THE EFFECTS OF LEADERSHIP WITHIN VIRTUAL ENVIRONMENTS: A

FUNCTIONAL LEADERSHIP APPROACH

by

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(Under the Direction of Kristen M. Shockley)

ABSTRACT

The rapid expansion of remote work has raised essential questions about how virtual settings alter leadership dynamics and the effectiveness of leadership behaviors. This study, grounded in functional leadership theory, investigates the impact of specific leadership functions—structuring and planning, providing feedback, supporting the social climate, and initiating virtual social activities—on subordinates' job performance, work effectiveness, and sense of belongingness in remote work environments. Utilizing data from 122 supervisor–subordinate dyads, results showed that neither the structuring and planning function nor the providing feedback function were associated with improvements in job performance or work effectiveness. However, subordinates' sense of workplace belongingness was positively linked to a supervisor's efforts in fostering a supportive social climate, with virtual social activities having no significant impact on belongingness. The implications of these findings and suggestions for future research directions are discussed.

INDEX WORDS: Leadership, Virtual leadership, Remote work, Functional

leadership theory, Belongingness

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CHAPTER 1

GENERAL INTRODUCTION

Leaders are vitally important to the functioning and effectiveness of an organization. Their import has galvanized a considerable amount of research on the traits, characteristics, and behaviors of "good" or effective leaders (for a review, see Lord et al., 2017). However, to date, the majority of this research has focused on studying leadership within a traditional office (i.e., in-person) setting (Contreras et al., 2020; Lord et al., 2017). While the value of the extant literature cannot be overstated, the increasing prevalence of remote and hybrid work arrangements (Wigert et al., 2023) has begun to incite questions surrounding which aspects or theories of leadership might be altered by such an arrangement (Contreras et al., 2020; Dulebohn & Hoch, 2017; Kahai et al., 2017).

Remote work, or *telecommuting*, refers to "a work practice that involves members of an organization substituting a portion of their typical work hours (ranging from a few hours per week to nearly full-time) to work away from a central workplace—typically principally from home—using technology to interact with others as needed to conduct work tasks" (Allen et al., 2015, p. 44). Although the COVID-19 pandemic in 2020 was a significant impetus for the widespread shift to remote work arrangements, employees had already begun to increasingly leverage these arrangements throughout the previous two decades thanks in part to technological advances and globalization (Raghuram et al., 2019). Current estimates indicate that 80% of employees with remote-capable jobs are working remotely to some extent (Wigert et al., 2023). The appeal of remote work can be understood in light of the perceived benefits for both

employees and organizations. For example, remote work is associated with higher perceived job autonomy and job satisfaction (Gajendran et al., 2024), more efficient use of employees' time (Wigert et al., 2023), reduced commutes and the costs associated with commuting (McKinsey Global Institute, 2023), higher supervisor-rated job performance (Gajendran et al., 2024), and access to a more diverse talent pool (Park & Grensing-Pophal, n.d.).

The aforementioned benefits do not come without drawbacks as well. Given that remote employees are geographically separated from their coworkers, it is not surprising that some of the most frequently mentioned challenges associated with remote work center around communicating and collaborating with colleagues, fostering a positive organizational culture, and feeling isolated (Gajendran et al., 2024; Wigert et al., 2023; Wood et al., 2022). Discussions regarding how to address these issues often place the onus on leadership. Specifically, virtual leaders are called upon to be particularly proactive in establishing norms and processes for their work group, providing direction and clarifying work roles, monitoring performance, creating a culture of belonging within their work group, and providing opportunities for nonwork-related social interactions (Bell & Kozlowski, 2002; Byrd, 2022; Schwarzmüller et al., 2018; Wood et al., 2022). Carrying out these tasks within a virtual environment is difficult and can create an additional burden for remote leaders (Wigert & Barrett, 2023). This issue is exacerbated by the fact that most managers (~ 70–75%) report not having received any form of training on how to lead a remote or hybrid team (Global Workplace Analytics, 2024; Harter, 2024).

By nature, leading in a virtual context is not the same as leading in a face-to-face context. The physical separation between employees necessitates a greater reliance on technology to communicate, which is more ambiguous and less effective than face-to-face communication at conveying certain types of informational cues (e.g., facial expressions, vocal inflection; Daft &

Lengel, 1984, 1986). This can contribute to misunderstandings between coworkers and the asynchronous nature of many communication technologies can make coordinating work activities more difficult (Liao, 2017). Research also indicates that virtuality frequently presents a challenge to the formation of trusting, supportive relationships, strong social bonds, and a cohesive team climate (Bell & Nguyen, 2023; Schwarzmüller et al., 2018).

There are two important implications of these findings for leaders. Firstly, this means that the processes by which they display certain characteristics or engage in leadership behaviors can be altered when it is mediated through technology (Kahai et al., 2017). For example, a leader could demonstrate care and concern for a subordinate by inquiring about the subordinate's sick relative; yet, a line in an email lacks the tone of voice and facial expressions that would naturally accompany a face-to-face inquiry and can help convey the leader's sincerity. Secondly, certain leadership behaviors may become particularly important in a remote context to the extent that those behaviors target the challenges created by this environment (Bell & Kozlowski, 2002; Huang et al., 2010; Zimmerman et al., 2008).

One promising approach to studying the effectiveness of leaders in general—and virtual leaders in particular—is to adopt a functional perspective (Bell et al., 2019; Morgeson et al., 2010). According to functional leadership theory (McGrath, 1962), a leader's role is "to do, or get done, whatever is not being adequately handled for group needs" (p. 5). Said otherwise, a leader's role is to satisfy the needs of their followers in service of enhancing their effectiveness and improving their work outcomes, namely performance and well-being (Fleishman et al., 1991; Hackman & Walton, 1986; Inceoglu et al., 2018; Madanchian et al., 2017). Drawing from this literature, Morgeson et al. (2010) developed a taxonomy of key team leadership functions. The 15 leadership functions included in their taxonomy are: compose team, define mission,

establish expectations and goals, structure and plan, train and develop team, sensemaking, provide feedback, monitor team, manage team boundaries, challenge team, perform team tasks, solve problems, provide resources, encourage team self-management, and support the social climate. When applied to virtual leadership, research has primarily focused on identifying the specific needs that stem from a virtual environment and outlining the leadership functions that would address these needs (Bell & Nguyen, 2023). Thus, this perspective provides a practical framework for understanding what constitutes effective virtual leadership of both individuals and teams.

In their review of the virtual leadership literature, Bell et al. (2023) synthesize the empirical research surrounding functional leadership as applied to virtual settings. They highlight that the encourage self-management, define mission, establish goals and expectations, and support the social climate functions have previously been studied. Note that in terms of outcomes, their review included a wide variety of subordinate outcomes as indicators of leader effectiveness, including collaboration, performance, trust, and team commitment. Furthermore, in noting directions for which functions should be prioritized in future research, Bell et al. (2023) explicitly note the importance of the *structure and plan* function, which to date has not been empirically examined in virtual or hybrid settings. This involves determining how work will be completed, who will complete the work, and when the work will be done (Morgeson et al., 2010). This function is presumed to be especially critical for hybrid work arrangements wherein employees are routinely switching between working in and out of the office (Bell et al., 2023), typically according to their own preferences (Wigert et al., 2023). The dynamic nature of hybrid work arrangements might thus necessitate additional leadership efforts to structure the work and

coordinate employees' efforts in order to optimize performance and accomplish their objectives (Bell & Kozlowski, 2002).

Bell et al. (2023), in addition to others (e.g., Malhotra et al., 2007), also highlight that the *provide feedback* function is especially relevant in virtual settings, but has yet to be tested empirically. Feedback allows employees to assess their performance and provides them an opportunity to adapt their work and develop their skills (Morgeson et al., 2010). When working remotely, employees typically have fewer interactions with their supervisor and/or coworkers, which can mean there are fewer opportunities to receive feedback (Jansson & Kangas, 2024). This lack of feedback can hinder their performance and ability to meet their goals, as employees may struggle to gauge their progress towards goals, identify areas for improvement, or feel adequately supported by their supervisor when they do achieve their goals (Johnson et al., 2023; Zheng et al., 2015). In this sense, feedback becomes even more critical for maintaining performance standards and ensuring that employees remain engaged, motivated, and aligned with organizational objectives despite the physical distance.

As noted previously, the notion of effective leadership is broad and has been operationalized in many ways. Given that the core purpose of leadership is to influence others in such a way as to achieve a common goal, effective leadership is often defined in terms of their followers' behaviors and outcomes (Madanchian et al., 2017; Northouse, 2021). Most often, this is specifically operationalized as various indicators of subordinates' performance (Dhar & Mishra, 2001; Madanchian et al., 2017). However, in addition to performance, I argue that subordinate belongingness is a particularly relevant outcome that should be considered as a part of effective leadership in virtual environments. Fewer face-to-face interactions with colleagues make it difficult to form strong interpersonal relationships and can contribute to feelings of

loneliness and social isolation (Biron et al., 2023). These difficulties have long been recognized as one of the major downsides of working remotely (Allen et al., 2015; Golden et al., 2008; Shockley et al., 2024). Belongingness fulfills the fundamental human need for social connection and acceptance and is strongly linked to one's overall well-being and happiness (Baumeister & Leary, 1995). Feeling connected to others also provides a sense of emotional and social support which helps individuals manage stress, navigate challenges, and build resilience (e.g., Shakespeare-Finch & Daley, 2017). Thus, it seems important to also examine how leadership functions may contribute to belongingness as a core part of employee well-being.

Of most theoretical relevance to belongingness is the *supporting the social climate* function. This leadership function entails facilitating positive interpersonal interactions, showing respect and concern for individuals' needs, and promoting individuals' well-being (Bell et al., 2023; Morgeson et al., 2010). Although this leadership function is one of the four functions from the Morgeson et al. taxonomy which has received previous attention from the empirical literature, the part of the definition that involves promoting subordinates' well-being has received considerably less attention (Bell et al., 2023). This is significant given the myriad of ways in which greater virtuality can affect employees' well-being (e.g., greater professional and social isolation, tendencies to overwork, blurred boundaries between the work and home domains; Allen et al., 2015; Nurmi & Hinds, 2020; Shockley et al., 2024).

Moreover, because the social climate is so unique in virtual settings, I highlight the importance of a novel function that should have particular applicability to belongingness— leaders' facilitation of technology-mediated social activities for their teams (e.g., virtual lunches or happy hours; Goff-Dupont, 2021). These types of activities could enhance belongingness by providing remote employees with opportunities to interact with one another and engage in non-

work conversations, which could help them build and maintain social connections. On the other hand, some have questioned the effectiveness of such activities for improving remote employees' well-being and sense of belonging because these activities can feel impersonal or forced and employees may already be struggling with virtual fatigue (e.g., Gorvett, 2021). To this author's knowledge, this question has not been empirically evaluated.

With these ideas in mind, the present study aims to broaden the literature's understanding of what it means to be an effective virtual leader by evaluating the impact of theoretically important, yet relatively untested, leadership functions. Specifically, I will examine how the leadership functions pertaining to structuring and planning and providing feedback affect ratings of subordinates' job performance and work effectiveness. Job performance and work effectiveness are related constructs, but there is a subtle distinction. Whereas performance is focused on what an individual actually does, effectiveness emphasizes the broader impact of that performance in achieving a desired outcome or goal (Campbell, 2012). Given that leadership functions are meant to address specific needs that are acting as barriers to achieving the desired outcome, they should have a positive effect on both performance (i.e., what is done) and effectiveness (i.e., the outcome). I will also evaluate how subordinates' sense of workplace belongingness is influenced by the support the social climate leadership function as well as by supervisor-initiated virtual social activities. To test these relationships, I will leverage a dyadic dataset consisting of supervisor–subordinate dyads who both worked remotely at least 40% of the time.

This research seeks to advance the literature through two key theoretical contributions. First, it answers calls to examine a broader range of leadership functions within virtual settings (Bell et al., 2023). The present study focuses on several leadership functions which have not

received much empirical attention, but are theorized to be especially important within remote contexts. In addition to considering a broader range of leadership functions, this work also aims to contribute to our understanding of virtual leadership by evaluating the interplay between different leadership functions. Leadership research, while abundant, tends to be relatively siloed in that different aspects of leadership (e.g., behaviors, traits, etc.) are rarely considered in tandem (for a review, see van Knippenberg & Dwertmann, 2022). Thus, little is known about the interactive effects of different leadership functions. This study addresses this issue by including the interaction effects between leadership functions on the various outcome variables.

Beyond these theoretical contributions, an empirical evaluation of how leadership functions contribute to effective leadership within virtual environments is both a timely and practical issue. Although the number of employees engaged in remote work has risen significantly over the past few years, the field's understanding of virtual leadership is still fairly nascent and is lacking in terms of specific, actionable recommendations for remote leaders. A functional leadership lens is particularly well-suited to fulfill this need as it focuses on categories of leadership behaviors that are designed to address specific needs. Unlike many other leadership theories which instead focus on leaders' inherent traits or on poorly-defined leadership styles, functional leadership theory focuses on what a leader actually does. Such an approach is much more conducive to providing practical recommendations for virtual leaders. Additionally, research also indicates that training supervisors on functional leadership behaviors can lead to an improvement in the enactment of leadership functions and can positively impact both individual and team outcomes (Grill et al., 2024; Santos et al., 2015).

CHAPTER 2

OVERVIEW OF THE LITERATURE

Virtual Leadership

Organizations today are inundated with information and communication technologies (ICTs). This digital revolution has transformed many aspects of work, from how information is acquired and disseminated to how colleagues communicate and interact with one another. These changes to the nature of work have also altered aspects of leadership, as leaders are now operating within this new context (Van Wart et al., 2016). To be clear, ICTs have not redefined entirely what it means to be a successful leader, but there are notable distinctions between traditional and virtual leadership (Kahai et al., 2017).

The role of an organizational leader has been interpreted in many different ways. However, at its core, *leadership* is "a process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2021, p. 13). Included within this process are several core role responsibilities pertaining to providing direction and vision, evaluating and disseminating information, making decisions, coordinating the group's actions, mentoring and developing group members, and maintaining socioemotional relationships within the group (Kayworth & Leidner, 2002; Mintzberg, 1973). These role responsibilities are applicable to both traditional and virtual contexts. The difference between the two contexts lies in how these role responsibilities are enacted. Virtual leaders are, to some extent, physically separated from their subordinates and must utilize ICTs to communicate and engage with their subordinates when they are not co-located. Thus, compared to traditional leaders, virtual leaders rely more heavily

on ICTs to mediate or transmit their leadership behaviors (Kahai et al., 2017; Lilian, 2014; Torre & Sarti, 2020).

As briefly mentioned in the introduction, technology-mediated communications and interactions are generally considered inferior to face-to-face interactions. Communication richness refers to a medium's ability to convey information in a clear and timely manner (Daft & Lengel, 1984). Face-to-face communication is the richest medium because it can transmit verbal and nonverbal cues, allows for instantaneous feedback, and uses natural language. ICTs vary in their capability to do these things and are therefore more susceptible to information loss or to miscommunications (Daim et al., 2012; Friedman & Currall, 2003; Kayworth & Leidner, 2002). ICTs are also more physically and cognitively demanding than face-to-face communications (Thompson & Coovert, 2003). Compared to in-person communications, people spend more time crafting technology-mediated communications as well as processing and interpreting the messages they receive from others (Kayworth & Leidner, 2002; Lilian, 2014).

The nature of technology-mediated communications can also pose a challenge to some of the more social aspects of work. Traditional office settings are more conducive to spontaneous, informal interactions which can help build rapport and strengthen social bonds (Nardi & Whittaker, 2002). In contrast, virtual communications tend to be more deliberate and structured. Their diminished ability to convey nonverbal cues and emotions, the physical distance between communicators, and the often-asynchronous nature of virtual communications discourages the type of free-flowing conversations that help to build trust and maintain interpersonal relationships (Bos et al., 2002; Hacker et al., 2019; Hertel et al., 2005). Important contextual information (e.g., relationships among individuals; knowledge of others' roles and

responsibilities) is also more likely to be left out or obscured when using ICTs, which may constrain understanding and impede effective collaboration (Berry, 2011; Liao, 2017).

The above discussion would suggest that engaging in leadership behaviors becomes significantly more complicated when relying on ICTs to transmit these behaviors and communicate with subordinates. Because of the inherent deficiencies associated with ICTs, virtual leaders expend additional time and effort clarifying and coordinating team members' tasks, monitoring progress towards the team's goal, and fostering positive interpersonal relationships within the group (Bell & Kozlowski, 2002; Purvanova & Bono, 2009; Zigurs, 2003). How successfully they perform these responsibilities has the potential to shape a variety of outcomes for individual employees, the team, and the organization (Dulebohn & Hoch, 2017). For example, virtual leaders can impact a team's performance by mitigating task conflicts (Liao, 2017) and their ability to foster trusting, supportive relationships can enhance remote employees' well-being (Schmitt, 2024). In sum, remote work's physical distance creates subsequent psychological and cognitive gaps that leaders need to bridge to ensure remote employees are effective, adequately performing their jobs, and feel connected to and supported by the organization.

Although the literature has established that virtual leadership is critical to many important outcomes, this topic has been studied in a somewhat narrow manner. In line with much of the general leadership literature, many researchers have examined the effects of a particular leadership style (e.g., transformational leadership, leader–member exchange) within virtual settings (Brown et al., 2021; Höddinghaus et al., 2024). While there are merits to such an approach, there have been calls to adopt a more behavioral approach to studying virtual

leadership in order to have a more explicit understanding of what these leaders need to do to be effective in this context (Bell et al., 2023; Höddinghaus et al., 2024).

Functional Leadership Theory

Functional leadership theory (McGrath, 1962), a dominant theoretical perspective within the team leadership literature, has been presented as a particularly useful lens through which to examine virtual leadership (Bell et al., 2023). As previously mentioned, this theory is centered around the idea that the role of a leader is to enhance team effectiveness by addressing any outstanding team needs (Fleishman et al., 1991; McGrath, 1962). To ensure team needs are met, leaders must perform two core types of functions: 1) monitor the environment and keep abreast of any conditions or events which might affect the team's functioning, and 2) take action to create and implement solutions to any problems that are inhibiting the team's functioning and performance (Hackman & Walton, 1986). Building upon these ideas, researchers began identifying different categories of leadership behaviors that would address various team needs (e.g., DeRue et al., 2011; Morgeson et al., 2010; Yukl, 2012; Yukl et al., 2019). One advantage of the functional leadership perspective is that it does not require the delineation of specific leadership behaviors (Hackman & Walton, 1986). Instead, the focus is on identifying broader sets of behaviors, hereafter referred to as *leadership functions*, that are needed to address particular needs. Thus, the functional leadership perspective reserves space for the various specific ways in which a key leadership function could be accomplished.

The variety of leadership functions that have been proposed (for a review, see Burke et al., 2006) is, in part, due to the specific leadership functions that might be required to address needs situated within a particular context (Kozlowski et al., 2016). Said otherwise, different contexts may elicit specific needs that require certain leadership functions. This ability to adapt

to different contexts and their unique needs is what makes a functional approach so useful for understanding virtual leadership (Bell et al., 2023). As discussed, leading within a virtual environment is not equivalent to leading within a traditional office setting, nor is it an altogether unique phenomenon (Cortellazzo et al., 2019; Kahai et al., 2017). Adopting a functional approach to the study of virtual leadership allows one to isolate the challenges associated with remote work and focus on leadership functions that might be particularly relevant within this setting. In support of this approach, the extant literature has demonstrated that effective virtual leaders are those who are able to address the shortcomings of remote work (Hertel et al., 2004; Kahai et al., 2017; Kashive et al., 2022; Kayworth & Leidner, 2002; Kim et al., 2021). However, when it comes to empirically studying which leadership functions are key to addressing these shortcomings, researchers have tended to focus in on a narrow range of functions (Bell et al., 2019; Bell et al., 2023).

Leadership Behaviors and Functions

Leaders exhibit a variety of behaviors. These leadership behaviors have been sorted and incorporated into different taxonomies of leadership functions according to the types of functions deemed necessary to fulfill needs within a particular context (Kozlowski et al., 2016). One of the more recent taxonomies developed is Morgeson et al.'s (2010) taxonomy of team leadership functions, which serves as a guiding framework for the present study. To create their taxonomy, Morgeson et al. reviewed the team leadership literature to compile a list of 517 behavioral items relevant to team leadership. These behavioral items were independently coded into behavioral categories and resulted in a total of 15 team leadership functions. It is important to note that although Morgeson et al.'s framework originated within the team leadership literature, the leadership functions derived from it are relevant to both individuals and teams (Bell et al., 2023;

Liao, 2017). Additionally, even though the majority of the research Morgeson et al. reviewed was based on traditional, in-person teams, these leadership functions are also applicable to leading within virtual settings. In fact, some leadership functions may have an especially influential impact on desired outcomes in virtual, as compared to in-person, settings (Bell et al., 2023; Morgeson et al., 2010).

Empirical research on the impact of leadership functions within virtual environments has largely focused on four functions from Morgeson et al.'s (2010) taxonomy: encourage self-management, define mission, establish expectations and goals, and support the social climate (Bell et al., 2023). The emphasis on these functions is due to the challenges of the virtual environment and how these challenges are likely to impact followers' needs. The encourage self-management function entails leadership behaviors that empower followers and encourage them to engage in leadership behaviors (Morgeson et al., 2010). Encouraging and supporting this type of behavior helps enable the team to become more autonomous and less reliant on the leader or on outside expertise. Virtual settings, which limit face-to-face interaction, make it harder for leaders to fully engage in mentorship and performance monitoring, so fostering team self-management becomes essential for success (Bell & Kozlowski, 2002; Liao, 2017).

The define mission leadership function involves establishing and clearly defining the team's purpose. This function is needed to provide the group with direction and to ensure everyone has a shared understanding of their objectives (Morgeson et al., 2010). When done effectively, a well-defined mission can be motivating and create a foundation for team members to build a common identity (Joshi et al., 2009). The establish expectations and goals function reflects the next step in this process of planning how a group will accomplish their work. Setting realistic yet challenging goals and establishing expectations for performance are critical for

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enhancing performance because they provide direction and motivation (Locke & Latham, 1990; Morgeson et al., 2010). Establishing common goals in virtual teams can also strengthen individuals' team identity (Sivunen, 2006), which has a positive effect on performance (e.g., Solansky, 2011; van der Vegt & Bunderson, 2005). Both of these leadership functions are theorized to be especially important in virtual settings, where physical distance and heavy reliance on ICTs can inhibit the exchange of information and ideas as well as the development of a team identity (Morgeson et al., 2010). By ensuring the team has a shared understanding of its purpose, goals, and expectations, these functions counteract such challenges, providing direction, motivation, and a sense of collective identity that enhances overall team performance.

The last function, support the social climate, will be discussed in more detail in a later section, but its general purpose is to facilitate positive interpersonal interactions, largely by attending to team members' needs, concerns, and well-being (Morgeson et al., 2010). The ultimate goal is that strengthening interpersonal relationships will positively affect productivity and performance by enhancing cohesion and individuals' commitment to the team (Liao, 2017; Morgeson et al., 2010). As noted by Bell et al. (2023), research is lacking with regards to the component of this function that focuses on how leaders can promote team members' well-being. This is significant given the various ways in which remote work can impact employees' well-being (e.g., isolation, work-life conflict, overwork; Eddleston & Mulki, 2017; Efimov et al., 2022).

As the discussion above illustrates, concerns about remote work arrangements typically center around two general themes: performance and well-being. Given that the essence of effective leadership is that a leader's behavior shapes a subordinate's behaviors and outcomes, this study examines virtual leaders' effectiveness by focusing on how leadership functions

influence subordinate job performance, work effectiveness, and workplace belongingness. In the sections that follow, I discuss these outcomes and how they might be shaped by additional leadership functions within virtual environments.

Job Performance and Work Effectiveness

The COVID-19 pandemic in 2020 shifted a substantial portion of the workforce into temporary remote work arrangements. This forced transition opened people's eyes to the fact that a significant number of jobs can be completed remotely and job performance typically does not suffer as a result of doing so (United States Government Accountability Office, 2023). Prior to 2020, however, there was a fairly common sentiment that remote employees' performance often suffers and both managers and employees were reluctant to allow or to utilize these arrangements (Jones, 2023; Kaplan et al., 2018). From the managerial perspective, this reluctance stemmed from their loss of control over remote employees and the need to place a significant amount of trust in those employees to complete their jobs in the absence of the manager's direct oversight (Bailey & Kurland, 2002; Kaplan et al., 2018; Peters et al., 2010). Employees who work outside of the office force supervisors to relinquish some degree of control over remote employees as they are typically unable to closely monitor their behavior from a distance. Without this control, supervisors might be concerned that remote employees will be able to and/or willing to perform at the same level that they would attain if working in the office (Cascio, 2000; Kaplan et al., 2018). Research also indicates that supervisors might expect remote employees' performance to decline because of the difficulties remote workers face with regards to communicating with others and coordinating work efforts (Peters et al., 2010).

On the other hand, employees' reluctance to utilize remote work arrangements was often due to concerns over social isolation and potential career penalties (Golden & Eddleston, 2020;

Golden et al., 2008; Kurland & Cooper, 2002). Flexible work arrangements have been associated with a "flexibility stigma" referring to the negative career repercussions that sometimes result from utilizing these arrangements (Coltrane et al., 2013; Williams et al., 2013). This penalty stems from the work devotion schema and the ways in which flexible work arrangements are perceived to violate it (Blair-Loy, 2003). The work devotion schema places work at the center of one's life and espouses "ideal worker" norms that reflect one's commitment to their work (e.g., working long hours, being available outside of regular business hours; Reid, 2015). Utilizing a remote work arrangement, which reduces the amount of time an individual spends in the office and reduces their face-to-face interactions with colleagues, can be construed by others as a violation of the work devotion schema (Bourdeau et al., 2019; Williams et al., 2013). This is particularly the case if others believe the employee is leveraging the remote work arrangement in order to help address competing demands from a non-work role (Coltrane et al., 2013; Thébaud & Pedulla, 2022).

Given these various concerns about the remote worker's motivation and ability to perform their job, it is not surprising that a considerable amount of research on virtual leadership has been devoted to identifying ways to facilitate performance. As noted above, this research has primarily focused on leadership functions related to encouraging self-management, defining the mission, and establishing expectations and goals. However, there have been theoretical discussions about other leadership functions from the Morgeson et al. (2010) taxonomy that are believed to be crucial to facilitating performance in virtual environments. Below, I discuss how two of these leadership functions, the structure and plan function and the provide feedback function, relate to remote subordinates' job performance and work effectiveness.

Structure and Plan Function

The importance of the structure and plan function to virtual leadership builds off the ideas outlined in the discussion of the define mission function and the establish expectations and goals function. Just as it is important to have a shared understanding of what the team's mission, expectations, and goals are, it is also critical to have a shared understanding of how exactly the work will be accomplished. As stated earlier, the structure and plan leadership function involves determining how work will be completed, who will complete the work, and when the work will be done (Morgeson et al., 2010). This purpose of this function is to develop and specify a course of action for how to achieve a goal. When this function is performed well, individuals should have a clear understanding of the work to be done, how to do the work, and how to work with others (Morgeson et al., 2010). This should facilitate task accomplishment and contribute to higher levels of performance. Indeed, empirical results in non-virtual settings indicate that behaviors associated with this leadership function are related to various indicators of performance (e.g., job performance, team effectiveness, team productivity) as well as ratings of the leader (e.g., follower satisfaction with leader, leader job performance, leader effectiveness; Borgmann et al., 2016; Burke et al., 2006; DeRue et al., 2011; Judge et al., 2004).

Virtual leadership theorizing suggests there are several reasons why the structure and plan function might be particularly important within remote work settings. As previously discussed, ICT-mediated communications can be prone to misunderstandings and can create uncertainty and ambiguity (Lilian, 2014; Purvanova & Bono, 2009). Remote employees face difficulties maintaining awareness of others' work responsibilities and work progress because working in a separate location from others affords fewer opportunities for casual encounters, spontaneous conversations, or to observe colleagues working (Morrison-Smith & Ruiz, 2020; Weisband, 2002). In addition to being physically separated from colleagues, remote employees

may also be temporally separated from them. That is, remote employees may live in different time zones or they might adhere to a different set of work hours. These circumstances decrease the likelihood of synchronous interactions, which can make it difficult to coordinate tasks and collaborate with others (Cascio & Shurygailo, 2003; O'Leary & Cummings, 2007; Schwarzmüller et al., 2018). In light of these challenges, researchers recommend virtual leaders take additional care to ensure remote employees have a clear understanding of how to accomplish their work (Bell & Kozlowski, 2002; Carter et al., 2015; Liao, 2017).

Altogether, these arguments suggest the structure and plan leadership function is crucial within remote work contexts and a virtual leader's enactment of this function could have implications for subordinates' job performance and work effectiveness. Thus,

Hypothesis 1: A subordinate's report of the supervisor's enactment of the structure and plan leadership function is positively related to a) supervisor ratings of a subordinate's job performance, and b) supervisor ratings of a subordinate's effectiveness while working remotely.

Provide Feedback Function

Morgeson et al.'s (2010) provide feedback leadership function is another function purported to be quite important for effective virtual leadership. Feedback is a valuable source of information regarding one's progress towards a goal (Austin & Vancouver, 1996). It directs attention towards work efforts, helps maintain accountability for one's efforts, and allows one to adapt or adjust their work as necessary. In addition to serving as a corrective tool, feedback can also shape behavior by serving as a reinforcement tool (Morgeson et al., 2010). Positive feedback, such as recognition or encouragement, enhances job performance by increasing motivation and engagement (Behrendt et al., 2017; Liao, 2017; Mazzetti et al., 2023). This could

be particularly impactful for remote employees who, compared to employees who work in-person, are more likely to struggle to remain engaged and connected to their organization's mission and purpose (Harter, 2023b). A recent study from Gallup reported that receiving meaningful feedback provides a substantial boost in employee engagement regardless of how many days they worked in the office (Harter, 2023a). Furthermore, the most important characteristic associated with meaningful feedback was receiving recognition or appreciation for their work efforts.

Although several different sources (e.g., colleagues, subordinates) can provide feedback, leaders are considered one of, if not the most, important source (Pulakos et al., 2015). Feedback is also much more than a formal annual evaluation; in fact, a great deal of feedback is delivered within informal day-to-day communications and interactions (Levy et al., 2017; Pulakos & O'Leary, 2011). The relevance of this function for virtual leaders becomes evident when considering how the nature of remote work reduces and alters these types of interactions. Generally speaking, feedback is much easier to deliver and receive when the two parties are face to face. Not only does being co-located increase the frequency of communication, but it also allows one to quickly obtain feedback, paralinguistic cues can be used to emphasize or soften the verbal message, and any confusion or ambiguity can be immediately addressed (Daft & Lengel, 1984, 1986; Kraut et al., 2002). The physical distance between employees makes it difficult to maintain an awareness of what is going on across the work group, which can inhibit a leader's ability to deliver feedback (Armstrong & Cole, 2002; Hinds & Weisband, 2003; Weisband, 2002). This has potential implications for subordinate performance as well as ratings of leader effectiveness, both of which are positively associated with the frequency of feedback from supervisors (Mertens et al., 2021; Moore & Hanson, 2022).

To complicate matters further, research findings suggest positive feedback is particularly valued amongst remote employees, but it is not conveyed as often or as meaningfully (e.g., reaction buttons in a Zoom call) as it would have been conveyed in an in-person office setting (Blackburn et al., 2003; Cascio & Shurygailo, 2003; Jansson & Kangas, 2024). When working in an isolated environment, positive feedback and recognition can go a long way towards increasing remote employees' motivation and willingness to exert effort on tasks (Contreras et al., 2020; Dinh et al., 2021; Liao, 2017; Malhotra et al., 2007; Ng & Tung, 2018). Qualitative studies on remote employee samples highlight that providing positive feedback is a crucial virtual leadership skill, further underscoring the importance of such behavior (Blackburn et al., 2003; Kayworth & Leidner, 2002; Krehl & Büttgen, 2022).

> **Hypothesis 2:** A subordinate's report of the supervisor's enactment of the provide feedback leadership function is positively related to a) supervisor ratings of a subordinate's job performance, and b) supervisor ratings of a subordinate's effectiveness while working remotely.

Workplace Belongingness

Remote work can impact many different aspects of employee well-being; however, this study focuses specifically on workplace belongingness for several reasons. Firstly, a sense of belonging—or, conversely, feelings of isolation—is a well-documented challenge of remote work (Golden et al., 2008; Kurland & Cooper, 2002; Wigert & White, 2022). According to the State of the Global Workforce report (Gallup, 2024), one in five employees experiences daily loneliness and loneliness was highest amongst fully remote employees. Secondly, loneliness and isolation have a significant impact on a variety of individual and organizational outcomes. Workplace loneliness is associated with reduced job satisfaction, lower job performance, poorer

quality relationships with one's supervisor, higher levels of burnout, and higher turnover intentions (Bryan et al., 2023; Wood et al., 2022). Lastly, belongingness is an aspect of well-being that the supervisor can directly influence, unlike other facets that may depend more on individual factors (e.g., tendencies to overwork) or non-work domains (e.g., work-life conflict challenges arising from blurred boundaries at home). Belongingness stems primarily from workplace relationships and team culture, areas in which supervisors play a central role (Waller, 2020). By fostering inclusive team dynamics and a supportive environment, supervisors can actively shape an employee's sense of connection and inclusion within the team, making belongingness one of the most actionable areas of well-being within their influence (Randel et al., 2018; Shore et al., 2011). Two specific ways virtual leaders might enhance remote employees' belongingness is through the support the social climate leadership function and by organizing virtual social activities.

Supporting the Social Climate Function

Morgeson et al.'s (2010) supporting the social climate leadership function refers to a class of leadership behaviors that facilitate positive interpersonal interactions amongst the group. This leadership function can be enacted in various ways. One approach might be to facilitate the interaction in and of itself (e.g., schedule meetings, help address an interpersonal issue within the group). Alternatively, leaders can also support the social climate by enhancing the quality of interpersonal interactions. They accomplish this by demonstrating concern and respect for others, validating and addressing their individual needs, and promoting their well-being (Bell et al., 2023; Morgeson et al., 2010). This leadership function enhances followers' motivation and commitment to the group, which should promote collaboration and increase followers'

performance, satisfaction, and well-being (Burke et al., 2006; Ceri-Booms et al., 2017; Morgeson et al., 2010; Liao, 2017).

Researchers suggested this leadership function would be especially important in virtual settings because of how remote work affects interpersonal interactions and employee well-being (Bell et al., 2023). With respect to the former point, remote workers have fewer casual, spontaneous, and/or synchronous interactions with colleagues compared to office workers (Cortellazzo et al., 2019; Gibson & Cohen, 2003; Schwarzmüller et al., 2018). These types of interactions are important for building rapport and trust as well as maintaining social relationships (Dinh et al., 2021; Nardi & Whittaker, 2002). Technology-mediated communications typically convey less social presence than face-to-face interactions, which can inhibit the development of social bonds and of group identification (Berry, 2011; Byrd, 2022; Gibson & Cohen, 2003). Distributed work groups may also need to navigate miscommunications or conflicts arising from differences in organizational or national cultures (Armstrong & Cole, 2002; Contreras et al., 2020).

Although the effects of remote work on employee well-being are not entirely negative, a common concern is its tendency to increase social and professional isolation (Bailey & Kurland, 2002; Golden et al., 2008; Parker, 2023; Wigert & White, 2022). The physical and psychological distances inherent to remote work often disrupt employees' interactions with others, diminishing their ability to form strong social bonds, and consequently, their sense of belongingness (Byrd, 2022; Dinh et al., 2021). Many reviews of the virtual leadership literature emphasize the role leaders should play in facilitating social interactions with remote employees and ensuring they feel included and connected to the broader group and organization (Byrd, 2022; Contreras et al., 2020; Dinh et al., 2021; Schmitt, 2024). However, the literature lacks empirical studies regarding

what specifically virtual leaders can do to promote subordinates' sense of belongingness (Bell et al., 2023). Research suggests that leadership behaviors aligned with the support the social climate function (e.g., embracing diversity among the group, identifying shared values; Byrd, 2022; Dinh et al., 2021; Waller, 2020) would be conducive to promoting remote subordinates' belongingness. This function speaks to employees' dual needs for recognition of their individuality and for a sense of membership within the team; fulfilling both is essential for a genuine feeling of inclusion (Randel et al., 2018; Shore et al., 2011). Therefore, I hypothesize:

> **Hypothesis 3:** A subordinate's report of the supervisor's enactment of the support the social climate leadership function is positively related to a subordinate's sense of workplace belongingness.

Supervisor-Initiated Virtual Social Activities

Although this class of leadership behaviors does not reflect a formal leadership function recognized in a particular behavioral taxonomy, it has been mentioned a fair amount in recent years by both academics and practitioners alike (Bell et al., 2023; Dinh et al., 2021; Paris, 2024; Sivunen, 2006). The motivation behind the implementation of such activities is typically to provide remote employees with additional nonwork-related interactions with colleagues (e.g., virtual team building activities, virtual celebrations). Because they are unrelated to accomplishing work tasks, these activities might convey that leadership values interpersonal relationships and is invested in helping remote workers build and maintain connections to the broader organization. To date, the efficacy of this type of leadership behavior has not been empirically evaluated. While these types of virtual social activities may indeed foster social connections and enhance belongingness, it is also entirely possible that they have a limited impact on belongingness. Although they are meant to facilitate social interactions, they may not

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be sufficiently able to overcome the communication challenges associated with ICTs. Alternatively, employees may view virtual social activities as burdensome or as yet another work obligation (Gorvett, 2021).

Hypothesis 4: A subordinate's report of supervisor-initiated virtual social activities is positively related to a subordinate's sense of workplace belongingness.

Interactive Effects Between Leadership Functions

On any given day, leaders engage in multiple types of leadership behaviors. When addressing an issue, a leader might choose to enact one particular leadership function or they may decide the most effective approach would entail engaging in multiple different leadership functions. To date, most of the research on leadership has focused on studying the independent effects of a particular leadership style or behavior (Brown et al., 2021; Höddinghaus et al., 2024). As a result, there is scant empirical data that speaks to how different aspects of leadership may be understood in relation to one another (van Knippenberg & Dwertmann, 2022). The implications for the present study are that there is a limited understanding of how these different functions might interact to influence key outcomes (Bell et al., 2023). This has led to several calls to study different patterns of behaviors and how effective they are at producing the desired results (e.g., Bell et al., 2023; Kearney et al., 2019; Yukl, 2012).

The limited empirical evidence available indicates there is merit to the idea that it is not simply the degree to which a leader engages in a behavior that matters, but that the pattern of different behaviors they enact can also have a substantive effect (Amabile et al., 2004; Yukl, 2011). The majority of this research has focused on leadership in traditional office settings and studied the interactive effects of broad leadership styles (e.g., transformational and laissez-faire leadership; Breevaart & Zacher, 2019; Casimir & Ng, 2010; Kearney et al., 2019). Although

studying the interplay between such broad leadership styles can contribute to the leadership literature's theoretical integration goals (van Knippenberg & Dwertmann, 2022), examining more discrete leadership functions is better suited to address more practical lines of inquiry, such as those in the present study (Firestone, 1996; Höddinghaus et al., 2024; Van Quaquebeke & Felps, 2018).

Theoretical arguments suggest that leadership functions can interact in complex ways, influencing each other's effectiveness. Although it might seem intuitive that a virtual leader engaging in multiple leadership functions to meet a particular need would be more successful, there is also the potential for this approach to backfire if subordinates perceive the leader's behavior as overbearing or micromanaging (Yukl, 2011). Conversely, one leadership function might compensate for the absence of another. Functions may also complement one another; for example, virtual social activities might be an effective avenue through which virtual leaders are able to demonstrate behaviors related to the support the social climate function. Scholars have also suggested that certain functions may be interdependent, with the effectiveness of one contingent on another (Bell et al., 2023; Casimir & Ng, 2010; Yukl, 2010). For example, the monitoring function is critical for identifying problems, but it likely enhances leadership effectiveness only when paired with additional actions to address the identified issues. These interdependencies highlight the nuanced ways in which leadership functions might operate in concert.

Accordingly, the present study will also evaluate the interactive effects of the different leadership functions associated with each dependent variable. The interaction between the structure and plan function and the provide feedback function is examined in an exploratory

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manner as there is no established theoretical framework to guide specific predictions for their combined effects.

Research Question 1: Is there a significant interaction effect between a subordinate's report of the supervisor's enactment of the structure and plan leadership function and the provide feedback leadership function on a) supervisor ratings of a subordinate's job performance, and b) supervisor ratings of a subordinate's effectiveness while working remotely?

When considering the nature of the interaction between the support the social climate function and supervisor-initiated virtual social activities, it could be useful to draw from existing work related to the offering of other types of benefits in conjunction with aspects of the social climate. In particular, many organizations offer programs or implement policies designed to help accommodate the needs and demands of employees' non-work lives (e.g., paid parental leave, flexible work arrangements, on-site child-care). These types of benefits are often referred to as "family-friendly benefits" and have the potential to be quite useful in helping employees manage their non-work lives as well as in attracting and retaining talent.

Prior research indicates that the utilization and effectiveness of these family-friendly benefits depends a great deal on perceptions of supervisory and organizational support for such benefits (Allen, 2001; Thébaud & Pedulla, 2022; Thompson et al., 1999). Support is conveyed not by simply providing a policy, but by making a concerted effort to ensure it is effectively implemented and employees feel comfortable using it (Kirby & Krone, 2002; Ryan & Kossek, 2008). Beyond the instrumental support that helps facilitate the implementation of the policy, these additional efforts help convey that the supervisor is supportive of work-life issues and of the employee as an individual (Hammer et al., 2009; Ryan & Kossek, 2008). In short, the

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effectiveness and actual use of such policies depends largely on supervisory efforts to create an environment that is supportive of employees' family and non-work lives (Allen, 2001; Kossek et al., 2010; Kossek et al., 2011).

In a similar vein, I argue that supervisory efforts to create a positive, supportive social climate are critical to the effectiveness of virtual social activities on subordinate belongingness. That is, a supervisor's efforts to create a supportive social climate will not only convey the sincerity of their intentions behind organizing the virtual activities, but will also help establish an environment conducive to supporting the social benefits associated with these activities. When employees perceive that their supervisor genuinely values and prioritizes team connection, they might be more likely to engage meaningfully in these activities, which would foster authentic connections and enhance their sense of belonging. Additionally, a supportive climate could reduce any potential hesitation or reluctance employees might feel about participating. Thus, just as supervisory support is crucial in ensuring work-family policies are fully utilized and effective, a supervisor's commitment to fostering a positive social climate is essential for virtual social activities to truly benefit employees' sense of belongingness.

> **Hypothesis 5:** The effect of a subordinate's report of supervisor-initiated virtual social activities on a subordinate's sense of workplace belongingness is dependent on a subordinate's report of the supervisor's enactment of the support the social climate leadership function, such that virtual social activities will have a stronger positive effect on belongingness when the supervisor's enactment of the support the social climate function is higher.

CHAPTER 3

METHOD

Participants and Procedure

The data used for this study are part of a larger study on supervisor and subordinate employees' experiences while working remotely. Supervisor–subordinate dyads were recruited through a variety of means, including snowball sampling from researchers' networks, Facebook ads, ResearchMatch, and via a single organization. To participate, both members of the dyad had to work full time, work remotely at least 40% of the time, work a standard Monday–Friday day-shift schedule, live in the United States, have daily access to the internet, and could not be self-employed. Interested subordinates (supervisors) completed an initial eligibility survey, and if eligible, provided the contact information for their supervisor (up to three subordinates). Eligibility surveys were then sent to these individuals (if multiple subordinates were listed, one was randomly selected to participate) and a member of the research team independently verified the dyad's eligibility. After verifying this information, the supervisor–subordinate dyads were sent their respective surveys.

A total of 130 dyads were enrolled in the study. To protect the integrity of the data, several security measures were implemented at the outset of the study's enrollment process which prevented most ineligible and fraudulent participants from completing their surveys and enrolling in the study. Six dyads were removed from the datafiles after additional evidence emerged indicating they were likely not two unique people (i.e., when providing their contact information so they could be compensated for their participation in the study, they listed the

same information as another participant). The data from one other dyad as well as the data from another supervisor were also removed after they failed more than two checks for careless responding. Thus, the final sample consisted of 123 subordinates and 122 supervisors with matched data for 122 dyads.

On average, subordinates were 41.02 years old ($SD = 11.06$) and primarily identified as White (60.98%) and as women (73.98%). They typically work 42.48 hours ($SD = 5.75$) each week, have an average job tenure of 4.92 years ($SD = 5.09$), and work remotely 88.79% ($SD = 16.45$) of the time, on average. Supervisors were 43.55 years old ($SD = 9.28$) and predominately identified as White (77.87%) and as women (63.93%). On average, they work 45.10 hours ($SD = 6.75$) per week and have an average job tenure of 4.48 years ($SD = 4.04$). As a whole, the sample was highly educated, with the majority of both subordinates (79.67%) and supervisors (83.61%) holding a Bachelor's degree or higher. See Table 1 for additional demographic information.

Measures

A complete list of items can also be found in the Appendix. Where appropriate, composite scores for each scale were created from the average score across the individual items within a measure. For some items, a participant's actual name was imputed into the item wording; in instances where this was done, it is denoted by "<Supervisor>" or "<Subordinate>". As pointed out by Kozlowski et al. (2016), studies on functional leadership tend to develop their own measures of the leadership functions proposed to be critical within the particular context of the study. This study follows a similar approach and assesses leadership functions using items from validated scales that reflect core components of the target leadership functions.

Workplace Belongingness

Subordinates' overall sense of workplace belongingness was assessed with two items from Godard (2001) and one item from Schultz et al. (2015). These items were assessed on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*) and include: "I am well-accepted by my coworkers"; "When at work, I really feel like I belong"; and "I feel that the people I care about at work also care about me" α = .82. These two scales were combined to avoid the use of reverse scored items. Godard (2001) is a four-item scale and the other two items are negatively valanced ("You feel like you just don't fit in where you work" and "You feel quite isolated from others where you work"). Shultz et al. is an item from a relatedness scale, which the research team from the original data collection project felt was the most conceptually related item to the two other belongingness items among other published scales (e.g., Jena & Pradhan, 2018 seems to extend beyond actual belongingness as it incorporates career development and fairness; Cockshaw & Shochet, 2010 also has construct contamination via inclusion of work performance, pride in organization, and authenticity; Golden et al. (2008) captures aspects of professional and social isolation instead of belongingness).

Subordinate Job Performance

Supervisors provided a rating of their subordinate's overall job performance since they began working remotely using a single item ("Rate <Subordinate>'s overall level of performance"). Responses were provided using a 7-point Likert scale from 1 (*unacceptable*) to 7 (*outstanding*).

Subordinate Work Effectiveness

Supervisors also provided a rating of how effective their subordinate has been at fulfilling their work role since they began working remotely. This item ("Overall, to what extent do you

feel <Subordinate> has been effective at fulfilling his/her work roles and responsibilities?") was evaluated with a 7-point Likert scale from 1 (*not effective at all*) to 7 (*very effective*).

Structure and Plan Leadership Function

This measure was study created using four items from Zimmerman et al. (2008). Subordinates were asked to reflect on the supervisor's general leadership style over the past three months and responses were made on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The items include: "<Supervisor> has set clear tasks for the team members"; "<Supervisor> has ensured a common understanding of tasks"; "<Supervisor> has defined clear roles of what is expected of team members"; and "<Supervisor> has synchronized or prioritized contributions among team members" ($\alpha = .86$).

Provide Feedback Leadership Function

The provide feedback leadership function was assessed with two items: one item from Zimmerman et al. (2008) and one item from Carless et al. (2000). These items were selected because they both encapsulate the idea of receiving positive feedback from a leader in the form of recognizing individuals' contributions. This type of feedback is particularly meaningful (Harter, 2023a) and is an important leadership behavior regardless of subordinates' degree of virtuality (Zimmerman et al., 2008). Subordinates used a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*) to indicate their agreement with the following items: "<Supervisor> has recognized individual team members' contributions" and "<Supervisor> has given encouragement and recognition to team members" ($r_{SB} = .93$).

Support the Social Climate Leadership Function

Three items from Zimmerman et al. (2008) and one item from Carless et al. (2000) were used to assess the support the social climate leadership function ($\alpha = .85$). The three items from

Zimmerman et al. (2008) were selected because they entail leadership behaviors which were rated as more important in virtual settings than in face-to-face settings. The item from Carless et al. (2000), a validated measure of transformational leadership, was selected because it reflects leadership behaviors that facilitate a cooperative, participative team climate. Subordinates used a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*) to indicate their agreement with the following items: "<Supervisor> has made people feel like part of the team"; "<Supervisor> has been sensitive to diversity among team members (e.g., cultural, racial, life stage, etc.)"; "<Supervisor> has emphasized shared values among members of the team"; and "<Supervisor> has fostered trust, involvement, and cooperation among team members."

Supervisor-Initiated Virtual Social Activities

This measure was study created and included a checklist of 10 virtual activities that the supervisor might have initiated or helped organize over the previous three months. Subordinates completed this checklist and responses were scaled either 0 (*no*) or 1 (*yes*). A composite variable for this construct was created using the sum total of activities offered. The list of activities included: Virtual happy hours or gatherings outside of normal work hours; Virtual meetings during normal work time that are just for socializing; Shared lunch hours virtually; Virtual events with remote entertainment, such as a comedian or musician or instructional chef; Virtual celebrations (birthday parties, holiday parties, recognition ceremonies); Any virtual event where the organization provides food, drinks, snacks, or some other physical thing (or stipends for these) for each person to interact with during the event; Virtual team building activities; Activities that pair employees randomly with others in the company to chat virtually (e.g., Donut app on Slack); Encouragement of "co-working" (cameras on, mics off) so you feel like you're

working in same room as someone else; Company-specific internal websites or Slack channels where non-work related announcements or conversations can be posted.

Control Variables

Task Interdependence. Subordinates' typical job task interdependence was included as a control variable given that there has been significant discussion surrounding how this contextual factor may influence the impact of leadership behaviors (Bell et al., 2023; Brown et al., 2021). Two prior meta-analyses examined the effects of leadership behaviors on team performance and reported that task interdependence either had no moderating effect (Ceri-Booms et al., 2017) or that it strengthened the relationships between leadership behaviors and performance when task interdependence was higher (Burke et al., 2006). However, a recent meta-analysis focused specifically on leadership behaviors within virtual settings reported that task-focused team leadership behaviors were a weaker predictor of team performance when task interdependence was higher (Brown et al., 2021). While this very well might be the case for task-focused leadership behaviors in virtual settings, the opposite might be true of leadership behaviors that are more relationship-oriented in nature. When tasks are highly interdependent, it requires more coordination and cooperation among team members. Under these conditions, interpersonal relationships and dynamics might become more critical to performance and success than they would otherwise be. Thus, leadership behaviors focused on building positive interpersonal relationships might prove to be particularly impactful when task interdependence is higher (Liao, 2017). Given this discussion and the mixed empirical findings, task interdependence was controlled for in the analyses.

Task interdependence was assessed by subordinates using three items from van der Vegt et al.'s (2001) scale ($\alpha = .86$). The three items were: "I have to obtain information and advice

from others in order to complete my work"; "I have to work closely with others to do my work properly"; and "In order to complete my work, I have to collaborate with others extensively." Responses were made on a 5-point agreement Likert scale.

Subordinate Degree of Virtuality. One important factor to take into consideration when studying remote work is the degree to which employees are working remotely. This is an important issue to address in order to develop a sound understanding of how leadership practices translate to a virtual environment and provide useful recommendations to virtual leaders. The evidence available suggests the effects of leadership can vary according to the level of virtuality, though this is not always the case (Bell et al., 2019; Höddinghaus et al., 2024). These mixed findings have prompted calls to examine the effects of leadership across settings with varying degrees of virtuality (Bell et al., 2023; O'Leary & Cummings, 2007).

Virtuality can be defined and measured in different ways (e.g., extent of geographical dispersion, technological dependence; O'Leary & Cummings, 2007); the approach adopted in the present study is to define virtuality as the proportion of time that a subordinate spends working remotely. Presumably, remote workers who are physically separated from colleagues more often would have fewer opportunities for in-person interactions, rely more heavily on ICTs, and would have more difficulty creating and maintaining social relationships within the workplace. These circumstances seemingly indicate that high-quality leadership becomes increasingly important as the degree of virtuality increases (Golden et al., 2008). Ideally, this proposition would be evaluated by examining whether the subordinate's degree of virtuality moderates the relationships between leadership behaviors and the study's outcome variables. The nature of the study's sample precludes this, however, as there was limited variance in the degree of virtuality.

Nevertheless, given the potential impact this factor might have in shaping the effects of

leadership behaviors, it is included as a control variable in the study's analyses.

The extent to which subordinates were working remotely was measured with the item,

"What percentage of the time are you currently working remotely?" Response options ranged

from 0–100%.

Table 1

Demographic Information

	M or %	*SD*
Age – Subordinates	41.02	11.06
Age – Supervisors	43.55	9.28
Work hours – Subordinates	42.48	5.75
Work hours – Supervisors	45.10	6.75
Job tenure – Subordinates	4.92	5.09
Job tenure – Supervisors	4.48	4.04
Time spent working remotely (%) – Subordinates	88.79	16.45
Race/Ethnicity – Subordinates		
White	60.98	
Black or African American	19.51	
Asian	11.38	
Hispanic/Latinx/Spanish origin of any race	5.69	
Other	2.44	
Race/Ethnicity – Supervisors		
White	77.87	
Black or African American	6.56	
Asian	7.38	
Hispanic/Latinx/Spanish origin of any race	1.64	
Other	4.92	
Preferred not to disclose	1.64	
Gender – Subordinates		
Men	26.02	
Women	73.98	
Gender – Supervisors		
Men	33.61	
Women	63.93	
Non-binary or genderqueer	1.64	
Preferred not to disclose	0.82	
Education – Subordinates		
High school graduate	2.44	
Some college, no degree	8.94	
Associate's degree	8.94	
Bachelor's degree	45.53	
Master's degree	27.64	
Professional degree	2.44	
Doctoral degree	4.07	
Education – Supervisors		
High school graduate	2.46	
Some college, no degree	9.02	
Associate's degree	4.92	
Bachelor's degree	35.25	
Master's degree	33.61	
Professional degree	3.28	
Doctoral degree	11.48	

Note. $N_{Subordinates} = 123$. $N_{Supervisors} = 122$. Matched data were obtained from 122 dyads.

CHAPTER 4

RESULTS

Preliminary Analyses

Prior to testing the hypotheses, the data were screened for careless responding. In line with best practices, multiple checks were used and participants were excluded if they failed more than two of the careless response indices (Ward & Meade, 2023). These indices included: responses to three attention check items (e.g., "I work fourteen months in a year"; missing more than one of the three attention check items was considered failing this check), the longstring index (failure was based on outlier analysis), Mahalanobis distance (failure was based on outlier analysis), psychometric synonyms analysis (a correlation > .60 was considered failing this check), and survey completion time (a response time that was more than two standard deviations under the mean was considered failing this check). This resulted in the removal of one matched supervisor–subordinate dyad as well as the data from a single supervisor.

The factor structure of the leadership functions was also examined prior to testing the hypotheses. Mardia's test for multivariate normality indicated the data were not normally distributed; therefore, the confirmatory factor analysis (CFA) was conducted using maximum likelihood estimation with robust standard errors and a Satorra-Bentler correction. A three-factor model (structure and plan, provide feedback, and support the social climate) exhibited adequate to good fit, $\chi^2(32) = 48.41$, $p = .03$, robust CFI = .961, robust RMSEA = .089, SRMR = .051. This three-factor model demonstrated superior fit over a model in which the leadership functions loaded onto a single factor, $\Delta\chi^2(3) = 17.894$, $p < .001$.

To ensure construct independence across the broader theoretical model, a CFA was also conducted for the study's primary constructs of interest, where possible. This four-factor model (structure and plan, provide feedback, support the social climate, and workplace belongingness) demonstrated good fit, $\chi^2(59) = 72.887$, $p = .106$, robust CFI = .974, robust RMSEA = .059, SRMR = .054, indicating it is appropriate to consider these four factors separately. Multicollinearity was not an issue as the variance inflation factors ranged from 1.031–1.132.

Hypothesis Testing

Descriptive statistics and correlations are presented in Table 2. Hierarchical regression analysis was employed to test the study's hypotheses. The first model contained the two control variables: task interdependence and the degree to which the subordinate worked remotely. The leadership functions were then added to the model to assess their effects on the performance outcomes beyond those of the control variables. Lastly, the interaction effect between the leadership functions was added to evaluate any potential moderation effect. The results from the hierarchical regression analyses are summarized in Tables 3 and 4. The results pertaining to Hypotheses 1 and 2, which concern the effects of the structure and plan leadership function and the provide feedback leadership function on subordinates' job performance and work effectiveness, are outlined in Table 3. Table 4 contains the results related to Hypotheses 3 and 4 which focuses on the effects of the support the social climate leadership function and supervisor-initiated virtual social activities on subordinates' sense of workplace belongingness.

As indicated in Table 3, the control variables only explained 2% of the variance in subordinate job performance, $F(2, 119) = 1.07$, $p = .345$, and neither task interdependence ($\beta = .10$, $p = .263$) nor degree of virtuality ($\beta = .08$, $p = .386$) were significantly related to subordinate job performance. The inclusion of the leadership functions in the second model did not

significantly improve the model, $\Delta R^2 = .01$, $F(2, 117) = 0.81$, $p = .446$. In total, the second model accounted for 3% of the variance in subordinate job performance, $F(4, 117) = 0.94$, $p = .443$.

Thus, Hypotheses 1a and 2a were not supported as both the structure and plan leadership function ($\beta = .10$, $p = .428$) and the provide feedback leadership function ($\beta = .03$, $p = .810$) were nonsignificant predictors of subordinate job performance. To address Research Question 1a, the third model included the interaction effect between the structure and plan leadership function and the provide feedback leadership function. This model also did not explain a significant amount of variance in subordinate job performance, $F(5, 116) = 0.92$, $p = .472$ and there is no supportive evidence for a significant interaction effect between these leadership functions ($\beta = .05$, $p = .364$).

As with subordinate job performance, neither task interdependence ($\beta = .08$, $p = .384$) nor degree of virtuality ($\beta = .13$, $p = .142$) had a significant effect on subordinate work effectiveness, $F(2, 119) = 1.56$, $p = .214$. The addition of the leadership functions in the second model did lead to a significant improvement in the model, $\Delta R^2 = .07$, $F(2, 117) = 5.02$, $p = .008$. The total amount of variance in subordinate work effectiveness explained by this model increased to $R^2 = .10$, $F(4, 117) = 3.34$, $p = .012$. However, the provide feedback leadership function was not significantly related to subordinate work effectiveness ($\beta = .08$, $p = .513$) and the structure and plan leadership function did not quite reach conventional cutoff levels for statistical significance ($\beta = .22$, $p = .056$). Thus, Hypotheses 1b and 2b were not supported. The interaction effect between these two leadership functions was included in the third model to address Research Question 1b. However, this model did not explain significantly more variance in subordinate work effectiveness than the second model, $\Delta R^2 = .02$, $F(1, 116) = 1.94$, $p = .166$, and the interaction effect was nonsignificant ($\beta = .08$, $p = .166$).

In contrast to the performance-related outcome variables, both control variables were significantly related to subordinate belongingness, $R^2 = .07$, $F(2, 120) = 4.23$, $p = .017$. Task interdependence was positively related to subordinate belongingness ($\beta = .19$, $p = .033$), while degree of virtuality was negatively related to subordinate belongingness ($\beta = -.18$, $p = .040$). The subsequent model, which included the leadership functions, was also significant, $R^2 = .29$, $F(4, 118) = 12.25$, $p < .001$, and explained significantly more variance than the previous model, $\Delta R^2 = .22$, $F(2, 118) = 19.01$, $p < .001$. After controlling for task interdependence and degree of virtuality, the support the social climate leadership function had a significant main effect on subordinate belongingness ($\beta = .49$, $p < .001$). Thus, Hypothesis 3 was supported. However, Hypothesis 4 was not supported as supervisor-initiated virtual social activities was not related to subordinate belongingness ($\beta = -.02$, $p = .801$). Examining the interaction effect presented in Hypothesis 5 revealed a nonsignificant interaction between these two leadership functions ($\beta = -.07$, $p = .485$) and the overall model did not explain significantly more variance in subordinate belongingness, $\Delta R^2 = .01$, $F(1, 117) = 0.49$, $p = .485$ and was thus not supported.

Exploratory Analyses

The idea of hosting or engaging in virtual social activities became quite popular during the COVID-19 pandemic when social distancing measures were implemented. Because this is still a relatively new concept that has not received empirical attention and was measured with items created for this study, I examined this construct further in an exploratory fashion. I first examined if any of the individual virtual social activities were significantly associated with subordinate belongingness. As reported in Table 5, only "virtual happy hours or gatherings outside of normal work hours" was significantly correlated with belongingness ($r = .18$, $p = .042$). A multiple regression analysis indicated that after controlling for the effects of task

interdependence and degree of virtuality, this particular virtual social activity had a significant positive effect on belongingness ($b = .24$, $p = .049$).

It would also be interesting to explore if there were distinct factors or dimensions within the different virtual activities. However, it was not possible to evaluate this given the dichotomous nature of the data (participants could only select "yes" or "no" to the question of whether their supervisor initiated or helped organize the activity). An exploratory factor analysis would not be appropriate as the data are not continuous. The tetrachoric correlations between the different virtual social activities reported in Table 5 are for descriptive purposes and it should be noted that the correlation matrix was not positive definite and was smoothed, making exploratory factor analysis impossible.

Table 2

Descriptive Statistics and Intercorrelations Between Study Measures

Variable	1	2	3	4	5	6	7	8	9
1. Workplace belongingness (Sub)	(.82)								
2. Subordinate's job performance (Spr)	-.01	—							
3. Subordinate's work effectiveness (Spr)	.10	.70**	—						
4. Structure and plan (Sub)	.35**	.12	.27**	(.86)					
5. Provide feedback (Sub)	.41**	.10	.21*	.65**	(.93)				
6. Support social climate (Sub)	.51**	.19*	.31**	.81**	.71**	(.85)			
7. Virtual activities (Sub)	.13	.14	.02	.15	.20*	.23*	—		
8. Task interdependence (Sub)	.18*	.11	.09	.10	.26**	.23*	.19*	(.86)	
9. Degree of virtuality (Sub)	-.17	.09	.14	-.05	-.16	-.02	-.14	.06	—
M	4.47	6.16	6.48	4.47	4.51	4.58	2.87	3.82	88.79
SD	0.67	0.84	0.65	0.69	0.86	0.66	2.58	1.09	16.45
n	123	122	122	123	123	123	123	123	123

Note. (Sub) indicates the variable is from the subordinate's report. (Spr) indicates the variable is from the supervisor's report.

*p < .05. **p < .01.

Table 3

Hierarchical Regression Results for the Effects of the Structure and Plan Leadership Function and the Provide Feedback Leadership Function on Subordinate Job Performance and Work Effectiveness

	Subordinate Job Performance				Subordinate Work Effectiveness			
	β	SE	t	p	β	SE	t	p
Model 1 – Controls								
Intercept	.00	.09	-0.01	.996	.00	.09	-0.01	.994
Task interdependence	.10	.09	1.13	.263	.08	.09	0.87	.384
Degree of virtuality	.08	.09	0.87	.386	.13	.09	1.48	.142
	$F(2, 119) = 1.07, p = .345$				$F(2, 119) = 1.56, p = .214$			
	$R^2 = .02$				$R^2 = .03$			
Model 2 – Leadership functions								
Intercept	.00	.09	0.00	.998	.00	.09	0.01	.990
Task interdependence	.08	.10	0.88	.381	.03	.09	0.36	.717
Degree of virtuality	.09	.09	0.96	.338	.16	.09	1.79	.077
Structure and plan	.10	.12	0.80	.428	.22	.12	1.93	.056
Provide feedback	.03	.13	0.24	.810	.08	.12	0.66	.513
	$F(4, 117) = 0.94, p = .443$				$F(4, 117) = 3.34, p = .012^*$			
	$R^2 = .03$				$R^2 = .10$			
	$\Delta R^2 = .01$				$\Delta R^2 = .07^*$			
Model 3 – Interaction effect								
Intercept	-.03	.10	-0.33	.739	-.05	.09	-0.50	.616
Task interdependence	.08	.10	0.84	.402	.03	.09	0.31	.758
Degree of virtuality	.09	.09	1.01	.317	.17	.09	1.86	.066
Structure and plan	.13	.13	1.03	.304	.27	.12	2.27	.025^*
Provide feedback	.09	.14	0.64	.524	.17	.14	1.23	.220
Structure and plan x Provide feedback	.05	.06	0.91	.364	.08	.05	1.39	.166
	$F(5, 116) = 0.92, p = .472$				$F(5, 116) = 3.09, p = .012^*$			
	$R^2 = .04$				$R^2 = .12$			
	$\Delta R^2 = .01$				$\Delta R^2 = .02$			

$^*p < .05$.

Table 4

Hierarchical Regression Results for the Effects of the Support the Social Climate Leadership

Function and Supervisor-Initiated Virtual Social Activities on Subordinate Belongingness

	Subordinate Belongingness			
	β	*SE*	*t*	*p*
Model 1 – Controls				
Intercept	.00	.09	0.00	1.000
Task interdependence	.19	.09	2.16	.033*
Degree of virtuality	-.18	.09	-2.08	.040*
		$F(2, 120) = 4.23, p = .017^*$		
		$R^2 = .07$		
Model 2 – Leadership functions				
Intercept	.00	.08	0.00	1.000
Task interdependence	.08	.08	0.99	.326
Degree of virtuality	-.17	.08	-2.13	.035*
Support the social climate	.49	.08	6.09	< .001**
Virtual social activities	-.02	.08	-0.25	.801
		$F(4, 118) = 12.25, p < .001^{**}$		
		$R^2 = .29$		
		$\Delta R^2 = .22^{**}$		
Model 3 – Interaction effect				
Intercept	.02	.08	0.19	.849
Task interdependence	.09	.08	1.07	.287
Degree of virtuality	-.16	.08	-2.08	.039*
Support the social climate	.47	.09	5.17	< .001**
Virtual social activities	-.01	.08	-0.11	.913
Support the social climate x Virtual social activities	-.07	.10	-0.70	.485
		$F(5, 117) = 9.86, p < .001^{**}$		
		$R^2 = .30$		
		$\Delta R^2 = .01$		

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

Table 5

Intercorrelations Between Belongingness and Virtual Social Activities Items

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Workplace belongingness	(.82)										
2. Happy hours or gatherings outside of normal work hours	.18*	—									
3. Social meetings during work hours	.01	.43	—								
4. Shared lunch hours	.03	.41	.64	—							
5. Events with remote entertainment	.17	.70	.69	.70	—						
6. Celebrations	.08	.53	.58	.44	.59	—					
7. Event with provided or subsidized thing for employees to interact with	.12	.64	.46	.54	.66	.55	—				
8. Team building activities	.07	.33	.67	.46	.64	.52	.49	—			
9. Activities that randomly pair employees together	.06	.36	.73	.49	.71	.38	.67	.77	—		
10. Co-working	.03	.16	.34	.43	.59	.38	.30	.37	.62	—	
11. Company-specific internal websites or Slack channels for nonwork-related information	.06	.47	.52	.52	.60	.45	.41	.56	.61	.46	—
M	4.47										
SD	0.67										
n	123	49	64	20	11	47	29	57	14	27	35

Note. The correlation coefficients reported between the different types of virtual social activities are tetrachoric correlations. The *n* for each virtual social activity is the number of subordinates who indicated their supervisor initiated or helped organize that activity over the past three months.
* $p < .05$.

CHAPTER 5

DISCUSSION

Although there has been a dramatic increase in remote work arrangements over the past few years, research has not kept pace with regard to how to be an effective leader within such a context (Contreras et al., 2020). The present study sought to contribute to these efforts by drawing from functional leadership theory to examine how virtual leaders' enactment of a set of leadership functions contributed to various indicators of effective leadership, namely subordinates' job performance, work effectiveness, and sense of workplace belongingness. As evidenced by the descriptive statistics, subordinates in this sample of supervisor–subordinate dyads seemingly felt that their supervisor was consistently engaged in and/or sufficiently enacting these leadership functions (Structure and plan: $M = 4.47$, $SD = 0.69$; Provide feedback: $M = 4.51$, $SD = 0.86$; Support the social climate: $M = 4.58$, $SD = 0.66$). In contrast, out of a list of 10 virtual social activities, subordinates reported that their supervisor had only initiated an average of 2.87 activities ($SD = 2.58$). Key findings are discussed below.

Of the leadership functions examined in the study, only the support the social climate function exhibited a significant relationship with its hypothesized outcome variable. The results show that even after controlling for task interdependence and degree of virtuality, the support the social climate leadership function has a significant positive effect on subordinate belongingness. This model also indicated that supervisor-initiated virtual social activities as a whole had no effect on their sense of workplace belongingness. Interestingly, the exploratory analyses revealed that only one out of the 10 activities listed was significantly associated with belongingness. This

activity, virtual happy hours or gatherings outside of normal work hours, was positively related to belongingness even after accounting for task interdependence and degree of virtuality.

The association between the support the social climate leadership function and belongingness is consistent with research on inclusive leadership, which views inclusion as the satisfaction of the needs for uniqueness and belongingness (Shore et al., 2011). This conceptualization of inclusion underscores the importance of acknowledging and appreciating people for their individuality while also conveying their acceptance by and belonging to the broader group (Randel et al., 2018; Shore et al., 2011). By engaging in these types of inclusive leadership behaviors, leaders can strengthen followers' identification with the work group, which in turn could enhance subsequent behavioral outcomes (e.g., job performance, reduced turnover; Randel et al., 2018). The relevance of this literature to the present study is seen in the similarity between this conceptualization of inclusion and the support the social climate leadership function, which incorporates both components of inclusion (e.g., "<Supervisor> has been sensitive to diversity among team members"; "<Supervisor> has made people feel like part of the team"). It follows that this leadership function would be expected to have a positive effect on subordinate workplace belongingness given how these types of leadership behaviors are purported to shape one's group identity.

Contrary to expectations, neither the structure and plan leadership function nor the provide feedback leadership function were predictive of subordinate job performance or work effectiveness. This is surprising given that these leadership behaviors are traditionally viewed as essential for enhancing task coordination, role clarity, and employee motivation, which in turn are expected to positively impact performance (Yukl, 2012). There are two likely explanations for these findings. The first explanation is based on the debate surrounding the role that

hierarchical leadership plays in virtual settings. Some researchers have suggested hierarchical leadership structures are less relevant and/or effective in virtual settings (e.g., Bell & Kozlowski, 2002; Cascio, 2000; Hoegl & Muethel, 2016). They argue the direct influence of a formal, designated leader is weakened in virtual environments and centralized leadership structures are not always the most conducive approach for addressing the challenges presented by this type of environment (Pearce et al., 2009).

Instead, shared leadership (also referred to as collective or distributed leadership) is purported to be better suited to addressing team needs and enhancing performance within this complex environment (Hoegl & Muethel, 2016). In a shared leadership structure, leadership roles and responsibilities are distributed among team members, which can enhance performance by increasing team members' autonomy and ownership over their work, fostering a collaborative climate, and increasing the team's adaptability (Han & Hazard, 2022; Pearce & Conger, 2003). These ideas are not meant to suggest that the role of a leader is irrelevant or ineffective; rather, any team member may take on leadership responsibilities and that doing so in an ongoing, dynamic fashion will help facilitate the achievement of the group's goals (Han & Hazard, 2022; Shuffler et al., 2010). In light of these arguments, the current study's nonsignificant findings might be explained by its focus on the supervisor's enactment of these leadership functions. It could be the case that these leadership functions are associated with job performance and work effectiveness, but they were being performed by other members of their work group.

The second possible explanation for these nonsignificant findings pertains to timing and how the leadership functions were measured in the current study. Functional leadership theory states that the leader's role is to address any outstanding needs that are inhibiting followers' success (McGrath, 1962). However, needs can change over time, meaning the relevance and

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effectiveness of leadership behaviors will also vary (Yukl, 2012). Thus, the nonsignificant results reported above may reflect that these leadership functions were not relevant within the particular timeframe in which they were assessed, not that they are irrelevant or ineffective altogether.

This study also sought to examine potential interaction effects between leadership functions. None of these interaction effects were statistically significant and these models did not explain significantly more variance in the outcome variables beyond what was explained in the main effects models. However, these results should not discourage future researchers from studying patterns of leadership behaviors as this area of literature remains fairly uncharted (Bell et al., 2023; van Knippenberg & Dwertmann, 2022). To capture the true interactive effect between leadership functions, it may be necessary to look beyond *which* functions are combined and examine *how* they are combined (Yukl, 2012). Prior research on this topic is limited, but it provides some initial support for the relevance of considering the substantive nature of the proposed interaction (Casimir, 2001; Casimir & Ng, 2010). For example, researchers have reported that the sequencing of leadership functions and the temporal spacing between leadership functions can influence the effectiveness of the behavior (Casimir & Ng, 2010).

Although it was not the primary objective of this study, another notable finding is that neither task interdependence nor subordinate degree of virtuality were related to subordinate job performance or work effectiveness. These nonsignificant findings are actually somewhat encouraging as they suggest that a supervisor's perceptions of their subordinate's job performance and work effectiveness are not influenced (either positively or negatively) by either contextual factor. Task interdependence reflects the degree to which an employee needs to interact with and coordinate their work with others in order to fulfill the responsibilities of their role. As previously discussed, communicating and coordinating work with others can be difficult

within virtual environments (Daft & Lengel, 1984; Thompson & Coovert, 2003). It might follow that remote employees whose roles entail higher degrees of task interdependence would face additional challenges that could result in lower job performance (Podolsky et al., 2022). Fortunately, the results presented above do not indicate this is the case. With that said, task interdependence could still have created additional challenges for remote employees even if its effects did not have direct implications for performance in the present study. Virtual leaders would still be advised to consider how task interdependence affects remote employees' work and how to ameliorate any potential obstacles it presents.

Regarding the degree of virtuality, the nonsignificant relationships with subordinate job performance and work effectiveness help allay concerns about potential consequences stemming from the negative perceptions some people may have regarding remote employees' work ethic and performance (e.g., Kelly, 2021). Evidence from prior research indicates that supervisors have, at times, interpreted employees' decisions to work remotely as an indicator of their low devotion to work (Munsch et al., 2014; Williams et al., 2013). Because the amount of time spent in the office is a common proxy for work devotion, those who work remotely more often might incur a more severe flexibility stigma than those who work remotely to a lesser extent (Bourdeau et al., 2019; Golden & Eddleston, 2020). Data from this study do not support this proposition as subordinate degree of virtuality was unrelated to ratings of their job performance and work effectiveness. It is worth noting, however, that the supervisors in this sample were also working remotely to a significant extent (an average of 84.54% of the time), which suggests they likely support remote work arrangements to some degree, and this could account for the unique finding in this particular sample.

It is also worth noting a recent meta-analysis reported an overall positive, albeit modest, relationship between degree of virtuality and supervisor-rated performance (Gajendran et al., 2024). These contradictory findings may be due, in part, to the complicated relationships between remote work arrangements and job performance, which researchers have only recently begun to systematically disentangle. For example, although the total effect was positive in Gajendran et al.'s (2024) meta-analysis, the beneficial effects were partially eroded by a significant negative indirect effect of degree of virtuality on supervisor-rated performance via perceived isolation. Other recent findings suggest that in order to better understand the impact on job performance, one should simultaneously take into consideration the degree of virtuality as well as key contextual factors (e.g., the nature of employees' work, the organizational context; Golden & Eddleston, 2020; Golden & Gajendran, 2019). Thus, the nonsignificant results from this study should be interpreted in light of this recommendation and future research should continue to explore, or at least account for, these complex dynamics.

In contrast to the findings discussed above, both task interdependence and degree of virtuality were significantly related to subordinates' workplace belongingness. The nature of these relationships aligned with expectations, such that belongingness was positively associated with task interdependence and negatively associated with degree of virtuality. The positive relationship between task interdependence and belongingness is likely due to the increased communication and interaction with colleagues that is necessitated by highly interdependent work. Additional interpersonal interactions, which tend to be constrained in remote work environments, provide more opportunities for remote employees to build trust with one another, create a sense of community, and strengthen social bonds (Byrd, 2022; Dinh et al., 2021; Kim et al., 2021). Although this specific mediating mechanism was not assessed in the current study, it

is informed by prior research demonstrating task interdependence can enhance the development of workplace friendships and improve employees' subsequent well-being (Zhang et al., 2022). The negative effect of degree of virtuality on belongingness observed in this study aligns with the extant literature (Gajendran et al., 2024), which has consistently reported that higher degrees of virtuality can result in increased feelings of isolation and social disconnection, often stemming from fewer interactions with colleagues and leaner communication mediums (Efimov et al., 2022; Leonardi et al., 2024; Van Zoonen & Sivunen, 2022).

Theoretical Implications

This research answers calls to evaluate the effectiveness of understudied leadership functions within remote work settings and to assess potential interaction effects between these leadership functions. The study's findings pertaining to the support the social climate leadership function and supervisor-initiated virtual social activities attest to the theoretical conceptualization of belongingness as a need to experience positive, meaningful interpersonal bonds. The two categories of leadership behaviors examined in relation to belongingness seemingly address different aspects of interpersonal relationships. Organizing virtual social activities increases the number of social interactions remote workers have with one another, while the support the social climate function is more focused on enhancing the quality of interpersonal interactions by addressing both the need for uniqueness and for belongingness. That only the support the social climate function was significantly related to belongingness is an indication that belongingness is more reflective of the depth and general quality of one's social bonds.

As discussed earlier, performance is a common topic in discussions about the effects of remote work. Although the findings regarding the two leadership functions proposed to support subordinate job performance and work effectiveness were not significant, this study still helped

contribute to the literature's understanding of the effectiveness of leadership functions within virtual environments. However, these null results raise additional questions regarding whether these functions are impactful under alternative conditions (e.g., when performed by a colleague or when assessed at a different point in time) or if they are influential at all. It also begs the question of which leadership functions do in fact matter for subordinate job performance and work effectiveness beyond the define mission function, the establish expectations and goals function, and the encourage self-management function (Bell et al., 2023). The study's results also did not support any significant interaction effects between the leadership functions, perhaps due to limitations in the study's design (discussed in more detail below). Prior theorizing within this area of literature suggests interactive effects may be driven by how leadership functions are combined (e.g., the sequence in which functions are enacted; Casimir & Ng, 2010; Yukl, 2011), a consideration which should be thoughtfully explored in subsequent work. Although this research was limited in its ability to identify which leadership functions were effective in virtual settings, it did help to advance theoretical knowledge by identifying potential boundary conditions on the impact of specific leadership functions in this setting. Future research addressing these various questions is needed to advance theoretical understanding in this area.

Practical Implications

Social isolation has been an ever-present concern for remote workers (Bailey & Kurland, 2002; Wigert & White, 2022), and the study's findings suggest that leadership practices aimed at enhancing the quality and depth of interpersonal interactions and relational dynamics could substantially alleviate this issue. To enhance subordinate belongingness, virtual leaders should focus on fostering a trusting, cohesive, and inclusive culture within their work groups, rather than concentrating on planning virtual social activities. By prioritizing the development of a

supportive team culture, virtual leaders can more effectively address this particular challenge of remote work and promote a sense of connection among team members (Dinh et al., 2021; Ford et al., 2017; Sivunen, 2006).

The nonsignificant effect of virtual social activities on subordinate belongingness seems to indicate that workplace belongingness is more closely tied to everyday interpersonal interactions and a supportive social climate, rather than occasional or structured social events. This is not to suggest that virtual social activities could not serve an alternate purpose (e.g., boosting team morale), merely that they do not appear to directly influence employees' deeper sense of connection to the team or organization. It is possible that these activities, while fostering surface-level interactions, do not address the underlying elements of belongingness, such as feeling valued or integrated into the core social fabric of the team. Taken together, these results suggest that for virtual leaders aiming to enhance remote employees' work belongingness, the focus should be placed on building a strong, inclusive social climate through consistent and intentional interpersonal engagement rather than relying primarily on virtual social activities and events.

Limitations

There are several limitations of the present study that should be explicitly acknowledged. It is uncertain to what extent these results may be generalizable as approximately half of the sample was recruited from a single organization. Furthermore, only one of the supervisor's subordinates could participate in the study and it would be unusual for a participant to nominate their supervisor or subordinate to also participate in the study if they did not already have a good relationship with that individual, which could have biased the results. To the extent that this constrained the variance observed in the study's measures, this could have further reduced the

study's statistical power, which may have already been limited due to the relatively small sample size. Additionally, although I prioritized studying leadership functions that have received limited empirical attention and were purported to have strong theoretical relevance for virtual environments, additional work is needed that investigates the effectiveness of other leadership functions within this setting (Bell et al., 2023; Carter et al., 2015). Researchers are also encouraged to study these effects across various ranges and types of virtuality. The present study only considered virtuality in terms of the amount of time the subordinate spent working remotely and limited variance in this construct constrained its usage to that of a control variable.

The cross-sectional nature of the data stymied the ability to study how virtual leaders' enactment of these functions may change over time and what impact this would have on the outcome variables. It also prevents an exploration of how leadership functions operate within and across performance cycles. When creating their taxonomy of leadership functions, Morgeson et al. (2010) grouped the functions according to which phase of an episodic performance cycle they would be most pertinent to. For example, both the structure and plan function and the provide feedback function are transition phase functions. This phase encompasses the period of time in the performance cycle where the team is focused on activities that establish the structures and processes which will enable them to ultimately achieve their goal. It is during the action phase that the team is focused on activities that directly contribute to accomplishing their goals. This study assessed these leadership functions by aggregating the supervisor's enactment of the functions across the previous three months, blurring their effects across numerous performance cycles within that timeframe. Depending on the nature of the task at hand, certain leadership functions may be more or less useful within a particular performance cycle. The nonsignificant

findings could therefore be the result of not assessing these leadership functions within a discernable phase of a specific performance cycle.

Lastly, this study was unable to test the theoretical mechanisms and processes through which these leadership functions are purported to exert their effects. It is presumed that these functions exert their effects by addressing specific needs, but this process was unable to be examined due to the limitations of the dataset. The cross-sectional nature of the data also prevented the testing of alternative types of models. As previously discussed, the effect of a leadership function can be impacted by other functions and their combined effect may not be completely captured by a simple product-term interaction (Casimir & Ng, 2010). It could also be the case that one leadership function exerts its effect on the outcome of interest through a different leadership function. For example, virtual social activities may indirectly enhance subordinate belongingness by fostering a positive, supportive social climate. To appropriately test this and other such mediational models, longitudinal data would be needed.

Future Research Directions

Future research should build upon this and other existing work by studying the effects of additional leadership functions across varying types and degrees of virtuality. When doing so, researchers are encouraged to examine the effects of leadership functions across a greater proportion of the supervisor's team. It would also be prudent to take into consideration additional parties beyond the formal leader who could be engaging in these leadership functions. To advance our theoretical understanding of virtual leader effectiveness, longitudinal research assessing fluctuations in followers' needs and leaders' behavior is especially needed. When doing so, researchers should be mindful of the nature and timing of performance cycles. As suggested by Morgeson et al. (2010), certain leadership functions may be particularly relevant

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during certain points of the performance cycle. However, employees can be engaged in the pursuit of multiple goals at the same time and these performance cycles may not necessarily adhere to the same timeline (Marks et al., 2001). These issues will require researchers to carefully consider how and when to assess leadership functions so as to best capture the true impact of their effects.

Relatedly, future research should conduct longitudinal studies examining the entirety of the process through which leadership functions are purported to operate. Specifically, they should assess the leadership functions of interest, the needs those functions address, how effective the functions are at addressing those needs, the outcomes of interest, and any additional factors relevant to the intervening process (Kozlowski et al., 2016). As noted above, researchers should be sensitive to who is performing these leadership functions as well as the dynamics of the task performance cycle when evaluating leadership functions. Additionally, careful consideration should be given to how various leadership functions may interact with one another and if there is a particular combinative aspect driving the effects of this interaction. This type of research would vastly advance theoretical understanding of how and under what circumstances leaders are effective in virtual work environments.

When examining the relationships between different leadership functions in future research, it could also be informative to evaluate the relative importance of leadership functions or to explore deeper aspects of potential interactive effects. The former suggestion is based on the fact that most needs can be addressed through a variety of leadership behaviors (Yukl, 2012). Likewise, a specific leadership behavior can influence multiple outcomes. Knowing which behaviors have the most substantial impact on the outcome(s) of interest could help inform leaders about how to make the best use of their time and effort. Potential mediational models

should also be considered as leadership functions could exert an effect through one or more other functions. Future research should carefully consider these dynamics when studying multiple leadership functions.

Lastly, there has been speculation about the effectiveness of virtual social activities in helping remote employees connect and bond with colleagues. The present study is the only known study to date which has empirically evaluated the effectiveness of such activities in fostering remote employees' belongingness. Future research might consider exploring this construct further, such as by evaluating the relative importance of individual activities or by examining the dimensionality of the construct. This latter suggestion was not feasible given the nature of the data in the current study, but certain activities may share similarities and be more or less effective at achieving particular social outcomes. To study this issue, researchers might consider using Q methodology to examine remote employees' general views and opinions on these types of activities or to evaluate how effective various activities are at addressing different socially-related goals and outcomes (e.g., fostering a sense of belongingness, facilitating initial connections during onboarding, maintaining social bonds within an established work group).

CHAPTER 6

CONCLUSION

The growth in remote work arrangements over the past several years has prompted questions regarding how this type of environment alters various aspects of leadership. To help address this question, the present study drew from functional leadership theory to examine the influence of several leadership functions proposed to be theoretically relevant to leading within a virtual environment. Results indicated that supervisor ratings of subordinate job performance and work effectiveness were not related to either the structure and plan leadership function or to the provide feedback leadership function. Subordinates' sense of workplace belongingness was positively related to the support the social climate leadership function, but was not associated with virtual social activities initiated by one's supervisor. This research suggests that virtual social activities and events do not cultivate the deeper types of connections associated with a true sense of belongingness. Virtual leaders can instead enhance remote subordinates' belongingness through ongoing efforts to foster an inclusive, supportive social climate.

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APPENDIX A

LIST OF STUDY MEASURES

Structure and Plan Leadership Function – Subordinate Baseline

Consider <Supervisor>'s typical management style for the past 3 months and indicate the extent to which you agree with the following statements about his/her behaviors. <Supervisor>...

- ... has set clear tasks for the team members
- ... has ensured a common understanding of tasks
- ... has defined clear roles of what is expected of team members
- ... has synchronized or prioritized contributions among team members

Response scale: (1) Strongly Disagree (2) Somewhat Disagree (3) Neither Agree Nor Disagree (4) Somewhat Agree (5) Strongly Agree

Provide Feedback Leadership Function – Subordinate Baseline

Consider <Supervisor>'s typical management style for the past 3 months and indicate the extent to which you agree with the following statements about his/her behaviors. <Supervisor>...

- ... has recognized individual team members' contributions
- ... has given encouragement and recognition to team members

Response scale: (1) Strongly Disagree (2) Somewhat Disagree (3) Neither Agree Nor Disagree (4) Somewhat Agree (5) Strongly Agree

Support the Social Climate Leadership Function – Subordinate Baseline

Consider <Supervisor>'s typical management style for the past 3 months and indicate the extent to which you agree with the following statements about his/her behaviors. <Supervisor>...

- ... has made people feel like part of the team
- ... has been sensitive to diversity among team members (e.g., cultural, racial, life stage, etc.)
- ... has emphasized shared values among members of the team
- ... has fostered trust, involvement, and cooperation among team members

Response scale: (1) Strongly Disagree (2) Somewhat Disagree (3) Neither Agree Nor Disagree (4) Somewhat Agree (5) Strongly Agree

Supervisor-Initiated Virtual Social Activities – Subordinate Baseline

Has <Supervisor> initiated or helped organize any of the following activities over the past 3 months?

- Virtual happy hours or gatherings outside of normal work hours
- Virtual meetings during normal work time that are just for socializing
- Shared lunch hours virtually
- Virtual events with remote entertainment, such as a comedian or musician or instructional chef
- Virtual celebrations (birthday parties, holiday parties, recognition ceremonies)
- Any virtual event where the organization provides food, drinks, snacks, or some other physical thing (or stipends for these) for each person to interact with during the event
- Virtual team building activities
- Activities that pair employees randomly with others in the company to chat virtually (e.g., Donut app on Slack)
- Encouragement of "co-working" (cameras on, mics off) so you feel like you're working in same room as someone else
- Company-specific internal websites or Slack channels where non-work related announcements or conversations can be posted

Response scale: (0) No (1) Yes

Workplace Belongingness – Subordinate Baseline

- I am well-accepted by my coworkers
- When at work, I really feel like I belong
- I feel that the people I care about at work also care about me

Response scale: (1) Strongly Disagree (2) Somewhat Disagree (3) Neither Agree Nor Disagree (4) Somewhat Agree (5) Strongly Agree

Subordinate's Degree of Virtuality – Subordinate Baseline

- What percentage of the time are you currently working remotely?

Response scale: Slider from 0–100%

Task Interdependence – Subordinate Baseline

- I have to obtain information and advice from others in order to complete my work
- I have to work closely with others to do my work properly
- In order to complete my work, I have to collaborate with others extensively

Response scale: (1) Strongly Disagree (2) Somewhat Disagree (3) Neither Agree Nor Disagree (4) Somewhat Agree (5) Strongly Agree

Subordinate's Overall Remote Work Performance – Supervisor Baseline

>   When answering the question below, please think about <Subordinate>'s performance **<u>since <Subordinate> began working remotely.</u>**
>   - Rate <Subordinate>'s overall level of performance.

Response scale: (1) Unacceptable (2) Poor (3) Below average (4) Average (5) Above average (6) Very good (7) Outstanding

Subordinate's Overall Remote Work Effectiveness – Supervisor Baseline

>   When answering the question below, please think about <Subordinate>'s performance **<u>since <Subordinate> began working remotely.</u>**
>   - Overall, to what extent do you feel <Subordinate> has been effective at fulfilling his/her work roles and responsibilities?

Response scale: (1) Not effective at all (2) Considerably ineffective (3) Somewhat ineffective (4) Neither effective nor ineffective (5) Somewhat effective (6) Considerably effective (7) Very effective