

Micro-behavioral Building Blocks of Effective Leadership, Followership and Team Interaction

Both leadership and team research are flourishing academic areas. However, most studies have examined leader behavior and team interaction based on aggregated perceptual recall ratings. Important leadership theories, such as the transformational-transactional model, and team phenomena have been investigated mainly on the basis of static behavioral survey studies. More and more leadership and team scholars question whether these examinations yield insights into the subtleties of real-time micro-behaviors and interactions between effective leaders and their followers. The aim of this PhD dissertation is, therefore, to (1) show how a host of micro-behaviors of leaders and followers are related with enhanced effectiveness, and (2) identify effective social dynamics between leaders and followers in teams. A blend of advanced methods, tools and techniques (including quantitative video-capture and -coding as well as physiological data collection) were used that resulted in new insights into how effective leaders and their followers interact.

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**MICRO-BEHAVIORAL BUILDING BLOCKS OF EFFECTIVE LEADERSHIP,
FOLLOWERSHIP AND TEAM INTERACTION**

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DISSERTATION

to obtain
the degree of doctor at the University of Twente,
on the authority of the rector magnificus,
prof. dr. T. T. M. Palstra,
on account of the decision of the Doctorate board,
to be publicly defended
on Thursday, the 19th of December, 2019
at 16:45 hrs

by

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born on the 15th of July 1986
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This PhD dissertation has been approved by:
Prof. dr. C.P.M. Wilderom

ISBN: 978-90-365-4913-4

DOI: 10.3990/1.9789036549134

Cover design: Douwe Oppermaans

Layout: Sandra Schele

Printer: Ipskamp Drukkers B.V. Enschede

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“Because the issues relating to leadership cut across all types of human activity and thought, true understanding of such a complex phenomenon requires a broadly conceived approach.”

(J. Thomas Wren, The Leader's Companion, 1995, p. 10)

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1

General Introduction

“... we know much less about how leaders make organizations effective than how leaders are perceived” (Dinh et al., 2014, p. 37)

Interest in the development of effective leadership (or management), both scientific and practical, has grown exponentially in recent years. Practically, industry research and other sources have reported that organizations in the United States alone spend a staggering \$24-\$60 billion on leadership and management development; outside the USA, these figures also increase each year (Askenas & Hausmann, 2016; McDonald & Tang, 2014). In the academic leadership arena, a multitude of studies have established that human dynamics and interaction are at the core of effective leader and team processes (e.g., Waller & Kaplan, 2018; Zaccaro, Rittman, & Marks, 2001). Not surprisingly, a key question driving much scientific work has been what constitutes effective leader behavior and team interaction (e.g., Behrendt, Matz, & Göriz, 2017; Kozlowski & Bell, 2008). However, academic research on effective micro-level leader, follower and team behavior is still scarce. Most studies have relied on static descriptions of a leader and follower’s overall style and/or a team’s aggregated team states (Behrendt et al., 2017; Lehmann-Willenbrock & Allen, 2018) that do not inform us about the subtleties of the moment-to-moment, real-time micro-behaviors and interactions between leaders and followers (e.g., Collinson, 2005; Day, Gronn, & Salas, 2004; Uhl-Bien, 2006). Rather, survey recall measures tend to capture overall positive or negative evaluations from team members and not the actual micro-behaviors (e.g., during social interactions) in the team (Baumeister, Vohs, & Funder, 2007). No wonder many people have raised the question if this huge amount of expenditure on leadership/management development generates the expected return on investment. This dissertation takes the view that to improve management-development efforts, academic research needs advanced tools and methods that help to provide insight into how leaders and team members actually interact and how they should specifically behave—at the micro-behavioral level—to become more effective.

A foundation of much empirical work on effective leader behavior is the transformational-transactional model developed by Bernard Bass (Bass, 1985; Bass & Avolio, 1995). Bass and many others established how transformational behavior is related to team functioning and effectiveness and identified the team states through which transformational behavior helps teams to effectively accomplish their goals. However, although this theory is widely regarded as one of the most influential theories of leader behavior (e.g., Zhu, Song, Zhu, & Johnson, 2019), its body of research did not result in breakthrough insights into effective leader and team functioning (Van Knippenberg & Sitkin, 2013; Yukl, 2012). Several reasons limited such types of insights. First, the transformational-transactional model has been criticized—in my view, rightly so—for focusing on too narrow

a set of leader behaviors (DeRue, 2011). Second, transformational-transactional behaviors were measured with surveys that have been shown not to offer sharp distinctions from other leader behaviors, that is, having too much conceptual overlap. Despite these criticisms, the transformational-transactional theory still offers social researchers relevant behaviors that account for both direct and indirect effects on leader, follower and team performance (Lee, Martin, Thomas, Guillaume, & Maio, 2015). However, this dissertation work started out by assuming that this theory does need to provide a fuller-range or more all-inclusive behavioral model and a more team- and follower-centric view of effective leadership. This PhD dissertation aims to *broaden* and *enrich* transformational-transactional theory. *Broadening* comes through (1) expanding the transformational-transactional model to include other relevant (theory-driven) behaviors, offering a fuller behavioral model, and (2) sharpening the behavioral concepts to represent actual observable micro-behavior. The *enriching* part of the aim of this dissertation invokes my capturing of fine-grained, minute transformational-transactional dynamics during team interactions (offering dynamic and not static accounts). Hence, the purpose of this PhD dissertation is to extend the existing body of knowledge and insights about effective leader, follower and team interactions. The specific goal is to get closer to the phenomena of interest: to investigate the actual behaviors that we are trying to explain, and to understand the temporal dynamics that surround them.

Why did I combine leader and team-(member) type behaviors? Other scholars have advocated that leadership is interconnected with daily follower behaviors visible in team settings (e.g., DeRue, 2011). How leaders and followers interact with each other in a team setting plays a crucial role in organizational success (e.g., Vroom & Jago, 2007). Hence, the extent to which leaders and followers function effectively in a team depends heavily on their (micro-) behaviors and related social dynamics (Day & Antonakis, 2012; Fairhurst & Connaughton, 2014; Fairhurst & Uhl-Bien, 2012). Despite these claims favoring a reliable, high-resolution understanding of effective leader and follower behavior in teams, most leader and follower research to date has still employed survey-type designs, using *only* Likert-type scales to assess perceptions of big behavioral agglomerates (e.g., Baumeister et al., 2007; Fairhurst & Uhl-Bien, 2012; Lehmann-Willenbrock & Allen, 2018). Although this work has advanced our understanding of effective leadership and followership, there is a need for much more sophisticated identification of actual leader and follower behaviors that are effective. Therefore, the five studies in this dissertation draw upon functional and pragmatic leadership theory (Morgeson, DeRue, & Karam, 2010), as well as several other behavioral theories, to generate insight into the micro-behavioral building blocks of effective leadership and followership. In this general introductory chapter, the guiding models for capturing the precise micro-behaviors of leaders and followers and interactions within teams are presented. In the interest of advancing management research, it is

important to note that each chapter uses a different multi-modal theoretical lens to test and develop theory. Below, I briefly introduce the trends that led towards the current state of leadership and team research. These trends also provide a “red” or guiding thread for the questions I intent to address in the respective chapters of this PhD dissertation.

STUDY 1: THE BEHAVIORAL FOUNDATION OF LEADERSHIP

A recent bibliometric study (Zhu et al., 2019) showed that the transformational-transactional behavioral model developed by Bass and colleagues (Bass, 1985; Bass & Avolio, 1995) continues to be at the forefront in leadership research. Scholars who examined leadership styles or behaviors have drawn heavily upon this model (Lord, Day, Zaccaro, Avolio, & Eagly, 2017; Meuser et al., 2016). The Ohio State, initiating-structure vs. consideration distinction (Fleishman, 1973) and the relations- vs. task-oriented behavioral dichotomy (Yukl, 2012) come close in terms of their popularity among leadership scholars. Leadership scholars continue to refine these renowned leadership theories (as evidenced by, for example, the dual-level model of individual- and group-focused transformational leadership: Wang & Howell, 2010). Yet, to date, these models of leader behavior have still predominantly been operationalized as aggregated, perception-based, survey-based, meta-categories (Behrendt et al., 2017), and explicit, complex links to follower or team interactions are much less often made.

The survey instruments that are used to assess these important leadership behaviors suffer from low construct validity and are often regarded as too parsimonious (e.g., Van Knippenberg & Sitkin, 2013). Furthermore, survey assessment scales capture followers’ perceptions that reflect overall positive or negative evaluations, which suffer from intrusive observer errors such as the halo effect or confirmation bias (Frone, Adams, Rice, & Instone-Noonan, 1986; Hansbrough, Lord, & Schyns, 2015; Thorndike, 1920). As a result, they do not precisely capture actual leader behaviors in the field (Baumeister et al., 2007; Behrendt et al., 2017).

To get a more accurate understanding of effective real-life leader behavior, it is critical to “take approaches that are more proximate to actual behavior, such as video-based behavior analysis” (Behrendt et al., 2017, p. 242). Video capture and coding enable the examination of the micro-behavioral dynamics (i.e., actual temporal interactions and behavioral patterns that emerge over time) affecting individual and team processes, leader/follower effectiveness and team outcomes. Video recordings capture evolving action processes as they unfold in time (e.g., Streeck, Goodwin, & LeBaron, 2011; Klonek, Quera, Burba, & Kauffeld, 2016; Lehmann-Willenbrock & Allen, 2018), “through orchestrations of discourse, bodies, and things” (LeBaron, Christianson, Garrett, & Ilan, 2016, p. 518). All five empirical studies reported in this PhD dissertation focus on observable micro-behaviors,

projected onto the transformational-transactional model, Ohio state model and/or relations- vs. task-oriented framework. This integrative approach enables the creation of novel viewpoints and theoretical refinements with regard to effective (leadership/followership) behavior in and of teams.

As a starting point, Chapter 2 provides an answer to the question: how well do *actual* effective leader behaviors (i.e., using video-observation measures) stack up against *perceptions* of effective leader behavior (i.e., capturing the implicit, cognitive schema that people hold about what constitutes effective leader behavior: Shondrick & Lord, 2010). I answered the following research question in that chapter:

What are the differences between recall ratings (or prototypical images) and the actual behavioral repertoire of effective leaders?

Uncovering the differences between *actual* and *perceived* effective leader behavior is likely to (1) help better interpret previous survey-based findings and how these results inform us about what constitutes effective leader behavior, and (2) help pinpoint what type of behavioral focus is needed in current leadership theorizing. Chapter 2's results give confidence in the fruitfulness of the laborious multi-modal, minute or micro-behavioral approach taken also in the other four empirical chapters of this dissertation.

STUDY 2: A FULLER-RANGE LEADER BEHAVIORAL MODEL

In addition to the need to shed light on the (micro-)behavioral building blocks of effective leadership and teams, another fundamental challenge exists in today's leadership research that stalls the theoretical enrichment of extant models: prior leadership research has hardly examined an entire full range of behavior (Yukl, 2008). Most leadership studies do not face this criticism; they tend to invoke one single model (DeRue, Nahrgang, Wellman, & Humphrey, 2011) that fails to account for the full diversity of workplace behaviors. As a consequence, they omit potentially crucial leader behaviors, while the effect of the invoked behaviors or style gets overestimated (Antonakis & House, 2014), leading to an incomplete picture of what effective leadership (and followership) looks like, both in practice and as a *theoretical gap*. I fill this void by using multiple models of leader behavior (i.e., the transformational-transactional model: Bass, 1985; the initiating vs. consideration model: Fleishman, 1973; the relations-vs task-oriented behavioral dichotomy: Yukl, 2012), with which I coded leaders (and followers) at the behavioral event level during interactions. Also, it is well known that during workplace interactions, leaders (and followers) sometimes

express mildly negative relations-oriented or counterproductive behaviors (Meinecke, Lehmann-Willenbrock, & Kauffeld, 2017). To capture the full breadth of behaviors during social interactions, counterproductive behavior is thus an important, yet less studied, category. Hence, in line with a growing focus on *the dark side of leadership* or counterproductive behaviors (see, e.g., Mackey, McAllister, Maher, & Wang, 2019), I extend the behavioral repertoire with actual observable counterproductive behaviors in my investigations.

To test if this adding of theoretically-sound behaviors to the so-called full-range model of leader behavior (i.e., the transformational-transactional model) improves the amount of explained variance in various workplace outcomes, I answer the following question in Chapter 3:

Does a fuller model of leader behavior (including the distinctions between transformational/transactional and initiating structure/consideration) explain more variance in important workplace outcomes (including leader and, team effectiveness and employee extra effort) than single leadership behavioral models?

STUDY 3: THE PHYSIOLOGICAL PROCESSES UNDERLYING WORKPLACE BEHAVIOR

In addition to capturing a great variety of minute, micro-level leader behaviors during social interactions at work, neuroscience-based or physiological-type insights have been assumed by scholars to be instrumental in moving the field of leadership forward (e.g., Ashkanasy, Becker, & Waldman, 2014; Becker, Cropanzano, & Sanfey, 2011; Boyatzis et al., 2012; Decety & Cacioppo, 2010; Healey & Hodgkinson, 2014; Lee, Senior, & Butler, 2012; Waldman, Balthazard, & Peterson, 2011). A variety of different physiological processes might underlie leader workplace behaviors. Physiological arousal, in particular, has the potential to inform our understanding of effective (leader) behavior (Akinola, 2010; Antonakis, Ashkanasy, & Dasborough, 2009; Boyatzis, Rochford, & Taylor, 2015). Hence, combined insights about both behavioral and physiological processes might sharpen our understanding of effective leader behavior. In Chapter 4, I report an empirical test of the question whether leaders' physiological processes are indeed associated with distinct workplace behaviors. To that effect, I posed the following key question:

How does physiological arousal fluctuate in conjunction with various leader behaviors, and can we discern synchronized physiological and behavioral patterns among highly effective and less effective leaders?

STUDY 4: COMPLEXITY OF LEADER-FOLLOWER DYNAMICS

Complex adaptive systems theory provides explanations for the key point made thus far in this dissertation, that micro-behavioral examinations of leader and follower dynamics show much more variation, complexity and insight than when such dynamics are captured with simple or static behavioral accounts. Taking a complex adaptive systems approach to explaining team effectiveness implies that both the local, dynamic team interactions as well as the context in which those interactions take place should be taken into consideration (Ramos-Villagrasa, Navarro, & García-Izquierdo, 2012; Ramos-Villagrasa, Marques-Quinteiro, Navarro, & Rico, 2018).

When team members interact with one another to accomplish one or more task-related team goals, they can quickly develop and maintain routines and patterns of interaction (Gersick & Hackman, 1990). When a team engages in established interaction patterns, they choose these over an alternative manner of interacting (Lei, Waller, Hagen, & Kaplan, 2016). Such patterns of interaction (i.e., recurring sets of behavioral events) intended to accomplish team goals are considered to be main drivers of performance (Stachowski, Kaplan, & Waller, 2009; Zijlstra, Waller, & Phillips, 2012). Despite an increased awareness that these behavioral dynamics or patterns of interaction can explain variance in leader and team performance, not much is yet known about functional or dysfunctional temporal behavioral contingencies.

In Chapter 5 of this dissertation, I map ongoing team interaction dynamics and behavioral dynamics of leaders during ongoing interactions with their followers. By doing so, I shed light on how team interaction patterns contribute to higher team performance as well as increased levels of information sharing, in two distinct task contexts.

How do team interaction patterns impact team effectiveness, and does this vary in routine or nonroutine task contexts?

STUDY 5: THE PROCESS OF MUTUAL INFLUENCE BY LEADER AND FOLLOWERS IN TEAMS

Past leadership research has predominantly paid attention to examining the impact of leader behaviors (and traits) on follower-related outcomes such as job performance and follower behavior, and has thus been criticized as too “leader-centric” (e.g., Howell & Shamir, 2005). However, leadership has already been conceptualized as co-created by leaders and followers in an interconnected, interactive context (Fairhurst & Uhl-Bien, 2012). Although followership research is gaining more and more research momentum (Zhu et al., 2019), the processes of

mutual influence in which a follower also contributes proactively to the effectiveness of the leader and her or his team are not well understood (DeRue & Ashford, 2010; Dinh et al., 2014). Understanding the interwoven, co-existing process of leadership and followership requires a study design in which both actors are studied in tandem (i.e., in which their behavioral trajectory is captured simultaneously). In Chapter 6, I respond to the calls for more insights into the (in)effectiveness of follower-leader behaviors (Uhl-Bien, Riggio, Lowe, & Carsten, 2014). In that chapter, I analyze the behavioral trajectory and effectiveness of leaders and followers during regular staff meetings, using a behavioral taxonomy rooted in transformational leader theorizing (Dansereau, Yammarino, & Markham, 1995; DeChurch, Hiller, Murase, Doty, & Salas, 2010). Both transformational and transactional behavior can be demonstrated by leaders, but “may also be shown by team members” (Wang, Waldman, & Zhang, 2014, p. 183). It is argued here that this behavioral dichotomy might differentiate highly effective from less effective followers as well, and might also be useful in obtaining further empirical insights regarding team effectiveness. Chapter 6 provides insight into the moment-to-moment micro-behavioral dynamics between leaders and followers/team members and an answer to the question:

“What do patterns of leading and following look like in effective leadership and followership”? (Uhl-Bien et al., 2014, p. 99)

STRUCTURE OF THIS PHD DISSERTATION

Overall, the aim of this PhD dissertation is to (1) show how the actual micro-behaviors of leaders and followers are associated with enhanced effectiveness, and (2) identify effective social dynamics between leaders and followers. The central question of this PhD dissertation is as follows:

What micro-behaviors and related behavioral patterns are associated with leader, follower and/or team effectiveness?

The five empirical studies in this PhD dissertation (see, Figure 1) advance our understanding of *how* leaders and followers need to behave and interact with each other in order to enhance their own and/or team effectiveness.

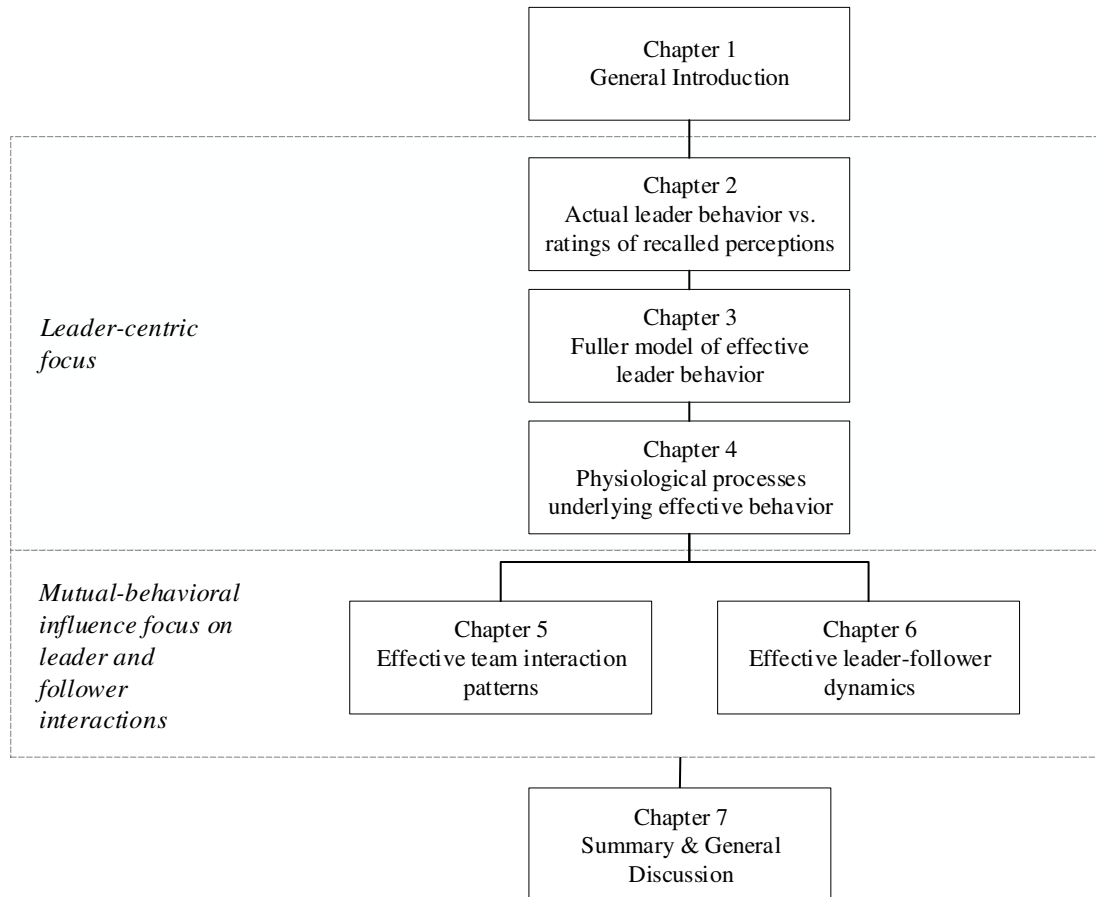


Figure 1. Overview of the foci in the chapters of this PhD dissertation.

GENERAL CONTRIBUTIONS

This PhD dissertation analyzes team phenomena (i.e., leadership, followership, information sharing, effectiveness) by applying micro-behavioral video observation methods, including interaction coding, sequential analyses, pattern detection and, in one chapter, the simultaneous collection of physiological arousal data. By doing so, I add to the lines of research on formal leadership (e.g., Sparrowe & Liden, 1997), the communicative foundation of leadership and followership (e.g., Fairhurst & Connaughton, 2014; Fairhurst & Uhl-Bien, 2012), team effectiveness studies (e.g., Mathieu, Maynard, Rapp, & Gilson, 2008) and physiological processes underlying effective leadership (Arvey & Zhang, 2015).

The chapters in this PhD dissertation contribute to the leadership and team literature in at least three ways. First, by examining co-occurrences of leader-follower behaviors and interactions, the presented studies offer an original way of studying leadership and followership and their associations in real-life settings. To achieve this, I employed a minute video-observational method accompanied with systematic coding of the captured in-site field behaviors. I offer much requested insights into the real behaviors of leaders and

followers and how they contribute to important effectiveness criteria (as called for by, e.g., Behrendt et al., 2017). Second, I quantitatively trace the interaction sequences and patterns that leaders, followers and teams demonstrate, which offers insight into the effective social dynamics at play (as called for by, e.g., Cronin, Weingart, & Todorova, 2011). Third, I combine theories from the fields of organizational behavior, leadership and team research, and even physiology, while employing techniques borrowed from computer science, comprising a multidisciplinary effort to ultimately help uncover trainable, effective human dynamics in organizations (as called for by, e.g., Akinola, 2010; Lehmann-Willenbrock, Hung, & Keyton, 2017). The collection of multi-model, multi-sensory and multi-actor data with relatively little common-method/source bias is, in my view, a promising path for future leadership or team research; I invite the reader to join me, so that developing both leaders and followers becomes even more of a science and less of an art.

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2

Effective Leader Behaviors in Regularly Held Staff Meetings: Surveyed vs. Videotaped and Video-Coded Observations

This chapter is published as:

Hoozeboom, A. M. G. M., & Wilderom, C. P. M. (2015). Effective leader behaviors in regularly held staff meetings: Surveyed vs. videotaped and video-coded observations. In J. A. Allen, N. Lehmann-Willenbrock, & S. G. Rogelberg (Eds.). *The Cambridge handbook of meeting science* (pp. 381-412). Cambridge University Press: U.K. Currently (Fall, 2019), the chapter is the *most cited chapter* in the Cambridge handbook of meeting science.

At the User-meeting of Noldus Information Technology (Wageningen, March 22), I presented the video-observation methodology used in this chapter: Hoozeboom, A.M.G.M. (2012). Behavioral dynamics of leaders: What patterns lead to success? Also, an earlier version of this working paper was presented at the Measuring Behavior Conference, Utrecht, August 28-31: Hoozeboom, A.M.G.M. (2012). Behavioral dynamics (in staff meetings): What patterns lead to success?

ABSTRACT

In this chapter, we report on two studies that took an exploratory behavioral approach to leaders in regular staff meetings. The goal of both studies, which used a still rarely deployed observation method, was to identify effective behavioral repertoires of leaders in staff meetings; we specifically examined how video-observed instances of effective leader behavior differ from group members' perceptions of effective leader behavior. One study found that members attribute more relation-oriented and fewer task-oriented behaviors to an effective leader while their actual behavioral repertoire is predominantly made up of task-oriented behaviors. Study 2 explored whether followers' ratings of a transformational leadership style can be explained by the coded leader behaviors actually shown in the meetings. We found that this perceived style was significantly explained by both "individualized consideration" and (task-oriented) "delegating" leader behavior. In the discussion we reflect on the findings of both studies and sketch some practical implications. A number of conclusions further aim to contribute to the productivity of meetings in work-unit settings.

INTRODUCTION

Regular staff meetings are omnipresent in the work setting. What happens within such meetings has been linked to overall employee job satisfaction and well-being, and meetings are also known to affect employee perceptions about the organization (Rogelberg, 2006; Rogelberg, Allen, Shanock, Scott, & Shuffler, 2010; Rogelberg, Scott, & Kello, 2007). Staff meetings are often crucial to both organizational and leader effectiveness (Romano & Nunamaker, 2001), but meetings cost the organizations time and money. Hence it is surprising that not many studies have examined this specific workplace context empirically (Luong & Rogelberg, 2005; Rogelberg, Shanock, & Scott, 2012), despite the importance of gaining a better understanding of organizational meetings (Baran, Rhoades Shanock, Rogelberg, & Scott, 2012). This lack of attention is remarkable, especially because of the earlier calls for leadership studies to be more context specific (e.g., Peus, Braun, & Frey, 2013).

According to Rogelberg et al. (2012) it is very important to study effective meeting leadership, because the role of leaders is crucial in these contexts (Nixon & Littlepage, 1992). In meetings, leaders are expected to facilitate many interrelated organizational, team, and task-level processes, such as decision making, brainstorming, and prioritizing and clarifying tasks (Allen & Rogelberg, 2013). Given that leader behaviors are known to affect such team processes (Judge, Piccolo, & Ilies, 2004; Srivastava, Bartol, & Locke, 2006) this chapter offers a detailed account of leaders' behaviors in regular staff meetings. To the best of our knowledge, insight into the precise behavioral repertoire of leaders during regular staff meetings has been absent in both the leadership and meeting literatures. According to Allen

and Rogelberg (2013) a behavioral approach, using a leader perspective, can advance our understanding of effective manager-led staff meetings (Galanes, 2003).

A meeting is a joint activity that involves two or more participants who interact. Staff meetings are mostly facilitated by a chair or leader (Clark, 1996). Put differently, a staff meeting is a place where leadership manifests itself (Allen & Rogelberg, 2013; Schwartzman, 1989). Baran et al. (2012) emphasize the need to study leaders' behaviors during the staff meetings that they chair. Followers in meetings tend to have an active role; for example, by giving input to problems that are raised or solved during the meetings. This makes regularly held staff meetings an important nexus in organizational life, making this (workplace) event salient for both leaders and their followers.

This chapter focuses on whether the specific behaviors of leaders in organizational staff meetings differ from people's perceived estimates of these behaviors. Several earlier leadership studies have shown that individual perceptions of others' behaviors are biased by individual personality characteristics, cultural backgrounds, experiences or affective events (e.g., Brown & Keeping, 2005; Shondrick, Dinh, & Lord, 2010; Srull & Wyer, 1989). These factors may constrain people's capacity to observe a leader's behavior in objective ways. Hence, biases tend to affect people's ratings of leader behaviors (see, e.g., Bono, Hooper, & Yoon, 2012). Therefore, some leadership scholars have pointed out that perceptions of behavior (which are predominantly used when studying leader behaviors) do not accurately reflect the actual behaviors (Shondrick et al., 2010). Wherry and Bartlett (1982) emphasized the importance of the rarely examined differences between ratings of behaviors and true behavior behaviors. In this chapter, we not only report the perceptual behavioral ratings in the context of staff meetings; using a relatively new video method, we also contrast the actual to the perceived or estimated leader behaviors. We do so partly in response to Shondrick et al. (2010), who called for event-based measures of leader behaviors. They showed that the so-called episodic memory of raters, which refers to the memory of autobiographic events (or contextual "what" knowledge), is more accurate than the so-called person-focused ratings. The latter type of rating taps the implicit memory of raters, resulting in recall of prototypical behaviors rather than of actually displayed behaviors. The event-based nature of meetings is more likely to result in accurate behavioral recall ratings than are elicited by other, less sedentary types of managerial work situations. Moreover, studies that combine perceptions of leader behaviors with more precise observation methods are increasingly being called for (e.g., Kaplan, Cortina, Ruark, LaPort, & Nicolaidis, 2014). This chapter's comparisons of inter-reliably coded actual leader behaviors in staff meetings with people's perceived or estimated ratings aims to yield a better understanding of the differences between actual and perceived leader behaviors and to provide insight into effective meeting behaviors of organizational leaders.

In this chapter, we aim to contribute to an enhanced understanding of measurement error in behavioral recall ratings (e.g., Bono et al., 2012; Bono & Judge, 2004; Murphy & DeShon, 2000; Schriesheim, Kinicki, & Schriesheim, 1979). We draw on implicit leadership theory to explore whether perceptual recall ratings (or prototypical behavioral images) by followers differ from the actually shown behaviors of leaders in staff meetings. Thus, we examine the extent to which a range of specific leader behaviors can be accurately estimated by different respondents, including outsiders, followers, and the leaders themselves. By contrasting the actual fine-grained leader behaviors in staff meetings with the perceptions of outsiders (Study 1) and insiders (Study 2), we aim to learn about both organizational meetings and the behaviors of the leaders who typically chair these regularly occurring workplace events.

THEORETICAL BACKGROUND

Leader and Follower Behaviors in Meetings

A staff meeting typically facilitates several organizational processes such as information exchange, sharing procedural goals, making decisions, identifying problematic issues, brainstorming, or reaching an agreement on proposed solutions (Cox, 1987; Kriesberg, 1950; Schwartzman, 1989). Moreover, in some professional settings, crucial aspects of the work are accomplished during organizational meetings. Rienks (2007) describes important team processes necessary for successful meetings. To ensure appropriate behaviors on the part of followers, the structure of a meeting must be made clear to followers. Factually informing team members, for example, is assumed to be a key part of an effective meeting (Lord, 1977; Rackham & Morgan, 1977). On the basis of a preset observation grid, Rackham and Morgan (1977) rated the following set of leader activities in a group context: seeking information (29.1%) and giving information (21.7%), testing understanding (15.2%), summarizing (11.5%), procedural proposals (9.6%), content proposals (5.8%), supporting (3.2%), disagreeing (2.0%), defending/attacking (1.8%), and building (0.1%). This set of leader activities during meetings illustrates the necessity to include a great variety of behaviors, or so-called full ranges of leadership, in behavioral research (Bass & Bass, 2008).

Thus, when examining leader behaviors, leadership scholars have argued that it is important to consider their full behavioral repertoire (Avolio, Bass, & Jung, 1999; Bass, 1985, 1998; Bass & Avolio, 1994). Bass's (1985) early models of leadership behavior included transformational and transactional leader behaviors. Transformational leadership is geared to motivating followers toward high levels of performance by making them aware of a collective vision, by intellectually stimulating them, and by paying attention to their individual needs. Transactional leaders tend to use more rewarding and corrective types of

behaviors. They direct rather than enhance expectations, and they engage in an exchange process when followers meet preset (organizational or leader) expectations (Bass, 1985).

This characterization of leader behaviors has received some criticism. Scholars have argued that an oversimplistic two-factor model omits important work-related behaviors, such as providing information or leading meetings (Hinkin & Schriesheim, 2008; Yukl, 1999). Yukl, Wall, and Lepsinger (1990) offered a number of behavioral additions, such as informing and organizing and delegating tasks. The study by Pearce and Conger (2003) extended the transformational/transactional paradigm to include empowering and directing behaviors. Under the label of “directing” behavior Yukl (1999) and Yukl, Gordon, and Taber (2002) classified the following task-oriented leadership behaviors: clarifying roles and objectives, informing, and monitoring. Martin, Liao, and Campbell (2013) have interpreted “directive” leadership as being comparable to initiating structure. Leaders have a directive leadership style when they actively monitor performance and provide guidance to followers on how to accomplish specific tasks. Yukl's taxonomy shows convincingly that leaders’ relation-oriented and task-oriented (including transactional) behaviors are both important and should be included when studying leader behaviors in organizational settings such as regularly occurring staff meetings.

Yet, when doing so it is important not only to assess transactional or task-oriented behavior and transformational or relations-oriented behaviors; it is also important to capture less constructive or apparently counterproductive behaviors. Counterproductive behaviors have been defined as behaviors that undermine the goals, tasks, or overall effectiveness of the organization and/or the motivation of followers (Einarsen, Aasland, & Skogstad, 2007). Such behaviors do occur every day in organizational settings (including meeting contexts), and they form a part of a leader's full behavioral repertoire (Schyns & Schilling, 2013). It has been shown that these destructive (or less negative, but often still demotivating) types of leader behaviors might affect employees more than transformational or transactional leader behaviors (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Tepper, Duffy, Henle, & Lambert, 2006). Examples of counterproductive leader behaviors that are frequently displayed in work environments are “unsupportive managerial work behaviors” or “despotic leadership behavior.” These counterproductive behaviors are generally concerned with “communicating disinterest in their followers” and thereby disrespecting them (De Hoogh & Den Hartog, 2008; Rooney & Gottlieb, 2007). Thus, to better understand how a leader behaves in a meeting, it is important to focus on a wide range of behaviors.

Observed Behavior vs. Behavioral Recall Ratings

Research on leader behavior is abundant in the leadership literature. However, most of it relies on more traditional, quantitative survey methods (Bass & Bass, 2008). Inherent in these

methods of inquiry is that the measures reflect the mere perceptions of behavior instead of capturing the actual field behaviors. In their 1982 article, Wherry and Bartlett discuss several factors that might affect the perceptual ratings of leader behavior. These ratings can be biased due to the behavior or performance of the ratee, rater bias (i.e., mostly of followers or experts), or random measurement error (Wherry & Bartlett, 1982). To obtain an accurate understanding of (leader) behaviors and their contributions to performance, these biases must be minimized. More insights into the differences between perceptual recall ratings and true behavior will help researchers take perceptual biases into account when theorizing about leader behaviors.

Rating individual behavior in the workplace is a highly complex cognitive task (Landy & Farr, 1987). Largely because of the complexity of objectively assessing other's behavior, most raters rely on subjective, prototypical representations. Even for important outcomes, such as performance measurement, perceptual indices are used as primary means of assessment. In leader behavioral research we find a similar trend. Most articles on leadership published in A-journals (i.e., top journals in the field of management) have used employees' perceptual recall ratings for assessing leader behavior (Stentz, Plano Clark, & Matkin, 2012). To date, scholars have not examined the differences between perceptual and objective indices of leader behaviors. This analysis is needed because perceptual ratings are often inaccurate because of inadvertent biases (Bass & Bass, 2008; Landy & Farr, 1987).

In their study of memory Srull and Wyer (1989) showed that impression formation (i.e., the representation of persons based on cognitive processes) involves both information processing, which is based on memory, and the transformation of this information into judgments about the person, which is based on affect (i.e., likability). Hence, what in effect should be a cognitive task represents an affective evaluation (i.e., a social judgment), which influences behavioral ratings (Srull & Wyer, 1989). These affective biases distort accurate behavioral measurement (Brown & Keeping, 2005). Similarly, Ilgen, Fisher and Taylor (1979) found that source credibility (comprising both the ability of a rater and his or her motivation to accurately rate the behavior) affected rater variance. Thus, affective and social-learning determinants shape behavioral perceptions. In addition, descriptions of target persons can be manipulated by the use of strong prototypical leader behaviors. For instance, based on the assumptions of the categorization theory, Lord, Foti, and Phillips (1982) showed that more easily accessible, prototypical leader behaviors, such as “emphasizes goals,” “seeks information,” or “coordinates groups,” are rated more often than nonprototypical behaviors. In other words, people's categorizations of leader behaviors are also likely to distort behavioral ratings or assessments.

Another reason why other-ratings of behavior are often biased is because people select behavioral information in line with their own pre-observational impressions. Every

individual follower has his or her own thoughts about what constitutes (effective) leadership and thus an idiosyncratic theory of leadership (e.g., Shondrick et al., 2010). In this implicit process, followers make use of cognitive processing, in which they reduce the complexity of a highly complex phenomenon such as behavior by giving a similar set of attributions to a particular observed “object” (Shaw, 1990). The GLOBE study, for instance, showed that transformational and charismatic attributions (e.g., encouraging) were cross-culturally attributed to leadership (Den Hartog, House, Hanges, Ruiz-Quintanilla, & Dorfman, 1999). Other prototypical leader attributes were “emphasizes goals,” “proposes solutions,” and “exercises influence” (Lord, Foti, & De Vader, 1984). Offermann, Kennedy and Wirtz (1994) found sensitivity, charisma, intelligence, attractiveness, and strength to be prototypical attributes of effective leaders. Epitropaki and Martin (2004) found similar results, adding dedication, honesty, and determination to the list. Thus, followers are inclined to match perceptions of leader behavior to an intrinsically held prototypical image of a leader (Foti & Luch, 1992; Sy, 2010). Almost all of the studies based on the implicit leadership theory have been examined in experimental settings; yet the cognitive schemas that people hold in relation to actual leader behaviors could best be studied in an actual, field type of leadership setting. Shondrick and Lord (2010) recommended comparing observed behaviors with perceptual behavioral estimates of leaders. This leads to the first research question of this chapter:

RQ1: What are the differences between perceptual recall ratings (or prototypical images) of effective leaders in staff meetings and their actual behavioral repertoire?

METHODS: STUDY 1

In Study 1 we compared the collected video observational data from a sample of 25 effective Dutch leaders with perceptual data from 445 employees and students who were not direct followers of the observed leaders.

Perceptual Sample and Measures

In addition to the video-coded behaviors, we surveyed 548 individuals taking a master’s-level course in business administration (both full-time business administration students and employees of various Dutch organizations) at the beginning of each master’s-level class or seminar in leadership. The one-page survey contained short definitions of the 15 video-coded leader behaviors. All 548 respondents were given the task of allocating percentage points to the 15 behaviors in answer to the question – “How often do you expect the following behaviors to occur among effective leaders during regular staff meetings?” – so that the sum of their 15 percentages added up to 100%. Of the 548 distributed surveys, 103

leadership ratings (18.1%) were invalid because the respondents' columns did not add up to 100%. The final perceptual sample consisted therefore of 274 full-time students and 171 employees. Compared to the full-time students, the significantly older employees had had more experience with leadership. Hence, one would expect the employees to be more accurate in their leader behavioral perceptions than the full-time, younger students, who had less work experience.

Observational Sample and Leader Behavioral Measures

In large private- and public-sector organizations, the behavior of 25 effective Dutch leaders in their natural work habitats was recorded and systematically and minutely coded (Van Der Weide, 2007). Three of the 25 leaders were female (12%). On average, the leaders were 42.5 years old, had a job tenure of 12.6 years, and had worked three years in their current positions. All of the leaders, except one, had at least a bachelor's degree; 13 held a master's degree. These middle managers worked in a supervisory position and were categorized as highly effective by expert raters (who worked in a supervisory position vis-à-vis the leaders), compared with their less effective peers. An extensive, 15-page codebook was developed for the video-coding. Moreover, immediately after the videotaped staff meetings, each meeting participant was asked to judge the overall effectiveness of the leaders; these ratings were then compared to the earlier judgments of the expert raters (Faction, Faction, Schoel, Russell, & Poteet, 1998; Luthans & Peterson, 2003). On average, these direct reports of the 25 leaders gave an effectiveness score of 3.9 from a scale of 1 to 5, where 1 is very ineffective and 5 is very effective.

The data were collected during 25 randomly selected regular staff meetings. This meeting context was chosen for three reasons. First, manager-led meetings are important events in the world of business and organizing; such meetings are phenomena of interest to social scientists, who study them with the ultimate aim of optimizing their effectiveness. Second, from a methodological design point of view, the meeting is a suitable context to analyze leader behaviors in a field setting (Shondrick et al., 2010). Third, meetings are framed in the leadership literature as typical leader events (Rogelberg, Leach, Warr, & Burnfield, 2006). Displayed and anticipated leader behaviors during a meeting are seen as a representation of typical behavior in the rest of the organization (Baran et al., 2012).

Brand (1976) and others have argued and substantiated that videotaping, in which a video camera is in a fixed place, does result in reliable footage, especially in comparison to a constantly moving frame of action (e.g., video shadowing: Czarniawska-Joerges, 2007). Given the relatively constrained nature of meetings, in that they are typically held in an office location where both the leader and the followers are seated, meetings are suitable for unobtrusive video observations of behaviors.

Table 1

Definitions and Examples of Video-Observed Leader Behaviors

	Behavior	Definition	Example
1.	Defending one's own position	Defending one's own position or opinion; emphasizing own importance	"I cannot help it, my boss wants it like that" "I am the operations manager within this department"
2.	Showing disinterest	Keeping a distance from followers; not showing any interest; not taking any action (when expected)	Talking to others while someone else is talking Not listening actively, looking bored, looking away
3.	Providing negative feedback	Criticizing the behavior of followers	"I am not happy with the way you did this" "You shouldn't have acted so hastily"
4.	Disagreeing	Disagreeing with a follower; opposing a follower	"No, I don't agree with you on this point"
5.	Task monitoring	Checking on the current situation; coming back to check on previously made agreements	"Last week we agreed upon this. How are things now?" "Are we going to meet our deadlines?"
6.	Enforcing	Enforcing a follower to (not) do something; calling a follower to order	"John, you will take responsibility for this task, I thought we already discussed this last week"
7.	Structuring the conversation	Interrupting when someone is talking; changing the topic abruptly; structuring the meeting	"The next item on the agenda is..." "We will end this meeting at 14:00 hours"
8.	Providing direction	Dividing tasks among followers (without enforcing them); giving one's own opinion; determining the direction for the staff	"Will you take responsibility for that project?" "In the future I think we need to handle the tasks like this" "According to the unit's goals we need to..."
9.	Asking for ideas	Stimulating followers to come up with ideas or solutions; inviting followers for a discussion	"What actions should be taken according to you?"
10.	Agreeing	Agreeing with a follower; showing compliant behavior	"Yes, that is the way I see it too"
11.	Being friendly	Showing sympathy; creating an open and friendly environment	"Don't worry we will handle this problem together"
12.	Providing positive feedback	Evaluating and rewarding the behavior of followers positively	Follower: "I suggest we discuss this first." Leader: "That is fine, good idea!"
13.	Encouraging	Positively stimulating the behavior of followers; challenging professionally; laughing, joking	"I am sure you will do a great job" "How do you think we can solve this problem?"
14.	Showing personal interest	Showing interest in the follower's feelings or situation; showing empathy	"I am sorry to hear that, how are things at home now?" "You must be happy about that"
15.	Listening	Listening actively; showing verbally and/ or nonverbally that the speaker is understood	Nodding, eye contact and brief paraphrasing

An average of 90 minutes of videotaped footage was collected per meeting. A behavioral transcription software program – the Observer XT 11.5 – was used to analyze the videotapes (Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000; Zimmerman, Bolhuis, Willemsen, Meyer, & Noldus, 2009). Two independent, extensively trained coders systematically analyzed each videotape (i.e., following Reid, 1982). They used a preset coding scheme containing 15 mutually exclusive behaviors (see Table 1 for examples and descriptions of the 15 behaviors) to ensure systematic and reliable coding (Luff & Heath, 2012; Van Der Weide, 2007).

Drawing on the so-called full range of leadership theory, we included key relation-oriented leader behaviors (such as “asking for ideas,” “being friendly,” and “showing personal interest”) as well as task-oriented leader behaviors (such as “task monitoring,” “structuring the conversation,” and “providing direction”) in the empirical part of this research. In addition to these known categories of important leader behaviors found in almost all leader-behavioral repertoires, the study incorporated more negatively colored or counterproductive leader behaviors, such as “showing disinterest,” “defending one's own position,” and “providing negative feedback.” Both the frequency and the duration of the behaviors were coded: the obtained average inter-rater reliability percentage was 99.4% (employing a similar procedure as Fleiss, 1971). In total, six raters coded the 25 videotapes; these coders had, on average, studied social sciences for 5 years, and all had a bachelor's or Master's degree in either business or public administration.

Data analysis. All valid cases were categorized in one of the two groups: full-time master's-level students in business administration ($n = 274$) or employees studying for a master's-level degree ($n = 171$). Normality tests revealed that the data were not normally distributed. Hence, we used a nonparametric, distribution-free Mann-Whitney U-test (Mann & Whitney, 1947).

RESULTS: STUDY 1

Table 2 contrasts the behavioral repertoire of the effective leaders in the video-coded meetings with the estimates of the employees and the full-time students. According to the video-based assessments, the behaviors of the leaders during regular staff meetings were predominantly task-oriented in nature. However, the means in Table 2 show that both groups were not able to accurately estimate the specific behaviors of effective leaders in staff meetings: Both overestimated the amount of relations-oriented behaviors and underestimated the amount of task-oriented behaviors. People have a tendency to think that effective leaders in meetings show significantly more relational type of behaviors than they actually do.

Table 2

Differences between Actual vs. Employees' and Students' Estimates of Effective Leader Behaviors

Behavior	Leader behavior	Employees'	Students' estimates
	in %	estimates of effective leader behavior in %	of effective leader behavior in %
	<i>n</i> = 25	<i>n</i> = 171	<i>n</i> = 274
1. Showing disinterest ^a	1.5	1.0 ^b	1.4 ^c
2. Defending one's own position ^a	5.4	3.3 ^b	4.4 ^c
3. Providing negative feedback ^a	3.8	2.6 ^b	3.6
4. Disagreeing ^a	1.0	3.2	3.5 ^c
<i>Subtotal Counterproductive^a</i>	<i>11.7</i>	<i>10.1^b</i>	<i>12.9</i>
5. Task monitoring	8.2	6.6	6.4 ^c
6. Enforcing ^a	0.5	4.4 ^b	5.4 ^c
7. Structuring the conversation ^a	9.0	6.7 ^b	7.7
8. Providing direction	23.6	10.7 ^b	10.3 ^c
<i>Subtotal Task-oriented^a</i>	<i>41.3</i>	<i>28.4^b</i>	<i>29.8^c</i>
9. Asking for ideas ^a	1.1	10.0 ^b	8.2 ^c
10. Agreeing ^a	2.7	3.9	4.9 ^c
11. Being friendly ^a	0.3	5.5 ^b	6.5 ^c
12. Providing positive feedback	1.0	9.1 ^b	8.7 ^c
13. Encouraging	6.5	10.7 ^b	10.3 ^c
14. Showing personal interest ^a	0.2	8.8 ^b	7.7 ^c
<i>Subtotal Relation-oriented^a</i>	<i>11.8</i>	<i>48.0^b</i>	<i>46.3^c</i>
15. Listening ^a	35.2	13.5 ^b	11.0 ^c
Total	100%	100%	100%

Note. Statistically significant differences in scores between observed and perceptions of leader behavior are based on the Mann-Whitney test. ^a Indicates a statistical difference between students' and employees' estimates ($p < .05$, two-tailed). ^b Indicates a significant difference between the actual behavior (in column 2) and the employees' estimates of the leader behavior ($p < .05$, two-tailed). ^c Indicates a significant difference between the actual behavior (in column 2) and the students' estimates of the leader behavior ($p < .05$, two-tailed).

Table 2 shows that the effective leaders displayed the following three behaviors the most during these meetings: providing direction (23%), structuring the conversation (9%), and task monitoring (8.2%). The following three task-oriented behaviors occurred significantly more than what employees and students estimated: "providing direction" ($U_e = 3.983$, $p = .000$, $U_s = 6.848$, $p = .000$), "structuring the conversation" ($U_e = 2.889$, $p = .003$, $U_s = 4.184$,

$p = .062$), and “task monitoring” ($U_e = 2.606$, $p = .064$, $U_s = 4.360$, $p = .0211$). The results show that leaders' actual behaviors are more task-oriented than what employees and students perceive them to be ($U_e = 563$, $p = .000$, $U_s = 796$, $p = .008$).

People's prototypical perceptions of effective behaviors of leaders are more relations oriented than task-oriented in nature. Both employees and students thought that effective leaders would show significantly more positive relational type of behaviors than they actually did ($U_e = 4.232$, $p = .000$, $U_s = 6.912$, $p = .000$): specifically, “asking for ideas” ($U_e = 247$, $p = .000$, $U_s = 187$, $p = .000$), “being friendly” ($U_e = 695$, $p = .000$, $U_s = 282$, $p = .000$), “providing positive feedback” ($U_e = 284$, $p = .000$, $U_s = 148$, $p = .000$), “encouraging” ($U_e = 1.149$, $p = .000$, $U_s = 1.665$, $p = .000$) and “showing personal interest” ($U_e = 180$, $p = .000$, $U_s = 181$, $p = .000$). There was only one relational behavior in this sub-repertoire, “Agreeing,” that the students, and not the employees, thought would be displayed significantly more often than was actually shown in the video-based sample ($U_s = 1.677$, $p = .000$).

In terms of counterproductive meeting behaviors of leaders, Table 2 shows that only employees estimated that effective leaders would display such behaviors significantly less often ($U_e = 1.596$, $p = .036$, $U_s = 3.521$, $p = .889$) in staff meetings. Table 2 shows that effective leaders demonstrate “showing disinterest” ($U_e = 3.380$, $p = .000$, $U_s = 4.457$, $p = .008$), “defending one's own position” ($U_e = 3.257$, $p = .000$, $U_s = 4.401$, $p = .017$) and “providing negative feedback” ($U_e = 2.874$, $p = .003$) more during a staff meeting than was estimated by employees and students.

Finally, there is one category of leader behavior that occurs quite frequently in staff meetings, but almost seemed to be overlooked by the employee and student raters: listening. Because this behavior cannot be unambiguously interpreted as belonging to one of the three categories, in Table 2 we reported it separately (item #15). All in all, Study 1 charts a large mismatch between people's estimations of specific behaviors displayed by effective leaders in staff meetings and the behaviors actually displayed in those meetings in the field.

METHODS: STUDY 2

One of the limitations of Study 1 is that we had no experiential stimulus on which the respondents (i.e., the students and employees) could estimate the actual behaviors. Experiencing the behavior of the leader in a setting such as a staff meeting was thought to enhance the accuracy of behavioral recall ratings (Shondrick et al., 2010). To examine this assumption, in Study 2 we linked the videotaped behaviors of a different sample of leaders

¹ The first statistic (U_e) represents the difference between actual leader behavior and the estimates of the behavior by the employees; the second statistic (U_s) represents the difference between actual leader behavior and the estimates by the students.

in staff meetings to the perceptions of those who attended these meetings. Study 2 examines therefore whether a range of leader behaviors displayed in staff meetings, similar to those in Study 1, can be accurately assessed by both the leader's own followers and the leaders themselves (i.e., an insider's perspective).

In addition to exploring whether both the followers and the leaders themselves were able to accurately estimate leader behavior directly after the meeting (as the main stimulus event), we examined whether follower perceptions of the leader displaying a transformational leadership style could be explained by the observed behaviors representing that style. This is of interest given the relative popularity of the transformational style, as also suggested by the results of Study 1, in which transformational leader behaviors were thought to be a major part of the leader's behavioral repertoire during the staff meetings, although task-oriented behaviors were actually displayed more often. Thus, we examine in Study 2 whether event-based leader behaviors can be assessed (more) accurately by their own followers (i.e., insiders) and pose the following research question:

RQ2: Does a leader who scores higher on perceived transformational style also show more transformational-type behaviors in staff meetings?

Sample and Data Collection

In this study, a sample of 53 leaders, employed in three private- and public-sector organizations in The Netherlands, were videotaped during one of their regular staff meetings. On average, these leaders were 44.4 years old and had a job tenure of 10.9 years; 62% were male. All of the leaders' followers who were present during the video-observed meeting were surveyed immediately after each meeting. This subsample consisted of 416 followers, with an average age of 41.0 years and a job tenure of 10.9 years. As in Study 1, the videos were minutely coded with a preset codebook, but with only 11 specific behaviors because of the relatively infrequency of some specific behaviors.

Measures

Observed leader behavior. Actual leader behavior was systematically video-coded, using the same specialized Noldus software and procedure as in Study 1. In this study, 11 mutually exclusive behaviors were coded (Hoogeboom, Wilderom, Nijhuis, & Van Den Berg, 2011).

Leadership style. Leadership style was assessed using the Multifactor Leadership Questionnaire (MLQ Form-5 X short; Bass & Avolio, 1995). Studies have shown that the MLQ is a valid and reliable instrument, especially regarding the measurement of transformational leadership style (TLS; e.g., Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996);

most leader behavioral studies have used the MLQ (Avolio & Bass, 2004). Transformational leadership style comprises five dimensions; Idealized Influence Behavior (e.g., “Talk about my most important values and beliefs”, $\alpha = .79$), Idealized Influence Attributed (e.g., “Instill pride in others for being associated with me”, $\alpha = .70$), Inspirational Motivation (e.g., “Talk optimistically about the future”, $\alpha = .70$), Intellectual Stimulation (e.g., “Reexamine critical assumptions to question whether they are appropriate”, $\alpha = .84$), and Individualized Consideration (e.g., “Spend time teaching and coaching”, $\alpha = .84$). Following the practice of most studies (e.g., Avolio et al., 1999), we took the aggregated measure to represent follower's ratings of their leader's transformational style (ICC1 = .24, ICC2 = .65).

Transactional leadership style includes the traditional three MLQ dimensions: Contingent Reward (CR) (e.g., “Provide others with assistance in exchange for their efforts”, $\alpha = .67$, ICC1 = .26, ICC2 = .59), which has been shown to co-vary with transformational style in several studies (e.g., Avolio et al., 1999); Management-by-Exception Active (MBEA; e.g., “Focus attention on irregularities, mistakes, exceptions, and deviations from standards,” $\alpha = .69$, ICC1 = .32, ICC2 = .65); and Management-by-Exception Passive (MBEP; e.g., “Fail to interfere until problems become serious,” $\alpha = .29$; $\alpha = .60$, without the item “Wait for things to go wrong before taking action” – an acceptable Cronbach's alpha was established, but because of the earlier validation of this dimension, it was decided to keep the latter item in the analysis, ICC1 = .11, ICC2 = .46).

Behavioral leader questionnaire. In line with the behavioral descriptions in the codebook, a set of survey items was developed specifically to represent the coded behaviors. Although the MLQ is known as a valid instrument for assessing transformational leadership, the measurement of transactional behavior within the MLQ has been criticized, several studies have shown that the content of most of the so-called transactional behaviors does not represent the full set of behaviors typically seen in the workplace (e.g., Peus et al., 2013). Examples of behaviors that are shown during meetings, but are not incorporated in the MLQ and similar other instruments, are the more task-oriented behaviors, such as structuring the conversation, task monitoring, and delegating. Each of the video-coded behaviors were reflected in the form of three items: to represent one of the 15 behaviors in a new survey instrument, called the behavioral leader questionnaire (BLQ; see table 3). The respondents (both the videotaped focal leaders themselves and their followers) were asked to indicate how frequently the leaders engaged in these specific behaviors (1 = not at all frequent, 7 = very frequent). Due to a low Cronbach's alpha we had to delete 1 item from the task monitoring scale: “wants employees to follow the rules.” After this deletion we obtained an alpha of .60. Exploratory factor analysis revealed that the three visionary items did not load on the intended factor. Hence, these items were left out in the confirmatory factor analysis (CFA). CFA was used to validate the factor structure of the 27 retained BLQ items.

Table 3

Confirmatory Factor Analysis: Loadings on the Leader-Behavioral Description Items

Item	Defending one's own position	Showing disinterest	Providing negative feedback	Delega- ting	Informing	Task moni- toring	Struc- turing the conver- sation	Intellec- tual stimu- lation	Indivi- dualized conside- ration
Feels insulted by employees	.78								
Sticks to his/her own opinion to defend a position	.77								
Shows bossy or dictatorial behavior	.60								
Shows little involvement		.79							
Is showing disinterest		.76							
Does not show any interest in employees		.67							
Disagrees with employees			.82						
Interrupts employees			.81						
Criticizes employees			.65						
Explicitly tells employees what to do				.77					
Carefully formulates new tasks for employees				.68					
Delegates tasks to employees				.55					
Answers questions					.82				
Informs employees					.64				
Tells us where we can find information					.39				
Frequently checks current task progress						.80			
Is checking upon tasks						.58			
Wants employees to follow rules and procedures						.10			
Clearly takes the lead in conversations and meetings							.83		
Structures meetings and conversations							.70		
Convincingly provides arguments for his/her opinion							.69		
Asks for opinions and/or ideas/input								.77	
Shows interest in employees								.70	
Constantly re-examines the current state of the work								.53	
Gives compliments									.83
Shows appreciation towards employees									.81
Gives positive feedback after employees perform well									.68
A	.65	.70	.68	.67	.71	.56	.77	.79	.73
ICC1/ICC2	(.24;.39)	(.36;.63)	(.38;.65)	(.36;.63)	(.39;.66)	(.18;.39)	(.53;.77)	(.54;.78)	(.47;.73)

Note. Standardized loadings are presented; all loadings are significant at $p < .001$.

The fit indices for the targeted model, including nine factors, were good ($\chi^2/DF = 2.522$, CFI = .93, TFI = .88, IFI = .93, RMSEA = .060). We compared this model with an eight-factor model, which showed a worse model fit ($\chi^2/DF = 2.63$, CFI = .92, TFI = .87, IFI = .92, RMSEA = .061; Bentler, 1990; Browne & Cudeck, 1993). Table 3 presents the factor loadings for each of the 27 BLQ items, as well as descriptive statistics, Cronbach's alphas, and ICCs. In the zero-order correlation table (Table 3), there are a number of positive significant links between the behavioral descriptions of perceived visioning, individualized consideration, and intellectual stimulation with transformational leadership style; these links strengthen the idea that the BLQ captures key transformational behavior.

Data analysis. First, we tested the data for univariate nonnormality; some of the behavioral descriptions and observed behaviors were not normally distributed. To meet the normality assumption, we transformed the data with a lognormal distribution, which resulted in normal distributions. We then used hierarchical regression analysis to estimate the standardized regression coefficients on both the overall transformational and transactional leadership styles (see also Cohen, Cohen, West, & Aiken, 2002).

Results: Study 2

Tables 4, 5, and 6 present the means, standard deviations, and correlations of the actual leader behaviors and the followers' post-meeting perceptions of those behaviors, respectively. As expected, both the followers and the leaders themselves had difficulty in rating accurately the amount of displayed behavior. Only the leader behavior with a relatively long duration (i.e., "factual informing") was accurately recalled by the followers who had been present at the meetings, and not by the leaders themselves ($r = .29$, $p < .05$). Tables 6 and 7 present all the zero-order correlations between the self-reported behaviors of the leaders and their displayed video-coded behaviors: None of the self-reported ratings about the leaders' own behaviors are linked to any of the actual behaviors during the meetings. Hence, followers seem to be better at recalling leader behaviors; however, they were only more accurate in recalling those leader behaviors that lasted for a relatively long time.

Table 4

Correlations between the Duration of Actual Leader Behaviors in Staff Meetings and Recalled Ratings of These Behaviors

	M	Sd	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1. Defending one's own position	0:00:13	0:00:20																						
2. Showing disinterest	0:00:14	0:00:23	.27																					
3. Providing negative feedback	0:00:53	0:00:54	.49**	.21																				
4. Delegating	0:01:14	0:00:59	.47**	.06	.22																			
5. Informing	0:13:23	0:10:26	.00	-.17	-.04	.15																		
6. Task monitoring	0:01:24	0:00:56	.44**	.41**	.26	.21	-.19																	
7. Structuring the conversation	0:02:37	0:00:55	.10	.06	-.02	.18	.25	.28*																
8. Visioning	0:10:17	0:06:31	.43**	.14	.41**	.22	.08	.39**	.36**															
9. Individualized consideration	0:02:39	0:01:29	.45**	.25	.24	.15	.17	.43**	.45**	.45**														
10. Intellectual stimulation	0:03:07	0:02:51	.26	.10	.18	-.19	-.03	.21	.28*	.44**	.28*													
11. Perceived defending one's own position	2.68	.38	.38**	.03	.23	.14	-.04	.31*	-.08	.18	.25	.07												
12. Perceived showing disinterest	2.01	.38	-.09	-.10	-.04	-.13	-.10	-.13	-.23	-.10	-.14	-.19	.44**											
13. Perceived providing negative feedback	2.72	.46	.32*	.06	.29*	.13	-.09	.28*	-.04	.01	.26	-.03	.62**	.20										
14. Perceived delegating	4.35	.40	.34*	.21	.17	.33*	.07	.27	.13	.12	.25	-.17	.08	-.35	.14									
15. Perceived informing	4.81	.49	.11	-.03	.05	.20	.29*	.06	.16	.25	.16	.06	.10	-.46**	-.03	.57**								
16. Perceived task monitoring	4.88	.63	.14	-.08	-.03	.22	.24	.16	-.02	.05	.16	-.15	.41	-.07	.30*	.55**	.53**							
17. Perceived structuring the conversation	4.17	.55	.16	-.01	.17	.22	.22	.23	.01	.27	.31*	.07	.29*	-.23	.17	.47**	.67**	.60**						
18. Perceived intellectual stimulation	4.09	.59	.25	.05	-.04	.21	.17	.24	.15	.22	.29*	.16	.06	-.45**	.13	.35*	.39**	.35*	.43**					
19. Perceived individualized consideration	4.63	.57	.20	-.07	-.11	.19	.31*	.17	.25	.23	.23	.02	.05	-.48**	-.01	.53**	.68**	.65**	.53**	.67**				
20. TLS	4.36	.49	.21	.03	.07	.26	.11	.19	.08	.22	.32*	.12	.13	-.39**	.16	.47**	.56**	.34*	.68**	.69**	.59**			
21. CR	4.14	.52	.20	-.02	-.11	.27	.20	.18	.10	.14	.31*	-.06	.16	-.27	.18	.48**	.60**	.53**	.66**	.70**	.69**	.83**		
22. MBEA	4.29	.66	.11	-.10	.02	.26	.23	.06	-.01	.07	.16	-.19	.41**	-.01	.30*	.48**	.54**	.71**	.54**	.25	.46**	.54**	.67**	
23. MBEP	2.85	.44	.19	.21	-.01	-.12	-.19	.08	.12	-.09	.06	-.01	-.01	.44**	-.03	-.10	-.36**	-.13	-.33*	-.04	-.10	-.26	-.11	-.27*

Note. Behavioral items 1 to 10 represent the standardized video-observed leader behaviors in duration; items 11 to 24 represent the surveyed behavioral descriptions and the transformational and transactional leadership style. TLS = Transformational Leadership Style; CR = Contingent Reward; MBEA = Management-By-Exception Active; MBEP = Management-By-Exception Passive.

* $p < .05$; ** $p < .01$.

Table 5

Correlations between the Duration of Actual Leader Behaviors in Staff Meetings and Leader Self-Perceptions of These Behaviors

	M	Sd	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
11. Self-perceived Defending one's own position	2.38	.86	.11	.02	-.22	.27	.31*	.06	.36**	.20	.16	.03												
12. Self-perceived Showing disinterest	2.18	.60	-.02	.11	.06	.00	-.33*	.17	-.08	.07	.08	.09	.10											
13. Self-perceived Providing negative feedback	3.13	.66	-.03	-.03	.05	.22	-.11	-.11	-.13	-.14	-.05	-.03	.16	.32*										
14. Self-perceived Delegating	4.68	.79	.22	-.13	-.07	.21	.13	.12	.18	.06	.27	-.19	.18	.03	.06									
15. Self-perceived Informing	5.18	.64	.10	-.06	.01	.22	.04	-.12	-.13	-.11	-.09	-.03	-.05	-.15	-.09	.47**								
16. Self-perceived Task monitoring	4.28	.83	.20	-.11	-.12	.12	.19	.09	-.02	.12	.26	.03	.05	.02	-.07	.42**	.27*							
17. Self-perceived Structuring the conversation	5.14	.69	.20	-.18	.01	.22	.15	-.05	.05	.06	.10	.08	.21	-.01	.15	.57**	.53**	.46**						
18. Self-perceived Individualized consideration	4.83	.86	.20	-.04	-.05	.09	-.02	-.01	-.10	-.15	-.06	-.16	-.05	-.31*	-.28*	.57**	.65**	.31*	.37**					
19. Self-perceived Intellectual stimulation	4.58	.94	.22	.23	-.11	.07	-.24	.27*	.03	-.05	.17	-.05	.01	-.18	-.22	.39**	.46**	.31*	.34*	.61**				
20. Self-perceived TLS	5.02	.60	.19	.15	-.05	.06	-.11	.01	-.04	.00	.03	.03	-.01	-.13	-.39**	.33*	.32*	.20	.27	.62**	.52**			
21. Self-perceived CR	4.81	.96	.16	.10	-.20	.08	-.13	.09	-.21	-.23	.01	-.18	-.05	-.09	-.19	.48**	.47**	.43**	.31*	.63**	.58**	.75**		
22. Self-perceived MBEA	4.46	.87	.16	-.12	-.08	.06	.04	-.09	-.06	-.08	-.04	-.01	.06	-.12	-.09	.58**	.38**	.51**	.47**	.53**	.27*	.50**	.63**	
23. Self-perceived MBEP	2.85	.64	-.12	.24	.19	-.14	-.22	.02	.02	-.04	-.13	.17	-.09	.20	-.01	-.11	-.03	-.13	-.07	-.01	.07	.21	.10	.04

Note. Items 1–10 are the variables 1–10 in Table 4. TLS = transformational leadership style; CR = Contingent Reward; MBEA = Management-By-Exception Active; MBEP = Management-By-Exception Passive. * $p < .05$; ** $p < .01$.

Table 6

Correlations between the Frequency of Actual Leader Behaviors in Staff Meetings and Recalled Ratings of these Behaviors

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1. Defending one's own position	2.59	3.57																						
2. Showing disinterest	3.16	3.78	.42**																					
3. Providing negative feedback	19.63	15.56	.50**	.47**																				
4. Delegating	23.43	15.35	.57**	.35**	.77**																			
5. Informing	70.92	48.97	.15	-.26	.09	.31*																		
6. Task monitoring	35.08	16.84	.58**	.43**	.42**	.49**	.10																	
7. Structuring the conversation	42.58	13.81	.43**	.15	.33**	.47**	.29**	.40**																
8. Visioning	65.60	41.79	.51**	.32**	.50**	.51**	.09	.67**	.31**															
9. Individualized consideration	34.54	16.09	.27	.17	.31**	.23	.04	.29*	.52**	.39**														
10. Intellectual stimulation	63.23	28.17	.56**	.34**	.57**	.53**	.12	.52**	.53**	.55**	.46**													
11. Perceived Defending one's own position	2.68	.38	.31*	.04	.05	.04	-.08	.29*	.13	.13	-.04	.19												
12. Perceived Showing disinterest	2.01	.38	-.26	-.13	-.23	-.27*	-.15	-.24	-.35*	-.12	-.26	-.23	.44**											
13. Perceived Negative feedback	2.72	.46	.33*	.09	.15	.08	-.07	.32**	.16	.07	-.01	.20	.62**	.20										
14. Perceived Delegating	4.35	.40	.42**	.20	.36**	.42**	.19	.40**	.11	.24	-.13	.18	.08	-.35*	.14									
15. Perceived Informing	4.81	.49	.22	.04	.23	.27	.27*	.27	.18	.24	.07	.13	.10	-.46**	.03	.57**								
16. Perceived Task monitoring	4.88	.63	.19	-.10	.08	.09	.27	.20	-.06	.05	-.19	.01	.41**	.07	.30	.55**	.53**							
17. Perceived Structuring the conversation	4.17	.55	.21	.10	.20	.22	.12	.29*	.13	.23	.02	.20	.29*	-.23	.17	.47**	.67***	.58**						
18. Perceived Individualized consideration	4.09	.59	.21	.05	.13	.22	.11	.37**	.29*	.22	.19	.23	.06	-.45**	.13	.35**	.39***	.35*	.43**					
19. Perceived Intellectual stimulation	4.63	.57	.24	-.11	.08	.21	.31*	.27	.18	.24	.01	.19	.05	-.48**	.01	.53**	.68***	.65**	.53**	.63**				
20. TLS	4.36	.49	.26	.07	.24	.27	.03	.36**	.23	.21	.17	.28*	.13	-.39**	.16	.47**	.56**	.34*	.68**	.72**	.59**			
21. CR	4.14	.52	.25	-.06	.02	.17	.16	.29*	.11	.14	-.04	.11	.16	-.27*	.18	.48**	.60**	.53**	.66**	.69**	.70**	.83**		
22. MBEA	4.29	.66	.19	-.11	-.04	-.01	.21	.13	-.09	.00	-.18	-.05	.41**	.01	.30*	.48**	.54**	.71**	.54**	.58**	.46**	.54**	.67**	
23. MBEP	2.85	.44	.05	.08	-.09	-.05	-.20	-.13	-.08	-.05	-.12	.05	-.01	.44**	-.03	-.10	-.36**	-.13	-.33*	-.34*	-.10	-.26	-.11	-.27*

Note. Behavioral items 1 to 10 represent the standardized video-observed leader behaviors in duration; items 11 to 24 represent the surveyed behavioral descriptions and the transformational and transactional leadership style. TLS = Transformational Leadership Style; CR = Contingent Reward; MBEA = Management-By-Exception Active; MBEP = Management-By-Exception Passive. * $p < .05$; ** $p < .01$.

Table 7

Correlations between the Frequency of Actual Leader Behaviors in Staff Meetings and Leader Self-Perceptions of These Behaviors

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	19.	20.	21.	22.	23.
11. Self-perceived Defending one's own position	.08	-.13	-.11	.10	.31*	.10	.24	.13	.03	-.03												
12. Self-perceived Showing disinterest	-.07	.11	.06	-.01	-.27*	.15	.02	.11	.09	.04	.10											
13. Self-perceived Providing negative feedback	-.04	.12	.01	.07	-.12	-.21	-.02	-.10	-.12	-.02	.16	.32*										
14. Self-perceived Delegating	.14	-.17	-.05	.13	.21	.15	.13	.11	-.15	.17	.18	.03	-.06									
15. Self-perceived Informing	.06	.00	.07	.16	.09	.04	.12	-.05	.11	-.04	-.05	-.15	-.09	.47*								
16. Self-perceived Task monitoring	.13	-.08	-.12	-.03	.19	.16	-.02	.15	.10	.10	.05	.02	-.07	.42**	.27*							
17. Self-perceived Structuring the conversation	.11	-.17	-.14	-.05	.08	-.08	.07	.00	.08	-.06	.21	-.01	.15	.57**	.53**	.46**						
18. Self-perceived Intellectual stimulation	.08	-.06	-.04	.00	.06	.07	-.02	-.07	-.13	.00	-.05	-.31*	-.28*	.57**	.65**	.31*	.37**					
19. Self-perceived Individualized consideration	.17	.17	-.04	.03	-.17	.33*	.03	.05	-.04	.07	.01	-.18	-.22	.39**	.46**	.31*	.34*	.61**				
20. Self-perceived TLS	.08	.10	.04	.04	-.06	.20	.08	.02	.12	.02	-.01	-.13	-.39**	.33*	.52**	.20	.27	.62**	.54**			
21. Self-perceived CR	.06	.04	-.12	.01	-.07	.19	-.04	-.13	-.11	-.04	-.05	-.09	-.19	.48**	.47**	.43**	.31*	.63**	.58**	.75**		
22. Self-perceived MBEA	.07	-.11	-.05	-.05	.04	.00	-.08	-.08	.07	-.06	.06	-.12	-.09	.58**	.38**	.51**	.47**	.53**	.27*	.50**	.63**	
23. Self-perceived MBEP	-.01	.27	.13	-.07	-.19	.07	-.01	.01	.13	-.06	-.09	.20	-.01	-.11	-.03	-.13	-.07	-.01	.07	.21	.10	.04

Note. TLS = Transformational Leadership Style; CR = Contingent Reward; MBEA = Management-by-Exception Active; MBEP = Management-by-Exception Passive.

* $p < .05$; ** $p < .01$.

In terms of the other zero-order correlations in Table 4, it was found that when leaders displayed “defending one's own position” behavior for several minutes, employees rated them higher on this behavior ($r = .38, p < .01$). Similar significant positive associations were found for providing negative feedback ($r = .29, p < .05$) and delegating ($r = .33, p < .05$). Although these significant associations could be interpreted as accurate follower perceptions of these specific leader behaviors, further inspection of the correlation tables shows that some actual leader behaviors were correlated with different behavioral perceptions. For example, observed informing behavior was significantly associated with follower perceptions of intellectual stimulation ($r = .31, p < .05$). An examination of the transformational/transactional type of behaviors revealed that, for example, not only the transformational leadership style but also contingent reward was associated with observed individualized consideration (respectively, $r = .32, p < .05$; $r = .31, p < .05$). Hence, the zero-order correlational analyses reveal positive significant links between behaviors that are supposed to belong to different dimensions of the MLQ. These correlations between behaviors that are assumed to belong to entirely different theoretical dimensions are not unusual (e.g., Hinkin & Schriesheim, 2008). Rather than sticking to the survey-based, dimensional clustering of leader behaviors, we show that the actually displayed leader behaviors are not represented accurately in the minds of those who recalled the behaviors they had just experienced.

We examined which actual behaviors would explain a leader's overall, perceived transformational leadership style. Hierarchical regression analyses revealed a number of unexpected findings (see Table 8a and Table 8b). In the equation we included the two most prominent video-observed transformational behaviors – individualized consideration and intellectual stimulation (Hinkin & Schriesheim, 2008) – and the two most leading task-oriented or transactional behaviors (i.e., delegating and task monitoring). The results show that the perceived transformational style of a leader can be explained by the duration of individualized consideration behaviors shown in the staff meeting; in addition, the duration of “delegating” leader behavior explained significant variance in the follower ratings of transformational leadership style (Tables 8a and 8b).

Table 8a
Regression Results on Transformational Leadership Style with the Duration of Actual Transformational and Task-Oriented Leader Behaviors

Variables	Step 1	Step 2	Step 3	Step 4
Individualized consideration	.32*	.31*	.25†	.26†
Intellectual stimulation		.03	.09	.09
Delegating			.24†	.24†
Task monitoring				.01
R^2	.10	.10	.15	.15
		.00	.05*	.00
F	5.63	2.78	2.95	2.17

Note. $N = 53$. Standardized beta coefficients are reported. * $p < .05$; ** $p < .01$ (two-tailed). † $p < .05$ (one-tailed).

Table 8b

Regression Results on Transactional Leadership Style with the Frequency of Actual Transformational and Task-Oriented Behaviors

Variables	Step 1	Step 2	Step 3	Step 4
Intellectual stimulation	.28*	.26†	.17	.08
Individualized consideration		.05	.05	.03
Delegating			.17	.09
Task monitoring				.26
R^2	.08	.08	.10	.14
		.00	.02	.04
F	4.30	2.17	1.81	2.02

Note. $N = 53$. Standardized beta coefficients are reported. * $p < .05$ (two-tailed); † $p < .05$ (one-tailed).

In other words, the display by leaders in meetings of both individualized consideration and delegating behaviors for a relatively long time contributes to followers' perceptions of leader transformational leadership style. This is a surprising finding because delegating is truly task-oriented in nature; this behavior does not aim to motivate followers to perform above expectations, nor is it transformational. Thus, follower perceptions of leadership style may not always be in line with actual leader behaviors in meetings.

One can interpret these results in light of the following: (1) Both followers and leaders have a great deal of difficulty in accurately recalling the specific leader behaviors they experienced in the meetings they just attended; and (2) there is a (prototypical) bias to rate one's leader as a desirable, transformational leader even though he or she displays behaviors that do not fit entirely with the way transformational leadership has been conceptualized/operationalized. More generally, we see the regression results as an indication of overreliance on transformational leader behaviors (as we saw in Study 1), as if specific task-oriented leader behaviors in meetings do not belong to an effective leader's behavioral repertoire.

DISCUSSION

Substantial amounts of organizational time are spent in meetings chaired by leaders. Despite the large number of popular books on conducting effective staff meetings, very few academic studies have focused on the behaviors of leaders during these meetings (Baran et al., 2012). Yet, because leadership is explicitly demonstrated in meetings, leader development programs and meeting effectiveness studies should indicate which behaviors are displayed by an effective leader during a regular staff meeting. Drawing on the implicit leadership and categorization theories, this chapter zoomed in on the differences between

perceptual recall ratings and specific leader behaviors displayed during regularly held staff meetings. In our view, such types of studies are necessary to advance both the leadership and meetings literatures, which share an overreliance on global perceptual assessments. The chapter reports on such comparisons from two exploratory field studies, which aim to simultaneously contribute to the academic literatures on meetings and leadership.

In staff meetings, employees meet to share information, knowledge, and wisdom and collectively advance a joint purpose (Romano & Nunamaker, 2001). Thus, organizational meetings are held primarily for the purpose of facilitating productivity (Miller, 1994). The displayed behavioral repertoire of effective leaders in meetings (see, Study 1 and Tables 1 and 2) acknowledges this aim; the largest part of their behavioral repertoire consists of task-oriented behaviors. However, people were not able to accurately estimate how often the specific meeting behaviors occurred. Study 1 showed how both employees and students underestimated task-oriented leader behaviors while overestimating the amount of relation-oriented, transformational-type leader behaviors in staff meetings led by an effective leader. This finding reveals the benchmark of effective leaders' video-observed behaviors: People's prototypical ideas of effective leader behaviors in staff meetings are more positive relational than task-oriented or counterproductive in nature. Thus, we established that most people do not have accurate perceptions about effective leader behaviors in regularly held staff meetings; this finding is consistent with the evidence amassed by leadership studies that are guided by implicit leadership and categorization theories.

Rooted in the same theorizing, we examined in Study 2 whether leader behaviors can be more accurately estimated by someone participating in that meeting. Of a range of 11 specific leader behaviors, followers accurately recalled only one: the duration of the leader's "informing" in the meeting. In Study 2 we also showed that followers' ratings of transformational leadership style are explained not only by the actual "individual consideration" behavior of the leader during the meetings but also by the task-instructing type of behavior called "delegating." This finding suggests that actual delegating behavior in staff meetings co-predicts followers' ratings of a leader's overall transformational style. Cross-cultural leadership studies examining prototypical images of followers have found not only transformational behaviors but also a clear task-oriented focus (including the giving of information and matching instructions) to be typical of effective leadership (Den Hartog et al., 1999; Epitropaki & Martin, 2004; Offermann et al., 1994).

In terms of the implicit leadership theory, our results support the idea that people do use prototypical images when rating leader behaviors. In fact, people's perceptions of a specific leader behavioral repertoire are shown to be hardly based on the leaders' actual behaviors at meetings; we found a great deal of perceptual inaccuracy not only among the leaders and followers present in the meetings themselves but also among the young

students and employees who estimated in an intuitive way a repertoire of effective leader behaviors in meetings in general.

There are a number of substantive explanations for the reported inaccuracy in both studies. The first set of explanations deals with the difficulty most people have when thinking in specific behavioral terms. Previous studies have shown that raters have difficulties differentiating between observable and non-observable behaviors (Lord et al., 1984). In an experimental study, Maurer and Lord (1991) showed that followers' observations of the leader's behavior are reflected in the general evaluation or prototypical image of a leader. Thus, the prototypical perceptual ratings of Study 1 (primarily relation-oriented leadership behavior) simply belong to the general prototype that people have in mind when rating leader behaviors, even though task-oriented behaviors are notably more prevalent in a leader's behavioral repertoire. It may be that such desirable, relation-oriented leader behaviors are quite consciously experienced if they occur and therefore come to mind more frequently when random persons, naïve to leadership studies, are asked to rate effective leader behaviors. Study 1's outcome is in line with Yukl's (1999) insight. In real work settings, leaders do not show much transformational-type behavior, in contrast to the prominence given to the transformational leadership style in people's recalled leader perceptions (a bias that seems present also in the current scholarly leadership literature). Those kinds of easily recalled behaviors tend to fall in the relationship-based cluster of behaviors and are not reflected in the more task-oriented behaviors, whose main goal is to make sure that the tasks are accomplished in an efficient manner.

Another explanation for the inaccurate perceptual findings reported in this chapter could relate to the fact that behavior is often assessed with Likert scales. Hence, it is important to consider the restrictive predictive value of these Likert-type scales; they rely on "inferential measurement" (Bledow & Frese, 2009, p. 231), rather than measuring actual leader behavior. According to Shondrick et al. (2010) Likert-type scales activate semantic memory rather than episodic memory and thus hinder more precise follower ratings. Especially when adopting a situation-based view of leadership, most empirical studies have used Likert-type scales to measure leader behavior (including the frequently used MLQ: Bass & Avolio, 1995). These Likert-type scales suffer from a lack of sensitivity for the context and situation in which leadership takes place (Antonakis, Avolio, & Sivasubramaniam, 2003). They may capture attributes or traits, but not behavior, thereby erroneously conceptualizing human action as the mere manifestation of contextualized traits. One may thus expect that people's perceptions or estimates of leader behavior in meetings are inaccurate when contrasting them with leader behaviors occurring during such actual meetings in the field.

We expected more accurate leader perceptions in Study 2 because of the direct stimulus, but that did not occur. It appears almost impossible for the followers attending the meetings to offer an accurate assessment of their own leader's behavioral repertoire. Moreover, the leaders themselves were unable to accurately recall their specific staff-meeting behaviors. This might be due to the symbolic leader representations that both leaders and followers have; it is known that, when recalling events, one tends to rely on abstract representations of one's long-term memory (Lord et al., 1984). We infer that when it comes to specific behaviors displayed in one's "natural meeting habitat" leaders do not have an outsider's perspective when asked to retrospectively recall their own behaviors that they had just displayed toward their staff; it seems that the leaders focused much more on the content of the meetings they conducted than on their own behaviors, which makes practical sense, of course, but seems misleading when asked to reflect on their own meeting behaviors. The fact that the followers are slightly more accurate in their ratings than the leaders themselves supports the empirical research practice that uses followers, and not leaders' perceptions (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

In the next section, we sketch practical implications of our findings: people's inaccurate recollection of the specific behaviors shown in the staff meetings they attended and how, regardless of their own meeting experiences, most raters of leader behaviors in such meetings falsely think such behaviors contain extensive relational-types of transformational behaviors.

Practical Implications

Casual observations of staff meetings have shown that effective leader behaviors in meetings can make a productive difference. It is important to know what people see as effective leader behavior in meetings, not in the least because it may serve as a baseline and may explain why many employees complain about the relative ineffectiveness of such meetings. The results of Study 1 can be used as a benchmark for people's naïve perceptions of effective leader behaviors in staff meetings. When asked, people do have specific ideas about the specific behaviors of effective leaders in such meetings. Nevertheless, Study 1 shows that these perceived behaviors are biased: Both students and employees significantly overestimate the amount of relational or transformational-type behaviors (e.g., "encouraging," "asking for ideas." and "showing personal interest") displayed by effective leaders. This finding has two important practical implications.

First, because transformational leadership has been shown to be highly correlated with leader effectiveness, based mostly on perceptual recall ratings only, leadership development programs might put too much emphasis on those kind of behaviors, even though task-oriented behaviors are shown to be equally, if not more, important in the

studied staff-meeting settings. Instead, there has to be a fine balance between task-oriented and relations-oriented transformational type of behaviors, as suggested not only by both our studies' results but also by the so-called augmentation effect (i.e., to be effective, a leader should display both transactional and transformational behavior; Bass, 1985; Bass, Avolio, Jung, & Berson, 2003; Hater & Bass, 1988). Second, when considering behavioral antecedents of meeting effectiveness, it is important to include a full-range of behaviors, instead of solely focusing on the transformational relationship-oriented behaviors.

More meeting research needs to take place that uses a combination of survey and observational data. Comparing both datasets will enhance the accuracy with which leaders can be actively coached and trained. In such instances, the degree of congruence between a leader's assessment of his or her own behaviors vs. actual videotaped behaviors is informative (as in actual self-state vs. own self-state; Fecteau et al., 1998; Higgins, 1987). This mixed-methods approach could enable the examination of self-other rating congruence; that is, if a leader is able to assess his or her behavior more accurately, the congruence with follower perceptions might be higher (Kaplan et al., 2014).

Limitations and Future Research Directions

A recurring point of criticism of the video-observation methodology used in both studies described here pertains to the subjects' reactivity (i.e., the influence that an observation procedure can have on the actually displayed behaviors; Kazdin, 1979). However, we can show in both the literature and our survey that the amount of reactivity is trivial. In Study 2 the team members were asked how representative they found the filmed meeting in comparison with other non-videotaped meetings; they indicated that the leader behaviors in the videotaped meetings was 96% representative, on average. Study 2 used a Likert scale to assess reactivity, where 7 was highly representative. An average score of 5.9 was obtained. In addition, decades ago, scholars disconfirmed the reactivity assumption. Smith, McPhail and Pickens (1975), for example, showed that using a paper and pencil method for observation is more obtrusive than using video observation. In our study we chose to locate the camera in a fixed place, in a position where it blended easily into the background (i.e., unobtrusiveness; see also Foster & Cone, 1980). In such conditions, Smith et al. (1975) showed that reactivity has no effect in observational studies.

Another relevant methodological question is the degree to which the behavioral categories of the coded leaders in the meetings are representative of the behavior shown outside the confines of a staff meeting; the answer to this question is particularly important when interpreting the results of Study 1, given that prototypicality of the perceptual ratings is inferred on the basis of a small sample: 25 effective middle managers. Van Der Weide

(2007) contrasted the observed behavioral repertoire of a leader in a face-to-face meeting with the repertoire in a regular staff meeting and found no significant differences. It seems that the behavioral repertoire of an effective leader might be fairly consistent across various work situations (most likely due to its relation with one's individual value constellation).

Even though the behavioral categories were picked from the globalized leadership literature, the specific sets of coded behavioral observations may, unavoidably, have been truncated by cultural aspects embedded in the empirical research undertaken. The observational samples included only Dutch leaders. Yet, these leaders spanned a broad set of economic sectors and organizational cultures in the Netherlands. Hence, the behavioral categories with which the coding took place might be seen as a generic baseline for the Dutch staff meeting culture. Similar studies would need to take place in other countries, so that the content of the reported biases might be examined in terms of possible cross-cultural influences (e.g., Atwater, Wang, Smither, & Fleenor, 2009).

In terms of other recommended new research, we see value in similar comparative studies between actual and perceived leader behaviors in various organizational meetings. Recent categorization theorizing has recommended that both the stimulus behavior (i.e., leadership behaviors) and perceiver characteristics (i.e., for both the leaders themselves and their followers) should be assessed simultaneously (Nye & Forsyth, 1991). Some studies have found that affect plays an important role in ratings of event-based leader behavior (Naidoo, Kohari, Lord, & DuBois, 2010). Future studies would need to find out to what extent affective factors play a role in perceptual inaccuracy of behaviors shown in meetings and to what extent this inaccuracy is cross-culturally a generic effect or not.

Hollander and Julian (1969) noted several decades ago that leadership is a function of leader characteristics, situational characteristics, and follower perceptions. Future meeting studies should take into consideration the characteristics and behaviors of followers. This is needed not only to yield more in-depth insights into the possible reasons for their estimates of their leaders' behaviors but also to chart and examine followers' patterns of interactions in meetings. Such future research would need to concentrate, for instance, on whether normative ideas of how followers and leaders ought to behave during meetings differ from what is recalled and shown by the meeting participants. This and related future knowledge would contribute to the emerging implicit followership theory, which is important in elevating the attractiveness of staff meetings in organizations. After all, even though leaders and their organizations set the tone, productive followers must "do the dancing."

CONCLUSION

Given that very few scholars have paid attention to the actual behaviors of leaders who chair regularly scheduled staff meetings, the aim of this chapter is to offer new insights into the

behavioral repertoire of (effective) leaders in this context. In this chapter, we showed leader behavioral repertoires to four independent samples in meetings; we contrasted the actual (videotaped and coded) repertoires of leaders in meetings in the field with estimated, recalled ratings of these behaviors. We found that task-related behaviors dominate the repertoires of leaders in regularly scheduled staff meetings, whereas the followers involved in these meetings mostly recall relationship-oriented, transformational type of leader behaviors, as well as one specific leader behavior when it lasted for a relatively long time: informing. Thus, this chapter's findings point to the fact that we cannot rely on people's intuitive insights about which leader behaviors are effective in meetings; in addition, the recall of behaviors in meetings by those who just attended the meetings is far from accurate as well.

The chapter points to the importance of gaining more knowledge about the sources of error when assessing leader behaviors in organizational staff meetings. Large-scale field studies in different cultural settings are needed to replicate the meeting mismatch between actual and perceived behaviors and to examine its consequences. To get a better understanding of more effective behaviors of leader and followers in meetings, we recommend the simultaneous use of a great variety of research samples and methods (including video technology). Carrying out more precise research on managerial (and nonmanagerial) behaviors during meetings will aid in enhancing leader and follower effectiveness/efficiency during these (relatively costly!) staff meetings.

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3

Advancing the Transformational-Transactional Model of Effective Leadership:

Integrating Two Classic Leadership Models with a Video-based Method

This chapter is published as:

Hoogeboom, A. M. G. M., & Wilderom, C. P. M. (2019). Advancing the Transformational-Transactional Model of Effective Leadership: Integrating Two Classic Leadership Models with a Video-based Method. *Journal of Leadership Studies*, 13(2), 23-46.

A previous version of this chapter was accepted and presented at the Academy of Management conference, Vancouver, British Columbia, August 7-11: Hoogeboom, A. M. G. M., & Wilderom, C. P. M. (2015). *Integrating Two Leadership Models: Augmentation Effects with Initiating Structure*.

An improved version of this chapter were accepted and presented at the International Leadership Association, Barcelona, October 14-17: Hoogeboom, A. M. G. M., & Wilderom, C. P. M. (2015). *Integrating Two Leadership Models: On the Value of Initiating Structure*.

ABSTRACT

The presented empirical study demonstrates that the predictive validity of Bass' 'transformational-transactional' model of leadership can be enhanced by incorporating certain aspects of the older Ohio State 'initiating structure-consideration' model of leadership. A precise, fine-grained video-based method shows that 'initiating structure' behaviors (e.g., directing, informing, structuring) explain the variance in leader and team effectiveness better than 'transactional behavior.' Thus, a refined version of Bass' augmentation thesis is supported: initiating structure behaviors (and not transactional behaviors, as originally posed) plus transformational leader behaviors are associated with high leader effectiveness. Another moderation effect of transformational leadership is established: between management-by-exception active and team effectiveness. The resulting, expanded version of the transformational-transactional model calls for further video-based research of effective (team) leadership behaviors.

INTRODUCTION

For decades, the transformational-transactional model has been the dominant model for explaining leader effectiveness. The Ohio State model had been dominating the leadership field much longer. Numerous leadership scholars have voiced the need to integrate both models (e.g., Avolio, 2007; Behrendt, Matz, & Göritz, 2017; Dansereau, Seitz, Chiu, Shaughnessy, & Yammarino, 2013; DeRue, Nahrgang, Wellman, & Humphrey, 2011). Yet, most studies examined both models in isolation (i.e., compartmentalization: Glynn & Raffaelli, 2010) even though both of them comprise task- as well as relation-oriented leader behaviors (DeRue et al., 2011). Although transactional and initiating structure behaviors generally fit the task-oriented behavior category, transformational and consideration behaviors are more associated with relation-oriented behaviors of leaders vis-à-vis their followers (Bass & Bass, 2008; Behrendt et al., 2017; DeRue et al., 2011). But the correspondence between both behavioral meta-categories and the two leadership models has been imprecise (Behrendt et al., 2017; DeRue et al., 2011). Moreover, a simultaneous re-examination of both models would need to overcome several other criticisms.

Firstly, the transactional contingent reward (CR) dimension overlaps empirically with transformational leadership (e.g., Hinkin & Schriesheim, 2008; House & Aditya, 1997; Michel, Lyons, & Cho, 2011; Rafferty & Griffin, 2004; Rowold & Heinitz, 2007; Tejada, Scandura, & Pillai, 2001; Tepper & Percy, 1994; Willis, Clarke, & O'Connor, 2017; Yukl, 1999). If CR were to be dismissed as a necessary part of transactional leadership, then only management-by-exception (MBE) would be left in the transactional part of the model. This behavior, defined as continually and proactively monitoring and taking corrective action before mistakes

become a problem, covers only a fraction of the range of task-based leader behaviors (e.g., Michel et al., 2011). Conversely, if CR were to remain as a legitimate part of the transactional style, other crucial task-oriented leader behaviors would be omitted in the transformational model (DeRue et al., 2011; Michel et al., 2011; Yukl, 1999). Secondly, task-oriented behavior is not reflected adequately in the MLQ (i.e., the most used measure of the model) (Antonakis & House, 2014; O'Shea, Foti, Hauenstein, & Bycio, 2009; Willis et al., 2017). Given that the range of valid task-based behaviors in the transactional part of the transformational model is too narrow, the present paper aims to fill this void: by adding the task-based, initiating-structure behaviors of the Ohio State model. A practical rationale is that effective leadership is rooted in concrete task-oriented behaviors, such as the ability to direct employees' actions, inform them and provide structure (Hannah, Sumanth, Lester, & Cavarretta, 2014; Mumford & Fried, 2014).

All the measures used to examine initiating structure behavior have also been criticized for being merely perceptual recall ratings (Bono, Hooper, & Yoon, 2012; Glynn & Raffaelli, 2010; Yukl, Gordon, & Taber, 2002; Yukl, 2012). Another relevant point of criticism pertains to the most frequently used measurement scale of initiating structure: this survey scale is too parsimonious; it fails to capture specific task behaviors (Antonakis & House, 2014; Behrendt et al., 2017; Dansereau et al., 2013; DeRue et al., 2011; Schriesheim, House, & Kerr, 1976). More objective and precise measurement of leader initiating structure behaviors is therefore highly recommended (Blickle et al., 2013). The aim is to gain insight into a fuller behavioral repertoire of effective leaders (e.g., Schurer Lambert, Tepper, Carr, Holt, & Barelka, 2012). Thus, the research presented in the present paper includes precise, quantitative analyses of leaders' initiating structure and model-related behaviors. The guiding question is: To what extent is initiating structure behavior a better predictor of desirable leader and team outcomes than transactional behavior, when controlling for transformational behavior and consideration? The studied outcomes are: leader effectiveness, team effectiveness and employee extra effort. These three criteria are included in most meta-analyses of effective leadership (DeRue et al., 2011; Dumdum, Lowe, & Avolio, 2002; Seltzer & Bass, 1990).

The present study responds to at least three recent calls. The first pertains to extant leadership models (e.g., Behrendt et al., 2017; Dansereau et al., 2013; DeRue et al., 2011) whereby specific initiating structure behaviors are assumed to explain more variance than the behaviors traditionally included in the transformational-transactional model. The second is to look more specifically at initiating-structuring behavior of effective leadership as a differentiator between effective and less effective leadership (Meuser et al., 2016). The third is to offer more precise and objective insights into the micro-behavioral repertoire of effective leaders, as called for by Blickle et al. (2013) and Hoogeboom and Wilderom (2015). We did this by systematically coding leader behaviors in addition to using survey data. In the

design of the multi-method approach, substantial common-method bias is curbed which, in the past, strongly inflated the reported links between leader behaviors and outcomes (e.g., van Knippenberg & Sitkin, 2013). In effect, the classic augmentation effect is re-examined (i.e., entering transformational behavior into the equation after transactional behavior has led to a significant change in the explained variance of leadership effectiveness; Bass, 1985, 1990; Bass & Avolio, 1993). Possible cross-model augmentation effects, as well as “additive augmentation” effects, may lead to new insights, especially in relation to task-based behaviors (Vecchio, Justin, & Pearce, 2008, p. 72). Thus, the present study examines whether 1) the effects of both classic leadership models might be dependent on each other, 2) extending Bass’ model with the usual task behavior is viable, and 3) the newly integrated model can explain most of the variance between the frequently used outcome criteria (Meuser et al., 2016): see, Figure 1.

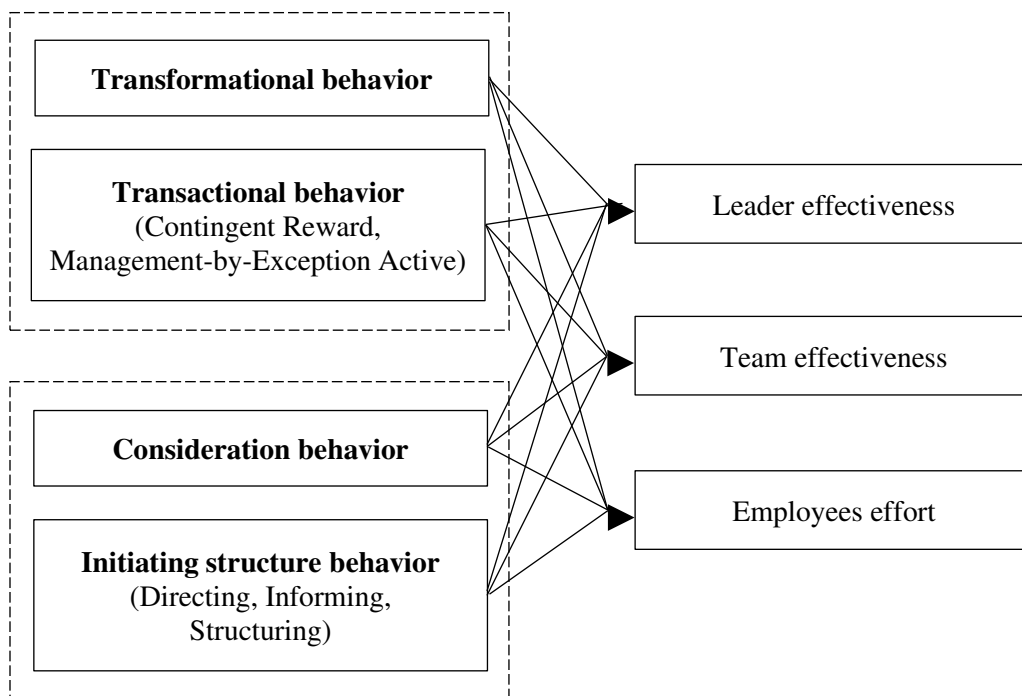


Figure 1. A Depiction of this Study’s Re-examination of Transformational, Transactional, Consideration and Initiating Structure Behaviors from Two Classic Models of Effective Leadership.

COMPARISON OF THE TWO LEADERSHIP MODELS

Initiating Structure-Consideration Model

The initiating structure-consideration model resulted from studies conducted at the Ohio State University (Fleishman, 1973). Initiating structure is defined as assigning to and structuring work tasks for the employees (Fleishman, 1973; Judge, Piccolo, & Ilies, 2004).

Consideration behavior is characterized by showing concern for and empathy with employees (Judge et al., 2004). High levels of leader consideration have especially been shown to have positive effects on job satisfaction, employees' commitment and leader effectiveness (e.g., Judge & Piccolo, 2004; Judge et al., 2004; Wallace, de Chernatony, & Buil, 2013). Initiating structure behavior is more strongly related to team performance (Keller, 2006; Klein, Knight, Ziegert, Lim, & Saltz, 2011), because it contains a high level of task direction and clarity and increases employees' perceptions of accountability (Dale & Fox, 2008).

Transformational-Transactional Model

Bass' (1985) transformational-transactional leadership theory has received a lot of research attention (Antonakis, Bastardo, Liu, & Schriesheim, 2014; Antonakis & House, 2014; Gardner, Lowe, Moss, Mohoney, & Coglisier, 2010; Rowold & Borgmann, 2013). Transformational leaders, as initially conceptualized by Burns (1978), define the need for change, develop a vision for the future and mobilize employee commitment to achieve extraordinary results. More than 100 empirical studies found transformational behavior to be consistently related to organizational, team and leadership effectiveness as well as subordinate satisfaction and motivation (e.g., Bass & Avolio, 1995; Bass & Bass, 2008; Bryman, 1992; Hater & Bass, 1988; Lowe, Kroeck, & Sivasubramanian, 1996; Judge & Piccolo, 2004; Wilderom, van den Berg, & Wiersma, 2012). These results are, however, due in part to the fact that the measures were often based on perceptual recall ratings from the same rating source (Rowold & Borgmann, 2013).

Transactional leadership was defined by Bass (1985) as monitoring and controlling the task progress of employees whereby a leader clarifies employees' responsibilities and task objectives (Bass, 1997; Yukl, 1999). Edwards, Schyns, Gill, and Higgs (2012) suggested that transactional leadership can be represented best by CR and MBE, but as separate factors. CR focuses on exchanging rewards with employees on achieving expected performance (Bass, 1985). MBE is centered on actively monitoring task progress (MBE-Active: MBEA) and intervening after mistakes have been made (MBE-Passive: MBEP) (Howell & Avolio, 1993). MBEP is known to lead to ineffective leadership in most work settings. CR, on the other hand, is associated with leader effectiveness while research with the MBEA dimension has led to contradictory results (Deichmann & Stam, 2015; Howell & Avolio, 1993; Judge & Piccolo, 2004).

Integrating both Models

Empirical studies that used Bass' transformational-transactional model typically overlooked specific leader behaviors needed for task-based activities (Griffin, Neal, & Parker, 2007). One may extend this model with key task-based initiating structure behaviors, identified by

the earlier Ohio model. Meuser et al. (2016) signaled a renewed interest in task-oriented behaviors after being depicted as the elementary cause of ineffective leadership due to: the inability to plan, direct, inform, and coordinate (Hannah et al., 2014; Mumford & Fried, 2014). Indeed, other researchers have argued that the task-oriented behaviors covered by the initiating structure dimension are omitted in the transformational-transactional conceptualizations (Antonakis & House, 2014; Hunt, 2004; Judge et al., 2004; Meuser et al. 2016; Michel et al., 2011; Nadler & Tushman, 1990; Rafferty & Griffin, 2004; Yukl, 2010). House (1996, p. 329), for example, advocated a more appropriate measurement of initiating structure noting that the extant survey scale “has been found to measure very different kinds of behavior” (see, also, Antonakis & House, 2014). Initiating structure behaviors ensure that employees are well-informed about their tasks, thus promoting greater task productivity (Bass, 1990; DeRue et al., 2011). Directing, informing and structuring are important initiating structure behaviors in the taxonomy specified by Burke et al. (2006). Hence, examining them independently, rather than as one parsimonious meta-category, is a possible way forward for substantiating the interpretative claims of the model (Mumford & Fried, 2014).

Directing leader behavior is defined as providing employees with explicit guidance or precise directions to execute tasks (House, 1996). This instructive leader behavior is likely to achieve employee satisfaction and enhanced performance (House, 1996; Martin, Liao, & Campbell, 2013). Martin et al. (2013) defined directing leader behavior as being different from the transactional style; it represents the guiding of employees to ensure they accomplish their tasks. Therefore, directive leadership behavior can be placed within the realm of initiating structure behaviors (see, also, Pearce et al., 2003).

Leader informing is described by Kim and Yukl (1995, p. 65) as “disseminating relevant information about decisions, plans, and activities to people who need the information to do their work.” Borgatta (1962) and Greenhalgh and Chapman (1998, p. 474) saw the purest form of information sharing within teams as “stating the facts.” The ability of a leader to disclose factual information to employees is a central tenet in the organizing process (Mumford, 2006). A leader who offers frequent information might be more effective compared to a leader who does so infrequently (Mesmer-Magnus & DeChurch, 2009; Srivastava, Bartol, & Locke, 2006).

Structuring is described as being analogous to “enabling structure” (Burke et al., 2006, p. 219; Judge et al., 2004). This behavior entails guiding team actions or interactions efficiently by outlining their roles (Zaccaro, Rittman, Marks, 2001). Along a similar vein, Fleishman et al. (1991) claimed that structuring of resources, such as data, roles or tasks, is an important leadership function. A leader can thus engage in the more broadly termed structuring behavior by managing resources efficiently for the tasks at hand (Burke et al., 2006).

Compared to the transactional style, initiating structure behaviors are expected to have a stronger explanatory effect on leader and team effectiveness as well as on employee extra effort because of their broad, task-oriented effects. Initiating structure and transactional behaviors are dissimilar constructs whereas transformational and consideration behaviors are conceptually much closer (House & Aditya, 1997; Yukl, 2010). Several studies revealed that transformational style and consideration overlap (Keller, 2006; Seltzer & Bass, 1990; Piccolo et al., 2012). Hence, when testing whether initiating structure behaviors explain more incremental variance than transactional behaviors, in terms of predicting leader and team effectiveness as well as extra effort, one should control for transformational or consideration behavior (Mumford & Fried, 2014). Evidencing incremental validity is important (Hunter, Bedell-Avers, & Mumford, 2007). Judge and Piccolo (2004, p. 758) stated hereto that “transactional leadership (or at least one dimension of it) should predict the outcome criteria when controlling for transformational leadership.” Accordingly, it is hypothesized that whilst controlling for transformational behavior, the initiating structure leader behaviors (directing, informing and structuring) have more incremental validity in predicting leader and team effectiveness as well as employee extra effort than the transactional behaviors (contingent reward and management-by-exception active) (H1). Along similar lines, we hypothesize that whilst controlling for consideration behavior, the initiating structure leader behaviors (directing, informing and structuring) have more incremental validity in predicting leader and team effectiveness as well as employee extra effort than the transactional behaviors (contingent reward and management-by-exception active) (H2).

Augmentation Effects

A recurring theme in the literature regarding the transformational-transactional model is its augmentation effect. Bass (1985) hypothesized that transformational leadership style adds unique variance, above and beyond the transactional behaviors, in predicting leader effectiveness. Even though this effect is considered to be one of the most “fundamental” propositions in leadership research (Bass & Avolio, 1993, p. 69), few studies have substantiated the augmentation thesis (Judge & Piccolo, 2004) in terms of the two active transactional style factors: CR and MBEA. It is argued here, however, that augmentation effects can be revealed with other task-oriented behaviors, such as initiating structure behaviors (e.g., Vecchio et al., 2008). Specifically, transformational leader behavior is seen to augment the relation between the three initiating structure behaviors of the Ohio model and the three commonly used outcome variables. Basically, transformational leader behavior is assumed to be more effective if the leader also displays a good basis of initiating structure behaviors. Transformational leader behavior is assumed to lead to higher effectiveness when a leader informs the employees, directs their activities and structures

their tasks. Since initiating structure leader behaviors are deemed essential for effective follower task execution, it is likely that transformational leader behaviors add unique variance to the three outcome criteria, through enhanced employee motivation (Rowold, 2006; Wang, Waldman, & Zhang, 2014). Hence, if transformational leader behaviors were to occur without the solid basis of initiating structure behavior, effective task accomplishment would be more difficult to obtain as the task objectives are not clear (e.g., Antonakis & House, 2014). However, cross-model augmentation effects are foreseen if a broader range of task-based leader behaviors are captured and included in the model. Therefore CR and MBEA are both substituted with the three initiating structure behaviors. These initiating structure-augmentation effects are also expected with team effectiveness and extra effort.

The literature shows two different ways of testing augmentation (e.g., Rowold, 2006; Schriesheim, Castro, Zhou, & DeChurch, 2006; Wang, Oh, Courtright, & Colbert, 2011). Similar effects can be established, in addition to the classical augmentation effect (Bass, 1985), with positive moderation, which is referred to as “additive augmentation” (Vecchio et al., 2008). Transformational behavior thereby strengthens the interactive relationship between task-based behavior and effectiveness outcomes (Schriesheim et al., 2006; Vecchio et al., 2008). Both the classical and additive augmentation effects assume that task-based behaviors lead to higher levels of desired outcomes when paired with transformational behavior. Therefore, the third hypothesis tested is if transformational leader behavior (a) augments and (b) moderates the relationships between the initiating structure behaviors (directing, informing and structuring) and leader and team effectiveness as well as employee extra effort, whereby the relationships are more positive when the level of transformational leader behavior is high (H3). And, also building upon these ideas if transformational leader behavior (a) augments and (b) moderates the relationships between the transactional behaviors (contingent reward and management-by-exception active) and leader and team effectiveness as well as employee extra effort, whereby the relationships are more positive when the level of transformational leader behavior is high (H4).

Due to their large overlap, similar effects are proposed on substituting transformational behavior with consideration behavior in the two next hypotheses. First, consideration leader behavior (a) augments and (b) moderates the relationships between the initiating structure behaviors (directing, informing and structuring) and leader and team effectiveness as well as employee extra effort, whereby the relationships are positive when the level of consideration is high (H5). Second, consideration leader behavior (a) augments and (b) moderates the relationships between the transactional behaviors (contingent reward and management-by-exception active) and leader and team effectiveness as well as employee extra effort, whereby the relationships are more positive when the level of consideration is high (H6).

METHODS

Study Design

This study is cross-sectional, with three different data sources: (1) experts' rating of the effectiveness of 72 leaders, (2) a survey which measured followers' perceptions of transactional leadership style (represented by CR and MBEA), transformational leadership style and team effectiveness, and (3) systematic video-based coding which quantified the leaders' initiating structure behaviors (directing, informing and structuring) as well as consideration behaviors during regular staff meetings.

Sampling, Data Collection, and Research Setting

Data were gathered from 72 randomly selected permanent work teams, including their 72 leaders and 623 followers, in three Dutch public and private sector organizations. A 100% response rate was obtained from all these organizations, thanks to the authors' personal contacts and our promise of benchmarked feedback. The leaders (43 males and 29 females) were on average 45.2 years of age (ranging from 27 to 61: $SD = 8.9$), with an average job tenure of 14.0 years ($SD = 12.6$). Employees attending a randomly chosen video-recorded periodic meeting with their leaders were asked to fill out a survey immediately afterwards. This follower subsample consisted of: 332 males and 272 females (19 employees did not fill in the demographic questions). Their average age was 43.6 years ($SD = 10.6$); their average team tenure was 15.9 years ($SD = 12.6$).

Measures

Leadership Effectiveness. Three expert raters were selected from each participating organization to give, independently of each other, one overall effectiveness score per leader. The selected raters were knowledgeable, at that time, about the functioning of each focal leader. This selection process was carried out in conjunction with the HRM staff in all the organizations. The expert raters ($n = 216$) were predominantly male (76%) and either supervisors/leaders of the focal leaders or other highly-knowledgeable higher-ups. Leader effectiveness was rated on a scale of 1 (highly ineffective) to 10 (highly effective) which is the grading scale most commonly used in the Netherlands. The leaders were video-taped and their followers were surveyed. Thereafter, the expert raters had to evaluate the leaders' effectiveness. The employees also rated the degree of leader effectiveness which was measured by the 4 overall-effectiveness items that are part of the so-called MLQ-5X-Short package (Bass & Avolio, 1995). A sample item is: "My supervisor is effective in meeting my job-related needs." The response categories ranged from 1 (never) to 7 (always). The Cronbach's alpha for this construct was .83. The expert leader effectiveness scores

correlated significantly with the effectiveness scores given by the employees ($r = .60$, $p < .01$), giving extra confidence when using the expert scores to assess leader effectiveness.

Team effectiveness. Team effectiveness, as perceived by the employees, was measured with the four-item scale developed by Gibson, Cooper, and Conger (2009). A sample item is: "Our team is effective" ($\alpha = .91$). The responses were scored on a 7-point Likert scale ranging from 1 (totally disagree) to 7 (totally agree).

Employee extra Effort. Employee extra effort was measured through the eyes of the employees, with a three-item scale from Bass and Avolio's MLQ instrument. A sample item is: "Heighten others' desire to succeed" ($\alpha = .80$), with response categories ranging from 1 (totally disagree) to 7 (totally agree).

Transformational leader behavior. The extent to which employees perceived that their leaders exhibited transformational behavior was measured through the following MLQ dimensions: Idealized Influence, split further into the sub factors Idealized Influence behavior (4 items, $\alpha = .90$) and Idealized Influence Attributed behavior (4 items, $\alpha = .85$); Inspirational Motivation (4 items, $\alpha = .93$); Individualized Consideration (4 items, $\alpha = .86$); and Intellectual Stimulation (4 items, $\alpha = .92$). The response scale ranged from 1 (never) to 7 (always). Overall, we obtained a Cronbach's alpha of .97.

Transactional leader behavior. Transactional leader behavior was assessed with the CR and MBEA items from the MLQ (Bass & Avolio, 1995). The employees' answers, based on a 7-point scale, ranged from 1 (strongly disagree) to 7 (strongly agree). Earlier studies indicated that CR and MBEA reflect the transactional style (Antonakis, Avolio, & Sivasubramaniam, 2003; Avolio, Bass, & Jung, 1999; den Hartog, van Muijen, & Koopman, 1997). A sample CR item is: "Provide others with assistance in exchange for their efforts", and of MBEA: "My leader keeps track of all mistakes." The Cronbach alphas of the aggregated scores were .81 for CR and .94 for MBEA.

Leader initiating structure and consideration behavior. The 72 leaders were video recorded during a randomly selected, regular staff meeting (Perkins, 2009; Romano & Nunamaker, 2001; Scott, Rogelberg, & Allen, 2010). The camera was placed at a fixed position in the room before each meeting and was directed at the leader; it quickly became a "normal" part of the background (Erickson, 1992; Foster & Cone, 1980; Mead, 1995).

The meeting context was selected because meetings are prevalent in modern organizational life and managers spend 25-80% of their time in meetings. The behavior during meetings is known to affect leader and team effectiveness (e.g., Allen, Lehmann-Willenbrock, & Rogelberg, 2015). Minute-by-minute investigations of verbal leader behaviors could enable a better understanding of effective leadership (e.g., Sims & Manz, 1984).

Use was made of a detailed 15-page behavioral observation manual, designed and developed in previous field studies, to systematically code leader directing, informing, structuring and consideration behavior (e.g., Hoogeboom & Wilderom, 2015; van der

Weide, 2007). After being trained in this coding scheme, two independent coders minutely coded the mutually exclusive leader behaviors on the university premises using a specialized software program, “The Observer XT” (Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000; Spiers, 2004). See Appendix 1 for the short descriptions and examples.

After coding the same video independently, the two coders discussed their results using the so-called confusion error matrix and inter-rater reliability output generated by the program. An average inter-rater reliability of 95.1% (Kappa = .94) was established, which can be interpreted as an “almost perfect” agreement (Landis & Koch, 1977). The totals of the coded behaviors were: leader directing 1,546; informing 5,339; structuring 2,856; and consideration 4,470. The standardized frequencies were used for the analyses.

To control for reactivity assumptions, the employees were asked, directly after the meetings, to give their views on the behavior of the leader: “to what extent do you find your leader’s behavior during the video-taped meeting to be representative of the non-video-taped meetings?” The response category ranged from 1 (not representative) to 7 (highly representative). The average score was 5.8 ($SD = 1.0$), indicating that the leaders’ behaviors were representative.

Control variables. Past research identified demographic variables, including the gender and age of the leader and employees, which could aid in explaining leader and team effectiveness as well as employee extra effort (e.g., Bass, Avolio, & Atwater, 1996; Dobbins & Platz, 1986; Eagly, Karau, & Makhijani, 1995; Liden, Stilwell, & Ferris, 1996). Therefore, these two demographic factors were included in the regression analyses.

Analytical Procedures

Before testing the hypotheses, we conducted Confirmatory Factor Analysis (CFA) to analyze the factor structure and distinctiveness of the independent variables. To execute the CFA and maximum likelihood estimation, we used Amos 21.0. First, a 7-factor structure was estimated, where 3 of the 7 factors represented leadership behaviors (i.e., transformational, CR and MBEA, each loading on 1 factor) and the 4 other initiating structure-consideration behaviors ($\chi^2 (92) = 123.14$, CFI = .97, RMSEA = .07, SRMR = .07). In order to test the distinctiveness of transformational behavior, CR and MBEA, we also estimated a 5-factor model where transformational behavior, CR and MBEA were loaded onto 1 factor, together with the 4 initiating structure-consideration behaviors ($\chi^2 (107) = 195.15$, CFI = .92, RMSEA = .10, SRMR = .07). In addition, the CR and transformational behaviors were loaded onto 1 factor. This model did not result in a significantly better measurement model with a better model fit ($\chi^2 (100) = 188.02$, CFI = .92, RMSEA = .10, SRMR = .06). The model, where the 2 transactional dimensions (CR and MBEA) were loaded onto one factor, resulted in a significantly worse model fit ($\chi^2 (92) = 226.29$, CFI = .86, RMSEA

= .15, SRMR = .32). The same was true when transformational behavior and MBEA were loaded onto 1 factor ($\chi^2(92) = 233.68$, CFI = .86, RMSEA = .14, SRMR = .29). In accordance with the CFA results, we used the 7-factor structure, whereby the transformational style, CR and MBEA each loaded onto 1 factor.

Intraclass correlation coefficients (ICC; Bliese, 2000) and within-group agreement indexes (R_{wg} ; James, Demaree, & Wolf, 1984) were calculated to justify the aggregation of the expert rater scores for leader effectiveness and the employees' scores of leader transformational behavior, CR, MBEA, employee extra effort and team performance. Aggregation decisions were based on: 1) an evaluation of R_{wg} (which reflects the homogeneity or consensus among the expert raters), and 2) the ICC1 and ICC2 (which reflect the amount of variance attributable to group membership and reliability across group members, respectively (Biemann, Cole, & Voelpel, 2012; Klein & Kozlowski, 2000). Aggregation of the data in a target construct is justified when R_{wg} exceeds the widely accepted cut-off score of .70 (Lance, Butts, & Michels, 2006), when ICC1 values exceed or are equal to .05 and when ICC2 values exceed .70 (LeBreton & Senter, 2008).

The results of the three dependent variables demonstrated satisfactory within-group agreement as well as ICC1 and ICC2 values: an average R_{wg} of .82 (range .49 to .98) for leader effectiveness (ICC1 = .07, $p < .05$; ICC2 = .82, $p < .05$); an average R_{wg} of .84 (range .53 to .99) for team effectiveness (ICC1 = .05, $p < .05$; ICC2 = .73, $p < .05$); and an average R_{wg} of .76 (range .18 to .99) for employee extra effort (ICC1 = .06, $p < .05$; ICC2 = .75, $p < .05$). Also, the within-group agreement indexes for the independent variables permitted aggregation of these scores at the team level: an average R_{wg} of .86 (range .63 to .99) for transformational behavior (ICC1 = .07, $p < .05$; ICC2 = .84, $p < .05$); an average R_{wg} of .80 (range .40 to .98) for CR (ICC1 = .05, $p < .05$; ICC2 = .75, $p < .05$); and an average R_{wg} of .83 (range .49 to .99) for MBEA (ICC1 = .07, $p < .05$; ICC2 = .84, $p < .05$). Given these within-group agreements, the data were aggregated at the team level.

Dominance or so-called relative weights analysis and hierarchical moderated regression analysis (Budescu, 1993) were used to test the hypotheses. A standard regression analysis does not partition variance. Dominance analysis is used to examine the true relative contribution of each of the variables (LeBreton, Hargis, Griepentrog, Oswald, & Ployhart, 2007). Budescu (1993) overcame several issues of earlier techniques, such as using the squared partial or semi-partial correlation, or by decomposing the model's fit into the variables' direct and total effects. Piccolo et al. (2012) and Michel et al. (2011) applied dominance analysis to compare the relative validity and importance of predictors to several

outcome variables. Also, Graen, Rowold, and Heinritz (2010) advocated greater use of these kinds of variance techniques. Given the central question of the present study, dominance analysis is merited: The aim of the analysis is essentially to find the extent to which initiating structure behavior has higher incremental validity than transactional behavior. Dominance analysis is a technique which provides additional information about a predictor's importance on top of the information about its predictive validity.

To test for augmentation effects (e.g., Wang et al., 2011), hierarchical regression analysis was conducted, including the interaction terms for the independent variables. The R^2 was adjusted for the number of predictors (as this varies per model), as reported in the regression figures in Tables 3 and 4. No outliers were present; a check was made for influential residuals, using diagnostic plots of Cook's distance. When testing for univariate non-normality, the data for leader directing and informing were not normally distributed. In order to use the data under the assumption of normal distribution it had to be transformed with a lognormal distribution, which resulted in no univariate non-normalities.

RESULTS

Table 1 presents the means, standard deviations and bivariate correlations of the key variables of the study: CR, MBEA and transformational behavior are significantly related to leader effectiveness ($r = .60, p < .01, r = .35, p < .01, \text{ and } r = .52, p < .01$, respectively). Only CR is significantly related to team effectiveness ($r = .27, p < .05$). In terms of leader initiating-structure behaviors, directing is not significantly related to the three dependent variables. Informing is significantly associated with both leader and team effectiveness ($r = .34, p < .01, \text{ and } r = .34, p < .01$, respectively). Structuring is negatively related to employee extra effort, although in the opposite direction than expected ($r = -.48, p < .01$). Consideration is not significantly related to any of the three outcome variables.

Hypotheses Testing

Hypothesis 1 posits that the initiating structure behaviors (i.e., directing, informing and structuring) are more strongly related to leader effectiveness, team effectiveness and employee extra effort than the transactional behaviors (CR and MBEA). Dominance analysis gave the relative importance of the initiating structure behaviors over the transactional factors, whilst controlling for transformational behavior; Table 2 presents the results.

Table 1
Variable Means, Standard Deviations and Zero-order Correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Leader effectiveness ¹	7.18	.75													
2 Team effectiveness ²	5.10	.60	.40 **												
3 Employee extra effort ²	4.17	.71	.53 **	.17											
4 CR ²	4.32	.62	.60 **	.27 *	.83 **										
5 MBEA ²	4.45	.69	.35 **	.21	.52 **	.69 **									
6 TL ²	4.56	.63	.52 **	.21	.91 **	.90 **	.61 **								
7 Directing ³	20.61	16.00	.20	.12	.10	.11	.14	.11							
8 Informing ³	71.20	47.14	.34 **	.34 **	.06	.20	.28*	.06	.19						
9 Structuring ³	38.09	16.56	-.18	-.29 *	-.48 **	-.36 **	-.32 **	-.41 **	-.05	.02					
10 Consideration ³	59.59	27.87	.14	-.04	.17	.05	-.02	.07	-.14	-.20	.08				
11 Leader gender	1.39	.49	-.05	-.07	.03	-.03	-.08	.00	-.02	-.17	.27 *	-.04			
12 Leader age	45.23	9.00	.19	.12	.19	.15	-.05	.18	.04	-.23	.06	.13	-.13		
13 Employee gender	1.45	.26	-.01	.18	-.23	-.09	-.13	-.17	-.09	.15	.02	-.10	.22	-.25 *	
14 Employee age	43.17	6.39	.06	.02	.34 **	.26 *	.19	.36 **	.09	-.15	-.15	.03	-.01	.49 **	-.45 **

Note. CR = Contingent Reward; MBEA = Management-by-Exception Active; TL = Transformational Leadership. * $p < .05$, two-tailed. ** $p < .01$, two-tailed. ¹Variable measured through surveys filled in by expert raters of each leader (N = 72). ²Variable measured through surveys filled in by employees of the participating leaders (N = 623). ³Variable measured through systematic video-based coding of the leaders (N = 72).

The initiating structure behaviors explain 14% of the additional variance in leadership effectiveness whereas CR and MBEA explain an additional 10% of variance (see columns 3 and 4 of Table 2, bold numbers). On controlling for transformational behavior, the initiating structure behaviors explain an additional 20% of variance in predicting team effectiveness while the transactional factors only add 4% to the explained variance. In terms of employee extra effort, both initiating structure and transactional behaviors explain an additional 1% of variance. Thus, Hypothesis 1 is supported, especially regarding leader and team effectiveness. Examining the explained variance in the final steps of the hierarchical regression analysis gives similar results (Table 3). The transformational-transactional model (i.e., CR+MBEA+transformational behavior) explains 40%, 20% and 84% of the total variance in leader effectiveness, team effectiveness and employee extra effort, respectively; in the final step, 52%, 38% and 84% is explained by the regression results of the model in which the classic transactional factors are replaced by the initiating structure behaviors (initiating structure behaviors+ transformational behavior), respectively. As expected, the three specific initiating structure behaviors explain, together with transformational behavior, greater variance in both leader and team effectiveness.

Table 2

Results of the Dominance Analysis of Leader and Team Effectiveness as well as Employee Extra Effort ($n = 72$)

Leadership behaviors entered in Step 1	R ² for Step 1	Incremental contribution of behaviors in Step 2							
		CR, MBEA	Dir, Info, Struct	TL	CR	MBEA	Dir	Info	Struct
<u>Leadership effectiveness</u>									
TL	.27 **	.10 **	.14 **		.09 **	.00	.05 †	.10 **	.00
Consideration	.14 **	.24 **	.10 **	.14 **	.23 **	.00	.00	.02	.00
CR	.36 **		.11 **	.00		.01	.04 †	.05	.00
MBEA	.12 **		.11 **	.15 **	.25 **		.03	.04	.01
Directing	.01	.40 **		.31 **	.39 **	.15 **		.11 **	.04 †
Informing	.11 **	.32 **		.26 **	.30 **	.07 *	.01		.04 †
Structuring	.03			.24 **	.33 **	.10 **	.02	.12 **	
CR, MBEA	.37 **		.35 **	.00			.04 †	.06 *	.00
Directing, Informing, Structuring	.17 **	.55 **		.24 **	.28 **	.30 **			
<u>Team effectiveness</u>									
TL	.04 †	.04 †	.20 **		.04 †	.02	.01	.11 **	.05 †
Consideration	.04	.04 †	.19 **	.01	.04 †	.00	.00	.05 †	.04 †
CR	.07 *		.17 **	.01		.01	.01	.09 **	.04 †
MBEA	.05 †		.18 **	.01	.00		.01	.08 **	.05 †
Directing	.00	.08 **		.05 †	.08 *	.05 †		.12 **	.01
Informing	.11 **	.05 †		.04 †	.05 †	.00	.01		.09 **
Structuring	.08 *	.03		.01	.03	.00	.02	.12 **	
CR, MBEA	.07		.17 **	.01			.01	.09 **	.04 †
Directing, Informing, Structuring	.23	.01		.01	.00	.05 †			
<u>Employee extra effort</u>									
TL	.82 **	.01	.01		.00	.00	.00	.00	.01
Consideration	.03	.67 **	.21 **	.80 **	.67 **	.27 **	.01	.01	.21 **
CR	.69 **		.03	.13 **		.00	.00	.01	.02
MBEA	.27 **		.08 **	.55 **	.42 **		.02	.01	.09 **
Directing	.01	.68 **		.81 **	.68	.26		.00	.17 **
Informing	.00	.69 **		.82 **	.69 **	.27 **	.01		.21 **
Structuring	.20 **	.52 **		.63 **	.51 **	.16 **	.00	.01	
CR, MBEA	.69 **		.03	.14 **			.00	.01	.03
Directing, Informing, Structuring	.18 **	.11 **		.65 **	.54 **	.17 **			

Note. CR = Contingent Reward; MBEA = Management-by-Exception Active; TL = Transformational Leadership; Dir = Directing; Info = Informing; Struct = Structuring. * $p < .05$, two-tailed. ** $p < .01$, two-tailed. † $p < .05$, one-tailed.

Hypothesis 2 proposes that, when controlling for consideration, the initiating structure behaviors explain more incremental variance than the transactional behaviors. The initiating structure-consideration model (initiating structure+consideration) was compared with a transactional behaviors-consideration model (i.e., CR+MBEA+consideration). After controlling for consideration, the explained variance of the initiating structure behaviors is lower for leader effectiveness in comparison with the transactional behaviors (10% versus

24%), but higher for team effectiveness (4% versus 19%). Thus, Hypothesis 2 is only accepted when team effectiveness is the dependent variable. In general, the initiating structure behaviors explain more variance than the two original transactional factors. In addition, the explained variance in the final steps of the hierarchical moderated regression analysis was compared. The model in which initiating structure behaviors replace the two transactional factors (CR+MBEA+consideration) explains, in the final step, 36%, 23% and 74% of the total variance in leader effectiveness, team effectiveness and employee extra effort, respectively; the classic Ohio State initiating structure-consideration model explains 29%, 35% and 39% respectively. In the CR+MBEA+consideration model, CR is the most important predictor of leader effectiveness and employee extra effort. But, as expected, CR is highly correlated with transformational behavior; it shows multicollinearity in the regression models. As argued before, CR is shown here more as a reflection of transformational behavior than as a representation of a leader's task-oriented behavior (see, also, van Knippenberg & Sitkin, 2013; Wang et al., 2011).

Table 3
Hierarchical Moderated Regression Analyses of the Integrated (I) and Classic (II) Models

Model	Leader Effectiveness				Team Effectiveness				Employee Extra Effort			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
I Leader Gender	-.02	.60	.09	.00	-.12	-.17	-.16	-.19	.05	-.05	.03	.02
Leader Age	.00	.43	.13	.15	.12	.23 †	.23 †	.28 *	.03	.04	.03	.03
Employee Gender	-.09	.28	-.10	-.04	.26 †	.24 †	.24 *	.26 *	-.12	-.12	-.11 *	-.09
Employee Age	.09	.74	-.14	-.15	.09	.08	.04	.04	.29 *	.23 †	-.05	-.05
Directing		.10	.08	.12		.06	.06	.07		.03	-.01	-.00
Informing		.43 **	.38 **	.34 **		.37 **	.36 **	.39 **		.1	.01	.00
Structuring		-.07	.10	.10		-.34 **	-.29 *	-.31 *		-.40 **	-.10	-.09
TLS			.53 **	.53 **			.12	.15			.86 **	.86 **
TLS*Directing				.22 *				.03				.01
TLS*Informing				-.21 *				-.20 †				-.02
TLS*Structuring				-.19 *				.00				-.05
R ²	.02	.23 **	.43 **	.52 **	.07	.33 **	.34 **	.38 **	.14 **	.31 **	.84 **	.84 **
ΔR ²		.11 **	.20 **	.09 *		.14 **	.01	.04		.17 **	.53 **	.00
II Leader Gender	-.02	-.01	-.01	.00	-.12	-.10	-.10	-.12	.05	.08	.05	.04
Leader Age	.00	.06	.06	.00	.12	.18	.18	.13	.03	-.01	.01	-.01
Employee Gender	-.09	-.06	-.06	-.07	.26 †	.27 *	.27 *	.25 †	-.12	-.16 *	-.12 *	-.12 *
Employee Age	.09	-.12	-.12	-.13	.09	-.02	-.01	.00	.29 *	.07	-.14	-.04
CR		.59 **	.59 *	.61 *		.18	.22	.22		.87 **	.15	.15
MBEA		.01	.01	-.02		.14	.14	.06		-.11	-.08	-.10
TLS			.00	-.04			-.04	.00			.81 **	.82 **
TLS*CR				.25 †				-.11				-.02
TLS*MBEA				.01				.29 *				.08
R ²	.02	.34 **	.35 **	.40 **	.07	.15 †	.15	.20	.14 **	.72 **	.83 **	.84 **
ΔR ²		.11	.01	.06 *		.08 †	.00	.05		.58 **	.11 **	.01

Note. Standardized regression coefficients are displayed in the table. TL = Transformational Leadership; CR = Contingent Reward; MBEA = Management-by-Exception Active. * $p < .05$, two-tailed. ** $p < .01$, two-tailed. † $p < .05$, one-tailed.

Table 4

Hierarchical Moderated Regression Analyses of the Integrated (I) and Classic (II) Models (continued)

Model	Leader Effectiveness				Team Effectiveness				Employee Extra Effort			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
III Leader Gender	-.02	.07	.07	.07	-.12	-.17	-.13	-.13	.05	-.05	-.03	-.03
Leader Age	.00	.11	.09	.08	.12	.23 [†]	.19	.20	.03	.04	.02	.03
Employee Gender	-.09	-.14	-.12	-.10	.26 [†]	.24 [†]	.23 [†]	.26 [*]	-.12	-.12	-.10	-.09
Employee Age	.09	.05	.06	.08	.09	.08	.06	.05	.29 [*]	.23 [†]	.25 [†]	.25 [†]
Directing		.10	.13	.14		.06	.05	.07		.03	.08	.05
Informing		.43 ^{**}	.47 ^{**}	.53 ^{**}		.37 ^{**}	.34 ^{**}	.43 ^{**}		.10	.18	.16
Structuring		-.07	-.09	-.04		-.34 ^{**}	-.31 ^{**}	-.25 [†]		-.40 ^{**}	-.40 ^{**}	-.39 ^{**}
Consideration			.22 [†]	.25			.04	.10			.25 [*]	.23 [†]
Consideration*Directing				.15				.16				.10
Consideration*Informing				.03				.07				-.07
Consideration*Structuring				-.03				-.05				-.12
R ²	.02	.23 [*]	.27 ^{**}	.29 [*]	.07	.33 ^{**}	.33 ^{**}	.35 ^{**}	.14 ^{**}	.31 ^{**}	.36 ^{**}	.39 ^{**}
ΔR ²		.11 ^{**}	.04 [*]	.03		.14 ^{**}	.00	.02		.17 ^{**}	.05 [*]	.03
IV Leader Gender	-.02	-.01	-.01	-.01	-.12	-.10	-.10	-.10	.05	.08	.08	.08
Leader Age	.00	.06	.05	.04	.12	.18	.19	.17	.03	-.01	-.02	-.02
Employee Gender	-.09	-.06	-.05	-.05	.26 [†]	.27 [*]	.26 [†]	.27 [*]	-.12	-.16 [*]	-.15 [*]	-.15 [*]
Employee Age	.09	-.12	-.11	-.12	.09	-.02	-.02	-.04	.29 [*]	.07	.08	.08
CR		.59 ^{**}	.58 ^{**}	.59 ^{**}		.18	.19	.19		.87 ^{**}	.86 ^{**}	.86 ^{**}
MBEA		.01	.02	.00		.14	.14	.09		-.11	-.10	-.11
Consideration			.10	.08			-.05	-.09			.11 [†]	.10
Consideration*CR				.12				.33 [*]				.05
Consideration*MBEA				-.07				-.08				-.03
R ²	.02	.34 ^{**}	.35 ^{**}	.36 ^{**}	.07	.15 [†]	.16	.23 [*]	.14 [*]	.72 ^{**}	.74 ^{**}	.74 ^{**}
ΔR ²		.11 ^{**}	.01	.01		.08 [†]	.01	.07 [†]		.58 ^{**}	.02 [†]	.00

Note. Standardized regression coefficients are displayed in the table. TL = Transformational Leadership; CR = Contingent Reward; MBEA = Management-by-Exception Active. * $p < .05$, two-tailed. ** $p < .01$, two-tailed. † $p < .05$, one-tailed.

Bass' classic augmentation thesis gave rise to Hypothesis 3a proposing that transformational behavior positively augments the three initiating structure behaviors in relation to leader effectiveness, team effectiveness and employee extra effort. Table 3 presents the results of the hierarchical moderated regression analyses. The initiating structure behaviors are entered first into Model I in relation to leader effectiveness (Step 3), followed by transformational behavior. The beta weights in the regression equation, with leader effectiveness and employee extra effort as the dependent variables, show that transformational behavior contributes significantly, after controlling for the initiating structure behaviors. Thus, Hypothesis 3a is partially supported. Hypothesis 3b posits that the relation between initiating structure and the three effectiveness outcomes are positively moderated by transformational behavior. The results show that transformational behavior positively moderates directing behavior in relation to leader effectiveness (Model I, Step 4, $\beta = .22$, $p < .05$, and Figure 2); the relationship between directing and leader effectiveness is significant among high transformational leaders (simple slope = .47, $t = 2.10$, $p < .05$), but not among low transformational leaders (simple slope = .07, $t = .31$, n.s.).

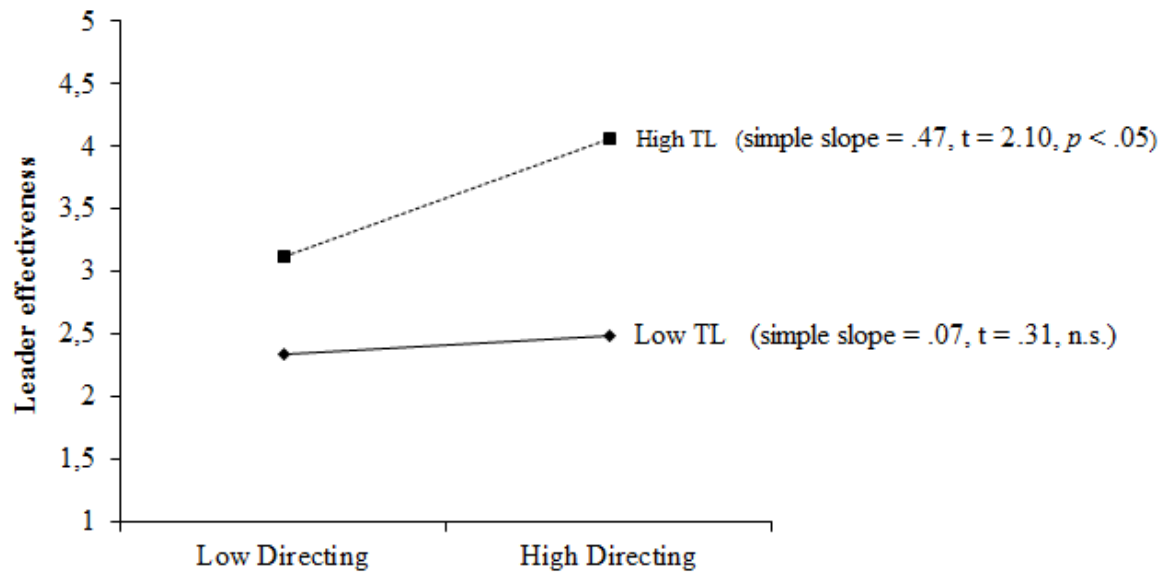


Figure 2. Interaction between the Effect of Leader Directing Behavior and TL on Leader Effectiveness.

Contrary to expectations, transformational behavior negatively moderates informing and structuring behavior ($\beta = -.21, p < .05$; $\beta = -.19, p < .05$, respectively: Figures 3 and 4). Moreover, only the hypothesized moderating effect of transformational behavior on the link between directing and leader effectiveness (Hypothesis 3b) is supported. No significant moderation effects of initiating structure and transformational behavior are found for team effectiveness and employee extra effort. Hypothesis 4a proposes that transformational behavior positively augments the transactional factors. Table 3 (Model II, Step 3) shows that when CR is entered into the equation (with leader and team effectiveness as well as employee extra effort), transformational behavior does not significantly add to the prediction. Thus, no support is found for Hypothesis 4a. Hypothesis 4b states that transformational behavior positively moderates the relationship between the transactional factors and the three effectiveness criteria. The relationship between MBEA and team effectiveness is positively moderated by transformational behavior (Model II for team effectiveness, Step 4: $\beta = .29, p < .05$, see also, Figure 5). Hence, partial support is found for Hypothesis 4b.

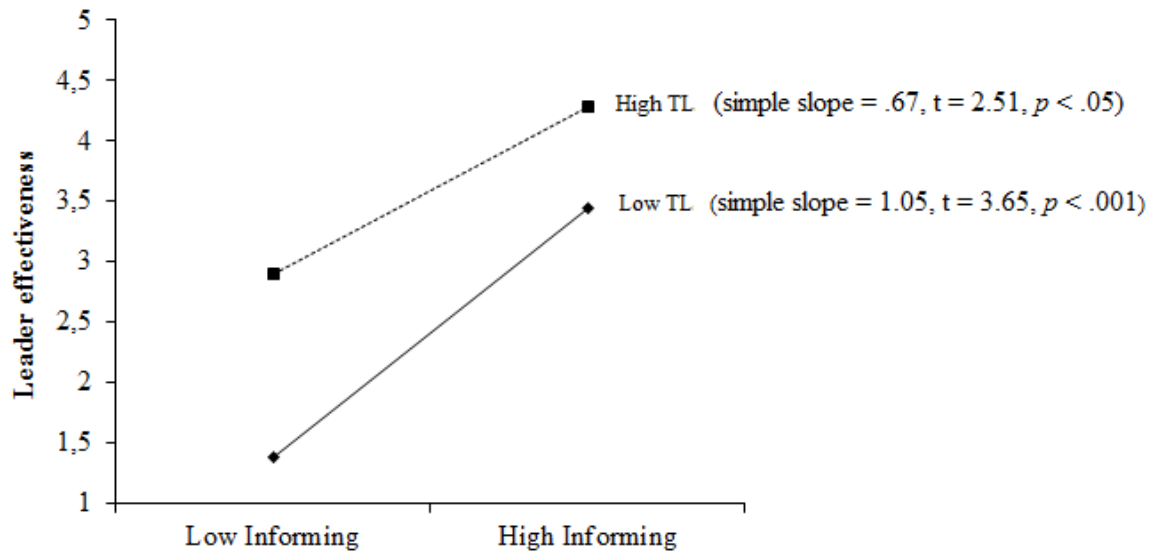


Figure 3. Interaction between the Effect of Leader Informing Behavior and TL on Leader Effectiveness.

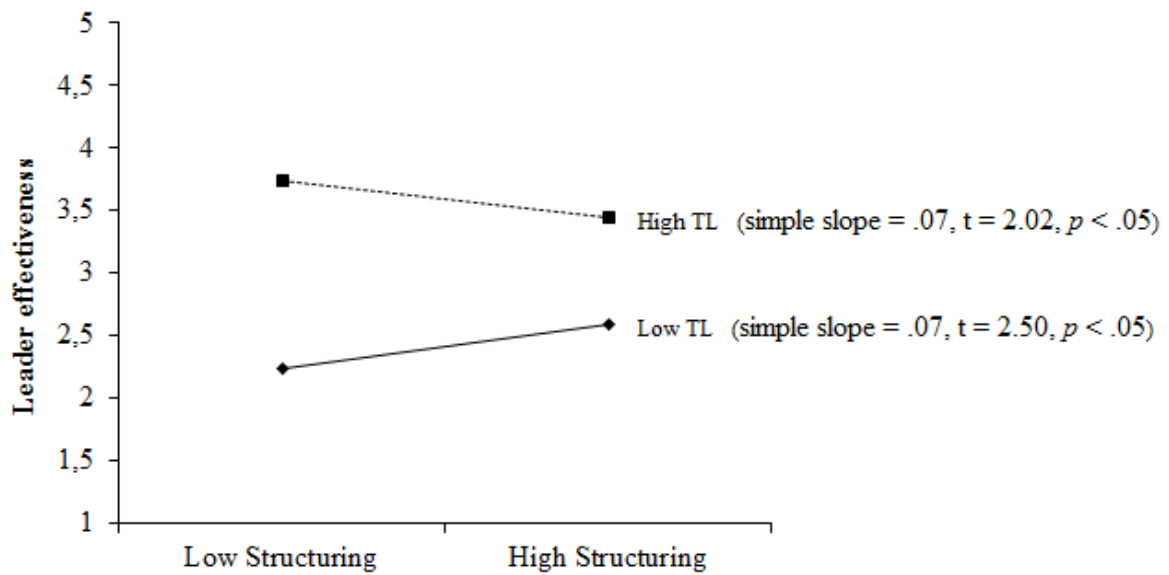


Figure 4. Interaction between the Effect of Leader Structuring Behavior and TL on Leader Effectiveness.

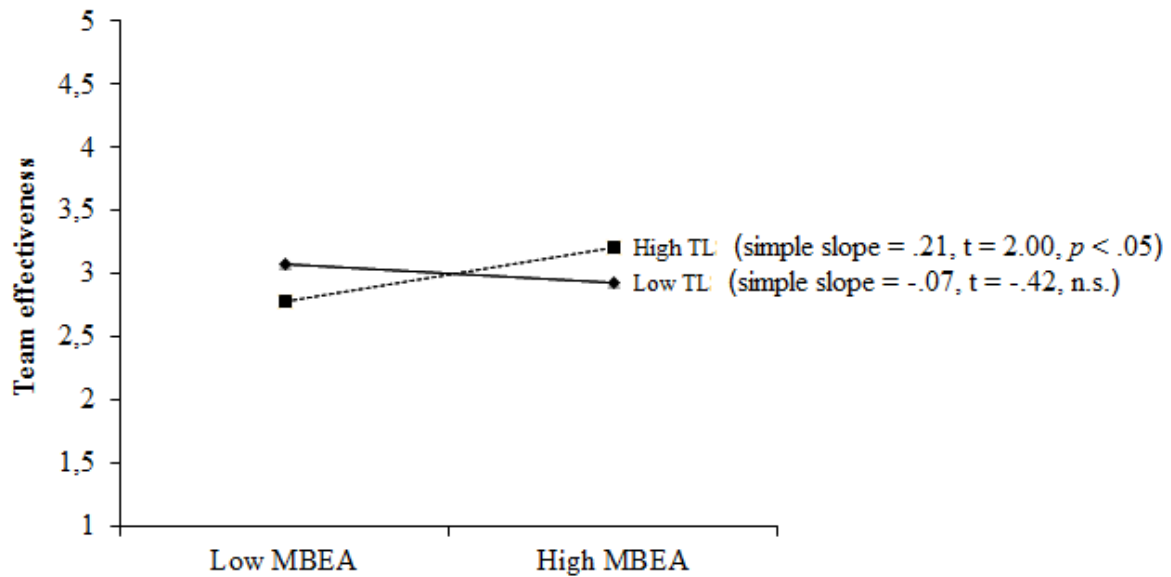


Figure 5. Interaction between the Effect of MBEA and TL on Team Effectiveness.

Hypothesis 5a proposes that consideration positively augments the three initiating structure behaviors in relation to the three dependent variables. The results are presented in Table 4. In Model I, Step 3, the beta weights in the regression of leader effectiveness and employee extra effort show that consideration partially supports, after controlling for the initiating structure behaviors, Hypothesis 5a. Hypothesis 5b posits that consideration positively moderates the initiating structure behaviors. However, no significant interaction terms are found. Hypotheses 6a and 6b state that consideration augments and moderates the relationship between the transactional factors (CR+MBEA) and the three effectiveness outcomes. We find no support for Hypothesis 6a (Model II, Step 3). The moderation effect between consideration and CR is significant (Model II, Step 4: $\beta = .33, p < .05$) thereby partially supporting Hypothesis 6b, in relation to team effectiveness. Again, CR might reflect transformational behavior better than transactional or task-oriented behavior.

Supplemental Analyses

To remove the concern that the established effects might be due to method differences (i.e., non-comparability of the measures) the following transformational behaviors were also video-coded: intellectual stimulation, individualized consideration, inspirational motivation and idealized influence.

Two additional transactional behaviors were examined with the video-based method as well: task monitoring and providing negative feedback (see Appendix 1). Another transactional behavior, contingent reward, was not video-coded because of the difficulty to code this behavior reliably; a leader's provision of assistance in exchange for followers'

efforts was not captured easily by the micro-behavioral, mutually exclusive coding carried out here. Moreover, rewarding employees is typically more interwoven with organizational HRM practices than with leaders' effective task behaviors. After employing dominance analysis, the video-based transactional behaviors (task monitoring and providing negative feedback) explain less incremental variance in both leader and team effectiveness as well as employee extra effort, when controlling for transformational behavior (3%, 3% and 1%, respectively). Also, these two additional task-based behaviors explain less incremental variance than the three initiating structure behaviors for the three effectiveness outcomes (leader effectiveness, team effectiveness and extra effort) when controlling for the video-coded transformational behavior (3%, 3%, and 0%, respectively). In addition, the regression results show that video-observed transactional behavior is not significantly associated with leader effectiveness ($\beta = -.03$, n.s.), team effectiveness ($\beta = -.12$, n.s.) or employee extra effort ($\beta = -.10$, n.s.), when controlling for survey-measured transformational behavior. The interaction effect between transactional MBEA and transformational behavior is significant for team effectiveness ($\beta = .29$, $p < .05$), providing further support for Hypothesis 4b. Also, when controlling for the video-coded transformational behaviors, video-coded transactional behavior does not explain added variance in leader effectiveness ($\beta = .05$, n.s.), team effectiveness ($\beta = -.15$, n.s.) and employee extra effort ($\beta = .01$, n.s.).

DISCUSSION

According to Antonakis and House (2014), a fuller range of the so-called behavioral transformational leadership model is needed to explain leader effects better. In order to empirically substantiate this point, and by 'borrowing' task behavior from the Ohio State model, a triangulated field-research design was invoked. As hypothesized, after controlling for leader transformational behavior or consideration, each of the three initiating structure behaviors (directing, informing and structuring) explain unique, meaningful variance: more than the two transactional leader behaviors (CR and MBEA). Also, transformational leader behavior is found to augment the three initiating structure behaviors. Vis-a-vis leader and team effectiveness, "additive augmentation" effects (Schriesheim et al., 2006, p. 33) are found for directing and MBEA behavior. Informing and structuring appear to be less conducive to leader effectiveness when a leader scores high on transformational behavior. These moderation effects reflect the major contribution of this study: that the desired effects of transformational behavior are stronger when a fuller range of task-based leader behaviors is shown.

Even though it appears that CR adds to team effectiveness under a high level of leader consideration behavior, due to the overlap between CR and transformational behavior, this effect is seen as contrived. Such overlap is not only exposed in the present study (see the

significant correlation coefficient of .90 in Table 1) but also in previous studies, e.g., Willis et al. (2017).

The tested consideration behavior hypotheses yield no meaningful moderation effects. The fact that consideration is not significantly linked to the three outcome criteria is in contrast to Piccolo et al.'s (2012) results. Compared to consideration behavior, transformational behavior is a much stronger predictor of the three effectiveness criteria. While consideration behavior only pertains to the relational aspects of leadership, transformational behavior includes consideration and is also oriented towards changes in the professional development of employees and the organization.

Theoretical Implications

The results of this study have a number of implications for leadership theorizing. First, CR again overlaps with transformational behavior. Hence, it should be excluded as a measure of the transactional style (Sommer, Howell, & Hadley, 2016; Willis et al., 2017). Secondly, whatever is left of the transactional style (i.e., MBEA) does not capture a sufficiently broad variety of task-based workplace behaviors of effective leaders; initiating structure behaviors explains more variance in leader and team effectiveness. Thus, compared to the original transformational-transactional model, the combination of transformational and initiating structure behaviors predicts leader and team effectiveness better. The task-based leader behaviors have not been represented well in prior examinations of the so-called full range model (e.g., Antonakis & House, 2014). The findings of the present, video-based study show that the MBEA part of the transformational-transactional model should be extended with the three initiating structure behaviors, thus yielding 'the best of both classic leadership models.'

Positive moderation effects are obtained for two of the examined task-based behaviors. Transformational leader behavior not only augments directing leader behavior towards higher leader effectiveness; it also augments MBEA towards higher team effectiveness. Both behaviors seem to operate according to the goal-setting and path-goal theories (House, 1996; Locke & Latham, 1990; Martin et al., 2013): i.e., they specify goals and monitor employee performance. Hence, effective transformational leaders are shown to be instrumental to their followers: employees need a sense of concrete direction to execute their tasks successfully. Also, Keller's (2006, p. 209) longitudinal study suggests that transformational behavior should be complemented with initiating structure behavior as this provides "the detail and direction that subordinates need and may not get from transformational leadership."

Even though informing is shown here to be a crucial task-based behavior that is positively related to leader and team effectiveness, frequent factual informing has less impact on leader and team effectiveness when a leader also scores highly on the

transformational style (Figure 3). Thus, being supervised by someone with a transformational leadership style seems to remove followers' need for a lot of factual information. In other words, leaders with a transformational behavior pattern seem to give followers sufficient guidance (e.g., through vision, trust and other inspirational behaviors) (Bass, Avolio, Jung, & Berson, 2003; Schaubroeck, Lam, & Cha, 2007; Wang et al., 2011). Conversely, a leader without a transformational style can obtain high leader and team effectiveness when he or she frequently distributes relevant factual information. If team members receive more task-relevant information, they are able to assess alternative task-types of decisions better, and thereby accomplish their tasks more effectively (e.g., van Ginkel & van Knippenberg, 2009). Hence, the research outcome illustrates that only examining a main effect of initiating structure behaviors, without also testing the possible interaction with more relation-oriented behaviors, can result in an incomplete understanding of effective leadership.

Similarly, transformational leader behavior is found to negatively moderate the relation between structuring and leader effectiveness; when transformational leaders engage in frequent structuring behavior, their effectiveness is inhibited. Plenty of structuring behavior by a transformational leader is likely to undermine employees' self-directed actions, leading to lower levels of leader effectiveness (Locke & Latham, 1990). This finding of the present research is in line with Social Learning theory's point that too much leader structuring diminishes the perceived autonomy and motivation of employees to perform above expectations (Bandura, 1977; Holtz & Harold, 2013; Wallace et al., 2013). Hence, if leaders are perceived as transformational, and also display a lot of structuring behavior, they might come across as overly controlling or intimidating. This explanation is strengthened by the main negative effect of structuring behavior on both team effectiveness ($\beta = -.31, p < .05$, Table 3) and employee extra effort ($\beta = -.39, p < .01$, Table 4).

Practical Implications

On adopting a combination of transformational, MBEA and initiating-structure behaviors, effective leaders demonstrate a broader and more nuanced behavioral repertoire than heretofore shown. The studied behaviors are part of the two classic models of effective leadership. Our simultaneous testing of the combined classic models shows that more success will be obtained by leaders when the transformational behavioral style is combined with both the directing initiating structure behavior and the MBEA transactional behavior. Leaders who do not use a transformational style can nevertheless enhance their effectiveness by engaging in frequent factual informing. A leader's structuring behavior appears to be negatively related to the three effectiveness outcomes, i.e., too much leader micro-managing (of meetings) is ineffective (Pearce, 2007). CR, the most researched transactional-style factor thus far, does not capture important task-based leader behaviors.

Designers of leadership development programs are advised to focus on the transformational style of leadership together with the four task-oriented behaviors (MBEA and the three initiating structure behaviors), rather than on the opaque 'transactional style.' The four initiating structure behaviors should be 'dusted off' and recombined in future models of effective leadership. This is because, as we show in this study, without a more solid understanding of these initiating structures and MBEA behaviors, transformational effects might not be easily optimized in practice (Bass, 1998).

Strengths, Limitations and Future Research

The results of this leadership study yield new insights into the behaviors of effective leaders, and refine the central long-standing models of leadership effectiveness. Common source bias was curbed by using multiple methods and sources of data (including video observation and expert ratings). Various task-oriented and consideration behaviors of leaders in a regularly occurring field setting were systematically coded. This data was complemented with expert judgements on leader effectiveness as well as survey data from the followers. The examined links with team effectiveness and employee extra effort could still contain common-source bias. Despite this potential bias, we do not establish a significant direct association between transformational behavior and team effectiveness. The great value of capturing more objective leader micro-behaviors is shown by employing systematic video observations in the field. Dinh et al. (2014) found that only 1 percent of the published studies, over a 12-year period from 2000 to 2012, in the top 10 management journals employed an observation methodology (see, Antonakis, Fenley, & Liechti, 2011; Frese, Beimel, & Schoenborn, 2003; Purvanova & Bono, 2009).

A possible weakness of the present study is that the hierarchical level of the leaders was not considered. To be effective, different hierarchical positions may require different managerial behaviors (Pavett & Lau, 1983). However, in their meta-analysis, Lowe et al. (1996) found that the effect of transformational style was not moderated by the level of the leader. New research should explore whether the results hold at different hierarchical levels and also in other prototypical leadership settings, beyond the regular meeting-place context. Although immediate, post-meeting survey responses affirmed that the leaders' behaviors in the video-taped meeting setting were representative of their workplace behaviors, extensive similar longitudinal field research is needed to affirm this. Also, the Dutch context may be less representative given the empirical fact that Dutch employees are not positively affected by charismatic leadership (den Hartog, 1997; Kirkman, Chen, Farh, Chen, & Lowe, 2009). Hence, future cross-cultural research will have to corroborate the obtained results.

Due to survey-space constraints, the survey-based LBDQ was not integrated. Hence, no full comparison of both classic models was made (Burke et al., 2006). Instead, new video-based measures of initiating structure and consideration behaviors were tested which controlled for perceptions of transformational behavior. Comparability of the current results was established with those of prior leader-behavioral studies. Supplementary analyses showed, moreover, that using only 1 method (i.e., video-observation) to test our hypotheses resulted in similar findings. Even though survey measures of initiating structure have been shown to add little variance to a model with the transformational leadership style (e.g., Koene, Vogelaar, & Soeters, 2002; Piccolo et al., 2012), future research ought to examine perceptual measures of both models' variables, together with video-based measures, such as the ones utilized here.

CONCLUSION

As assumed at the outset, the original transformational-transactional model does not cover a full, comprehensive range of task-oriented, effective leader behaviors. By integrating the three initiating structure behaviors of the Ohio State model of leadership effectiveness into the transformational-transactional model, our video-based research demonstrates the usefulness of a refined version of the original model. As hypothesized, the initiating structure behaviors, namely directing, informing and structuring, plus MBEA, appear to represent a more complete task-type or transactional behavioral spectrum of effective leaders. Reliable and valid leaders' micro-behaviors may thus add to survey-based data; this study points to a recapturing of the task side of effective leadership, in addition to the well-established effects of transformational behaviors. Future research ought to, therefore, focus on a recombined range of task-based leader behaviors, together with the transformational-style behaviors.

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Appendix 1.

Descriptions and Examples of the Video-based Coded Behaviors, including their Relative Displayed Frequency (n = 72)

Coded behaviors		Short description	Examples	Displayed behavior in %	
1.	Directing	IS	Dividing tasks among employees (without enforcing them); Determining the current task direction	“John, I’d like you to take care of that”	5.9
2.	Informing	IS	Giving factual information	“The budget for this project is...”	21.9
3.	Structuring	IS	Concretizing the employees’ tasks, including the conduct of meetings towards the next agenda point	“We will end this meeting at 2pm”	12.0
4.	Intellectual stimulation	TF	Positively stimulating the behavior of employees; Challenging someone on rational or professional grounds	“What actions should be taken according to you”	8.9
5.	Consideration	TF	Showing an interest in followers’ feelings or situations; Showing empathy; Creating a friendly environment	“I am sorry to hear that; how are things now?”	18.3
6.	Providing negative feedback	TA	Criticizing the behavior of employees; Focusing on irregularities or mistakes	“I am not so happy with the way you did this”	2.1
7.	Task monitoring	TA	Checking upon employees’ current task progress; Referring to previously made agreements with employees	“Have you not done this yet?”	10.7
8.	Group-focused goal explication	O	Giving a perspective on collective plans	“Given the recent organizational developments, I think we should...”	18.3
9.	Showing disinterest	CP	Not taking any action (when expected)	Not listening actively	0.7
10.	Defending one’s own position	CP	Emphasizing one’s leadership position; Emphasizing self-importance	“I am the manager within this organization”	1.2
				100%	

Note. IS = Initiating structure behavior; TF = Transformational behavior; TA = Transactional behavior; O = Other behavior which is not placed in one of the four, common categories; CP = Counterproductive behavior.

4

Physiological Arousal Variability Accompanying Relations-oriented Behaviors of Effective Leaders:

Triangulating Skin Conductance, Video-based Behavior Coding and Perceived Effectiveness

An earlier version of the methodological part of this chapter has been accepted and published as: Hoogeboom, A.M.G.M. & Wilderom, C.P.M. 2016. New Effective Leader-Behavior Insights through Combining Skin Conductance with Video-coded Field Behaviors. In A.J. Spink et al. (Eds.). *Measuring Behavior 2016*: 136-139. ISBN 978-1-873769-59-1.

An initial version of this chapter has been accepted and presented at the Academy of Management conference, Chicago, United States, August 10-14: Hoogeboom, A.M.G.M, Saeed, A. Noordzij, M.L., & Wilderom, C.P.M. (2018). *Physiological Arousal During Video-coded Leader Behaviors*.

Currently, the chapter is requested to be *revised for resubmission* at *Leadership Quarterly*.

ABSTRACT

With the aim of expanding the healthy physiological variability thesis to effective leadership, we tested the hypothesized links among leaders' within-person variability in physiological arousal, their task- and relations-oriented behaviors and their overall effectiveness. During regularly-held staff meetings, wristband skin sensors and video cameras captured synchronized physiological and behavioral data for 36 leaders. Perceived effectiveness ratings were obtained from their followers. Multi-level log-linear analyses showed a significantly greater likelihood of high levels of arousal within the highly effective leaders when displaying positive and negative relations-oriented behaviors, compared to the less effective leaders. Elevated levels of arousal were not seen during the task-oriented leader behaviors of either the highly effective or the less effective leaders. As hypothesized, we observed a physiological correlate of relations-oriented leader behavior; the most effective leaders showed relations-oriented behavior that matched their own arousal fluctuations. Research using a similar triangulation of methods is recommended.

INTRODUCTION

Much research in the field of leadership studies has focused on predicting leader effectiveness on the basis of leader behaviors. Recently, it has been argued that within-person physiological processes might contribute to leader effectiveness (e.g., Boyatzis, Passarelli, Koenig, Lowe, Mathew, Stoller, & Phillips, 2012; Damen, van Knippenberg, & van Knippenberg, 2008). Leaders' physiological arousal, for instance, may inform our understanding of effective leader interactions with followers (Akinola, 2010; Antonakis, Ashkanasy, & Dasborough, 2009; Boyatzis, Rochford, & Taylor, 2015). Despite the growing calls to conduct research at the intersection of human physiology and leadership (Arvey & Zhang, 2015; Boyatzis et al., 2012; Heaphy & Dutton, 2008; Zyphur, Narayanan, Koh, & Koh, 2009), to date, empirical studies have examined within-leader arousal and behavior separately. Joint investigations of physiological arousal and leader behaviors are likely to enhance our understanding of leader effectiveness. Examining how leaders' physiological arousal fluctuates during their own social behaviors and its association with leader effectiveness may thus add to our knowledge of possible explanations of leader effectiveness. Hence, in the present study we test whether a synchronized physiological/behavioral pattern may co-explain leader effectiveness.

In pursuing a joint test of leaders' within-person variability in physiological arousal and their social behaviors, one cannot bypass the so-called healthy variability thesis. This thesis offers a non-linear way of thinking about high fluctuation in arousal in humans (Navarro & Rueff-Lopes, 2015). Originating in the field of human physiology, "healthy

variability” holds that to be effective, fluctuation in one’s physiological system must be aligned with the fluctuation of cues induced by one’s social environment (Navarro & Rueff-Lopes, 2015). Navarro and Rueff-Lopes (2015) argued that organizational environments entail complex social situations in which a host of social cues must be processed at the same time. If a leader’s physiological arousal fluctuations are high, high performance is more likely to occur. A lack of physiological variability in arousal in a social setting is then an indicator of a leader’s lack of sensitivity to social cues. Navarro and Rueff-Lopes (2015, p. 537) call this “unhealthy stability.” The crux of the present study is not whether physiological variability in a leader’s arousal is either “healthy” or “unhealthy.” Rather, in order to broaden the range of explanations of leader effectiveness, we examine how leaders’ within-person variability in physiological arousal is associated with a range of social behaviors and whether a particular physiology-behavior pattern may be linked to leadership effectiveness. Thus, applying the healthy variability thesis to the leadership literature, an indicator of leader effectiveness might be when variation in leaders’ own physiological arousal is accompanied by variation in his or her own social behavior.

Electrodermal activity (EDA), most often approximated using skin conductance, is a peripheral physiological phenomenon with well-understood couplings to the central nervous system (Boucsein, 2012). EDA is considered to be the most sensitive physiological measure of emotional arousal (Lidberg & Wallin, 1981; Marci, Ham, Moran, & Orr, 2007; Picard, Fedor, & Ayzenberg, 2016). EDA is considered to be “the result of direct mediation by the sympathetic branch of the autonomic nervous system” (Marci et al., 2007, p. 104), especially during social interactions. This means that, unlike heart rate, EDA is not directly influenced by the parasympathetic nervous system. This is important, because neuro-hormonal influences from the parasympathetic nervous system can potentially confound other physiological variables, such as heart rate (Cacioppo & Tassinary, 2000). Thus, compared to other physiological measures, skin conductance best captures the intensity of emotions experienced during workplace interactions (Akinola, 2010; Figner & Murphy, 2011). EDA has also been used within the context of neuroscience. For instance, neuromarketing studies have approximated the emotional responses in the body during decision making (e.g., Bechara, Damasio, Damasio, & Lee, 1999; Gakhal & Senior, 2008). Only a handful of scholars in the field of Organizational Behavior (OB) have assumed an association between skin conductance levels and important behaviors at work (e.g., Ashkanasy, Becker, & Waldman, 2014; Bormann & Rowold, 2016).

Drawing upon the functional approach to leadership, a leader’s behavior typically ensures that all critical task- and relations-related functions are performed (Burke, Stagl, Goodwin, Salas, & Halpin, 2006; McGrath, 1962; Morgeson, DeRue, & Karam, 2010). Hence, one of the most well-known leader-behavioral categorizations distinguishes relations-oriented from task-oriented behaviors (Behrendt, Matz, & Göritz, 2017; Yukl, 2012). In

order to cover a broader range of real-life organizational behaviors, we also differentiated between positive vs. negative relations-oriented behavior (Meinecke, Kauffeld, & Lehmann-Willenbrock, 2017). Task-oriented and positive and negative relations-oriented leader behaviors fulfill essential leadership functions, especially during social interactions with followers. Due to their different functions, different physiological processes might accompany these three types of behaviors. Variability in physiological signals captures the bodily signals from the peripheral nervous system that reflect the so-called secondary emotions; the person who experiences such physiological fluctuations is not always conscious of these peripheral (positive or negative) emotions. These biomarkers of emotional experiences originate in the social environment (e.g., Bechara, Damasio, Tranel, & Damasio, 2005). As a reflection of that social environment, different within-person physiological variability might thus be associated with different behaviors. Physiological responses can thus be considered critical inferential elements that can reflect the diversity in workplace behaviors (Christopoulos, Uy, & Yap, 2016). As such, they “may help to elucidate how physiological processes can underpin and even modulate affective, cognitive, and motivational processes relevant to organizational settings” (Akinola, 2010, p. 204).

Building upon the theoretical accounts of healthy variability and functional leadership, we aim to advance our understanding of leadership effectiveness by answering the following research question: During social interactions with followers, how is the variability in the physiological arousal of leaders associated with their task-oriented and (positive and negative) relations-oriented behaviors and their leadership effectiveness? We combine unobtrusive measures of skin conductance to capture leaders’ within-person variation in physiological arousal with the simultaneous collection of time-stamped behavioral event data during staff meetings (e.g., Endedijk, Hoogeboom, Groenier, de Laat, & Van Sas, 2018). Such time-based field research enables an analysis of synchronization of leaders’ physiological and social behavioral events.

With this study, we contribute to the leadership literature in at least two ways. First, despite the wealth of research on the effects of task- and relations-oriented leader behaviors on leader effectiveness (DeRue, Nahrgang, Wellman, & Humprey, 2011; Judge, Piccolo, & Ilies, 2004), the question of how physiological arousal may accompany these well-known leader behaviors has remained unexplored. Capturing the physiological arousal of leaders when interacting with their followers can enhance our knowledge about how our biological system is associated with social workplace behaviors. Second, in this paper, we show how a reliable, time-stamped assessment of various social leader behaviors can serve to test the healthy variability thesis. With this test, we enhance our understanding of how within-leader arousal might be associated with high overall leader effectiveness. Thus, the potential association of within-person arousal variability with particular leader behaviors is likely to inform us about the social dynamics of effective leadership.

THEORETICAL FRAMEWORK

Healthy Variability in OB Research

Not many studies in the field of OB have investigated the healthy variability thesis (for a review, see Navarro & Rueff-Lopes, 2015). Yet, prior leadership and team research has been scarce regarding the dynamic nature of work motivation, team coordination and performance, showing that fluctuations do exist in these work-related variables (Arrieta, Navarro, & Vicente, 2008; Gorman, Amazeen, & Cooke, 2010; Guastello, Reiter, Shircel, Timm, Malon, & Fabisch, 2014). With regard to higher individual performance, Guastello et al. (2014) established that variability in performance (especially in moderate to high levels of performance) led to higher performance. Hence, instead of a static account of important workplace variables, which has prevailed in OB research to date (e.g., Baumeister, Vohs, & Funder, 2007), adopting a within-person variability perspective might enhance our understanding of the social dynamics of workplace behavior. Examining joint variability in such behavior and in physiology is especially important because in today's complex work environments, leaders must constantly adapt their behaviors to the exigencies of the changing situations in which they operate.

Skin Conductance as a Parameter of Physiological Arousal

How people respond (neuro)physiologically to stimuli has been examined with several methods and techniques, including, for instance, functional magnetic resonance imaging (fMRI) for scanning the brain, and electrocardiography (ECG) for measuring the heart's functioning. Some leadership studies have applied such cognitive neuroscience and physiological techniques, under the umbrella of what is now termed organizational cognitive neuroscience (Senior, Lee, & Butler, 2011; Lee, Senior, & Butler, 2012). The focus of such studies is on the biological or brain systems and how they are associated with cognition and behavior during social workplace interactions (see, e.g., Balthazard, Waldman, Thatcher, & Hannah, 2012; Spain & Harms, 2014). Skin conductance is a key physiological parameter of EDA. It is captured through variations in the eccrine sweat glands (present in all bodily parts, with the highest density in the palms and soles) in response to sweat secretion from the skin (e.g., Benedek & Kaernback, 2010). These changes in eccrine sweating or skin-conductance responses are interconnected with the sympathetic branch of the autonomic nervous system (SNS). The origins of eccrine sweating are tied to brain networks including the amygdala, the hippocampus, the hypothalamus, the brainstem and the prefrontal cortex. It has been shown that these brain areas (such as the amygdala and the prefrontal cortex) are tied to affective processes, and are implicated for skin conductance responses (SCRs) in relation to emotional stimuli, but not to SCRs related to

non-emotional stimuli such as taking a deep breath (Naqvi & Bechara, 2006; Tranel & Damasio, 1989, 1994). Furthermore, the SNS is responsible for producing neuronal and hormonal stress responses (e.g., the fight-or-flight response) and has been found to significantly impact emotional processes and people's motivation (Boucsein, 2012; Figner & Murphy, 2011). Changes in skin conductance has been found to be strongly associated with changes in human emotion (Pennebaker, Hughes, & O'Heeron, 1987). Hence, skin conductance is commonly used as an index of general and emotional arousal, attention and intensity of emotions (Akinola, 2010; Figner & Murphy, 2011).

The skin conductance signal provides information about the intensity of physiological arousal, but does not specify the psychological state (e.g., happiness or fear) associated with it (e.g., Akinola, 2010). Hence, one cannot draw inferences from the intensity of arousal about the exact emotional states being experienced (e.g., Boucsein, 2012; Larsen, Diener, & Lucas, 2002). When trying to better understand workplace processes, such as performance or learning, physiological intensity is seen as a crucial biomarker; in a leader development program, the highest amount of learning occurred during critical situations (i.e., when the highest physiological arousal occurred: during a public speaking and difficult conversation exercise; Waller, Reitz, Poole, Riddell, & Muir, 2017). Hence, higher physiological intensity (and not the emotional valence) was positively associated with long-term learning effects after leader development training. Other empirical work has established that experiencing higher levels of arousal is a more important predictor of recall and forgetting rates than the valence of these emotions (Talarico, LeBar, & Rubin, 2004); when participants were asked to recall an autobiographical event that varied in valence (i.e., positive or negative emotion) and intensity (i.e., low or high), intensity predicted significantly more variance in memory recall. These results could indicate that a person more strongly experiences those events. Hence, high physiological intensity or arousal might accompany the display of particularly sensitive leader behaviors.

Leader Behaviors

Because leader behaviors must “essentially be (1) task-oriented and (2) relations-oriented” (Behrendt et al., 2017, p. 233), we relied upon this classic distinction. This dichotomy has served as an important foundation for most well-known leader behavioral models such as the widely used transformational-transactional model (Bass, 1985) and the Ohio State consideration and initiating structure model (e.g., DeRue et al., 2011; Fleishman, 1973; Judge et al., 2004). However, these models have typically relied on surveys to assess these kinds of behaviors. These survey measures were created on the basis of perceptions from experts and others (Behrendt et al., 2017; Yukl, 2010). As a result, they do not necessarily reflect observable behaviors or specific behavioral events during interactions with followers. Hence, although we built upon the classical task- vs. relations-oriented

distinction, the specific behavioral observation scheme used in this study does not run entirely parallel to the behavioral dimensions found in most leader-behavioral studies.

In essence, task-oriented leader behavior refers to behaviors that promote the accomplishment of work tasks or mutual objectives in an efficient manner (Yukl, 2012; Yukl, Gordon & Taber, 2002). Typical components of such behaviors include: clarifying task objectives and role expectations, planning short-term activities, monitoring operational performance (Yukl et al., 2002) and problem solving (Yukl, 2012). Other actually observable task-oriented behavior entails initiating structure. Leader behaviors that initiate structure ensure that employees are well-informed about the work processes, and provide structure about their roles and direction about how to plan activities, thus promoting greater task productivity (Bass, 1990; DeRue et al., 2011). Actual observable task-oriented leader behavior during interaction with followers comprises sharing organizational information, guiding employees to ensure that they accomplish a particular number of tasks (i.e., directing) and enabling structure (Burke et al., 2006; Pearce et al., 2003; Sims & Manz, 1984). In addition, task-oriented leader behavior during interactions with followers (i.e., at the behavioral event level) includes monitoring work processes to ensure that goals are accomplished, providing negative feedback and corrective action if necessary. These types of task behaviors represent the observable part of transactional or management-by-exception behavior (DeRue et al., 2011; Ewen et al., 2013; Vecchio, Justin, & Pearce, 2008; Wang, Tsui, & Xin, 2011). Task-oriented leader behaviors also react to task behaviors that the leader does not wish to see among followers. A leader could then engage in corrective action or negative feedback type behavior (Bass & Avolio, 1995; Sommer, Howell, & Noonan-Hadley, 2016). Such task-related feedback often sets a norm or sharpens up future task behavior (Morgeson et al., 2010).

Another task-oriented behavior that is regularly displayed by leaders during interactions with followers is providing their own opinion or view about the task objective or requirements for adequately performing a task (Kauffeld & Lehmann-Willenbrock, 2012). In addition to these behaviors, creating consensus about task elements is considered to be an important task-oriented, problem-focused behavior as well (Kauffeld & Lehmann-Willenbrock, 2012): which can translate to agreeing or disagreeing about task directions or accomplishment. Hence, when a leader displays task-oriented behavior, clear performance expectations, information and standards are being communicated (including clarifying, planning, monitoring, and correcting) to ensure adequate goal accomplishment in regard to tasks (Behrendt et al., 2017).

Relations-oriented behavior is defined as showing concern for followers' needs, behaving respectfully towards them, providing support and showing appreciation (Bass & Bass, 2008; Keyton & Beck, 2009). The following behaviors are typically subsumed within

this category: behaviors that support and encourage the developing of follower skills and confidence, including recognition of achievements and empowering followers to take the initiative in problem solving in light of a particular vision (Yukl, 2012). Leaders who display relations-oriented behavior during interactions with followers might show behaviors of (individualized) consideration (i.e., expressing appreciation and support for followers, being concerned for followers and looking out for follower wellbeing: see Piccolo et al., 2012), as well as other transformational leader behaviors (such as inspiring followers to perform beyond expectations by intellectually stimulating them, providing inspirational motivation through giving positive feedback and articulating a vision through idealized influence behavior: Bass & Avolio, 1995). In addition, especially in the context of leader-follower interactions at work, humor and building cooperative relationships, based on a shared vision, including the sharing of personal information, might act as catalyzers for the quality of human relations (Lehmann-Willenbrock & Allen, 2014; Yukl, 2012).

Whereas the above relations-oriented behaviors are all positive types of behaviors, the current leadership and leader communication literature differentiates positive from negative relations-oriented behaviors (Meinecke et al., 2017). Hence, an important kind of behavior that might be observable and influential during interactions with followers is negative relations-oriented behavior (Meinecke et al., 2017). This category of leader behavior reflects antisocial behaviors or those that are not conducive to high performance (Dalal, 2005). More extreme forms of this type of behavior have been discussed in the literature, such as destructive leadership (behavior that disturbs followers: Einarsen, Aasland, & Skogstad, 2007) or abusive supervision (nonphysical aggression by leaders aimed at their followers: Tepper, Henle, Lambert, Giacalone, & Duffy, 2008). These latter, less desirable leader behaviors typically include intense forms including belittling, loud outbursts, malice or tyranny. The present video-observational field study includes coding for three relative mild forms of antisocial leader behavior during interactions with followers that are also included in other classifications (Meinecke et al., 2017): showing disinterest, defending one's own position and interrupting. These three kinds of behavior (disinterest, defensiveness and disruptiveness) are labeled here as negative relations-oriented leader behavior at the (mutually exclusive) behavioral-event level. Together, they cover the milder forms of counterproductive behavior (Penney & Spector, 2005). Thus, observable, mutually exclusive positive and negative relations-oriented and task-oriented leader behaviors are examined here in conjunction with physiological arousal. Below, the potential associations between these three categories of leader behaviors, physiological arousal and effectiveness are delineated.

Physiological Arousal and Positive Relations-oriented Leader Behavior

Heaphy and Dutton (2008) argued that, especially during positive social interactions, beneficial physiological processes can enhance human capital (e.g., health or work

recovery). They suggested that when employees experience more positive social workplace interactions, their physiological resourcefulness (i.e., healthy heart rate and blood pressure at and after work) leads to higher levels of physical health. Although their review only linked positive social interactions with enduring physiological effects, we might infer from their ideas that, when showing positive leader behavior (such as providing individualized consideration and giving positive feedback), activation of physiological markers accompanies this behavior. In other words, their review made it plausible to assume an association between positive workplace interactions and the physiological effects on the workers, including the organizational leaders. Prior work in the field of emotions has also found that positive emotions, which usually accompany positive relations-oriented behavior, can be associated with high physiological arousal. For example, studies that related various facial expressions or emotional movie segments to subjects' arousal levels found the largest physiological reactions when positive expressions or happy film scenes were shown (Golland, Keissar, & Levit-Binnun, 2014; Vrana & Gross, 2004). Furthermore, when evaluating positive emotional pronoun-noun phrases (e.g., "my happiness") on a computer, people were more aroused than when evaluating neutral or other-related pronoun-noun sentences (e.g., "his happiness") (Weis & Herbert, 2017). This means that positive words related to the self may fuel the highest physiological response. Experiencing or being exposed to positive events or expressions may thus elicit human physiological reactions. Building upon these ideas, a leader who displays positive relations-oriented behavior might show higher levels of physiological arousal, because of the positive emotions underlying this overt behavior. Damen and colleagues (2008) argued, along these lines, that the leader's high physiological arousal, coupled with positive affect, leads to attributions of leader charisma and effectiveness. Hence, if leaders often pair higher physiological arousal with verbal positive relations-oriented behavior, not only would this increased physiological arousal during positive relations-oriented leader behavior be expected, but also higher leader effectiveness.

Related studies that used brain scanning techniques such as quantitative electroencephalography (qEEG) have reached similar insights. When a leader was perceived as transformational, and thus as showing more positive relations-oriented behavior, different regions of the leaders' brain were activated (Balthazard et al., 2012). This evidence suggests that transformational leaders can be differentiated from non-transformational leaders on the basis of stronger activation patterns in the pre-frontal and frontal lobes. On the basis of right frontal coherence, Waldman, Balthazard, and Peterson (2011) were able to differentiate highly inspirational and charismatic leaders from their less inspirational and charismatic counterparts. These studies showed that when different neurological regions were activated in the leaders, they were considered to be transformational. Ample evidence exists about the association between this leadership style and leader effectiveness. The above offers some

grounds for suggesting that other physiological processes, such as high physiological arousal, might also be activated when positive relations-oriented behavior is displayed.

Physiological Arousal and Negative Relations-oriented Leader Behavior

When psychological threats are encountered in social interactions, distinct patterns of cardiovascular responses are elicited, such as the amount of blood pumped from the heart (Blascovich & Tomaka, 1996). When individuals perceive threats during social interactions with others, higher levels of physiological arousal can be observed (van Prooijen, Ellemers, van der Lee, & Scheepers, 2018). Because of perceived threat, showing negative relations-oriented behavior when interacting with followers, in the form of, for instance, protecting one's own position, is likely to activate higher arousal (Scheepers, 2009; Scheepers & Ellemers, 2005). Hence, feelings associated with leader-status threats could trigger higher levels of physiological arousal. Related empirical work has established that anger is accompanied by higher physiological arousal (Berkowitz, 1990). Negative stimuli, such as pictures of negative facial affect, have been shown to lead to enhanced skin conductance responses (Vrana & Gross, 2004). Even when participants in a study were asked to regulate their emotions during the display of negative and neutral pictures (i.e., downregulating their emotional responses by distraction or reappraisal), their skin conductance did not decrease as a result (Kinner et al., 2017). This means that when a certain emotion is felt, for example, during or right before negative relations-oriented leader behavior, it is difficult to 'manipulate' the physiological responses. Another study found that when people felt anxiety (when playing a video game), higher arousal was elicited (Ravaja, Turpeinen, Saari, Puttonen, & Keltikangas-Järvinen, 2008). One might argue, therefore, that a leader who displays negative relations-oriented behavior is experiencing higher levels of anger or anxiety, which are likely to be accompanied by higher physiological arousal.

Physiological Arousal and Task-oriented Leader Behavior

Compared to positive and negative relations-oriented behavior, which can be considered as highly arousing or activating states, task-oriented behavior can be seen as much more neutral. This is in line with the finding that people respond more neutrally (captured by facial electromyographic activity) to neutral behavioral expressions shown in pictures (Dimberg, Thunberg, & Elmehed, 2000). Weis and Hebert (2017) extended the idea that spoken language and emotional activation are strongly intertwined (i.e., the so-called embodiment thesis of language, which indicates that language can cause emotional processes in the body and brain). They assessed physiological activation during positive, negative and neutral word-pairs that were displayed on a computer screen. Participants showed lower physiological responses (i.e., heart rate and skin conductance) when neutral word pairs (e.g., "no book") were processed. The results fit well with previous findings and

assumptions about increased physiological responses (including skin conductance) that are typically evoked by positive or negative type behavioral or emotional stimuli and not by neutral events, words or stimuli. Christopoulos et al. (2016) argued that for more resilient performers, physiological elevation quickly returns to the baseline when a decidedly positive or negative stimulus is no longer presented. This assumption is in line with the key assumptions underlying the healthy variability proposition that physiological responses fluctuate in social contexts. Hence, one may expect higher arousal levels during positive as well as negative relations-oriented leader behavior, and lower levels of activation or arousal during decidedly task-oriented leader behavior. Because this would entail more fluctuations in arousal when leaders shift between task- and relations-oriented behavior, we expect that, in line with the healthy variability thesis, the highly effective leaders would especially match their physiological arousal to their own verbal display of positive and negative relations-oriented behavior (i.e., matching the dynamics of the environment).

Hypothesis: Whereas low physiological arousal accompanies task-oriented leader behavior and is not associated with higher overall leader effectiveness, the co-occurrence of high physiological arousal and relations-oriented leader behavior is associated with higher overall leader effectiveness.

METHODS

Study Design

The present field study tests the relationship between physiological arousal, video-coded leader behavior during regular staff meetings and follower ratings of leader effectiveness. A multimethod design was adopted which included three different sources of data: (1) the Empatica E4 wristband to capture physiological arousal of the leader, (2) video coding of leader behavior, and (3) follower surveys to assess the leaders' effectiveness. The data were collected in a large public-sector organization in the Netherlands, in three of their four divisions. The study was approved by both the ethical review board of the university and by the workers' council of the participating organization.

Participants

A total of 101 leaders were randomly selected through stratified random sampling. After selection of these participants, they were invited to information sessions in which the design of the study and requirements were explained in detail. The teams they led either processed financial-administrative data or were in charge of creating and/or facilitating the ICT infrastructure to increase organizational efficiency. On average, the leaders were 51.9 years old ($SD = 7.5$), had been employed in the organization for 25.1 years ($SD = 13.8$) and

had worked with their team for 2.1 years ($SD = 1.5$); 60% were male. The average team was comprised of 12 followers ($SD = 5.7$).

In the 12-month data-collection part of this study, one regular staff meeting, chaired by each of the participating leaders, was video-recorded. In those periodic staff meetings, which took place once or twice a month, work-related topics and progress were discussed. As was the custom in this and many other organizations, most teams in the study met periodically, on average once per month. Most of the leaders' followers, who worked together on the completion of the team's tasks, had to be present. Moreover, the video-recorded meeting had to be a randomly selected regularly held meeting that would have been held even had the video-recording apparatus not been installed in their regular meeting room. Directly after each recorded meeting, each attending follower was asked to complete a survey that included ratings of overall leader effectiveness. The duration of the recorded meetings ranged from 42.2 to 191.2 minutes ($M = 89.3$, $SD = 37.8$).

Measures

Leader effectiveness. Leader effectiveness was measured using follower perceptions. They were assessed with the four leader effectiveness items of the Multifactor Leadership Questionnaire (MLQ: 5X-Short package; Bass & Avolio, 1995). A sample item is: "This leader is effective in meeting organizational requirements." A Likert scale from 1 (strongly disagree) to 7 (strongly agree) was used. Cronbach's alpha showed good internal reliability: $\alpha = .90$. ICC's and R_{wg} 's were calculated to obtain information about the within-group agreement and group reliability of the scores (i.e., indexing group-level dispersion or diversity in the scores; Newman & Sin, 2009). ICC1 was .22 ($p < .01$) and ICC2 was .85 ($p < .01$). Within-group agreement (mean $R_{wg} = .81$; min $R_{wg} = .61$; max $R_{wg} = .98$) also indicated that the followers agreed about the relative effectiveness of their team leader (Lance, Butts, & Michels, 2006; LeBreton & Senter, 2008). Two groups of leaders were formed on the basis of a median split (5.71 on a scale of 1-7): highly effective leaders ($n = 18$) vs. less effective leaders ($n = 18$).

Physiological arousal. Each leader's skin conductance was assessed during the entire randomly selected regular staff meeting, as a continuous physiological measure, using a special wristband biosensor. This small, unobtrusive wristband allows for the precise capturing of human physiological data. Physiological data from sensors is more objective as compared with self-reports (Blascovich, Mendes, & Seery, 2002; Cacioppo, Tassinari, & Berntson, 2016). Before the meeting started, the biosensor from Empatica (the E4, which uses 8 mm, silver-plated electrodes) was secured around the leader's non-dominant wrist by one of the field researchers. Although previous research has indicated that EDA can be assessed more reliably and validly on the hairless palm of the hand or sole of the foot

(Boucsein et al., 2012; van Lier et al., 2017), we chose to use the E4 because of its low obtrusiveness in professional work settings. However, due to technical data-collection issues, valid EDA measurements were not obtained from all of the leaders. Physiological data measured with sensors in field settings tend to be precarious (Sano et al., 2018); in our study, we also encountered many problems where sensors broke down or problems occurred with sensor hardware functionality. Due to these issues, sometimes the leaders' physiological arousal was not recorded at all, or only 'snippets' of the meeting were captured. Due to these malfunctions, valid EDA data were obtained from only 46 of the 101 leaders.

The software program 'Empatica Manager' uploaded and stored the EDA data for each participating leader. These data were put in an Excel sheet that included 4 data points per second (i.e., 4Hz). The most important phasic and tonic parameters can be derived from these raw data: Skin Conductance Responses (SCRs, i.e., the number of peaks for certain periods of time: short-term changes in phasic skin conductance activity), Amplitude (i.e., the amplitude of each SCR, with a minimum of 0.03 micro Siemens: μS) and Skin Conductance Level (i.e., SCL: the slowly varying tonic skin conductance activity).

In terms of preprocessing the EDA data, trough-to-peak analysis was conducted with Ledalab, an extension of Matlab, to arrive at the number of SCRs per minute. In addition, the SCL was calculated using Continuous Decomposition Analysis. This type of analysis reduces over-estimation of the SCL by excluding the SCRs from the average SCL (Benedek & Kaernbach, 2010); the Benedek and Kaernback (2010) formula was used to derive a precise measure of SCL.

The EDA data were manually examined for each participant. Two of the authors independently checked the data for artifacts and non-responsiveness (i.e., flat lines). On that basis, one nonresponsive participant was excluded from the sample, resulting in 45 participants.²

Leader behavior. Regular staff meetings were video-taped to assess leaders' behavior during actual interaction with their team members. Such meetings are seen as a critical work context (Allen, Yoerger, Lehmann-Willenbrock, & Jones, 2015; Baran, Shanock, Rogelberg, & Scott, 2012; Hoogeboom & Wilderom, 2015; Lehmann-Willenbrock, Meinecke, Rowold, & Kauffeld, 2015). In staff meetings, social interaction patterns occur between leaders and followers (Heaphy & Dutton, 2008). We also checked in the survey whether the teams found the meeting to be representative compared to non-videotaped meetings, measured on a Likert scale from 1 to 7 ($M = 5.5$, $SD = 1.4$), whether the leader's

² When we inspected this data visually, the descriptive plots for each participant, as well as the data overall, showed that leaders were physiologically responsive during regular staff meetings with their followers. This strengthens earlier ideas in the literature that these meetings are good contexts for examining workplace interactions between leaders and followers (e.g., Allen et al., 2015; Baran et al., 2012; Hoogeboom & Wilderom, 2015; Lehmann-Willenbrock et al., 2015).

behavior was representative of the behavior he or she normally displays ($M = 5.7, SD = 1.2$) and whether the team's behavior was similar to that in non-videotaped meetings ($M = 5.9, SD = 1.1$). On the basis of an earlier validated 15-page codebook (Hoogeboom & Wilderom, 2019a), 19 mutually exclusive behaviors were systematically coded using specialized software ("The Observer XT," Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000; Spiers, 2004). Based on previous research (Bass & Avolio, 1995; Behrendt et al., 2017; DeRue et al., 2011; Yukl, 2010), these 19 micro-behaviors can be grouped into 3 meta-categories of behavior (Table 1): task-oriented, positive relations-oriented and negative relations-oriented behavior. In addition, the behavioral code 'listening' was assigned when a leader did not display verbal behavior but was attentive to what followers were saying.

In order to systematically and reliably code each leader's micro behaviors, students with a background in either Business Administration, Psychology or Communication studies were selected. Before coding the videos, the students received extensive training, especially in how to properly use the codebook and the video-coding software (Behrendt et al., 2017). Each video was coded in its entirety by 2 independent coders. They had to code the same behavior as occurring within a 2-second time frame. Coding similar behaviors outside the 2-second time window would result in a disagreement. Overall, an inter-rater reliability of 94.35 was established ($Kappa = .93$), which is considered to be a good level of agreement (Landis & Koch, 1977). The means of the behavior scores (i.e., frequencies) from the two coders were used as input for the statistical analyses.

Controls. Variables that were expected to have a strong influence on the display of arousal were controlled for in the analyses. Women are often assumed to have different physiological reactions towards emotional stimuli, compared to men (Poláčková Šolcová & Lačev, 2017). On the basis of social expectations for men and woman, one might expect that females in general show more positive emotions (Fabes & Martin, 1991) and might also show higher arousal during emotion-laden behavior, such as positive or negative relations-oriented behavior. Age can also result in variations in physiological arousal, because of changes in skin thickness, skin elasticity, the number of active eccrine sweat glands and the sweat quantity per gland (Boucsein, 2012). In addition, meeting duration was included as a control variable, because habituation in physiological responses is a physiological mechanism likely to occur during any psychophysiological study (Boucsein, 2012; Figner & Murphy, 2011).

Analysis Plan

The data analysis and synchronization of the EDA and video-coded behavioral data occurred in three phases. In the first phase, the video-coded behaviors were synchronized on a mutual timeline with the EDA data. In the second phase, a Machine Learning (ML) model was used to distinguish low vs. high arousal moments. In the third phase, the associations between arousal, behaviors and leader effectiveness were examined using multi-level log-linear modeling.

Table 1

Definitions and Examples of Video-coded Behaviors

Coded behavior	Definition	Example from the video
1 Providing negative feedback	Task Criticizing the behavior or actions of other team members	"I do not think that this is a good solution" "In August I sent an email with amendments, and I find it regrettable that at least half of the attendees does not know the content of this e-mail" "How is the project progressing" "Do you also have a specific role in that process, since there might be possibilities for a follow-up project"
2 Task monitoring	Task Asking team members for clarification and confirmation about (the progress on) their tasks	"Yes, but that is the wrong decision" "Now you are talking about a failure fine, however this is a different type of fine"
3 Correcting	Task Imposing disciplinary action; Presenting team members with a "fait accompli"	"John, I'd like you to take care of that"
4 Directing	Task Dividing tasks among team members (without enforcing them); Determining the current direction	"Jack, I want you to ..."
5 Informing	Task Giving factual information	"The budget for this project is..." "The sick-leave figure is relatively low"
6 Structuring	Task Structuring the meetings; Changing the topic; Shifting towards the next agenda point	"We will end this meeting at 2 pm"
7 Giving own opinion/voice	Task Giving one's own opinion about what course of action needs to be followed for the organization, department or the team	"Maybe, we need to discuss this point after you are finished"
8 Agreeing on task-related matters	Task Agreeing with something; Consenting to something	"We already discussed this, let's talk especially about how we can avoid these things in the future" "In my opinion, we should..."
9 Disagreeing on task-related matters	Task Contradicting team members	"This also reflects how I personally think about the matter" "Yes, I agree with you" "That is not correct"
10 Individualized consideration	Positive relations Paying attention to each individual's need for achievement and growth by acting as a coach or mentor and creating a supportive climate	"I have to disagree with you on this point"
11 Intellectual stimulation	Positive relations Asking for ideas, stimulating team members to critically think about tasks, opportunities and so on, including the questioning of assumptions;	"We offer a training course in August, which might be helpful for your career planning" "You can make a note of that request, I am willing to help you with it" "Yes, if you have any ideas put them together and discuss it with me or Jan" "We will discuss how we can reduce this number together"
12 Idealized influence behavior	Positive relations Thinking about old situations in new ways Talking about an important collective sense of vision; Talking about important values and beliefs	"I find it important that we all work in unison towards this shared objective" "Until Vision 2020 is more clearly specified we will be operating under these standards; It is important to follow this agreed line"
13 Providing positive feedback	Positive relations Positively evaluating and rewarding the behavior and actions of team members	"How you approach the project is much better than 3 months ago" "I am delighted to see that you did not passively wait, but rather pro-actively came with a proposal"
14 Humor	Positive relations Making jokes or funny statements	Often jokes are made within the context of the interaction. When 3 or more members laugh the code 'humor' is assigned
15 Giving personal information	Positive relations Sharing personal information (e.g., about the family situation)	"We had a lovely holiday"
16 Showing disinterest	Negative relations Not taking any action (when expected)	"My mother is doing better now, thank you" Not listening actively
17 Defending one's own position	Negative relations Emphasizing one's leadership position; Emphasizing self-importance	"I am the manager within this organization" "We do it my way, because I am the manager"
18 Interrupting	Negative relations Interfering or disturbing when other team members are talking	Disrupting other team members when they did not finish their sentence
19 Listening	Listening Active listening	Nodding, paraphrasing

Synchronizing EDA Measures and Leader Behavioral Coding

In order to answer our research question, the physiological recordings and the leaders' video-coded behaviors had to be synchronized. Synchronization of the EDA measures and behavioral coding was done on the basis of the internal clocks in both the EDA and video recording devices, using customized Python and Matlab code. The internal clock time in the Empatica E4 device is represented in Unix time (i.e., seconds from 1-1-1970 in Coordinated Universal Time: UTC). Unix time was converted to UTC. In addition, to ensure precise synchronization, an event marker had been placed in front of the camera by the field researcher. At the start of each meeting, the field researcher has placed an event marker in front of the camera. The time of this marker was reflected in Unix time. Because the video recording device provides a time stamp at the start of each video recording, the number of seconds between the start of each recording and the event marker was calculated. We found the clock times of the Empatica E4 biosensor and those of the video recordings as equivalent. Using customized Python code, we then synchronized the video-coded behavior with arousal.

Although several scholars have shown an average delay of 0.8 to 3.0 seconds between a stimulus and an event-related SCR response (e.g., Dawson, Schell, & Filion, 2007; Weis & Herbert, 2017), we chose not to control for this time window in the data. Because we chose to associate the SCR's with onset and termination of broad categories of behavior (positive and negative relations- and task-oriented) without claiming SCR specificity, and because we are relying on a large number of data points (i.e., 20,394), the effect of correcting for this small time window would have resulted in negligible differences.

Machine Learning to Assess High vs. Low Arousal

Matlab and Python software were used to develop a ML model. We developed a ML classifier for binary arousal detection using the most important EDA parameters: SCR, SCL and amplitude of SCRs (see also Sano et al., 2018, for the application of Machine Learning in classifying high and low arousal on the basis of physiological data). The Random Forest (RF) model (i.e., an ensemble of decision trees) was trained with 25 estimators and evaluated using the Leave-One-participant-Out Cross-Validation (LOOCV) procedure for cross-validation. Performance was evaluated by calculating accuracy and Kappa values for each participant in the dataset.

Ground-truth generation (high and low arousal labels). We defined the ground-truth generation scheme (i.e., supervised ML methods such as RF require labeled training data to

learn to differentiate between various categories) for high arousal³ as well as low arousal, based on the mean and standard deviation of the SCL parameter (or attribute) in the dataset. Below, s represents the stress label; m and std denote the mean and standard deviation of a SCL, respectively, and x is the mean SCL of an instance (or dataset row). Then high arousal and moderate-to-low arousal labels are specified as follows:

$$s = \begin{cases} \text{no stress (0), if } x < m - std \\ \text{stress (1), if } x > m + std \end{cases} \rightarrow (1)$$

An additional 9 participants were discarded because of not having a ground-truth for training the ML model, resulting in a total sample size of 36. The ML models can be evaluated in several different ways, depending on how the problem is specified. Some widely used methods are: stratified cross-validation and randomly splitting data into a training, validation and testing set (e.g., Flach, 2012). We used the so-called LOOCV. With this method, the ML model is trained with all data except the data of one participant. Subsequently, the model is tested against the left-out participant's data. This process is repeated for every participant and the performance metrics are calculated on the validation set. Compared to standard K-fold validation (i.e., randomly splitting the data into training and testing folds), LOOCV reflects model performance better because, during each training cycle, the classifier does not learn from the data of the 'left-out' participant. The model's performance (such as accuracy) on 'left-out' participants is used to validate the model and averaged to get the overall model performance.

Evaluation metrics. We evaluated the classifier's performance by using two widely-used metrics, namely accuracy and Cohen's kappa. Brief descriptions of both metrics are given below.

Accuracy is expressed as the ratio of the number of correct (or actual) true labels out of all the predictions made by the classifier. Accuracy is the most widely used metric for evaluating the classification performance of ML models (e.g., Flach, 2012). However, it is sometimes also misused and is only suitable when the number of cases in each class in the dataset are equal or when the dataset is balanced (i.e., when each case has an approximately equal representation). It can be calculated as follows:

$$\text{Accuracy} = \frac{\text{Total correct predictions by the classifier}}{\text{Total number of observations}}$$

³ It should be noted that in this specific workplace setting, only moderately high levels of arousal are to be expected (see also, e.g., Coughlin, Reimer, & Mehler, 2009, who visualize how arousal is associated with performance).

Cohen's kappa is a measure of overall agreement between two raters. It classifies items into a given set of k categories. The formula for kappa is given below, where p_{ii} is the proportion of examples that both raters classify into category i . p_{i+} is the proportion of examples that rater A assigns to category i and p_{+i} is the proportion assigned to category i by rater B. The denominator is then used as a normalizing factor to make the kappa value (K) equal to 1. A kappa statistic can have a minimum value of -1, in case of complete disagreement, and a maximum of 1, for perfect agreement.

$$K = \frac{\sum p_{ii} - \sum p_{+i} * p_{i+}}{1 - \sum p_{+i} * p_{i+}} \rightarrow (2)$$

Random forest. RF is an ensemble learning algorithm that generates multiple decision trees, which allows for precise classification of physiological data. The ensemble is a 'divide and conquer technique' that is used to improve the performance of the classification system. The key idea behind this method is that, together, a group of weak learners can produce a strong learner (e.g., Flach, 2012). RF generates many different decision trees. Each decision tree gives a classification or 'tree vote' for the particular class; on the basis of this, the algorithm then selects the classification with the most votes. In contrast to traditional decision trees, which are more likely to suffer from high variance or bias, RF uses the average to find the natural balance between the two extremes. For a detailed description of the RF algorithm, see Breiman (2001).

The ML model generated a mean Cohen's kappa of .38 for all participants (mean Accuracy = .73). According to Landis and Koch (1977, p. 165), this could be termed as "fair agreement." Similar ML studies have found comparable kappas and accuracy. The kappa for each participant provides information about how well the ML model can predict high and low arousal for that specific participant. To enhance the robustness of the findings, we used the results of the final sample ($n = 36$) and checked if similar results were obtained when using a subsample of participants ($n = 15$), with "almost perfect" kappas.

Multi-level Log-linear Modeling to Test the Hypothesis

To examine the associations between leader arousal, behavior and effectiveness, multi-level log-linear modeling was employed using the open source platform R, while controlling for gender, age and meeting duration. Because the behavioral events are nested at the individual leader level, a multi-level three-way log-linear model was used. Assumptions were checked before conducting the analyses. The residuals were normally distributed and the variance was homogenous across the fitted data. To ensure that the multilevel random-

effects model is tenable, a Hausman Test was employed (Antonakis, Bendahan, Jacquart, & Lalive, 2010; McNeish & Kelley, 2018). This test (Hausman, 1978) checks whether the estimator is consistent. The Hausman statistic provides information about the chi-square value (Antonakis et al., 2010; Hausman, 1978). The non-significant chi-square result ($\chi^2 = 7.67$, $df = 6$, $p = 0.26$) shows a lack of endogeneity, which supports the use of a log linear multi-level model; including group means as level-2 predictors (i.e., following the Mundlak procedure: Antonakis et al., 2010) was therefore not required as a correction of endogeneity issues. In the next section, we will report the estimates of the multi-level log-linear model used.

RESULTS

Table 2 depicts both the probabilities and absolute counts of the leaders' behaviors in relation to leaders' arousal, for both the highly and less effective leaders. This table provides information about the associations among the three constructs. The probabilities are row-conditional and show that the highly effective leaders displayed higher arousal during both positive relations-oriented ($\chi^2(1) = 13.50$, $p < .001$) and negative relations-oriented behavior ($\chi^2(1) = 13.54$, $p < .001$).⁴ The results indicate that during positive relations-oriented behavior high arousal was exhibited: 32% of the time by the highly effective leaders versus 21% by the less effective leaders. This significant difference is even more apparent with negative relations-oriented behavior, where high arousal was shown 43% of the time by highly effective leaders versus 12% of the time by less effective leaders. Hence, highly effective leaders are more likely to display higher arousal when they display positive relations-oriented or negative relations-oriented behavior. Overall, the results also indicate that the highly effective leaders more frequently displayed positive relations-oriented behavior and less often negative relations-oriented behavior, as compared with the less effective leaders. In addition, Table 2 shows that during the display of listening and task-oriented behavior, both highly and less effective leaders were physiologically less aroused (i.e., higher percentages of low physiological arousal). Table 3 presents the means, standard deviations and intercorrelations between the studied variables. A significant negative association between physiological arousal and meeting duration ($r = -.38$, $p < .05$) shows that when the meetings lasted longer, fewer moments of high arousal were noticeable.

⁴ Similar results were obtained for positive relations-oriented behavior ($\chi^2(1) = 7.60$, $p < .01$) in a subset of the data ($n = 15$).

Table 2

Parameter Estimates for the Selected Log-linear Model: Leader Arousal Proportions per Behavior and Leader Effectiveness

Behavior	Leader effectiveness	Physiological Arousal			
		Low arousal		High arousal	
Listening	Highly effective	.79	(1436)	.21	(378)
	Less effective	.79	(1189)	.21	(319)
Task-oriented	Highly effective	.80	(2116)	.20	(517)
	Less effective	.79	(1675)	.21	(436)
Positive relations-oriented ^a	Highly effective	.69	(406)	.32	(187)
	Less effective	.79	(320)	.21	(85)
Negative relations-oriented ^a	Highly effective	.57	(26)	.43	(20)
	Less effective	.88	(56)	.12	(8)

Note. Table entries are row-conditional; the sum is 1.0 across rows. Frequency counts are shown between parentheses. The two groups of leaders were formed on the basis of a median split: highly effective leaders ($n = 18$) vs. less effective leaders ($n = 18$). ^aSignificant difference between the probabilities of high/low arousal for highly effective and less effective leaders for the behavioral group on the basis of a chi-square test (2-tailed).

Table 3

Means, Standard Deviations and Intercorrelations of Study Variables

	<i>M</i>	<i>SD</i>	1	2	3	4
1. Physiological Arousal	.25	.17	-			
2. Leader effectiveness	1.53	.51	.02	-		
3. Gender	1.25	.44	-.16	-.14	-	
4. Age	52.61	6.85	-.06	.15	-.47**	-
5. Meeting duration	92.10	35.94	-.38*	-.18	-.08	.19

Note. $n = 36$. Physiological arousal was classified as 0 (low arousal) and 1 (high arousal). Leader effectiveness was classified as 1 (highly effective) and 2 (less effective). Gender was coded 1 (male) and 2 (female). Meeting duration was measured in minutes. * $p < .05$ (2-tailed). ** $p < .01$ (2-tailed).

The results from Table 2 are further substantiated with the results from the multi-level log linear regression model, which are presented in Table 4. Higher levels of arousal were shown during positive relations-oriented behavior by the highly effective leaders ($\gamma = -.58$, $p < .01$). When displaying negative relations-oriented behavior, highly effective leaders were also more aroused compared to less effective leaders ($\gamma = -1.53$, $p < .01$).⁶ This result

⁵ Although median splits have been heavily criticized, as they increase the chance of producing Type I errors and reduce statistical power (e.g., McClelland, Lynch, Irwin, Spiller, & Fitzsimons, 2015), use of a median split in our data is not likely to result in such an error, as it did not suffer from multicollinearity.

⁶ Again, similar results were obtained when only using individuals with high kappa's. In that subsample, the highly effective leaders were more aroused when displaying both positive relations-oriented behavior ($\gamma = -.56$, $p < .05$) and counterproductive behavior.

supports the hypothesis that highly effective leaders display higher levels of physiological arousal during positive and negative relations-oriented behavior without such physiological-behavioral association being established for task-oriented leader behaviors.

Table 4

Multi-level Log-linear Results of Regression of Leader Behavior and Effectiveness on Physiological Arousal

Parameter	Physiological Arousal		
	γ	SE	CI
Intercept	-.26 ***	1.05	(-2.317 to 1.806)
Gender	-.44	.24	(-.901 to .029)
Age	.00	.02	(-.029 to .034)
Meeting duration	-.01 *	.00	(-.011 to -.000)
Leader effectiveness	-.01	.21	(-.401 to .405)
Task-oriented behavior	-.14	.18	(-.496 to .225)
Positive relations-oriented behavior	1.20 ***	.27	(.668 to 1.734)
Negative relations-oriented behavior	2.49 **	.79	(.951 to 4.035)
Leader effectiveness * Task-oriented behavior	.07	.12	(-.169 to .308)
Leader effectiveness * Positive relations-oriented behavior	-.58 **	.19	(-.944 to -.214)
Leader effectiveness * Negative relations-oriented behavior	-1.53 **	.54	(-2.586 to -.486)

Note. $n = 36$. CI = Confidence Interval (95%; shown in parentheses). * $p < .05$ (2-tailed). ** $p < .01$ (2-tailed).

DISCUSSION

With this field study, we tested a novel hypothesis at the intersection of research on human physiology and leadership. Despite the complexity of coupling fine-grained leader behaviors with skin conductance data (e.g., Arvey & Zhang, 2015), we showed how arousal in the sympathetic branch of the autonomic nervous system may accompany three categories of leader micro-behaviors. Specifically, for the most effective leaders, higher physiological arousal was found when they relayed verbal messages of a positive and negative relations-oriented nature to their followers. Leaders' task-oriented behaviors were accompanied by significantly lower physiological arousal and without a significant association with overall leader effectiveness. In other words, only the highly effective leaders exhibited a pattern of higher physiological arousal accompanied by either positive or negative relations-oriented behaviors. Thus, among a group of organizational leaders in action, we offer evidence of the healthy variability thesis: only the most effective leaders showed significantly stronger fluctuations in their physiological arousal when they engaged in relations-oriented behavior.

Theoretical Implications

The results have at least three theoretical implications. First, they advance prior research that has assumed biological correlates of prototypical leader behaviors (e.g., Senior et al.,

2011). We provide evidence that task-oriented leader behaviors vis-à-vis followers are accompanied by relatively low levels of arousal. Significantly higher levels of arousal accompany both positive and negative relations-oriented leader behaviors. Hence, bridging the fields of leadership studies and physiology can indeed inform us about the biological correlates of important organizational leader behaviors (Akinola, 2010). The results uncover not only that emotional responses are reflected in the autonomous nervous system (e.g., Golland et al., 2014), but also that they occur with organizationally relevant, actually observable behaviors that fulfill different functions (Morgeson et al., 2010). By demonstrating that leaders are significantly more aroused when displaying positive and negative relations-oriented behavior compared to their arousal level during task-oriented micro-behaviors, we add a physiological marker to a distinct functional set of key leader behaviors. Our results underpin the idea that task- and relations-oriented leader behaviors can be separated on the basis of their different functions (Behrendt et al., 2017); lower levels of arousal accompany the behaviors aimed at ensuring task accomplishment and efficiency, whereas different physiological processes seem to be triggered by relations-oriented behaviors aimed at supporting the social climate. Thus, our findings offer support for the idea that the task/relations distinction, which has been prevalent in leadership research for many decades, can be gainfully extended to the level of physiological arousal. Even though there is some debate on the usefulness and content of this behavioral distinction (Keyton & Beck, 2009; Watzlawick, Beavin, & Jackson, 1967), our results offer support for more physiological study in leadership research of this bifurcation (Behrendt et al., 2017).

Second, in addition to finding a different physiological association for the two sets of behaviors, we uncovered a specific physiological relationship with overall leader effectiveness. When the highly effective leaders engaged in relations-oriented behavior they were especially likely to show higher levels of physiological arousal, presumably to offer relational clarity. This finding advances the literature on transformational leadership. The latter style, in particular, is considered to reflect relations-oriented behavior (DeRue et al., 2011). Although much empirical work has established strong associations of relations-oriented and transformational behavior with leader effectiveness (for meta-analytic evidence see, e.g., Judge & Piccolo, 2004), we show initial evidence here that relations-oriented behaviors are accompanied by higher levels of arousal and that this particular match is associated with higher leader effectiveness. Highly effective leaders less often display negative relations-oriented behavior. But when they do it, it is accompanied by higher physiological arousal.

Third, various scholars have argued that OB scholars commonly neglect “when” a certain phenomenon (or construct) of interest appears. Our application of the variability thesis to leadership research illuminates the importance of this gripe (Navarro & Rueff-Lopes, 2015). By combining a micro-behavioral approach to measuring the continuous

physiological data of leaders at the intra-individual level, we are able to answer to an essential “when”-type of question. The highly effective leaders are especially likely to show variability in their physiological response “when” they display specific relations-oriented behaviors. More generically, we show that when taking a dynamic approach, including micro-level behavioral coding, an important behavioral-physiological correlate of leadership effectiveness is uncovered. Hence, our study highlights that applying non-linear type techniques to time-stamped data over time enriches our understanding of effective leadership. The healthy variability thesis, in particular, which includes a temporal match between changes in physiology and displayed behavior, thus served here to characterize effective leadership. The variability of important entangled phenomena, such as physiological arousal and leader behavior, should become a more regular part of future leadership research.

Strengths, Limitations and Future Research

The study reported herein is a first empirical inquiry into how leader physiological arousal is associated with different kinds of leader behaviors in the organizational field. Having collected the physiological data of leaders at work, in combination with minutely coded, mutually exclusive leader behaviors, is a great strength of this study. Although our sample is somewhat small, other leadership studies that have used neuroscience methods (e.g., Balthazard et al., 2012; Boyatzis et al., 2012; Waldman et al., 2011) have worked with similar sample sizes (Button et al., 2013). Combining video-coded leader behavioral and physiological data is labor-intensive, but allows for detailed investigation of the biological correlates of different leader behaviors, and renders visible some aspects of the otherwise invisible. The research results of this cross-sectional field study, which do not include any common-method bias, show that it is worthwhile to commit resources to similar, fairly nonobtrusive, field research.

Prior studies that have linked physiological reactions to ‘felt’ emotions have mostly relied upon recalled reflections (see, e.g., Boyatzis et al., 2012). Merely recalling experiences to identify a physiological reaction is problematic, because it is often difficult for individuals to ‘go back’ and relive that particular emotional state (Mauss & Robinson, 2009). Instead of relying on potentially biased memory recall, we linked actual, in situ leader behavioral displays to physiological arousal at the same moments. Some scholars have already highlighted the positive aspects of obtaining valid physiological measures during real-life interactions. Van Prooijen et al. (2018, p. 75), for example, argued that capturing physiological data during team interactions can show precisely how someone is feeling, “thereby avoiding the possibly biased evaluation of situations in anticipation or in hindsight.” Relying on real-time field data of actual leaders in interaction with their followers is more representative than the convenience samples of students in leadership roles, or employing only surveys. Even when EDA data are

collected in a laboratory setting, it results in an artificial representation of real workplace behavior. Although collecting EDA data in an organizational field setting is a strength of the study, it also posed several challenges.

First, disruptions of the skin-electrode interface could have been due to the fact that the participants wore the Empatica E4 under their clothes or moved their arms during the meeting (i.e., gross body movements). This affects the stability of the E4. In addition to this practical issue, technical disruptions can be caused by loose electrodes. To minimize such disruptions, the device was checked by a field researcher before the session began. All EDA recordings were also visually inspected to check for segments containing artifacts (Boucsein, 2012). The limitations of collecting data in the field may be outweighed by several advantages; namely, using a wristband (similar to a regular watch) allows for fairly unobtrusive measurement of physiological measures in the workplace, which enables parallel, fine-grained analyses of video-based behavioral data matching their moment-to-moment physiological responses.

Physiological data collection in a field setting poses another limitation. Outside of a laboratory, there are fewer chances to control for a variety of sources of physiological responses, like recall of emotionally salient events, which can also activate higher levels of arousal (D'Esposito, Zarahn, & Aguirre, 1999). It has been empirically established that EDA activity can also show fluctuations caused by factors such as mental effort, cognitive load, room temperature, general arousal and even body posture (Berntson & Cacioppo, 2000; Stemmler, 2004). Hence, quasi-experimental type field studies are especially called for; they would enable the study of causes of leader arousal-behavior linkages.

Third, by using skin conductance as a physiological measure of arousal, we do not empirically take into account the valence of emotions. Distinguishing between different emotional states, such as happiness or fear, on the basis of neural information is difficult (Lindebaum & Jordan, 2014). A combination with other methods, such as self-reports or non-verbal coding, is needed to capture such valences. Using the physiological tonic and phasic parameters as dichotomous measures of arousal also means that other dynamic physiological signals have not yet been taken into consideration, such as latency, rise time or recovery time (Boucsein, 2012). The present study incorporates only leader behavior and physiological arousal, together with leader effectiveness. One could argue that, above and beyond the body and behavior, other factors such as intellectual and social-emotional skills (Lindebaum & Jordan, 2014) can determine the effectiveness of leaders. Thus, future research designs could be extended with measures of emotions (see, e.g., Baker, 2019; Gooty, Connelly, Griffith, & Gupta, 2010). In such new research, the valence of the emotions, that is, beyond mere arousal fluctuation, must be included as well.

Fourth earlier research has shown that we are especially physiologically responsive to others at moments that are meaningful to our sense of self (Kiecolt-Glaser & Newton, 2001). This could mean that some of the observed physiological reactions might be linked to specific followers. For this study, we did not take into account whether leader arousal fluctuated when specific followers showed certain behaviors. We also did not take into account in this study how leaders' behavioral displays may affect followers' physiological processes (Tee, Ashkanasy, & Paulsen, 2011), including their physiological and/or mental health. Some have already argued that to understand leader effectiveness fully, neural or physiological data must be obtained from multiple members of teams (Waldman et al., 2011). Even though quite labor-intensive, this type of more precise, triangulated type of research is indeed urgently needed so that more evidence-based leadership enrichment interventions can be designed, tested and used, for more sensible organizational leadership and followership.

Practical Implications

The research results presented here lend great support to the idea that among the most effective leaders, there is congruence between what they feel bodily and how they verbally express themselves. Specifically, if leaders pair high arousal fluctuations with relations-oriented statements, this may positively influence their ratings of effectiveness. Among the least effective leaders in this study, there was no connection found between their own arousal fluctuation and verbal behaviors; it is likely that they were either making predominantly task-based verbal statements or their relations-oriented behavior was not reflective of their own, inner arousal fluctuations. Relations-oriented behaviors that were included in this study covered follower consideration and empowerment, including vision related verbalizations. Together, the 19 micro-behaviors (see Table 1) cover a large part of what is known as transformational behavior. We found that overall, effective leaders display such behaviors especially when they are physiologically aroused. This behavior-arousal fit of effective leaders was also visible for the negative relations-oriented behaviors. Insofar as the highly effective leaders did display such mildly uninterested, defensive, and disruptive behavior, it was accompanied by higher arousal.

There are still many questions that need to be addressed before practical application of this study's results can yield significant leader effectiveness enhancements (Lindebaum, Al-Amoudi, & Brown, 2018; Waller et al., 2017). Even though the physiological results of this study were fed back to the participating leaders, more efficient ways for precise, customized leader on-the-job learning could be created. For this purpose, more technological feedback sophistication would need to be developed. Such easier-to-offer customized feedback must provide leaders with the possibility of learning from their own actual work experiences and

interactions. Once physiological and behavioral leader feedback are more efficiently been coupled, more effective leader coaching could take place Mintzberg (2004: 24) called this “3rd generation management development”; this would advance leadership effectiveness in practice.

CONCLUSION

Leaders were asked to wear wrist sensors measuring electrodermal variability during periodic staff meetings and the data were combined with fine-grained, video-based observations of verbal exchanges occurring in the meetings, as well as leadership effectiveness measurements. The research extends our understanding of the physiological basis or correlate of effective leader behavior during workplace interactions; As hypothesized, the highly effective leaders showed more variability in their physiological arousal than the less effective leaders, as evidenced by significantly higher levels of arousal during relations-oriented behavior compared to task-oriented behavior. The less effective leaders showed significantly lower physiological arousal levels for both relations- and task-oriented behavior. Thus, not the task-oriented verbalizations, but rather the explicitly relations-oriented leader expressions were found to be accompanied by high physiological arousal fluctuations among the highly effective leaders. Thus, this study’s initial testing of the healthy variability thesis on a sample of leaders operating in their regular work context calls for more integrative analyses or triangulation of physiological, behavioral and effectiveness data in real-life organizational contexts (Becker & Menges, 2013). Given the prominent prior reliance on surveys in the field of leadership, future pairings of physiological arousal data with large-scale, systematic, video-based behavioral observations are likely to result in new insights, with less measurement bias than reported heretofore.

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5

A Complex Adaptive Systems Approach to Real-life Team Interaction Patterns, Task Context, Information Sharing and Effectiveness

This chapter is published as:

Hoogeboom M.A.M.G, Wilderom C.P.M. (2019). A complex adaptive systems approach to real-life team interaction patterns, task context, information sharing, and effectiveness. *Group and Organization Management (in press)*.

A previous version of this chapter was accepted and presented at the Academy of Management conference, Atlanta, United States, August 4-8: Hoogeboom, A. M. G. M., & Wilderom, C. P. M. (2017). *Effects and Antecedents of Routine Patterns of Team Interaction: A Video- and Survey-based Analysis*.

ABSTRACT

Interaction dynamics are considered to be key characteristics of complex adaptive systems (CAS). Taking a CAS approach, this study examines how three team interaction patterns affect team effectiveness. Specifically, we analyze recurring, heterogeneous and participative patterns of team interaction in routine and nonroutine team task contexts. Fine-grained coding of video-based footage plus nonlinear dynamical systems (NDS) statistics are used to identify the interaction patterns in a sample of 96 real-life teams, comprising 1,395 team members. We establish that recurring patterns of team interaction reduce perceived team information sharing and, in turn, team effectiveness and that these harmful effects are more pronounced in teams doing nonroutine work than in those engaged in routine work. Participative team interaction was found to be positively related to a high level of perceived team information sharing and effectiveness. Heterogeneous team interaction was not associated with perceived team information sharing and effectiveness. Post-hoc analyses, in which the behavioral content of the interaction patterns of the 15 most-effective and least-effective teams is compared, revealed primarily task-directed patterns in the most-effective teams. We offer practical recommendations for team development and call for more CAS research on the communicative behaviors within teams of knowledge workers.

INTRODUCTION

Why are some teams more effective than others? One potential explanation, of interest to scholars since the earliest days of team research, lies in the way that team members interact in pursuit of their goals. Despite a general acceptance of the importance of team interaction patterns, our understanding of them remains limited. This is because team research to date has predominantly used “statistical approaches directly or indirectly grounded in the general linear model” to capture team interactions (Knight, Kennedy, & McComb, 2016, p. 223). Team interaction patterns, however, are decidedly nonlinear (e.g., Cronin, Weingart, & Todorova, 2011; Gorman, Cooke, Amazeen, & Fouse, 2012). More understanding of them is needed, especially in today’s knowledge economy which highlights the need for strong interaction skills (e.g., Greiner, 2002; Mathieu, Gallagher, Domingo, & Klock, 2019). A theory that underpins the explicit incorporation of the dynamics of team interaction in a given task context is complex adaptive systems (CAS) theory. CAS at the team level focuses on members interacting with each other in their team-task context (e.g., Arrow, Poole, Henry, Wheelan, & Moreland, 2004; McGrath, Arrow, & Berdahl, 2000). CAS deviates from team research which considers “teams as simple systems characterized by unidirectional cause–effect relationships, failing to take into account the context in which teams operate”

(Ramos-Villagrasa, Navarro, & García-Izquierdo, 2012, p. 780). Teams may indeed tailor their interactions to the nature of the work at hand: complex team tasks may require complex interactions among the team members. Thus, to explain why teams are effective, we must incorporate both the nonlinear nature of team interaction patterns and the contexts in which such patterns occur (Endedijk, Hoogeboom, Groenier, de Laat, & Van Sas, 2018; Pentland, 1992; Kerr, 2017; Marks, Mathieu, & Zaccaro, 2001; Mathieu, et al., 2019; Ramos-Villagrasa, Marques-Quinteiro, Navarro, & Rico, 2018; Rawl, 2006).

An important distinction of a team's task context is whether it operates in a routine or nonroutine manner (Kerr, 2012). A routine task context is characterized by higher levels of stability and predictability, while a nonroutine task context is defined by more complex and novel situations (e.g., Lei, Waller, Hagen, & Kaplan, 2016). In order to advance the CAS theory at the team level, we identified and examined patterns of team interaction and how they are related to team effectiveness in both task contexts. Our key research question is: How do team interaction patterns impact team effectiveness, and does this vary in routine or nonroutine task contexts?

In addition to examining team interaction patterns and how they may vary, given their contexts, the CAS theory advocates combining nonlinear and linear methods to expand our understanding of team effectiveness (Ramos-Villagrasa et al., 2018). Integrative frameworks of team effectiveness and CAS theory promote the inclusion of team processes as antecedents of team effectiveness and "products" of team interaction dynamics (Marks et al., 2001, p. 358; Curşeu, 2006). An influential team process that is known to "result from the dynamic process" of team interaction is information sharing (Curşeu, 2006, p. 252; Mesmer-Magnus & DeChurch, 2009); effective teams are considered to be information-sharing and subsequently adaptive entities (Marks et al., 2001). Prior studies on team interaction patterns have examined such patterns and team processes in isolation (e.g., Kanki, Folk, & Irwin, 1991; Kolbe, Grote, Waller, Wacker, Grande, Burtscher, & Spahn, 2014; Stachowski, Kaplan, & Waller, 2009; Zijlstra, Waller, & Phillips, 2012). Some scholars (e.g., Kanki et al., 1991) have called for more comprehensive models that integrate team interaction patterns with important team processes as well as task contexts (or contextual dynamics) and effectiveness (see, also, Curşeu, 2006; Green & Mitchell, 1979). Through recent advances in CAS theory (including its underlying nonlinear dynamical systems approach: NDS), we can now examine in more integrative terms which team interaction patterns are associated with team information sharing and team effectiveness in different task contexts.

This paper contributes to a better understanding of effective patterns of team interaction. Specifically, we investigate: 1) the team-task context in which such interactions are enacted, i.e., routine vs. nonroutine, and 2) the downstream outcomes of different team interaction patterns, i.e., their impact on perceived team information sharing and

effectiveness. In addition to advancing CAS theory with these investigations, we exemplify how team pattern analysis can capture the “discontinuous bursts and lulls of interactivity” among team members (Gorman et al., 2012, p. 503). As opposed to static team snapshots, we incorporate temporality by zooming in on various team interaction patterns over time, using minute video-based coding of the behavior of all team members. We contribute to the team and CAS literatures by adding nuance to our understanding of how interaction dynamics translate into a crucial team process, in relation to team contexts, and how both team processes co-shape team effectiveness. In addition to offering empirical evidence of effective teams as CAS, our research responds to the call by Leenders, Contractor, and DeChurch (2015, p. 1) that “current theoretical and operational formulations of team process require greater specificity if they are to truly afford a high-resolution understanding.” In this paper, the ephemeral behavioral patterns within teams are made visible and are coupled to team effectiveness.

THEORY AND HYPOTHESES

A CAS Approach to Team Interaction Patterns

Although management scholars have referred to teams as complex adaptive systems (CAS), very few studies have empirically examined the dynamics of team interaction (Ramos-Villagrasa et al., 2012). In order to advance our understanding of why some teams are more effective than others, more team models need to incorporate these dynamics (McGrath & Tschan, 2007). A nonlinear dynamical systems (NDS) approach (Ramos-Villagrasa et al., 2018; Ramos-Villagrasa et al., 2012) requires the modeling and measurement of temporal processes among several elements that interact (Friedman, Brown, Pincus, Kiefer, & Beyer, 2017). Guastello and Liebovitch (2019, p. 1) argue that “when combined with domain-specific knowledge about psychological phenomena, NDS constructs...reveal commonalities in dynamical structure among phenomena that might not have been compared or connected otherwise.” To better understand the dynamics of team interaction, task context cannot be bypassed when viewing teams as CAS. (Ramos-Villagrasa et al., 2012). In other words, the within-team dynamics can be assumed related to team contexts. As we capture nonlinear team interaction patterns in the present field study, we take a NDS approach and examine how three team patterns are linked to team effectiveness in two different task contexts.

Team interaction patterns are defined as sets of observable behaviors that evolve sequentially and occur at certain time intervals. These patterns are thus sequential sets of behavioral events which occur above and beyond chance, if they are all independently distributed (Magnusson, 2000; Magnusson, Burgoon, & Casarrubea, 2016; Waller & Kaplan, 2018). Over time, through successive iterations, team interactions can thus become

discernible as discrete ‘patterns’ of interaction. Particular interaction patterns may be required for teams to operate effectively (Stachowski et al. 2009). Gorman et al. (2012) argued that recurring team interaction patterns can indicate whether a team is in a more stable or adaptable mode. Kanki et al. (1991) focused on heterogeneous team interaction patterns: they found that the more variety or complexity there was in the patterns, the poorer the teams’ effectiveness. Interaction patterns within teams can fluctuate also in terms of the degree of participation or collaboration (Lei et al., 2016). To date, no prior empirical study has compared these three types of interaction patterns.

The various patterns of team interaction can be detected with so-called T-pattern analysis (see, e.g., Kolbe et al., 2014; Stachowski et al., 2009; Zijlstra et al., 2012), permitting the identification of interactive behavioral chains that are governed by structures of variable stability (Gorman et al., 2012; Magnusson et al., 2016). Herein we will also use T-pattern analysis to detect team interaction patterns. Addressing how these team interactions are linked to team context and perceived information sharing, as well as to team effectiveness aims to enhance our understanding of effective team interaction (Gorman et al., 2012; Gorman, Amazeen, & Cooke, 2010). In the text below, we describe how the three team interaction patterns are linked to perceived information sharing which subsequently influences team effectiveness. We hypothesize also how team-task context may moderate the relation between the three types of interaction patterns and information sharing (see Figure 1).

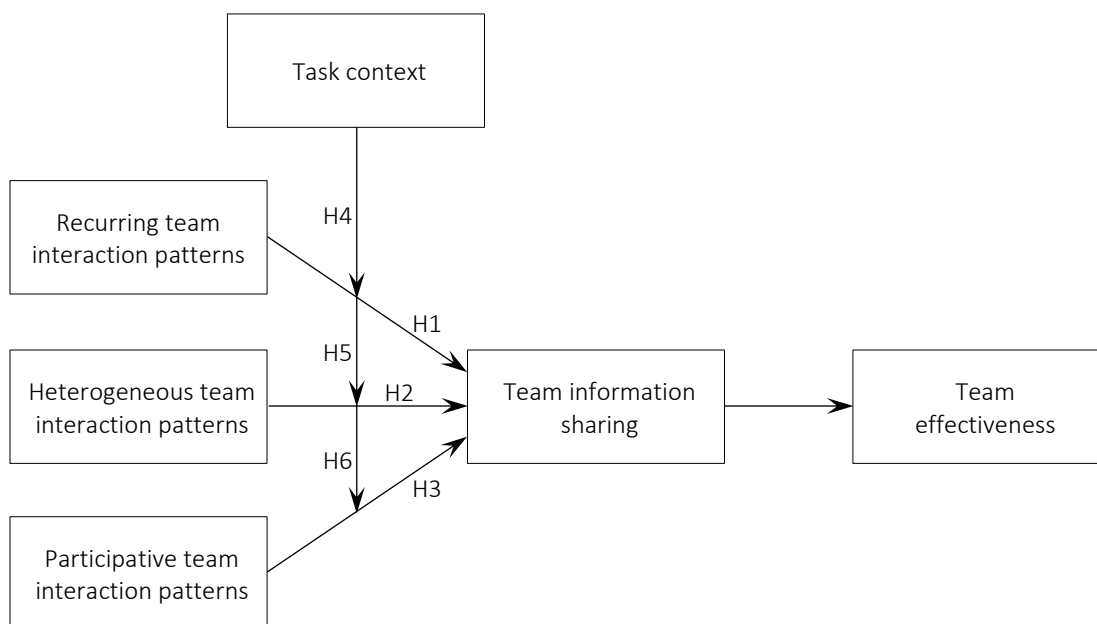


Figure 1. Research Model.

Information Sharing

Team members' frequent sharing of task-relevant information is considered the bedrock of team effectiveness (Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt, 2007; Mesmer-Magnus & DeChurch, 2009). The more information a team can share, analyze, store, and use, the greater the team's effectiveness, especially for knowledge-intensive teams (Schippers, Homan, & van Knippenberg, 2013; Tost, Gino, & Larrick, 2013). Team members' proactive sharing of information produces apt team knowledge, which improves coordination as well as decision making (Klimoski & Mohammed, 1994; Marks, Zaccaro, & Mathieu, 2000; van Ginkel & van Knippenberg, 2009; Zaccaro, Rittman, & Marks, 2001). According to Phelps, Heidl and Wadhwa (2012), higher degrees of perceived information sharing are associated with effective social interaction in a team. Hence, when interacting with each other, team members can make optimal use of each other's information and knowledge. Thus, team interaction patterns can be seen as a primary mechanism of how information gets shared and exchanged (Marks et al., 2000; Zellmer-Bruhn, Waller, & Ancona, 2004); they can either enable or inhibit perceived information sharing (Schippers et al., 2014; Super, Li, Ishqaidef, & Guthrie, 2016).

A specific interaction pattern that is likely to influence both team information sharing and effectiveness is the so-called recurring team interaction pattern. In their taxonomy of information-processing failures, Schippers et al. (2014) highlight habitual team routines as being detrimental to team information sharing. Using habitual 'scripts' that teams developed earlier on in their interactions might not spark information sharing any longer in the current moment. As opposed to 'mindful' engagement or behavioral adaptation to the moment, recurring patterns of team interaction are likely to curb perceived information sharing. Thus, when a team engages in habitual routines (i.e., in repeatedly co-occurring actions or interactions), it may fail to allow an exchange of information among team members that represent changed situational dynamics. Conversely, teams that adapt quickly are more flexible or open towards each member's input, such as information and knowledge (Stachowski et al., 2009). Hence, recurring patterns of team interaction might inhibit the open, continuous sharing of opinions, ideas, and knowledge in a team. Recurring team interaction patterns are thus likely to create a sense of stability that may lead to rigidity in teams which in turn might limit their effectiveness (LePine, 2003). When teams adhere to many recurring interactions, lower team effectiveness or even tragic team failures may come about as shown in post-hoc accident investigations (Gersick & Hackman, 1990; Lei et al., 2016; Stachowski et al., 2009; Zijlstra et al., 2012). Therefore, we can hypothesize that in teams with a high number of recurring team interaction patterns, within-team information sharing fails, leading to lower team effectiveness.

Hypothesis 1: There is an indirect negative relationship between recurring team interaction patterns and team effectiveness, through team information sharing.

In addition to recurring patterns, heterogeneous team interaction patterns may also affect team effectiveness. When the heterogeneity of team interaction patterns is high, the total number of different interaction patterns in a team is high.⁷ Such heterogeneity thus entails a relatively large range of different team interaction patterns (Kanki et al., 1991). Teams with heterogeneous patterns of interaction are assumed to share more information and knowledge among their members. A high degree of team members' sharing of information has been associated with high team performance because the information can be used to make sense of the team's task environment and then take proper action (e.g., Larson, Christensen, Abbott, & Franz, 1996). Although compositional heterogeneity in teams (e.g., in terms of diversity, tenure, or expertise) has been linked to diversity in information and expertise, sparking the interaction and exchange of ideas (Frigotto & Rossi, 2012), heterogeneity in team interaction patterns has not been frequently associated with team performance or information sharing. When teams engage in heterogeneous interaction patterns, team members interact in a more flexible, non-standard or prescribed manner with each other (Zijlstra et al., 2012). This greater variety of interaction is assumed, in turn, to lead to a higher level of team information sharing and performance: due to more information and knowledge exchange (Rico, Sanchez-Manzanares, Gil, & Gibson, 2008). Consistent with the idea that compositional heterogeneity is functional for team information sharing (Frigotto & Rossi, 2012), we hypothesize that more diversity in team interaction patterns stimulates team effectiveness through a higher degree of team members' information sharing.

Hypothesis 2: There is an indirect positive relationship between heterogeneous team interaction patterns and team effectiveness, through team information sharing.

A third type of pattern, participative team interaction, is also assumed to co-occur with a high degree of perceived information sharing and subsequent team effectiveness. Earlier research on team interaction and communication dynamics has shown that greater amounts of communicative action or participation among leaders and followers nurture the revelation of new information (Cotton, 1993). When team-level interaction patterns are more participative, in the sense that they include more frequent switches among team members, including the team leader, more possibilities to exchange and co-construct

⁷ Whereas recurring patterns denote the total sum of interaction patterns shown by a team (e.g., it engages in the "abc" pattern 10 times), heterogeneous patterns refer to the number of different patterns that are being displayed (e.g., the interaction pattern "abc" is different to another occurring behavioral pattern such as, for instance, "ade").

relevant information arise (Edmondson & Lei, 2014). Team members in team meetings characterized by highly participative or collaborative patterns are strongly involved in sharing and exchanging their ideas; a steady informational flow among the team members has been associated with collective team behavior (Bourbousson & Fortes-Bourbousson, 2016). This means that participative or collaborative relationships can enable the transfer of information among team members (Phelps et al., 2012). Hence, to perform team tasks effectively, interdependent action and interaction among team members may be required (e.g., Cheng, 1983). Such action or collaborative communication may be associated with a high degree of exchange of information and knowledge (Butchibabu, Sparano-Huiban, Sonenberg, & Shah, 2016). More participative team interaction patterns might thus enhance team performance. In addition, meetings have been perceived as more effective when active employee participation is warranted and relevant informational input is provided by the employees as well as their leader (Meinecke, Lehmann-Willenbrock, & Kauffeld, 2017). Based on the above, we hypothesize that participative team interaction patterns are positively related to team effectiveness, and that they are mediated by perceived team information sharing.

Hypothesis 3: There is an indirect positive relationship between participative team interaction patterns and team effectiveness, through team information sharing.

Task Context

In team research, the difference between a routine and nonroutine task context has been highlighted as one of the most powerful moderators of team interaction and a contingent condition of information sharing (Chung & Jackson, 2013; Kerr, 2017; Unger-Aviram, Zwikael, & Restubog, 2013). Both task contexts vary in their degree of knowledge intensiveness (Campbell, 1988). Routine team contexts include team tasks that are more predictable and are handled with standardized work procedures and efficient team interaction (e.g., Resick, Murase, Randall, & DeChurch, 2014). Nonroutine contexts, in contrast, involve team tasks that occur in less predictable situations, with frequent change, requiring relatively unique interactive team behaviors. In an experimental study, Rico et al. (2008) found that team members in a nonroutine or more novel task environment exchanged more information and ideas compared to teams in a routine environment. Although team interaction and effectiveness depend crucially upon the teams' task context, most prior empirical research focused on one type of task context only (Kerr, 2017). Our inclusion of more than one team-task context enables insight into how team interaction patterns may vary with this context.

Drawing upon the structural contingency approach (Drach-Zahavy & Freund, 2007), which stresses that the optimal course of action is dependent upon the situation, it is likely

that the effectiveness of different team interaction patterns is contingent upon the task context (Agliati, Vescovo, & Anolli, 2006; Perlow, Gittell, & Katz, 2004). Knowledge-intensive teams tend to work on more ambiguous or nonroutine team tasks. Therefore, they need to gather and share information to adapt adequately or adroitly to changing circumstances (Raes, Heijltjes, & Glunk, 2011). When a team's task is knowledge-intensive, the team members "experience greater changes and exceptions to their task and hence, are likely to become less familiar with their task" (Wong, 2004, p. 647). Complex issues are also less likely to have standard solutions (Cummings & Cross, 2003; Jehn, 1997). Such issues call for anticipation of dynamic behavioral adjustment by the team (Gardner, Gino, & Staats, 2012; Kozlowski, Gully, Nason, & Smith, 1999). Thus, vigorous, interactive work contexts call for members to behave flexibly, in order to adapt to continually changing demands and objectives (Gardner et al., 2012).

When a team displays recurring interaction patterns, it relies on a habitual mode of interaction. Kozlowski and colleagues (1999) theorized about the opposite: in order to be effective, teams undertaking complex or rapidly changing work must integrate their members' knowledge in an ongoing process of mutual adjustment (Chung & Jackson, 2013; Thompson, 1967; Van de Ven, Delbecq, & Koenig, 1976). Drawing upon CAS theorizing, the wider the variety of interaction patterns that are being displayed by teams, the more this enables them to effectively exchange information and adapt to unpredictable situations (Ramos-Villagrasa et al., 2012). The effect of more recurring interaction patterns on team information sharing may thus be negative in knowledge-intensive teams, as this context requires more dynamic anticipation and a less habitual form of interaction. Recurring modes of interaction patterns are likely to occur more in teams with routine tasks (Kerr, 2017; Resick et al., 2014). Because routine tasks are less knowledge-intensive, they can be properly handled with standard or more recurring team interaction patterns and with considerably less information sharing. We hypothesize therefore that if recurring team interaction patterns occur in knowledge-intensive teams they inhibit information sharing and consequently team effectiveness.

Hypothesis 4: Team-task context moderates the relation between recurring patterns of team interaction and information sharing, such that the negative relation is stronger when the team-task context is nonroutine.

Viewing teams as CAS, one could argue that nonroutine team tasks require proactive anticipation or continuous adaptation by team members: in such task contexts, a wide variety of content must be reflected in the team's interaction patterns (Ramos-Villagrasa et al., 2012). Hence, team interaction patterns that are more varied (i.e., more heterogeneous) might have an impact on how well the team can anticipate a complex task context. Whereas

nonroutine situations require continuous monitoring of complex systems and quick adaptation to novel situations (e.g., Waller, Gupta, & Giambatista, 2004), routine team tasks require more conventional forms of interaction with lower variety in their content. In line with this, Kanki et al. (1991) found that in a realistic flight scenario, requiring prescribed sequences of action and communication, highly effective aviation teams exhibited more homogenous (or protocolized) interaction patterns. Hence, only in routine type task contexts that require conventional forms of interaction can team members predict each other's behavior (Kanki et al., 1991). In nonroutine or more knowledge-intensive task contexts, constant adaptation and coordination is seen as an important source of team performance (LeBaron, Christianson, Garrett, & Ilan, 2016). When team members in such task contexts show high behavioral conformity, they are unable to address the dynamic demands typical of nonroutine task contexts (Uitdewilligen, Waller, & Zijlstra, 2010). Thus, in nonroutine team-task contexts, homogeneous interaction patterns might reduce information sharing. Nonroutine task contexts call for more 'nonscripted' team interactions (LePine, 2005). We surmise therefore that in nonroutine task environments, heterogeneous team interaction patterns are beneficial for perceived information sharing.

Hypothesis 5: Team-task context moderates the relation between heterogeneous patterns of team interaction and information sharing, such that the positive relation is stronger when the team-task context is nonroutine.

Teams in nonroutine task environments tend to be confronted with new and changing task elements. In order to perform well, these teams are required to alter or modify their knowledge or information frequently (Chen, Thomas, & Wallace, 2005). Thus, knowledge-intensive team tasks seem to require continuous exchange, sharing and interpretation of complex information among team members (Kozlowski & Bell, 2013). In such contexts, in which continuous sharing of member expertise and coordination is important, leaders and followers exchange ideas and develop a shared understanding of their changing task environment (Lei et al., 2016). Kanki, Palmer, and Veinott (1991) found that swift-starting teams, which were constantly facing unpredictable, challenging and new situations, were more effective when they showed more participative interaction patterns. Curşeu (2006) also took a CAS perspective to better understand the emergence of important team processes and interaction in teams. He suggested that efficient use of information technology creates higher levels of team participation and interaction between virtual team members, which is crucial for high performance. As virtual teams tend to operate mostly in the context of knowledge-intensive tasks (Castellano, Davidson, & Khelladi, 2017) and can thus be considered as working in a nonroutine type task context, highly participative team interaction in such teams enhances the transfer of knowledge and information. Therefore,

we expect that in such nonroutine contexts participative team interaction patterns enhance perceived information sharing.

Hypothesis 6: Team-task context moderates the relation between participative patterns of team interaction and information sharing, such that the positive relation is stronger when the team-task context is nonroutine.

METHODS

Sample

A stratified random sample of 150 teams was drawn from one large public-sector organization in the Netherlands; 96 teams, or 64%, accepted our invitation to be videotaped during one randomly selected, regular staff meeting. A total of 1,395 members participated, including the 96 formally appointed team leaders. There was freedom and variety in how the team meetings were conducted, so that possible agenda-setting effects are likely to have been randomly distributed across the teams. In terms of the teams' tasks, they processed financial-administrative data (in various degrees of knowledge-intensiveness) or created the infrastructure to increase efficiency while complying with regulative, normative, and cultural forces. An example of a nonroutine task context in our sample is a team of software developers; an example of a team operating in a routine task context in our sample is a call center for internal clients. During the videotaped meetings, more than 80% of the team members was present. Immediately following these meetings, they all completed a hard-copy survey to rate the degree of perceived information sharing of their own team. Later, 167 expert ratings of team effectiveness were collected: an average of 1.8 ratings per team. These experts held managerial positions senior to the focal team leaders and were well acquainted with each team.

The team leaders averaged 50.94 years of age (ranging from 27 to 64: $SD = 7.70$), with employment tenure ranging from 0.5 to 46 years ($M = 24.98$, $SD = 13.24$), and with an average of 13.18 years of experience in leadership positions (ranging from 1 to 36: $SD = 9.02$). Of these leaders, 23.70% was female. Among the nonmanagerial team members in the sample, 34.80% was female. Team members were on average 49.19 years old ($SD = 10.68$), with an average tenure of 24.16 years (ranging from 0 to 48: $SD = 13.77$), and had worked for an average of 3.88 years (ranging from 0 to 38: $SD = 5.26$) in their current teams. The average team was comprised of 13 members (min = 4; max = 33).

Measures

Team effectiveness. The Gibson, Cooper, and Conger (2009) scale, consisting of 4 items, was used to capture the overall idea of team effectiveness, rather than whether specific goals were accomplished. A high level of team effectiveness implies that a team accomplishes its assigned tasks very satisfactorily (Gibson et al., 2009). Scores were given by the experts on a Likert scale ranging from 1 (very inaccurate) to 7 (very accurate). A sample item is “This team is consistently a high performing team.” The Cronbach’s alpha was .94. There was sufficient within-group agreement among the experts of each team ($M R_{wg} = .64$, ranging from .22 to .91: Lance, Butts, & Michels, 2006; Bliese, 2000; LeBreton & Senter, 2008). Because 39 teams only had one expert rater we correlated this score with team effectiveness ratings obtained from the followers.⁸ A significant association was found between the expert scores and follower perceptions on team effectiveness ($r = .37, p < .01$). This indicates that we could validly use the expert ratings on team effectiveness.

Team information sharing. Using the four items developed by Bunderson and Sutcliffe (2002), team information sharing was rated by the team members on a survey scale from 1 (very inaccurate) to 7 (very accurate). A sample item is “When a member of this team gets information that affects the team, they are quick to share it.” We obtained a Cronbach’s alpha of .95. The ICC1 (.14, $p < .01$), ICC2 (.70, $p < .01$), and the R_{wg} ($M = .63$, ranging from .18 to .91) values indicated that the data could be aggregated to the team level.

Team interaction patterns. We analyzed behavioral patterns in regular team staff meetings (Hoogeboom & Wilderom, 2015; Lehmann-Willenbrock, Meinecke, Rowold, & Kauffeld, 2015; Meinecke & Lehmann-Willenbrock, 2015). Such meetings can provide rich insights into interaction patterns between team members (see, also, Agliati et al., 2006; Gardner et al., 2012). They have often served as a prime context for ethnographic-type workplace studies (e.g., Svennevig, 2008; Vine, Holmes, Marra, Pfeifer, & Jackson, 2008). Lehmann-Willenbrock, Chiu, Lei, and Kauffeld (2017) highlighted that interactions during regular staff meetings mirror the social interactions outside the meeting context.

Three separate video cameras were used to record each of the 96 regular staff meetings. To minimize obtrusiveness, all three cameras were set up before each meeting began. The post-meeting surveys found both the videotaped meetings ($M = 5.59, SD = 1.36$) and the behaviors displayed by the team members ($M = 5.90, SD = 1.08$) to be

⁸ ICCs and R_{wg} were calculated to assess the within-group agreement and reliability of the team members’ ratings of team effectiveness (i.e., indexing group-level dispersion or diversity in ratings: Newman & Sin, 2009). ICC1 (.17, $p < .01$) and the ICC2 (.76, $p < .01$) values showed sufficient levels of agreement.

representative of similar non-videotaped meetings. This indicated that habituation occurred quickly after the start of the meetings (e.g., Smith, McPhail, & Pickens, 1975). The meetings' duration varied considerably, from 30 to 191 minutes ($M = 85$, $SD = 31$), depending on the length of the agenda and the amount of discussion. The total number of minutes coded in this study was 8,194.

Each recording was sent directly to the university and was systematically coded by 2 members of a rotating panel of 14 trained and supervised MSc and BSc students majoring in either Business Administration, Psychology, or Communication Science. They used a 15-page validated codebook and specialized coding software ("The Observer XT": Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000; Spiers, 2004). The codebook was developed and refined during earlier behavioral studies (Hoozeboom & Wilderom, 2015). The basis of the codebook was developed in a prior PhD study with a set of mutually exclusive behavioral categories, allowing for exhaustive coding of a full range of leader-follower interactions (Bakeman & Quera, 2011). It was later refined and further detailed on the basis of existing behavioral taxonomies and team communication research. Since then, the codebook has been validly used in other studies (Hoozeboom & Wilderom, 2015).

In total, 18 mutually exclusive micro-behaviors were coded (Table 1: IRR = 82.53, Kappa = .81, indicating "almost perfect agreement" Landis & Koch, 1977, p. 165). The unit of analysis when systematically coding the videos was a speech segment that reflected a completed statement (Bales, 1950; Borgatta, 1962). For example, when a team member says, "Yes, exactly," in reaction to an opinion of another member, this is coded as agreement (i.e., one of the behavioral codes: see, Table 1). Sometimes a code comprises only a single word, but mostly a single sentence, reflecting an independent sequence of interaction (Waller & Kaplan, 2018). With the preset codebook, we assigned a code to every speech segment from each entire meeting. Most of these micro-behaviors were grouped into four behavioral meta-categories on the basis of current leadership theory (i.e., transactional, transformational, initiating structure, and counterproductive behavior). Six additional micro-behaviors in our codebook were not classifiable into one of these four categories (entries 13-18 in Table 1). Team interaction patterns were identified here with these four behavioral meta-categories and the six additional micro-behaviors.

Next, pattern recognition algorithms were employed using Theme software (Magnusson, 2000; Magnusson et al., 2016). Theme is capable of discovering behavioral patterns in a temporal order. The program predicts whether the occurrence of sets of sequential behavioral events within a specific time period appears significantly more often than by chance (i.e., when the data is randomized). A so-called T-pattern reflects a sequence of temporal behaviors (see Figure 2).

Table 1
Examples of the Video-coded Behaviors

Coded behavior	Definition	Examples
1 Providing negative feedback	(TA) Criticizing the behavior or actions of other team members	"I do not think that this is a good solution" "In August I've send an e-mail with amendments, and I find it regrettable that at least half of the attendees does not know the content of this e-mail" "How is the project progressing?" "Do you also have a specific role in that process, since there might be possibilities for a follow-up project"
2 Task monitoring	(TA) Asking team members for clarification and confirmation about (the progress on) their tasks	"Yes, but that is the wrong decision" "Now you are talking about a failure fine, however this is a different type of fine" "We offer a training course in August, which might be helpful for your career planning" "You can make a note of that request, I am willing to help you with it"
3 Correcting	(TA) Imposing of disciplinary actions; Presenting team members with a "fait accompli"	"Yes, if you have any ideas put them together and discuss it with me or Jan"
4 Individualized consideration	(TF) Paying attention to each individual's need for achievement and growth by acting as a coach or mentor and creating a supportive climate	"I find it important that we all work in unison towards this shared objective" "Until Vision 2020 is more clearly specified we will be operating under these standards; it is important to follow this agreed line"
5 Intellectual stimulation	(TF) Asking for ideas, stimulating team members to critically think about team tasks, opportunities and so on, including the questioning of assumptions; thinking about old situations in new ways	Not listening actively "I am the manager within this organization" "We do it my way, because I am the manager" Disrupting other team members when they did not finish their sentence "John, I'd like you to take care of that" "Jack, I want you to ..." "The budget for this project is..." "The sick-leave figure is relatively low"
6 Idealized influence behavior/Inspirational motivation	(TF) Talking about an important collective sense of vision; Talking about important values and beliefs	"We will end this meeting at 2pm" "Maybe, we need to discuss this point after you are finished" "How you approach the project is much better than 3 months ago"
7 Showing disinterest	(CP) Not taking any action (when expected)	"I am delighted to see that you did not passively waited, but rather pro-actively came with a proposal"
8 Defending one's own position	(CP) Emphasizing one's leadership position; Emphasizing self-importance	"We already discussed this, let's talk especially about how we can avoid these things in the future"
9 Interrupting	(CP) Interfering or disturbing when other team members are talking	"I my opinion, we should..."
10 Directing	(IS) Dividing tasks among team members (without enforcing them); Determining the current direction	"This also reflects how I personally think about the matter"
11 Informing	(IS) Giving factual information	"Yes, I agree with you" "That is not correct"
12 Structuring	(IS) Structuring the meetings; Changing the topic; Shifting towards the next agenda point	"I have to disagree with you on this point" Often jokes are made within the context of the interaction. When 3 or more members laugh the code 'humor' is assigned. "We had a lovely holiday" "My mother is doing better now, thank you"
13 Providing positive feedback	(O) Positively evaluating and rewarding the behavior and actions of team members	
14 Giving own opinion	(O) Giving one's own opinion about what course of action needs to be followed for the organization, department or the team	
15 Agreeing	(O) Agreeing with something; consenting with something	
16 Disagreeing	(O) Contradicting with team members	
17 Humor	(O) Making jokes or funny statements	
18 Giving personal information	(O) Sharing personal information (e.g., about the family situation)	

Note. TA = Transaction behavior; TF = Transformational behavior; CP = Counterproductive behavior; IS = Initiating Structure behavior; O = Other behavior which is not placed in one of these four meta-categories of coded micro-behaviors.

The behavioral input is aggregated by Theme into time sequences of multiple behaviors, based on statistical significance thresholds. First, Theme detects patterns involving 2 sequential behaviors that occur significantly more often than by chance (e.g., ab). Then, Theme searches and ‘builds’ patterns that are more complex (i.e., involving more behaviors: e.g., abcd or abdc). It should be noted that the less complex and smaller initial patterns (identified in Step 1: e.g., ab or cd) are then discarded because they are considered to be less complete. A visual representation including more information about the pattern detection algorithm in Theme is provided in Figure 2. We strove to detect the most important types of patterns.

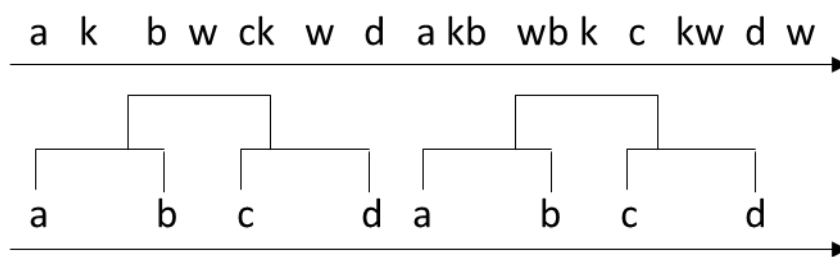


Figure 2. Schematic Illustration of Team Interaction Patterns.⁹

Theme provides the following information about the detected T-patterns: 1) recurring team interaction patterns (i.e., the total number of times patterns of team interaction occurred), 2) heterogeneous team interaction patterns or the number of unique patterns¹⁰, and 3) participative team interaction patterns, as represented by the number of actor switches in a pattern (i.e., the number of times that another actor - leader or follower - starts to speak

⁹ Above the upper horizontal line, random examples of ‘behavioral events’ of individuals (such as w, a, k) are displayed. Below this line, four behaviors of team members (a, b, c, d) are presented that the software detected as part of a pattern of team interaction. An actual team interaction pattern found in the data is, for example, “Leader Counterproductive behavior (a) – Leader Transformational behavior (b) - Leader Transactional behavior (c) – Leader Initiating Structure behavior (d).” More examples of patterns of team interaction can be found in Table 6. Smaller patterns (ab or cd) are combined into more complex patterns that are longer and/or with more levels. The software automatically ensures that the smaller patterns (e.g., ab) that are also part of larger patterns (e.g., abcd), are included.

The team interaction patterns themselves are detected on the basis of critical intervals. For example, in the above figure, behavioral event b occurs later than event a and is part of the later pattern at t. This interval $([t + d1, t + d2](d2 - d1 - 3 \cdot 0))$ (Magnusson, 2000) should include minimally one (1) more incident of b than what would be expected by chance. The search for team interaction patterns stops when no more critical intervals are detected.

¹⁰ For example, the pattern abc occurs 5 times, while the pattern ade occurs 4 times. The total number of unique patterns does not take into account how many times such a pattern occurs: only how many unique patterns can be identified. The patterns, abc and ade, would be both given a count of 1 as they are both unique patterns.

in the patterns). Participative team interaction patterns are thus represented by interaction sequences of the same set of actors.

In this study, a total of 110,635 separate behavioral events were coded, and Theme detected 7,879 behavioral patterns. By comparing the average number of detected patterns in the randomized data with the actual number of patterns, we verified that the generated patterns were due neither to chance nor to the presence of many data points (Figure 3). Here, the randomly distributed data produced significantly fewer patterns. This means that the patterns of behavior found during the team meetings had a statistically valid basis for interpretation. All earlier available team pattern studies (Lei et al., 2016; Kanki et al., 1991; Stachowski et al., 2009; Zijlstra et al., 2012) had smaller sample sizes and focused on pattern length, complexity, and number of actor switches. The focus of the present study is on the context, effects, and behavioral content of team interaction patterns.

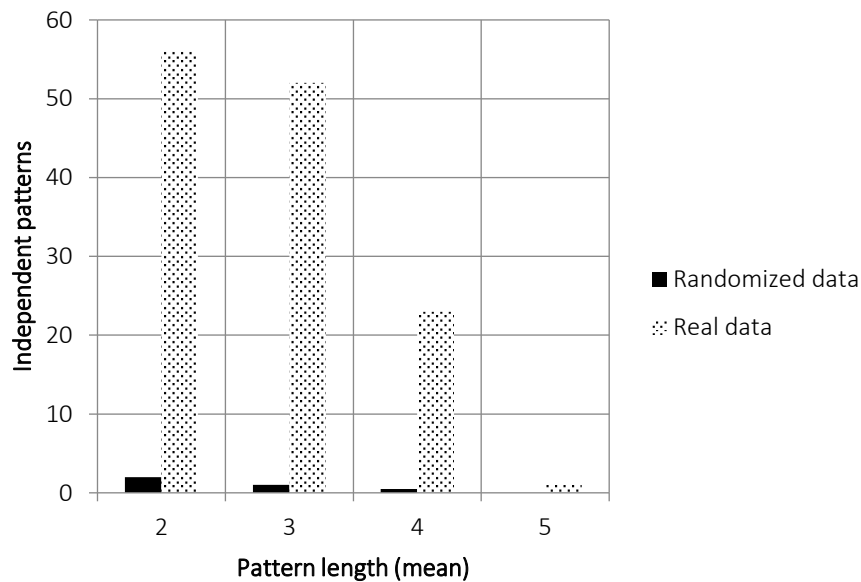


Figure 3. Randomized vs. Real Data.¹¹

Across all Theme analyses, the default of pattern occurrences was set at “3”; based on the minimum meeting time of 30 minutes, a pattern had to occur at least once every ten minutes. A similar default was used by Zijlstra et al. (2012). Figure 3, demonstrating that meaningful patterns were detected, also shows that, in terms of the patterns’ length, fewer

¹¹ The video-coded, actual data are compared with a randomized set of behaviors to test whether the real data set contains meaningful patterns. In this figure, pattern length was taken as the exemplar parameter. The randomization procedure is performed 5 times, by the Theme software, on the basis of which means are computed. This figure shows that the data contain meaningful patterns of team interaction; when randomizing the data, team interaction patterns are no longer found.

patterns were detected that consisted of 4 or 5 behaviors. Hence, the figure also reveals that complex patterns (consisting of more than 3 behaviors) are less likely to be repeated within short time intervals. Although the figure combines two distinct 'parameters (i.e., pattern occurrence and pattern length),' it implies that if a threshold of 4 would have been used (i.e., a pattern had to occur every 7 minutes), the more complex patterns would not have been captured by the analysis. Note that the number of patterns was standardized to the shortest video time to control for variability in the staff meeting duration.

T-pattern analysis has been used in several domains, including animal research (Casarrubea, Sorbera, Magnusson, & Crescimanno, 2011), sports science (e.g., Bloomfield, Jonsson, Polman, Houlihan, & O'Donoghue, 2005), child psychology (e.g., Merten & Schwab, 2005), psychiatry, psychopharmacology, ethology and, only recently, team research (Lei et al., 2016; Stachowski et al., 2009; Zijlstra et al., 2012). The software reveals patterns that would be difficult to observe with the naked eye and are therefore easily overlooked.

Task context. The organization distinguishes between teams working in a routine vs. nonroutine task context. This classification of teams is a long-standing tradition in public-sector organizations in the Netherlands. The same distinction was adopted here. The teams that work in a routine task context are described as doing comparatively more of the same, repetitive tasks. They do work that includes strong procedural guidelines, including protocols on what to do when deviations occur. Teams who operate in a non-routine task context are constantly facing new situations and have to continuously adapt their way of working, to fit the changing task context. Hence, the level of task complexity varies between the teams who operate in routine vs. non-routine task contexts. In total, 40% of the teams in our sample worked in routine task contexts, the rest in nonroutine task contexts.

Control variables. Prior studies that examined both information sharing and the nature of team interactions noted that these dynamics are impacted by the gender and age of the group members as well as by team tenure and size (e.g., Chang, Bordia, & Duck, 2003; Gersick & Hackman, 1990; Gardner et al., 2012; Stasser, Taylor, & Hanna, 1989). Compared to team members that had spent a long time working together, those team members who had spent less time working together showed more adaptive interaction dynamics (Gorman et al., 2010). Throughout the analyses, individual responses about gender, age, and tenure in the team were aggregated to the team level. Team size was measured by the total number of employees.

Data Analysis

To test the hypotheses, hierarchical multiple regression analyses were conducted. All the reported agreement and reliability indices, for the variables for which more than 1 rater was present, justify aggregation to the team level (James, Demaree, & Wolf, 1984). The variables and our theorizing were all pitched at the team level. Hence, we did not perform

a multilevel analysis (Gooty & Yammarino, 2011). Although we tested the mediation hypothesis with Baron and Kenny’s (1986) four well-known conditions,¹² we strengthened the examination of the moderated mediation effects by following Edwards and Lambert (2007). Previous tests of moderated mediation, such as splitting the data into subgroups (e.g., Fabrigar & Wegener, 2011), the moderated causal steps procedure for mediation (Baron & Kenny, 1986), or the piecemeal approach to test mediation and moderation, have limitations: they do not reveal which of the dependent, independent, or mediator paths vary as a function of the moderator; or they lower the statistical power by splitting up the sample. Using the path-analytical approach, in addition to Baron and Kenny’s (1986) procedure, provides several important benefits and overcomes the issues associated with these earlier analytical approaches.

RESULTS

Descriptive Statistics

Means and standard deviations of the variables in the hypothesized model, as well as their zero-order correlations, are shown in Table 2. Tables 3, 4 and 5 present the results of the hierarchical regression and moderated path analyses of the proposed moderated-mediation model.

Table 2.
Means, Standard Deviations, and Correlations

	<i>M</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>	1	2	3	4	5	6	7	8	9
1. Team effectiveness	6.95	.64	5.00	8.00									
2. Team information sharing	5.19	.49	4.13	6.50	.48 ***	-							
Recurring team interaction													
3. patterns	82.07	119.19	3.00	434.00	-.33 **	-.30 **	-						
Heterogeneous team													
4. interaction patterns	18.67	26.64	1.00	105.00	-.05	-.03	-.23 *	-					
Participative team													
5. interaction patterns	1.18	.52	.29	2.33	.27 **	.31 **	-.25 *	.04	-				
6. Team gender	1.33	.19	-	-	-.02	-.18	-.01	.02	.08	-			
7. Team age	49.25	5.11	33.95	59.83	-.02	-.04	.04	-.04	.03	-.37 ***	-		
8. Team tenure	3.73	3.12	.63	17.03	.02	-.04	.15	-.09	.09	-.31 **	.34 **	-	
9. Team size	13.32	5.89	4.00	33.00	.01	-.17	.03	-.06	-.09	.17	.04	.02	-
10. Task context	1.60	.49	-	-	.06	-.00	-.27 **	.07	.22 *	-.14	.12	-.07	-.14

Note. *N* = 96. * *p* < .05. ** *p* < .01. *** *p* < .001. Gender was coded “1” = Male and “2” = Female. Task context was coded “1” = Routine and “2” = Nonroutine. Team tenure was measured in years.

¹² The first step is to test the relation between the independent and the dependent variable. When this effect is significant, in step 2, the effect between the independent variable and the mediator must also be significant. In the final, third step, the relationship between the mediator variable and dependent variable should be significant while controlling for the independent variable.

Hypotheses Testing

Support was found for Hypothesis 1, which proposed that the relationship between recurring patterns of team interaction and team effectiveness is mediated by information sharing. The hierarchical regression analysis shows that 1) recurring team interaction patterns were negatively related to team effectiveness ($\beta = -.34, p < .01$: Model 2 for team effectiveness); 2) recurring team interaction patterns were negatively related to team information sharing ($\beta = -.31, p < .01$: Model 2 for team information sharing); and 3) when controlling for recurring team interaction patterns in the regression equation, the relationship between information sharing and team effectiveness remained significant ($\beta = .46, p < .001$: Model 4 for team effectiveness).

No support was found for Hypothesis 2, which stated that heterogeneous team interaction patterns are positively related to team effectiveness through information sharing. Heterogeneous team interaction patterns did not significantly predict team effectiveness ($\beta = -.05, ns$: Model 5 for team effectiveness) nor team information sharing ($\beta = -.05, ns$: Model 3 for team information sharing).

Hypothesis 3, stating that the relationship between participative team interaction patterns and team effectiveness would be mediated by information sharing, was supported. Participative team interaction patterns were significantly related to team effectiveness ($\beta = .29, p < .01$: Model 7 for team effectiveness), fulfilling the first condition for mediation. They were significantly and positively related to information sharing ($\beta = .31, p < .05$: Model 4 for team information sharing), fulfilling the second mediation condition. Finally, while holding participative team interaction patterns constant, information sharing significantly predicted team effectiveness ($\beta = .48, p < .001$: Model 8 for team effectiveness).

Table 3
Results of Hierarchical Regression Analyses

	Team information sharing					Team effectiveness															
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11										
<i>Control variables</i>																					
Team gender	-.21	-.22	-.22	-.25 *	-.21	-.15 **	-.20 †	-.20 †	-.24 *	-.21 †	-.23 *	-.03	-.02	.08	-.03	.08	-.03	.08	-.06	.06	
Team age	-.09	-.11	-.09	-.13	-.11	-.07	-.07	-.07	-.10	-.09	-.11	-.04	-.04	.01	-.04	.01	-.04	.01	-.07	-.01	
Team tenure	-.03	.07	-.08	-.05	.05	-.03	-.08	-.07	-.05	-.01	.03	.03	.08	.07	.09	.02	.06	.05	.07	.07	
Team size	-.15	-.22 *	-.15	-.10	-.20	-.31	-.14	-.13	-.10	-.10	-.10	.02	.02	.09	.02	.09	.02	.09	.05	.10	
<i>Independent variable</i>																					
Recurring team interaction patterns	-.31 **				-.40 ***	-.28 *					.21 †			-.34 **						-.20	
Heterogeneous team interaction patterns		-.05			-.05	-.09					.12										-.05
Participative team interaction patterns				.33 *					.38 ***	.28 **	.23 *										
<i>Moderator</i>																					
Task context					-.18	-.13	-.06	-.05	-.15	-.15	-.17										
<i>Interaction</i>																					
Recurring team interaction patterns*											-.20 *										
Task context																					
Heterogeneous team interaction patterns*								.06			-.02										
Task context																					
Participative team interaction patterns*																					
Task context												.28 **	.19 †								
<i>Mediator</i>																					
Team information sharing																					.52 ***
																					.48 ***
R ²	.07	.15	.08	.18	.15	.24	.07	.07	.20	.26	.36	.00	.12	.26	.29	.00	.26	.08	.27	.08	.27
F	1.64	3.04 *	1.44	3.82 **	3.52 **	3.73 **	.98	.86	3.39 **	4.16 **	3.98 ***	.05	2.28 *	6.13 ***	6.01 ***	.08	5.06 ***	1.57	5.43 ***	5.43 ***	

Note. N = 96. † p < .10. * p < .05. ** p < .01. *** p < .001.

Table 4

Results of the Moderated Path Analysis for Recurring Team Interaction Patterns

Moderator	Recurring team interaction patterns (X) → Team information sharing (M)				
	→ Team effectiveness (Y)				
	Stage		Effect		
	<i>First</i>	<i>Second</i>	<i>Direct effects</i>	<i>Indirect effects</i>	<i>Total effects</i>
<i>PMX^a</i>	<i>PYM^b</i>	<i>PYX^c</i>	<i>PMX*PYM</i>	<i>PYX + (PMX*PYM)</i>	
Routine task context	-.07 [-.24, .11] ^d	-.12* [-.22, -.05]	-.20 [-.45, .04]	-.08 [-.27, .11]	-.19 [-.45, .05]
Non-routine task context	-.14* [-.25, -.07]	-.11* [-.21, -.03]	-.11 [-.28, .07]	-.14* [-.29, -.04]	-.11 [-.30, .08]

Note. $N = 96$. ^a PMX: path from recurring team interaction patterns to team information sharing. ^b PYM: path from team information sharing to team effectiveness. ^c PYX: path from recurring team interaction patterns to team effectiveness. * $p < .05$.

The results support Hypothesis 4, which posited that task context moderates the relation between recurring team interaction patterns and team information sharing ($\beta = -.23$, $p < .05$: Model 6 for team information sharing, see Figure 4). Further support for the hypothesized indirect effect was obtained using moderated path analysis (Table 4). Differences in the effects of routine vs. nonroutine task contexts show that the first stage of the indirect effect was stronger for the nonroutine task context (.14 - .07 = .07, $p < .05$). In the second stage, the indirect effect was slightly stronger in routine task contexts (.12 - .11 = .01, *ns*). The differences in the first stage contribute especially to a significantly stronger indirect effect in knowledge-intensive team-task contexts. The negative relationship between recurring patterns of team interaction and team information sharing was significant in nonroutine task contexts (simple slope = -.31, $t = -3.47$, $p < .01$), but not in routine task contexts (simple slope = -.16, $t = -1.91$, *ns*).

No support was found for Hypothesis 5, which stated that a task context moderates the relation between heterogeneous team interaction patterns and team information sharing ($\beta = .06$, *ns*: Model 8 for team information sharing).

Support was found for Hypothesis 6, which posited that task context moderates the relationship between participative team interaction patterns and information sharing ($\beta = .28$, $p < .01$: Model 10 for team information sharing). We also found further support for the moderated-mediation effect in the results of the moderated path analysis (see Table 5).

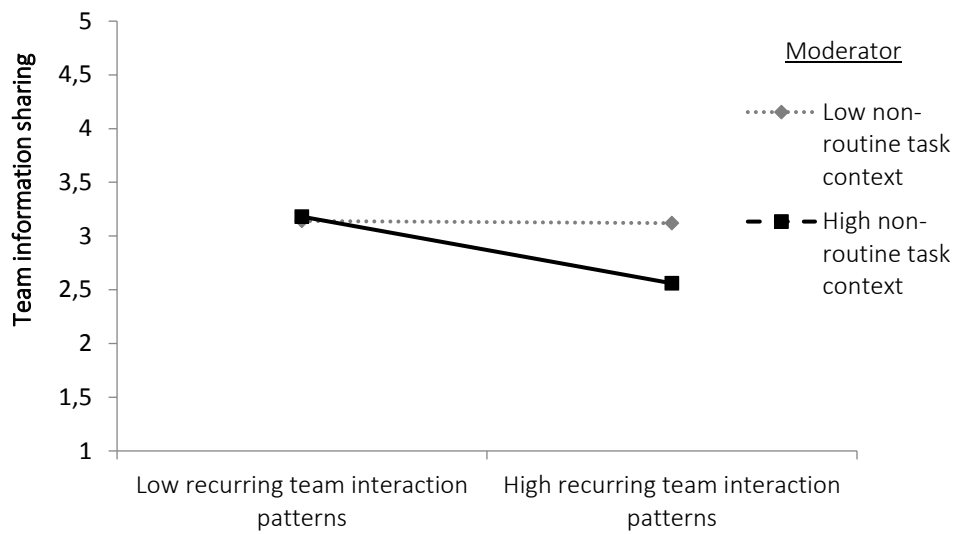


Figure 4. Moderating Effect of Task Context between Recurring Team Interaction and Team Information Sharing.

Table 5

Results of the Moderated Path Analysis for Participative Patterns of Interaction

Moderator	Participative team interaction patterns (X) → Team information sharing (M)				
	→ Team effectiveness (Y)				
	Stage		Effect		
	First	Second	Direct effects	Indirect effects	Total effects
	PMX ^a	PYM ^b	PYX ^c	PMX*PYM	PYX + (PMX*PYM)
Routine task context	-.07 [-.24, .11] ^d	-.12* [-.22, -.05]	-.20 [-.45, .04]	-.08 [-.27, .11]	-.19 [-.45, .05]
Non-routine task context	-.14* [-.25, -.07]	-.11* [-.21, -.03]	-.11 [-.28, .07]	-.14* [-.29, -.04]	-.11 [-.30, .08]

Note. $N = 96$. ^a PMX: path from participative team interaction patterns to team information sharing. ^b PYM: path from team information sharing to team effectiveness. ^c PYX: path from participative team interaction patterns to team effectiveness. * $p < .05$.

When comparing the differences in the effects of the nonroutine versus the routine task contexts, the results show that the first stage of the indirect effect was stronger for the nonroutine task context ($.37 - .09 = .28, p < .05$). The indirect effect was somewhat stronger in routine task contexts in the second stage of the model ($.21 - .19 = .03, ns$). The big differences in the first stage of the model are in line with our prediction of a stronger effect of participative team interaction patterns in a nonroutine task context. This moderation effect is visualized in Figure 5, including the simple slope for the nonroutine task context (simple slope = $.43, t = 4.53, p < .001$) and the routine task context (simple slope = $.27, t = 2.57, p < .05$).

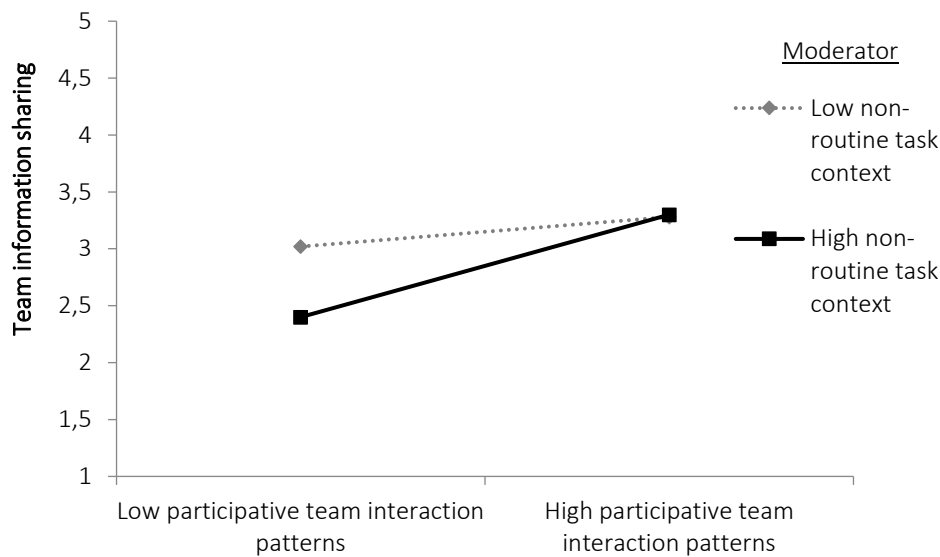


Figure 5. Moderating Effect of Task Context between Participative Team Interaction and Team Information Sharing.

When analyzing the control variables that were included in our hierarchical regression analyses, team age and tenure yielded no significant effects on information sharing and team effectiveness. In some models on team information sharing, a significant negative relationship between team gender and team information sharing appeared (see, e.g., $\beta = -.23, p < .05$: Model 11 for team information sharing): if more females were part of the team, lower perceptions on information sharing were obtained. If the team consisted of more males, higher levels of perceived information sharing were attained.

Post-hoc Analysis

No effects were found for the heterogeneous team interaction patterns; this type of pattern was not associated with information sharing or effectiveness. To better understand how all three patterns are linked to perceived information sharing and team effectiveness, we conducted post-hoc content analysis of the behaviors involved in the patterns. Table 6 illustrates the most frequently occurring patterns within the 15 most-effective and the 15 least-effective teams. These teams were selected on the basis of an extreme scores analysis in which the most-effective teams had effectiveness scores above 7.5 and the least-effective teams had scores below 6.25 (on a scale of 1 to 10, which is the most customary performance rating scale in the Netherlands). The number of frequently occurring patterns was 258 for the most-effective teams and 263 for the least-effective teams. The pattern

characteristics were visualized by the software program but were counted manually.¹³ By doing this, we overcame the limitation noted by Gorman et al. (2012) of looking only at mean results; we also engaged in a detailed behavioral content analysis.

Table 6
Post-hoc Analysis: Differences in the Behavioral Content between the Most- and Least-Effective Teams

Most effective teams (N = 15)				Least effective teams (N = 15)			
	Number of teams in which the Observed number of interaction patterns was		Pattern	Number of teams in which the Observed number of interaction patterns was		Pattern	
	displayed	displayed		displayed	displayed		
1	33	5	Leader TA - Follower IS - Follower TA	27	5	Leader TA - Follower IS - Leader IS	
2	32	5	Leader TF - Leader TA - Leader IS	19	4	Follower TA - Leader IS - Follower IS	
3	32	5	Leader TA - Follower IS - Leader IS	19	3	Follower TA - Leader IS - Leader TF	
4	31	4	Follower IS - Follower TA - Leader - IS	15	2	Follower IS - Follower TA - Follower CP	
5	25	3	Leader TA - Leader TF - Leader IS	15	3	Follower IS - Follower TA - Follower CP	
6	23	6	Leader TA - Follower IS - Leader TF	14	3	Follower TA - Leader CP - Follower CP	
7	22	4	Leader TA - Follower TA - Leader IS	13	3	Follower TA - Leader IS - Follower CP	
8	21	4	Leader TA - Follower IS - Follower TA	12	2	Follower IS - Leader TA - Leader IS	
9	20	4	Follower humor - Leader humor - Leader IS	11	3	Leader TA - Follower IS - Leader IS	
10	19	4	Follower TA - Follower CP - Follower IS	10	3	Follower TA - Leader TA - Follower IS	
11				10	3	Follower TA - Follower CP - Leader IS	
12				10	2	Follower TA - Leader IS - Follower CP	
13				9	3	Follower CP - Leader TF - Leader TA - Leader IS	
14				9	2	Follower TA - Leader IS - Leader TA	
15				8	2	Follower TA - Follower humor - Leader IS	
16				8	2	Follower TA - Leader TF - Leader IS	
17				8	2	Follower TA - Follower IS - Leader IS	
18				8	2	Follower TA - Leader TA - Leader IS	
19				8	2	Follower TF - Leader IS - Leader TF	
20				8	2	Follower TF - Follower TA - Leader IS	
21				8	2	Leader CP - Follower CP - Leader IS	
22				7	2	Follower CP - Follower TA - Leader CP	
23				7	2	Leader TA - Follower TF - Leader IS	
Total	258			263			

Note. This “extreme teams” analysis is only made for illustrative purposes. In total, 678 team interaction patterns were detected in the 15 most-effective teams versus 1603 in the 15 least-effective teams. The 15 most-effective teams scored above 7.50 on team effectiveness (on a scale of 1 to 10, 10 meaning extremely highly effective); 8 of them were knowledge-intensive teams. The 15 least-effective teams scored lower than 6.25 on team effectiveness; 8 of them were knowledge-intensive teams. In terms of the behavioral categories: TA = Transactional behavior; TF = Transformational behavior; CP = Counterproductive behavior; IS = Initiating Structure behavior. The pattern in italics occurs both in the most-effective and least-effective teams. See Table 1 for an overview of the video-coded behaviors.

Table 6 shows that even the most-effective teams showed recurring behavioral patterns, but much less so than the least-effective teams. In terms of the content of the interaction patterns of the most-effective teams, task-oriented behavior prevails; in the most-effective teams many patterns consist entirely of task-oriented behaviors, such as transactional or

¹³ An option to retrieve a summary of the different interaction patterns was missing in the software program. Therefore, the content analysis and counting of the different behavioral patterns were done manually. In total, 678 and 1,603 patterns were found for the most-effective and least-effective teams, respectively. Given the total number of 7,879 patterns, we analyzed about 33% of the total number of patterns of the most-effective and about 16% of the least-effective teams.

initiating structure behavior (e.g., leader transactional – follower initiating structure – follower transactional; see Table 6, row 1). This task-directedness was observed in 54% (i.e., from rows 1, 3, 4, 7, and 8 we add up: $(33 + 32 + 31 + 22 + 21)/258$) of the most-effective teams, compared to just 40% in the least-effective teams. It is noteworthy that the task-oriented ‘transactional’ and ‘initiating structure’ behaviors were the most dominant type of behaviors in the identified team interaction patterns (Judge & Piccolo, 2004). Surprisingly, transformational behavior hardly played a part in the patterns presented in Table 6. The least-effective teams demonstrated much more counterproductive behavior within their interactions; this behavior occurred in 38% of their patterns, compared to 7% in the highly effective teams (Table 6).

Another differentiator between the most-effective and least-effective teams was the type of team member who initiated a team interaction pattern. In the least-effective teams, followers initiated interaction patterns more often than the leaders (80% of the patterns in the least-effective teams versus 27% in the most-effective teams). Conversely, more leader-only patterns were visible in the most-effective teams; in such patterns, the leader appraised, inspired, and steered his or her team.

DISCUSSION

This CAS study identified three team interaction patterns in two types of real-life task contexts and examined how the patterns relate to perceived team information sharing and team effectiveness. Multi-method/source data on the 96 videotaped teams, involving the micro-behaviors of 1,395 team members, were used to link the patterns to both perceived team information sharing and effectiveness. By combining linear and nonlinear statistical methods, we established that a high frequency of recurring team interaction patterns reduces the sharing of information among team members, especially in nonroutine task contexts, thereby lowering team effectiveness. In both nonroutine and routine task contexts, participative team interaction patterns are shown to be beneficial for perceived information sharing and team effectiveness. No effects were found for the heterogeneous team interaction patterns; this type of team interaction pattern appears not to be associated with team information sharing or effectiveness. Potentially divergent effects of the possibly related team interactive and compositional heterogeneity may have masked the hypothesized effects. Through content analysis, we illustrated that even the highly effective teams show recurring patterns. As noted by Gersick and Hackman (1990), a certain low degree of recurring team interaction is needed to accomplish team goals. The most-effective teams appear to have predominantly task-based interaction patterns that only recur occasionally. The least-effective teams manifest many more counterproductive behaviors.

We have shown that team dynamics captured with nonlinear techniques might be coupled to important team processes, such as perceived team information sharing. Having identified how this key process may be reached (through non-recurring, participative team interaction), by viewing teams as CAS and incorporating nonlinear techniques, we extend the linear team research tradition (Ramos-Villagrasa et al., 2018). In addition to establishing that both non-recurring and participative team interaction patterns are associated with information sharing and effectiveness, our study shows that the effects of those patterns can depend on the team-task context. Thus, we empirically support the idea that the task context is a key aspect of teams as CAS (Kerr, 2017; Ramos-Villagrasa et al., 2018; Stevens & Galloway, 2014); Highly knowledge-intensive teams are more vulnerable to the negative effects of recurring team interaction patterns, as this limits their information sharing. A greater variety of informational sources, such as those from various external and internal stakeholders, must then be integrated to make high-quality team decisions (Cummings & Cross, 2003). To perform well as a team, members of knowledge-intensive teams must bring together disparate bodies of information and knowledge for robust team sharing of information (Hau, Kim, Lee, & Kim, 2013). Based on our results, this can be accomplished with a high degree of participative deliberation within these teams. More generally, to improve their information sharing capacity and effectiveness, both types of teams should become more participative in their patterns of team interaction. But because little information exchange and elaboration are usually needed in effective routine team task execution (Resick et al., 2014), many recurring interaction patterns are less detrimental for routine types of team work (see the moderation effect in Figure 4).

Our findings support a key element of the team information sharing theory (Stasser & Titus, 1985). Team information sharing implies adaptive coordination, which in turn can explain why teams with participative interaction patterns contribute to a higher level of team effectiveness, and why teams with mainly recurring team interaction patterns contribute so little. Our results show that team information sharing is especially inhibited when teams engage in recurring interaction patterns. In other words, recurring interaction patterns can be seen as signs of team “information processing failure” (Schippers et al., 2014, p. 731). Full utilization of the potentially available informational resources of all team members leads to a high level of team effectiveness. This research outcome points to the potential value of examining leadership relationally, i.e., examining leaders and followers together, ‘in interaction,’ rather than separately, which is particularly relevant for teams that are knowledge-intensive or involved in nonroutine tasks. New CAS studies of teams should explain how effective team interaction patterns are established, i.e., under what sort of team conditions? We must then also trace actual versus perceived team information sharing and interaction patterns over time. Multilevel-type data collection would be needed to complement such promising longitudinal team analyses. Indeed, adopting a NDS

approach has consequences for both theory and research design (Kozlowski & Chao, 2012; Roe, Gockel, & Meyer, 2012).

Practical Implications

One of the fundamental characteristics that make a team ‘a team,’ and more than just a collection of individuals, involves the interactions that occur between and among its members. The present study found that team interaction patterns need to match their task environment; an adequate match, in essence, leads to effectiveness. We show evidence in this study that participative team interaction patterns are associated with a team’s extensive sharing of information and, in turn, with team effectiveness in both routine and nonroutine task contexts. Especially in nonroutine task contexts, recurring team interaction patterns are undesirable, because then little information is exchanged among the members of a team, which makes the team ineffective. Thus, to be effective as a team, its members need to become aware of the patterns in their team interactions so that they can move to or stay in a mode in which they can optimally share and use each other’s information.

Especially leaders of teams must become aware of the effectiveness benefits of various interaction patterns; In order to achieve team effectiveness, high participative and few recurring interaction patterns among the members must be ensured. Team coaches must also be able to detect the two team interaction patterns with the demonstrated opposing effects. Such coaches are increasingly charged with ‘getting teams out of a rut’ or with helping team members and leaders to adapt better to the realities of their task environment (Hackman & Wageman, 2005). On the basis of our results, coaching guidance seems especially important for restoring the effectiveness of knowledge-intensive work teams. A final, more classical strategy to reduce the debilitating recurrent team interaction patterns is changing the composition of a team; how to do that well during an important team assignment is a practically relevant topic deserving future quasi-experimental field research into the degree to which and when certain members of teams are more inclined to engage in recurring team interaction patterns than other members.

Strengths, Limitations, and Future Research

The examination of real-time, behavioral data in order to understand team effectiveness better has been on the research agenda for at least a decade (Arrow et al., 2004; Cronin et al., 2011; Humphrey & Aime, 2014; Leenders et al., 2015; Mathieu, Maynard, Rapp, & Gilson, 2008; Salas, Cooke, & Rosen, 2008). To the best of our knowledge, no other large-scale, time-based study has coupled various team interaction patterns – derived from real-life organizational team member behaviors – to different team task contexts. This CAS study has also limitations that must be acknowledged.

First, the study was carried out within a single organization in the Netherlands. Different patterns of team behavior may exist in other national and organizational cultures (Erez & Earley, 1993; Perlow, 2003), especially because the Netherlands is known as a low power-distance country. In the Netherlands, participation in a team's affairs during regularly scheduled team meetings is the norm. Similar research in a high power-distance country must examine whether or not comparable results of participative team interaction patterns on team information sharing and effectiveness can be retrieved. Future studies will thus need to examine whether the results are generalizable across nations or cultures.

Second, although our hypothesized relationship between heterogeneous interaction patterns, information sharing, and subsequent team effectiveness yielded no results, other studies did find an effect of heterogeneous interaction patterns on team performance. Kanki et al. (1991) established that team performance is inhibited in aviation teams when the interaction patterns are more heterogeneous. Aviation teams need to perform in highly standardized and formalized work contexts, with predefined protocols for information sharing. Heterogeneous interaction patterns might inhibit effective information sharing in crisis contexts because, in order to respond quickly to a rapidly changing situation, the members must share the most crucial information efficiently so as to resolve the situation. Hence, although the suggested relationship could not be confirmed empirically in this study, it was found to be crucial in another context.

Third, the data include one video recording per team of one randomly selected, regularly held team meeting. Nevertheless, all behaviors of the 1,395 team members in those 96 team meetings, including 96 leaders, were reliably coded with a predeveloped behavioral observation scheme. To date, fine-grained analytical techniques have been cumbersome, and team processes have been typically studied as aggregated, perceptual measures, without considering the time-based patterns of team interaction (Leenders et al., 2015). Even though footnote 5 shows that the nonlinear software in use still needs improvement, future team-effectiveness research can be greatly enriched with continuous-time data from real-life patterns of team interaction.

Fourth, even though the methods used in this study enable the mapping of three different patterns of real-time team interactions, the field data is cross-sectional. Due to our use of various methods and sources, common-source/method bias is not an issue, and moreover, the order in which we collected the data for the variables is correctly reflected in our analyses. More research on the antecedents and content of team interaction patterns is recommended so that leaders and coaches are enabled even better to prevent or correct detrimental patterns (Bolger & Laurenceau, 2013). Qualitative examinations of how team interaction patterns unfold over time (e.g., Harrison & Rouse, 2015) could result in a more complete understanding of the development of such patterns.

Fifth, in this study we rely on a perceptual measure of information sharing. Hence, by using this measure to assess information sharing we were not able to delineate whether the shared information is either unique or common knowledge (Stasser & Titus, 1985). Moreover, information can take different forms (see, e.g., Uitdewilligen & Waller, 2018, who distinguished between fact, interpretation and projection sharing). Future empirical research on the team dynamics of information sharing must focus on the different types of information sharing needed in various task contexts. Most prior studies on the relationship between information sharing and team effectiveness have relied on the perceptions of team members. Also, using more objective measures of information sharing within teams has become desirable.

CONCLUSION

We took a complex adaptive system approach to better understand how real-life interaction patterns within teams are associated with team effectiveness in different task contexts. As hypothesized, when a large number of recurring team interaction patterns are present, this is negatively related to team effectiveness, through limited team information sharing. Instead, the more teams engage in participative patterns of interaction, the more they engage in information sharing which, in turn, is associated with higher levels of team effectiveness. Knowledge-intensive teams in particular are advised to avoid frequently recurring patterns of team interaction. Teams working on routine tasks can be less concerned with recurring patterns of interaction, because their work requires less information sharing. Nonetheless, both types of teams, their leaders, members and coaches should learn how to reduce recurring team interaction patterns and instead promote participative or collaborative patterns of team interaction. Given that the world is increasingly affected by the outcomes of knowledge-intensive teams, and nonlinear research methods are progressively available, we suggest that future research on work teams consider the use of more video-based CAS investigations to complement traditional methods.

ACKNOWLEDGEMENTS

We would like to thank our editor Deanna D. M. Kennedy and the anonymous reviewers for their constructive comments and feedback throughout the review process.

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6

Co-constructive Patterns of Interaction Between Effective Leaders and Followers and Effective Followers and Leaders:

A Video-Based, Multi-Level Field Study in Support of Complementary Behavior

A previous version of this chapter has been presented at the Academy of Management conference, Anaheim, United States, August, 5-9: Hoozeboom, A.M.G.M. & Wilderom, C.P.M. (2016). *Comparing Effective Leader and Follower Behavior: A Video-based, Multi-level Field Study*.

A further improved version was presented at the 30th Annual British Academy of Management Conference, Newcastle, United Kingdom, September, 6-8: Hoozeboom, A.M.G.M. & Wilderom, C.P.M. (2016). *Comparing Effective Leader- and Followership Behaviors: A Video-based, Multi-level Field Study*.

Currently, the chapter is requested to be revised for resubmission at the *Journal of Applied Psychology*.

ABSTRACT

Relational approaches to leadership are now at the forefront of leadership research. However, our understanding of the actual, in situ interactions between leaders and followers—whereby leadership as a relational construct is co-constructed—remains limited. In this field study, we video capture 101 regularly scheduled team meetings involving 101 leaders and 1,266 followers to address the question: What are the micro-behavioral patterns of interaction of effective leaders and followers? Our findings demonstrate that the highly effective leaders make use of both transformational and transactional behaviors, eliciting productive follower responses in the form of voice and informing behavior, respectively. Not only the highly effective leaders but also the highly effective followers were found to elicit complementary responses within their teams (i.e., they evoke follower informing behavior with both their transformational and transactional behaviors). Less effective *leaders* made more frequent use of transactional behaviors, right after which more of the same own leader behavior ensued, acting in effect to suppress follower behavior. The less effective *followers* did not trigger any complementary behavior either from their leader nor from their team members, but rather trigger similar behavior. In effect, less effective followers evoked a similar type interaction pattern as compared to the less effective leaders. Hence, we show that both the highly effective leaders and followers elicit active input from the followers. At the team level, effectiveness appeared associated with the same complementarity mechanism. Additional research to further illuminate these temporal patterns of interaction can help both leaders and followers work together more effectively.

INTRODUCTION

-- "If you think you're leading, but no one is following, then you're only taking a walk" -- Afghan proverb

Today, the idea that leadership depends on both leaders and followers, working together for positive outcomes, may be a given, something of a truism. Indeed, Endres and Weibler (2017) proclaim that relational approaches—which consider 'leadership' to be the co-constructed result of the interactions between leaders and followers—have now become the 'zeitgeist' of contemporary leadership research. Historically, we can trace the origins of a relational approach back to leader-member exchange theory (LMX) (Dinh et al., 2014). Emerging in the mid-1970s, LMX focused explicitly on both leaders *and* followers, as well as the relationships between them. In a seminal paper that lay the foundation for LMX, Dansereau, Graen, and Haga (1975) wrote that leadership research up until that time had rested on two assumptions:

first, that “the members of an organizational unit who report to the same supervisor” were “sufficiently homogeneous” that they could be treated as a “single entity,” and second, that leaders, as a result, could behave “in essentially the same prescribed manner toward each of his [sic] members” (p. 47). As seminal research often does, it moves us forward in our thinking, and also makes us to wonder how we could have conceived of the situation as we once did. How could a thorough understanding of leadership have been possible, we now wonder in retrospect, without acknowledging the followers, and not as an amorphous ‘single entity’ but as unique, agentic co-constructors of leadership?

While the inclusion of ‘followers’ into leadership research began some time ago, ‘followership,’ as a separate topic of research did not appear until recently. In a comprehensive review, Uhl-Bien, Riggio, Lowe and Carsten (2014) report that academic interest in followership is on the rise, and they advocate for more research. Importantly, however, they also caution us not to “replicate our mistakes of the past” (Uhl-Bien et al., 2014, p. 100) by pursuing research on followership separately, in isolation from leadership. Followership approaches “privilege the role of the follower in the leadership process” (Uhl-Bien et al., 2014, p. 89). Shamir (2007) had called already for a more “balanced approach” to leadership research that “views both leaders and followers as co-producers of leadership and its outcomes” (Uhl-Bien et al., 2014, p. 100). Responding to this call for a more balanced approach to leadership research, is the overall objective of this empirical paper.

More specifically, the present field study examines the fine-grained behavioral interaction that occur between leaders and followers, to understand how it is that they work together as ‘co-producers’ of effective leadership (Vroom & Jago, 2007). From a relational perspective, leaders and followers relate, or ‘inter-act,’ to co-produce or co-construct leadership (Hosking, 2000; Uhl-Bien, 2006). A leader ‘en-acts’ a particular behavior, to which followers then ‘re-act’ (and vice-versa). When leaders and followers interact successfully, effective leadership and followership emerge as the co-constructed result (Hosking, 2001; Vroom & Jago, 2007). Close examination of this in situ behavioral interplay between leaders and followers has been called for by numerous scholars (e.g., Avolio, 2007; Benson, Hardy, & Eys, 2016; Humphrey & Aime, 2014; Meinecke, Lehmann-Willenbrock, & Kauffeld, 2017). Keyton and Beck (2015), for instance, highlight the need to better analyze sequential patterns of transformational (relations-oriented) and transactional (task-oriented) behaviors of leaders and followers, and how such patterns relate to effectiveness. An intriguing related question is: do highly effective leaders and followers elicit different responses, than do the less effective among them? And another is: to what degree do patterns of interaction of leaders and followers relate to effectiveness at the team level? These are not new questions. We have known for some time that effective leadership depends on effective followership, and that particularly effective followers can be *complementary* to leadership (Carson, 1969; Kiesler, 1996; Tiedens,

Unzueta, & Young, 2007). Yet our understanding of how effective leadership emerges or what it looks like --in real time and via micro-behavioral patterns between leaders and followers-- remains limited.

We see at least three primary reasons for this limited understanding to date. First, capturing the real-time behavioral interactions and temporal dynamics of leaders and followers, in situ, is labor-intensive work (e.g., Lehmann-Willenbrock & Allen, 2018). As a result, researchers have predominantly relied on post-hoc self-reports and surveys (e.g., Behrendt, Matz, & Göritz, 2017). New methods and technologies, however, are increasingly available, including compact yet high quality video for unobtrusively capturing their interactions, in real-time, and sophisticated software for behavioral analysis (e.g., Hoozeboom & Wilderom, 2019a; Klonek, Quera, Burba, & Kauffeld, 2016; Lehmann-Willenbrock & Allen, 2018; Meinecke et al., 2017).

Second, within extant leadership research there is a problematic entanglement of 'roles' and 'behaviors' (Barley, 1990). While roles are usually formally assigned and relatively fixed, at least in the short term, the behaviors enacted by the people occupying these roles, are much more fluid. This potentially complicates any research inquiry into the interactions between leaders and followers. For example, if a person in a follower role (i.e., operating in a non-leader position or being a 'team member') enacts a behavior normally expected of someone in a leader role (e.g., a 'team leader'), such as paying attention to individual's need for achievement and growth, are they not then, a leader? The potential difficulty can be resolved, however, by making clear, in the research design itself, the distinction between roles and behaviors. From a formally assigned role perspective, 'team members' are not 'team leaders' and the converse is true as well. From a behavioral perspective, however, one could make a strong case that yes, a person successfully enacting leadership behaviors is, at least in that situation or event, a leader. As Follett noted in 1949, leaders are not always 'order givers,' and followers are not always 'order takers.' In other words, leaders sometimes follow, and followers sometimes lead. Certainly this is a useful insight—it's insightful because it makes clear the differentiation between roles and behaviors, and it's useful because it reminds us to make this differentiation clear in our research, and to be more precise in our use of language, foci and measures. It is for this reason, i.e., this fixity and fluidity of roles and behaviors, respectively, that we will focus at the behavioral level: our focus is on the micro-behavioral patterns of interaction between those in the formal roles of leader and follower. Based on these considerations the present study's central question is: What are behavioral patterns of interaction between effective leaders and followers?

For our empirical field research, we chose a site that is particularly well-suited for studying the real-time interactions between leaders and followers: the regularly scheduled

team meeting. As several scholars have noted, leadership is particularly apparent during every day work activities and through talk-in-interaction, as occurring during regularly scheduled meetings (Baran, Rhoades Shanock, Rogelberg, & Scott, 2012; Allen, Yoerger, Lehmann-Willenbrock, & Jones, 2015; Larsson & Lundholm, 2007: 2013; Uhl-Bien, 2006; Vine, Holmes, Marra, Pfeifer, & Jackson, 2008). The existing team structure (with formally assigned roles of team leader and team member) allows for close observation of people in those roles without our behavioral focus being constrained by those roles. At the behavioral event level, we used video-captured and -coded data as well as lag sequential analysis (providing information if a sequence of behaviors occurs above chance) to identify the patterns of behavioral interaction, and their association with the effectiveness of not only the team leader and members (or followers) but also the team as a whole.

With this study we contribute in at least two ways to extant research on leadership, followership, and temporal interaction dynamics in teams. First, by using a balanced-(micro-) behavioral lens, we show what effective interaction patterns of both team leaders and their members look like in practice. By doing so, we thus illuminate what behaviors are involved in how leadership is co-constructed in actual work practice (DeRue, Nahrgang, Wellman, & Humphrey, 2011). Second, no prior study has systematically examined how actual behavioral patterns may be associated with the effectiveness of leaders, members, and their teams (Carson, Tesluk, & Marrone, 2007). Finally, the lag sequential analyses of this study will enlighten the team-effectiveness literature, enabling it to break free from the problematic past reliance on post-hoc survey-based research. We provide an understanding what leaders and followers are doing when they are productively “teaming” and how this process of interacting is associated with higher team effectiveness (Edmondson, 2012).

THEORY

Transformational-transactional as Taxonomy of Micro-behavioral Interactions

A first step in identifying and examining the behavioral patterns of team interaction is the derivation of a comprehensive taxonomy of behaviors. In the present study, we build upon the transformational-transactional model as the basis for such a taxonomy (Bass, 1985; Bass & Avolio, 1995). Several reasons have informed our choice. First, the transformational-transactional model remains one of the most adopted for leadership research (Dinh, et al, 2014). Both transformational and transactional behaviors have long been regarded as essential for effective interaction between leaders and followers (e.g., Zhu, Song, Zhu, & Johnson, 2019). Second, it is a *behavioral* model, i.e. it is focused on behaviors rather than traits or dispositions. Third, the transformational-transactional model is deemed one of the most comprehensive models of leadership, with its transformational, relations-oriented

behaviors and its transactional, task-oriented behaviors, together constituting what many consider to be a fairly “full range” of leadership behaviors (Bass & Bass, 2008; DeRue et al., 2011; Larsson & Lundholm, 2013; Vine et al., 2008). Finally, it is these same behaviors, enacted in a complementary, reciprocal fashion, that might constitute the patterns of interaction between those in the roles of leader and follower. In turn, it is through these patterns of interaction that leadership itself, as a relational construct, is co-constructed.

Although the transformational-transactional model is a behavioral model, the actual behaviors, as operationalized in much of the extant research, are not precise enough for the micro-behavioral focus we intend to pursue. To date, the transformational and transactional behaviors have been operationalized almost exclusively through the use of post-hoc surveys of expert opinion (e.g., Behrendt et al., 2017; Yukl, 2010). However, behaviors operationalized in this way are not always compatible with observable communicative behaviors of leaders and followers during social interactions at work (Hansbrough, Lord, & Schyns, 2015; Behrendt et al., 2017). Because of this imprecise ‘translation’ process, from past observations to perceptions, the Bass model, along with other effective-leadership *survey* scales tend to lack specificity or precision at the behavioral event level or during in situ interactions with followers (Behrendt et al., 2017; Hoogeboom & Wilderom, 2019b; Meinecke et al., 2017). Below we explain how the essential transformational and transactional behaviors were conceptualized or modified at the behavioral event level for both leaders and followers at work.

Transformational Behaviors

Transformational behavior has often been associated with effective leadership (for meta-analytical evidence see, e.g., Judge & Piccolo, 2004) and is focused on enabling other people at work to perform well. Transformational behaviors can motivate, raise awareness of the importance of task outcomes, and activate higher-order needs—that is, they induce workers to transcend their own self-interests for the sake of the team or organization (Bass, 1985; Bass & Avolio, 1995; Yukl, 2012). The defining behaviors of the transformational style are: *idealized influence*, *inspirational motivation*, *intellectual stimulation* and *individualized consideration*. These are communicative behaviors that team leaders and members might enact when, for example, emphasizing the importance of having a collective mission and purpose, or when giving voice to their job-related values and beliefs (Steinmann, Klug, & Maier, 2018). Both leaders and followers can inspire others by vigorously articulating their vision of the work future, e.g. by "convincing peers to embrace the organization’s vision" (Hernandez, Eberly, Avolio, & Johnson, 2011, p. 1167). Furthermore, they can challenge each other to think about opportunities and problems from a different perspective and keep an active eye on individual growth and related opportunities (Bass, 1990).

Transactional Behaviors

While transformational behaviors are focused on people and the enablement of their work, transactional behaviors tend to be aimed at the efficient accomplishment of that work itself (Bass & Bass, 2008; DeRue et al., 2011; Yukl, 2010). In the original model, transactional behavior consists of two main dimensions. The most often studied is contingent reward (CR); that is, the offering of rewards in exchange for task execution. However, CR was also found to be strongly co-varying with the transformational style; its correlation typically exceeds .60 (Michel, Lyons, & Cho, 2011; O’Shea, Foti, Hauenstein, & Bycio, 2009; Rowold & Heinitz, 2007), leading Wang Oh, Courtright and Colbert (2011, p. 234) to conclude that “the predictive power of transactional leadership is solely due to its overlap with transformational leadership.” Hence, CR is not treated here as a part of the transactional style (see, e.g. also, van Knippenberg & Sitkin, 2013). The transactional style’s dimension management-by-exception active (MBEA) represents the essence of transactional behavior more accurately (DeRue et al., 2011; Ewen, Wihler, Blickle, Oerder, Ellen, Douglas, & Ferris, 2013; Vecchio, Justin, & Pearce, 2008; Wang et al., 2011). MBEA is focused on monitoring work processes to ensure that goals are accomplished, and taking pro-active, corrective action when necessary. On the behavioral event level, MBEA entails *task monitoring, correcting and providing negative feedback* (Avolio & Bass, 1995). Hence, in accordance with prior leadership research, we take these three MBEA micro-behaviors to represent the transactional style (Sommer, Howell, & Noonan-Hadley, 2016; Willis, Clarke, & O’Connor, 2017).¹⁴ Such observable MBEA behaviors can be displayed both by the team leaders and members alike (Hollander, 1992). Larsson and Lundholm (2013) reported that followers can also take corrective action, which is an important part of the transactional MBEA cluster. Also on the basis of the self-organizing and substitute-for leadership literatures (Nübold, Muck, & Maier, 2013), it is plausible to assume that follower can, just as leaders, monitor task progress for effective task execution, correct the behavior or actions of co-workers and criticize the behavior or actions of others.

Effective Leader-Follower Interaction Patterns

To explain how leaders and followers can fruitfully interact during social interactions, dominance complementarity theory (Carson, 1969) can help us to understand what the process of a follower’s reaction to a behavior enacted by the leader (and vice-versa) looks like. Dominance complementarity theory argues that people often behave in ways that are complementary to the behavior of another individual. Originally, the theory proposed that effective and high quality interpersonal relationships require complementary of dominance

¹⁴ A related dimension, known as management-by-exception passive (MBEP), was associated with *ineffective* leadership (Howell & Avolio, 1993) and is therefore excluded from the present study.

and submission values and/or behavior (Carson, 1969; Kiesler, 1996; Leary, 1957). In an interaction, complementarity occurs when one person in an interaction takes a dominant and controlling role and the other party takes a more passive role (e.g., Carson, 1969). Research established that such complementarity leads to higher productivity and effectiveness (e.g., Tiedens et al., 2007). On the interpersonal behavioral level, previous empirical work established that functional social interaction in a dyadic situation begets complementarity, such that dominant behavior elicits submissive behavior and vice versa (Sadler & Woody, 2003).

Applying these insights to transformational behavior of a leader, he or she ought to elicit complementary follower behavior, such as a transactional response. Other scholars have argued that such dissimilar behavior can have a complementary function, such that it can lead to higher task performance (e.g., Estroff & Nowicki, 1992; Meinecke et al., 2017). Reasoning from within the behavioral paradigm that the present study adopted, transformational behavior displayed by highly effective leaders is likely to evoke (complementary) transactional behavior from followers. A leader's transformational behavior (e.g., the inspirational collective mission and purpose) enables his or her followers to take it as an invitation to speak up, thereby then expressing what their leader's behavioral utterance means for them in terms of the task that they need to execute. Thus, followers may translate their leader's transformational behavior to task monitoring, correcting or feedback behavior. Specifically, we reason that when *highly effective* leaders display transformational behavior, they pay attention to individual needs, abilities and skills of followers, creating a supportive climate, which enhances follower empowerment, initiative, self-efficacy and self-esteem (Antonakis & House, 2002). The followers in the team thereby highlight their strengths, capabilities and (highly-regarded or expected) contributions which can produce complementary task-oriented follower behavior in turn.

In addition to transactional follower responses to transformational leader behavior of highly effective leaders, complementary voice behavior can be triggered from followers. Meinecke et al. (2017), for example, found that during performance appraisals, relation-oriented behavior of the supervisor (i.e., often paralleled with transformational behavior: Duan, Li, Xu, & Wu, 2017) elicited greater voice and participation from the employee. It can be argued that leaders who show transformational behavior towards their employees promote a climate of high psychological safety in which employees are more eager to voice their own ideas about work-related issues or opportunities (Liang, Farh, & Farh, 2012). Moreover, the personalized attention and visionary behavior that is displayed by transformational leaders enhances a positive self-image which invites followers to offer their own suggestions and beliefs about how work should be handled (Stam, Lord, Knippenberg, & Wisse, 2014). Thus, the highly effective leaders who display

transformational behaviors are expected to evoke voice behavior from followers. On the basis of the above, we propose the following hypothesis:

H1 As compared to less effective leaders, highly effective leaders who display transformational behavior are more likely to trigger transactional behavior (H1a) and active voice (H1b) from their followers.

At the behavioral level, we thus expect that this “interpersonal dance” between a leader and his or her followers may have a complementary function. On the basis of the complementary perspective, we expect that highly effective leaders elicit also complementary behavior when they engage in transactional behavior. As transactional leader behavior includes monitoring task progress and correcting deviations from an effective task execution (Bass & Avolio, 1995), transactional behavior of a highly effective leader is likely to “activate” followers to speak up by providing their own ideas and thoughts about past and/or future directions. There is scant empirical evidence that also points in this direction. A study from Kolbe et al. (2014, p. 1256) showed that in effective surgical teams, monitoring, as an important element of transactional behavior, was followed up by “speaking up behavior” from followers. In such highly performing teams, monitoring behavior by a surgeon was “translated” by followers to voicing their ideas about future coordination needed to treat the patient adequately. Also, in a regular staff meeting, a highly effective leader who displays such transactional behavior may activate and invite followers to share their ideas about what they think of the (task-related) situation. Such speaking up can occur not only in the form of voice behavior, but also in the form of transformational behavior (e.g., by communicating how a certain issue can be reframed or is reason for a new future direction which might create more desirable states for one or more of the actors involved). Hence, we conjecture:

H2 As compared to less effective leaders, highly effective leaders who display transactional behavior are more likely to trigger transformational behavior (H2a) and active voice (H2b) from their followers.

Effective Follower-Leader Interaction Patterns

Previous research has noted that followers can “come to be seen as leaders” at certain moments in the interaction process (DeRue & Ashford, 2010). That is why the leadership process could be considered as a mutually shared and reciprocal influence process, whereby it is not only the formal leader who can exert one-directional or impactful influence (DeRue et al., 2011). Yet, follower behavior does not always match with the behavior that one might expect to see in a formal organizational hierarchy (Hackman & Wageman, 2007). Followers can thus engage in behaviors that are conventionally thought of as behavior exclusively reserved for leaders. Especially when followers expand their own

individual task-effort and act on behalf of the team's purpose, e.g., by highlighting the collective mission of the team, they can affect others within their team and are granted higher effectiveness (Anderson & Brown, 2010). On the basis of these ideas, the behavioral pattern that is evoked by highly effective followers in a team might thus be similar to that of effective leaders.

Moreover, while previous cross-sectional type work established that effective leaders elicit different behavioral responses from their followers than less effective leaders, it can also be expected that highly effective individual followers may affect the team, through their behavior, in a different way than their less effective counterparts (Greene, 1976). Invoking the complementarity perspective to interactions between followers and leaders (e.g., Carson, 1969; Tiedens et al., 2007) we suggest that when highly effective followers show transformational behavior they elicit complementary behavior from their leader. Ideas about the specific complementary behavior that is triggered can be found in a thesis that originated in Bass et al.'s leadership research: the augmentation effect of transformational behavior over transactional behavior (Bass, 1985). The augmentation thesis proposes that transformational behavior explains unique variance over transactional behavior in attaining high performance (Bass, 1990; Bass & Avolio, 1993), but recently also the reverse was being shown: Transactional behavior explains unique variance over transformational leader behavior (Wang et al., 2011). Hence, both behaviors might be needed in a team to achieve high levels of task accomplishment and effectiveness (Bycio, Hackett, & Allen, 1995). Reasoning from both the complementarity *and* the augmentation effect, and assuming that both effects might apply to interaction initiated by the leader but also initiated by the followers, we assume that after a highly effective follower displays transformational behavior, this is followed by leader transactional behavior. When a highly effective follower, for example, invites the team to rethink or reframe a particular problem or specifies the importance of having a collective mission he or she tends to act for the greater good of the team. Equally, if such followers are perceived to be highly effective, they then tend to continue to show such trans-individual behavior (Willer, 2009). When followers engage in transformational behavior, they might evoke the same interaction patterns than an effective leader. Following the complementary perspective, a follower's behavior might then be followed up by a leader's transactional behavior. When effective followers talk about the importance of their mission, for example, this could foster functional communication about the task process to complement the previous speaker's message. The leader can thus 'augment' transformational behavior shown by an effective follower. The leader then translates what the message of the follower means for the task that the team is executing. Returning to the essence of task-execution and translating such higher-order communication between followers and leaders to the specifics of task accomplishment can be done by means of

various behaviors, such as for instance, task monitoring, correcting or feedback behavior: behaviors that can be subsumed as 'transactional' in nature (Willis, Clarke, & O'Connor, 2017).

H3 Compared to less effective followers, highly effective followers who display transformational behavior are more likely to trigger transactional behavior from their leader.

Again, on the basis of complementarity theory and the augmentation thesis (e.g., Wang et al., 2011), we propose, in addition, that highly effective followers who show transactional behavior (such as task monitoring or correcting) trigger behavior from the leader in which he or she clarifies indirectly what should be done in regard to the (higher-order) goals of the team (i.e., transformational behavior). Prototypically, the roles of followers are focused primarily on task accomplishment (Vine et al., 2008). Thus, we expect that followers who show more transactional behaviors during team interaction in meetings, to fulfill this role effectively, typically monitor task progress, correct (if needed) and also provide feedback (Poksinska, Swartling, & Drotz, 2013). Separate from the idea that followers can also show leader behavior, one may expect in terms of the characteristic content of a follower's behavior that he or she is oriented towards the task and thus shows more transactional type behavior (Carsten, Uhl-Bien, West, Patera, & McGregor, 2010). This type of follower behavior is valuable (e.g., for leader effectiveness) because follower monitoring of task execution can reinforce not only innovation but also ensure the attainment of team objectives (Fuller, Marler, Hester, & Otondo, 2015). Hence, if a follower is effective he or she is expected to be task-oriented or transactional; Reasoning from both the complementarity and augmentation mechanisms he or she is likely to trigger from his or her leader complementary behavior, most likely of a transformational nature.

H4 Compared to less effective followers, highly effective followers who display transactional behavior are more likely to trigger transformational behavior from their leader.

Behavioral Dynamics between Leaders and Followers and Team Performance

In the leadership literature, leaders have always been regarded as an attentive and inspiring force for teams (e.g., Bass & Riggio, 2006; Cho & Dansereau, 2010; Hopton, Christie, & Barling, 2012; Judge & Piccolo, 2004; Larsson & Lundholm, 2013). Because they occupy a formal, powerful position in the team, their behaviors are seen as a catalyzer for the social dynamics and behavioral processes in teams (e.g., Sy, Côté, & Saavedra, 2005). However, for a supportive and, at the same time, task-oriented team climate (fostering high task accomplishment), the interactive responses from the leader to followers are equally important. Several scholars have found or noted that followers can have an active and significant role in the leadership process and can be viewed, therefore, as co-constructors

in the process leading to higher team effectiveness (Baker, 2007; Bligh & Kohles, 2012; Shamir, 2007; Uhl-Bien et al., 2014).

Wageman (1995) already claimed that effective teamwork involves frequent interactions between team members either from the leader towards followers or vice versa. Previous empirical work has showed that complementarity in traits and values between leaders and followers enhances team effectiveness (Hu & Judge, 2017; Tiedens et al., 2007). Such traits and values drive behavioral responses during social interaction (Tracey, Ryan, & Jaschik-Herman, 2001). Hence, one may postulate the existence of a behavioral complementarity mechanism operating also at the team level. Originally, dominance complementarity suggests that high-quality interactions are facilitated when dominance and assertiveness are complemented with obedience and submissiveness (Grant, Gino, & Hofmann, 2011; Kiesler, 1983). When we apply this idea to the behavioral level, though, and following the core principles of the complementarity theory that people seek balance in social interaction (Leary, 1957), when one person shows transformational behavior it is more effective if the other person follows up with transactional or voice behavior. This pairing of behavior between leader and followers, and vice versa, can enhance an effective coordination of their tasks, leading ultimately to higher team effectiveness. Thus, we propose:

H5 The interaction patterns in the below are positively associated with team effectiveness:

5a: leader transformational/follower transactional,

5b: leader transformational/follower voice,

5c: leader transactional/follower transformational,

5d: leader transactional/follower voice,

5e: follower transformational/leader transactional, and

5f: follower transactional/leader transformational.

METHODS

Study Design

This study arose from a request by representatives of a large public sector organization in the Netherlands, who wanted to know how to improve the effectiveness of teams and team leaders. In response, researchers drew a stratified random sample of 101 teams, which in total included 101 leaders, and 1,266 followers. For each team, one regularly scheduled team meeting was selected at random, and videotaped. The meetings ranged in duration from 49 minutes to 212 minutes. In total 9,678 minutes of meeting time were coded, resulting in 25,428 discrete behavioral events. The length, style and agenda of the meeting

was under control of the team leaders, with no restrictions from researchers which reduced any interference with the social dynamics of the meetings. Surveys were administered to the followers after each video-taped meeting for perceptions about overall team effectiveness; furthermore, follower effectiveness ratings were obtained from each leader. Moreover, expert scores about the relative effectiveness of each team leader and team were solicited one month later.

Following ethical approvals by the central work council of the participating organization, as well as by our university, team leaders were contacted individually by telephone by one of the researchers and were given information regarding the video-observation and survey procedures.¹⁵

Participants and Procedures

The team leaders' demographics were: 71% male, 29% female; an average age of 51.59 ($SD = 7.27$); an average job tenure of 23.67 years ($SD = 13.63$); and an average team tenure of 2.50 years ($SD = 3.12$); 41.6% had attained a Master's degree, 42.7% had a Bachelor degree and 15.7% were educated at a lower level. Follower characteristics included: 59% males, 41% female; an average age of 48.77 ($SD = 10.68$); an average job tenure of 23.73 years ($SD = 13.89$); and an average team tenure of 4.00 years ($SD = 5.26$). They were predominantly educated at the senior-vocational level (49.1%); some had a Bachelor degree (32.6%) and a Master's degree (18.3%). The minimum team size (including the team leader) was 4, while the maximum team size comprised 28 followers ($M = 12.8$, $SD = 5.7$).

The Research Site

The regularly scheduled team meeting was selected as a research site for several reasons. First, the focal interest of the participating organization was on leaders and followers, and how to improve their effectiveness. The regularly scheduled team meeting allowed for a robust study of both leaders and followers, more robust than, for example, more individualistic investigations of, for example leader-follower dyads. For the participating organization, it is customary for leaders to hold team meetings regularly with all members present, thus ensuring that the results were representative of an entire team. Secondly, team meetings allow researchers to capture leader-follower interactions as they emerge, in real-time, and in situ. Several scholars have emphasized that leadership is particularly visible

¹⁵ Besides collecting data for scientific purposes, the participating leaders received individualized feedback reports, containing both behavioral and survey scores. As a result, most leaders agreed to participate (about 30% were not willing to participate). After collecting the data, two individual coaching meetings were offered by their employer to each of the participating leaders, to discuss their individualized report and to provide feedback on the basis of the video-footage of the studied meetings (i.e., the leaders also received a copy of the tape of the entire meeting: within 24 hours).

in everyday work activities and through talk-in-interaction, such as occurs during regular meetings (Allen et al., 2015; Larsson & Lundholm, 2007: 2013; Uhl-Bien, 2006; Vine et al., 2008). Third, the pre-existing (i.e., prior to our research) appointment of participants into the roles of leader and follower clarifies for researchers who is in the role of leader, and follower, respectively. Combined with our micro-behavioral focus, this allowed us to attribute specific behaviors to specific roles, while at the same time not being constricted to those roles. In other words, our study is designed to accommodate for the fact that 'leaders sometimes follow, and followers sometimes lead.' Finally, numerous previous studies have demonstrated the effectiveness of regularly scheduled meetings as a site for leadership research (see, for example, Baran et al., 2012; Lehmann-Willenbrock & Allen, 2014; Svennevig, 2008; Vine et al., 2008).

Three compact high definition cameras were used for each meeting. To minimize intrusiveness, the cameras were placed in fixed positions in the meeting room, before the arrival of the participants, and with no video technicians present during the meetings. Reactivity, i.e., the influence on behaviors of participants due to the presence of the video equipment, was checked in several ways. First, using a survey administered immediately following the meeting, followers were asked to compare the representativeness of the recorded meeting to previous non-recorded meetings. Specifically, followers were asked to rate, on a scale of 1 ("least representative") to 7 ("most representative"), the representativeness of 1) the leader's behavior during the recorded meeting, 2) their own behavior during that meeting, and 3) the overall representativeness of meeting itself. Followers rated the representativeness of the leader's behavior at a mean of 5.69 ($SD = 1.21$), their own behavior at a mean of 5.88 ($SD = 1.11$), and the meeting itself at 5.50 ($SD = 1.41$). In line with this, there is past empirical evidence that using a paper-and-pencil method to capture team interaction is significantly more obtrusive than video-recording the meeting and coding the behavior afterwards (Smith, McPhail, & Pickens, 1975). Anecdotally, feedback from participating leaders and followers indicated that they quickly forgot about the camera (i.e., it became a natural part of the surroundings) and that normal behaviors quickly ensued after the meeting began. Based on these results, we conclude that the behaviors and the meeting to be acceptably representative.

Behavioral Taxonomy and the Systematic Coding of Behaviors

After the recording, each video was systematically and meticulously analyzed by two independent coders, on the basis of a pre-developed codebook and the use of 'The Observer XT,' specialized video-observation software from Noldus Information Technologies (Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000; Spiers, 2004). Our unit of analysis was a speech segment that indicated a finished statement, a sentence or sometimes even a word (e.g., an utterance like "right" is coded as a micro-"agreement"

behavior) (Bales, 1950; Borgatta, 1962). Using the preset codebook, a behavioral code could be assigned to each speech segment (see, also, Hoozeboom & Wilderom, 2019a). All behavioral codes were mutually exclusive, meaning that when a behavior was observed, no other behavior could be coded at the same time (Hoozeboom & Wilderom, 2019a).

The 16 carefully selected coders had backgrounds in Business Administration, Psychology or Communication Science and were all trained on how to use the software and codebook. They were not aware of the study's hypotheses. An inter-rater agreement of 81.33 (Cohen's kappa = .80: Cohen, 1960) was established, indicating "almost perfect agreement"; Landis & Koch, 1977, p. 165). Guidelines indicate that at least 15-20% of the total video-tapes should be independently coded to calculate the Kappa (Bakeman, Deckner, & Quera, 2005). Instead of following this guideline, 100% of the video-material was analyzed to ensure high quality behavioral coding (using a 2 seconds time interval for agreement; meaning that when coder 1 observed a similar behavior as coder 2, but set the start time of the behavior more than 2 seconds after the start time of coder 2, this would result in a disagreement).

As noted by several scholars (e.g., Bakeman & Quera, 2011; Klonek et al., 2016; Chiu & Lehmann-Willenbrock, 2016), it is important to employ a broad range of codes to account for the behavioral interactions among followers. In this study, we employed a codebook that is based on the transformational-transactional model (Bass & Avolio, 1995) and then supplemented with additional micro-behaviors from the team communication and leadership literatures. The codebook has been validly used in previous studies (Hoozeboom & Wilderom, 2019a; 2019b) and is presented in Table 1.

Table 1. *Definitions and Examples of Video-coded Behaviors of Leaders and Followers*

Behaviors	Definitions	Sub-dimensions	Video-coded Examples (L=Leader; F=Follower)
Transformational (Bass & Avolio, 1995)	<p><u>Idealized influence behavior/inspirational motivation</u>: Specify the importance of having a strong sense of purpose and emphasize the importance of having a collective sense of mission</p> <p><u>Individualized consideration</u>: Pay attention to each individual's need for achievement and growth by acting as a coach or mentor and creating a supportive climate</p> <p><u>Intellectual stimulation</u>: Stimulate effort to be innovative and creative by questioning assumptions, reframing problems, and approaching old situations in new ways</p>	<p>-Idealized influence behavior</p> <p>-Individualized consideration</p> <p>-Intellectual stimulation</p>	<p>"I find it important that we all work in unison towards this shared objective" (L)</p> <p>"There is a vision for 2016-2020 which includes our aims and what types of people need to be recruited" (F)</p> <p>"We are offering a training course in August, which might be helpful for your career planning" (L)</p> <p>" I am willing to help you with it" (F)</p> <p>"My question is: what are your ideas and can we progress from here?" (L)</p> <p>"Before it becomes public knowledge that we cannot manage the workload, what solution, in your opinion, would solve this problem?" (F)</p>
Transactional (represented by Management-by-exception active)	<p><u>Management-by-exception active</u>: Monitoring task execution for any problems that might arise and correcting those problems to maintain current effectiveness levels</p>	<p>-Task monitoring</p> <p>-Providing negative feedback</p> <p>-Correcting</p>	<p>"How is the project progressing?" (L)</p> <p>"Do you also have a specific role in that process?" (F)</p> <p>"I do not think that this is a good solution" (L)</p> <p>"He is not sticking to the agreements that we made last month" (F)</p> <p>"Yes, but that is the wrong decision" (L)</p> <p>"How could you have missed this" (F)</p>
Counterproductive	<p>Not taking any action (when expected); Emphasizing one's leadership position;</p> <p>Emphasizing self-importance; Interfering or disturbing when other team members are talking</p>	<p>-Showing disinterest</p> <p>-Defending one's own position</p> <p>-Interrupting</p>	<p>Not listening actively (L/F)</p> <p>"I am the manager within this organization" (L)</p> <p>"We do it my way, because I am the manager" (L)</p> <p>Disrupting other team members when they did not finish their sentence (L/F)</p>
Directing	<p>Dividing tasks among team members (without enforcing them); Determining the current direction</p>		<p>"John, I'd like you to take care of that" (L)</p> <p>"Jack, I want you to ..." (F)</p>
Informing	<p>Giving factual information</p>		<p>"The budget for this project is..." (F)</p> <p>"The sick-leave figure is relatively low" (L)</p>
Structuring	<p>Structuring the meetings; Changing the topic; Shifting towards the next agenda point</p>		<p>"We will end this meeting at 2pm" (L)</p> <p>"Maybe, we need to discuss this point after you are finished" (F)</p>
Voice	<p>Giving one's own opinion about what course of action needs to be followed by the organization, team or other actors</p>		<p>"We already discussed this, let's talk especially about how we can avoid these things in the future"</p> <p>"I my opinion, we should..."</p>
Agreeing	<p>Agreeing with something; consenting with something</p>		<p>"This also reflects how I personally think about the matter" (L)</p> <p>"Yes, I agree with you" (F)</p>
Disagreeing	<p>Contradicting with team members</p>		<p>"I have to disagree with you on this point" (L)</p> <p>"That is not correct" (F)</p>
Relation-oriented behavior	<p>Positively evaluating and rewarding the behavior and actions of team members; Sharing personal information (e.g., about the family situation); Making jokes or funny statements</p>	<p>-Providing positive feedback</p> <p>-Giving personal information</p> <p>-Humor</p>	<p>"This is better approach than 3 months ago" (F)</p> <p>"I am delighted to see that you did not passively waited, but rather pro-actively came with a proposal" (L)</p> <p>"We had a lovely holiday" (F)</p> <p>Often jokes are made within the context of the interaction. When 3 or more people laugh the code 'humor' is assigned.</p>

Measures

Leader and follower transformational and transactional behavior. First, in correspondence with transformational leadership theorizing, transformational behavior was rendered by the behavioral codes: 1) idealized influence behavior, 2) inspirational motivation, 3) intellectual stimulation, and 4) individualized consideration. De Vries, Bakker-Pieper and Oostenveld (2010) showed that transformational behavior is grounded in clearly distinguishable communication styles. Moreover, several studies have showed that transformational leadership behavior can be trained (e.g., Awamleh & Gardner, 1999; Frese, Beigel, & Schoenborn, 2003). For example, after training individuals on the visionary/idealized influence component of transformational behavior, they were able to show more of this behavior during a speech. This means that transformational leadership consist of actually observable communicative behaviors. In the below we explain how the defining transformational behaviors were coded from the video's.

Idealized influence behavior and inspirational motivation were coded when either the team leader or member emphasized the importance of having a collective mission by communicating an inspirational and motivating future vision (Bass & Avolio, 1994; Podsakoff, MacKenzie, Moorman, & Fetter, 1990) during the meeting. For example, visionary communication or underlining the importance of a shared mission was coded as transformational behavior. *Intellectual stimulation* was coded when independent and creative thinking were encouraged, for example, by asking how others would look at a certain problem (Bass & Avolio, 1994). *Individualized consideration* was coded when caring and nurturing behavior was shown as well as supportive behavior directed toward individual or team development (Bass & Avolio 1994). In total, leader and follower transformational behavior was coded in this study 6,629 times.

When operationalizing transactional behavior that can be displayed during interactions between leaders and followers into micro-behavioral codes (i.e., at the behavioral event level), actually observable transactional behavior might include monitoring task processes to ensure that goals are being accomplished and taking proactive, corrective action when necessary (Bass, 1985). On a micro-behavioral level, observable transactional behavior might then entail task monitoring, correcting and providing negative feedback (Avolio & Bass, 1995; Sommer, Howell, & Noonan-Hadley, 2016). These three observable behaviors were added into a composite measure of transactional behavior. *Task monitoring* behavior was coded when followers monitored deviations from task progress (i.e., checking the current status quo and if the team was still effectively progressing: Willis et al., 2017). When leaders or followers interact they may offer critical feedback on how a task is executed; this denotes *negative feedback* behavior (Sommer et al., 2016). If a follower identified or corrects errors, it was coded as *correcting*

behavior (Bass & Avolio, 1995). In total, leader and follower transactional behavior was coded 18,799 times.

The coded transformational and transactional behaviors were all standardized (i.e., relative frequencies were computed on the basis of the shortest video time). This enabled direct comparisons of the frequency of actors' behaviors.

Leader effectiveness. To assess leader effectiveness, the leader's own hierarchical boss was asked to provide an effectiveness score. The leader effectiveness scale from the Multifactor Leadership Questionnaire (MLQ) 5X-Short package, consisting of 4 items, was used (Bass & Avolio, 1995). A sample item is: "This leader is effective in meeting organizational requirements." Responses were given on a Likert scale from 1 (*strongly disagree*) to 10 (*strongly agree*). The Cronbach's alpha was .86.¹⁶

Follower effectiveness. This construct was measured with the 4 items from Gibson, Cooper, and Conger (2009). We revised the wording of each item to attain a job evaluation of each individual follower (e.g., "This follower produces high quality work"). A 7-point Likert scale was used, ranging from 1 (*very inaccurate*) to 10 (*very accurate*). Each team's focal leader was asked to rate each of their own individual followers.

Followers were asked to wear a number tag during the recorded meetings. These numbers were used both when coding the behaviors of each follower and when soliciting their effectiveness scores from the leader. After the video was recorded, a print screen was made of the group of followers. This print screen was included in the leader's survey that assessed their followers' effectiveness. To enhance participants' perceptions of confidentiality, a researcher explained that the data would only be shared with the university which maintained an anonymous data handling process (e.g., by only including numbers, and without names in the database). Similar matching procedures were followed by Hu and Shi (2015) and Moon, Kamdar, Mayer, and Takeuchi (2008). The Cronbach's alpha for this construct was .94.

Team effectiveness. To assess overall team effectiveness, the four-item scale from Gibson et al. (2009) was used. When teams score high on this measure it implies that a team is able to effectively accomplish the assigned tasks (Gibson et al., 2009). Ratings were provided by the followers on a Likert scale ranging from 1 (very inaccurate) to 7 (very accurate). A sample item is "This team does high quality work." The Cronbach's alpha was

¹⁶ The leader effectiveness scores given by the expert raters (i.e., each leader's own hierarchical leader) correlated significantly with the followers' effectiveness ratings ($r = .21, p < .05$). Furthermore, ICCs and R_{wg} were calculated to assess the within-group agreement and group reliability of these follower effectiveness scores (i.e., indexing group-level dispersion and diversity in leader scores: Newman & Sin, 2007). ICC1 was .21 ($p < .01$) whereas ICC2 was .81 ($p < .01$). The degree of within-group agreement (mean $R_{wg} = .72$) signaled how much followers within a team agreed amongst each other about the relative effectiveness of their leaders (Lance, Butts, & Michels, 2006; Bliese, 2000; LeBreton & Senter, 2008).

.93. There was sufficient within-group agreement among the followers of each team (ICC1: .17, $p < .01$; ICC2 .75, $p < .01$; R_{wg} ($M = .76$, ranging from .17 to .91)) (Bliese, 2000; Lance, Butts, & Michels, 2006; LeBreton & Senter, 2008). Ratings of team effectiveness correlated significantly with expert ratings of leader effectiveness ($r = .32$, $p < .01$).

Controls. Several control variables that could have a strong influence on the leader and team effectiveness were analyzed statistically. Leader and follower age, gender and team tenure were included to control for their potential impact on leader and team effectiveness (Harrison, Price, Gavin, & Florey, 2002; Jackson, Joshi, & Erhardt, 2003; van der Vegt & Janssen, 2003). In addition, team size was included as a control variable because it can influence the displayed behaviors as well as leader and team effectiveness (Gladstein, 1984).

Data Analysis

Statistical analysis. To identify the effective interaction patterns between leaders and followers, lag sequential analysis was performed (Bakeman & Quera, 2011). This type of analysis is a statistical approach which examines if a specific sequence of behaviors occurs more or less often than expected (Bakeman & Quera, 2011; Kauffeld & Meyers, 2009; Lehmann & Allen, 2018). We analyzed the association between a given behavior (i.e., also termed criterion behavior) and the behavior which directly follows this behavior (i.e., also termed target behavior). Lag1 associations between the behaviors (i.e., where the target behavior directly trails the given or criterion behavior: McClean, Barnes, Courtright, & Johnson, 2019) were determined on the basis of an interaction sequence matrix, generated with the The Observer software. After generating this matrix, transition probabilities were calculated on the basis of the interaction sequence matrix for each group (i.e., the low and high performing leaders and their groups of followers). Z-scores were computed to test if specific behavioral sequences occurred above or below chance. Significant positive Z-scores (i.e., values higher than 1.96 at an alpha level of 5%) denote “excitatory dependency” (i.e., when person A demonstrates behavior X, it is followed significantly more by person Z demonstrating behavior Y) whereas significant negative Z-scores denote “inhibitory dependency” (i.e., when person A demonstrates behavior X, person Z will rarely respond with behavior Y: see, e.g., Becker-Beck, Wintermantel, and Borg (2005) as well as Bakeman and Quera (2011)).

Hypothesis testing. To test hypotheses 1-4, i.e., that the behavior that highly effective leaders and followers elicit is different from the behaviors that their less effective counterparts evoke, a median split was conducted to separate the data into two groups: a group of highly vs. less effective leaders (for the highly effective leaders, $M = 7.50$, $SD = .28$; for the less effective leaders, $M = 6.39$, $SD = .74$) and the group of highly vs. less effective

followers (for the highly effective followers, $M = 8.33$, $SD = .86$; for the less effective followers, $M = 5.37$, $SD = 1.36$); the groups were statistically significantly different on the basis of their effectiveness scores ($p < .001$). By conducting a median-split to cluster highly versus less effective leaders and followers these behavioral patterns can also be associated with effectiveness (for a similar procedure, see, e.g., Kolbe et al., 2014).

To test H1 and H2 (i.e., the leader-follower interaction patterns) we first compared the lag sequential results for both groups. To further examine our hypotheses, the frequency of how many times the behavioral leader-follower pattern was displayed was then translated to relative frequencies (i.e., the relative or proportionate occurrence of these leader-follower patterns in a regular staff meeting (i.e., (frequency of the pattern/sum of all leader-follower patterns in that regular staff meeting) * 100: Bakeman & Quera, 2011). This enabled us to test, using regression analyses, e.g., if highly effective leaders and followers display more leader-follower or follower-leader patterns in which transformational behavior was followed by complementary, transactional or voice behavior by their counterparts in their team.

To test H3 and H4 (i.e., the follower-leader interaction patterns) we again compared the group of highly vs. less effective followers. Because each team included multiple followers, the highly effective followers were selected on the basis of the effectiveness scores that were provided by the leader. In order to account for the non-independence among observations (i.e., among individuals nested within teams), we selected the highest and lowest performing follower. Hence, follower behavior and effectiveness were thus treated as individual-level variables. When the leader provided similar scores for more than one follower, they were requested to specify the ranking of similarly scored followers. To test if the highly effective followers in each team trigger different behavior as compared to the less effective followers, lag sequential results were requested for each subset (i.e., the subset of highly effective followers vs. the subset of less effective followers: Bakeman & Gottman, 1986), which allowed the identification of behavioral patterns in each group.

For all 4 groups, transition frequencies were requested for each pair of behavioral codes. Z-scores were computed and applied to test if the transition probability for an interaction pattern (i.e., a target behavior following a given behavior) occurred above ($Z > 1.96$) or below chance ($Z < -1.96$: Bakeman & Quera, 2011). When the Z value was above or below 1.96, this indicates that a behavioral code followed another behavioral code more or less often than expected by chance (Bakeman & Quera, 2011; Klonek et al., 2016).

In addition, after we conducted the analyses at the individual level of analysis within each of the 101 teams, we examined the extent to which the hypothesized interaction patterns between leaders and followers were associated with team effectiveness: H5. To do so we use regression analyses to examine the association between the relative or

proportionate occurrence of the interaction patterns between leaders and followers and team effectiveness.

RESULTS

Table 2 presents the means, standard deviations and t-tests for the highly vs. the less effective leaders and followers. For leaders, when comparing the frequency counts of the highly vs. the less effective ones, the highly effective ones engaged significantly more in voice behavior ($M = 21.41$, $SD = 7.13$ for the most effective leaders, and $M = 16.84$, $SD = 7.49$ for the less effective leaders, $p < .05$).

For followers, when comparing the highly vs. the less effective, the highly effective followers engaged significantly more in all behaviors except for disagreeing behavior: no statistical difference was found in the frequency of disagreeing behavior between the most and less effective followers.

Table 2. Mean Frequencies, Standard Deviations and T-tests for the Highly vs. the Less Effective Followers and their Leaders

	Highly effective leaders (n = 51)		Less effective leaders (n = 50)		95% CI		Highly effective followers (n = 101)		Less effective followers (n = 101)		95% CI	
	M	SD	M	SD	LL	UL	M	SD	M	SD	LL	UL
	Transactional Behavior	11.29	6.04	15.00	5.32	-3.04	1.81	2.38***	1.94	1.16	1.46	.68
Transformational Behavior	10.19	5.42	8.17	3.29	-5.10	.14	.53*	.86	.28	.50	.03	.47
Counterproductive Behavior	3.02	3.29	3.66	2.87	-1.80	.83	1.13**	1.79	.52	.80	.18	1.06
Directing Behavior	1.80	1.49	2.24	1.86	-1.07	.37	.07*	.17	.02	.09	.01	.09
Informing Behavior	28.53	6.95	26.13	9.73	-4.65	2.58	3.90**	3.43	2.45	2.92	.40	2.42
Structuring Behavior	11.83	4.59	14.97	5.71	-2.34	2.09	.44*	1.10	.11	.31	.07	.58
Voice Behavior	21.41*	7.13	16.84*	7.49	2.41	8.65	4.28***	3.84	2.14	2.52	1.11	3.17
Agreeing	5.62	3.06	5.81	3.31	-1.27	1.45	1.03**	1.21	.54	.76	.17	.81
Disagreeing	.91	1.20	1.03	.87	-.52	.38	.25	.45	.19	.39	-.07	.19
Relation-oriented Behavior	5.40	3.28	6.15	3.99	-2.02	1.10	1.10**	1.52	.50	.62	.24	.97

Note. Mean values represent proportional frequency counts. CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit. * $p < .05$ level (2-tailed). ** $p < .01$ level (2-tailed). *** $p < .001$ level (2-tailed).

On the basis of the lag sequential results in Table 3 we cannot accept H1a, that highly effective leaders who display transformational behavior are more likely to trigger transactional follower behavior. However, H1b, which hypothesized that leaders' transformational behavior would be met with follower voice behavior, was supported ($z = 2.75, p < .01$, for the highly effective leaders; $z = -.16, n.s.$ for the less effective leaders). The regression results provide further support that leader transformational-follower voice patterns do significantly predict leader effectiveness ($\beta = .41, p < .01$). Rather, the transformational behavior of less effective leaders was followed by still more of their own transformational behavior ($z = 2.60, p < .05$).

H2a predicted that the transactional behavior of highly effective leaders would trigger transformational behavior of followers. This hypothesis could not be supported on the basis of the results reported in Table 3 (i.e., $z = -.62, n.s.$, for the highly effective leaders vs. $z = -.15, n.s.$, for the less effective leaders), nor on the basis of the regression results. Also H2b, which stated that highly effective leaders' transactional behavior would elicit followers' voice behavior, could not be supported (i.e., $z = 1.65, n.s.$, for the highly effective leaders vs. $z = 1.39, n.s.$, for the less effective leaders). Rather, transactional behavior of highly effective leaders triggered followers' informing behavior ($z = 2.91, p < .05$), while less effective leaders showed more transactional behavior themselves after their own display of transactional behavior ($z = 1.99, p < .05$).

Hypothesis 3, which stated that highly effective followers who display transformational behavior are more likely to trigger transactional behavior from their team leader, was not supported (see Table 4: $z = -.08, n.s.$, for the highly effective followers; $z = .33, n.s.$, for the less effective followers). Rather, transformational behavior displayed by highly effective followers triggered informing behavior from followers ($z = 2.37, p < .05$), whereas the transformational behavior from less effective followers was met with more of their own transformational behavior ($z = 2.07, n.s.$).

Hypothesis 4, stating that highly effective followers who display transactional behavior are more likely to trigger transformational behavior from the leader was not supported (see Table 4: $z = -.46, n.s.$, for the most effective followers; $z = -.43, n.s.$, for the less effective followers, respectively). Rather, the transactional behavior from highly effective followers triggered followers' informing behavior ($z = 2.59, p < .05$), while the transactional behavior from less effective followers triggers followers' transactional behavior ($z = 2.56, p < .05$). Thus, we found similar patterns for the ineffective leaders and followers; the response to their own behaviors, was still more of their own same behaviors, whether transformational or transactional.

Table 3. Z-values for the Transactional and Transformational Leader Behaviors for Lag 1

Criterion Behavior (Previous Act)	Target Behavior (Following Act)																			
	Leader				Team member								Follower							
	Transactional Behavior	Transformational Behavior	Transactional Behavior	Transformational Behavior	Counter-productive Behavior	Directing Behavior	Informing Behavior	Structuring Behavior	Voice Behavior	Agreeing	Disagreeing	Relation-oriented Behavior	Counter-productive Behavior	Directing Behavior	Informing Behavior	Structuring Behavior	Voice Behavior	Agreeing	Disagreeing	Relation-oriented Behavior
<i>Highly effective leaders (n = 50)</i>																				
Transactional Behavior	.84	-.23	.55	-.62	-.77	-.71	1.17	.10	.44	-.59	-.86	-.42	-.48	-.90	2.91	-.81	1.65	-.18	-.80	-.29
Transformational Behavior	.48	.84	.20	-.40	-.82	-.82	1.62	.83	.54	-.62	-.98	-.21	-.65	-1.07	.74	-.85	2.75	-.40	-.98	-.18
<i>Less effective leaders (n = 51)</i>																				
Transactional Behavior	1.99	-.31	.79	-.15	-.93	-.92	1.89	.09	.42	-.68	-1.07	-.56	-.72	-.88	1.47	.11	1.39	-.37	-1.10	-.56
Transformational Behavior	.91	2.60	-.36	-.14	-.63	-.78	1.52	1.27	1.35	-.38	-.94	-.01	-.83	-.89	-.01	-.20	-.16	-.67	-1.02	-.63

Note. A Z-value larger than 1.96 or smaller than -1.96 implies that a behavioral sequence occurred above or below chance at the $p < .05$ level.

Table 4. Z-values for the Transactional and Transformational Follower Behaviors for Lag 1

Criterion Behavior (Previous Act)	Target Behavior (Following Act)																			
	Leader				Team member								Follower							
	Transactional Behavior	Transformational Behavior	Transactional Behavior	Transformational Behavior	Counter-productive Behavior	Directing Behavior	Informing Behavior	Structuring Behavior	Voice Behavior	Agreeing	Disagreeing	Relation-oriented Behavior	Counter-productive Behavior	Directing Behavior	Informing Behavior	Structuring Behavior	Voice Behavior	Agreeing	Disagreeing	Relation-oriented Behavior
<i>Highly effective followers (n = 101)</i>																				
Transactional Behavior	.17	-.46	1.72	-.55	-.60	-.78	1.23	-.45	.18	-.54	-.88	-.63	.04	-.90	2.59	-.79	1.63	.00	-.68	-.30
Transformational Behavior	-.08	.25	1.31	.99	-.94	-1.05	.42	-.23	-.36	-.85	-1.06	-.57	-.31	-1.08	2.37	-.62	1.73	-.08	-.78	.93
<i>Less effective followers (n = 101)</i>																				
Transactional Behavior	.26	-.43	2.56	-.33	-.73	-.68	2.11	-.36	.17	-.43	-.81	-.64	-.46	-.88	1.17	-.82	1.32	.19	-.60	-.26
Transformational Behavior	.33	.49	1.34	2.07	-.96	-1.00	1.09	-.08	-.49	-.61	-1.27	-.30	-.45	-1.21	1.59	-1.18	.71	-.14	-.74	.74

Note. A Z-value larger than 1.96 or smaller than -1.96 implies that a behavioral sequence occurred above or below chance at the $p < .05$ level.

On the basis of the regression results, we found support for hypothesis H5b, which states that leader-follower patterns of leader transformational and follower voice behavior would be positively related to team effectiveness ($\beta = .36, p < .05$). No support was found for the other hypotheses: leader-follower interaction patterns of leader transformational and follower transactional behavior (H5a: $\beta = -.14, n.s.$), leader-follower interaction patterns of leader transactional and follower transformational behavior (H5c: $\beta = .03, n.s.$), leader-follower interaction patterns of leader transactional and follower voice behavior (H5d: $\beta = -.12, n.s.$), follower-leader interaction patterns of follower transformational and leader transactional behavior (H5e: $\beta = .04, n.s.$), and follower-leader interaction patterns of follower transactional and leader transformational behavior (H5f: $\beta = -.09, n.s.$) were not significantly associated with higher team effectiveness.

Table 5.
Regression Results for Leader and Team Effectiveness

Variables	Leader Effectiveness					Team effectiveness				
	Model 1		Model 2			Model 1		Model 2		
	B	SE	B	SE	CI	B	SE	B	SE	CI
Intercept	9.21	1.45	9.21 **	1.46	(5.92, 11.76)	7.10	.98	6.38 ***	1.30	(5.91, 11.34)
Gender	-.21	.54	-.22	.51	(-1.91, .13)	-.20	.37	-.16	.47	(-1.53, .36)
Age	-.11	.02	-.09	.02	(-.05, .03)	-.18	.01	-.05	.02	(-.04, .03)
Team tenure	-.03	.03	-.08	.03	(-.08, .04)	-.04	.02	-.18	.03	(-.10, .02)
Number of followers	-.15	.02	-.18	.02	(-.06, .01)	-.26 *	.01	-.21	.02	(-.06, .00)
Leader Transformational -> Follower Transactional			-.11	.01	(-.03, .01)			-.14	.01	(-.03, .01)
Leader Transformational -> Follower Voice			.41**	.01	(.01, .03)			.36*	.01	(.00, .03)
Leader Transactional -> Follower Transformational			.16	.01	(-.01, .04)			.03	.01	(-.02, .03)
Leader Transactional -> Follower Voice			.01	.01	(-.02, .02)			-.12	.01	(-.02, .01)
Follower Transformational -> Leader Transactional			-.07	.52	(-1.33, .74)			.04	.48	(-.80, 1.13)
Follower Transactional -> Leader Transformational			.03	.01	(-.01, .01)			-.09	.00	(-.01, .01)
R ²	.06		.27*			.06		.11*		
Δ R ² change			.21**					.22*		

* $p < .05$ level (2-tailed).

** $p < .01$ level (2-tailed).

*** $p < .001$ level (2-tailed).

DISCUSSION

The present study builds upon relational leadership theory by shedding light on the temporal dynamics between leaders and followers in a team context. It contributes to our understanding of specific interaction patterns of highly and less effective leaders and followers during team meetings. More specifically, we explicated the precise behavioral responses that are triggered by the transformational and transactional behaviors of highly and less effective leaders and followers. We engaged in detailed video-based coding of minute behaviors during 101 regularly held staff meetings and included effectiveness ratings of leaders, followers and their teams. We employed lag sequential analyses to reveal

that interaction patterns between highly and less effective leaders differ in significant ways and according to the two invoked theories (complementarity theory and the augmentation thesis of the transformational-transactional theory).

When highly effective leaders initiate or display transformational or transactional behavior, followers are significantly more likely to “voice” their views or provide factual information right after these behaviors. For less effective leaders, both their transformational and transactional behaviors do not elicit a verbal contribution from their followers. Instead, these leaders respond with more of their own same behavior, thus acting, in effect, to suppress any response or active input from their own followers. The same complementarity principle is found to govern the precise interaction patterns in highly effective follower-initiated (transformational and transactional) behavior vis-à-vis the response of their team members. Highly effective followers are found to elicit informing behavior from their team members after transactional or transformational behavior, whereas less effective followers are more likely to evoke similar behavior from their team members, and thus do not complement the follower’s behavioral ‘initiative.’ For the highly effective teams, the ‘transformational-voice’ pattern (transformational leader behavior followed by follower voice behavior) was significantly more often present than in the less effective teams. Moreover, in support of complementary behavior as the most effective response to a highly effective counterpart in a team, both the transformational and transactional behaviors initiated by leaders or followers were met with complementary voice or informing behavior (see Table 6, for an overview of all the interaction patterns uncovered in this study).

Table 6.
Complementary Interaction Patterns between Leaders and Followers during Regular Staff Meetings

Actor who initiates the communication	Interaction pattern	Complementarity?
Highly effective leader	TLS → Follower voice behavior	✓
Highly effective leader	Transactional → Follower informing	✓
Less effective leader	TLS → Leader TLS	
Less effective leader	Transactional → Leader transactional	
Highly effective follower	TLS → Follower informing	✓
Highly effective follower	Transactional → Follower informing	✓
Less effective follower	TLS → Follower TLS	
Less effective follower	Transactional → Follower transactional	
Less effective follower	Transactional → Leader informing	✓
Highly effective team	Leader TLS → Follower voice behavior	✓

Note. TLS = Transformational behavior.

These findings suggest that highly effective leaders and followers elicit more complementary interaction patterns, as compared to their less effective counterparts. Less effective leaders and followers continue to show similar behavior during interaction with their counterparts. They are engaged in a much less productive/functional pattern of interaction, just as complementarity theory proposed. For effective leaders, transformational behaviors have the power to elicit follower voice, whereas transactional behaviors elicit follower informing. In general, the results support the idea that leaders and followers both have a powerful influence on the behavioral dynamics of the team, for both highly effective and less effective leaders and followers alike. Via the transformational and transactional behaviors, as defined precisely herein, both the effective leaders and the followers evoke, active input from their team members, leading in turn not only to higher leader and follower effectiveness but also to higher *team* effectiveness. The less effective leaders and followers seem to discourage or even suppress input from their counterparts, leading in turn to lower leader, follower and *team* effectiveness.

Theoretical Implications

The insights obtained from findings of this study have several implications for leadership and team theory as well as complementarity theory. By focusing on the micro-behavioral level and in situ, we can greatly enhance our understanding of effective social dynamics between leader and followers (as called for by, e.g., Day & Antonakis, 2012; Fairhurst & Connaughton, 2014; Fairhurst & Uhl-Bien, 2012). Rooted in complementarity theory (e.g., Carson, 1969; Tiedens, Unzueta, & Young, 2007), the lag sequential results reveal that highly effective leaders do indeed trigger active, complementary behaviors from their followers. In addition, the highly effective followers are more likely to trigger active, complementary behavior from followers. Hence, both leaders and followers can play an active role during social interaction in meetings to shape functional communication with both transformational and their transactional behaviors. Our precise behavioral results provide clarity on the role of effective leaders and their followers as they enact, or co-construct leadership (Uhl-Bien et al., 2014).

Although the complementarity literature largely focused on the complementarity of interpersonal traits and subsequent behavior (i.e., dominance and affiliation: Sadler & Woody, 2003), we took a micro-behavioral, temporal approach to study actual communication dynamics as they unfold in real time. Complementarity theory in general proposed that relationships characterized by complementarity are most effective (Tiedens et al., 2007): when people respond to each other in a complementary manner they perceive the relationship as more pleasant (Horowitz, Dryer, & Krasnoperova, 1997; Horowitz et al., 2006). How complementarity works precisely at the micro-behavioral event-level during workplace interaction remained largely unknown. Our results show that only when leaders

or followers are perceived as highly effective, do their counterparties respond, and act in complementary ways. We add to the complementarity theory also by showing that the degree of effectiveness of a team actor leads to complementary behavior on the part of another team actor. Highly effective leaders or followers might thus trigger functional, complementary team interaction because they invoke a sense of interpersonal understanding and task-clarity leading to mutual cooperation and co-construction. Less effective leaders and followers are more likely to evoke similar behavioral patterns (i.e., transformational-transformational or transactional-transactional patterns): illustrating the negative effects of anticomplementarity (Hu & Judge, 2017).

The lag sequential results show that transformational behavior displayed by effective leaders triggers subsequent voice behavior among followers. This is in line with the core ideas of the social exchange theory (Blau, 1964). According to Blau, reciprocal interdependence triggers effective interpersonal transactions. If the action of one party benefits the other, then the other is especially likely to reciprocate with enhanced performance (Gottfredson & Aguinis, 2017): our study shows that, in this case, enhanced performance is marked by complementary behavior. We show here that transformational behavior by a highly effective leader evokes active voice behavior from their followers; a pattern of exchange sequences between a leader and followers is identified here which offers insight into how “one party’s actions are contingent on the other’s behavior” (Cropanzano & Mitchell, 2005, p. 876). More specifically, transformational leader behavior plays a key role, supporting meta-analytic findings that transformational leader behavior leads to high leader and follower effectiveness (Wang et al., 2011). Another key role is played by transactional leader behavior of effective leaders. Whereas effective transformational leader behavior is more likely to evoke follower voice behavior; effective leader’s transactional MBEA behavior triggers (complementary) information sharing by followers. Immediately after actively monitoring the task progress, correcting or offering negative feedback, followers tend to offer factual information. MBEA might be thus seen as a request for information exchange. This is consistent with prior theoretical ideas that transactional behavior is a more task-oriented behavior that links more closely with task related information processes, while transformational is more of a relationship-focused behavior that may be more directly aligned with relationship outcomes and thus creating voice (DeRue et al., 2011). Hence, compared to the less effective leaders, the highly effective leaders do trigger different, complementary responses from followers and thus “co-construct” an effective mutual influence process. The less effective leaders seem to effectively suppress the voice or input from followers by continuing to engage in similar behavior.

From a role-based perspective, compared to highly effective leaders, who trigger voice behavior from followers with their transformational behavior, highly effective

followers evoke informing behavior from their team members with both their transformational and transactional behavior. Transformational and transactional (MBEA) behavior initiated by highly effective followers are thus vessels through which followers' presence can be used to stimulate factual information sharing in a team. Thus, we find that transformational behaviors when enacted by a follower have a different impact on the rest of the team than the transformational behavior initiated by the leader, all else being equal. The act of following can also be influential as compared to an act of leading; however, from a micro-behavioral vantage point, it is patterned slightly differently than the act of leading by a formally appointed leader.

Furthermore, our results thus provide clarity about "how relational messages functioned in sequence with task-oriented messages" (Keyton & Beck, 2009, p. 17). The lag sequential results illuminate how leaders' transformational and transactional behavior (i.e., paralleling relation- and task-oriented behavior) works in interaction with followers. Both behaviors serve an important function towards higher effectiveness; transformational behavior fosters a voice climate, whereas transactional behavior seems to create the open flow of information and knowledge exchange within a team. Hence, both behaviors are equally important in fostering a generative climate. It is important to note though, that while we used complementarity theory and the transformational-transactional model as the basis of our reasoning, the complementarity behavioral effect goes beyond transformational and transactional behaviors. On the basis of the exhaustive coding approach that we took, we support here, in fact, that leadership scholars are in need of taking into account a much fuller behavioral model (as called for by e.g., Antonakis & House, 2014; Behrendt et al., 2017; Hoogeboom & Wilderom, 2019).

Limitations and Future Research

Although this micro-behavioral study was carefully designed and executed, methodological limitations remain. First, although our examination of leader-follower interaction patterns is based on time-stamped sequential behavioral data, given our study's design we could not capture how leader and follower interaction patterns evolve over time, as emphasized by DeRue and Ashford (2010). Hence, while the video-based field approach taken here offers new insights into how effective leader- and followership is played out at the behavioral level (see, also, Fairhurst & Grant, 2010), we do rely here on data taken from one regular staff meeting per team. Future studies should conduct similar analyses in longitudinal ways to examine if interaction patterns between leaders and followers change over time and which conditions explain this change; e.g., what might cause a disruption or change in how leaders and followers behave vis-à-vis each other in their own ecosystem. An interesting guiding question is how do leader-follower interactions emerge into effective patterns of interaction over time?

Secondly, although our results are not affected by common-source bias, it should be noted that follower effectiveness ratings consist of perceptions of one's own team leader. Earlier studies have shown that such ratings correlate with Leader-Member Exchange (Gerstner & Day, 1997). Even though leader perceptions of follower effectiveness are a better measure than the more frequently used self-reports, we recommend replicating the study with more objective follower effectiveness measures. The fact that we did establish the same complementary mechanism at the team level as well as the inter individual level within teams may attest to the viability or validity of the reported results herein.

Third, in the present study, regularly occurring staff meetings have been taken to represent leader-follower interactions. Are the interactions during those types of meetings sufficiently representative of their non-meeting type of interactions? No prior comparative research has reported behavioral differences in both work settings. Although several ethnographic or observational studies have used meetings to examine workplace interactions (e.g., Baran et al., 2012; Lehmann-Willenbrock & Allen, 2014; Svennevig, 2008; Vine et al., 2008), future research must compare interactions between team leaders and members across various interactive interfaces at work: for example through "video-shadowing" of field behaviors and reliable coding of them afterwards.

Fourth, all the teams in this sample worked in a single large Dutch public sector organization. Some studies have found that there is a difference in how leaders behave (and subsequently interact with their team) between the private and public sector (Andersen, 2010; Lowe, Kroeck, & Sivasubramaniam, 1996). Our findings may therefore not be generalizable to private sector organizations. Yet, the literature review by Baarspul and Wilderom (2012) showed little solid evidence for behavioral differences across both sectors. Future research must examine how cross-cultural and other contextual factors may affect effective interaction patterns between leaders and followers (Hoogeboom & Wilderom, 2019a). The current study, for example, was carried out in the Netherlands, where power distance is generally low (Den Hartog, House, Hanges, Ruiz-Quintanilla, & Dorfman, 1999). It seems particularly likely that similar results are achievable in more informal work settings (e.g., DeRue, Nahrgang, & Ashford, 2015; Morgeson, DeRue, & Karam, 2010), for instance in self-managing or project-based teams.

Practical Implications

This study originated from a request by a client organization, for guidance on how their team leaders and members might work together more effectively. Results from our field study suggest that team leader development efforts should continue to focus on the full range of transformational and transactional behaviors, and that team member development efforts should stress the importance of displaying task monitoring, correcting

and negative feedback, both as a reaction to and elicitation of team leader behavior. At the overall team level, our results indicate that teams are most effective when all members—team leaders and team members alike—behave in ways that are complementary to the behaviors of their colleagues, thereby eliciting active voice.

CONCLUSION

To date, the patterns of interaction between leaders and followers have remained relatively unexplored. Scant empirical efforts have been made before to identify and examine micro-behavioral patterns between leaders and followers and how these are associated with higher effectiveness. Extant empirical research has focused primarily on how leaders influence their followers (DeRue et al., 2011) and less on the dynamic interactions that underly effective leadership or followership (Hoffman & Lord, 2013; Lehmann-Willenbrock, Meinecke, Rowold, & Kauffeld, 2015). Prior followership research gives insight into follower roles but has not yet examined the micro-behavioral repertoire of effective followers when they interact with their leaders. In addition, most leadership studies have focused on *transformational* behaviors, even though scholars have pointed out the theoretical and practical incompleteness if transactional behaviors are not included (e.g., Judge & Piccolo, 2004; Vecchio et al., 2008). In this video-based field study, using the transformational-transactional model of effective leadership as a base, supplemented by complementarity theory, we identify and compare several patterns of interaction between effective leaders and followers.

Grint's (2000) well-known criticism was that the field of leadership studies will remain theoretically inadequate, insofar it excludes followers. With the current study we clearly and empirically illustrate how "understanding followers is as important as understanding leaders" (Howell & Shamir, 2005, p. 110). The results also demonstrate the viability of complementarity theory, which is shown here to work in 'both directions,' i.e. for both leader- and follower-initiated patterns. Nevertheless, more studies, and relationally-oriented studies in particular, are required. We still have much to learn about how and when both leaders and followers can work together to co-construct leadership more effectively, and with more beneficial impact to all involved. If more studies will continue on this balanced research route, the so-called 'relational turn' in empirical leadership/followership studies might really 'turn on.'

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7

Summary and General Discussion

Many studies of effective leadership have been guided over the last few decades by only one behavioral model: the transformational-transactional model (e.g., Bass, 1985; Bass & Avolio, 1995). The present set of PhD-dissertation studies has broken with that myopic tradition; all five reported empirical studies use multiple theoretical models. I believe such a multiple-model approach, which advances our knowledge of effective leadership and teamwork, is becoming increasingly necessary. New research must also link back to, and build on older, related theoretical models when offering new knowledge; I aim to extend as well as deepen the transformational-transactional model through this dissertation. In addition to moving away from being guided by a one-model paradigm, all the chapters focus on micro-behavioral team interactions, including that of a leader. Each of the 5 substantial thesis chapters offer several theories to guide my study of actual micro-behaviors of effective leaders in the field. As a result, the contours and content of a new deeply, interactive model of effective leader, follower and team behaviors becomes visible.

Innovative methods are used intentionally in this dissertation. Most studies in the field of organizational leadership and team behavior have relied on aggregate, perception-based measures of leader styles, team activities (such as reflection, planning and decision-making), and processes (such as team monitoring or coordination).¹⁷ Over the last two decades, a growing body of researchers have repeatedly voiced the need to “get closer to the phenomena of interest” by examining the actual behaviors, that is, the “observable movements, interactions, communications, and so forth that individuals and groups actually engage in” and to consider these behaviors “in their continuity” (Aisenbrey & Fasang, 2010, p. 441; Lehmann-Willenbrock & Allen, 2018, p. 326). As a response to these calls, a wider range of methods are also used in this dissertation to examine how leader behaviors, leader-follower dynamics, and team interactions are related to leader, follower and team effectiveness. New insights into the effective micro-behaviors of leaders and followers¹⁸, the dynamic nature of leading and following and the multipart patterns of effective team interaction are presented: see Table 1 for an overview of the relatively innovative methods and analyses used in the 5 respective studies presented in this dissertation.

¹⁷ Marks, Mathieu and Zaccaro (2001, p. 357) define processes as “members' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioral activities directed toward organizing taskwork to achieve collective goals.”

¹⁸ Follower and team member are used interchangeably in this Discussion. Labels denoting certain phenomena can have powerful consequences: “Labels facilitate sense-making and guide our interactions by providing cues for how to organize and understand experiences” (Hopton, Christie, & Barling, 2012, p. 221). Followers have been defined as non-leaders, and as having less power and status compared to leaders, whereas leaders, as a result, have more power and control over followers (Hollander, 1974; Vanderslice, 1988), which parallels the definition of (the more neutrally phrased) team member. Followers can also be referred to as team or group members, although both leader and follower are part of the team, which can blur the distinction between leader and follower (Hopton et al., 2012).

A common denominator in the respective chapters is my use of precise, fine-grained accounts of leader and team member behaviors and interactions and how these enhance their own and/or their team's performance. By building upon implicit leadership theories (Lord, Foti, & De Vader, 1984; Shondrick & Lord, 2010) in Chapter 2, I present my initial insights about the specific micro-behavioral repertoire of leaders by focusing on actual verbal communication, using video-capture and coding, which are then compared with the effective leader behavior perceptions from various employee and student samples. Guided by what is termed a fuller (behavioral) leadership model (fuller than the transformational-transactional model), Chapter 3 reports how some leader micro-behaviors predating the transformational-transactional model are able to explain more variance in leader effectiveness and related workplace outcomes. Chapter 4, which furthers the idea that physiological data can enrich our knowledge of effective leadership, presents empirical insights about physiological processes underlying actual leader behaviors during their interaction with team members. While the first three empirical chapters focus on uncovering effective building blocks of specific *leader* behavior, Chapters 5 and 6 are directed at the dynamic interactions between leaders and team members. I rely on actual field behavioral data to compare leader and follower roles by addressing more of the dynamic nature of not only effective leadership but also followership (i.e., "how [*sic*] do patterns of effective leadership and followership look like?" (Uhl-Bien, Riggio, Lowe, & Carsten, 2014, p. 99). Chapter 5 shifts the lens slightly: from the leader to the team, including the leader. Leader's behaviors are not the only keys to leader, follower and team effectiveness; the interactions that occur between the leader and followers are also known drivers of high team effectiveness. Chapter 5 adopts a complex adaptive systems lens to examine such team interaction patterns, matched with the team task context, and how they may enhance team performance. Chapter 6 explicitly adds the behavioral role of the followers to those interactions and examines the effectiveness of both those patterns initiated by the leader and those initiated by their followers. In addition, we test what specific behavioral interaction patterns of leader and followers are associated with higher team effectiveness.

I begin with a brief *summary of the findings of each of the chapters*. By integrating the results, several *theoretical implications* can be sketched that deal especially with: 1) our understanding of the micro-behaviors displayed by leaders during prototypical interactions with their followers, including the physiological foundation of effective behavior (Chapters 2, 3 and 4); 2) the temporal leadership, followership and team dynamics (Chapters 5 and 6) as well as 3) how effective followers shape their role in relation to their leaders (Chapters 5 and 6). This last thesis chapter offers the key *practical implications* of my collection of findings. I conclude with ideas for *future research* deduced from both this dissertation's findings and the inherent *limitations* of the presented studies.

Table 1

Specific Aims and Methodological Features of Chapters 2-6

Chapter	Specific aim	Methodology used and type of analysis (in parentheses)	
Chapter 2:	Examining differences between the actual behaviors that effective leaders display and the recall-based ratings of effective leaders, offered by lay people Demonstrating a video-observational method to capture a full range of leader behaviors	<ul style="list-style-type: none"> - Video observation of leaders - Recall-based ratings of perceived leader effectiveness and leadership style (Mann-Whitney and hierarchical regression analyses)	Identifying a fuller range of fine-grained behavioral building blocks of effective leadership behaviors and other important workplace outcomes
Chapter 3:	Testing if an integrative, fuller-range behavioral model of leadership can explain more variance in the 3 leadership effectiveness criteria : leader effectiveness, team effectiveness, extra employee effort	<ul style="list-style-type: none"> - Video observation of leaders - Recall-based ratings of perceived leadership style, leader and team effectiveness, and extra effort (confirmatory factor analysis, dominance analysis, hierarchical moderated regression analysis)	
Chapter 4:	Investigating the relationship between physiological arousal, leader relations- and task-oriented behaviors and perceived leader effectiveness, to find out if we can deduce a physiological correlation with effective leader behavior	<ul style="list-style-type: none"> - Video observation of leaders - Physiological data - Recall-based ratings of experts of perceived leader effectiveness (machine learning, multi-level log-linear modeling)	
Chapter 5:	Examining the nature, consequences and context of effective team interactions between leaders and followers	<ul style="list-style-type: none"> - Video observation of leaders and followers - Recall-based ratings from followers about perceived team information sharing - Recall-based ratings from team effectiveness experts - Team task context information from the organization (hierarchical regression analysis, moderated path analysis, pattern analysis, post-hoc behavioral content pattern analysis)	Uncovering micro-dynamics of effective leadership, followership and team performance
Chapter 6:	Examining the fine-grained behavioral interactions that occur between effective leaders and effective followers , and how these interactions enhance team effectiveness	<ul style="list-style-type: none"> - Video observation of leaders and followers - Recall-based ratings from followers and leaders of perceived other-rated effectiveness (sequential analysis regression analysis)	

SUMMARY OF THE FINDINGS OF CHAPTERS 2 TO 6

Chapter 2: Effective Leader Behaviors in Regularly Held Staff Meetings: Surveys vs. Coded Video Observations

Many contemporary leadership studies focused on uncovering the behavioral antecedents of effective leadership (e.g., Behrendt, Matz, & Göritz, 2017). Although we know that there is considerable dissimilarity between actual behaviors and behavioral perceptions, most leadership studies to date still use surveys to assess leader behavior (Stentz, Clark, & Matkin, 2012). This is problematic because the resulting knowledge limits our understanding of the behavioral antecedents of effective leadership and group functioning. The aim of this first chapter is to present a comparative study of perceptions versus actual leader behaviors to pinpoint the differences between ‘what people believe is effective’ and the behaviors that effective leaders actually display. Despite the widespread acceptance that surveyed perceptions differ from actual behaviors, as assessed with video capture, we know relatively little about how these self or other-employee perceptions misalign with instances of actual behaviors during workplace interactions. Hence, the focus of this chapter is to demonstrate the differences between an effective leader’s behavioral repertoire, as measured with a novel, more fine-grained video-observational measurement method, and recall-based ratings of perceived effective leader behavior.

It is interesting to note that scholars, such as Staw (1975) and Lord and colleagues (Lord, 1977; Lord, Binning, Rush, & Thomas, 1978), raised concerns more than 50(!) years ago about the use of psychometric survey measures to capture leader behaviors. Using surveys, which rely heavily on retrospection and implicit mental processes such as liking, colors the objectivity of behavioral assessments (Sims & Manz, 1984). Several errors can bias or distort the accurate perception of leader behaviors. First, we know from the implicit leadership and categorization theory (Lord et al., 1984; Lord & Maher, 1991; Shondrick & Lord, 2010) that respondents often rely on their own cognitive schemata about what constitutes effective leadership when completing the survey. This leads to a confirmation bias that distorts the recall-based behavior rating, because respondents report higher ratings for a behavior if this behavior matches their own pre-existing implicit cognitive schemata about what effective leadership entails. Secondly, another related observation error that can blur accurate behavioral recall, which was initially presented many decades ago, is: the halo effect (Thorndike, 1920). The implication is that if the respondents or observers already consider the targeted leader to be effective whilst completing the leader behavioral survey, they will give more positive reports of the respective behaviors on all the survey items or categories. The known mismatch between behavioral recall (i.e., on surveys) and actual observed leader behaviors (e.g., through video-based means) has not been

illustrated before for effective leader behaviors. We expected substantial diverging results from the implicit leadership cognitive schemata.

The first substantive chapter compares lay-persons' surveyed perceptions of effective leader behaviors with specific, actually observed video-captured coded behaviors of effective leaders; the aim is to enhance our knowledge about the influence of implicit leadership theories, as well as the halo effect, on prevailing ideas about effective leader behaviors. The data from 25 coded video observations of effective leaders are compared in Chapter 2 with the perceptions from both employee and student samples and we show that a big part of an effective leader's repertoire consists of task-oriented behavior, amounting to more than 40% of the total sum of leader verbal communication during a regular staff meeting.

With this result in mind, it is remarkable that most effective-leadership research to date has focused on charismatic or transformational leadership in isolation, and did not measure instrumental or explicit task-type behaviors (Antonakis & House, 2014). By going beyond the leadership theories that focus on interpersonal influence and motivating individuals/followers to perform above and beyond expectations, we see that effective leadership also depends on task-oriented goal accomplishment. Chapter 2 shows that the behavioral foundation for how leaders communicate to ensure *task accomplishment* should not be omitted and might serve as an important antecedent for effective leadership. Survey-based studies have typically reported high positive correlations between relations-oriented, charismatic, transformational behavior (representing the implicit cognitive schemata that many followers hold of effective leadership: Stock & Özbek-Potthoff, 2014) and effective leadership, whilst unjustifiably omitting important task-based behaviors. Theoretical models of task-oriented leader functions do exist (Bowers & Seashore, 1966; Fleishman, 1953; House, 1971; Stogdill, 1963), but they, particularly the once highly popular initiating-structure part the Ohio State model, seem to have been somehow forgotten. However, specific, mutually exclusive, actually observed behaviors, which together comprise larger behavioral categories, provide a more comprehensive input for enhancing leader effectiveness than only narrow, parsimonious models derived from survey-based "super scales" (Antonakis & House, 2014, p. 754).

Based on the outcomes of this initial empirical study, I find it surprising that technical advancements, including high fidelity cameras and specialized software to enable video-based micro-behavioral coding, are not used more frequently in the field of leadership and organizational behavior. Sims and Manz (p. 230) already advocated, in 1984, the "feasibility of measuring leader verbal behavior through observational methods."

After establishing the differences between *actual* video-observed leader behavior and *survey ratings* of effective leader behavior, I was (1) able to take on, more vigorously, the observational focus that is needed to enhance our understanding of the behavioral *building blocks* of effective leadership, and (2) demonstrate the value of using a video-observational

approach to study (micro-)behaviors of effective leadership. Moreover, I am convinced that including specific *task-oriented* behaviors broadens our present-day knowledge of a leader's effective behavioral repertoire when interacting with others, together with transformational and relations-oriented behaviors. I therefore investigated in the next study (Chapter 3) how such a fuller, broader set of task-oriented behaviors, together with transformational/relations-oriented behaviors, lead to a *fuller* behavioral model and can be used to predict important workplace outcomes better, such as leader and team effectiveness as well as extra employee effort.

Chapter 3: Advancing the Transformational-Transactional Model of Effective Leadership: Integrating Two Classic Leadership Models with a Video-based Method

Despite decades of research on the relationship between leader behaviors and performance, many current studies (e.g., DeRue, Nahrgang, Wellman, & Humphrey, 2011) have used a single behavioral leadership model by, for example, only adopting the transformational-transactional model, which limits the prediction of effective leadership or team effectiveness. In my view, more integration of various leadership models can uncover whether the models are independent of each other, that is, whether they conceptually overlap or depict distinct behaviors. Integrated models are better predictors of work-related outcomes (DeRue et al., 2011). However, very few multi-model empirical studies are available in the literature. When studying behavioral predictors of effective leadership, a fuller range of behaviors must be included in order to prevent overestimating what is in fact a limited range of behavioral effects (Behrendt et al., 2017). Chapter 3 extends the transformational-transactional model with the Ohio State 'consideration versus initiating structure' model (see, e.g., DeRue et al., 2011), also in part because I felt that the transactional side of Bass's transformational model needs improvement even though the transformational-transactional model is used widely to assess leader behavior (Zhu, Song, Zhu, & Johnson, 2019).

It is almost as if the leadership-research pendulum has swung too far—the field went from a transactional orientation, associated with older, traditional views of management, toward a transformational focus (Bass, 1985; Bass & Avolio, 1995), and in doing so left behind the importance of task-based behavior. Hence, although such task-oriented behaviors and interactions have been prevalent in the team literature, limited research attention has been paid to specific task-related behavioral statements by leaders while interacting with followers. Incorporating this task-focus of effective leaders is urgently needed. According to Meuser et al. (2016), transactional behaviors focus predominantly on correcting and controlling behaviors. However, when differentiating highly effective from

less effective leaders, we should remember that task-related behaviors also entail showing structuring types of activities—planning, directing, informing, and the like.

In an empirical attempt to extend the range of effective leader behaviors, and to add granularity to their depictions, we supplemented the transactional side of the transactional-transformational model with a specific behavioral basis coming from the older Ohio State model of effective leadership. As hypothesized, our data – which consisted of independently coded videos, employee surveys and expert ratings – supported the view that transformational leadership is complemented by initiating structure behaviors. Initiating structure behaviors (i.e., directing, informing and structuring) were found to explain more variance in the important work-related outcomes of leader and team effectiveness and extra employee effort than transactional leadership, after controlling for transformational leadership ($n = 72$). In this study, I avoid self-reporting bias from the same source and reduce the potential overestimation effects of the seemingly desirable leader behaviors. Thus, Chapter 3 provides fine-grained clarity about the task-oriented behavioral side of effective leadership. The findings of both Chapters 2 and 3 encouraged me to further our knowledge about specific, in situ relations- *and* task-oriented leader behaviors.

To enhance the knowledge about the specific behavioral building blocks of effective leadership, I turned to even more-fine-grained, physiological measures. Previous research voiced the need to carry out empirical work on the intersection of leadership research and physiology (e.g., Arvey & Zhang, 2015; Boyatzis et al., 2012) because it is assumed that physiological processes may inform our understanding of effective leader behavior (e.g., Akinola, 2010).

Chapter 4: Physiological Arousal Variability Accompanying Relations-oriented Behaviors of Effective Leaders: Triangulating Skin Conductance, Video-based Behavior Coding and Perceived Effectiveness

The third substantive chapter of this PhD dissertation presents the results from 101 team leaders who were asked to wear wrist sensors measuring electrodermal activity during meetings. The physiological data were combined with the video recordings and coding of verbal exchanges occurring in the meetings as well as a leadership effectiveness measure obtained from expert raters. By doing so, I respond to calls to conduct empirical research at the intersection of organization behavior, leadership and physiology (e.g., Arvey & Zhang, 2015). It has long been assumed that physiological or cardiovascular measures (such as respiration, heart rate or blood pressure) can provide new insights into affective states or behavioral tendencies (e.g., Heaphy & Dutton, 2008; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Although some argued cogently that combinations of leaders' physiological arousal and behaviors might be associated with favorable work outcomes, such as enhanced

effectiveness or higher quality work relationships (e.g., Boyatzis et al., 2012; Damen, van Knippenberg, & van Knippenberg, 2008), we still do not know how physiology underpins or may inform us about effective leader behaviors.

This is one of the first studies to show a physiological correlate between the actual behaviors displayed by leaders during social interactions among their team members. We specifically examined skin conductivity, as this electrodermal parameter reflects emotional arousal, and is not influenced by changes in the parasympathetic nervous system (Marci, Ham, Moran, & Orr, 2007). Furthermore, we applied machine learning in order to classify the degree of arousal (for reviews of interdisciplinary research among organizational behavior scholars and computer scientists, see Allen et al., 2017; Lehmann-Willenbrock, Hung, & Keyton, 2017). Our results show that higher levels of arousal are linked with positive and negative relations-oriented behaviors such as providing positive feedback or defending one's own position. Additionally, this higher level of physiological arousal during positive and negative relations-oriented leader behavior was especially found among the highly effective leaders in our sample.

Note that each of the three studies described thus far has come up with a more precise answer to the question: How does an effective *leader* behave? Reflecting upon these answers, I noted that we need: (1) more precision when studying (actually observable) leader behavior, (2) to extend current models to capture a fuller range of effective leader behaviors, (3) to set specific foundations of task-oriented behaviors related to higher leader and team effectiveness, and (4) to include measures of physiological arousal, coupled with a range of relations-oriented and task-oriented behaviors. I used those insights in the next two chapters for a within-team examination of effective leader- and followership processes.

How does the the leader's behavior influence the behavior displayed by his or her followers and vice versa? This mutual-interaction team process has been under-addressed so far. Therefore, I report in chapters 5 and 6 the investigations of various patterns of interaction between leaders and followers, in terms of potentially enhancing team and/or follower and leader effectiveness.

Chapter 5: A Complex Adaptive Systems Approach to Real-life Team Interaction Patterns, Task Context, Information Sharing and Effectiveness

Chapter 5 also examines the micro-behaviors of leaders and followers through the video-observational field-study methodology, paying attention to team interaction patterns. In addition, this team-behavioral chapter takes a 'complex adaptive systems' (CAS) approach. The importance of effective team interaction is illustrated by the fact that 90% of U.S. and 73% of E.U. employees now spend at least part of their workday in a team (To, Kilduff,

Ordoñez, & Schweitzer, 2018). Insight into what constitutes such effective, dynamic team interactions can promote more effective intra-team processes, including information sharing, as well as higher team performance.

In this chapter, I examine the various interaction patterns of 96 teams¹⁹ and how they impact team effectiveness. I use both a complex adaptive systems approach and information sharing theory (Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt, 2007; Mesmer-Magnus & DeChurch, 2009; Ramos-Villagrasa, Marques-Quinteiro, Navarro, & Rico, 2018; Ramos-Villagrasa, Navarro, & García-Izquierdo, 2012) to develop a model that includes antecedents and consequences of information sharing. I establish that recurring patterns of team interaction are negatively linked to team effectiveness, while participative interaction patterns are positively associated with team effectiveness. These relationships are mediated by team information sharing. In addition, I provide empirical evidence for the important moderating role of team task context (e.g., Kerr, 2017). Through information sharing, in a mediated moderated model, a non-routine team task context augments the indirect negative and positive effects of recurring and participative interaction patterns on team effectiveness. The harmful effects of recurring team interactions are even more pronounced in teams doing nonroutine work than in those engaged in routine work. Furthermore, in a nonroutine task context, participative type interactions (including many different iterations between leaders and their team members) are related to higher team effectiveness through the mediation of information sharing.

Given that Chapter 5 highlights the role of participative interaction patterns, on the basis of my capturing of micro-behavioral data, I felt the urge to zoom in on this seemingly effective co-constructive, participative process between effective leaders and their followers. That led to the next and last substantive chapter (Chapter 6). Only scant empirical evidence is available on the in situ team interaction patterns in various contexts. Moreover, the role of followers' behaviors in such processes remains largely unknown. That raised my interest in taking up a co-contributing or co-constructive approach to identify and examine the specific behavioral patterns of effective leaders and their followers.

Chapter 6: Co-Constructive Patterns of Interaction Between Effective Leaders and Followers and Effective Followers and Leaders: A Video-Based, Multi-Level Field Study in Support of Complementary Behavior

¹⁹ In Chapter 5, a sample of 96 teams was included due to the number of expert ratings that were received. Chapter 6 included 101 leaders, based on the number of expert ratings that we received from higher-ups. Some experts who were able to assess the leader's effectiveness were not able or knowledgeable enough to provide information about the effectiveness of the team.

The verbal interactions enabling effective leadership and followership were studied in Chapter 6. Sims and Manz already noted in 1984 that “both the leader and subordinate influence each other in a system of reciprocal determinism” (p. 222). This quote may illustrate that the leader is not the only source of influence on follower or leader performance: the follower can also be a source of influence on leader effectiveness. Hence, their behaviors mutually interact towards higher or lower levels of leader and follower performance. However, not many empirical studies provide an integrative, (micro-)behavioral account of leaders *and* followers simultaneously. A more balanced account of the behavioral processes shaped by both leaders and followers would be welcome in a field that has predominantly produced *leader-centric* studies (Day, 2014; Riggio, 2014). In Chapter 6, I did not “shift the lens” (Shamir, 2007; Uhl-Bien et al., 2014), I *made the lens bigger*: by studying followership as part of the leadership process and reciprocally, leadership as part of the followership process.

Hence, the overall aim of the study presented in Chapter 6 is to show how highly effective leaders and followers work together—by examining their patterns of interaction, and how those patterns may differ from the less effective ones. By doing so, I show how leader and followers, together, co-construct effective leadership. Such knowledge may greatly move the leadership, followership and team literature forward as evidenced by the rise of “relational approaches” to leadership. I build upon the complementarity literature and draw upon the transformational-transactional model for the hypotheses: if leaders and followers trigger responses that are complementary in nature (i.e., transformational behavior triggers transactional behavior, and vice versa), then leaders and followers will likely co-construct their work together effectively, which will have a positive association with their team’s effectiveness. Taking a communication-based approach, and video capturing and coding the leader and follower behaviors during regular staff meetings, enabled me to examine effective sequences or patterns of interaction. The results show that highly effective leaders trigger follower voice and informing behavior with their transformational and transactional behavior whereas less effective leaders and followers do not evoke active input from their team members. The less effective leaders and followers rather continue to behave in the already established way of interaction (i.e., following up their transformational or transactional behavior with similar transformational or transactional behavior). Thus, I establish that both highly effective leaders and followers evoke complementary interaction patterns. It is also important to note that complementarity happens outside of the “transformational-transactional paradigm,” strengthening the use of a fuller behavioral model (as evidenced also in Chapters 1-5). Highly effective leaders and followers produce effectiveness by maximizing or getting a fuller contribution from their team members; by eliciting greater voice and engagement.

THEORETICAL CONTRIBUTIONS AND IMPLICATIONS

The thesis' results summarized in the above provide several theoretical implications for and contributions to the leadership, followership and team literatures, including complex adaptive systems theory and role theory (e.g., Biddle, 1979: role theory explains how individuals adopt roles and behaviors based on role expectations, also within organizations). The aim now is to integrate a number of the theoretical implications or contributions provided by the dissertation.

The overall purpose of this dissertation was two-fold. The first aim was to identify and examine a fuller range of fine-grained leader and follower behaviors observed through video capture and coding *to explain* important workplace outcomes better. Instead of relying only on traditional methods to capture perception-based accounts of general leadership styles, a fuller range of micro-behavioral examinations appear to be a fruitful research endeavor, leading to novel solid contributions. Hence, I will first discuss how the empirical findings from this dissertation add to our knowledge of leader and follower behaviors and important workplace outcomes such as leader, follower and team effectiveness. After empirically substantiating the *importance of capturing a fuller range of micro-behaviors*, the second aim was to understand more of the temporal dynamics of the displayed behaviors. Using *interaction* as a focus to understand the effective behavioral dynamics between leaders and followers better, I was able to delineate how effective leaders and followers behave during team meeting interactions.

Effective Leader-Follower Dynamics in High Performing Teams

The central question of this dissertation is: *What micro-behaviors and related behavioral patterns are associated with leader, follower and/or team effectiveness?* Based on the presented empirical studies, five effective leader, follower and/or team micro-behavioral dynamics or processes are identified.

1. Leader and team member *factual information sharing* enables high leader and team effectiveness. First, high levels of leader information sharing, that is, the degree to which leaders share and discuss important factual information with followers (see also Arnold, Arad, Rhoades, & Drasgow, 2000), help team members to accomplish their tasks. Leaders lacking such information sharing are perceived as significantly less effective (Chapter 3). Moreover, Chapter 5 shows that team information sharing is a key mechanism of effective team interaction. The importance of both leader and follower information sharing is also evidenced by the established sequential effects (Chapter 6): follower factual information sharing is displayed immediately after highly effective leaders' and followers' transactional behavior. This sequence of events, where highly effective leaders and followers who display transactional behavior trigger follower

informing (Chapter 6), helps to build a team state with high levels of clarity, also resulting in higher team effectiveness (Chapter 5). Furthermore, after a highly effective leader displays transformational behavior, such as idealized influence leader behavior, that is, communication about higher-order beliefs and mission (Bass, 1985; Bass & Avolio, 1995), followers tend to follow up with 'voice' behavior. Voice behavior can be regarded as non-factual information sharing or expression of own ideas, thoughts or opinions to improve current ways of working. Information sharing in general is suggested to enhance the clarity of the mission of a work unit in light of the organization's mission and provides more specific ideas about guidance and input in terms of how this mission translates to operational team tasks and actions (Chapter 3). Although the leader has been conceptualized as the central source of information (e.g., Dineen, Lewicki, & Tomlinson, 2006), followers' information sharing may be equally important for high levels of team effectiveness. Followers' information sharing, by providing factual input or voicing nonfactual information about team task accomplishment and direction (about for instance their expectations and actions), is an important response after a highly effective leader has requested information by, for instance, monitoring the task process.

2. Besides factual information sharing, effective followers are found to engage significantly more in frequent task monitoring, providing feedback and correcting, which are transactional behaviors (Chapter 6). They keep a close eye on the progress and completion of the ongoing tasks and intervene when any problems are detected that inhibit personal or immediate colleagues' effective task execution. Although the transactional style is grounded in the leadership literature, where there are mixed findings about its effectiveness (e.g., Howell & Hall-Merenda, 1999), we reliably show here which specific behaviors within that style are important for team members/followers to display (as also evidenced by their sequential effects shown in Chapter 6). Highly effective followers display significantly more voice behavior (i.e., nonfactual information sharing about ideas, thoughts and opinions) as compared to their less effective counterparts.
3. Another behavioral dynamic associated with high levels of leader, follower and team effectiveness pertains to openness or making room for follower input (Chapter 6). After a highly effective leader displays either transformational or transactional behaviors, followers/team members demonstrate voice or informing behaviors. Moreover, high levels of team effectiveness occur through *highly participative leader-follower interaction patterns* (Chapter 5). In contrast, after less effective leaders display transformational or transactional behaviors, they repeat the same (transformational or transactional) behavior which, in effect, suppresses follower input.

4. Another behavioral pattern between leaders and followers shown in this thesis, associated with high leader and follower effectiveness, is complementarity (Chapter 6). When highly effective leaders or followers engage in transformational or transactional behavior, they evoke complementary informing or voice behavior from followers or leaders, respectively. By doing so, they jointly and effectively co-construct the 'process' or situation towards effective task execution in their units.
5. *Leaders' transformational behaviors*, especially those entailing individualized consideration and intellectual stimulation, remain an important building block for high leader effectiveness (Chapter 3). Moreover, the relations-oriented (micro) behavioral part of transformational leadership has a physiological correlate, especially among highly effective leaders (Chapter 4). The sequential results offered in Chapter 6 show, furthermore, *why* transformational leader behaviors are important. When transformational behaviors are displayed by the highly effective leaders, they spark follower voice behavior, which is a non-required follower behavior that emphasizes the expression of one's own ideas (e.g., Van Dyne & LePine, 1998). Apparently this works well in organizations: not only for leader and follower effectiveness but also in association with team effectiveness.

As well as pinpointing specific micro-dynamics between effective leaders and followers, Chapters 3, 4, 5 also show behaviors effective leaders and teams do *less* engage in. For example:

1. As expected, highly effective leaders display less counterproductive or negative relations-oriented behavior; they engage less frequently in self-defense of their position, showing disinterest and interrupting others (Chapter 4).
2. Highly effective leaders and teams exhibit significantly fewer behaviors or interaction patterns that induce rigid or scripted type communication. Behaviors that constrain team effectiveness are: leader structuring, a procedural type communication that provides suggestions on how to proceed during the meeting (Chapter 3), and recurring interaction patterns (Chapter 5). These communication patterns reflect processes of interaction that are more deterministic, with less room for continuous team-level adaption and flexibility.

Actual Micro-Behavioral and Physiological Insights into Effective Leader- and Followership

The micro-behavioral analyses in the thesis' chapters provide additional insights into actual behaviors embedded in the workplace. By differentiating the highly effective from the less effective leaders, followers and/or teams, the results reveal differences in the patterns of

effective behavior. In particular, Chapters 2, 3, 4 and 5 emphasize that task-based leader and follower behavior is needed in addition to the more affective or moral behaviors in current leadership research, which entails focusing more on inspirational, authentic, ethical, servant and charismatic type leader styles (e.g., Banks, Gooty, Ross, Williams, & Harrington, 2018). It should be noted that old studies already reported that teams tend to spend more time on task-related interaction, compared to socioemotional or relational communication (Bales, 1950, 1999). This is not surprising since giving and asking for suggestions, opinions, and information are central to a variety of group goals and tasks. Even though non-task elements might be more nerve racking for many employees at work (there is sufficient anecdotal evidence for this), and the physiological results of Chapter 4 suggests this as well, there is a full gamut of micro-behavioral task aspects that have been underdeveloped in the recent leadership literature. My first two empirical studies support that: apart from relations-oriented or transformational leader behaviors, other task-based behaviors such as directing or informing may also be important for leadership effectiveness and team functioning. The last thesis chapter on the co-constructed behavioral effects of leader and followers also indicated that a particular task-based transactional type behavior evokes complementary task-based informing behavior (which has been shown as an important predictor of both leader effectiveness (Chapter 3) and team effectiveness (Chapter 5)).

Thus, the studies presented in this dissertation certainly stress the need to assess specific, observable micro-behaviors. A recent study by Banks et al. (2018), which examined construct redundancy in leadership research on task- and relations-oriented, inspirational and value-based and moral leader behavior, proposed that newer approaches such as authentic, charismatic, ethical and servant leadership (i.e., new style behaviors) are most valuable, given their associations with effectiveness criteria. However, these newer approaches to leadership have been found to correlate heavily with relational outcome variables such as LMX, trust and perceived justice. The entire leadership literature is replete with empirical work which only used questionnaires to examine associations between overall leader styles and outcome criteria, including follower job satisfaction, team effectiveness and organizational citizenship behavior. Again, the use of such questionnaires for assessing precise human behavior is problematic. Chapter 2 showed that these survey ratings are not accurate reflections of actual leader behaviors, but rather tap into employee beliefs about leaders. Those pre-developed survey instruments for assessing leader behaviors do not cover all the critical, often task-based behaviors. Their exclusive use in leadership studies are likely to result in over-inflated reports of significant relationships between new style behaviors and outcomes or predictions. It is, in my view, alarming that such studies as the one by Banks et al. (2018) propose to focus only on a few behavioral constructs, that is, transformational, authentic, servant, or ethical leadership, on the basis

of imprecise survey-based measures. This may push leadership research in, what I see as, the wrong and imprecise direction.

Also, on the basis of the novelty of the empirical work reported in this dissertation, I contend that -instead of using only surveys for measuring complex human behavior- leadership, field research needs to adopt precise micro-behavioral accounts of effective leadership and followership during actual interactions. Such future research may remedy many of the flaws of traditional leadership research, for example: 1) treating process type variables as static; 2) measuring them at one moment in time; 3) little attention for situational factors; and 4) focusing on outcome prediction and not on the processes of leadership/followership. The field would need to offer the world a more detailed account of what *effective* leaders and followers *actually do* (in various prototypical settings). That kind of inquiry would also provide a solution for the seemingly contradictory calls for future research that, on the one hand, need more parsimonious models to assess leader behavior or leadership styles (e.g., Banks et al., 2018; Banks, McCauley, Gardner, & Guler, 2016; Shaffer, DeGeest, & Li, 2016) and, on the other hand, need to examine a fuller behavioral model including a wider breadth of important leader and follower behaviors (e.g., Antonakis & House, 2014). In my view, video-based field research will be able to serve both of these seemingly competing aims.

The five empirical studies presented in this dissertation use different behavioral classifications to assess leader and follower behaviors (see Appendix IV for an overview of the coded behaviors in each chapter). Chapters 2, 3 and 5 identified and reported micro-behaviors, including initiating structure behaviors. Chapter 6 used and extended a behavioral taxonomy rooted in transformational leader theorizing –the transformational-transactional model– including the use of theoretically-grounded micro-behaviors to capture a fuller range of behavioral patterns. In Chapter 4, we relied on the same behavioral classification for differentiating between relation- and task-oriented behaviors. The use of different behavioral taxonomies has some important theoretical implications. First, by building upon the most prominent leadership models, namely, the Ohio State tradition (Judge, Piccolo, & Ilies, 2004; Schriesheim & Bird, 1979), the transformational-transactional model (Bass & Avolio, 1995), and the relation- vs task-oriented grouping (Judge et al., 2004; Yukl, 2010), I developed a solid basis for capturing the interaction between leaders and followers ‘in the wild.’ Studies of *effective leader* behavior typically rely on leader taxonomies, mostly as aggregated perception-based measures. Translating them to actual observable clusters of micro-behaviors offers a chance to use them to validly capture actual *follower* behavior.²⁰ Second, the empirical studies in this dissertation establish that micro-

²⁰ It should be noted, though, that a one-on-one translation of survey *items or dimensions* to actually observable behavior is hardly possible. The broadly defined, overarching transformational vs. transactional,

behavioral accounts, on the basis of overarching behavioral taxonomies (i.e., the Ohio State initiating and consideration structure categories as well as the transactional and transformational behaviors represented subsequently as task- and relations-oriented behaviors (DeRue et al., 2011)), can differentiate effective from ineffective leader- and followership or workplace interactions. Using a single behavioral classification may pose a limitation for future advancement of leader, follower and team research. It may create fragmented knowledge (Glynn & Raffaelli, 2010), which complicates comparisons of the effects uncovered in extant studies. Chapter 3 shows the potential and integrative benefits of working towards a fuller behavioral model. Thus, as denoted by the Chinese saying 'let a 1000 flower bloom', there is ample room for the careful creation of many more behavioral taxonomies for similar future research endeavors.

In addition to uncovering micro-behavioral elements (see, also, Tengblad, 2006) of effective leader and followership, we added a physiological correlate to effective leader behavior in the fourth empirical chapter. Although it was commonly assumed that physiological arousal plays a critical role in effective leader behaviors (Akinola, 2010; Antonakis, Ashkanasy, & Dasborough, 2009; Boyatzis, Rochford, & Taylor, 2015), not much was known about the extent to which physiological arousal underpins relations- or task-oriented behaviors. By synchronizing both data sources (video-coded leader behavior and continuous wrist-based physiological data) and applying machine learning, we identified the importance of high physiological arousal during relations-oriented behavior and the absence of such high arousal during task-based leader behavior among the highly effective ones. In other words, in the context of leader-follower interactions, highly effective leaders show a fit between high physiological arousal and relations-oriented behavior.

There are several theories in the field of leadership studies that advocate fit as an aspect of good leadership. For instance, alignment between words and deeds leads to perceptions of behavioral integrity (Simons, 2002), while person-supervisor fit leads to improved dyadic leader-follower relationships and desirable work outcomes (Kristof-Brown, Zimmerman, & Johnson, 2005). The outcome of Chapter 4 adds another fit-related finding: a physiological-behavioral fit or match that is demonstrated by highly effective leaders, whereby a leader's physiological arousal corresponds with a set of particular behavioral displays vis-à-vis followers. It would be intriguing to find out to what extent followers also

consideration vs. initiating structure and task- vs. relations-oriented leader behavior *dimensions* were used by me to learn more about the association with hypothesized workplace outcomes. In addition to using Yukl's, Bass' and Fleishman's leader behavioral taxonomies, which are well established in leadership research, behavioral codes must be compatible with observable communicative behaviors by leaders and followers during social interactions with each other. Clearly, leader survey dimensions are not always reflective of actual, specific behaviors, at the behavioral event level, during interactions between leaders and followers (Behrendt et al., 2017; Meinecke, Lehmann-Willenbrock, & Kauffeld, 2017).

become aroused after this displayed pattern of leader arousal or what arousal patterns they display across various work type situations.

We have shown herein that multi-model designs which include rich data from various sources or sensors can provide a richer understanding of effective workplace interactions. Simultaneous data from micro-behavioral coding and sensors, such as, but not limited to, physiological data, have the potential to greatly advance current leadership and team theories.

Temporal Leader, Follower and Team Interaction Patterns and Sequences

Many leadership and team process scholars have repeatedly voiced the need to study the *temporal* dynamics of organizational behavior (e.g., Cronin, Weingart, & Todorova, 2011; DeRue, 2011; Dinh et al., 2014; Gorman, Cooke, Amazeen, & Fouse, 2012; Herndon & Lewis, 2015; Knight, Kennedy, & McComb, 2016; Leenders, Contractor, & DeChurch, 2016; Li & Roe, 2012; Waller, Okhuysen, & Saghafian, 2016). Temporal dynamics are defined as “constant change, activity, or progress” (Oxford Dictionaries, 2018). Temporal team dynamics can be captured by team interaction patterns or sequences, which are sets of observable behaviors that evolve sequentially and occur at certain time intervals (Magnusson, 2000; Magnusson, Burgoon, & Casarrubea, 2016; Waller & Kaplan, 2017). Using this micro-behavioral, temporal lens may provide insight into effective behavioral contingencies and complex social dynamics that are essential for well-functioning workplaces (Herndon & Lewis, 2015). Empirical field research which uncovers actual interactions over time can harvest knowledge about “what, when, and how a leader needs to communicate in order to motivate their team toward a particular goal” (Lehmann-Willenbrock & Allen, 2018, p. 326).

Chapters 5 (using specialized software for the detection of temporal patterns) and 6 (employing lag sequential analyses²¹) provide insights into actual interactions between team members as they unfold over time. By focusing on the role of time, as behavioral sequences and patterns unfolded, I aimed to advance not only the transformational-transactional model of leadership but also teams as complex adaptive systems. For example, while transformational behavior has been related to a variety of affective workplace outcomes, such as trust and satisfaction felt by employees (Dumdum, Lowe, & Avolio, 2013), I show in Chapter 6 that it also triggers actual voice behavior from followers. Uncovering such interaction patterns illustrates why certain behaviors (in this case, transformational leader behavior displayed by highly effective leaders) are important and how they contribute to effective team interaction. Furthermore, the distinctive sequential interactions displayed by different team members, varying from leader to follower, and

²¹ Sequential analysis is a method that offers a description of the social process evidenced by a series of behavioral events that occur one after the other (e.g., Abbott, 1995).

from the highly effective to the less effective ones, offer more clarity about how leaders and followers influence the social dynamics in a team (Leenders et al., 2016). Hence, by building upon previous research, in Chapters 5 and 6 I (1) stopped the exclusion of the followers (Grint, 2000), (2) took a “balanced” approach (Uhl-Bien et al., 2014, p. 100), and (3) used a behavioral event lens that could precisely explicate the behaviors involved in effective leader-follower interaction or behavioral co-construction in teams. The behavioral lens in chapters 5 and 6 enhances our understanding of the co-construction process between leader and followers in a team context. While many scholars in the past advocated that leadership is co-constructed, no other large-scale empirical research has shown the specific behaviors involved in effective patterns that are co-constructed among leaders and followers. We show (in Chapter 6) that both highly effective leaders *and* followers invite active contributions from others in their team: their transformational and transactional behaviors trigger both complementary voice and informing behavior. Less effective leaders and followers, on the other hand, suppress input from other team members. This is also evidenced in Chapter 5, in which I report that less effective teams engage in more recurring or rigidly patterned non-participatory type interactions. Such less effective teams seem to fall back on behavioral patterns that they were already familiar with. Actively participating in non-recurring co-constructed interactions between leaders and follower is shown to be more beneficial for the team, its leader and its followers.

By showing, in Chapter 5, that recurring team patterns are negatively associated with team performance, and that participative patterns are conducive to higher information sharing and effectiveness, especially in a nonroutine task environment, the chapter adds to the complex adaptive systems theory. The chapter advances the general CAS research stream because it illustrates how dynamic team interactions and contextual factors influence team processes, functioning and outcomes (as called for by Maloney, Bresman, Zellmer-Bruhn, & Beaver, 2016; Mathieu, Hollenbeck, Knippenberg, & Ilgen, 2017). As such, Chapters 5 and 6 showcase how adopting a temporal, micro-behavioral lens can contribute to our understanding of effective interactions within teams.

Leader and Follower Roles in a Hierarchical Setting

From the “older” role-system perspective, Chapter 6 argues that leader and follower roles each have certain qualifications and can supplement or complement one another to establish an effective configuration of communication (Cheng, 1983). Cheng (1983) argued that, for an organization to maintain competitiveness, its members must perform in accordance with their roles. However, as to *how* leader and followers should behave to fulfill their organizational roles effectively remains poorly understood to date. I assumed in Chapter 6 that video-based studies of both roles, operating at the same time in a staff meeting context, would help to uncover the specific behaviors that enhance effectiveness,

resulting in knowledge about how to enact these roles effectively (Ford & Harding, 2018). In addition to identifying specific effective verbal behaviors, this chapter gives a detailed account of the different roles that leaders and followers may play. In 1973, Henry Mintzberg was one of the first to offer a specific description of the roles of effective managers. He was also one of the first who actually tried to examine what managers actually do, how they do it, and why. Mintzberg published a summary of an intensive study of the work behaviors of five chief executives in his book, *The Nature of Managerial Work*, including ten possible management roles and 13 propositions about the characteristics of managerial work (Mintzberg, 1973, p. 51). For example, managers can perform these roles: *figurehead*, representing the work unit to the rest of the organization; *monitor*, tracking information flows or task progress; or *entrepreneur*, initiator of change. Followership research also offers typologies for describing or labelling different types of followers (see, e.g., Chaleff, 1995; Howell & Mendez, 2008; Kellerman, 2008; Kelley, 1988). Carsten, Uhl-Bien, West, Patera and McGregor (2010) identified four different classes of how *followers* can enact their roles in the organization. Although these classifications provide a general understanding of how people can enact their role in an organization, they do not offer specifics on the social dynamics that unfold between leaders and followers. Hence, instead of giving static descriptions of a leader's or follower's overall style or role, I open up the black box of effective leader-follower dynamics by examining differences in verbal behavioral acts across both roles in Chapter 6.

Invoking a behavioral-interaction research frame and collecting parallel field-behavioral data from leaders and followers reveals how and when a leader and follower need to communicate in order to be effective. The results in Chapter 6 also illustrate how less effective leaders and followers interact, and how these team actors' formal positions in the organization's hierarchy only became visible in this less effective condition and hindered effective behavioral co-construction across the actors. Thus, Chapters 5 and 6 embellish the value of capturing and comparing multi-actor interactions; instead of only capturing the downward influence of leadership on followers, the comparison of micro-behavioral leader and follower interaction processes gives a more specific understanding of the seemingly simultaneously operating, differentiable team leading and following processes.

In chapter 6, I show that the primary function of the leaders' transformational behavior is to create a supportive climate in which followers can freely exchange their ideas. The sequential effect of eliciting follower voice by a highly effective leader may demonstrate the potential power of transformational behavior of highly effective leaders. Highly effective followers' transformational and transactional behaviors are found to evoke information sharing in the team. Thus, the transformational-transactional model with which I began my thesis research became, in retrospect, a fascinating theoretical base, despite its

criticisms. In my view, the justified criticisms pertain to its most common, survey-based operationalizations. Conversely, the model has been shown here to be extendable and was deepened. Analyzing how behavioral ‘events’ of highly effective transformational and transactional leaders *and* followers influence the social team dynamics surely offers greater precision about how leaders and followers effectively enact their roles and how their interactive messages can contribute to achieving the team’s task success.

PRACTICAL IMPLICATIONS

Evidenced by the space allowed for theoretical implications in scholarly journal articles, it is clear that the academic community is the predominant stakeholder of an average scholarly journal publication. The intentions of my research go a bit further. The aim of my findings, following the design of my empirical thesis’ studies and the focus on micro-behaviors and social dynamics in the field, is to speak to practitioners as well. In this section, I will first sketch the implications of the five studies for practice in general and then continue with the harvest for the participating organizations. Furthermore, suggestions are also presented on how the results from my research may further the development of effective management practices.

Implications for Practice in General

Leader behaviors can be trained (e.g., Antonakis, Fenley, & Liechti, 2011; Lacerenza, Reyes, Marlow, & Joseph, 2017) and developed over time (e.g., Collins & Holton, 2004; DeRue & Wellman, 2009; Dragoni, Tesluk, Russell, & Oh, 2009). Examining observable micro-behaviors in the field can provide clear practical suggestions for improving leader, follower and team effectiveness. The benefit of studying the actual behaviors and the social influences between leaders and followers in a real organizational setting is that the obtained behavioral data is close to the phenomena of interest, both conceptually and methodologically (e.g., Baumeister, Vohs, & Funder, 2007). This can decrease the typical wide gap between leader self-representation, other-ratings and actual behaviors (e.g., Tengblad, 2006). Detailed accounts of *how* effective leaders, followers and teams behave or interact, and not just merely how they are being *perceived*, may give HRD-professionals, organizational coaches, and other practitioners (including the subjects themselves) useful chances to reflect on effective workplace behaviors. The comprehensive behavioral codebook used in this research, consisting of 19 micro-behaviors, spans essential features of real leader *and* follower behaviors. Making more use of such observable micro-behavioral insights might even decrease the current scholar-practitioner gap in leadership or team studies (Hodgkinson & Rousseau, 2009). Illustrative are some of the findings in this thesis

about (micro-)behavioral repertoires; they can be used directly by instructional designers to improve leadership training and development (programs).

For example:

- Leaders without a transformational style can improve their effectiveness by engaging in frequent factual information sharing.
- Interaction in teams is most effective when it is not rigid or pre-determined (i.e., often recurring): ensuring high participation by both leaders and followers during staff-meeting interactions and boosting team effectiveness. Communication in teams should *not* be a one-way street: transformational and transactional behaviors by highly effective leaders open up conversations and enable followers' input, resulting in higher team effectiveness.
- Also, highly effective *followers* can positively influence the social dynamics and team effectiveness: they trigger team member informing, an essential behavior for higher team effectiveness. Furthermore, they engage (more frequently than the less effective followers) in vigorous monitoring and controlling/correcting behaviors, voice behavior and factual informing.

These specific practical insights can be used by human resource management and development practitioners to educate leaders and followers. While many past leader development programs focused predominantly on charismatic or relations-oriented transformational type social influences, a focus on a fuller, more actual specific/precise behavioral repertoire will help to stimulate considerations of how leaders can interact effectively with their followers (and vice versa). Hence, our findings can encourage practitioners to reconsider or rethink the (behavioral) focus of current leader development trajectories. Leaders who take part in leader development training can be shown videos that exemplify what effective behaviors and interactions look like. Evidence has already been documented that audio and video can trigger changes in leader behavior (e.g., Antonakis et al., 2011; Waldman, Balthazard, & Peterson, 2011). By providing them with exemplary videos, leaders can be taught about effective behaviors during team meetings, which is likely to evoke more effective social dynamics.

Furthermore, while leadership studies and development theories have focused on educating the leader, more organizational-developmental attention needs to be given to the context of the interactions of leaders and followers (Avolio, 2005; Day, 2000). Instead of solely focusing on the leaders, HRD could be broadened or be more inclusive of followers, now that not only leaders but also followers have been studied in terms of their (micro)behavioral impacts in their teams. Also, when training followers, one may now make more (effective) use of exemplary videos, role playing or video-based acting. The shown

influence of particular social-behavioral dynamics on team effectiveness might also open up improved team(-member) feedback and coaching effort.

Implications for the Participating Organizations

In addition to the insights from the substantive papers presented in this dissertation, the large participating organizations in the thesis research received the following materials that supported their own leader and team development: (1) *customized research reports* for (parts of) their organization in which the practically relevant results were outlined, including suggestions for the implementation of the results in current HR practices (see, e.g., appendix III for an illustrative poster to enable valorization of the research results); (2) a *customized feedback report* for all the leaders who participated in the studies reported in Chapters 3 to 6, including the results concerning their own behavioral repertoire, the social dynamics of the team, aggregated information about the survey data and an individual description including possible points of improvement in terms of how they can optimize their own effectiveness (see Appendix II); (3) a *video* of each participating leader's staff meeting, including their physiological data that was projected on the recorded video of the meeting; (4) the opportunity for the participating leaders to make use of two one-on-one *coaching sessions* (offered by one of the organizations involved in this research) that provided the possibility to discuss and reflect upon their own video and feedback report.

The participating organizations used these customized reports to affect an organizational landscape with more highly effective leaders and teams. Based on this thesis' specific findings, more organizations can *sharpen and optimize interventions and developmental programs* to facilitate high leader and team effectiveness. For example, one of the organizations that participated in my thesis research had been investing heavily in the idealized influence behaviors of their leaders (on the basis of the aggregated perception-based survey results). They found out that their leaders interpreted their ideas about effective leadership as having to constantly repeat the vision, mission and values of the organization during their meetings. We actually found that only the less effective leaders tended to continuously repeat these kinds of messages without inviting input from team members nor translating their broader organizational vision and mission ideas to the specific tasks of their teams. Hence, based on this example of a unique practical behavioral insight, I argue that my approach can directly sharpen leader development programs. After all, the goal of most leadership development is to close the gap between what organizations and leaders already know and what they need to know (e.g., Van Velsor, McCauley, & Ruderman, 2010).

By offering customized feedback and sending the video recording to the participating leaders, I was able to ensure a low level of non-response. My assessment tools also provided

participating leaders with immediate and relatively easy-to-interpret learning effects. The feedback (both in the form of the video and the feedback report) has already stimulated evaluations of and reflections on specific, displayed behaviors. Moreover, anecdotal evidence of post-coaching sessions illustrates (to me) that coaching, based on an account of precise micro-behaviors, can alleviate the learning effects after reflecting on own behaviors. Combining a customized feedback report with the video, and enabling the leader coaching sessions, certainly increases, in my view, the level of leader development. It may accelerate promotions and possible retention of talent; and is in line with earlier suggestions from Mintzberg, who termed this sort of intervention third-generation management development (Mintzberg, 2004). The idea behind third-generation management development is to give leaders the chance to learn from natural experiences that occur in the workplace, instead of simulations, role playing, case studies or artificial examples. Providing leaders with video footage of their own interactions with their followers literally offers them a mirror of their behavior. This is especially useful, I think, if supplemented with video-based coaching. Such a form of leader development leaves a much stronger imprint compared to lecturing about effective leader practices or discussion of a leader business case (i.e., first-generation development) and learning from each other (i.e., second-generation development). In terms of the practical implications, the current research design and the feedback that was offered to the participating leaders enabled them to learn about displaying more effective behaviors and make their leadership more effective or functional for their team and organization.

The practical implications drawn up to now have focused on leader development at the expense of team development opportunities. This narrow focus may hamper the understanding and explanation of how effective teams are developed. An additional practical opportunity would be to share and discuss the results of the leader feedback report with the entire team. Furthermore, organizations such as those in which we collected our data could offer specific team-type interventions that allow the team to improve their own behaviors as well as their social dynamics. Currently, little knowledge about effective team type interventions is available (see, e.g., the work by London & Sessa, 2007, in which they propose interventions that yield team learning and subsequently higher levels of team performance). Another option to create awareness of behaviors that should be displayed during team meetings is to let the team complete the survey with the 19 observable behaviors used in Chapter 2 (see Appendix I for this rating form). From an intervention perspective, using and discussing a list of observable behaviors and the perceptions of the functionality of those behaviors, even though they are distinct from actually observed and coded behaviors, can already create awareness of possible patterns of interaction. Naturally, such team-level discussions would be enriched if the team members were provided with a personalized micro-behavioral feedback report about their actually

displayed behaviors. Teams could learn from such behaviorally refined discussions that raise team-members' awareness about the range of effective behaviors that they display vis-à-vis each other.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The micro-behavioral approach of this dissertation, including the lag sequential and pattern analyses, reveals effective interaction patterns and behavioral dynamics for both leaders and their followers. Although the five studies show the value of a multi-model focus on effective leadership and followership/team membership at the micro-behavioral event level (as proposed by, e.g., McClean, Barnes, Courtright, & Johnson, 2019), a number of limitations constrain what we know about effective leader and follower micro-behaviors and patterns of interaction. In the below, I highlight the five main limitations of the research reported in this dissertation: *implicit presence of temporality; antecedents/causes of social dynamics; primitive depiction of leader and follower roles; only focusing on the quantity of team member interactions; and employing one form of lag-sequential analyses*. After discussing each limitation, solutions and future research suggestions are derived.

Limitation 1: Implicit Presence of Temporality: Not Taking Repeated Measures of Effectiveness, Team States and Task Context

Many scholars have acknowledged that leadership should be defined as a relational process that evolves over time through interactions between team members (e.g., DeRue & Ashfort, 2010; Uhl-Bien, Marion, & McKelvey, 2007). Although we identified how verbal interaction patterns, including leader and follower verbal behaviors, are associated with higher leader, follower and team performance in a specific task context (in Chapters 5 and 6), the temporal element of pattern development over time was implicitly present in these studies. A limitation of the reported studies is that the focal elements, i.e. the effectiveness of the leader-follower interaction patterns and sequences, were not tracked over the course of the meeting. For example, leader or follower micro-behaviors might have a temporal relationship with effectiveness; certain leader or follower behaviors might be more essential or effective at different time points in team development or project progress (see, e.g., Gerpott, Lehmann-Willenbrock, Voelpel, & Van Vugt, 2019). Since we relied upon one meeting per team, thereby only having one measurement point, it was not possible to study dynamic trajectories of effective leader-follower interactions over the course of, for example, a team project. Hence, we looked at the team member who initiated the interaction as well as the recipient and their specific response, but failed to characterize the time at which the interaction was initiated, which limits the knowledge about how team interactions develop over time or how they are constructed and arranged effectively over

time. Leenders et al. (2016) referred to this as relational events methodology, that is, the unfolding of interactions between team members at particular points in time. Drawing upon CAS theorizing and team adaption research, a team can continuously adapt its interactions to match the changes in its direct, within-team task environment, also referred to as the context dependency of certain interactions (e.g., Pavitt, 1999). Hence, in order to maintain high effectiveness in today's highly dynamic organizational context, teams, leaders and followers need to adapt their interactions. Taking a snapshot of the effectiveness provides an answer to the specific team interaction processes that are conducive to higher effectiveness/performance. However, it does not offer an account of how interaction patterns develop over time, and how this aligns with exigencies in the constantly changing team task context. For example, although the complexity of the team task environment has been shown to be a powerful moderator in the association between team interaction patterns, information sharing and effectiveness (Kerr, 2017; Chapter 6), the complexity of the team task might also vary within or across the meetings.

Team tasks and processes have been shown to explain variance in important workplace outcomes (e.g., Mathieu, Maynard, Rapp, & Gilson, 2008) and are thus also expected to be related to changes in team dynamics (Raes, Kyndt, Decuyper, Van den Bossche, & Dochy, 2015). Moreover, drawing upon insights from healthy variability research, performance may vary over time as well (Guastello et al., 2014). Team processes are also not homogenous over time (Leenders et al., 2016); many processes such as collective efficacy, cohesion, situational awareness or team mental model (Marks et al., 2001) are usually associated with systematic evolution or fluctuation. Instead of leaving the fluctuating or adaptable nature of processes, and the effectiveness and team task context out of the picture, future research must examine teams for a longer period of time, and analyze the dynamic relationship between the development of interaction patterns, team effectiveness, processes and team task context. Taking a more dynamic, longitudinal perspective on team development (or development of discrete patterns of interaction and effectiveness according to Collins, Gibson, Quigley, & Parker, 2016) will advance our understanding of the antecedents that trigger the development of patterns and effectiveness over time, and how it influences the emergence of important cognitive or task-based team processes. This aligns with the call that a patterned view of team processes is urgently needed (Crawford & LePine, 2013). A focus on short-term behavioral fluctuations in dynamic leader, follower and team effectiveness and processes at several points during a meeting, or over time (i.e., continuous monitoring of multiple team meetings), can thus provide an even better understanding of social team dynamics. This limitation was mainly due to the labor intensiveness of collecting and coding multiple videos per team. New technological innovations with regard to automatic text analysis of behavioral data might open up new avenues for accommodating such a limitation in future research.

Limitation 2: Associating Micro-Behaviors, Sequences and Interaction Patterns with Important Workplace Outcomes, but not Explaining Why We See These Communicative Acts in the Form of Leader-Follower Sequences of Behavior or Patterns of Team Interaction in the First Place, as Antecedents/Causes of Social Dynamics

Another related limitation is that although effective leader-follower and team dynamics were empirically uncovered in Chapters 5 and 6, the results did not reveal much about the enablers or antecedents of such dynamics. Leader-follower and team dynamics can be influenced by various team cultural and climate-related variables (Mathieu, Gallagher, Domingo, & Klock, 2018). For instance, certain cognitive team structures, such as team mental models, are represented in and are expected to drive specific patterns, as well as the content of communication between leaders and team members (Burke et al., 2006). Research that explicitly links such cognitive team climate and culture aspects to actual team communication and dynamics is scarce. Hence, we are not able to draw conclusions about the factors that drive social dynamics in teams; for example, it is not clear why we see more recurring or participative interaction patterns in a particular team.

Limitation 3: Not Accounting for More Dynamic Leader and Follower Roles During Team Meetings: Underspecifying Leader and Follower Roles

The studies in this doctoral dissertation examined leadership and followership in their formal, hierarchical roles. However, some scholars implied that followers can switch to a leader role whenever appropriate (e.g., Bastardo & Van Vugt, 2019). This means that leader and follower roles are not fixed (i.e., so-called genotypes), but are flexible, including the leader and follower traits that drive the switch from follower to leader and vice versa (Van Vugt, Hogan, & Kaiser, 2008). However, not much is known about this flexible process in the context of hierarchical settings. It does raise a conceptual issue: if followers regularly engage in leadership behavior, are they really followers? Or, can we also call these people informal leaders? If so, whom are they leading? Other studies (e.g., Humphrey, Morgeson, & Mannor, 2009) underscored that some team members seem to occupy a more important or central role than others in relation to the team's task performance and workflow, and thereby leave their marks on the social fabric of the team. The data collected in Chapters 5 and 6 show that followers/team members also engage sometimes in typical leader behaviors, such as transformational behaviors. Keyton and Beck (2009) stated that if one wants to truly understand the effective interactions in a team, this relational process should also be considered over time, and not only as an outcome. Capturing the relational process at multiple points in time is also important because leader and follower identities are

created through ongoing social interaction with each other (DeRue & Ashford, 2010). In the studies presented in this dissertation, we examined how leader and follower team membership is enacted in their formal, hierarchical roles. Whilst doing so, we did not track the dynamic or emergence of the relational subtleties between leaders and followers and how possible informal shifts in their roles take place. A better understanding of the social dynamics underlying informal or shared leadership (also in a hierarchical setting; see, e.g., Carson, Tesluk, & Marrone, 2007) can further our knowledge of effective leadership and followership.

A related point is that we studied teams as static entities in which team membership is constant over time. However, teams have also been increasingly viewed as entities that function in larger systems such as multi-team systems (MTSs; see Davison, Hollenbeck, Barnes, Slesman, & Ilgen, 2012; Zaccaro, Marks, & DeChurch, 2012). Employees of today's organizations are often parts of multiple teams that can be working on different projects (Luciano, DeChurch, & Mathieu, 2018). Such shifts in team composition mean that teams also become nodes or entities operating in a more complex network of role relationships, which might influence the interactions and communication processes between team members in order to achieve one or more higher-order goals.

Limitation 4: Not Assessing the Quality of the Leader and Team Member Interactions - Focusing on Team Member Interaction Quantity

The chapters presented in this dissertation assessed the content of team members' behaviors in terms of frequency and duration. The leader micro-behaviors were quantitatively linked to leader, follower and team effectiveness. However, it is possible that the quality of the displayed behavior also explains the variance in the effectiveness of the teams and team members, on top of the frequency of that behavior. For example, for one participating organization, we qualitatively analysed the visionary-type transformational leader statements. It was shown that highly effective leaders use more positive verbiage when expressing such behaviors as compared to their less effective counterparts. Besides content analysis, assessing the effects of leader and team member behaviors on other individual or team-related outcomes, including shared mental models or transactive memory systems or positive work climate, and the like, can provide information about the quality of such communication. For instance, expert raters, who are external to the work context, could rate the quality of the leader-follower communication. Future studies may show if such ratings are of added value.

Limitation 5: Only Assessing the Immediate Reaction in the Lag Sequential Analysis and Not Differentiating Between Delayed Reaction, Anticipatory Reaction and Contingent Reaction - Employing One Form of Lag Sequential Analyses

When examining the lag and triggered effects of effective leader and follower behaviors in chapter 5, we chose lag 1 (an immediate reaction in which behavior B directly follows behavior A) as the specific time lag. This decision was driven by theory, as it fitted the research question of interest; furthermore, focusing on lag 1 also allowed for easy interpretation of the findings because direct responses were considered. A challenge when using temporally organized data, and examining dynamism of interaction, is the selection of and justification for a certain time period, or lag in our case. Other conceptualizations include the delayed reaction (or lag 2: the second-order transition where behavior C follows not directly after behavior A, but after the direct reaction B to that behavior), anticipatory reaction (a change of behavior in anticipation of an upcoming event) or contingent reaction (where behavior C follows the sequence of behaviors A and B). A technique that might be useful in examining behavioral contingencies is time-window sequential analysis (Bakeman & Quera, 2011). Research could then test whether a response occurs within a pre-selected time period (e.g., 10 seconds). When doing so, it does not matter if it is a contingent reaction or delayed reaction, as each requires specific statistical testing; one can infer that a behavior is contingent upon another behavior if it occurs within the selected time-window. Furthermore, lag sequential analysis permits an examination of how long a specific behavior occurred, that is, its duration. The duration of a behavior might also inform us about the effectiveness of a certain behavior. For example, a highly effective leader might display short instances of transformational type behavior after a follower gives his or her opinion, while a less effective leader tends to ramble on ‘transformationally.’

FUTURE RESEARCH

Recently, many more scholars have voiced the need to examine effective leadership and teams as complex and dynamic systems, operating in a larger multi-layered organizational system. A dynamic system is defined as a collection of elements that changes over time (Allgood, Sauer, & Yorke, 1996; Thelen & Smith, 1998). Leadership and team researchers often draw upon oversimplified theoretical models (e.g., the more static input-process-output models) that exclude dynamic or temporal accounts of how leadership and/or team processes evolve over time. Furthermore, the strong reliance on traditional survey methods is plaguing the field, which constrains non-linear dynamic investigations (e.g., Mathieu et al., 2018; Tse & Ashkanasy, 2015), thereby limiting future theoretical advancement.

Although current behavioral leadership and team research has produced valuable insights, one could argue that, like many other areas of OB research, a “methodological stalemate” might have been reached. Even though video-observational coding (producing continuous time-stamped behavioral events) is (still) labor-intensive, the final three chapters show the importance of producing a micro-behavioral, temporal account, enabling new insights into the social dynamics in teams. However, the common denominator in the sketched limitations is the under-development of the conceptualization of time (Day, 2014). There are many holes in our current understanding of the various ways leader behaviors and team interactions change over time. Therefore, in this future research section, I discuss and illustrate (1) how taking a dynamic, temporal, complexity perspective can advance insights into leader and team effectiveness, and (2) what questions need more attention to further develop current leader and team theories.

Dynamism can be defined as “the degree and pattern by which a phenomenon changes over time” (McClellan et al., 2019, p. 485). The dynamism of leadership and team interactions can be captured by the changes from state to state and is often non-linear or even chaotic in nature. When taking such a perspective, leader and follower behaviors and their relations with processes and outcomes can be conceptualized and measured as ongoing dynamic social interaction over time. Two important components underlie this notion of leader and follower dynamism: time and change. First, *time* can be captured by relevant temporal characteristics such as stability or variability, lag, and cyclicity (see, for a detailed description of these specific temporal characteristics, McClellan et al., 2019). Second, *change* can be captured by fluctuation, for example, in micro-behavioral sequences or patterns, or cognitive states. Hence, the development and recurrence of team behavioral patterns and leader-follower sequences can be examined over time.

Even though scholars have explicitly recognized that leader-follower and team interaction patterns emerge over time (e.g., Uitdewilligen, Rico, & Waller, 2018), most researchers have not studied them yet as a developmental, time-dependent process by tracking development and changes. Such a dynamic view has great potential to broaden the theoretical range and practicability of the research. Instead of static and stable leadership or team factors, such “fluid or transient factors” (McClellan et al., 2019, p. 481) need to be exposed to paint a picture that is much closer to reality, and that will greatly sharpen our understanding of the dynamics of actual leader-follower and team interactions. Taking a dynamic perspective on leadership or teams helps to carve out possible performance episodes or events that have a significant influence on task accomplishment (Beal, Weiss, Barros, & MacDermid, 2005). It also has the potential to advance the functional leadership perspective (Burke et al., 2006), because it can provide insight into the relevance or functionality of certain leader behaviors in specific situations to fulfill certain team needs. A research design that includes dynamic tracking of behavior over time can provide clarity as

to which leader behaviors are functional for constructing leadership, and which less useful activities must be toned down. Such lower-order dynamics (i.e., the moment-to-moment micro behaviors or interactions between people: Meinecke, Hemshorn, Lehmann-Willenbrock, & Buengeler, 2019) would advance the knowledge about short-term behavior fluctuations (e.g., Nielsen & Cleal, 2011). Do we see fluctuations, why do we see fluctuations and are such behavioral or interactional fluctuations effective or functional? When transferred to team research, the dynamic systems theory can help us understand how moment-to-moment interactions among team members may result in repeating and stabilizing patterns of behavior, such as those that lead to the development of group norms (e.g., norms for turn taking during an organizational meeting).

Such future studies warrant an interdisciplinary framework that integrates existing team leadership research, followership research, physiology, developmental work such as models that suggest phases in goal-directed team activity (Marks et al., 2001) and complexity theory. The ideas for future research are grouped under the following themes: (1) Dynamic micro and team behavioral patterns, (2) Human physiology, and (3) Leader and team complexity and variability. They could move the field of leadership and team research forward.

Dynamic Micro-Behavioral Patterns

On employing a micro-behavioral perspective, relevant future research questions are: 1) How do behavioral dynamics in teams unfold over time (using longitudinal tracking)?; 2) Do behavioral dynamics and developmental paths of teams in different domains, such as team learning or other states, co-exist; 3) What can (patterns of) social signals in group interactions tell us about complex, often difficult to grasp constructs such as conflict emergence, cohesion, productive cooperation, or team learning climate? The subsets or order of events that can be captured by micro-behavioral dynamical tracking may offer an advanced, high-resolution representation of behavioral complexities and provide more clarity on how team processes (including effectiveness) unfold (Leenders et al., 2016). Contextual and interpersonal aspects of how team leadership impacts effective team interaction patterns over time can yield valuable theoretical and practical insights, relevant to the daily concerns of millions of employees. For example, how can productive interaction patterns be established? When a team engages in dysfunctional patterns, how can a leader or coach intervene in such habitual routines?

In addition to a more detailed quantitative examination of behavioral patterns over time (adding to the so-called team/group growth and decay literature, McClean et al., 2019), more attention is needed on how leader and follower behavioral roles unfold over time. Chapter 5 already showed that different behaviors are associated with effectiveness

in those roles. More light needs to be shed, using a micro-behavioral focus, on how leaders and followers progress or mature in their roles in different organizational contexts (see, also, Uhl-Bien et al., 2014, for a discussion of future research on followership). However, there might be many different occasions in which the boundaries between being a leader or a team member/follower become blurred in organizations. That is, over time, team members sometimes get promoted to leadership roles in the same team. Or, along the same lines, sometimes leaders of teams operate as a team member/follower in a hierarchically higher placed team. Currently, knowledge about such leader-follower fluxes is sparse; not studying leader- and followership as static entities (i.e., their role is not constant in organizations) can help us to understand the leader and follower roles better. More knowledge about the trickle-down effect of leadership can also enable our understanding of the impact of effective leader interactions and dynamics in organizations.

Another important future research question is: How does a leader influence team members' verbalizations and behavioral patterns? For example, if a leader provides negative feedback or disagrees frequently, a follower might be more likely to engage in defending his or her own position more frequently and show damaging behaviors more often over time. More in-depth understanding of how leader and follower statements contribute to functional or dysfunctional patterns is needed so that potentially dysfunctional patterns can be prevented.

Relatedly, an examination of critical behavioral moments or turning points that influence shifts in teams would advance the nascent "shift" literature (i.e., the behavioral change resulting from specific events or interventions: McClean et al., 2019). Different phases or critical moments can be illustrative of the development of different states or processes of team functioning (Erbert, Mearns, & Dena, 2005; Napier, Bahnson, Glen, Maille, Smith, & White, 2009), which might be characterized by different behavioral interactions and patterns. Identifying such critical moments or trigger events (e.g., by interviewing team members about critical moments or by closely examining possible changes in team interactions or micro-behavioral patterns) can help to uncover how changes in behavioral interactions influence team processes, such as information sharing or team cognition. Additional research questions in this realm could be: Which triggers/critical moments can reduce dysfunctional interaction patterns? Which behavioral interaction patterns underlie changes in the development of team processes? Taking a micro-behavioral approach to uncovering factors in team development processes goes beyond the prevailing thinking based on sequential models. It can also uncover nonphasic or hybrid type models that are time- or structure-based (i.e., specific behavioral events can drive the development of team processes). Identifying the specific behavioral interactions that characterize specific team developmental phases will aid in sharpening our understanding of the development of team states. Other theoretical perspectives (e.g.,

affective events theory: Weiss & Cropanzano, 1996) may also be suitable for studying such transient events or conceptions of team growth or decay over time.

Enriching leadership research in terms of studying a fuller behavioral repertoire, including counterproductive behavior, will help us to understand the implications of such behavior better (e.g., Liao, Yam, Johnson, Liu, & Song, 2018; Lin, Scott, & Matta, 2016). Even mildly negative forms of leader behavior might disrupt functional leader-follower and team interactions; however, knowledge about the precise impact of such behavior remains limited. Adopting a sequential or interactionist lens has the potential to inform us about negative consequences for followers, teams, and potentially also for the leaders themselves (Qin, Huang, Johnson, Ju, & Hu, 2018). Research questions that can be explored include, for example: Which follower behaviors or team interaction patterns are triggered by various forms of counterproductive leader behaviors in various work contexts? Future research could also focus on how leaders or followers can successfully break the possible spiral of negative behavioral events.

Human Physiology

In addition to furthering the examination of micro-behavioral leader and team dynamics, the physiological processes underlying them deserve much more research attention as well. An advantage of physiological data is that it can be collected as a continuous signal that informs us about levels of physiological arousal. Arousal does not provide information about valence (i.e., affective, emotional states which can be either positive, negative or neutral: Rubin & Talerico, 2009); thus, also collecting continuous valence data from other sources is another new path. For example, text-based analysis and classification software such as the Linguistic Inquiry and Word Count (LIWC) program can provide information about the valence of each uttered word. The valence trajectory of leaders (and their followers) must be examined in combination with the physiological signals that can be translated into low-medium or high levels of arousal; for example, do we see certain combinations more during specific moments (e.g., the beginning of the meeting or project)? Future research could combine various sources of data, coming from different wearable sensors, collecting field information about participants' physiological processes, body movements, speech patterns, and so forth. The increasingly refined wearable sensors offer many more possibilities for collecting and recording continuous streams of behavioral data, thereby exposing fundamental team processes. These emerging technologies offer great promise for generating real-time longitudinal data that will enable sophisticated modeling of actual team dynamics.

Leader and Team Complexity and Variability

A complex adaptive systems approach must also be taken to examine further how micro-behaviors as well as leader (either formal or informal) and followers' interactions develop over time. Do certain behavioral pairings occur more often at specific moments than others (providing information about the development or trajectory of effective team interaction)? How can we relate team interaction patterns to the phases of team development processes in different contexts? Doing and embracing research on the behavioral event level and fully utilizing multi-modal/sensory technology may account for the complexity and dynamism that is at the core of most team processes (Ramos-Villagrasa et al., 2018). Over time, such knowledge may add, eventually, to a heightened sense of vitality for all team members.

The principle of methodological fit applies here. Alignment between theory (e.g., dynamic systems theory, Thelen & Smith, 1998), measurement (e.g., continuous tracking of behavioral and/or physiological data) and analytical methods (e.g., sequential or pattern analysis, recurrence analysis or State Space Grids) is needed to truly advance our understanding of team dynamics (Edmondson & McManus, 2007). An important question would be: Does each team show distinctive, unique, verbal or physiological interaction patterns or trajectories or can similar patterns be detected across several types of teams?

Future research should also adopt designs in which linear and nonlinear methods are augmented. Chapter 4 already highlighted the potential of combining pattern detection methodology with more traditional methods. Additional research questions can be answered concerning the specific antecedents or contextual drivers of specific patterns (e.g., team process entrainment patterns or learning cycles), as well as how these so-called entrainment patterns (McGrath, Kelley, & Machatka, 1984) are subsequently associated with important workplace outcomes?

New research that tracks teams or leaders for a longer period of time, and analyzes their communicative-and-learning type dynamics, team effectiveness, processes and team task context could truly advance knowledge about effective leadership and team work. To enable such longitudinal tracking, increasingly sophisticated methodologies and tools for capturing the dynamics in teams should be used (such as, but not restricted to, sensory trace measures and sequence clustering techniques). Such increasingly multidisciplinary studies can alleviate our understanding of effective social dynamics at work. For that purpose, we can draw upon and combine insights from the areas of teamwork, cognitive, educational, and social psychology, computer science, communication studies, human (resource) development, and related areas of learning and instruction.

Future research must go beyond static descriptions of a leader's overall style or follower role. A dynamic model of temporal team interactions can harvest knowledge about

what and when team members need to communicate to accomplish their tasks. Research that conceptually links team development, leadership, and the interaction-coding literature must then specify and examine the (micro-) behavioral building blocks of employees in effective social interactions at many points in time. Such research can overcome the lack of flexibility in earlier published models of group development (e.g., sequential-linear progressive models of group development: Heinen & Jacobson, 1976; Kozlowski, Gully, Nason, & Smith, 1999; Rickards & Moger, 2000; Sheard & Kakabadse, 2004; Tuckman, 1965; Wheelan, 2005). These models are thus far mostly conceptual in nature, depicting different phases of team or group development. Studying how developmental states occur in real time and how interpersonal patterns form and stabilize (e.g., Hollenstein, 2007, 2013) will offer a clearer lens on how (various types of) groups/teams mature over time.

Using the *interaction* as an (understudied) own unit of analysis on which to map the (changing) dynamics of teams will give more insight into how teams actually develop, change and accomplish tasks over time. When scholarly interest in the development of work teams became stronger, the question of a better fit between the models and the reality of work teams became more and more relevant (Arrow, Poole, Henry, Wheelan, & Moreland, 2004; Erbert et al., 2005; Heinen & Jacobson, 1976). The description of actual functional or dysfunctional interaction dynamics, including possible events or critical instances that imprint follower and leadership changes, for example, from functional to dysfunctional patterns over time, will help create awareness of them in teams, and may enable better coaching of organizational teams (i.e., instead of using a general team development path for all teams; Chang, Duck, & Bordia, 2006).

Luckily, we seem to be at the start of a new era. There are some promising advancements that should enrich future leadership and team research studies. The importance of the leader and team task environment in which their interactions take place is increasingly part of theory and measurement. Advanced (dynamic) theories, methodologies and tools/sensor technologies for capturing complex, dynamic leader and team development and interactions over time will really expand what we know about effective leadership and team functioning.

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Nederlandse Samenvatting

INLEIDING

Leiderschap en team dynamiek blijven, zowel in de praktijk als in de wetenschappelijke literatuur, belangrijke thema's. Leiderschap en intermenselijke dynamiek hebben veel invloed op effectieve samenwerking en uitvoering van taken. Veel studies zijn gewijd aan het identificeren van factoren en processen die geassocieerd zijn met een hoge mate van leiderschaps- en/of teameffectiviteit. Daarnaast spenderen organisaties in verschillende sectoren veel geld, tijd en energie aan leiderschaps- en teamontwikkeling. De gemeenschappelijke basis van deze studies is het gebruik van vragenlijsten of afnemen van interviews. Dit levert informatie op over *gepercipieerd* leiderschapsgedrag en samenwerking in teams. Percepties zijn au fond slechts meningen en reflecteren dus niet precies het werkelijke leiderschapsgedrag of de teamdynamiek. Ondanks dat leiderschap en team dynamiek ontzettend belangrijke drijfveren zijn voor hoge performance, weten we dus nog relatief weinig van het precieze, daadwerkelijke gedragsrepertoire van effectieve leidinggevend en de gedragsdynamieken die plaatsvinden in hoog presterende teams. Deze dissertatie volgt de vele oproepen in de leiderschap- en team literatuur om het werkelijk observeerbare gedrag van leidinggevend en teams fijnmaziger, en met non-lineaire technieken te analyseren (zie o.a., Aisenbrey & Fasang, 2010; Lehmann-Willenbrock & Allen, 2018).

ONDERZOEKSOPZET

De centrale vraag die deze dissertatie beantwoordt is: "Welke micro-gedragingen en interacties zijn geassocieerd met een hoge mate van leiderschaps- medewerkers- en team-effectiviteit?" Het onderzoek bestaat uit twee delen. Het eerste deel bestaat uit drie empirische studies die elk bijdragen aan theorievorming over het specifieke, minutieuze gedragsrepertoire van effectieve leidinggevend en. Één van deze studies richt zich op het fysiologische proces dat hiermee gepaard gaat. Deze eerste drie empirische studies (achtereenvolgens gepresenteerd in hoofdstuk 2, 3 en 4) vormen de opmaat voor het tweede deel. De video-observatie methode en specifieke classificering van gedrag is hiertoe verfijnd en toepasbaar gemaakt voor observatie van de medewerkers. In de laatste twee empirische studies (hoofdstuk 5 & 6) zijn effectieve gedragsdynamieken van teams en interactie tussen leidinggevend en medewerkers geïdentificeerd. De vijf empirische studies, beantwoorden daarmee een aantal theoretisch *en* praktisch belangrijke vragen. Ten eerste is ingegaan op de vraag hoe leiderschap wordt ge-co-construeert samen met medewerkers tijdens hun interacties. Ten tweede wisten we tot op heden nog weinig over hoe dynamieken van effectief leiden en volgen er uit zien in teams. Ten derde wordt steeds vaker in de huidige leiderschapsliteratuur om meer inzicht gevraagd in micro-gedrag en interacties in plaats van of in aanvulling op algemene percepties van stijlen.

EFFECTIEF LEIDERSCHAPSGEDRAG EN ONDERLIGGENDE FYSIOLOGISCHE PROCESSEN

De studie in hoofdstuk twee heeft als doel om het effectieve gedragsrepertoire van leidinggevend, gemeten met fijnmazige video-observatie en codering, te vergelijken met percepties van medewerkers en studenten, gemeten met vragenlijsten. Om gedrag te meten wordt nog steeds in meer dan 99% van de gepubliceerde leiderschapsstudies alleen vragenlijsten of interviews gebruikt. Het gebruik van louter percepties om (leiderschaps)gedrag te meten heeft echter veel kritiek gekregen. De wetenschappelijke literatuur omschrijft vele beïnvloedende factoren die een precieze en accurate meting van (leiderschaps)gedrag door enkel percepties belemmeren. Zo is bijvoorbeeld gesteld dat vragenlijsten niet het precieze gedrag van leiders maar slechts algemene positieve evaluaties meten. Ook is aangetoond dat bij beoordelingen van gedrag met een vragenlijst het semantische geheugen (en niet het episodische geheugen) wordt gebruikt. Dit heeft als resultaat dat in dit soort metingen het impliciete geheugen over algemene 'objecten of fenomenen' wordt gebruikt, resulterend in universele beelden die overeenkomen met prototypisch leiderschapsgedrag. Impliciete leiderschapstheorie geeft tevens aan dat mensen zich veelal laten leiden door prototypische beelden bij het beoordelen van leidinggevend. Daarnaast spelen affectieve processen (zoals bijvoorbeeld het hebben van een goede relatie met een leidinggevende) een rol bij het invullen van vragenlijsten over gedrag. In plaats van de cognitief complexe taak die de beoordeling van gedrag zou moeten zijn, is het in essentie niet meer dan een sociaal oordeel. Een beter begrip van de mate waarin deze percepties afwijken van daadwerkelijk gedrag kan ons helpen om eerdere resultaten uit vragenlijstonderzoek beter te duiden. Dit is van groot belang omdat veel van de huidige leiderschapstheorie en inzichten zich sterk heeft gebaseerd op resultaten verkregen uit vragenlijst en interview onderzoek, hetgeen zelden tot gedragsprecisie heeft geleid. Deze eerste empirische studie bleek een belangrijke basis voor de volgende studies omdat inderdaad werd vastgesteld dat met een scherpere gedragsmatige focus, preciezer onderzoek kan worden gedaan naar ingrediënten van leiderschapseffectiviteit.

Uit de resultaten gerapporteerd in hoofdstuk 2 blijkt dat medewerkers en studenten denken dat effectieve leidinggevend veel vaker relatie-georiënteerd gedrag (zoals het geven van positieve feedback of het tonen van persoonlijke interesse) vertonen (respectievelijk 48.0% en 46.3%) dan in de werkelijkheid (11.8%). Medewerkers en studenten denken dat juist taak-georiënteerd gedrag (zoals bijvoorbeeld het monitoren van de taken en het richting geven aan de taakhoud) minder wordt vertoont door effectieve leidinggevend (respectievelijk 28.4% en 29.8%). In werkelijkheid omvat dit juist een groot gedeelte van hun gedragsrepertoire (41.3 %). De inschatting van de hoeveelheid counterproductief gedrag (zoals bijvoorbeeld het verdedigen van de eigen positie of het tonen van desinteresse) van effectieve leidinggevend lag dicht bij de werkelijkheid (op

10.1 en 12.9% geschat door medewerkers en studenten t.o.v. 11.7% in werkelijkheid). Het perceptuele beeld wat werd verkregen correspondeert met de prototypische beelden die mensen hebben van effectief leiderschap: een effectieve leidinggevende houdt zich veel bezig met relationele kanten van het samenwerken. Veel leiderschapsliteratuur richt zich dan ook vaak op deze relationele leiderschapsgedragingen en stijlen; ontelbare studies hebben zich enkel gericht op transformationeel, authentiek, ethisch of dienend leiderschap, daarmee een belangrijke taakgerichte basis weglatend. In deelstudie twee hebben we de medewerkers en leidinggevendenden direct na vergaderingen gevraagd om een inschatting te maken van het vertoonde gedrag. De resultaten laten zien dat ook hier een mismatch is in de percepties en het daadwerkelijke video-gecodeerde gedragsrepertoire. Zo bleek bijvoorbeeld dat de frequentie van gecodeerd directief gedrag samenhangt met percepties van transformationeel gedrag. Beide deelstudies laten zien dat medewerkers, studenten en leidinggevendenden zelf het eigen vertoonde gedrag noch andermans gedrag niet accuraat kunnen inschatten. Een belangrijke verstoring van deze inschatting lijkt het prototypisch of gestigmatiseerd beeld van effectief leiderschap dat mensen hebben. Dit leidt ertoe dat medewerkers, studenten en leidinggevendenden zelf de relationele gedragingen vele malen hoger scoren, wat niet overeenkomt met het gedrag wat een effectieve leidinggevende daadwerkelijk vertoont. Daarnaast blijkt video-observatie en codering een arbeidsintensieve doch goede methodiek om het precieze gedragsrepertoire van leidinggevendenden te identificeren.

Deze bevindingen impliceren de noodzaak van (1) het inzetten van de video-observatie methode om accurater daadwerkelijk gedrag van leidinggevendenden valide te identificeren en (2) het verkrijgen van meer begrip van de taakgeoriënteerde gedragsbasis en de associatie met leiderschapseffectiviteit. In de huidige leiderschapsliteratuur wordt het transformationele-transactionele model veelal gebruikt om 'gedrag' te meten. De transactionele gedragingen, die door sommige worden geassocieerd met taakgedrag, blijken vooral correctief van aard. Een belangrijke vraag die hierdoor ontstond in de literatuur was of we met een toevoeging van taak-georiënteerd gedrag een beter beeld konden krijgen van effectief leiderschap. Mijns inziens was het taak-georiënteerde gedrag explicieter aanwezig in een voorganger van het transformationele-transactionele model: het model ontwikkeld door Ohio State University, met de gedragingen 'initiëren van structuur' (versus 'vriendelijkheid').

Een bijkomend probleem in het huidige academische leiderschapsvertoog is dat veel onderzoekers één gedragsmodel als uitgangspunt nemen (zoals met name het transformationele-transactionele model). Om tot een vollediger model van effectief leiderschapsgedrag te komen wordt geopperd om verschillende modellen te combineren. In hoofdstuk drie wordt de vraag beantwoord of met een combinatie van modellen, te weten het transformationele-transactionele model en het 'initiëren van structuur-vriendelijkheid'

model, belangrijke leiderschapsuitkomsten beter kunnen verklaren. Om dit te onderzoeken is het gedrag van 74 leidinggevendens gevideotaped en gecodeerd, zijn percepties van hun transformationele en transactionele stijl opgevraagd en zijn effectiviteitscores verzameld over leiderschapseffectiviteit, team effectiviteit en de mate waarop leiders medewerkers extra kunnen motiveren. De complementariteits- en regressie analyse laten beiden eenzelfde beeld zien: wanneer het transactionele deel uit het ene model wordt gesubstitueerd door specifiek (Ohio-state model) taak-georiënteerd gedrag, dat bestaat uit dirigeren, informeren en monitoren, kan meer variantie worden verklaard in leiderschaps- en team effectiviteit. Een belangrijke implicatie voor de leiderschapsliteratuur is dat specifiek taak-georiënteerd gedrag niet meer mag ontbreken in onze theoretisering over effectief leiderschap en zelfs belangrijker blijkt dan vele recente onderzoeken die zich louter richten op de relationele kant van leiderschap.

Nu een minutieuzer beeld is verkregen van het fijnmazige gedragsrepertoire van effectieve leidinggevendens, bestuderen we in hoofdstuk vier hoe specifiek gedrag samenhangt met een fysiologische indicator. Verschillende leiderschapsonderzoekers stelde reeds dat meer onderzoek op het interdisciplinaire vlak van leiderschap, organisatiegedrag en fysiologie nodig is. Gecombineerde inzichten van leiderschapsgedrag met onderliggende fysiologische processen kunnen de leiderschapsliteratuur een stap verder brengen.

We maken gebruik van de theorie over 'gezonde variabiliteit' om een propositie te ontwikkelen over de interactie van leiderschapsgedrag, fysiologie en leiderschapseffectiviteit. De theorie over gezonde variabiliteit stelt dat een hoge mate van effectiviteit samenhangt met coherentie tussen de fluctuatie van fysiologische arousal en de sociale omgeving. De gevideotapede micro-gedragingen worden gegroepeerd op basis van de theoretisch veel gebruikte categorieën taak, positief relatie- en negatief relatie-georiënteerd (zogenoemd counterproductief) gedrag. Middels machine learning technieken classificeren we per leidinggevende de mate van 'fysiologische opwindings' (arousal) onder hoge of lage arousal. Daarnaast is middels expert scores bepaald of leidinggevendens zeer of minder effectief zijn. Op basis van deze data testen we of verschillende niveaus van arousal samenhangen met bepaald gedrag en of dit patroon anders is voor zeer effectieve leidinggevendens. De resultaten tonen aan dat de zeer effectieve leidinggevendens een hogere mate van arousal hebben tijdens positief- en negatief relatie-georiënteerd gedrag. Tijdens taak-georiënteerd gedrag wordt bij zowel de zeer als minder effectieve leidinggevendens geen significante verhoging in de fysiologische arousal gevonden. Deze resultaten impliceren dus dat zeer effectieve leidinggevendens een hogere mate van fysiologische fluctuatie hebben, congruent met de sociale omgeving op dat moment. In het algemeen laat deze studie zien dat wanneer we een meer dynamische analysetechniek kiezen, in plaats van gepercipieerd gedrag en fysiologie als statische statistische constructen te beschouwen, dit leidt tot meer inzicht in effectief leiderschapsgedrag.

EFFECTIEVE GEDRAGSDYNAMIEK TUSSEN LEIDINGGEVENDEN EN MEDEWERKERS IN TEAMS

Ook in hoofdstuk vijf is eenzelfde non-lineaire techniek gebruikt. We doen dit om meer inzicht te krijgen in de effectieve gedragsdynamieken die plaatsvinden in teams. Vanuit de teamliteratuur beschouwd zijn er drie belangrijke interactiepatronen te onderscheiden: continue wederkerende patronen (patronen van gedrag die vaker terugkeren tijdens de interactie), heterogene patronen (patronen die bestaan uit een grotere variatie aan gedragingen) en participatieve patronen (patronen waarbij de leidinggevende en de medewerker gelijkelijk verdeeld aan het woord zijn). Een belangrijke basis voor het theoretiseren over team dynamieken en interactiepatronen is de 'Complex Adaptive Systems' theorie (CAS). De CAS theorie beschouwd teams als dynamische systemen die gekenmerkt worden door continue wisselende input-output processen en zich aanpassen aan hun sociale werkcontext. Deze theoretische lens is gebruikt voor de ontwikkeling van de hypothesen in hoofdstuk vijf. Het doel van dit hoofdstuk is om inzicht te geven in hoe dynamische interactiepatronen bijdragen aan een hogere team effectiviteit in verschillende taakcontexten.

Door middel van fijnmazige videocodering van gedrag en speciale patroonanalyse zijn de interactiepatronen per team vastgesteld. Daarnaast zijn de percepties van medewerkers over de informatie-uitwisseling in hun team verzameld en zijn verschillende expert raters per team gevraagd om een oordeel te geven over de team effectiviteit. De taakcontext is een objectief gegeven, vastgesteld door de organisatie. Op basis van de kwantitatieve data is een mediatie-moderatie model getest waarin de interactiepatronen worden geassocieerd met de mate van informatie-uitwisseling en team effectiviteit binnen twee typen taakcontexten: de routine versus de non-routine taakcontext. De data laat zien dat participatieve interactiepatronen een positief effect hebben op het behalen van effectieve team resultaten, terwijl continue wederkerende interactiepatronen een negatief effect hebben op de team effectiviteit. De invloed van interactiepatronen op team effectiviteit vindt plaats via informatie-uitwisseling: participatieve en wederkerende patronen hebben invloed op de mate van informatie-uitwisseling in het team, hetgeen sterk samenhangt met de team effectiviteit. Bovendien blijkt dat de taakcontext waarin de teams opereren een belangrijke invloed heeft op de samenhang tussen de interactiepatronen en de informatie-uitwisseling in een team. In non-routine, kennisintensieve teams blijken de gevonden effecten nog sterker: de wederkerende patronen hadden een nog negatiever effect op de informatie-uitwisseling en teameffectiviteit terwijl het belang van participatieve patronen binnen deze teams nog belangrijker bleken. Hiermee draagt deze studie bij aan een beter begrip van teams als complexe adaptieve systemen.

Nu gebleken is dat team interactiepatronen, die worden gevormd door interacties tussen leidinggevenden en medewerkers, sterk samenhangen met team effectiviteit,

zoomden we in hoofdstuk zes in op die interacties tussen medewerkers en leidinggevenden. Het is een cliché is dat effectief leiderschap wordt bepaald door leiders én medewerkers, die tezamen toewerken naar positieve resultaten. De rol van de medewerker in het leiderschapsproces wordt al sinds enige tijd erkend in de wetenschappelijke leiderschapsliteratuur. Pas sinds 2014, na talloze boeken, wetenschappelijke artikelen en vakliteratuur over leiderschap, wint de theorie over 'medewerkschap' aan terrein onder leiderschapsonderzoekers. Theorieën waarin de medewerker niet enkel als passieve entiteit, maar als belangrijke, proactieve partner wordt beschouwd zijn, hoe bijzonder dit voor buitenstanders misschien mag klinken, relatief nieuw. Een belangrijke theorie op dit gebied is de zogenaamde relationele theorie. Hierin wordt leiderschap beschouwd als co-constructie proces: het resultaat van effectieve interacties tussen leidinggevenden en medewerkers. Een meer 'gebalanceerde' onderzoeksaanpak waarin niet enkel de leider als belangrijke beïnvloeder van het proces (of de interactie) centraal staat, maar ook de medewerker, lijkt steeds meer in zwang te komen. In de laatste empirische studie nemen we zo'n gebalanceerde aanpak en analyseren we de fijnmazige interacties tussen leidinggevenden en medewerkers. Een dergelijke aanpak vergroot het begrip van hoe leidinggevenden én medewerkers, als co-constructanten, bijdragen aan effectief leiderschap. Het fijnmazige gedragspatroon van zowel 101 leidinggevenden en 1266 medewerkers wordt in kaart gebracht middels video observatie en codering. Met behulp van zogenoemde lag sequentiële analyse is vastgesteld of bepaald gedrag, vaker dan dat we op basis van kans kunnen verwachten, volgt op gedrag dat wordt vertoont door een leidinggevende of door een medewerker.

De uitkomsten laten zien dat zeer effectieve leidinggevenden gebruik maken van zowel transformationeel en transactioneel gedrag. Met beide typen gedrag ontlokken zij proactief, productief gedrag van medewerkers in de vorm van 'voice' (het uiten van constructieve suggesties, informatie en opvattingen) en informeren. Opmerkelijk is dat niet alleen de zeer effectieve leiders, maar ook de zeer effectieve medewerkers complementair en actief gedrag (in de vorm van informeren) van andere medewerkers ontlokken met hun transformationele en transactionele gedrag. Minder effectieve leiders lijken juist de actieve stem van medewerkers te onderdrukken; meteen nadat leidinggevenden transformationeel of transactioneel gedrag hebben vertoond blijven zij zelf hetzelfde type gedrag vertonen. Éénzelfde patroon zien we bij de minder effectieve medewerkers. Ook zij blijven hetzelfde type transformationeel of transactioneel gedrag vertonen meteen nadat ze zelf dit gedrag hebben laten zien; hiermee roepen ze geen actieve input op van andere medewerkers. Samenvattend roepen de effectieve leidinggevenden en medewerkers actieve input van andere medewerkers op. Dit gedrag blijkt complementair aan het door hun eerder vertoonde gedrag. Hieruit blijkt dat het in kaart brengen van deze temporele patronen van

effectief leider- en medewerkerschap bijdragen aan een beter begrip van effectievere samenwerking of co-constructie tussen leidinggevend en medewerkers.

PRAKTISCHE AANBEVELINGEN

De relevante resultaten van de onderzoeken die hebben plaatsgevonden bij de deelnemende organisaties zijn geborgen in specifieke (vertrouwelijke) onderzoeksrapporten die gecommuniceerd zijn aan de deelnemende organisaties. Naast die praktisch-relevante resultaten is er gepubliceerd in academische tijdschriften en een boek, en zijn momenteel nog twee wetenschappelijke artikelen in voorbereiding. Het gehele proefschriftonderzoek leverde dus zowel theoretisch- als praktijk-relevante inzichten op over de wijzen waarop managers leiding geven aan hun medewerkers en welke gedragselementen daarbinnen effectief zijn. Effectiviteit in de aansturing is van belang om te bereiken dat medewerkers de gedeelde visies op het werk, gecombineerd met hun eigen professionaliteit, productief kunnen doorvertalen naar hun dagelijkse werkzaamheden. Daarnaast kan wetenschappelijke kennis over leiderschap en effectieve teamdynamieken in potentie organisaties helpen om te komen tot een adequate, toekomstbestendige koers en effectieve training- en ontwikkelprogramma's.

Het leiderschaps- en team onderzoek wat is gepresenteerd in dit proefschrift heeft tevens op twee andere niveaus kennis opgeleverd. Op het individuele niveau heeft er terugkoppeling plaatsgevonden in de vorm van (1) individuele feedbackrapporten voor de leidinggevend die meededen (aan de dataverzameling gerapporteerd in hoofdstuk 2, 3, 4, 5 en 6), inclusief het fijnmazige gedragsrepertoire, de verzamelde leiderschapspercepties en een benchmark-achtige vergelijking, (2) de ge-videotapede vergadering, inclusief de geïntegreerde fysiologische data, en (3) een aanbod van de deelnemende organisatie voor een tweetal coaching gesprekken waarin de toegestuurde videotape en het feedbackrapport besproken konden worden. De coaches werden vooraf geïnformeerd over de verschillende gedragscategorieën en informatie die werd opgenomen in het feedbackrapport opdat een effectieve terugkoppeling en dialoog kon plaatsvinden. Deelname aan het onderzoek heeft dus een direct leereffect voor de leidinggevend opgeleverd. Zij kregen inzicht in hun eigen gedrag en interacties. Daarmee werd hen letterlijk een spiegel voorgehouden. Hoewel we al langer weten dat gedrag trainbaar is, behoren dit soort interventies, waarbij gebruik wordt gemaakt van werkelijke situaties die plaatsvinden in de eigen dagelijkse werkcontext (Mintzberg noemt dit 3^e generatie training en ontwikkeling) nog steeds tot een unicum.

Op het organisatieniveau hebben speciale onderzoeksrapporten voor de deelnemende organisaties en organisatieonderdelen inclusief alle relevante uitkomsten inzicht gegeven in "hoe effectieve leiders en medewerkers zich daadwerkelijk gedroegen op de werkvloer." De bevindingen in dit proefschrift almede de informatie uit de onderzoeksrapporten (en de

feedback die wij daarop weer kregen) lieten zien dat het fijnmazige gedragsrepertoire van leidinggevend en teams goed geïntegreerd kan worden in bestaande trainings- en ontwikkelprogramma's. Specifiek gedrag dat onderdeel uitmaakt van een breder gedragsrepertoire blijkt een belangrijke voorspeller van leiderschaps- en team effectiviteit alsmede van wenselijke intra-team interacties.

Door het nauwgezet in kaart brengen van het fijnmazige gedrag van leidinggevend en medewerkers en eventuele situatie-eisen (zoals is gedaan in hoofdstuk 5) kan de precisie of kwaliteit waarmee leidinggevend en teams succesvol worden geadviseerd en getraind verbeterd worden.

TOT SLOT

Dit proefschrift illustreert dat effectief gedrag en gedragsdynamieken tussen leidinggevend en medewerkers in teams niet precies genoeg met enkel vragenlijsten kan worden gemeten. Middels video-observatie en codering van gedrag dat in de dagelijkse praktijk wordt vertoond laten we zien dat een veel fijnmaziger beeld kan worden verkregen. We dragen daarmee bij aan een beter begrip over hoe teams als complexe systemen werken, hoe co-constructie tussen leidinggevend en medewerkers plaatsvindt en hoe effectieve teampatronen eruitzien. Een beperking van de gebruikte methodologie is het arbeidsintensieve karakter dat inherent is aan fijnmazige codering van gedrag. Het gebruik van dit onderzoeksinstrument resulteert echter in een unieke dataset die rijk is aan informatie en die het mogelijk maakt om de centrale onderzoeksvraag van dit proefschrift te beantwoorden, inclusief vele andere theoretisch- en praktisch relevante vragen. Belangrijk om te benoemen in dit kader zijn de technologische en data-analytische ontwikkelingen die bij kunnen dragen aan het verkrijgen van inzicht in effectieve leiderschaps- en teamdynamieken. Tal van sensor-technologische instrumenten, zoals bijvoorbeeld de fysiologische, of machine-learning technieken, zouden in de toekomst kunnen helpen. Te denken valt bijvoorbeeld om interessante momenten ('arresting moments') in kaart te brengen, bijvoorbeeld door middel van sensoren die fysieke informatie geven (over bijvoorbeeld momenten waarop een routine in een non-routine situatie veranderd) die gecodeerd kunnen worden, maar ook tekstmining of tekstanalyse methodes te gebruiken (zoals bijvoorbeeld 'LIWC') om automatisch positieve of negatief geladen fragmenten of interacties zichtbaar te maken.

Kortom, video-codering en het gebruik van non traditionele, hoge resolutie technieken om inzicht te krijgen in dynamieken van leiderschaps- en teamgedrag hebben een belangrijke toekomst in de leiderschaps- en team literatuur, en ik ben blij dat ik hieraan mijn steentje heb kunnen bijdragen binnen het 'high tech - human touch' motto van de Universiteit van Twente.

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Selected Presentations & Invited Talks

- Leader development workshop (September, 2019). "Developing high performing leaders." Garderen, The Netherlands.
- INGroup conference (June, 2019). Poster "Using innovative measurement techniques that allow the precise capturing of human interaction dynamics." Lisbon, Portugal.
- Workfield session & pitch (October, 2017) "Objectiever leren kijken: Wat kenmerkt de effectieve teams in uw organisatie?" Enschede, The Netherlands.
- Network Meeting Wearables in Practice (January, 2017). Presentation "Integrating behavioral with psychophysiological data. Towards an enhanced understanding of leader behavior?" The Hague, The Netherlands.
- Presentation at an in-house research center (December, 2016). "Success factors of effective leadership." Utrecht, The Netherlands.
- Presentation for a Director General (November, 2016). Presentation "Effectief leidinggeven bij de [...]." Utrecht, The Netherlands.
- Symposium Tech4People (October, 2016). "Integrating behavioral with psychophysiological data; towards an enhanced understanding of leader behavior?" Enschede, The Netherlands.
- Presentation Network Meeting Wearables in Practice (October, 2016). "New effective leader-behavioral insights through combining skin conductance with video-coded field behaviors." Utrecht, The Netherlands.
- Colloquium Research Symposium HRD/University of Oulu (October, 2016). "Integrating behavioral with psychophysiological data: Rendering the invisible visible?" Enschede, The Netherlands.
- Presentation for the Management Team of [...] (October, 2016). "Effectief leiderschap bij [...]." Noordwijk, The Netherlands.
- Guest lecture at the department of Educational Science (June, 2016). "Leader Behavior & Implicit Leadership Theories." Enschede, The Netherlands.
- Presentation at an in-house research center (December, 2014). "Results-oriented leadership: Success factors of effective leadership." Utrecht, The Netherlands.
- Round Table Discussion Leadership with a Top Management Team (November 2014). "Effectief leiderschap." Utrecht, The Netherlands.
- Professionalization workshop (March, 2014). "Video-observing leadership behavior." Utrecht, The Netherlands.
- Presentation held for a central employee counsel (January, 2014). "Onderzoek leiderschapsgedrag." The Hague, The Netherlands.
- Presentation at the INTER.COM symposium for the Technische Universität Braunschweig (August, 2013). "Leader and follower behavior as co-created interaction process." Braunschweig, Germany.

Guest lecture at the Technische Universität Braunschweig (January, 2013). "Using video-observation methodology to observe leader and follower behavior." Braunschweig, Germany.

Presentation at Noldus Information Technology (March, 2012). "Behavioral dynamics of leaders (in staff and board meetings): What patterns lead to success?" Wageningen, The Netherlands.

Presentation at the Summer course, Association for the Advancement of Assistive Technology in Europe (August, 2011). "How to evaluate healthcare information systems?" Maastricht, The Netherlands.

Presentation at the Medisch Informatica Congres (MIC) (November, 2011). "A combined approach for the evaluation of healthcare information systems." Maastricht, The Netherlands, with M.B. Michel-Verkerke.

Courses taught for the Business Administration & Educational Sciences programs at the University of Twente

BSc Innovation & Change Management

BSc Organizational Behavior

MSc Masterclass Service Management

MSc Leadership Organizational Change & Consultancy

BSc Professional Learning in Organizations

MSc Team Learning at Work

MSc Trending Topics in Educational Sciences

Dankwoord (Acknowledgements)

Tijdens het schrijven van dit proefschrift over micro-dynamieken van leiderschap, medewerkerschap en team interactie kwam ik de onderstaande quote tegen:

“Because the issues relating to leadership cut across all types of human activity and thought, true understanding of such a complex phenomenon requires a broadly conceived approach.”

(J. Thomas Wren, The Leader's Companion, 1995, p. 10)

Deze quote intrigeerde mij destijds en bleek temeer toepasselijk voor mijn PhD onderzoek. Gedrag en gedragsprocessen zijn klaarblijkelijk geen aspecten die gemakkelijk en simpel te begrijpen, analyseren en toe te passen zijn. Gedrag en gedragsprocessen zijn zeer complex en worden gedreven door veel verschillende factoren. Om dergelijke complexe fenomenen in kaart te brengen is dus een brede aanpak nodig met inachtneming van dynamieken, omgevingsfactoren en micro-processen. Dit proefschrift is een reflectie van mijn zoektocht om middels een combinatie van video-observatie en codering, fysiologische dataverzameling en patroonanalyse meer inzicht te krijgen in effectief leiderschap, medewerkerschap en teaminteractie. De afgelopen jaren zijn ontzettend inspirerend geweest; ik heb veel mensen ontmoet die eenzelfde passie hadden, of die op een andere manier op professioneel of persoonlijk vlak hebben bijgedragen aan mijn ontwikkeling of de totstandkoming van dit proefschrift. Het veelgehoorde gezegde dat een proefschrift geen ‘one man (of woman) show’ is, is zeker ook in dit geval van toepassing. Een prachtige quote van de beroemde Britse wiskundige Isaac Newton is hier op zijn plek: “If I have seen further, it is by standing on the shoulders of giants.” Ook ik heb het geluk gehad om (niet letterlijk, wel figuurlijk) op de schouders van een aantal belangrijke ‘giants’ te staan.

Allereerst, Celeste, mijn promotor, dank voor je nooit afnemende inzet, input en inspiratie. Ik heb zelfden iemand ontmoet met een dergelijke hoge werkethos en passie voor haar vakgebied. Tijdens onze samenwerking was je altijd bereikbaar; de momenten dat ik 's avonds laat een manuscript toestuurde voor feedback en vervolgens voor 4 uur 's ochtends (of 's nachts) feedback kreeg per email kan ik niet op 1 hand tellen. Naast de vele inspirerende inhoudelijke discussies heb je mij ook het belang en de kunst van het re-(re-én re-)editen van papers geleerd. Je bent een geweldige academische mentor voor mij geweest: dankjewel dat ik (spreekwoordelijk) op jouw academische ‘giant’ schouders heb mogen staan!

Daarnaast ben ik ook veel dank verschuldigd aan Ton de Jong en Maaïke Endedijk, die het vertrouwen hadden om mij aan te stellen bij de vakgroep Educational Science. Dank voor jullie geduld, interesse en bemoedigende woorden met betrekking tot mijn proefschrift. Bedankt dat ik mijn proefschrift onder de vlag van Educational Science af heb mogen ronden! Jullie zijn allebei ‘giants’ binnen jullie eigen vakgebied.

Graag wil ik ook op deze plek de commissieleden, Simone Kauffeld, Joseph Kessels, Holger Schiele, Jan Maarten Schraagen, Mark van Vugt en Sjur Uitdewilligen, hartelijk bedanken voor het lezen van mijn proefschrift, de interesse in mijn werk en de constructieve feedback.

Dank aan (oud-)collega's van bedrijfskunde en in het bijzonder de vakgroep Change Management en Organizational Behavior en de vakgroep Instructional Technology. Speciale dank aan mijn huidige vakgroepsgeenoten (Bas, Mireille, Reinout, Stijn, Marijn, Ellen, Ilona, Marlon, Dieuwertje, Maria, Sietse, Nick, Nathalie, Natascha en Mirte) voor al jullie steun, geloof en aanmoediging met betrekking tot de afronding van mijn proefschrift. Dank ook voor het aanbieden van een inspirerende werksfeer en collegiale werkomgeving. Matthias, je bent naast oud-collega ook mijn paranimf. Ik ben vereerd dat je deze rol op je wilde nemen tijdens deze special dag. We hebben naast het werk ook gezamenlijk de MTB hobby beoefend (hoewel ik soms in plaats van 'op' de fiets, 'naast' de fiets lag). Bedankt voor je bemoedigende woorden en de support. Daniël, hoewel je ook mijn broertje bent (en dus ook onder de categorie familie hoort), noem ik jouw naam ook alvast op deze plek. Ik heb jou anderhalf jaar geleden al gevraagd of je mijn paranimf zou willen zijn en ben erg blij dat jij in dit proces ook een steun en toeverlaat wou zijn. Dank voor je enthousiaste gesprekken over machine learning, python en data-analyse. Heerlijk om soms even met iemand te kunnen sparen over analysetechnieken en methoden. Ook dank voor alle keren dat je mijn gedachten even op iets anders bracht door bijvoorbeeld de vele bordspellen die we samen hebben gespeeld (waarbij we dan samen de patronen en het spelverloop analyseerden). Ik ben er trots op dat jij mijn broertje bent!

Daarnaast heb ik buiten de twee Universiteit Twente vakgroepen ook met andere collega's op de UT samengewerkt. Dank aan Marleen Groenier (voor onze gezamenlijke zoektocht, gebruik en toepassing van de social sensing technologie binnen de medische teams), Aaqib Saeed (for all our interesting talks about the application of machine learning) en Matthijs Noordzij (voor het delen van jouw kennis met betrekking tot de fysiologische data). Jeff, thanks for the inspirational Skype-talks; I truly enjoy collaborating with you and our co-construction of knowledge. Tijdens de periode dat ik mijn proefschrift schreef heb ik ook met andere onderzoekers van de Hebrew University of Jerusalem, University of Dallas, Vrije Universiteit van Amsterdam en University of Trento samengewerkt: ik kijk ernaar uit om ook na mijn proefschrift de literatuur op het gebied van leiderschap en teamleren een stap verder te brengen.

Het uitvoeren van empirisch veldonderzoek is onmogelijk zonder de betrokkenheid van de deelnemende organisaties en respondenten. Veel dank voor jullie bereidheid om deel te nemen aan dit onderzoek. In het bijzonder wil ik hier ook enkele namen noemen die hebben bijgedragen aan de dataverzameling en inbedding van het onderzoek binnen één

van de deelnemende organisaties. Peter, voor het aanwakkeren, creëren van draagvlak en het geloof in dit onderzoek. Herman, Bart en Albert voor jullie continue steun en de ontelbare momenten waarop we samen hebben gediscussieerd over het thema leiderschap. Deze samenwerking is, mijn inziens, een prachtig voorbeeld van hoe wetenschappelijk onderzoek in organisaties praktijk en wetenschap kan laten vervlechten.

Tevens benoem ik ook hier graag alle studenten die mee hebben gewerkt aan de projecten. Er zijn ontzettend veel studenten betrokken geweest die hebben geholpen met het coderen van de video's. Zonder jullie was het onmogelijk geweest om tot dit type fijnmazige inzichten te komen: dankjewel!

Jadzia and Emily, thanks for English editing my dissertation chapters (I honestly hope that I did not make any English spelling mistakes in this sentence ;-)). There were numerous times when you received a manuscript very late in the evening or during the weekend; thanks for your efforts and flexibility! Peter, het was fijn om een klankbord te hebben met betrekking tot de data-analyse en resultaten.

Speciale dank gaat uit naar Sandra Schele voor het formatten van mijn proefschrift. In deze periode had ik mij geen betere secretaresse kunnen wensen. Ondanks dat je het ontzettend druk hebt met twee vakgroepen maakte je altijd tijd om de laatste puntjes op de spreekwoordelijke 'i' te zetten voor het proefschrift. Jouw fijne werkhouding, hulp en voorliefde voor oude (en nieuwe) rock maakte de laatste stappen in het vervolmaken van het proefschrift een stuk aangenamer!

Lieve familie en vrienden, er zijn veel mensen die bewust of onbewust iets hebben betekend in de periode dat ik dit proefschrift schreef. Zo denk ik aan alle momenten dat jullie interesse toonden in mijn onderzoek of vroegen hoe het ging. Alle momenten onder het genot van een hapje en drankje buitenshuis (bij bijvoorbeeld 'de Markt') of gewoon gezellig bij ons of jullie thuis aan de eettafel. Alle momenten op de MTB, motor, kartbaan of aan de pooltafel. Alle momenten Catan, Fase 10, Monopolie etcetera. Dank ook aan Herman en Annie voor het oppassen, de wekelijkse avondmaaltijd als ik terugkwam van het werk en jullie interesse.

In het bijzonder, Pap en Mam, bedankt voor jullie steun, betrokkenheid en support tijdens mijn promotietraject. Bij jullie vond ik altijd een luisterend oor als dingen even tegenzaten (of juist goed gingen). Jullie hebben mij altijd gestimuleerd om nog een stapje extra te zetten (wat heb ik het gezegde 'wie zaait zal oogsten' vaak gehoord de afgelopen 6 jaar). Dankjewel voor jullie steun in alle stappen die ik heb gezet; jullie hebben mij geleerd om verder te klimmen om zo verder te kunnen zien (en dat is allemaal begonnen op jullie schouders).

Lieve oma, helaas mag je dit moment niet meer meemaken. Je bent nog steeds een groot voorbeeld. Jouw doorzettingsvermogen, werkethos en positieve kijk op het leven zijn

altijd een inspiratiebron voor mij geweest. Je hebt altijd een niet aflatende interesse getoond in mijn 'afstuderen.' Ook al werd je met de jaren steeds een beetje kleiner (en moest ik vaak door de knieën om je liefdevolle knuffels in ontvangst te nemen :-)), voor mij was en ben je één van de belangrijkste 'giants' in mijn leven.

Lieve Dave, lieve Maren, aan jullie ben ik de meeste dank verschuldigd. Dave, ik had mij geen grotere steun en toeverlaat kunnen wensen. Je luisterde altijd aandachtig als ik weer eens terug kwam van de universiteit en volledig geïnspireerd de bevindingen en werking van een mediatie-moderatie model uit ging leggen... Je bood ook de broodnodige momenten van rust en afleiding in een soms stormachtig proces. Een theoreticus en technicus: ik vind het een prachtige combinatie (of augmentatie, zie hoofdstuk 2; of complementatie, zie hoofdstuk 6 ;-)). Dankjewel voor je relativiseringsvermogen, humor en geduld: Ik vind het heerlijk om thuis te komen in onze eigen 'paradise city.'

Lieve Maren, wat ben ik onbeschrijfelijk trots op jou. Je bent met grote voorsprong het mooiste wat ons is overkomen in de periode dat ik mijn proefschrift schreef. Je bent de kleinste, grootste 'giant' in mijn leven!

Marcella

Enschede, november 2019

Appendices

APPENDIX I. RATING FORM FOR RECALLED PERCEPTIONS OF MICRO-BEHAVIORS

How often would you expect the following behaviors to occur among highly effective leaders during regular meetings with their followers?

Allocate 100% points over the 19 mutually exclusive behaviors.

	Behaviors	Percentage effective leader behavior:
1	Showing disinterest	
2	Defending one's own position	
3	Interrupting	
4	Correcting	
5	Providing negative feedback	
6	Task monitoring	
7	Directing	
8	Informing	
9	Structuring	
10	Giving own opinion	
11	Agreeing	
12	Disagreeing	
13	Individualized consideration	
14	Intellectual stimulation	
15	Idealized influence behavior	
16	Inspirational motivation	
17	Providing positive feedback	
18	Humor	
19	Giving personal information	
		+
		=====
		Total = 100%

APPENDIX II. FEEDBACK REPORT FOR THE PARTICIPATING LEADERS OF THE PARTICIPATING ORGANIZATIONS

Note. Identity disclosing information about the participating organizations has been marked in black.

VERTROUWELIJK



INDIVIDUEEL RAPPORT

Voorbeeld versie op
grond van gefingeerde
scores

LEIDERSCHAPSONDERZOEK

UNIVERSITEIT TWENTE.

VOORWOORD

Hartelijk dank voor uw medewerking aan het Leiderschapsonderzoek [REDACTED]. Dit onderzoek is in opdracht van [REDACTED] door de Universiteit Twente uitgevoerd in samenwerking met [REDACTED]. Het onderzoek beoogt in kaart te brengen welke factoren invloed uitoefenen op de effectiviteit van leidinggevend en de medewerkers in hun teams. De (geanonimiseerde en geaggregeerde) bevindingen zijn vastgelegd in een algemeen rapport voor de opdrachtgever. Daarnaast zijn per deelnemer de persoonlijke resultaten in één individueel en vertrouwelijk rapport opgetekend. Uw persoonlijke resultaten treft u in dit rapport aan.

Tijdens een regulier werkoverleg zijn video-opnames gemaakt, vragenlijsten door uzelf en door uw medewerkers ingevuld en heeft registratie plaats gevonden van bio-data. In deze rapportage koppelen we uw persoonlijke resultaten van de video-observatie en de vragenlijsten terug. De bio-resultaten volgen later omdat daarvoor een nadere analyse is vereist, die houdt u dus nog tegoed. Dit rapport kunt u, in samenhang met de videoband, met uw coach bespreken. De Universiteit Twente zal uw coach instrueren in de wijze waarop de omvangrijke informatie in dit rapport kan worden geïnterpreteerd. We hopen dat u door deelname aan dit onderzoek uw team nog effectiever kunt aansturen.

Leeswijzer:

De kern van het rapport wordt gevormd door de vergelijking van uw leiderschapsgedrag met het gedrag van drie, door de expert raters, als zeer effectief aangemerkte leidinggevend. Het rapport gaat dus niet in op de vraag in hoeverre u als effectief wordt aangemerkt, maar laat zien hoe uw leiderschapsgedrag zich verhoudt tot dat van de als zeer effectief aangemerkte collega's. Uw gedrag, dat op objectieve wijze is vastgelegd, wordt bovendien afgezet tegen uw leiderschapsstijl en werkwaarden zoals die door uzelf en uw medewerkers worden beleefd (subjectief). Ook wordt uw leiderschapsgedrag afgezet tegen het gedrag van uw medewerkers, het gaat tenslotte om de interactie tussen u beiden. De rapportage is als volgt opgebouwd.

In hoofdstuk 1 geven we inzicht in het onderzoeksdesign en de onderzoeksmethoden. Hierin worden ook de belangrijkste resultaten van de Pilot besproken; aspecten waar u extra aandacht aan kunt besteden tijdens het lezen van deze rapportage, het bekijken van de videoband en het gesprek met uw coach.

In hoofdstuk 2 worden de resultaten van de video-observatie teruggekoppeld. Hierin rapporteren we eerst uw eigen gedrag en daarna het gedrag van uw medewerkers. Tevens vindt u, ter vergelijking, de gedragsscores van de 3 meest effectieve leidinggevend (naar het oordeel van de expert raters).

In hoofdstuk 3 worden de resultaten van de vragenlijsten gerapporteerd. In 3.1 vindt u de resultaten over leiderschapsstijlen. In 3.2 komen de werkwaarden en individuele eigenschappen aan bod. In 3.3 krijgt u inzicht in de kenmerken van uw team. In 3.4 worden de overige gemeten werkpercepties gepresenteerd.

In hoofdstuk 4 koppelen we tot slot uw individuele resultaten terug, voor zover corresponderend met de gedragshoofdlijnen van het Pilot onderzoek.

Wij danken u nogmaals voor de medewerking en hopen dat u dit rapport, samen met de coachgesprekken, als leerzaam ervaart.

Met vriendelijke groet,

Drs. A.M.G. Marcella Hoogeboom

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1 INLEIDING

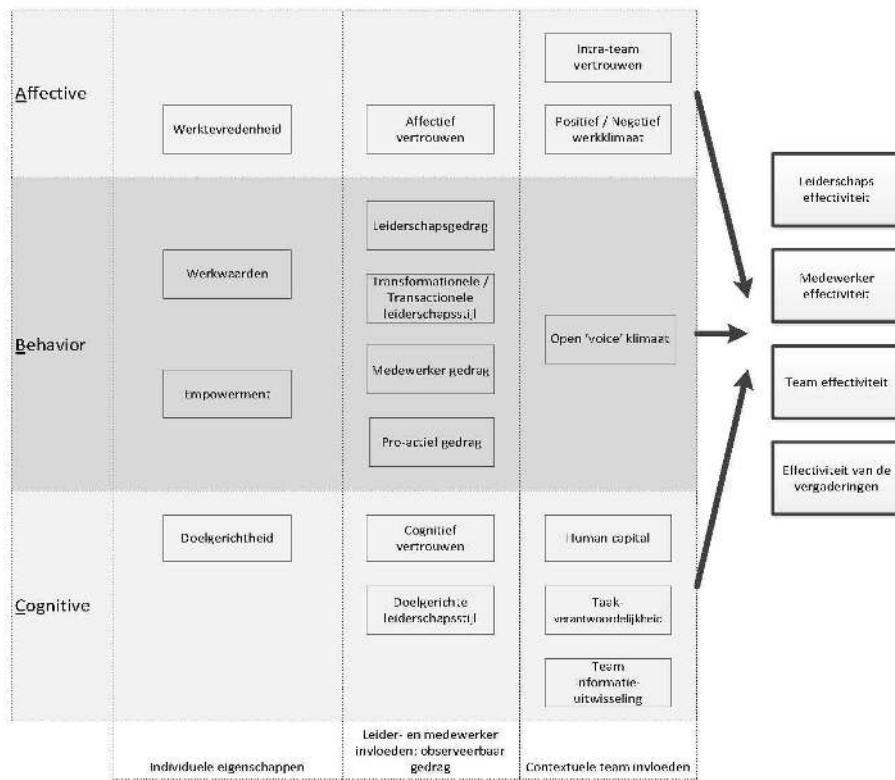
In dit hoofdstuk wordt informatie gegeven over het gehanteerde onderzoeksmodel en de onderzoeksmethode.

1.1 ONDERZOEKSMODEL

De studie is gebaseerd op het onderstaande onderzoeksmodel (zie figuur 1).

De variabelen zijn verdeeld in 3 categorieën: affectie, gedrag (behavior) en cognitie. Binnen deze 3 categorieën zijn speciaal voor de context van de ██████████ een aantal variabelen geselecteerd die betrekking hebben op verschillende aspecten van leiderschaps- en medewerkersgedrag. De variabelen zijn gemeten met vragenlijsten en video-observaties van reguliere staf vergaderingen.

Figuur 1. Het gehanteerde ABC onderzoeksmodel



1.2 ONDERZOEKSMETHODE

In het onderzoek zijn 14 leidinggevendens betrokken op ██████████. Deze 14 leidinggevendens hebben hun medewerking verleend aan video-opname, bio-dataverzameling en vragenlijstsonderzoek. In totaal hebben ook 170 medewerkers van deze leidinggevendens een vragenlijst ingevuld.

Per leidinggevende is tijdens een reguliere vergadering een video opname gemaakt zodat het werkelijke gedrag van leidinggevendens "real-life" kon worden vastgelegd. De video-opname is aan de hand van een vooropgesteld gedragscodeschema vervolgens minutieus geanalyseerd (zie onderaan 1.3). Dit codeschema is ontwikkeld aan de hand van bestaande leiderschaps- en managementliteratuur. Om de objectiviteit te waarborgen werden de video's door twee verschillende observatoren onafhankelijk en systematisch gecodeerd, met behulp van speciale software ('The Observer XT,' Noldus). Hierna zijn de gedragsanalyses met elkaar vergeleken. In totaal is gemiddeld 95,4% overeenstemming bereikt tussen deze twee onafhankelijke codeerders. Dat geeft aan dat de codering betrouwbaar is.

Per leidinggevende is vastgesteld hoe vaak bepaald gedrag voorkwam tijdens de gefilmde vergadering (frequentie). Daarnaast is vastgelegd hoe lang bepaalde gedragingen duurden (duur).

Direct na de gefilmde vergadering is door de leidinggevende en de op de vergadering aanwezige medewerkers een vragenlijst ingevuld (Zie Bijlage 1 voor de vragenlijst items per variabele). Deze vragenlijst betreft, naast enkele controlevragen en personalia, de werkwaarden, leiderschapsstijl, effectiviteit van de leidinggevende en de teameffectiviteit. Anders dan de data die via de videoopname zijn verzameld betreft het hier de (subjectieve) beleving van de respondenten.

Aan leidinggevendens van elke deelnemende leidinggevende is via een korte vragenlijst gevraagd de effectiviteit van de deelnemer te "raten". Deze expert rating geldt als basis voor de mate van effectiviteit van de deelnemers. In de analyse zijn de verschillende onderwerpen van de vragenlijsten, per leidinggevende, met elkaar in relatie gebracht. Gerapporteerd worden het beeld dat een leidinggevende van zichzelf heeft en de gemiddelde van zijn of haar eigen medewerkers. Als referentiepunt worden tevens de gemiddelde scores van de totale groep medewerkers ($n = 170$) gepresenteerd.

Van de resultaten is per deelnemer een individueel rapport opgemaakt, en er wordt voor de opdrachtgever één totaalrapport opgesteld (de resultaten daarin zullen niet herleidbaar zijn naar individuen: zowel voor de Pilot als de beoogde hoofdstudie).

1.3 HOOFDLIJNEN GEDRAG

Uit de resultaten kwamen enkele belangrijke hoofdlijnen naar voren. Alvorens uw persoonlijke resultaten te presenteren, informeren wij u over de belangrijkste uitkomsten van de Pilot zodat u (enigszins) gericht door de grote hoeveelheid informatie kunt "surfen". De gedragsanalyse van de Pilot resultaten levert de volgende indicaties op:

1) De meest effectieve leidinggevendens vertonen in het werkoverleg **méér relatiegerelateerd gedrag** dan de anderen. Echter slechts in frequentie, niet in tijd. Ze geven dus méér persoonlijke aandachtsmomenten die elk vrij kort duren.

2) De meest effectieve leidinggevendens geven in het werkoverleg **minder** (dan de andere leidinggevendens) hun *eigen mening* over zaken. Hun informatie is objectiever en is afgestemd op de organisatiedoelen; zij bevat dus minder persoonlijke opvattingen en emoties.

3) De meest effectieve leidinggeevenden treden in het werkoverleg **minder vaak** corrigerend op ten aanzien van hun medewerkers. Het *corrigeren* van medewerkers in het werkoverleg correleert dus negatief met leiderschapseffectiviteit.

4) De meest effectieve leidinggeevenden besteden veel meer tijd dan de anderen aan de *structurering van het verloop van het gesprek* (overleg vormgeven) tijdens het werkoverleg. Het tijdsbeslag hiervan beslaat 25% van de totale overlegtijd. Dat lijkt erg veel maar toch correleert dit gedrag positief met leiderschapseffectiviteit.

Verder is het van belang te beseffen dat het hier een Pilot onderzoek betreft met een relatief kleine groep leidinggeevenden. Uitspraken over gedrag dat binnen de ██████████ als effectief kan worden aangemerkt moeten om die reden met (enige) terughoudendheid worden gelezen. Uitspraken over effectiviteit in dit rapport geven trends aan. Een hoofdonderzoek met een groter aantal respondenten is vereist om te bepalen in hoeverre deze trends (daadwerkelijk) statistisch aantoonbaar zijn binnen de ██████████. Dat geldt uiteraard niet voor de vastlegging van uw persoonlijke resultaten uit video-opname, bio-data en vragenlijstonderzoek. Deze resultaten vloeien rechtstreeks (zonder statistische bewerking) voort uit de data en worden alleen aan elke deelnemende leidinggevende zelf gerapporteerd.

Tabel 1. Gedragscodeschema: Bij de ██████████ geobserveerde leiderschaps- en medewerker gedragingen

Gedrag	Definitie
1. Ongeïnteresseerd	Geen belangstelling tonen; geen actie ondernemen
2. Eigen positie beschermen	Statusbewust eigen belang of positie beschermen
3. Negatieve feedback geven	Het gedrag van de medewerker negatief beoordelen; kritiek geven
4. Tegenspreken/Het oneens zijn	De medewerker(s) ongelijk geven; zich verzetten tegen de medewerkers
5. Richting bepalen: Corrigeren	De medewerker(s) berispen of verbeteren; teamleden gebieden iets (niet) te doen en/of voor een voldongen feit te stellen, tot de orde roepen
6. Richting bepalen: Delegeren	Anderen taken geven om uit te voeren
7. Verifiëren	De stand van zaken bij medewerkers checken; verduidelijkende vragen
8. Gesprek sturen	Het gesprek vormgeven; de vergadering structureren
9. Feitelijk informeren	Het geven van feitelijke informatie
10. Richting geven: Eigen mening	Eigen mening of visie geven
11. Richting geven: Lange termijn	Koers bepalen voor de medewerkers in samenhang met langjarige organisatie- of teamdoelen
12. Instemmen/Het eens zijn	Akkoord gaan; volgzzaam gedrag tonen
13. Intellectueel stimuleren	De medewerkers stimuleren om mee te denken
14. Persoonlijke aandacht geven	Sympathie tonen, belangstelling laten blijken voor medewerkers en empathie tonen
15. Gebruik van humor	Gedrag wat grappig of als amusement is bedoeld
16. Positieve feedback geven	Het gedrag van medewerkers positief belonen
17. Persoonlijk informeren	Informatie geven over de privé situatie

2 VIDEO RESULTATEN

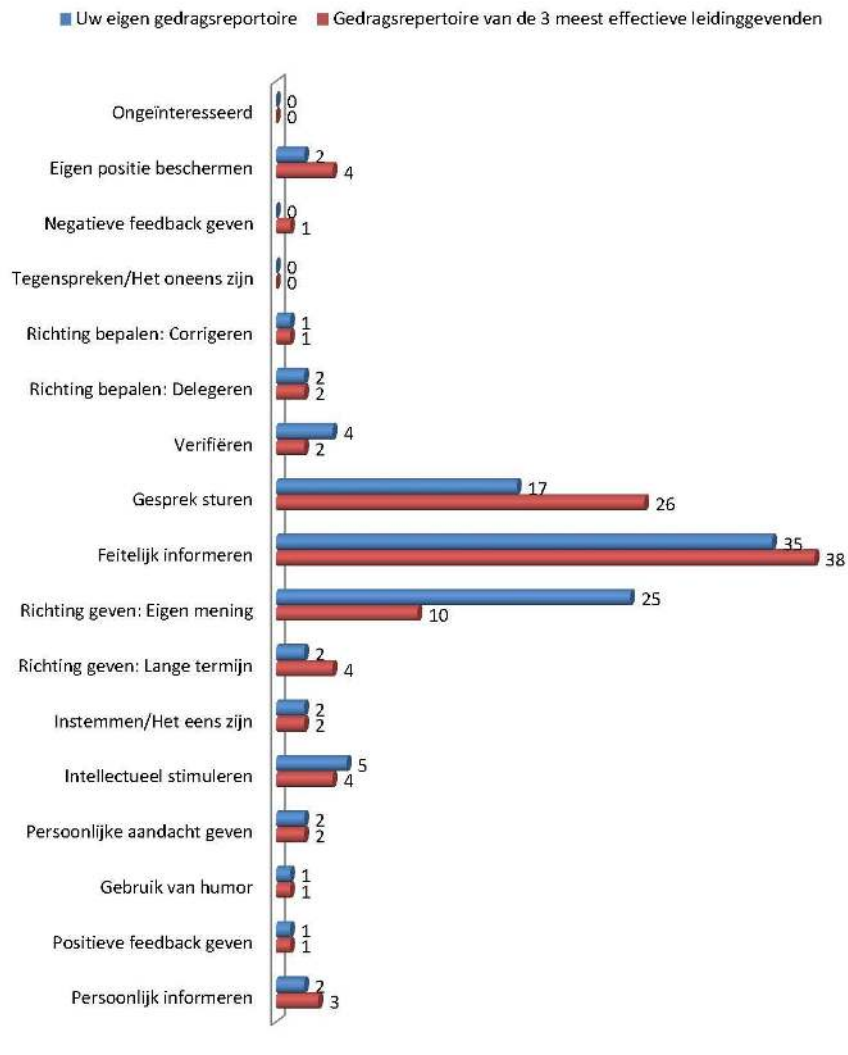
De gedragingen zijn gecodeerd aan de hand van de frequentie (hoe vaak een gedrag zich heeft voorgedaan), als ook de tijdsduur (hoe lang een bepaald gedrag heeft geduurd). De reden hiervoor is dat een bepaald gedrag zelden kan optreden, maar toch een lange tijd kan duren. Of vice versa: gedragingen die relatief veel voorkomen maar slechts kort duren.

2.1 UW GEDRAGSSCORES

In onderstaande grafiek zijn de frequenties van uw gedragingen weergegeven. Het totaal van deze gedragingen is 100%. Daarnaast is tevens, ter vergelijking, het gemiddelde gedragsrepertoire van de 3 meest effectieve leidinggevendenden (n = 3) in de Pilot gepresenteerd.

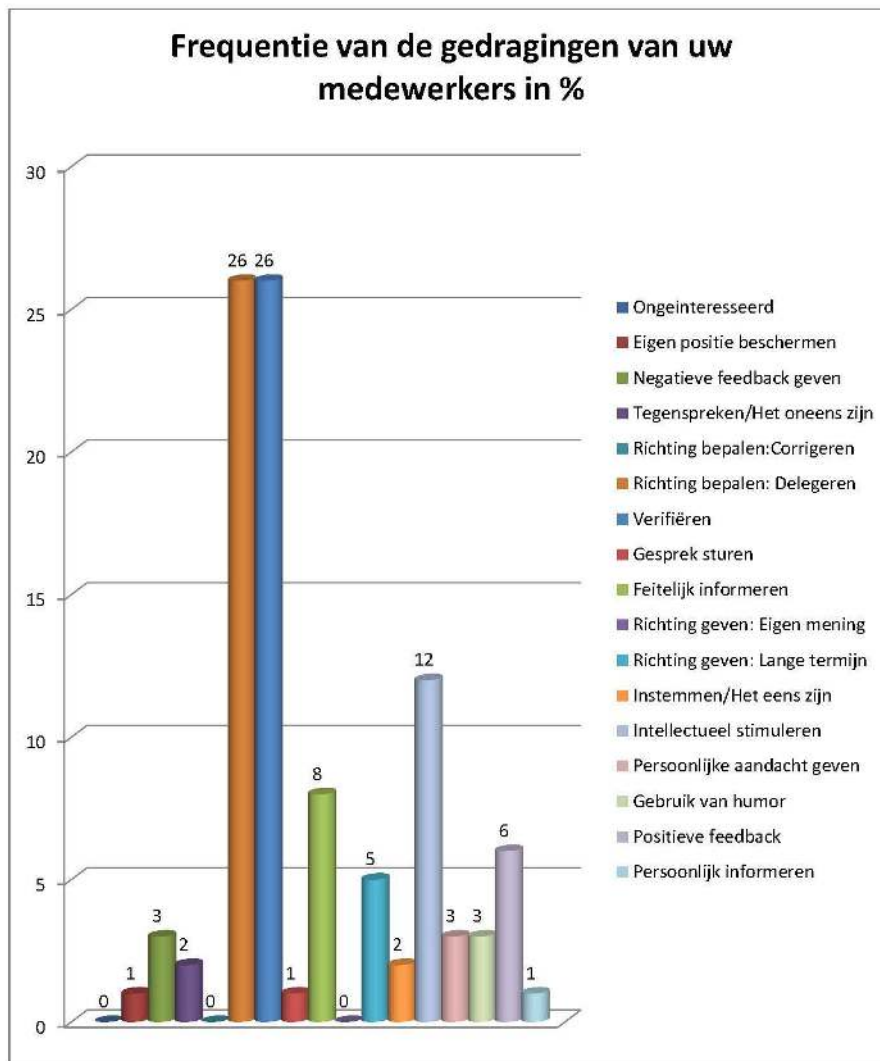


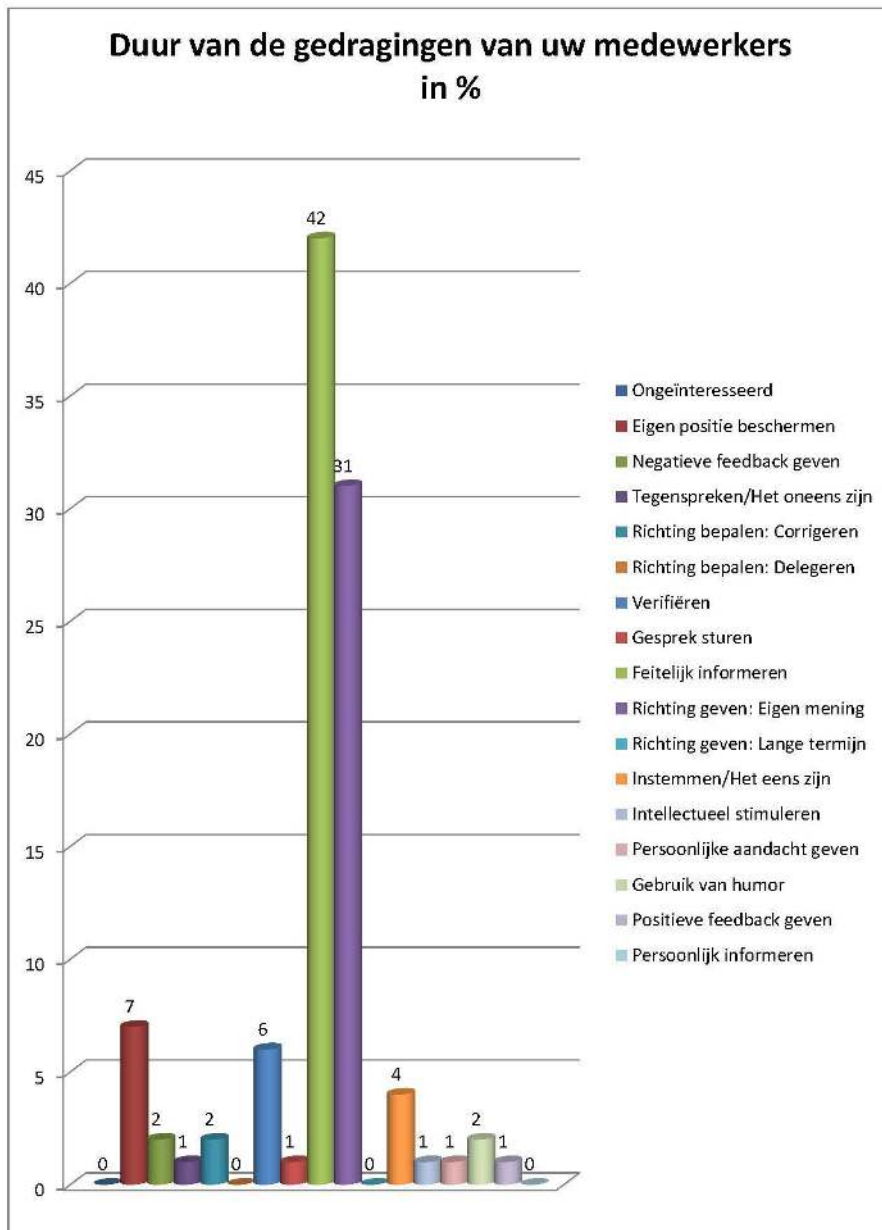
Duur van uw gedragingen in %, en een vergelijking met de 3 meest effectieve leidinggevendenden in de pilot



2.2 DE GEDRAGSSCORES VAN UW MEDEWERKERS

In de onderstaande twee grafieken zijn de gedragsscores van uw medewerkers gepresenteerd. Het totaal van deze gedragingen is 100%. Op deze wijze krijgt u, naast inzicht in uw eigen gedragsrepertoire, ook inzicht in welk gedrag uw medewerkers vertoonden tijdens de opgenomen staf vergadering.





3 VRAGENLIJST RESULTATEN

In de onderstaande grafieken presenteren wij de resultaten van de vragenlijst. Op een schaal van 1 tot en met 7; waarbij 1 staat voor ‘geheel mee oneens’ en 7 voor staat voor ‘geheel mee eens’.

3.1 LEIDERSCHAPSSTIJL

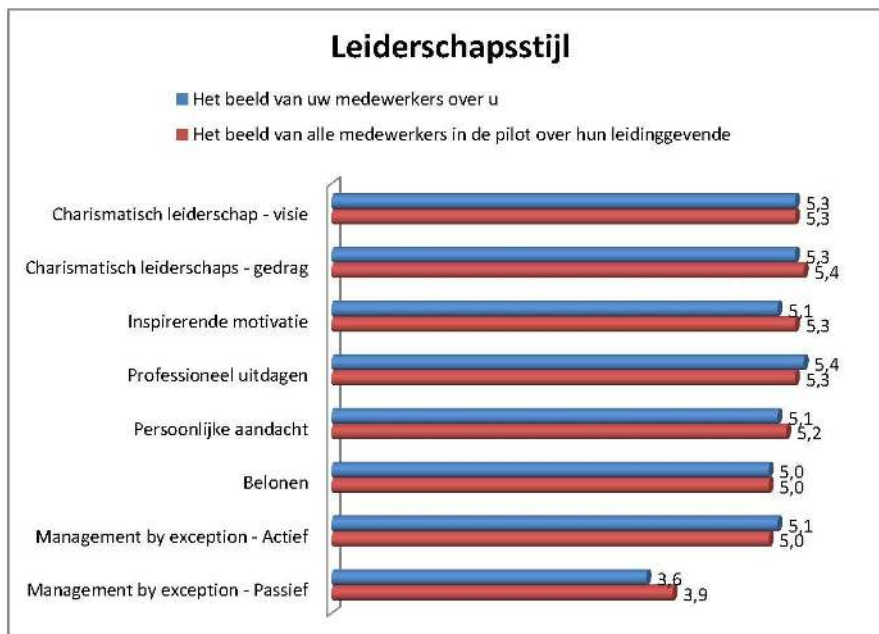
In de vragenlijst werden onder andere vragen gesteld over uw leiderschapsstijl. Onder leiderschapsstijl verstaan we in dit onderzoek het gedragspatroon waarmee u optreedt richting uw medewerkers. We onderscheiden een transformationele en een transactionele stijl. In de grafiek vindt u de volgende dimensies van transformationeel leiderschap (d.i., het inspireren en motiveren van uw medewerkers om boven verwachting te presteren):

- Charismatisch leiderschap – visie
- Charismatisch leiderschap – gedrag
- Inspirerende motivatie
- Persoonlijke aandacht
- Professioneel uitdagen

De volgende dimensies van transactioneel leiderschap (d.i., het zorgen dat medewerkers naar verwachting presteren door ze te monitoren, corrigeren en te belonen) zijn ook opgenomen in onderstaande grafiek:

- Belonen
- Management by exception – Actief (monitoren tijdens het proces)
- Management by exception – Passief (pas in actie komen nadat fouten zijn gemaakt)

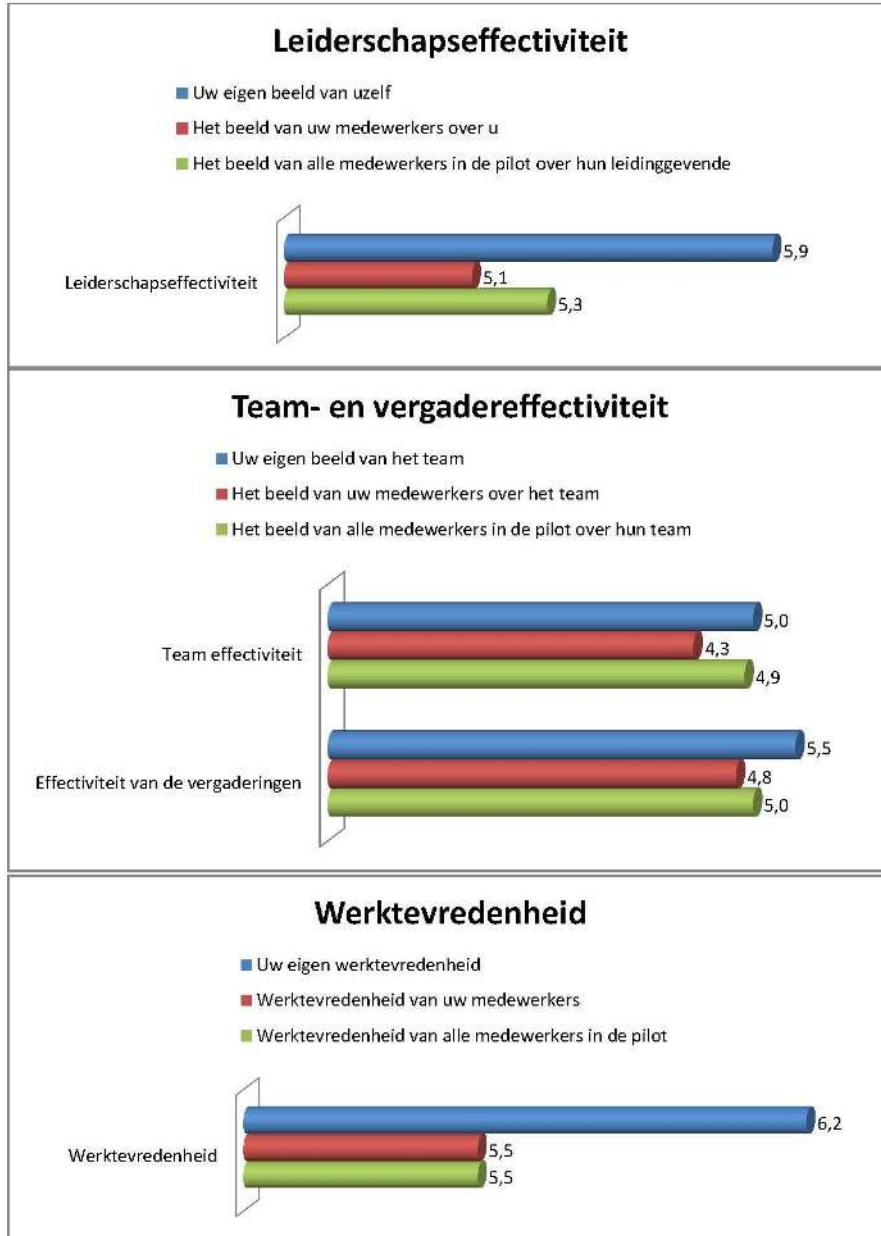
Pal onder het beeld dat uw eigen medewerkers van uw leiderschapsstijl hebben is afgezet het beeld dat alle medewerkers in de Pilot van hun leidinggevende hebben.



In de onderstaande grafieken over 'mate van doelgerichtheid van de leidinggevende' en 'vertrouwen in de leidinggevende' vindt u het beeld dat u van uzelf heeft; het beeld dat uw medewerkers van u hebben en het beeld dat de andere medewerkers in de Pilot van hun leidinggevende hebben.

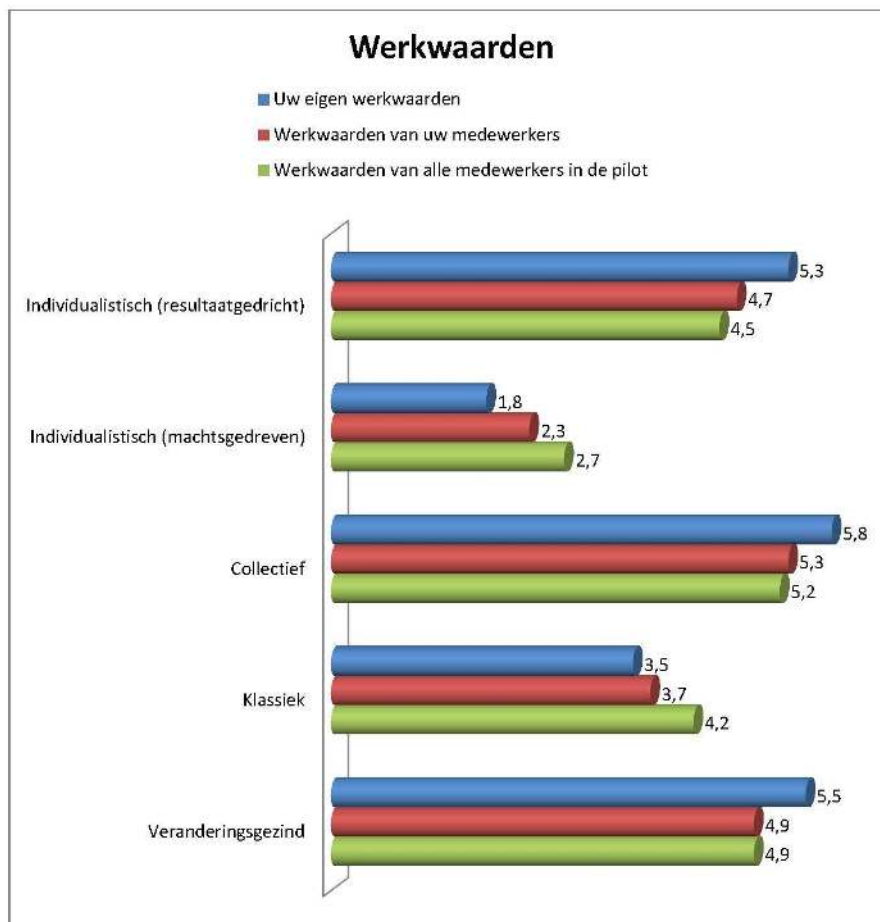


In de onderstaande grafieken vindt u de effectiviteitsscores. In de eerste grafiek is de leiderschapseffectiviteit gepresenteerd en in de tweede grafiek de team- en vergadereffectiviteit. Tevens is hieronder de mate van werktevredenheid getoond.



3.2 WERKWAARDEN

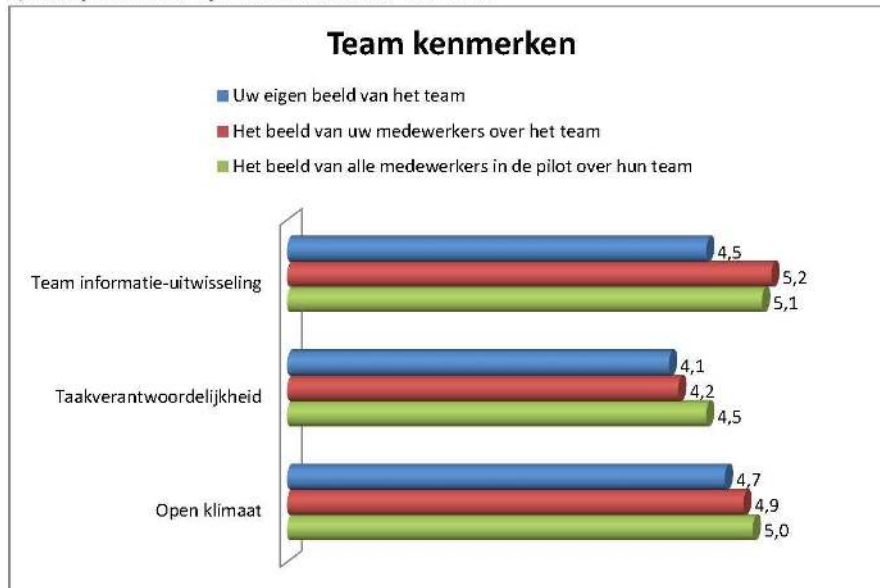
Uw leiderschapsgedrag en uw stijl van leidinggeven worden beïnvloed door onderliggende werkwaarden. In het vragenlijstonderzoek zijn zowel bij uzelf als bij uw medewerkers deze onderliggende werkwaarden uitgevraagd op een schaal van -1 tot en met 7; waarbij -1 staat voor 'tegengesteld aan mijn waarden' en 7 staat voor 'van zeer groot belang'. In de grafiek hieronder wordt van een vijftal werkwaarden afgezet hoe belangrijk u die zelf vindt en hoe belangrijk uw medewerkers deze waarden vinden. Bovendien is aangegeven hoe belangrijk de andere medewerkers in de Pilot deze werkwaarden vinden.



3.3 TEAM KENMERKEN

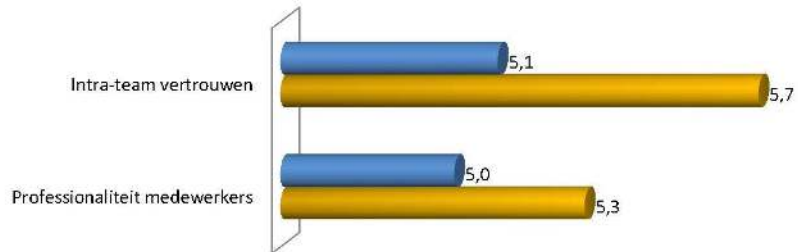
Deze paragraaf gaat over uw team. De grafieken hieronder geven aan hoe u over uw team denkt en hoe uw medewerkers over het team denken. In de grafieken zijn uw scores op de vragenlijst afgezet tegen het gemiddelde van de scores van uw medewerkers. Daarnaast zijn ook de gemiddelde scores van alle medewerkers in de Pilot gegeven.

De scores kunnen variëren van 1 tot en met 7; waarbij 1 staat voor 'geheel mee oneens' en 7 staat voor 'geheel mee eens'. De schalen die betrekking hebben op het werkklimaat zijn gemeten op een schaal van 1 tot en met 5; waarbij 1 staat voor 'bijna niet' en 5 staat voor 'heel vaak'.



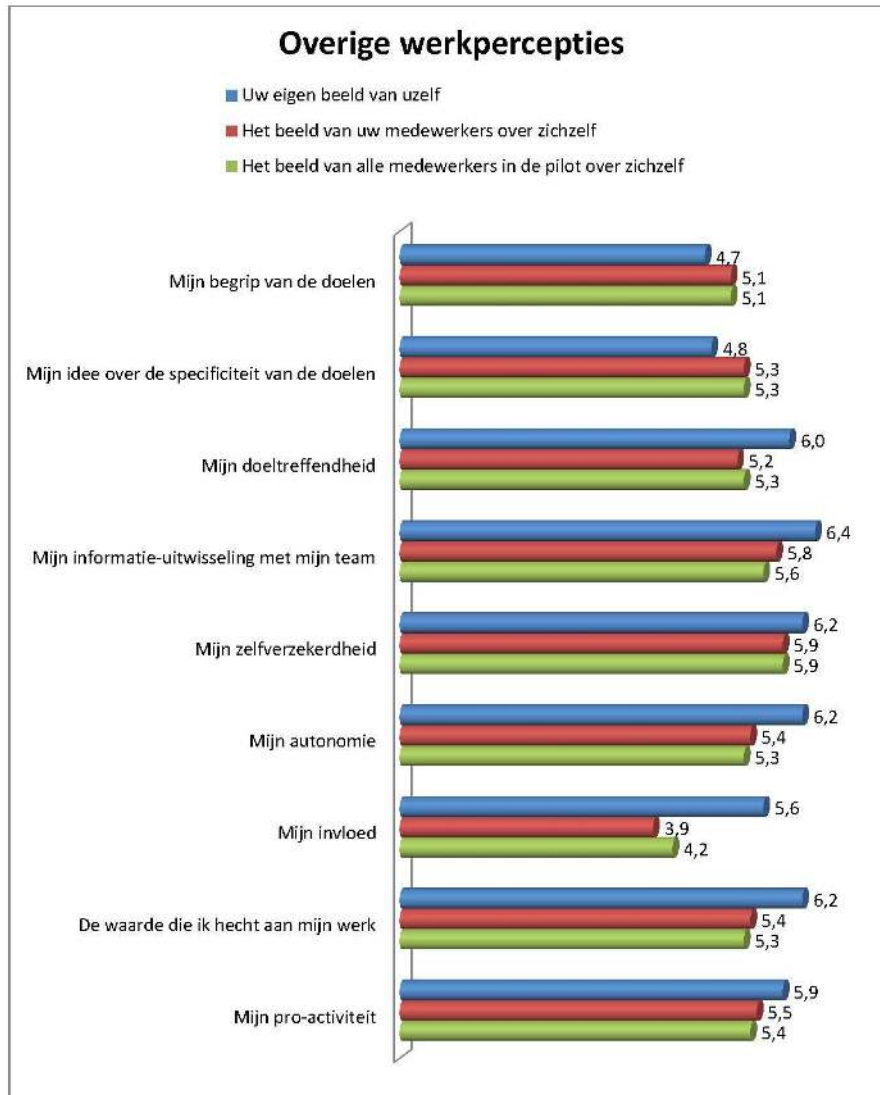
Percepties over het team: Leidinggevenden

■ Uw eigen beeld van het team ■ Het beeld van alle leidinggevenden in de pilot over hun team



3.4 OVERIGE WERKPERCEPTIES

In de onderstaande grafiek zijn de overige werkpercepties gepresenteerd op een schaal van 1 tot en met 7; waarbij 1 staat voor 'geheel mee oneens' en 7 staat voor 'geheel mee eens'. Dit betreft onder andere de beelden die leidinggevenden of medewerkers hebben van de doelen die ze nastreven ('mijn begrip van de doelen,' 'mijn idee over de specificiteit van de doelen,' en 'mijn doeltreffendheid'). Hierna rapporteren we over informatie-uitwisseling, empowerment ('mijn zelfverzekerdheid,' 'mijn autonomie,' 'mijn invloed,' en 'de waarde die ik hecht aan mijn werk') en de mate van pro-activiteit.



4 TOT SLOT

Hieronder worden een aantal van uw resultaten in verband gebracht met hoofdresultaten van de Pilot. U kunt uw [REDACTED] coach raadplegen wanneer u dieper op dit persoonlijke rapport wilt ingaan. Uw coach is door de Universiteit Twente omtrent de interpretatie van de cijfers geïnstrueerd.

- 1) U vertoont, in vergelijking met de 3 meest effectieve leidinggevers binnen de [REDACTED], minder vaak relatie-georiënteerde gedragingen; zoals b.v. *persoonlijke aandacht geven* (5% ten opzichte van 7%, pag. 6) en *positieve feedback geven* (2% ten opzichte van 3%, pag. 6).
- 2) In vergelijking met de 3 meest effectieve leidinggevers tijdens het overleg:
 - a. Doet u minder lang over het gesprek sturen (17% ten opzichte van 26%, zie pag. 7)
 - b. Laat u minder vaak feitelijk informeren zien (23% ten opzichte van 28%, zie pag. 6)
 - c. Laat u vaker en langer richting geven: eigen mening zien (21% ten opzichte van 10%, pag. 6 en 25% ten opzichte van 10%, pag. 7)

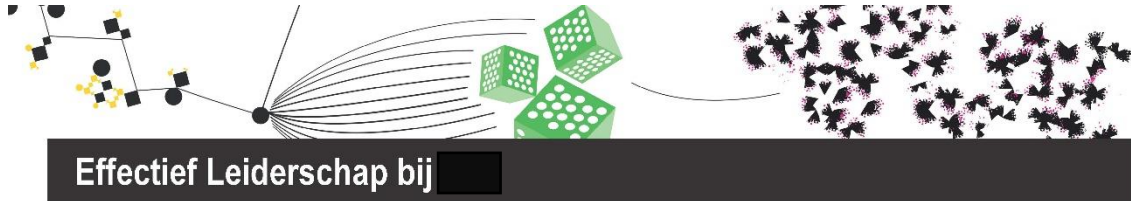
BIJLAGE 1 VRAGENLIJST ITEMS PER VARIABELE

Variabele	Dimensie	Items
AFHANKELIJKE VARIABELEN		
Leiderschaps-effectiviteit	Leiderschapseffectiviteit	leidt het team effectief is effectief in het voldoen aan werk-gerelateerde behoeften behaalt op een effectieve manier de organisatiedoelen vertegenwoordigt het team effectief in de hogere hiërarchie
	Extra effort	verhoogt de ambitie van medewerkers stimuleert mijn bereidheid om harder te werken motiveert mij meer te doen dan wordt verwacht
	Tevredenheid met de leiderschapsstijl	geeft leiding op een bevredigende manier werkt samen met anderen op een bevredigende manier
Team effectiviteit		is effectief maakt weinig fouten levert continu hoge prestaties zorgt voor werk met een hoge kwaliteit
Werktevredenheid		Ik heb veel plezier in mijn werk Ik vind mijn werk leuker dan de gemiddelde persoon Op de meeste dagen ben ik enthousiast over mijn werk Ik ben tevreden met mijn werk
Effectiviteit van de vergaderingen		helpen mij om mijn werkdoelen te bereiken helpt het team in het bereiken van de doelen helpt onze afdeling in het bereiken van de doelen bieden mij een gelegenheid om bruikbare informatie te verkrijgen bieden mij een gelegenheid om mensen te ontmoeten, elkaar beter te leren kennen en/of te netwerken stimuleren medeverantwoordelijkheid voor wat er is gezegd en gedaan tijdens de vergaderingen zijn meer bevredigend dan frustrerend zijn productief zijn mijn tijd waard
Doelgericht leiderschap		geeft richting en stelt prioriteiten verduidelijkt specifieke rollen/taken en verantwoordelijkheden vertaalt strategieën in begrijpelijke doelen en plannen relateert de missie van het team aan de missie van de organisatie koppelt terug om er zeker van te zijn dat het werk goed wordt uitgevoerd
INDIVIDUELE PERCEPTIES		
Empowerment	Mijn zelfverzekerdheid	Ik heb vertrouwen in mijn eigen deskundigheid om mijn werk te doen Ik ben zelfverzekerd over mijn capaciteiten om op het werk mijn taken goed uit te voeren
	Mijn autonomie	Ik beheers de vaardigheden die nodig zijn voor mijn baan Ik kan zelf bepalen hoe ik mijn werk doe Ik kan zelf beslissen hoe ik mijn werk aanpak
	Mijn invloed	Ik heb voldoende mogelijkheden om zelf te bepalen hoe ik mijn werk doe Mijn invloed op hetgeen gebeurt in mijn team is groot Ik heb veel controle over wat er in mijn team gebeurt
	De waarde die ik hecht aan mijn werk	Ik heb een grote invloed op wat er in mijn team gebeurt Het werk wat ik doe is heel belangrijk voor mij De werkzaamheden in mijn baan zijn betekenisvol voor mij Mijn werk is betekenisvol voor mij
Pro-activiteit		In mijn werk probeer ik verbeterde procedures uit Ik probeer hoe ik mijn werk uitvoer te veranderen: om effectiever te worden Ik probeer verbeterde procedures te introduceren Ik probeer nieuwe werkmethode uit die effectiever zijn Ik probeer ineffectieve regels of beleid te veranderen Ik maak constructieve suggesties voor verbeteringen Ik probeer een onjuiste procedure/werkwijze te corrigeren Ik probeer onnodige procedures te verwijderen Ik probeer om oplossingen te realiseren voor dringende kwesties Ik probeer nieuwe structuren, technologie of benaderingen te introduceren om de efficiency er mee te verbeteren

Doelgerichtheid	Mijn begrip van de doelen	Ik begrijp hoe mijn werkprestaties worden gemeten Mijn leidinggevende is duidelijk in de uitleg van mijn doelen Mijn leidinggevende geeft me de redenen voor de doelen die hij/zij me geeft Ik krijg regelmatig feedback over hoe ik mijn werk doe in relatie tot mijn doelen Ik begrijp exact wat ik moet doen in mijn werk
	Mijn idee over de specificiteit van de doelen	Ik heb specifieke, duidelijke doelen in mijn werk Wanneer ik meer dan één doel heb, weet ik welke doelen het meest belangrijk zijn en welke het minst belangrijk
	Mijn doeltreffendheid	Mijn collega's moedigen mij aan om mijn doelen te bereiken Als ik doelen heb in mijn werk vind ik dat leuker dan zonder doelen Ik voel mij trots wanneer ik mijn doelen gehaald heb Ik denk dat ik effectieve actie plannen heb om mijn doelen te behalen Mijn training was goed genoeg om mijn doelen te behalen
Werkwaarden	Individualistisch (resultaatgericht)	Ambitie (hoge aspiraties hebben) Succes (prestatief, resultaatgerichtheid) Initiatiefrijk (ondernemend, inventief)
	Individualistisch (machtsgedreven)	Directief (willen dat anderen doen wat je zegt) Bewonderenswaardig (bewonderd willen worden) Wedijverig (gericht op onderlinge rivaliteit/concurrentie) Materialistisch (je wilt graag veel geld en/of dure dingen) Onbaatzuchtig (zorgzaam, anderen ondersteunen)
	Collectief	Rechtvaardig (anderen eerlijk behandelen) Hulpvaardig (je inzetten voor het welzijn van anderen) Teamwork (samenwerken, coöperatief)
	Klassiek	Gelijkheid (zorg dragen voor gelijke kansen voor iedereen) Gehoorzaam (plichtsgetrouw en verplichtingen nakomen) Meegaand (de regels opvolgen, aanpassen) Traditioneel (gebruiken in stand houden) Zelf discipline (zelfbeheersing)
	Veranderingsgezind	Respectvol (oudere medewerkers het voordeel van de wijsheid geven) Experimenteel (nieuwe dingen uit proberen) Creatief (innovatief, het denken buiten bestaande paden) Zoeken naar afwisseling (op zoek gaan naar verandering en nieuwigheden) Durf (op zoek naar avontuur, risico's durven nemen) Nieuwsgierig (interesses navolgen, onderzoekend)
LEIDERSCHAPSTIJL		
Transformatie- neel leiderschap	<i>Mijn leidinggevende...</i> Charismatisch leiderschap – gedrag	maakt mij trots door met hem/haar samen te werken vindt het groepsbelang belangrijker dan het eigenbelang gedraagt zich op een respectvolle wijze naar mij roept sterk vertrouwen op spreekt regelmatig over de belangrijkste waarden en normen benadrukt het belang van duidelijke doelen
	Charismatisch leiderschap – visie	heeft aandacht voor de ethische en morele consequenties van besluiten benadrukt het belang van het hebben van een gezamenlijke missie spreekt optimistisch over de toekomst
	Inspirerende motivatie	spreekt enthousiast over wat er gerealiseerd moet worden draagt een overtuigende toekomstvisie uit straalt vertrouwen uit dat de doelen behaald zullen worden
	Professioneel uitdagen	stelt vragen met betrekking tot belangrijke veronderstellingen zoekt verschillende invalshoeken bij het oplossen van problemen laat mij problemen bekijken vanuit verschillende invalshoeken suggereert nieuwe mogelijkheden om naar de taakuitvoering te kijken besteedt tijd aan begeleiding en coaching
	Persoonlijke aandacht	behandelt mij meer als individu dan slechts als lid van het team heeft oog voor het feit dat ik verschillende behoeften, mogelijkheden en aspiraties heb, in vergelijking tot anderen helpt mij mijn sterke kanten te ontwikkelen
Transactioneel leiderschap	<i>Mijn leidinggevende...</i> Belonen	ondersteunt mij in ruil voor mijn inspanningen maakt duidelijk wie verantwoordelijk is voor het behalen van doelen maakt duidelijk welke beloning iemand tegemoet kan zien als de doelen zijn gehaald
	Management by Exception – Actief	toont waardering wanneer ik aan de verwachtingen voldoen is volledig geconcentreerd op de afhandeling van klachten en problemen vestigt de aandacht op onregelmatigheden en fouten houdt fouten goed in de gaten
	Management by Exception – Passief	is waakzaam ten aanzien van het niet behalen van doelstellingen wacht met optreden tot problemen serieus worden komt pas in actie als het fout gaat is aanhanger van het gezegde 'grijp niet in wanneer het niet noodzakelijk is' komt pas in actie wanneer problemen chronisch worden

Cognitief vertrouwen		Ik vind dat mijn leidinggevende een professional is Ik vind dat mijn leidinggevende voldoende ervaring en competenties heeft om zijn/haar werk te doen Mijn leidinggevende ondersteunt mij inhoudelijk in mijn werk Ik vertrouw en respecteer mijn leidinggevende door het werk wat hij/zij doet Ik beschouw mijn leidinggevende als vakbekwaam Ik vind dat mijn leidinggevende de juiste achtergrond en expertise heeft om deze functie goed te vervullen
Affectief vertrouwen		Ik kan openlijk ideeën, gevoelens en gedachten delen met mijn leidinggevende Ik kan openlijk tegen mijn leidinggevende praten over problemen die ik ervaar op het werk, wetende dat hij/zij zal luisteren Ik zou het jammer vinden als ik, door een overplaatsing, niet meer met mijn leidinggevende kon samenwerken Wanneer ik werk gerelateerde problemen met mijn leidinggevende deel, weet ik dat hij/zij constructief en zorgzaam zal reageren Ik heb een goede werkrelatie met mijn leidinggevende
TEAM KENMERKEN		
Team Informatie-uitwisseling		Informatie wordt vrijelijk gedeeld tussen leden van dit team Als een teamlid informatie krijgt welke van belang is voor het team, deelt hij/zij dit snel Teamleden werken hard om elkaar up-to-date te houden met betrekking tot hun activiteiten Alle teamleden worden betrokken gehouden als het gaat om belangrijke zaken die van invloed zijn op het team Teamleden delen vrijelijk hun expertise en inzichten
Team taak verantwoordelijkheid	<i>Mijn teamleden...</i>	volbrengen adequaat hun taken en verantwoordelijkheden participeren allemaal evenredig in het volbrengen van de teamtaken nemen hun verantwoordelijkheid voor teamtaken, zelfs als ze er onderuit zouden kunnen komen werken allemaal even hard aan de teamtaken verdelen de minder leuke taken gelijk over het team
Werkklimaat	Positief werkklimaat (geaggregeerd) Negatief werkklimaat (geaggregeerd)	Enthousiast; Geïnteresseerd; Vastberaden; Blij; Geïnspireerd; Alert; Actief; Sterk; Trots Bevreemd; Bang; Aandachtig; Ontdaan; Van streek; Zenuwachtig; Nervuus Beschaamd; Schuldig; Geïmiteerd; Vijandig
Open klimaat	Geef aan in hoeverre het team het gevoel heeft dat zij de volgende activiteiten effectief kunnen doen:	Het bedenken en inbrengen van verbeterpunten over zaken die het team aangaan Het delen van teamaangelegenheden en het aanmoedigen van teamleden om betrokken te raken bij zaken die spelen binnen het team Het uiten van meningen over werk-gerelateerde kwesties: ook als andere teamleden een andere mening hebben Het op de hoogte blijven van zaken waar je mening van belang kan zijn voor het team Het betrokken raken bij zaken die invloed hebben op de kwaliteit van de werkomgeving in het team Het komen met ideeën over nieuwe projecten of veranderingen in procedures
Intra-team vertrouwen		Ik kan op mijn medewerkers rekenen als ik problemen heb op het werk Ik weet zeker dat mijn medewerkers mijn belangen meenemen wanneer ze beslissingen nemen Ik weet zeker dat mijn medewerkers mij informeren over zaken die mijn werk aangaan Ik vertrouw erop dat medewerkers hun woord houden Ik vertrouw mijn medewerkers
Professionaliteit medewerkers	<i>Mijn medewerkers...</i>	zijn zeer vaardig zijn de beste in hun vakgebied zijn creatief en verstandig zijn experts in hun werk komen regelmatig aan met nieuwe inzichten

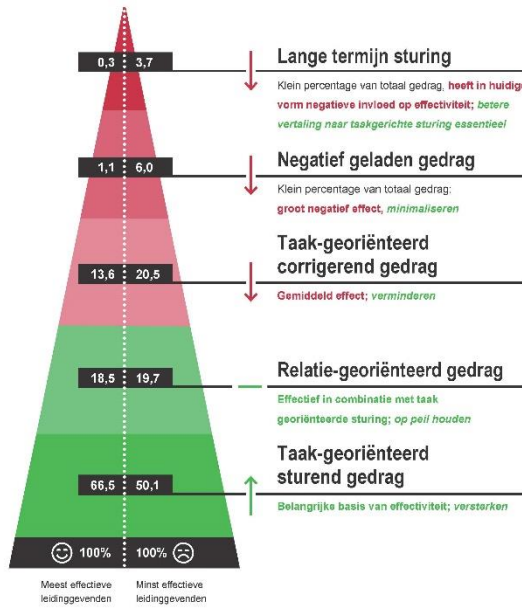
APPENDIX III. POSTER FOR DISSEMINATION OF SOME OF THE RESULTS



Effectief Leiderschap bij [redacted]

Eerdere hoofdconclusies onderzoek

In 2016-2016 heeft de Universiteit Twente met behulp van video-observatie leiderschapsgedrag tijdens reguliere stafvergaderingen geanalyseerd. Alle 114 (willekeurig gekozen) leidinggevenden die meededen hebben de video en een feedbackrapport ontvangen alsmede coaching.



Relatie-georiënteerd gedrag specifiek geduid

Een kleine selectie gedrag uit de relatie-georiënteerde gedragingen, namelijk **professioneel uitdagen** en **persoonlijke aandacht**, blijkt vooral belangrijk voor de effectiviteit van leidinggevenden. Ook voor de professionele ontwikkeling en persoonlijk welbevinden van de medewerkers leidt dit proactiever, doelgerichter gedrag bij de medewerkers.



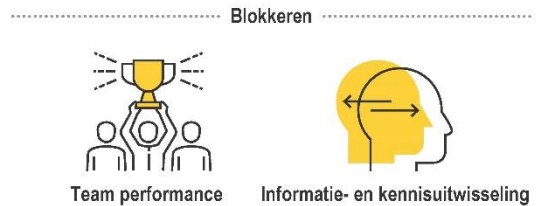
In vergelijking met leidinggevenden leidt zogenaamd transactioneel gedrag (**verifiëren, monitoren van taken en feedback geven**) tot een hogere effectiviteit van **medewerkers**. Als een medewerker dit gedrag vertoont wordt daarna meer feitelijke informatie uitgewisseld. In hun rol is dus ander gedrag effectief.

Effect van negatieve feedback op team effectiviteit

Het veelvuldig vertonen van negatief geladen uitingen draagt niet bij aan leiderschapseffectiviteit. Daarnaast blijkt dat **negatieve feedback** ook een sterke negatieve invloed heeft op informatie uitwisseling en daarmee op team effectiviteit.



Veel negatieve feedback van een leidinggevende leidt tot meer routinematige gedragspatronen (a,b,c - a,b,c).



Medewerkers keren terug naar wat veilig lijkt en schieten in een 'kramp'. Deze routinematige gedragspatronen dragen niet bij aan een efficiënte informatie-uitwisseling en teameffectiviteit.

De meest effectieve teams onderscheiden zich tov de minst effectieve teams door een **sterke informatie-uitwisseling**.

Lichamelijke reactie

Tijdens het vertonen van **relatie- en contraproductief gedrag** hebben de **zeer effectieve leidinggevenden** een **sterkere lichamelijke reactie**.



Als je een medewerker bijvoorbeeld een compliment geeft, moet je dit ook voelen; het moet gemeend zijn. Het gedrag moet congruent zijn met je fysiologie.

Onderzoeksteam Drs. Marcella Hoogeboom Universitair Docent Human Resource Development e.m.g.m.hoogeboom@utwente.nl	Prof dr. Celeste Wilderom Hoogleraar Organizational Behavior & Change Management c.p.m.wilderom@utwente.nl	In samenwerking met [redacted]	Bronnen & Publicaties Rapportages Effectief leiderschap bij de [redacted] Leiderschapsonderzoek (Plooi - 2014)	Deelnemers Binnen de steekproef zijn leidinggevenden van de dienstonderdelen [redacted] [redacted] willekeurig geselecteerd.
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APPENDIX IV. INTEGRATED TABLE, INCLUDING THE BEHAVIORAL CODES IN THIS DISSERTATION

	Coded behavior	Study 1*	Study 2	Study 3	Study 4	Study 5
1	Providing negative feedback <i>Criticizing the behavior or actions of other team members</i>	Providing negative feedback	Transactional <i>(DeRue, Nahrgang, Wellman, & Humprey, 2011; Ewen et al., 2013; Vecchio, Justin, & Pearce, 2008; Wang, Tsui, & Xin, 2011)</i>		Transactional <i>(DeRue, Nahrgang, Wellman, & Humprey, 2011; Ewen et al., 2013; Vecchio, Justin, & Pearce, 2008; Wang, Tsui, & Xin, 2011)</i>	Transactional <i>(DeRue, Nahrgang, Wellman, & Humprey, 2011; Ewen et al., 2013; Vecchio, Justin, & Pearce, 2008; Wang, Tsui, & Xin, 2011)</i>
2	Task monitoring <i>Asking team members for clarification and confirmation about (the progress on) their tasks</i>	Task monitoring				
3	Correcting <i>Imposing of disciplinary actions; Presenting team members with a "fait accompli"</i>	Enforcing (part of the definition reflects this behavior)		Task-oriented behavior <i>(Yukl, Gordon & Taber, 2002; Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006; Pearce et al., 2003; Sims & Manz, 1984; DeRue et al., 2011; Ewen et al., 2013; Vecchio, Justin, & Pearce, 2008; Wang, Tsui, & Xin, 2011)</i>		
4	Directing <i>Dividing tasks among team members (without enforcing them); Determining the current direction</i>	Providing direction				Directing
5	Informing <i>Giving factual information</i>		Initiating structure <i>(Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006; Pearce et al., 2003)</i>		Initiating structure <i>(Burke, Stagl, Klein, Goodwin, Salas, & Halpin, 2006; Pearce et al., 2003)</i>	Informing
6	Structuring <i>Structuring the meetings; Changing the topic; Shifting towards the next agenda point</i>	Structuring the conversation				Structuring
7	Giving own opinion <i>Giving one's own opinion about what course of action needs to be followed for the organization, department or the team</i>		Group-focused goal explication (Kauffeld & Lehmann-Willenbrock, 2012)			Voice behavior <i>(Kauffeld & Lehmann-Willenbrock, 2012; Van Dyne & LePine, 1998)</i>
8	Agreeing <i>Agreeing with something; consenting with something</i>	Agreeing			Other	Agreeing
9	Disagreeing <i>Contradicting with team members</i>	Disagreeing				Disagreeing
10	Individualized consideration <i>Paying attention to each individual's need for achievement and growth by</i>	Being friendly, showing personal interest (part of the definition reflects this behavior)		Relation-oriented behavior <i>(Bass & Avolio, 1995; Lehmann-Willenbrock & Allen, 2014; Yukl, 2012)</i>		
11	Intellectual stimulation <i>Asking for ideas, stimulating team members to critically think about team tasks, opportunities and so on, including the questioning of assumptions; thinking about old situations in new ways</i>	Asking for ideas, encouraging (part of the definition reflects this behavior)	Transformational behavior <i>(Bass & Avolio, 1995)</i>		Transformational behavior <i>(Bass & Avolio, 1995)</i>	Transformational behavior <i>(Bass & Avolio, 1995)</i>
12&13	Idealized influence behavior & Inspirational motivation <i>Talking about an important collective sense of vision; Talking about important values and beliefs</i>					
14	Providing positive feedback <i>Positively evaluating and rewarding the behavior and actions of team members</i>	Providing positive feedback				
15	Humor <i>Making jokes or funny statements</i>				Other	Relation-oriented behavior
16	Giving personal information <i>Sharing personal information (e.g., about the family situation)</i>					
17	Showing disinterest <i>Not taking any action (when expected)</i>	Showing disinterest	Counterproductive behavior <i>(Meinecke, Kauffeld, & Lehmann-Willenbrock, 2017)</i>	Negative relation-oriented behavior <i>(Meinecke et al., 2017)</i>	Counterproductive behavior <i>(Meinecke, Kauffeld, & Lehmann-Willenbrock, 2017)</i>	Counterproductive behavior <i>(Meinecke, Kauffeld, & Lehmann-Willenbrock, 2017)</i>
18	Defending one's own position <i>Emphasizing one's leadership position; Emphasizing self-importance</i>	Defending one's own position				
19	Interrupting <i>Interfering or disturbing when other team members are talking</i>					
20	Listening	Listening				

*on the basis of Van der Weide (2007)

