needed to successfully deal with new demands and thus, even teams with little adaptability may still be able to effectively adapt. On the other hand, when the magnitude of change is high and more drastic modifications in team processes are needed, the effective adaptation of key team processes is likely to be more dependent on teams' capacity to adapt.

Additionally, the magnitude of change is likely to influence the relation between team adaptation and adaptive outcomes. As Christian and colleagues (2017) argue and show in their meta-analytic review, the more a change disrupts existing processes, the more it requires adaptive responding in order for teams to increase their adaptive outcomes. Following this notion, the importance of the actual process of team adaptation (i.e., modification of team interaction) increases, with increases in demands for adaptive responding. For instance, when a change drastically increases the number of pathways in the task network, team members may need to process information more systematically, coordinate their actions more explicitly, and participate more actively in solving problems and finding solutions in order to increase adaptive outcomes, than when the task structure is only mildly altered.

Further, the relation between adaptive processes and emergent states is also likely to be stronger when the magnitude of change is high. The more a change increases the complexity of a task, the more are team members required to interact with one another in order to adapt current processes. This increase in interaction is likely to facilitate the emergence of cognitive, motivational, and affective states that result from team members' interaction (i.e., emergent states). Emergent states in turn, influence subsequent team interaction that may hinder or enable successful adaptation. As such, the relation between team adaptation, emergent states and team adaptive outcomes is likely to be stronger when the magnitude of change is high.

Summary

To summarize, team adaptation comprises the modification of key team processes (i.e., transition process, action process, leadership process) and can be organized within an input-mediator-output model. The 'mediator' part consists of the actual process of team adaptation as well as emergent states. The team adaptation process refers to the adaptive application of key team processes in response to and in congruence with a change in situational demands. To increase team effectiveness in simple, well-defined task situations, team members may rely on automatic information processing, implicit coordination and a hierarchical leadership structure (i.e., directive leadership, obedient followership). When complexities arise, team effectiveness is likely to benefit from a switch to systematic information processing, explicit coordination and decentralized leadership (i.e., participative leadership, active followership). Emergent states are the proximal mechanisms of team adaptation, as they result from and vary with team member interaction. Team adaptability (i.e., teams' capacity to adapt) represents the input to team adaptation, and team adaptive outcomes describe the consequences of team adaptation. Finally, the extent to which a change alters the complexity of a task (i.e., magnitude of change) is likely to influence the relation between team adaptation inputs, mediators and outcomes.

Aim and outline of this dissertation

Although research on team adaptation has accumulated in the past years, empirical investigations on the actual process of team adaptation and on how this effects adaptive outcomes over time, remains limited. In the interest of advancing current team adaptation research, the aim of this dissertation is threefold. First, I aim to explore the relation between team adaptability and the actual process of team adaptation by investigating how aspects of team adaptability (in particular, teams' cognitive structures and behavioral repertoire) lead to team member behaviors that enable and facilitate team behavioral adaptation processes. Second, I aim to investigate the contingency of team member behaviors in encouraging team effectiveness in dynamic environments over time. Third, I aim to explore boundary conditions and underlying mechanisms in the relation between team adaptation and team adaptive performance. To address these aims,

the following chapters in this dissertation present empirical studies that explore aspects of the behavioral input-mediator-output model of team adaptation outlined above.

Chapter 2 of this dissertation adds to the first two research aims and investigates the role of swift trust on teams' mode of information processing and team performance in dynamic environments. In the literature, swift trust has been conceptualized as an initial form of trust that is based on cognitive processes comprising beliefs about other members' dependability, reliability and capability (Crisp & Jarvenpaa, 2013). While previous research on team adaptation generally suggests that trust is inherently positive for team adaptation (e.g., via its positive impact on team psychological safety; Burke et al., 2006), other research suggests that too much trust can harm team performance in ambiguous, complex environments (e.g., Langfred, 2004). In Chapter 2, we² shed light on these inconsistent findings by exploring how swift trust influences team members' motivation to search for and to process information in an automatic or systematic manner. We further explored whether teams' mode of information processing (i.e., automatic or systematic) is contingent on the task situation, such that it facilitates team performance in simple, routine tasks but hinders team performance in complex, novel task situations. Thereby, Chapter 2 focuses on the first two research aims by (a) exploring the relation between team members' cognitive structure (i.e., swift trust) and team adaptive processes (i.e., information processing) and (b) investigating the situational contingency of effective member behaviors (i.e., automatic vs. systematic information processing) in dynamic environments.

Following these first two research aims, in **Chapter 3**, we developed and tested a predictive model of adaptive followership and team adaptive performance. Our model builds on the idea that follower entrainment to a previous leader impacts follower behavior under subsequent leaders and thereby, influences team adaptive performance. With 'follower entrainment', we refer to team members' experience in functioning under a specific leadership style during early team interaction and assume that interaction patterns that develop during early phases persist even if conditions change (e.g., change in leadership or the task situation). Additionally, we examined whether follower role perceptions mitigate the causal chain described

² I use the term 'we' instead of 'I', since the studies reported in the empirical chapters of this dissertation were conducted together with several co-authors.

1 above and how the effectiveness of active follower behaviors (i.e. voice, sharing task-relevant information) may differ depending on the complexity of the task teams face. We empirically tested this model across two studies. First, we rigorously tested the theorized effects in a controlled laboratory setting; second, to estimate the generalizability of findings derived from Study 1, we surveyed employees from various occupational settings. Thus, in Chapter 3 we focus on the first two research aims by exploring followers' role perceptions and experience in using different follower behaviors as important antecedents of adaptive followership and by investigating the role of adaptive followership on team performance in a dynamic task context.

Chapter 4 extends findings of Chapter 3 and primarily explores the third research aim. In this chapter, we investigated change magnitude as a potential boundary condition and leader psychological safety as a potential underlying mechanism in the adaptive followership-team adaptive performance relation. More specifically, we explored the impact of an adaptive followership training on leader psychological safety and team adaptive performance after an unexpected change by comparing groups who received an adaptive followership training to groups who received a control training. In Chapter 4 we further investigated whether the importance of the adaptive followership training and leader psychological safety was contingent on the magnitude of the change teams faced.

Finally, **Chapter 5** provides a summary of the main study findings and discusses their theoretical and practical implications. The chapter further discusses limitations of the research conducted in this dissertation and outlines directions for future research.

General contributions

This dissertation uses an input-mediator-output model of team adaptation as the theoretical basis to investigate what factors increase teams' adaptability, to explore team adaptive processes and to study how this influences team effectiveness over time. The empirical studies presented in Chapters 2, 3 and 4 are based on rigorously controlled, laboratory designs, and make use of behavioral observation methods and repeated observations to explore how teams respond to environmental changes as they occur and

1 to investigate how this affects team adaptive performance over time. By doing so, findings of this dissertation contribute to existing research in at least four main ways.

First, the reported studies empirically explore the notion that team adaptation depends on the adaptive application of team member behaviors related to three key team processes (i.e., information processing, coordination, leadership) -- a theoretical proposition consistently made in previous conceptual papers (Grote et al., 2018; Louis & Sutton, 1991; Rico et al., 2019; Waller et al., 2020). Second, the presented studies are based on an event-based research approach (Morgeson, Mitchell, & Liu, 2015), in which the environmental situation dynamically changes between simple and complex task situations (see Chapter 2 and Chapter 3). This approach acknowledges the dual nature of dynamic environments and study findings therefore provide called for insights regarding what constitutes effective team behaviors to meet both, efficiency and flexibility demands (see Grote et al., 2018). Third, Chapter 4 examines the role of change characteristics in team adaptation. Given its theoretical importance, this topic has received surprisingly little empirical attention to date. Fourth, in line with recent conceptualizations of leadership as a dynamic, reciprocal process, findings of Chapter 3 and 4 provide unique empirical insights into the role of followership in *co-constructing* adaptive leadership and team adaptation. On a final note, I hope that the theoretical framework, the research methodology and study findings of this dissertation not only contribute to the existing literature, but also provide a promising path to guide the direction for future research and practice.

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CHAPTER 2

The value of low swift trust for information processing and performance of temporary teams

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Abstract

This study investigates the team processes that transmit the effect of trust on team performance. Building on the motivated information processing in groups model, we propose that low swift trust increases team members' motivation to process information elaborately, which in turn benefits performance in non-routine situations. Using a mixed repeated measure design with 40 teams performing routine and non-routine decision-making tasks under manipulated conditions of low and high swift trust, we find that teams receiving the low swift trust manipulation, processed information more elaborately than teams in the high swift trust condition. This in turn, increased performance in non-routine tasks but did not influence performance when performing routine tasks. This study extends past individual level research on trust and strategic thinking to the team level and identifies information processing as an important mediator in the trust-team performance relation.

Organizations often employ temporary teams (e.g., medical teams, firefighters, crisis management teams) in order to deal with the complexity, dynamism and uncertainty of their environments (Huber, 2004; Stachowski, Kaplan, & Waller, 2009; Uitdewilligen, Waller, & Zijlstra, 2010). These teams typically consist of skilled experts who work together for a finite time span in order to manage unexpected occurrences and emergencies. In many cases, temporary teams assemble ad hoc on an 'as needed' basis to provide a rapid, high-quality solution to complex problems under high levels of uncertainty. In order to do this effectively, team members need to tightly coordinate their actions, rely on each other's contributions and work interdependently towards quick and accurate task execution (Uitdewilligen, Waller, & Pitariu, 2013; Zijlstra, Waller, & Phillips, 2012).

Such interdependencies require trust among team members in order to promote information sharing and facilitate coordinative and cooperative activities (De Jong & Elfring, 2010; Meyerson, Weick, & Kramer, 1996). Previously, trust has been mainly conceptualized as a process that develops over time (e.g., through familiarity, shared experiences, and reciprocal disclosure) (Rousseau, Sitkin, Burt, & Camerer, 1998). Yet, in newly formed temporary teams traditional sources of trust are largely absent (Meyerson et al., 1996). In such teams, trust is imported swiftly based on "cognitive processes that emphasize beliefs in the other party's capability, reliability, and dependability" (Crisp & Jarvenpaa, 2013, p. 45). Swift trust thus equips teams with the initial cognitive confidence that is required to work interdependently together but needs verification and calibration through interaction (Crisp & Jarvenpaa, 2013; Jarvenpaa, Knoll, & Leidner, 1998). It is therefore "not so much an interpersonal form as it is a cognitive and action form" (Meyerson et al., 1996, p. 191).

Although recent meta-analytical evidence suggests a moderate positive correlation between team trust and team performance (Breuer, Hüffmeier, & Hertel, 2016; De Jong, Dirks, & Gillespie, 2016), primary empirical examinations in a temporary team context have yielded mixed findings, suggesting that trust positively impacts performance outcomes in some situations but hinders performance in others (Jarvenpaa, Shaw, & Staples, 2004; Langfred, 2004; Lowry, Schuetzler, Giboney, & Gregory, 2015). However, research on situational contingencies and behavioral processes that follow initial trusting beliefs and that transmit the effect of trust on team performance outcomes remains limited.

In this study, we propose that low levels of swift trust in other members' reliability, competence and professionalism will increase team members' motivation to process information more elaborately, which in turn benefits performance in non-routine decision-making tasks. By low swift trust, we refer to low expectations in and a lack of willingness to act upon others words and actions, rather than negative expectations about others' bad intentions (i.e., distrust; Lewicki, McAllister, & Bies, 1998). Figure 2.1 depicts our research model. We provide support for these assumptions in a mixed repeated measure design with 40 student teams performing routine and non-routine decision-making tasks under manipulated conditions of low and high swift trust. Thereby, we provide important insights into how swift trust influences a team's strategic thinking and reveal contextual factors that limit the benefits of trust in a team context. That is, a) lower swift trust is associated with more effortful, systematic team information processing and b) this is crucial for effective performance when teams perform complex non-routine decision-making tasks.

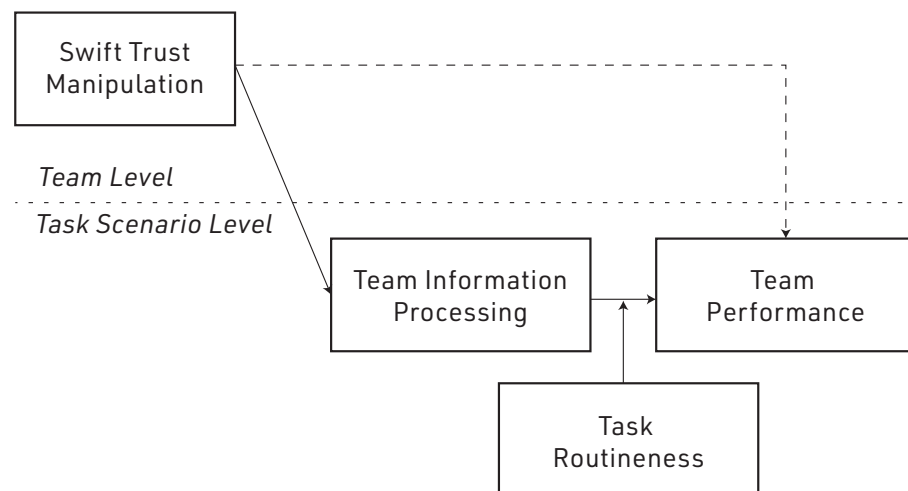


Figure 2.1. Research model

Theoretical background

Thoughts and actions under trust

Previously, scholars have begun to question the universally positive effects of trust. At the individual level, a number of empirical studies provide support for the notion that trust and distrust lead to different information

processing tendencies (e.g., Schul, Mayo, & Burnstein, 2004; Schul, Mayo, & Burnstein, 2008). Distrust is generally defined as “confident negative expectations regarding another’s conduct” (Lewicki et al., 1998, p. 439) that are associated with fear and a tendency to assume sinister intentions underlying others’ words and actions. Findings of these studies revealed that trust increases people’s tendency to rely on previously made hypotheses and assumptions and to make use of previous heuristics and categories when making a decision (J. Mayer & Mussweiler, 2011; Posten & Mussweiler, 2013). Distrust on the other hand, was found to increase the activation of multiple categories (Friesen & Sinclair, 2011), to enhance cognitive flexibility (Posten & Mussweiler, 2013), to increase the likelihood of alternative generation (Schul et al., 2004) and to facilitate the development of creative and non-routine solutions in decision-making tasks (J. Mayer & Mussweiler, 2011; Schul et al., 2008). In other words, information processing tendencies are becoming more complex under distrust, as opposed to trust, since individuals are less likely to take incoming information at face value and are more motivated to examine the credibility of this information by considering alternative explanations. However, although this research offers a promising approach on how a mental state of trust influences individuals’ immediate strategic thinking, it remains unclear whether and how these findings can be translated to teams.

Motivated information processing in groups

One prominent theory that offers insight into how teams process information is the motivated information processing in groups model (MIP-G; De Dreu, Nijstad, & van Knippenberg, 2008). The MIP-G regards groups as information processors (see Hinsz, Tindale, & Vollrath, 1997) and assumes that group decision-making is a function of individual- and group-level information processing tendencies. Individual level information processing can be defined as an individual’s tendency to “search for, attend to, select, encode, and retrieve information from outside the group boundary, from other group members, and from memory” (De Dreu & Beersma, 2010, p. 1111). These individual information processing tendencies influence group-level information processing, where information is disseminated and combined in order to form a collective decision. In line with dual-process theories of judgement and decision-making (e.g., Evans, 2008; Smith & DeCoster, 2000), the MIP-G assumes that individuals and groups differ in how elaborately and systematically they process information. On the one hand, groups can process information in a heuristic and shallow way; for instance, by relying on past associations or rule of thumbs when sharing

and integrating information to come to a decision. On the other hand, group members may process information deeply by engaging in full exchange of information, detailed assessment of the accuracy of information, and systematic integration of shared information.

Past research has shown that whether a group processes information elaborately depends on the team members' perceived need to do so. For instance, De Dreu and Beersma (2010) found that when group members were confident in their team's ability to make a high quality decision, teams search and process information in a heuristic manner by relying on shortcuts and previously established routines. However, when teams lacked confidence, members felt a need to receive a rich, thorough, and correct understanding of the task in order to ensure good performance.

Swift trust and motivated information processing in temporary teams

Extending this argument and building on individual level study findings, we propose that the level of swift trust in temporary teams may be an important precursor for information processing at the team level. In the current study, we investigate information processing in decision-making tasks with an incentive structure that facilitates cooperative motivation (De Dreu & Beersma, 2010; Hollenbeck et al., 2002). Therefore, we focus on low trust rather than distrust among team members, as the latter is associated with the assumption that others have sinister intentions, which is less likely to occur in cooperative settings (Lewicki et al., 1998). Yet, although we would like to point out that we regard distrust and low trust as conceptually different (see also Dimoka, 2010; Lewicki et al., 1998); we assume that both constructs are likely to manifest similarly at a behavioral level in temporary teams operating in an environment in which task characteristics and incentive structure facilitate cooperation. That is, individuals follow a more complex information processing strategy when experiencing low trust in other members in order to deal with potentially invalid information (De Dreu et al., 2008; Schul et al., 2004, 2008). Hence, under low trust conditions, team members are likely to engage in scrutiny of each other's inputs and engage in effortful integration of information in order to achieve an accurate understanding of the situation. On the other hand, trusting team members and perceiving the team to be competent and capable should increase team members' belief in the ability of the team to attain its goals successfully (De Jong et al., 2016; Marks, Mathieu, & Zaccaro, 2001) and thus, lower their tendency to systematically process and share information. A lack of swift

trust however, should raise team member's doubts about whether to rely on the input of other team members. Thereby low swift trust increases team members' tendencies to process information in a thorough and elaborate manner.

Recent empirical studies provide first evidence in favor of this prediction. For instance, in a study by Langfred (2004), self-managing MBA student teams that reported low trust in their team members, reported high monitoring behavior in comparison with lower trusting teams. Monitoring in turn was positively related to performance when team members reported high individual autonomy but decreased performance when individual autonomy was low. Langfred (2004) explained his findings by arguing that the more independently and autonomously team members work, the more monitoring is needed to avoid coordination losses and mistakes. Similarly, an experimental study on virtual teams by Lowry et al. (2015) found that teams receiving a distrust manipulation outperformed teams that did not receive the manipulation in a non-routine decision-making task. However, there was no difference in performance between the teams when performing routine tasks. In line with Schul et al.'s (2008) findings the authors argue that distrust "heightens the use of non-routine mental actions that are valuable in solving non-routine problems" (Lowry et al., 2015, p. 742). We extend this notion and argue that high initial trust in other team members' credibility, competence, and reliability is likely to manifest itself in a shallow and heuristic way of information processing -- less complexity in sharing and integrating information and a reliance on routinized communication patterns. Low swift trust on the other hand, is likely to increase people's awareness to team members' inputs and reduces their confidence to be sufficiently prepared to solve a task successfully. Therefore, we propose:

Hypothesis 1: Teams receiving the low swift trust manipulation will engage in more elaborate information processing at the team level, in comparison to teams receiving the high swift trust manipulation.

Swift trust and team performance: Task situation as a moderator

Next to examining the effects of swift trust on team information processing strategies, another objective of this research is to investigate why and when team information processing strategies, and therewith swift trust, benefit

or hurt team performance. Past work on the MIP-G has identified situational factors that determine the effectiveness of the two information processing modes of teams (i.e., shallow vs. deep processing). De Dreu et al. (2008) argued that when teams are performing routine tasks, team member inputs are less crucial to reach a high quality decision, and consequently a thorough dissemination and integration of information is also less critical. Routine tasks are familiar to the team and team members can deal with them effectively by using the same interaction patterns that have previously proven to be successful. In such predictable environments, deep-level information processing is not required and teams can rely on established heuristics and routines to reach a high quality decision. In fact, a shallow and heuristic way of processing is preferred in such situations, since it allows team members to devote time and energy into the quick and efficient coordination of information exchange (De Dreu & Beersma, 2010; Tasa, Taggar, & Seijts, 2007).

Conversely, when working on non-routine tasks, a thorough and systematic analysis of the available information is needed to perform successfully: Non-routine events are complex and require an adjustment of previously established interaction patterns (Uitdewilligen et al., 2013). Thus, to perform successfully, team members need to exchange additional insights and re-prioritize information to adjust their decision-making strategy. As a matter of fact, prior research has shown that team performance particularly benefits from thorough information dissemination and alternative thinking when teams execute non-routine decision-making tasks (De Dreu & Beersma, 2010; Kerschreiter, Schulz-Hardt, Mojzisch, & Frey, 2008). Taken together, elaborate information processing is likely to enable teams to make more accurate decisions when performing non-routine tasks. However, when performing routine tasks, heuristic information processing should lead to equally accurate decisions. Following this line of reasoning and building on previous research, we propose:

Hypothesis 2: Task routineness moderates the relationship between team information processing and team performance. Specifically, we expect the relationship to be significantly weaker when teams are working on a routine task compared to when teams are working on a non-routine task.

Method

Sample

The sample consisted of 136 undergraduate psychology students from a Western European University, who took part in this study as part of an elective course in their curriculum. Students were randomly assigned to 40 three or four person teams. Participant's age varied between 19 and 27 years ($M = 21.97$, $SD = 1.57$). The sample was primarily female (73.2%) and from similar cultural backgrounds (43.5% Dutch, 42.0% German, 10.2% other). Demographical data was missing from six participants, who did not fill in the pre-questionnaire. Each team completed four scenarios of the simulation task (described below) for a total of 156 team level observations (one audio recording file was disrupted). The best three performing teams received a small prize in a subsequent lecture; no other incentives were offered.

Task overview

Teams worked with a modified version of the Maastricht University Emergency Management Simulation (MUEMS). MUEMS is designed to simulate complex real-world decision-making scenarios, and is comparable to other decision making tasks used in experimental research (e.g., Homan, van Knippenberg, Van Kleef, & De Dreu, 2007b; Mohammed, Hamilton, Tesler, Mancuso, & McNeese, 2015). Participants were placed in the role of first-responders to emergency situations and must work together as a team to make optimal decisions. The overall aim of each task scenario is to minimize the impact of fires, while keeping the amount of costs as minimal as possible. For the purpose of this study, MUEMS teams consisted of a fire commander, a chemical specialist and a police officer, each holding unique knowledge and expertise necessary for making task related decisions. The distribution of knowledge was unknown to teams prior to interaction, thereby creating an individual level problem comparable to a hidden profile situation (Stasser & Titus, 1985, 1987). For example, the fire commander possessed knowledge about the number of available fire trucks in each fire station, the police officer had information about which roads to block in order to get to these fire stations and the chemical specialist could calculate the risk of other buildings catching fire. To simulate individual expertise, participants learned how to make simple cost calculations relating to their role. For instance, the fire commander learned to calculate building damage costs, the chemical specialist learned how to calculate the effects of

various chemicals, and the police officer learned when to close routes and how much costs was associated with this. All costs were weighted equally in the final performance score, representing a cooperative motive structure.

Procedure

An overview about the study procedure is depicted in Figure 2.2. The study received ethical approval by the local ethical review board (#ECP-145 08_02_2013_A1).

Pre-phase. One week prior to the experimental session, students were invited to fill in an online questionnaire to collect demographical and personality data of participants (i.e., age, gender, nationality, disposition to trust). Participants were randomly assigned to groups of nine to a timeslot for an experimental session in the laboratory. Upon arrival, we randomly divided participants into two or three teams and randomly assigned them to the different individual roles. In case a student did not show up to the session, four person teams were formed, whereby two persons were assigned to the role of the fire commander.

Individual training phase. Participants received information on their role and instructions on how to conduct role-specific cost calculations by watching a short explanatory video. This information was also summarized on a role instruction sheet and handed out to participants. Subsequently, students answered questions that tested their individual role expertise (hereafter referred to as *role test*). The role questions were asked in multiple choice format and were recorded digitally via an online platform.

Trust manipulation. Team members received the trust manipulation after the individual training through a false-feedback protocol prior to team interaction. The wording of the manipulation was based on an established cognitive trust measure (McAllister, 1995). Participants received false feedback about their own, as well as their team members' performance in the role knowledge test. In the high swift trust condition, participants were told that both, their own and their team members' performance in the individual role knowledge test provided a good basis for the upcoming team tasks. In the low swift trust condition, participants were told that their own performance provided a good basis for the upcoming team tasks, whereas at least one of their team members made multiple mistakes during the role performance tests, implying that they may have not fully grasped the breadth of their role tasks and responsibilities. Knowledge about other

team members' ability on a relevant task has been argued to be an important precursor of people's initial trusting beliefs prior to team interaction (McKnight, Cummings, & Chervany, 1998; Webber, 2008). To keep the manipulation salient to participants throughout the full experimental session, the experimenter reinforced this manipulation verbally after participants completed the third scenario. At that time, teams in the high trust condition were told that everyone seems to have understood their individual role, whereas in the low trust condition, team members were told that everyone should check their individual role calculations more carefully during the upcoming team tasks.

Team training phase. After the trust manipulation, team members sat around one table and received two task scenarios, which they had to solve together as a team. Thereby, team members should develop an understanding of how to integrate their unique information and expertise and how to coordinate their actions in order to reach a mutual decision. In between the two scenarios, participants returned to their computers to fill in a short questionnaire.

Team performance phase. Every team worked on four scenarios during the performance phase, two routine scenarios and two non-routine scenarios, which they performed in random order. Routine scenarios were similar to the tasks teams received during the training phase, whereas non-routine scenarios entailed novel elements (e.g. a bomb threat), which required a re-prioritization of information and an adjustment of established strategies and tactics to solve the task successfully. Hence, routine scenarios were more predictable and less complex than non-routine scenarios overall. Participants received a total of 10 minutes per task and a two-minute break between scenarios. Each participant was required to fill in an answer sheet unique to their role, in which they indicated the team's decision before the time limit expired. After participants finished the third scenario, they received a verbal manipulation reinforcement by the experimenter respective to their assigned condition (see *trust manipulation*). Subsequent to this, teams received the final three scenarios.

Pre-Phase	Individual training Phase	Team Training Phase	Team Performance Phase
- Pre-Questionnaire <i>After entering the lab:</i> - Team Formation - Role Distribution	- Role Instructions - Individual Role Training - Individual Role Test	- Scenario 1 - Questionnaire - Scenario 2	Situation Manipulation - Scenario 3 & 4 - Trust Manipulation Reinforcement - Scenario 5 & 6 - Final Questionnaire

Figure 2.2. Procedural overview

Measures

Manipulation check. The manipulation check consisted of a validated 3-item measure for cognitive trust ($\alpha = 0.81$; Webber, 2008), with the wording slightly adapted to be appropriate for the present study. Answers were given on a 7-point Likert Scale (from 1 = *Strongly disagree* to 7 = *Strongly agree*). An example item is: "Given the track record of my team members, I see no reason to doubt their competence and preparation for the upcoming team task". Cognitive trust was measured after the first team interaction task during the team training phase. In line with previous studies (e.g., Langfred, 2004), we regard trust at the team level as the aggregated trust perceptions of individual team members in other members. In other words, team trust reflects the summation of individual trust regardless of the variance among members -- an additive model --, and does not derive meaning from the consensus among individual's perception -- a directive consensus model (Chan, 1998). Hence, to assess cognitive trust at the team level, we calculated the average of individual team members' judgements.

Team information processing. Three master students coded team information processing behavior based on audio recordings made during the experimental team sessions. Out of the 40 recordings, one audio file was corrupted. Therefore, information processing data for this team was not included in the analysis. For the coding, the raters used a behavioral coding scheme that we developed for the purpose of this study. The scheme was based on an existing coding scheme for group information elaboration developed by Homan, van Knippenberg, Van Kleef, and De Dreu (2007a), who define information processing at the team level as the extent to which information is disseminated, processed and integrated to make decisions. Following this definition, our coding scheme consisted of

three main categories: information dissemination, information integration and information generation. Information dissemination involved sharing simple facts or decision-making without providing context or reasoning. Information integration was coded when team members built up on each other's statements to e.g. prioritize information or to contextualize information pieces. Information generation occurred when teams did not only integrate their different input's but also identified current problems and generated new ideas and strategies in order to solve them. Consistent with the approach that higher scores represent higher levels of information processing (Homan et al., 2007a), all three categories received a different weighing score respective to their level of information processing, i.e. dissemination received a weighing score of 1, integration a score of 2 and generation received a weighing score of 3. To ensure coding validity 20% of the recordings were rated by all three coders. The resulting ICC was .96, which exceeds the conventionally acceptable value of .70 (Dixon & Cunningham, 2006).

Team performance. Decision accuracy per scenario represents the costs a team made per scenario relative to the minimal amount of costs they would have incurred in case they had made the optimal combination of decisions. Scores were z-standardized over each scenario and inverted, so that higher scores reflect higher team performance.

Control variables

Disposition to trust. To control for individuals having inherently higher levels of trust, individual disposition to trust was controlled for, using a 4-item scale (Gefen, 2000). Answers were provided on a 7-Point Likert Scale (ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*). We measured individual's disposition to trust via a pre-questionnaire that participants filled in one week prior to the start of the experiment. An example item of this scale is: "I generally trust people unless they give me reason not to". Reliability analysis revealed a Cronbach alpha of 0.81.

Familiarity. To control for potential familiarity among team members we adapted a 4-item measure by Webber (2008) to the team level. Participants were asked to evaluate their familiarity with all their team members on average (e.g., "How familiar are you with the strengths and weaknesses of you team members?"), using a 5-point Likert Scale (ranging from 1 = *I am not familiar* to 5 = *I am very familiar*), with Cronbach $\alpha = .81$. To assess within-group agreement we calculated r_{wg} , using the expected random variance

for a 5-point scale with a null distribution ($\sigma_{EU}^2 = 2$) (Bliese, 2000). The mean r_{wg} was .75, which is considered acceptable for aggregation (Dixon & Cunningham, 2006).

Team size. We controlled for team size, as team size varied from three to four members depending on the amount of students showing up to the experimental session.

Design and statistical analyses

The experimental setup consisted of a mixed repeated measure design with trust being manipulated between and situations being manipulated within teams. This resulted in four different task scenarios nested within teams. Given the nested data structure, we used a hierarchical linear modeling (HLM) approach (Raudenbush & Bryk, 2002) to test our hypotheses. The dependent variable (team performance), mediating (team information processing) and moderating variable (routineness of the task scenario) were scenario-level variables (Level 1), whereas the independent variable (swift trust) was a team level variable (Level 2). Consequently, our second moderation hypothesis (Hypothesis 3) assumed cross-level interaction (Klein, Dansereau, & Hall, 1994). We estimated our models with the nlme package in R (version 3.4.0), which is well suited to conduct multilevel modeling (Bliese, 2016).

To test Hypothesis 1, we first estimated the intercept-only model (null model) for the dependent variable (*here*: team information processing), while adding the control variables as predictors to the model. This served as a baseline model to which a subsequent model with the manipulated trust condition as an additional predictor was compared to, using a maximum likelihood ratio statistic (Kreft & de Leeuw, 1998). We tested for significant model fit increase, using random-intercept, fixed-slope models (Bliese, 2016). To test our moderation hypotheses (Hypothesis 2), we added the interaction term to the model and allowed the slope to vary across teams (random-intercept, random-slope model) (Bliese, 2016). Simpler models that included the independent variables as predictors only, served as means of comparisons for a more complex model that included the interaction term. Again, we compared models using a maximum likelihood ratio statistic. To examine the effects of the slopes separately, we conducted a simple slope analysis with the Pequod package in R (version 3.4.0).

Results

Manipulation check and descriptive statistics

Results of an independent samples t-test revealed that teams in the low trust condition ($M = 5.56, SD = .62$) did not report significantly lower levels of cognitive trust than in the high trust condition ($M = 5.37, SD = .87, t(38) = -.78, p = .44$) after the first team interaction. This suggests a potential problem with the validity of our trust manipulation. However, as detailed below we did obtain a significant main effect of trust on information processing, as predicted, which provides evidence for the validity of our manipulation. We discuss this issue in depth in the Discussion.

For initial data examination, we conducted a descriptive analysis. Table 2.1 displays means, standard deviations and inter-correlations among study variables. Swift trust refers to the manipulated condition. Since task routineness was manipulated within teams, average scores across routine and non-routine tasks were computed for team information processing and team performance to assess correlations of interest among study variables. We inverted performance scores by multiplying values by -1, such that lower costs represent higher performance.

Table 2.1. Descriptive statistics and correlations between study variables

Variable	M	SD	1	2	3	4	5	6	7	8
Swift Trust Condition	0	1	-							
Info-Processing _{routine}	93.03	31.20	-.44**	-						
Info-Processing _{non-routine}	87.71	24.33	-.39*	.54**	-					
Performance _{routine}	-44.34	16.81	.10	.15	-	-				
Performance _{non-routine}	-170.28	36.23	.02	-	.10	.45**	-			
Disposition to Trust	5.19	0.51	.16	-.16	-.15	.15	.18	-		
Familiarity	1.80	0.50	.10	-.01	.01	-.08	.29 [†]	.21	-	
Team Size	3.4	0.50	.04	-.10	-.12	.23	.29 [†]	-.25	-.18	-

Note. $N = 40$ at the team level. Swift trust is a dichotomous variable comparing teams in the low swift trust condition (coded -1) to teams in the high swift trust (coded +1). Average scores across routine and non-routine tasks were computed for information processing and performance at the team level. Performance scores were inverted by multiplying values by -1, such that lower costs represent higher performance.

[†] $p < .10$ (two-tailed); * $p < .05$ (two-tailed); ** $p < .01$ (two-tailed); *** $p < .001$ (two-tailed)

Hypothesis testing

Results of the analysis testing Hypothesis 1 are reported in Table 2.2. We added disposition to trust, familiarity and team size as control variables to the models. As can be derived from Table 2.2, Hypothesis 1 was supported: Manipulated swift trust was directly negatively related to information processing at the team level ($\beta = -0.33$, $SE = 0.11$, $t = -2.99$, $p = .005$). Results of the data analysis testing Hypothesis 2 are displayed in Table 2.3. As expected, there was a significant interaction between team information processing and task routineness ($\beta = -0.09$, $SE = 0.03$, $t = -2.53$, $p = .01$).

Table 2.2. Multilevel models predicting team information processing from the swift trust manipulation

	Null Model			Model 1		
	Estimate	SE	t	Estimate	SE	t
Fixed Effects						
Intercept	2.41	1.53	1.57	1.27	0.33	0.90
Disposition to Trust	-0.32	0.26	-1.27	-0.18	0.23	-0.75
Familiarity	-0.35	0.26	-1.37	-0.01	0.22	-0.03
Team Size	-0.05	0.25	-0.22	-0.24	0.23	-1.03
Swift Trust				-0.33	0.11	-2.99**
-2*LL	-206.96			-204.19		
Δ -2*LL				2.77*		

Note. Models are random intercept, fixed slope models. $N = 156$ at the task scenario level; $N = 39$ at the team level. Swift trust: Low swift trust condition coded -1; high swift trust condition coded +1.

[†] $p < .10$ (two-tailed); * $p < .05$ (two-tailed); ** $p < .01$ (two-tailed); *** $p < .001$ (two-tailed)
 Δ = difference; SE = standard error; LL = log likelihood

To examine the nature of this interaction, we plotted the interaction pattern (see Figure 2.3) and conducted a simple slope analysis. Results revealed that for routine tasks, information processing did not significantly impact performance ($\beta = -0.02$, $SE = 0.05$, $t = 0.37$, $p = .71$). However, when tasks were non-routine, performance increased significantly for teams that engaged in high information processing ($\beta = 0.16$, $SE = 0.06$, $t = 2.68$, $p = .01$; see Figure 2.3). Hypothesis 2 was thus supported.

In order to additionally test for the indirect effect of the swift trust condition on team performance via team information processing, we computed two separate indirect effect models for routine and non-routine tasks. The 2-1-1 multilevel mediation models were tested with multilevel structural equation modeling (MSEM; Preacher, Zhang, & Zyphur, 2011), using the statistical software MPlus version 7 (Muthén & Muthén, 2012). Results of the analysis are reported in Table 2.4.

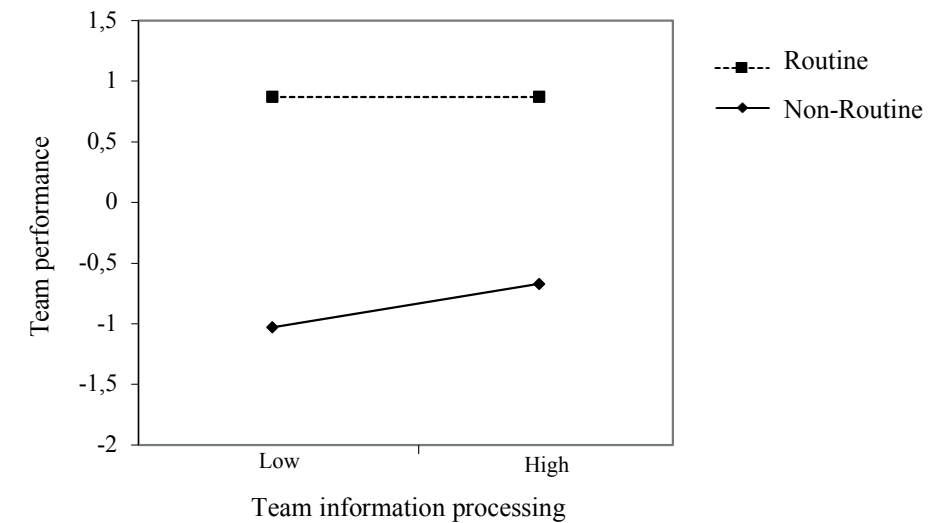


Figure 2.3. Interaction between task routineness and team information processing on team performance

The analysis revealed a significant indirect effect for non-routine tasks ($\beta = -0.06$, 95% CI [-0.128, -0.010]), indicating that swift trust affects team performance indirectly via team information processing in non-routine tasks. For routine tasks, the results show a non-significant indirect effect of swift trust on team performance via information processing ($\beta = -0.01$, 95% CI [-0.03, 0.02]). The direct effect of information processing on team performance was also not significant ($\beta = 0.02$, 95% CI [-0.04, 0.08]), whereas the direct effect of swift trust on information processing ($\beta = -0.39$, 95% CI [-0.65, -0.14]) was significant. In line with the preceding analyses conducted to test the study hypotheses, these results suggest that swift trust directly negatively affects information processing at the team level irrespective of the type of decision-making task and indirectly affects performance via information processing only in non-routine tasks.

Table 2.3. Multilevel models predicting team performance by team information processing, task routineness and their interaction

Variable	Model 1			Model 2			Model 3		
	Estimate	SE	t	Estimate	SE	t	Estimate	SE	t
Intercept	0.00	0.08	-0.05	0.00	0.05	0.08	0.01	0.05	0.21
Information processing	0.15	0.08	-1.83†	0.07	0.04	1.82†	0.09	0.04	2.14*
Task routineness				0.86	0.03	-26.00***	0.86	0.03	26.67***
Info-process x task routineness							-0.09	0.03	-2.53*
-2*LL				-221.77		-105.58			-104.92
Δ -2*LL						116.19***			0.66

Note. Models are random intercept, random slope models. $N = 156$ at the task scenario level; $N = 39$ at the team level. Model 1 was compared to Model 2; Model 2 was compared to Model 3 to estimate model fit increase. Task routineness: Routine task coded 1; non-routine task coded -1.

Δ = difference; SE = standard error; LL = log likelihood

† $p < .10$ (two-tailed); * $p < .05$ (two-tailed); ** $p < .01$ (two-tailed); *** $p < .001$ (two-tailed)

Table 2.4. Multilevel indirect effect models predicting team performance by swift trust condition and team information processing for routine and non-routine tasks

Variable	Routine Tasks			Non-Routine Tasks		
	Estimate	SE	t	Estimate	SE	t
Swift trust (ST) → Information processing (IP)	-0.39	0.13	-3.06**	-0.28	0.11	-2.67**
Information processing (IP) → Team Performance (P)	0.02	0.03	0.59	0.22	0.07	3.37**
Indirect effect: ST → IP → P	-0.01	0.01	-0.55	-0.06	0.03	-2.35*

Note. All paths were simultaneously tested in two separate 2-1-1 multilevel mediation models with swift trust being a between-level variable (team level) and information processing and performance being within-level variables (task scenario level). $N = 78$ at the task scenario level, $N = 40$ at the team level.

† $p < .10$ (two-tailed); * $p < .05$ (two-tailed); ** $p < .01$ (two-tailed); *** $p < .001$ (two-tailed)

Discussion

In today's work environments, experts from various fields are often assembled for a finite time span in order to deal with complex decision-making problems. Previously, it has been shown that trust among such temporary team members is likely to influence team performance (Crisp & Jarvenpaa, 2013; Dirks, 1999; Langfred, 2004). However, underlying mechanisms explaining why this relation is positive in some and negative in other contexts remain understudied. With the present study, we inform this gap by investigating information processing at the team level as a potential mediator in the trust- performance relation.

Overall, we find support for the notion that teams receiving a low swift trust manipulation prior to their first team interaction, engaged in significantly more elaborate information processing during following team tasks than teams receiving a high swift trust manipulation. Put differently, teams in the low swift trust manipulation were more willing to expend effort into sharing and integrating information in order to form a knowledgeable conclusion. Teams receiving a high swift trust manipulation on the other hand, put less effort into systematic information processing, most likely because they quickly perceived incoming information to be sufficient for making an accurate decision (Chaiken, Liberman, & Eagly, 1989). A second aim of this paper was to examine whether the effect of elaborate information processing on team performance depends on the routineness of the decision task that teams perform. Using MIP-G as the theoretical foundation, we expected that deep-level information processing benefits team performance in complex, non-routine decision-making tasks, in which members' inputs are critical to reach a high quality decision. Our findings provide support for this proposition. In line with previous studies (e.g., De Dreu & Beersma, 2010; Lowry et al., 2015), decision accuracy benefited from thorough information dissemination and integration in decision-making tasks that required an adjustment of pre-established routines. For routine tasks in contrast, we find that elaborate information processing does not affect decision accuracy. This result concurs with previous propositions and empirical study findings around the MIP-G (De Dreu & Beersma, 2010; De Dreu, Beersma, Stroebe, & Euwema, 2006; De Dreu et al., 2008): When team tasks are less complex, systematic dissemination and integration of inputs is less important. In fact, elaborate information processing leads to little new insights in straightforward, well-learned tasks and yet, takes time and is effortful. Therefore, in routine, predictable environments it

may be sufficient for teams to rely on heuristics and previously acquired action patterns instead of engaging in deep and systematic information processing.

Theoretical implications

Building on the answers to our research questions, this study has important theoretical implications. First, the findings contribute to the swift trust literature by showing that initial levels of trust in other team members' competences can significantly influence a team's strategic thinking in a subsequent decision-making task. Although individual level research (e.g., J. Mayer & Mussweiler, 2011; Posten & Mussweiler, 2013; Schul et al., 2004; Schul et al., 2008), as well as a recent team study by Lowry et al. (2015) suggest that trust influences individuals mental actions, few studies to date have examined behavioral team processes that follow such cognitions. Although the dominant assumption in research continues to be that intrateam trust benefits performance outcomes (De Jong et al., 2016), this research indicates that being suspicious about each other's inputs may prevent an overreliance on simplified strategies that may eventually lead to harmful decisions. A cautious judgement of team members' competences on the other hand, may increase systematic and thorough information processing that can help teams to make a well-informed, accurate decision; particularly when facing non-routine events. This notion is particularly crucial in the context of temporary teams (e.g. medical surgery teams, firefighting teams), in which any error in decision-making may lead to disastrous consequences. Additionally, our study findings contribute to the MIP-G research by pointing at the importance of swift trust in relation to motivated information processing in groups. Specifically, we introduce swift trust as a person-based antecedent of a group's motivation to process information thoroughly.

Practical implications

Findings of this study also inform current practice in enhancing temporary team performance. Consistent with theories on biases in decision-making or groupthink (e.g., De Dreu & Carnevale, 2003; Janis & Mann, 1977) our findings indicate that team members should be aware of harmful consequences that may potentially result from too much trust in team members' competences and reliability. Translating this knowledge into teamwork practice, our findings imply that temporary team managers should implement training programs, which increase team members' awareness that in particular situations, inaccurate decisions may result from too much

trust in each other's contributions. Hence, although previous researchers have advised to enhance trust among team members through trust-building activities (Long & Sitkin, 2006), our findings suggest that such activities should be complemented with a note of caution that an overreliance on the input of others can have a detrimental effect on team functioning. In order to manage the level of trust effectively, team managers should therefore closely monitor the level of trust in their working teams and initiate training activities when needed. However, we would like to note that the impact of trust on team information processing behavior may change in ongoing work teams, as the nature of trust also changes in the course of team interaction (Webber, 2008). Therefore, managers should take into account the team's life cycle when transferring these suggestions into practice.

Limitations and future directions

Like any research, this study has several limitations, which need to be considered when drawing implications from the results and which open areas for future research. One major limitation of the present study is the failed manipulation check. That is, teams in the high swift-trust manipulation did not report significantly lower levels of cognitive trust than teams in the high trust condition. While we cannot state with certainty that we actually manipulated trust instead of a related construct (e.g. team potency), our data provides evidence for construct validity of the trust manipulation. Several studies conducted at the individual level of analysis have found support for the notion that trust substantially impacts one's information processing tendency (e.g., J. Mayer & Mussweiler, 2011; Posten & Mussweiler, 2013; Schul et al., 2004, 2008). The fact that we did obtain the predicted main effect of trust on team information processing provides evidence for the construct validity of our trust manipulation.

Moreover, a number of factors can explain the non-significant relation between the swift-trust manipulation and the trust measure. For instance, one potential reason for the failed manipulation check may have been the timing of the manipulation check. Participants received the manipulation prior to their first team interaction, and the level of cognitive trust towards their team members was assessed after they have solved their first team task. Consequently, team members may have entered their first team task with intended levels of swift trust. This in turn, may have influenced their interaction patterns (i.e., information processing behavior) at early interaction stages, which set the tone for subsequent interaction during following task scenarios (Zijlstra et al., 2012). However, team members

may have adjusted their trusting beliefs in the course of the first team task due to extensive discussion of team member contributions. As Crisp and Jarvenpaa (2013) noted, "swift trust is conditional and in need of reinforcement and calibration" (Crisp & Jarvenpaa, 2013, p. 45). This may explain why we did not find significant differences in reported trusting beliefs between the two groups, but did find the hypothesized interaction patterns.

Furthermore, the scale that was used to assess trust perceptions after the first interaction was validated in the context of on-going teams (Webber, 2008), and may therefore be less applicable to a temporary team context. Considering these arguments, participants' self-reports after the first team interaction may not be an accurate assessment of whether our manipulation successfully influenced swift trust among team members. Yet, in order to ensure that our manipulation in fact led to variations in individual's cognitive trust perceptions, future experimental studies should test whether such variance was indeed successfully created.

Another limitation of the present study is that findings and implications might be bound to the context of temporary teams, in which trust is imported swiftly rather than developed over a long period of time. Long-term trust typically develops into two distinct dimensions over time (Webber, 2008): an affective dimension based on personal bonds, care and concern for one another and a cognitive dimension based on competence and reliability (R. C. Mayer, Davis, & Schoorman, 1995; McAllister, 1995). Therefore, the extent to which long-term trust affects team processes and outcomes as suggested in this study is subject to future research. For instance, it is possible that affective trust becomes increasingly important in long-term teams and differently affects team members' social motivation and information processing behavior (Williams, 2001).

Furthermore, future studies may investigate the impact of gender composition on decision-making processes and outcomes in different types of decision-making scenarios. Previous research suggests that all-female teams tend to choose different decision-making strategies on traditionally male dominated tasks in comparison to mixed-gender or all-male teams (e.g., Rogelberg & Rumery, 1996; LePine, Hollenbeck, Ilgen, Colquitt, & Ellis, 2002; Apesteguia, Azmat, & Iriberry, 2012). Given that our sample was primarily female and the decision-making task used is based on roles of traditionally male-dominated occupations (i.e., fire commander,

police officer, chemical advisor), it is possible that female teams might respond differently to decision-making tasks that are more gender neutral. Therefore, investigating the impact of gender composition on team information processing and decision-making in male-oriented vs. female-oriented or gender neutral tasks would be an interesting avenue for future research.

Conclusion

Temporary teams are becoming increasingly important in our work environments. In order to deal with unexpected challenges, expert members need to share and integrate their individual information and on the basis of this form a mutual decision. With the present research we provide first evidence that swift trust in other members' competence and reliability can influence how elaborate team members share and integrate information. More specifically, we found a negative relation between swift trust and depth of information processing at the team level. Building on the Motivated Information processing in Groups Model (De Dreu et al., 2008) we also show that elaborate information processing in turn, benefits performance in non-routine complex tasks. Altogether, our findings point to the importance of judging team members' competences in a cautious manner. A healthy suspicion towards others' contribution may ultimately enable team success in complex decision-making tasks in a temporary team setting. Having said this, we would like to emphasize that we do not intent to argue against the benefits of trust for team performance but to reveal boundary conditions of these benefits that shall inform future research and practice.

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CHAPTER 3

How previous leadership influences adaptive followership: Examining the effects of follower entrainment

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CHAPTER 4

Adaptive followership and team adaptation: The role of leader psychological safety and magnitude of change

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CHAPTER 5

General discussion

Complex global changes, such as the current COVID-19 pandemic, technological advancements or globalization, increasingly require organizations to adapt in order to remain competitive (Reeves & Deimler, 2011). To effectively respond to environmental changes, many organizations structure their work around teams rather than individuals, since teams can draw on a greater variety of knowledge, skills and abilities. Accordingly, team adaptation has been identified as central to team and organizational success (Burke, Stagl, Salas, Pierce, & Kendall, 2006). However, while the topic of team adaptation has gained increasing attention in the literature over the past decades (see Christian, Christian, Pearsall, & Long, 2017; Maynard, Kennedy, & Sommer, 2015; Rico, Gibson, Sánchez-Manzanares, & Clark, 2019), much is yet to be learned about the actual process of adapting; specifically, how team members effectively adjust their behaviors to changing conditions. This dissertation aims to address this question in order to extend existing knowledge on team adaptation and to advance team adaptation research.

Taking an input-mediator-output model of team adaptation as the underlying theoretical framework, this dissertation follows three main aims: First, to explore how factors underlying team adaptability (i.e., team members' cognitive structures and behavioral repertoire) relate to team member behaviors that enable and facilitate team adaptation. Second, to investigate the situational contingency in team member behaviors in facilitating team effectiveness in dynamic environments over time. Third, to explore boundary conditions and underlying mechanisms of the relation between team adaptation and team adaptive performance. In this final chapter, I will provide a summary of the main findings of the empirical studies presented in Chapter 2, 3 and 4 and discuss their theoretical, methodological and practical implications. I will further discuss limitations of the study findings and provide suggestions for future research.

Main findings

Chapter 2 focused on the first and second research aim of this dissertation, by investigating the extent to which swift trust -- an initial cognitive form of trust in other members' reliability, capability and dependability (Crisp & Jarvenpaa, 2013) -- drives teams' depth of information processing and performance during subsequent team interaction. To explore this research question, Chapter 2 presents a laboratory study, in which 40 student teams were randomly assigned to either a low or high swift trust manipulation and consecutively performed three routine and three non-routine decision-making tasks. Team information processing was assessed through fine-grained behavioral coding of team members' behaviors. In line with our expectations, we found that under conditions of low swift trust, team members processed information more elaborately than under conditions of high swift trust. Findings also revealed that the effectiveness of elaborate team information processing depended on situational requirements, such that it was beneficial for team decision quality when tasks were non-routine but negatively impacted performance when teams performed routine tasks.

Together, these findings suggest that swift trust constitutes an important cognitive structure underlying team adaptability by directly influencing which cues team members attend to, how they process these cues, and how they use them to form decisions when performing a task. Specifically, findings of Chapter 2 provide empirical support for the notion that in order to successfully adapt to unexpected complexities, team members need to remain cautious to one another's inputs in order to prevent an overreliance on simplified strategies. At the same time, our findings suggest that teams should switch to a heuristic way of information processing when tasks become routine. In line with previous research (e.g., De Dreu & Beersma, 2010; Louis & Sutton, 1991; Uitdewilligen, Waller, & Pitariu, 2013), our findings thereby emphasize the importance for teams to adapt their cognitive mode of functioning when working in dynamic environments.

Chapter 3 explored whether team members' experience in functioning under a previous directive, participative or adaptive leader (i.e., follower entrainment) influences follower role perceptions and thereby affects whether followers adapt their behaviors to changes in the leadership style of a subsequent leader. We further explored the role of adaptive followership in driving team adaptive performance in dynamic environments. Chapter 3 thereby adds to the first and second aim of this dissertation by investigating

follower entrainment as an important part of team adaptability and by examining how the adaptive use of active follower behaviors (e.g., voice, information sharing) facilitates team adaptive performance over time. Results presented in Chapter 3 are based on two studies: one conducted in a controlled laboratory setting (Study 1), and one in a field setting (Study 2). Findings revealed that followers entrained to a directive leader remained passive in interaction with subsequent leaders and had difficulties adapting to complex situations. On the other hand, follower entrainment to a participative leader increased active follower behavior under subsequent leaders when complexities occurred. We further found that follower role perceptions mediated this relation and that the relation between participative entrainment and active follower role perceptions was stronger when relational identification with the previous leader was high. Findings further showed that active followership was positively related to team performance in complex task situations, but was negatively related to team performance in simple tasks.

Overall, these findings support the notion that congruence in team leaders' and members' cognitive schemas regarding what constitutes effective leader- and followership creates compatible expectations that lead to optimal fit in leader and follower behaviors. Findings further suggest that congruent adaptive leader and follower behavior facilitates team adaptive performance in dynamic environments. Results presented in Chapter 3 do not only provide first causal evidence for these claims (Study 1), but also suggest that findings generalize across occupational settings (Study 2). Additionally, study findings further suggest that follower roles and associated behaviors can dynamically change over time, and that the adaptive use of active follower behaviors in accordance with situational demands increases team adaptive performance in dynamic environments.

Chapter 4 particularly focused on the third research aim of this dissertation by examining whether leaders' psychological safety perception mediates the relation between adaptive followership and team adaptive performance, and by exploring the extent to which the magnitude of change teams face constitutes a boundary condition to the proposed relations. We tested our predictions in a laboratory setting, in which we randomly assigned teams to an adaptive followership vs. a control training condition, as well as to a change type condition (team change, task change, or team *and* task change). Findings revealed that magnitude of change moderated the adaptive followership-team adaptive performance relation, such that adaptive

followership was not significantly related to team adaptive performance when teams faced *only* a task or a team change, but significantly increased team adaptive performance when teams faced *both* a team and a task change. We further found that leaders of teams receiving the adaptive followership training reported significantly higher levels of psychological safety across change type conditions, and that leader psychological safety mediated the positive adaptive followership-team adaptive performance relation in the team *and* task change condition.

Findings of Chapter 4 thereby extend findings of Chapter 3 by showing that adaptive changes in follower behaviors increase team adaptive performance not only directly, but also indirectly via leaders' perception that it is safe to take interpersonal risks (e.g., asking followers for help and input). Additionally, findings presented in Chapter 4 suggest that particularly when facing changes that significantly disrupt existing processes, active follower behavior and high leader psychological safety are important for teams to adapt to new situational demands.

Implications

The above outlined findings have important implications for the scientific literature and organizational practice. In the following section, I will discuss the main theoretical, methodological and practical implications following from the research presented in this dissertation.

Theoretical implications

Team adaptation. The first general implication following from this dissertation's research centers on its contribution to team adaptation literature. Although research on team adaptation has grown exponentially over the past decades, empirical studies examining behavioral underpinnings of key adaptive processes remain scarce to date. Building on previous conceptual work (e.g., Maynard et al., 2015; Rico et al., 2019; Waller, Uitdewilligen, Rico, & Thommes, 2020), the reported research provides important empirical insights on this topic and identifies team information processing and leader-follower interactions as key adaptive processes. Specifically, reported findings suggest that teams can adapt to situational changes by adjusting their leadership structures and the depth with which team members process available information. On the one hand, this entails switching to a decentralized leadership structure, in

which team members share and elaborately process available information and voice their ideas and suggestions when complexities arise. On the other hand, during simple, straightforward task episodes, teams should switch to a directive leadership structure in which team members rely on the routinized exchange of information and execution of instructions. The research presented in this dissertation thus extends knowledge on the micro-behavioral foundations of team adaptation.

The reported findings further contribute to team adaptation literature by providing important insights about the factors underlying teams' ability to adapt their behaviors to situational demands. For instance, the finding that team members' swift trust was negatively associated with elaborate team information processing challenges the long held assumption that trust is entirely positive for team interaction and adaptation (see Burke et al., 2006; De Jong, Dirks, & Gillespie, 2016). Instead, it suggests that team members should remain cautious about one another's inputs and suggestions when situational complexities arise. Additionally, findings presented in Chapter 3 showed that followers' experience with previous leaders influences whether they adapt their behaviors to changes in the situation and in the leadership style of their current team leader. Although scholars included leadership in their models of team adaptation (e.g., Burke et al., 2006), findings of this dissertation point to the importance of followership, particularly the role of followers' role understanding and behavioral repertoire, as important input factors of the team adaptation process.

Third, responding to recent calls for examining how teams can effectively adapt to flexibility *and* stability demands (e.g. Grote et al., 2019), the research presented in this dissertation examines how teams adapt to both, simple and complex situations. Thereby, reported findings draw attention to potential asymmetries in the adaptation process. For instance, the finding that followers entrained to a directive leader had difficulties adapting to complex situations, whereas followers entrained to a participative leader did not show difficulties adapting to simple situations, suggests that adapting to flexibility and stability demands comprise qualitatively different behaviors. Research on asymmetric adaptation (Hollenbeck, Ellis, Humphrey, Garza, & Ilgen, 2011; Moon et al., 2004) previously showed that team members may experience more difficulties switching their processes in one direction than in the other. Findings reported in Chapter 3 add to this research stream by supporting the notion that simple-to-complex transitions and complex-to-

simple transitions comprise different challenges that may be more or less difficult for teams to overcome, depending on the stability of cognitive schemas resulting from prior experiences.

Fourth, responding to recent calls (Christian et al., 2017; Maynard et al., 2015), the research reported in Chapter 4 provides insights into how characteristics of the change teams face affect team adaptation processes and adaptive outcomes. Specifically, findings suggest that the extent to which team adaptation is required for adaptive performance depends on the extent to which the change disrupts existing processes (i.e. magnitude of change) and thereby increases the complexity of the task. This empirical finding is in line with recent theoretical advancements in the team adaptation literature proposing to characterize task changes as task complexity variations (Rico et al., 2019). Findings presented in Chapter 4 support this proposition and provide empirical evidence for the notion that the greater the increase in task complexity caused by a change, the more are teams required to adapt their processes in order to effectively respond to situational requirements.

Together, these findings provide empirical support for the theoretical model outlined in the introductory chapter. Specifically, the reported research shows that team members' cognitive structures (i.e., swift trust and followership schemas) and behavioral repertoire influence team adaptive processes and that shifts in team information processing and leader-follower interactions drive team performance in dynamic environments. Findings further provide support for the notion that emergent states (e.g., psychological safety) can equip team members with the necessary confidence to switch behaviors if required and that the magnitude of change is an important moderator in the relation between team adaptation inputs, mediators and outputs.

The adaptive leadership process. Chapter 3 and 4 draw particular attention to the role of leader- and followership in team adaptation. Contingency theories of leadership previously suggested that the effectiveness of leader-follower interactions depends on how well they match a particular situational context (e.g., Bass, 2008; Fiedler, 1978; Vroom & Yetton, 1973). Yet, these theories predominantly conceptualize leader- and followership in terms of static behavioral styles (cf., Lord, Day, Zaccaro, Avolio, & Eagly, 2017; Uhl-Bien, Riggio, Lowe, & Carsten, 2014) and remain silent on what enables team members to adjust their leadership structures to

situational changes. Taking a dynamic approach to contingencies theories of leadership, findings reported in Chapter 3 and 4 show that leader- and follower interactions can dynamically change over time and that adaptive changes in leadership structures are important to increase team adaptive performance. A key implication following from the research presented in this dissertation is therefore that in order for team adaptation literature to advance, scholars should adopt a dynamic, temporal perspective when studying leader- and followership. Even though recent conceptual work has called for viewing leadership through a temporal lens (e.g., DeRue, 2011; McClean, Barnes, Courtright, & Johnson, 2019; Waller, Okhuysen, & Saghafian, 2016), empirical research examining how leader-follower interactions unfold over time and how this influences team adaptation and adaptive outcomes is still in its infancy.

An additional important implication following from the reported research is that followers play a central role in co-constructing the adaptive leadership process; accordingly, the study of followership should be included in the agenda of team adaptation research. Followership has gained comparatively little attention in the literature, despite common acknowledgement that follower behavior is important for leader and team effectiveness (Uhl-Bien et al., 2014). More recently, scholars have begun investigating leadership from a followership angle and have pointed to the importance of follower role perceptions and behaviors for leadership and team outcomes (e.g., Benson, Hardy, & Eys, 2016; Carsten, Uhl-Bien, & Huang, 2018; Carsten, Uhl-Bien, West, Patera, & McGregor, 2010). Findings reported in Chapter 3 & 4 add to this stream of literature by providing empirical support for the notion that how followers understand and behave in their roles influences team adaptive performance, both directly and indirectly via leader perceptions. Specifically, the reported research highlights the importance of adaptive followership: followers' ability and willingness to defer decision-making responsibility to the leader when situations are comparatively simple, but to speak up to the leader, to share their expertise and to voice suggestions when complexities arise.

Methodological implications

Next to these theoretical implications, this dissertation has some important methodological implications. First, the findings presented in the empirical chapters were based on fine-grained coding of team members' behavior. Although the use of real-time behavioral observation methods is typically a cumbersome process that requires a tailored coding scheme as well as a

careful training of coders (cf., Kauffeld, Lehmann-Willenbrock, & Meinecke, 2018), this method has important advantages over traditional behavioral survey data. For example, findings presented in this dissertation suggest that this method provides reliable behavioral indicators of team member behaviors and that it is sensitive to assessing change in these behaviors over time. Real-time behavioral observations thus go beyond the retrospective inference of team member behaviors based on self-reported data and behavioral aggregates, that is often strongly biased (Baumeister, Vohs, & Funder, 2007). Instead, it provides insights into how team members *actually* behave and what happens during the team adaptation process. The use of real-time behavioral data can therefore provide additional, meaningful insights for research and practice regarding how team interaction patterns develop, how team processes unfold and how this affects team effectiveness over time (see, e.g., Zijlstra, Waller, & Phillips, 2012).

Second, the research presented in this dissertation is primarily based on rigorously controlled, experimental studies. This methodological approach allowed investigating causal relationships between focal variables. The importance of disentangling causes from effects has particularly gained increasing attention in the leadership literature. For example, a recent study by Banks, Gooty, Ross, Williams, and Harrington (2018) revealed that moral behavior and value-based leadership models (e.g., ethical leadership, moral leadership) strongly correlate with constructs traditionally investigated as outcomes of leader behavior (e.g. trust, LMX). Findings like these raise endogeneity concerns and left leadership scholars to question their ability to draw theoretical and practical conclusions (Antonakis, Bendahan, Jacquart, & Lalive, 2010; Day & Antonakis, 2013). Similarly, as outlined in the introductory chapter, current team adaptation literature lacks a clear distinction between team adaptation inputs, processes and outcomes (see Maynard et al., 2015). Future research would therefore benefit from more experimental research designs that allow a clear disentanglement of inputs, mediators and outputs.

Additionally, the laboratory setting of the reported studies allowed manipulating the timing and characteristics of the change requiring teams to adapt. This provides researchers with the possibility to examine how specific events drive change in team member behaviors and associated outcomes and in identifying a priori if and when a modification in team processes is required. Such an event-based research approach (see Morgeson, Mitchell, & Liu, 2015) seems particularly advantageous when

studying team adaptation, as this comprises team process modifications in response to an external event, cue or trigger (Baard, Rench, & Kozlowski, 2014). For field research it may be difficult, and often impossible, to identify a priori when a critical event occurs, and if and when team process modifications are required to optimize team outcomes. Team adaptation research may therefore benefit from complementing and triangulating findings from the field with laboratory data in order to provide nuanced insights regarding the cognitive, affective and behavioral micro foundations of team adaptation.

Practical implications

The research reported in this dissertation also has important practical implications. Many of today's teams work in environments that require them to frequently adapt to situational changes. On the one hand, teams need to be able to remain flexible in their thoughts and actions when complexities arise; on the other hand, they need to efficiently coordinate their actions in order to effectively respond to stability demands when situations become more routinized. The reported empirical studies suggest that team adaptation requires teams to adaptively switch between different modes of cognitive functioning and leader-follower interactions, and that teams' cognitive structures and behavioral repertoires play an important role in enabling and facilitating the team adaptation process.

More specifically, results reported in Chapter 2 suggest that cognitive processes emphasizing beliefs in other team members' reliability, competence and dependability may lower team members' tendency to engage in close scrutiny of each other's contributions and increase their tendencies to rely on previous established routines. While routine interaction increases adaptation to stability demands, team adaptation to complex situations often requires teams to carefully sense and elaborately process available information in order to collectively make sense of and effectively respond to new demands (see Chapter 2; De Dreu & Beersma, 2010; Rico et al., 2019). An important practical implication that follows from these findings therefore is that practitioners aiming to facilitate team adaptation should foster team members' ability to maintain high levels of situation awareness and prevent rigidity in team members' knowledge structures and associated functioning. For example, managers may complement traditional team-building activities (e.g., Long & Sitkin, 2006) with training elements that promote a critical mindset and that encourage team members to closely monitor and question each other's inputs when

complexities arise. Alternatively, managers may increase team members' cognitive flexibility by implementing reflexivity interventions in which team members are asked to collectively reflect upon their knowledge structures and interaction processes (see Schippers, West, & Dawson, 2015).

Additionally, Chapter 3 and 4 draw attention to the role of followership in enabling and facilitating team adaptation. To date, organizations primarily focus on developing individual leaders at the expense of developing followers (Carsten et al., 2018). Results of this dissertation suggest that this focus may be too narrow to comprehensively understand and develop effective teams. Although the formal team leader may play a crucial role in the adaptive leadership process, this dissertation's research shows that followers are also crucial in enabling and facilitating an adaptive transition in team functioning. Specifically, findings suggest that adaptive performance benefits from followers who become actively involved in decision- and sense-making processes when complexities occur and who defer responsibility to the leader and obediently follow instructions during simple, routine episodes. These findings emphasize the importance of considering the situational context when examining followership effectiveness and adds nuance to the increasingly popular view that effective followers should generally be proactive and engaged (cf., Carsten et al., 2018; Carsten et al., 2010). Another important practical implication following from this dissertation's research is therefore that not only team leaders but also followers should be trained to be aware of their behavior and to recognize when a change in behaviors is necessary (see Bligh, Epitropaki, Jaser, Riggio, & Uhl-Bien, 2018).

Chapter 4, although still on an experimental basis, identifies the basic elements required for an adaptive followership training. First, followers should be trained in situation awareness, which entails increasing their ability to sense and interpret relevant change cues. Given the dual nature of modern environments, this may not only entail training followers in recognizing cues signaling demands for flexibility (e.g., disruption of existing structures), but also cues signaling demands for stability (e.g., routinizing roles or processes). Further, followers must learn to select appropriate behaviors in response to situational change cues. This can be achieved by training followers' metacognitive behavior; in other words, training followers' to think critically about which behaviors are required in a specific context (cf., Marks, Zaccaro, & Mathieu, 2000). At the same time, it seems important that followers expand their behavioral repertoire and learn to

apply different types of behaviors (e.g., voice, obedience) in alignment with situational demands. Additionally, followers should be trained in quickly and clearly signaling to their team members when a switch in leader and follower behavior is required. High-fidelity simulations seem particularly suitable to provide such trainings (cf., Stachowski, Kaplan, & Waller, 2009). To conclude, training team members next to team leaders may enable adaptive leadership and seems crucial for facilitating team adaptation.

Limitations

The above outlined implications are subject to several limitations that should be acknowledged when drawing conclusions. First, the reported research is based on data that was primarily obtained in a laboratory setting. Although rigorously controlled laboratory studies can provide substantial advantages over traditional field survey studies (e.g., reduction of endogeneity concerns, possibility to draw causal conclusions; see Antonakis et al., 2010; Day & Antonakis, 2013; Highhouse, 2009), they might too raise external validity concerns. To reduce such concerns, in Chapter 3, we surveyed employees from various occupations and found that laboratory findings were similar to those from the field. Yet, to fully alleviate external validity concerns, future research is needed to examine the extent to which findings hold in an applied setting with real teams and to uncover potential moderating factors (e.g. leadership experience, organizational tenure).

On a related note, although the dichotomous view of task situations as simple/routine vs. complex/nonroutine allowed to optimally test the guiding theoretical propositions of this dissertation, the task environment that teams encounter in the field is typically less clear cut. For instance, teams working in the field may have to perform different tasks at the same time, tasks may vary on a continuum of complexity, or different types of changes may increase task complexity levels to different extents. Future research is therefore needed to replicate findings in a field setting in order to further examine how team adaptive processes unfold in situations with varying complexity levels, and to explore how teams adapt when they have to perform several tasks simultaneously.

Third, the type of team may constitute a boundary condition to the reported findings. Although the ability to adapt to flexibility and stability demands and to switch behaviors accordingly is presumably crucial for many teams,

it seems specifically crucial for interdisciplinary *action teams*. Such teams typically consist of highly skilled experts that need to coordinate their actions in unpredictable, dynamic circumstances (Sundstrom, De Meuse, & Futrell, 1990). Examples of action teams include medical surgery teams, military teams, crisis management teams or firefighters (Klein, Ziegert, Knight, & Xiao, 2006). These teams typically work under time pressure in a fast-pace context, in which they need to perform efficiently during routine episodes but as soon as complications arise, they need to abandon established routines and find new effective solutions in short amounts of time. It is therefore important to note that the implications drawn from this research are specifically relevant for action teams and may potentially be less relevant for other types of teams.

A fourth limitation of the reported research concerns its time scope. In the scientific literature, team adaptation is defined as team process modifications and is therefore, by definition, a temporal phenomenon (e.g., Baard et al., 2014; Burke et al., 2006). Although the research reported in this dissertation is based on longitudinal designs that acknowledge the temporal nature of team adaptation and that allow to closely examine adaptive processes, teams only worked together for a comparatively short period of time. Drawn conclusions may therefore not be directly transferrable to teams that work together over longer periods. For example, long-term teams may experience stronger entrainment effects (see Chapter 3) or may need to spend significantly more time on managing their social interaction (e.g. conflict management, confidence building) to effectively adapt their transition and action processes (cf., Marks, Mathieu, & Zaccaro, 2001).

Finally, the reported research specifically focused on transitions between passive and active followership styles (and, analogously, directive and participative leadership styles) to enhance team adaptation. The main reason for this is that these styles are most strongly associated with contingency theories of leadership and clearly contrasted in the scientific literature (e.g., Lorinkova, Pearsall, & Sims, 2013; Martin, Liao, & Campbell, 2013; Vroom & Yetton, 1973). Yet, it is important to note that team adaptation in certain contexts may require the transition to other relevant leader- and followership styles. For instance, when a company experiences a crisis due to an ethical scandal (e.g., the recent VW crisis; Mansouri, 2016), teams may adapt by transitioning to an ethical leader- and followership style to foster teams' ethical decision-making and to rebuild the organizations' credibility (Coldwell, 2017). Thus, next to passive and

active followership and directive and participative leadership, leaders and followers may adaptively apply other behavioral styles to facilitate adaptation in certain contexts.

Directions for future research

Following the above outlined implications and limitations, this dissertation offers several important directions for future research. First, in order for team adaptation literature to advance, more longitudinal field research with real teams is needed. Capturing real-time behaviors and adopting a longitudinal research design in which central constructs are measured repeatedly over time, allows researchers to study the behavioral patterns and temporal dynamics underlying team adaptation (Waller & Kaplan, 2018). Such insights are vital to draw firm conclusions about what happens during team adaptation (i.e., when, what and how team members communicate) and how this affects adaptive outcomes over time. In order to provide further insights on these issues, future studies can make use of video-based field data and apply statistical techniques that allow for studying behavioral interaction patterns (e.g. lag sequential analysis, T-pattern analysis; Lehmann-Willenbrock, Allen, & Kauffeld, 2013; Magnusson, 2000) and dynamic trajectories of focal variables (e.g., discontinuous growth curve analysis; Lang & Bliese, 2009; see Chapter 4).

Additionally, future research is needed to investigate what increases team adaptability in the long run and how team adaptive processes emerge and develop over time. Although the present research provides important insights into the cognitive and behavioral micro-foundations of team adaptation, the extent to which these findings can be transferred to team adaptation over longer time intervals is yet to be examined (cf., Zaheer, Albert, & Zaheer, 1999). For example, it is possible that team adaptation over longer time periods may not only be a function of the adaptive application of transition, action and leadership processes, but may also depend on how well teams manage their interpersonal relations (e.g., conflict management, affect management confidence building). As noted by Marks et al. (2001) "interpersonal processes occur throughout both transition and action phases, and typically lay the foundation for the effectiveness of other processes" (p. 368). The relative importance of factors underlying team adaptability may therefore also change over time; for instance, affect regulation might become increasingly important over time, as members have to increasingly manage their interpersonal

relations. Additionally, team adaptability may change over time based on repeated team member interaction. For example, team members' cognitive schemas may solidify over time, as team members have prolonged experience in functioning under certain routines or as they increase their expertise in a specific domain (cf., Dane, 2010; Ilgen, Hollenbeck, Johnson, & Jundt, 2005).

Third, future research would benefit from further examining the role of change characteristics within the input-process-output framework of team adaptation. Chapter 4 empirically supports the notion that task changes can be conceptualized as task complexity variations that influence the extent to which adaptive responding is required (see Rico et al., 2019). However, much is yet to be learned regarding how features of the change (e.g., quantitative and qualitative differences) specifically influence task complexity and how they, in turn, differently prompt and require team process modifications. For example, how frequently teams have been exposed to a similar change in the past or at what point in their lifecycle teams face a change may affect the extent to which adaptive responding is required (Maynard et al., 2015).

Fourth, future research should further investigate the role of leader- and followership in enabling and enhancing team adaptation and adaptive outcomes. As previously outlined, it may be possible that the adaptive application of other leader- and followership styles, next to the ones investigated in this dissertations' research, facilitates team adaptation in specific contexts. Additionally, given that followership theory has received little attention in team adaptation literature, future research may particularly benefit from adopting a followership lens to further test and refine how followers *co-construct* the adaptive leadership process. That means, rather than focusing on the leader as the central observation unit when examining leadership, future research should acknowledge that leadership emerges from the double interact between followers and leaders; that is, how follower behaviors influence leader behaviors and vice versa, and how this affects patterns of leading-following identities over time (DeRue, 2011). As such, future research could investigate a wider range of follower traits and behaviors (e.g., proactive personality, resistance; Caniëls, Semeijn, & Renders, 2018; Tepper et al., 2006), examine how such follower behavior in turn, impact leaders' perceptual, motivational, and behavioral outcomes and how follower role perceptions change over longer periods of time as a function of leader- follower interactions.

Fifth, future research might benefit from investigating team adaptation from a shared leadership perspective. Findings of this dissertation provide support for the notion that adaptive performance benefits from flexible leader-follower interactions, whereby followers engage in behaviors typically associated with leadership if required by the task situation. (e.g., sense- or decision-making). This suggests that sharing leadership as necessitated by the situational context might be a functional response to situational changes; for instance, team members may take and grant the leader role at different points in time, based on whose expertise is required in a particular situation. Future research may therefore examine whether shared leadership can be understood as a form of adaptive leadership, what factors influence whether team members grant and take leadership and what constitutes boundary conditions to shared leadership effectiveness. For example, Aime, Humphrey, DeRue, and Paul (2014) showed that effective power transitions from one team member to the other required teams to match expertise, situational demands and team members. Teams' transactive memory system (i.e., a shared understanding of who knows what in the team; Wegner, 1986) may therefore moderate the relation between shared leadership and adaptive outcomes.

Finally, costs related to team adaptation comprise an important avenue for future research. Although team adaptation is generally conceptualized as an effective process (e.g., Baard et al., 2014; Burke et al., 2006; Maynard et al., 2015), there may exist important boundary conditions to team adaptation effectiveness. For example, continuous adjustments in team members' behaviors requires cognitive and affective resources that may accumulate to fatigue over time. Additionally, adaptive responding may not always be advantageous for team performance. For instance, teams may wrongly interpret a change in the situation as one requiring adaptation, or may keep making process adjustments when they are not beneficial anymore (Christian et al., 2017). Furthermore, teams are often embedded in a system of teams that interdependently work together to achieve superordinate goals (Mathieu, Marks, & Zaccaro, 2001). Thus, a modification of team processes that is beneficial for the outcomes of one particular team may negatively influence outcomes of other teams or the entire system. Future studies should therefore pay more attention to the costs of team adaptation and examine team adaptation across organizational levels.

Conclusion

In contemporary work environments, team adaptation is central for team and organizational effectiveness. This dissertation provides important insights into the conceptualization and study of team adaptation. By disentangling the team adaptation process from its inputs and outcomes and by taking a behavioral perspective, the reported research extends current understanding regarding what constitutes teams' capacity to adapt, how team members effectively adjust their behaviors to changing conditions and how this affects team performance over time. The reported findings suggest that in order for team adaptation literature to advance, we need to move beyond capturing team interaction as static behavioral agglomerates and instead, focus on investigating the cognitive and behavioral micro-foundations underlying the team adaptation process.

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Summary

Complex global challenges, such as the current COVID-19 pandemic, force organizations to abandon 'yesterday's logic' and to adapt to their dynamic environments. As organizations typically employ teams to increase their adaptive capacity, understanding how team members adapt their behaviors to effectively balance demands for stability and flexibility, is critical for team and organizational effectiveness. Team adaptation is defined as functional team process modifications in response to situational changes and has gained increasing attention in the literature over the past decades.

While knowledge on team adaptation is increasing, research on team members' *actual* behaviors during the adaptation process remains limited. To address this research gap, this dissertation focuses on how team members effectively adjust their behaviors to changing conditions. Taking an input-mediator-output model of team adaptation as the underlying theoretical framework, this dissertation follows three main aims: First, to explore how factors underlying team adaptability (i.e., team members' cognitive structures and behavioral repertoire) relate to team member behaviors that enable and facilitate team adaptation. Second, to investigate which specific team member behaviors are required to facilitate team effectiveness in dynamic environments over time. Third, to explore moderators and underlying mechanisms of the relation between team adaptation and team adaptive performance. As discussed in the remainder of this summary, the five chapters of this dissertation connect and address these aims to shed new light on how teams can effectively adapt in dynamic contexts.

Chapter 1 reviews team adaptation literature and introduces the theoretical framework of the presented research. The framework suggests that team adaptation can be organized within an input-mediator-output model and introduces the magnitude of change as a central boundary condition to these relations. *Inputs* are defined as factors underlying teams' ability to adapt, *mediators* comprise the process of adaptation and resulting emergent states, and *outcomes* represent the consequences following the team adaptation process. Specifically, the theoretical model focuses on the role of three key adaptive processes underlying team adaptation: information processing, coordinated action and leadership. It is concluded that team members need to change the configuration in these key processes in accordance with changes in situational demands in order to facilitate team adaptation.

Chapter 2 focuses on the first and second research aim of this dissertation, by investigating the extent to which swift trust - an initial cognitive form of trust in other members' reliability, capability and dependability - drives teams' depth of information processing and performance during subsequent team interaction. To explore this research question, Chapter 2 presents a laboratory study, in which 40 student teams randomly received a low or high swift trust manipulation and consecutively performed three routine and three non-routine decision-making tasks. Team information processing was assessed through fine-grained behavioral coding of team members' behaviors. In line with our expectations, we found that under conditions of low swift trust, team members processed information more elaborately than under conditions of high swift trust. Findings also revealed that the effectiveness of elaborate team information processing depended on situational requirements, such that it was beneficial for team decision quality when tasks were non-routine but did not influence performance when teams performed routine tasks. These findings emphasize the importance for teams to adapt their cognitive mode of functioning and associated behaviors when working in dynamic environments and identify swift trust as a central predictor of team information processing and performance.

Chapter 3 investigates team adaptation from a followership angle. We explored whether team members' experience in functioning under a previous directive, participative or adaptive leader (i.e., follower entrainment) influences follower role perceptions and thereby affects whether followers adapt their behaviors to changes in the leadership style of a subsequent leader. We further explored the role of adaptive followership in driving team adaptive performance in dynamic environments. Chapter 3 thereby adds to the first and second aim of this dissertation by investigating follower entrainment as an important part of team adaptability and by examining how the adaptive use of active follower behaviors (e.g., voice, information sharing) facilitates team adaptive performance over time. Results presented in Chapter 3 are based on two studies, one conducted in a controlled laboratory setting and one in a field setting. Findings revealed that followers entrained to a directive leader remained passive in interaction with subsequent leaders and had difficulties adapting to complex situations. On the other hand, follower entrainment to a participative leader increased active follower behavior under subsequent leaders when complexities occurred. We further found that follower role perceptions mediated this relation and that the relation between participative entrainment and active

follower role perceptions was stronger, when the relational identification with the previous leader was high. Findings further showed that active followership increased team performance in complex task situations, but decreased team performance in simple tasks.

Chapter 4 focuses on the third research aim of this dissertation by examining whether leaders' psychological safety perception mediates the relation between adaptive followership and team adaptive performance. We further explored whether the magnitude of change teams face moderates the proposed relations. We tested our predictions in a laboratory setting, in which we randomly assigned teams to one condition resulting from the 2 (adaptive followership training vs. control training) x 3 (team change, task change, or team *and* task change) factorial repeated measures design. Findings revealed that magnitude of change moderated the adaptive followership-team adaptive performance relation, such that the adaptive followership training condition was not significantly related to team adaptive performance when teams faced *only* a task or a team change, but significantly increased team adaptive performance when teams faced *both* a team and a task change. We further found that leaders of teams receiving the adaptive followership training reported significantly higher levels of psychological safety across change type conditions. Additionally, leader psychological safety mediated the positive adaptive followership-team adaptive performance relation in the team *and* task change condition.

Together, the studies have important theoretical, methodological and practical implications that are discussed in **Chapter 5**. Most importantly, the reported findings emphasize that team adaptation requires the modification of teams' cognitive structures and leader-follower interactions to situational demands. The findings of this dissertation specifically suggest that how followers understand and behave in their roles is a critical, yet under-investigated, factor of team adaptation. Next to these implications, Chapter 5 discusses limitations of the reported studies and provides avenues for future research. Although more longitudinal field research with real teams is needed, this dissertation provides meaningful guidance for future research to arrive at a comprehensive understanding of the team adaptation process. Further, this dissertation gives concrete practical suggestions regarding how to increase team adaptation and team adaptive outcomes.



Samenvatting

Geconfronteerd met complexe wereldwijde uitdagingen, zoals de huidige COVID-19 pandemie, worden organisaties gedwongen de 'logica van gisteren' los te laten en zich aan te passen aan hun dynamische omgeving. Aangezien organisaties doorgaans teams inzetten om hun adaptief vermogen te vergroten, is het van belang om te begrijpen hoe teamleden hun gedrag aanpassen om de behoeften aan stabiliteit en flexibiliteit effectief te balanceren. Teamadaptatie wordt over het algemeen gedefinieerd als functionele wijzigingen in de processen van het team in reactie op een verandering in de situatie. Gezien het belang van teamadaptatie voor het functioneren van organisaties, heeft het thema de afgelopen decennia in toenemende mate aandacht gekregen in de wetenschappelijke literatuur.

Hoewel de kennis over teamadaptatie toeneemt, blijft het onderzoek naar het *feitelijke gedrag* van teamleden tijdens het adaptatieproces beperkt. Om deze lacune in de literatuur te adresseren, richt dit proefschrift zich op hoe teamleden hun gedrag effectief aanpassen aan veranderende omstandigheden. Met een input-mediator-output model van teamadaptatie als onderliggend theoretisch kader, heeft dit proefschrift drie hoofddoelen: Het eerste doel is te onderzoeken hoe factoren die ten grondslag liggen aan het adaptief vermogen van teams (d.w.z. de cognitieve structuren en het gedragsrepertoire van teamleden) gerelateerd zijn aan gedragingen van teamleden die teamadaptatie faciliteren. Ten tweede wordt beoogd inzichten te genereren over welke specifieke gedragingen nodig zijn om teamadaptatie te faciliteren. Ten derde, heeft het proefschrift tot doel de randvoorwaarden en onderliggende mechanismen van de relatie tussen teamadaptatie en de effecten hiervan op teamprestatie te verkennen. Zoals beschreven in het resterende deel van deze samenvatting adresseren en verbinden de vijf hoofdstukken van dit proefschrift deze hoofddoelen om nieuw licht te werpen op hoe teams zich effectief kunnen aanpassen aan dynamische omgevingen.

In **hoofdstuk 1** wordt een overzicht gegeven van de literatuur over teamadaptatie en wordt het theoretisch kader van het proefschrift geïntroduceerd. Het theoretisch kader suggereert dat teamadaptatie kan worden gestructureerd in een input-mediator-output model en introduceert de omvang van veranderingen als centrale randvoorwaarde voor deze relaties. *Inputs* worden gedefinieerd als de onderliggende factoren voor het adaptief vermogen van teams, *mediatoren* omvatten het adaptatieproces en de resulterende emergent states, en de *outputs* vertegenwoordigen de gevolgen of uitkomsten van het teamadaptatieproces. Het theoretische

model richt zich met name op de rol van drie belangrijke adaptieve processen die ten grondslag liggen aan teamadaptatie: informatieverwerking, leiderschap en gecoördineerd handelen. De voornaamste conclusie is dat teamleden de configuratie van deze adaptieve processen moeten veranderen op een manier die overeenkomt met veranderingen in de situationele eisen om teamadaptatie te faciliteren.

Hoofdstuk 2 richt zich op de eerste twee onderzoeksdoelen van dit proefschrift en onderzoekt in welke mate swift trust - een initiële cognitieve vorm van vertrouwen in de betrouwbaarheid en de capaciteiten van andere teamleden - bepalend is voor hoe diep informatie verwerkt wordt voor en de prestaties van teams tijdens de daaropvolgende teaminteractie. Om deze onderzoeksvraag te beantwoorden wordt in hoofdstuk 2 een laboratoriumstudie gepresenteerd waarin 40 studententeams willekeurig werden toegewezen aan een conditie met ofwel een lage ofwel een hoge swift trust manipulatie. Vervolgens werkten deze teams achtereenvolgens aan drie routinematige en drie niet-routinematige besluitvormingstaken. De informatieverwerking door het team werd gemeten door nauwkeurige codering van het gedrag van de teamleden. In lijn met onze verwachtingen verwerkten de teams in de conditie met lage swift trust, informatie uitgebreider dan teams in de conditie met hoge swift trust. Daarnaast bleek dat de effectiviteit van de uitgebreide informatieverwerking door het team afhing van de situatie; uitgebreide informatieverwerking verhoogde de kwaliteit van teambeslissingen wanneer taken niet routinematig waren, maar had geen effect op teamprestaties wanneer taken wel routinematig waren. Deze bevindingen benadrukken dat belangrijk is voor teams om hun cognitieve functioneren en het bijbehorende gedrag aan te passen wanneer zij in dynamische omgevingen werken. Swift trust wordt geïdentificeerd als een belangrijke voorspeller van de informatieverwerking en prestaties van teams.

In **Hoofdstuk 3** wordt onderzocht of de ervaring van werken onder een directieve, participatieve of adaptieve leider (d.w.z. follower entrainment) in voorgaande situaties invloed heeft op de rolpercepties van volgers (teamleden) en daarmee bepaalt of volgers hun gedrag aanpassen aan veranderingen in de leiderschapsstijl van een nieuwe leider. Hiermee wordt de rol van adaptief volgerschap in het bepalen van de adaptieve prestaties van teams in dynamische omgevingen verder onderzocht. Hoofdstuk 3 draagt daarmee bij aan het bereiken van de eerste twee doelen van dit proefschrift. Ten eerste door de rol van follower entrainment

voor het adaptief vermogen van teams te verkennen. Ten tweede, door te onderzoeken hoe het adaptief inzetten van actief gedrag door teamleden (bv. opspreken tegen de leider, informatie delen) teamprestaties over tijd ten goede komt. De resultaten in hoofdstuk 3 zijn gebaseerd op twee studies die respectievelijk zijn uitgevoerd in een gecontroleerde laboratoriumsetting (Studie 1) en in een veldsetting (Studie 2). Uit de bevindingen bleek dat volgers die gewend waren aan een directieve leider, passief bleven in de interactie met nieuwe leiders en moeite hadden zich aan te passen aan complexe situaties. Daarnaast, waren volgers die eerdere ervaring hadden met een participatieve leider juist actiever onder nieuwe leiders wanneer zich complexe situaties voordeden. Daarnaast vonden we dat rolpercepties van de volgers deze relatie medieerde en dat de relatie tussen participatieve follower entrainment en actieve rolpercepties van volgers sterker was, wanneer de volgers zich sterk identificeerden met hun vorige leider hoog was. De bevindingen toonden verder aan dat actief volgersgedrag de teamprestaties bij complexe taken verbeterde, maar de teamprestaties bij eenvoudige taken juist verslechterde.

Hoofdstuk 4 adresseert het derde onderzoeksdoel van dit proefschrift door te onderzoeken of de perceptie van psychologische veiligheid van leiders de relatie tussen adaptief volgerschap en de adaptieve teamprestaties medieert, en door te verkennen in hoeverre de omvang van de verandering waar teams mee te maken hebben een voorwaarde is voor de deze relaties. We hebben deze vragen onderzocht in een laboratoriumsetting, waarin we teams willekeurig hebben toegewezen aan ofwel een conditie waarin zij werden getraind in adaptief volgerschap ofwel een controle teamwerk training kregen. Daarnaast werden de teams willekeurig aan een van drie types van verandering (nl. teamverandering, taakverandering, of team- en taakverandering) blootgesteld in een 2x3 design. De bevindingen tonen aan dat de omvang van de verandering de relatie tussen adaptief volgerschap en adaptieve teamprestatie modereert, zodat adaptief volgerschap niet significant samenhangt met adaptieve teamprestatie wanneer teams geconfronteerd werden met een team- of een taakverandering, maar wel positief bijdroeg aan adaptieve team prestatie wanneer teams werden geconfronteerd met een team- en taakverandering. We vonden verder dat leiders van teams die de training in adaptieve volgerschap kregen, significant hogere niveaus van psychologische veiligheid rapporteerden ongeacht het type verandering, en dat de psychologische veiligheid van de leider de effecten van de adaptieve volgerstraining medieerde in de team- en taakveranderingsconditie.

De studies hebben samen belangrijke theoretische, methodologische en praktische implicaties die in **hoofdstuk 5** worden besproken. Bovenal benadrukken de gerapporteerde bevindingen dat teamadaptatie vereist dat de cognitieve structuren van teams en het bijbehorende gedrag worden aangepast aan de eisen van de situatie, in het bijzonder een verandering in de leider-volger interacties en in de informatieverwerking binnen het team. De bevindingen suggereren specifiek dat de manier waarop volgelingen hun rol begrijpen en zich hiernaar gedragen een essentiële, maar onderbelichte, factor is van teamadaptatie. Naast deze implicaties worden in hoofdstuk 5 de beperkingen besproken van de gerapporteerde studies en worden suggesties gegeven voor toekomstig onderzoek. Hoewel meer longitudinaal veldonderzoek met echte teams nodig is, biedt dit proefschrift waardevolle richtlijnen voor toekomstig onderzoek om inzicht te verkrijgen in wat er gebeurt tijdens het adaptatieproces en biedt het concrete praktische suggesties voor het vergroten van teamadaptatie en het verbeteren van team adaptieve uitkomsten.



Zusammenfassung

Angesichts komplexer globaler Herausforderungen, wie beispielsweise die aktuelle COVID-19 Pandemie, sind Organisationen häufig gezwungen die „Logik von gestern“ aufzugeben und sich an ihre dynamische Umgebung anzupassen. Um schnell und effektiv auf akute oder laufende Veränderungen zu reagieren und damit einhergehende komplexe Aufgaben besser zu bewältigen, setzen viele Organisationen Teams ein. Es ist daher von zentraler Bedeutung Erkenntnis darüber zu erlangen, wie Teammitglieder ihr Verhalten bestmöglich an sich verändernde Situationen anpassen können. In der wissenschaftlichen Literatur wird *Teamanpassung* im Allgemeinen definiert als die funktionale Änderung von Teamprozessen, um veränderte situative Anforderungen zu erfüllen. Aufgrund der zentralen Rolle, die die Teamanpassung für das Bestehen und Funktionieren von Organisationen einnimmt, hat das Thema in den letzten Jahrzehnten zunehmend an Beachtung gewonnen.

Obwohl das Wissen über Teamanpassung stetig zunimmt, ist die Forschung über das *tatsächliche* Verhalten der Teammitglieder während des Anpassungsprozesses noch begrenzt. Diese Dissertation soll daher neue Erkenntnisse darüber liefern, wie Teammitglieder ihre Interaktion effektiv an veränderte Begebenheiten anpassen. Unter Verwendung eines Input-Mediator-Output-Modells als zugrundeliegender theoretischer Rahmen, hat diese Dissertation drei Hauptziele. Das erste Ziel ist es zu untersuchen, wie zentrale Prädiktoren der Teamanpassung (z.B. kognitive Strukturen und das Verhaltensrepertoire der Teammitglieder) mit den tatsächlichen Verhaltensweisen der Teammitglieder während des Anpassungsprozesses zusammenhängen. Zweitens sollen Erkenntnisse darüber gewonnen werden, welche spezifischen Verhaltensweisen erforderlich sind, um die adaptive Leistung von Teams zu erhöhen. Drittens zielt diese Forschungsarbeit darauf ab, Variablen zu identifizieren, die den Effekt zwischen Teamanpassung und Teamleistung beeinflussen und vermitteln. Diese Hauptziele werden in fünf Kapiteln aus unterschiedlichen Perspektiven betrachtet und in Zusammenhang gebracht.

In **Kapitel 1** wird auf Grundlage einer Literaturanalyse ein Forschungsmodell zur Teamanpassung abgeleitet, welches den theoretischen Rahmen der empirischen Untersuchungen (s. Kapitel 2-4) vorgibt. Danach lässt sich die Teamanpassung innerhalb eines Input-Mediator-Output Modells synthetisieren. *Inputs* werden definiert als Faktoren, die der Teamanpassungsfähigkeit zugrunde liegen. *Mediatoren* umfassen die funktionalen Teamprozessänderungen und die daraus

resultierenden kognitiven, motivationalen und affektiven Zustände der Teammitglieder (emergent states). *Outputs* beziehen sich auf die Ergebnisse des Teamadaptationsprozesses (z.B. Teamleistung). Das theoretische Modell konzentriert sich insbesondere auf drei zentrale adaptive Interaktionsprozesse, die der Teamanpassung zugrunde liegen: Informationsverarbeitung, Führung und koordiniertes Handeln. Eine der zentralen Schlussfolgerungen dieses Kapitels ist, dass durch die funktionale Änderung dieser Interaktionsprozesse und deren zugrundeliegenden kognitiven Strukturen, die adaptive Leistung von Teams erhöht werden kann.

Kapitel 2 stellt eine empirische Laborstudie mit 40 Teams vor, in der untersucht wird, inwieweit *swift trust* - eine anfängliche kognitive Form des Vertrauens in die Zuverlässigkeit, Fähigkeit und Verlässlichkeit anderer Teammitglieder - die Tiefe der kollektiven Informationsverarbeitung während der nachfolgenden Teaminteraktion und die adaptive Teamleistung beeinflusst. Um diese Forschungsfrage zu beantworten, wurden Teams zufällig einer *low swift trust* oder einer *high swift trust* Bedingung zugewiesen, und bearbeiteten anschließend sechs Entscheidungsaufgaben in randomisierter Reihenfolge, die in ihrer Komplexität variierten. Die empirische Auswertung der Daten basierte auf einer softwaregestützten, feingliedrigen Verhaltenskodierung der Teaminteraktion während der Aufgabebearbeitung. Die Studie zeigt im Ergebnis, dass Teams unter der *low swift trust* Bedingung, Informationen systematischer verarbeiteten als Teams unter der *high swift trust* Bedingung. Die Ergebnisse zeigen darüber hinaus, dass die Entscheidungsqualität der Teams von einer systematischen Informationsverarbeitung profitierte wenn Aufgaben nicht routiniert waren, jedoch keinen Einfluss auf die Teamleistung hatte, wenn Teams routinierte Aufgaben bearbeiteten. Insgesamt weisen diese Ergebnisse darauf hin, dass sich *swift trust* maßgeblich auf die kollektive Informationsverarbeitung von Teams auswirkt und dass eine funktionale Änderung der kollektiven Informationsverarbeitung die adaptive Teamleistung positiv beeinflusst.

In **Kapitel 3** wird die Teamanpassung aus dem Blickwinkel der Führungskraft-Mitarbeiter Interaktion betrachtet. Speziell wurde untersucht, ob sich die Erfahrung von Mitarbeitern unter einer direktiven, partizipativen oder adaptiven Führungskraft zu arbeiten (*follower entrainment*) nachhaltig auf die Rollenwahrnehmung und das adaptive Verhalten der Mitarbeiter auswirkt. Die in Kapitel 3 vorgestellten Ergebnisse basieren auf zwei Studien, die sowohl in einer kontrollierten Laborumgebung

(Studie 1), als auch in natürlicher Umgebung (Studie 2) durchgeführt wurden. Die Ergebnisse zeigen, dass sich Mitarbeiter, die vorher einer direktiven Führungskraft unterstellt waren, in ihrer Interaktion mit einer nachfolgenden Führungskraft passiv verhielten und Schwierigkeiten hatten, sich an komplexe Situationen anzupassen. Mitarbeiter, die vorher einer partizipativen Führungskraft unterstellt waren, verhielten sich hingegen maßgeblich aktiver in ihrer Rolle, sobald unerwartete Komplexitäten auftraten (z.B. aktive Einbringung in Entscheidungsprozesse). Dieser Effekt war am stärksten, wenn sich Mitarbeiter mit der Beziehung zu ihrer vorherigen Führungskraft identifizierten. Zudem zeigen die Ergebnisse, dass ein aktives Rollenverständnis und Verhalten seitens der Mitarbeiter die Teamleistung in komplexen Aufgabensituationen positiv, und in einfacheren Aufgaben negativ beeinflusste.

Die in **Kapitel 4** vorgestellte Studie konzentriert sich insbesondere auf das dritte Forschungsziel dieser Dissertation. Es wurde untersucht, inwieweit die Wahrnehmung von psychologischer Sicherheit (*psychological safety*) seitens der Führungskraft den positiven Effekt von adaptiven Mitarbeiterverhalten auf die adaptive Teamleistung nach einer situativen Veränderung mediiert. Zudem wurde untersucht, ob das Ausmaß der situativen Veränderung (*magnitude of change*) sich moderierend auf den Zusammenhang dieser Variablen auswirkt. Die vorgestellte Studie umfasst eine Stichprobe von 102 Teams, die zufällig einer der sechs Bedingungen zugeordnet wurden, die sich aus dem 2 (adaptives Mitarbeitertraining vs. Kontrolltraining) x 3 (Teamveränderung, Aufgabenveränderung, oder Team- und Aufgabenveränderung) faktoriellen Messwiederholungsdesign ergab. Die Ergebnisse zeigen, dass das Ausmaß der situativen Veränderung den Zusammenhang zwischen adaptivem Mitarbeiterverhalten und adaptiver Teamleistung signifikant beeinflusste. Das adaptive Mitarbeitertraining erhöhte die adaptive Teamleistung nur, wenn Teams sowohl mit einer Teamänderung, als auch mit einer Aufgabenveränderung konfrontiert waren (d.h. die situative Veränderung von hohem Ausmaß war). Zudem weisen die Ergebnisse darauf hin, dass die psychologische Sicherheit der Führungskraft diesen positiven Effekt des adaptiven Mitarbeitertrainings auf die adaptive Teamleistung mediiert.

Zusammen haben die empirischen Untersuchungen wichtige theoretische, methodische und praktische Implikationen, die in **Kapitel 5** diskutiert werden. Zudem werden in diesem Kapitel Limitationen der vorgestellten empirischen Studien diskutiert und Wege für die zukünftige Forschung

aufgezeigt. Obwohl mehr Langzeitstudien in realen Settings nötig sind, um die Generalisierbarkeit der hier vorgestellten Ergebnisse zu validieren, bietet diese Dissertation wichtige Einblicke und wegweisende Orientierung, um umfassende Erkenntnis über den Teamanpassungsprozess zu erlangen. Darüber hinaus bietet diese Forschungsarbeit konkrete praxisbezogene Vorschläge, wie die Teamanpassung verbessert und die adaptive Leistung von Teams gesteigert werden kann.



Impact paragraph

As emphasized by the current COVID-19 crisis, our work environments have become increasingly uncertain, fast-paced and complex over the past decades. Companies therefore frequently face changes in their environments forcing them to adapt existing structures and procedures. As organizations increasingly employ teams to deal with the dynamism and complexity of their environments, team adaptation is critical for team and organizational functioning and a topic of central interest for scholars and practitioners. The primary aim of this dissertation is to extend knowledge on team adaptation by investigating how team members effectively adjust their behaviors to changing conditions, what influences team members' ability to adapt, and what are the boundary conditions to the effectiveness of adaptive processes. In this paragraph, I will outline how the obtained research findings add value to science and society by focusing on three key points: (1) Improved understanding of the behavioral processes and cognitive structures required for team adaptation, (2) Examination of team adaptation from a followership angle, (3) Foundations for training interventions aimed at increasing team adaptation.

The first way in which this dissertation adds value to science and practice is by extending knowledge on cognitive structures and behavioral processes that improve team adaptation in dynamic environments. To date, many team adaptation studies adopt survey methods that rely on perceptions of behavioral aggregates, providing limited insights into what actually happens during the team adaptation process, and making it difficult to derive concrete practical suggestions on how to increase team effectiveness in dynamic environments. Findings of this dissertation suggest that team adaptation can be facilitated if team members flexibly adjust their information-processing behaviors and leader-follower interactions in accordance with situational demands. More specifically, when unexpected complexities arise, teams can improve their effectiveness by switching to a decentralized leadership structure in which team members systematically share, ask for and interpret available information, remain cautious about one another's inputs and actively voice suggestions, expertise and concerns. On the other hand, when processes become more routinized, teams can increase their efficiency by switching to a centralized leadership structures in which team members follow their leaders' instructions and rely on the routine exchange of information. These insights can be used for designing or improving interventions and training programs aimed at increasing team effectiveness in dynamic environments. For example, HR practitioners may complement traditional team-building activities with training elements

that promote a critical mindset when complexities arise or managers may combine situational awareness and reflexivity interventions; for instance, team members could collectively reflect upon how their team interactions influence team processes and outcomes in a specific situation.

Another way in which this dissertation adds scientific and practical value is by examining team adaptation from a followership angle. While studies on team adaptation and organizational development programs often focus on the role of the team leader, findings of this dissertation highlight the importance of followership in enabling and facilitating team adaptation. Specifically, findings suggest that followers can increase team adaptive performance by sharing their expertise and suggestions. At the same time, when tasks become routine, followers can facilitate adaptation by deferring responsibility back to the leader, thereby signaling when a switch in leader behavior is required. Additionally, our findings show that team leaders and followers need to have compatible mindsets regarding which leader and follower behaviors are required or appropriate in a specific situation, as incompatibility in behavioral expectations may lead to cognitive or behavioral inertia (see Chapter 3). Together, these findings emphasize that team adaptation is not a one-way street but a *co-constructed* process, based on the interaction of *all* team members. This dissertation thereby provides new directions for organizational-development practice. For example, instead of solely focusing on the individual leader, organizations may include followers in their development programs and pay attention to the situational context when evaluating effective leader-follower interactions. Such programs may thereby encourage team leaders and followers to be aware of and to develop in their roles and help them to behave in a more conscious, adaptive way.

Finally, this dissertation provides important insights into the foundations required for effective training interventions aimed at increasing team adaptation in dynamic environments. Such trainings may be particularly beneficial for teams working under time pressure in a fast-pace context, in which they need to interact efficiently but have to find new effective solutions in short amounts of time as soon as complications occur (e.g., medical surgery teams, military teams, crisis management teams). In Chapter 4, we developed and showed the effectiveness of an adaptive followership training. The elements used in this training may thus provide guidance for instructional designers and HRD practitioners. Findings suggest that an effective team adaptation training should focus on developing

team members' situational awareness, on explaining team members the importance of adaptive leader- and followership, and on training team members to flexibly adopt behaviors in accordance with situational demands. To achieve this, it is not necessary, and often unfeasibly, to train members on all potential events they may encounter; instead, adaptive team trainings should focus on teaching metacognitive behavior (cf., Marks, Zaccaro, & Mathieu, 2000). That is, team members should be trained in being aware of, interpreting and responding to situational demands and should therefore develop a wide behavioral repertoire that allows team members to flexibly choose an appropriate response. This may be achieved by showing exemplary video or audio fragments and by engaging in video-based acting or role-playing. Consistent with previous research (e.g., Stachowski, Kaplan, & Waller, 2009), our findings further suggest that high-fidelity simulations may be particularly suitable to train team members in effective interactions and to foster training transfer.

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Curriculum vitae

Marie S. Thommes was born on June 21, 1992 in Göttingen, Germany. She obtained her highschool diploma from Theodor-Heuss-Gymnasium Göttingen in 2010 and started her bachelor studies in Psychology at Mannheim University in the same year. While pursuing her undergraduate studies, she worked as a research assistant in the department of Social Psychology at Mannheim University and attended courses at Swansea University, United Kingdom, as an Erasmus student. In 2013, she graduated with a Bachelor of Science in Psychology from Mannheim University. Thereafter, Marie worked as an intern in the department of Recruiting and Management Support at Zalando AG in Berlin, Germany, and in the department of Personnel and Leadership Development at Deutsche Bahn AG in Frankfurt, Germany. In 2014, she continued her studies at Maastricht University and obtained her Master's degree in Work and Organizational Psychology with distinction (cum laude). In 2016, Marie started working in the department of Work and Social Psychology at Maastricht University, first as a research assistant and then as a PhD student. During her PhD project, Marie was a visiting doctoral researcher at the University of Western Australia Business School, as well as at the Neeley School of Business (Texas Christian University), where she conducted research activities in collaboration with Dr. Ramón Rico and Prof. Dr. Mary Waller. As of February 2021, Marie is continuing her research as a postdoctoral researcher in the Work and Social Psychology department at Maastricht University.

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Presentations

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