A Longitudinal Comparison of Leader-Follower Relationships Between High and Low Performing Self-Managed Work Teams in Virtual Settings

JoAnne Yong-Kwan Lim  
Division of Management Information Systems  
The University of Oklahoma  
yong-kwan.lim@ou.edu

Laku Chidambaram  
Division of Management Information Systems  
The University of Oklahoma  
laku@ou.edu

Abstract

We conducted a semester-long study that examined the influence of emergent leaders’ behaviors on followers’ behaviors in high- and low-performing teams over time. Our results indicated that in high-performing teams, followers engaged in greater adaptive, goal and stability behaviors solely as a function of time. Neither the virtualness nor the behaviors of leaders influenced the behaviors of followers in high performing teams. In contrast, in low-performing teams, leaders played an important role in facilitating followers to engage in more leadership behaviors. Generally, over time, in response to the increasing virtualness and behaviors of the leaders, followers responded by engaging in similar behaviors. Following the leader’s behavior, however, was dysfunctional for team performance. Our findings suggest that mimicking the task behaviors of emergent leaders who are virtual is not necessarily a formula for successful team performance, especially in self-managed work teams. Instead, as shown by the high-performing teams, behaviors that are self-initiated and autonomous—regardless of the leaders’ behaviors or virtualness—are what lead to success.

“Leadership: The art of getting someone else to do something you want done because he wants to do it.”  
— President Dwight D. Eisenhower

1. Introduction

Rapid technological development has enabled members who are collocated to work away from each other and collaborate on projects via electronic means. It is no longer the case that individuals must meet face-to-face in order to collaborate on projects. Indeed, distributed self-managing group work\(^1\) is an increasingly common phenomenon in organizations ([19]). Moreover, even members of the same group differ in their extent of virtualness, i.e. the extent to which a member relies on electronic means as opposed to face-to-face means to communicate with others in the group ([18]).

Despite the widespread reliance on virtualness, much of the extant research focuses on two ends of the virtualness spectrum, i.e. completely virtual teams and completely collocated teams, when in fact, members of many collocated teams tend to employ some virtual technologies in their collaboration ([33]). The virtual setting, however, poses some limitations on group functioning, such as coordination and difficulties in interpreting feedback ([49]; [19]). A vital factor that influences team effectiveness is leadership ([54]; [55]). Yet, a majority of the research concerning online leadership is only prescriptive in nature ([55]). Further, recent researchers noted that self-managed work team literature tends to focus predominantly on the leaders and underplay the pivotal role played by followers in the leadership process ([2]). However, there can be no leaders without followers. Thus, the inclusion of followers, in addition to leaders, provides a more comprehensive view of leadership, and more importantly, its influence on team performance ([2]).

Recent research has indicated the importance of shared leadership in both virtual and face-to-face contexts ([3]). Shared leadership is conceptualized as “a team process where leadership is carried out by the team as a whole, rather than solely by one individual.” ([41], p. 220), indicating that leadership roles and responsibilities are shared among team members throughout a project. However, not all members in a group emerge as leaders even though they engage in leadership roles.

\(^1\) Self-managing teams are defined as "groups of interdependent individuals that can self-regulate their behavior on relatively whole tasks" ([8], p. 13).
Emergent leaders differ from formal leaders in that emergent leaders are selected by members of the group while formal leaders are designated with authority over goal structuring and performance evaluation ([20]; [53]). Further, formal leaders may not be able to garner respect and be deemed as leaders by followers ([41]; [53]). Research suggests that emergent leaders are in a unique position as they exert significant influence on followers’ beliefs, goals and expectations ([41]; [50]), but the influence changes as a group progresses on a project ([41]). Across time, emergent leaders are likely to vary their behaviors as well as the extent to which these leaders rely on electronic media for collaboration. Followers, on the other hand, are likely to adjust and respond to the behaviors of emergent leaders as well. However, given that group performance is a function of both leaders and followers ([39]), the patterns of shared leadership success and failure are likely to differ. While research has acknowledged that followers are influenced by emergent leaders ([41]; [50]), it has not examined whether such a relationship differs between high and low performing teams over time. Thus, our research question is:

Over time, do the behaviors and virtualness of emergent leaders differentially impact followers’ behaviors in high-performing and low-performing groups?

This study employed the Quinn’s (1984) [43] model of competing leadership roles, which is drawn from the behavioral perspective of leadership. This theoretical perspective takes into account the paradoxes and contradictory roles played by leaders ([12]). While all leader behaviors spanning the four quadrants of the competing values framework are included in this study (in line with previous research), we focus on the two task-focused behaviors—goal-oriented and stability-oriented—of their followers. Previous research on self-managing teams (e.g., [24]) suggests that it is these task-oriented behaviors that distinguish the high and low-performing teams.

2. Literature review and research model

2.1 Behavioral perspective of leadership

An important theoretical perspective that is particularly useful for understanding leadership is the Theory of Behavioral Complexity, which suggests that effective leaders are characterized as having the abilities to match and manifest their requisite behaviors to task dynamics and situational needs ([21]; [28]; [54]; [35]). Quinn’s (1988)[43] model, which is derived from the Theory of Behavioral Complexity, consists of the four quadrants of leadership behaviors described below:

- The adaptive leadership function, comprising innovator and broker behaviors, focuses on intellectual stimulation, flexibility, creativity, innovation and the ability to build networks.
- The rational goal leadership function, consisting of producer and director behaviors, emphasizes planning, goal-setting, expectations clarification and performance.
- The stability leadership function, comprising coordinator and monitor behaviors, focuses on organization and management of structures, dealing with logistical issues and emphasizes the internal functioning of the unit.
- The human resource leadership function, consisting of the facilitator and mentor behaviors, focuses on mentoring, encouraging the expression of opinions, fostering the development of individuals and facilitating group process.

The emphasis of each leadership behavior varies in accordance with the group development lifecycle ([4]). Group development research and the Time, Interaction and Performance (TIP) theory contend that as a group develops, and depending on the level of maturity, members may participate in more social or task-oriented activities ([16]; [34]; [5]). Thus, as a group progresses through this lifecycle, leadership behaviors in self-managed virtual teams may vary according to the contextual requirements ([23]; [44]; [52]).

2.2 Influence of virtualness

While electronic technologies facilitate flexibility and convenience by enabling members to work remotely from others ([19]), the virtual setting results in “psychological distance” among members ([25]). Further, a highly virtual setting reduces the contextual cues (e.g., a handshake) that are available in a face-to-face context and are vital for the transmission of social elements such as warmth and development of trust ([25]; [17]). In a more virtual setting, there is also a greater tendency for inefficient communication and exchanges as the contextual indicators present in face-to-face interactions—such as implicit monitoring of each others’ work and the creation of common frames of reference useful for interpreting communications and feedback—are lacking. Mistrust, dissatisfaction and difficulties in cooperation are likely to ensue ([49]; [9]; [38]; [17]). In short, integration of knowledge, monitoring of work and the development of "shared emotions, experiences and insights" ([48]) are more difficult to realize as virtualness increases.

2.3 Hypotheses

Our proposed model is presented in Figure 1.
Our model posits interaction effects between emergent leaders’ virtualness and their behaviors on followers’ behaviors over time. Thus, it integrates four theoretical aspects: First, it suggests that the behavior of members who emerge as leaders will influence the behavior of other members, even in self-managed work teams. Second, just as leaders’ behaviors impact followers’ behaviors, so too will their physical presence. In other words, the extent to which emergent leaders rely on virtual media to communicate with others will affect members’ behaviors. Third, the impact of the leaders’ behaviors and their virtualness on members’ behaviors will not remain static, but will evolve over time. Finally, our model posits that the pattern of these dynamic relationships will differ between the high- and low-performing teams. These concepts are discussed further below, and used the basis for the ensuing hypotheses.

2.3.1 Impact of emergent leaders’ behaviors. During the initial phase of a project in a newly formed group, there is “weak structure” ([16]; [41]). Further, there is ambiguity and uncertainty with respect to task requirements, expectations, goals, roles and responsibilities ([16]; [41]). A leader is likely to be looked upon to make sense of the uncertain and complex environment ([36]). Smircich and Morgan’s (1982) [47] argued that a primary role of a leader is to manage meaning by clarifying work structure and enabling members to get a grasp on issues related to proceeding with the task, thereby developing a sense of certainty among members. Below we discuss how each of the leaders’ behaviors in the four quadrants will affect their followers’ behaviors over time.

Adaptive behaviors entail functions such as encouraging members to view present methods and assumptions from a new light, triggering discussions and ideation and, potentially, new goals and methods of working ([51]; [36]). Members who are involved in the goal setting process are more committed to team goals, translating to the development of a more common team identity and a more cohesive team, resulting in higher performance ([7]; [46]). Recent research has also shown that leaders who engaged in intellectual stimulation—an aspect of adaptive behaviors—enhanced idea generation and new methods of accomplishing work ([10]). With greater team commitment, there is thus a greater likelihood that members will engage in greater goal-oriented and stability-oriented behaviors that are essential in goal achievement and resolving task conflicts.

Goal-oriented behaviors: The Nobel Laureate Albert Schweitzer noted that, “Example is not the main thing in influencing others, it’s the only thing.” In the context of rational behavior, this sentiment is most relevant, and is supported by prior research. For instance, goal setting theory purports that goal clarity and feedback motivate individuals to reciprocate in kind—a process that culminates in goal accomplishment ([32]). Thus, we expect followers to respond in kind to leaders’ goal- and stability-oriented behaviors.

Stability-oriented behaviors establish consistent expectations in the team, promote mutual understanding of roles and responsibilities, and enable efficient coordination processes ([52]); they also develop a sense of control and stability ([21]). Through questioning and clarifying by emergent leaders, members gain awareness of performance expectations and milestones ([12]), and are likely to interact with one another more often ([36]). Research has shown that leaders who perform stability-oriented behaviors such as providing feedback and coordinating contributions, in turn, promote further coordination by members, resulting in greater communication within the team ([51]), which can enhance rational outcomes, i.e. more goal and stability-oriented behaviors of followers.

Human resource behaviors promote interpersonal relationships and the reconciliation of diverging opinions, leading to more cooperative team climate and concerted team actions and greater team enhancement ([12]; [52]). When members perceive that they are part of a group, they are more likely to be more active in task activities, respect and consider each others’ opinions and work effectively, enhancing team outcomes ([15]; [36]). Thus, more human resource behaviors by emergent leaders are likely to result in more task behaviors by followers.

2.3.2 High performing teams. The model of substitutes for leadership suggested that physical distance may neutralize leadership behaviors while physical proximity will facilitate communication dynamics ([30]). We suggest that initially, in high performing teams, emergent leaders’ virtualness and their behaviors will result in “follow the leader” behavior by followers, i.e. more leadership behaviors will result in more goal and stability-oriented behaviors by followers. This relationship is based on the argument that the greater uncertainty and coordination difficulties of collaborating work in a more virtual setting will be reduced.
However, the influence of emergent leaders’ behaviors on followers’ behaviors may be limited to the initial project phase only and we expect that in high performing teams, it will reduce over time even when the emergent leaders’ virtualness increases. Over time, members gain a better sense of their uncertain setting and are better equipped to proceed and less likely to rely on their leaders for directions and make sense of the ambiguity that arose in the earlier phase of the project ([42]) in a more virtual context. Research has shown that the relational development in virtual teams rival that of face-to-face teams over time ([6]). While groups are more vulnerable to misunderstandings in a more virtual context ([9]; [38]; [17]; [19]), successful groups tend to engage in greater goal clarification and make better decisions about the process earlier in a project ([16]), thus resolving some of the task coordination complexities in a virtual setting. Moreover, through experiences and interactions, members are more able to accurately identify and thus leverage each others’ expertise ([26]) and have greater clarity with respect to the task ([42]). They are thus less likely to depend on the emergent leaders for various task directions (such as goal setting). Pescosolido (2001) ([42]) showed that the influence of emergent leaders’ self-efficacy on the followers reduced dramatically over time. It is important to note that they did not examine if such patterns differed between high- and low-performing teams. Being less reliant on emergent leaders, the followers are apt to engage in more self-leadership behaviors so as to realize task performance. Self-leadership entails intrinsic motivation and various forms of guiding oneself (such as goal-initiating)—an important component in team effectiveness ([39]).

Furthermore, as the team project progresses towards task completion, there is an impending concern with task deliverables ([5]). The group must tie up the loose ends and integrate their results as the project progresses towards the end ([16]; [22]). During this phase, high performing teams engage in greater discussions of goals and implementation plans ([22]) and these behaviors are likely to be more self-directed in nature since members have attained a better understanding of their context. In short, we expect that in high performing self-managed work teams, the impact of leaders’ behaviors on followers’ goal and stability behaviors will reduce over time even when the virtualness of these leaders increases. Hence,

**H1:** In high performing self-managed work teams, followers will respond initially to the (a) adaptive behavior; (b) goal-oriented behavior; (c) stability-oriented behavior; and (d) human resource behavior of their emergent leaders with greater goal-oriented behavior. This relationship will become weaker over time and with the increasing virtualness of the emergent leaders.

**H2:** In high performing self-managed work teams, followers will respond initially to the (a) adaptive behavior; (b) goal-oriented behavior; (c) stability-oriented behavior; and (d) human resource behavior of their emergent leaders with greater stability-oriented behavior. This relationship will become weaker over time and with the increasing virtualness of the emergent leaders.

### 2.3.3 Low performing teams

Similarly, we expect that in low performing teams, followers will mimic the task behaviors of emergent leaders initially. However, we expect that this relationship will become even stronger over time (an entrenched “follow-the-leader” attitude) and as the emergent leaders’ virtualness increases (given the ease of engaging in uncritical thinking without peer pressure or social oversight). Kelly’s (1992) [29] model of followership suggests that there are two types of followers: the active versus the passive. The active followers adopt an active and independent approach when dealing with a problem (i.e., engaging in self-leadership) and do not need close supervision, while the passive followers limit themselves to activities only when they are being told. Further, passive followers are dependent and engage in uncritical thinking. Given the rational decision making process of followers ([13]), they will likely adopt a reliance approach throughout the project, depending on their emergent leaders to take the lead and mimicking their leaders’ behaviors. Given the greater coordination challenges that a more virtual context poses ([9]; [38]; [17]; [19]), coupled with the reliance of followers on their emergent leaders, the relationship between leaders’ behaviors and followers’ behaviors is likely to be heightened as the project draws closer to deadlines in which the team focuses on task completion ([5]).

Such behaviors however may engender feelings of mistrust and uncooperativeness and, thus, be insufficient to deal with the ambiguities arising from a more virtual context. Jarvenpaa and Leidner (1998) [23], in their study of virtual teams, found that from the start of the project, teams which experienced low levels of initial trust exhibited behaviors such as no-responses, lack of initiative, ambiguity over task expectations, inability to deal with the uncertainty created from the technology setting and low participation. Moreover, their study showed that once the initial trust was shattered, the majority of the teams failed to overcome it. Kanawanattanachai and Yoo (2002) [25] further found that low performing virtual teams were unable to maintain high levels of affective and cognitive trust throughout the project. Based on the
above discussion, we expect the following in low-performing teams:

**H3:** In low performing self-managed work teams, followers will respond initially to the (a) adaptive behavior; (b) goal-oriented behavior; (c) stability-oriented behavior; and (d) human resource behavior of their emergent leaders with greater goal-oriented behavior. This relationship will become stronger over time and with the increasing virtualness of the emergent leaders.

**H4:** In low performing self-managed work teams, followers will respond initially to the (a) adaptive behavior; (b) goal-oriented behavior; (c) stability-oriented behavior; and (d) human resource behavior of their emergent leaders with greater stability-oriented behavior. This relationship will become stronger over time and with the increasing virtualness of the emergent leaders.

### 3. Research methodology

#### 3.1 Subjects

The participants were 97 upper-division undergraduate business students enrolled in their final capstone course. Most subjects ranged in age from 19 to 24 years, had some work experience and were predominantly Caucasian. The students participated voluntarily for extra credit, while those who did not wish to participate in the study, but wanted to earn the extra credit were assigned an alternative writing assignment. 24 teams were formed by randomly assigning the subjects to four- or five-member teams.

#### 3.2 Procedures

The task assigned in this study was a semester-long group project that was a course requirement. The task comprised of two deliverables. For the first deliverable, the subjects were required to write up an outline of one organization that encountered fundamental changes and another organization that did not. In the outline, the subjects were expected to provide an analysis of their organization choices and offer justification for the changes. For the second deliverable, the subjects were expected to further develop and present a detailed version of their first deliverable. The subjects were given a total of about three weeks to complete their first deliverable and about seven weeks to complete their second deliverable.

Prior to the beginning of their project, the subjects completed a survey that measured demographic characteristics such as gender. After each deliverable was completed and before knowing their grades for that deliverable, the subjects completed another two surveys that assessed their perceptions of leader emergence, leadership behaviors and extent of virtualness. Further, the subjects completed a post-hoc survey that measured their perceptions of overall leader emergence after the completion of the entire project (i.e. the two deliverables). The subjects were reminded weekly to note down the time they expended on collaborating with their group members using the various communication technologies such as D2L bulletin board, Facebook, IM and email. This information was used to calculate the extent of virtualness (a construct described in depth below).

As this was a field experiment, the subjects were allowed to collaborate via any communication media they deemed fit. Further, each group was given their own work space on an electronic bulletin board, which provided file uploading and downloading capabilities. The bulletin board was created on Desire-to-Learn (D2L), a commonly-used computer-mediated learning environment. Subjects were encouraged by the course instructor to use the D2L bulletin board for collaboration given that it would offer a partial gauge of one’s course participation.

#### 3.3 Measures

**Extent of Virtualness.** In line with Griffith et al. (2003) [18], virtualness was measured as the extent to which a team member depended on electronic media (as opposed to face-to-face interactions) to collaborate, communicate and coordinate with others who are not collocated. As indicated above, after the submission of the deliverable in this study, members evaluated the amount of time they spent collaborating with other members about the task using face-to-face interaction and various computer-mediated communication media. Using this data, a composite Virtualness Index ($V_i$) denoting the cumulative extent to which a member relied exclusively on electronic media to collaborate with the group was calculated using the formula shown below:

$$V_i = \frac{\sum_{C_g} \left[ E_i - F_i \right] * E_i}{C_g}$$

Where $E_i$ = Time spent by member on electronic media; $F_i$ = Time spent by member on face-to-face meetings; and $C_g$ = Total time spent on collaboration by the group.

Based on an exhaustive search of the literature, Gibson and Gibbs (2006)[17] define virtuality, the concept we refer to as virtualness, as being composed of four characteristics—geographic dispersion, electronic dependence, structural dynamism, and national diversity. In this study, all members were resident in the same country; hence, national diversity was not a relevant component of virtualness. The other
three characteristics are included in our measure of virtualness, \( V_i \), as explained below:

(a) Geographic dispersion, which represents the degree to which a member is separated from the group, is captured by the extent to which that member communicated with other members using electronic media (\( E_i \)); (b) Electronic dependence, a measure of a member’s reliance on computer-supported media, is captured by the extent to which a member relied exclusively on electronic media to communicate with other members (\( E_i - F_i \)); and (c) Structural dynamism, which represents the setting, is captured by the total communication within the group (\( C_g \)).

To use an analogy, if the total amount of collaborative task-focused communication within a group represents a pie, \( V_i \) represents a member’s “slice” of a that pie whose size is based on the size of the overall pie and the extent of that member’s electronic communication adjusted for that member’s face-to-face communication. Taking all three aspects provides a more accurate measure of virtualness in that it rewards greater reliance on electronic media relative to non-electronic media by an individual and a greater proportion of that individual’s electronic communication relative to the group’s overall communication.

As an example, consider four members—A, B, C and D—who are in groups 1, 2, 3 and 4 respectively. Assume the following: (a) Member A spent 20 minutes online and 10 minutes face-to-face and Group-1 spent a total of 100 minutes collaborating; (b) Member B spent 200 minutes online and 100 minutes face-to-face and Group-2 spent a total of 1000 minutes collaborating; (c) Member C spent 200 minutes online and 50 minutes face-to-face and Group-3 spent a total of 1000 minutes collaborating; and (d) Member D spent 200 minutes online and 50 minutes face-to-face and Group-4 spent a total of 500 minutes collaborating.

- Comparing Members A and B, if we did not include for the magnitude of the online communication, the Virtualness Index for both members will be the same, resulting in a flawed measure. As is apparent, the time that Member B spent online far exceeds that of Member A.
- Comparing Members B and C, if we did not include the amount of time spent on face-to-face communication by a member, the Virtualness Index for both members will be the same. However, as is apparent, Member B spent more time on face-to-face communication than Member C.
- Comparing Members C and D, if we did not include the total communication pie, the Virtualness Index for both members will be the same. However, as is apparent, Group-3 spent more time collaborating than Group-4.

### Competing Leadership Roles

Quinn’s competing leadership roles was measured using an adapted 16-item instrument used in prior research (Denison et al., 1995; Thompson, 2000). The items were measured on a seven-point Likert scale ranging from 1 (“Almost Never”) to 7 (“Almost Always”). An example of a question is: “I came up with inventive idea”. Past leadership research has indicated that this scale demonstrates sound psychometric properties (Denison et al., 1995). As this instrument was originally constructed in the context of organization, some of the words were rephrased so that it is more applicable to student groups. Lower scores indicate that a lower level of leadership role employed by the individual.

### Leader Emergence

After completion of the entire project and prior to receiving their grades, each member was asked to identify the leader(s) of the team (excluding themselves) for the project. Leader emergence was calculated using the formula below:

\[
\text{Leadership Index} = \frac{\text{Number of votes received}}{(\text{Group size} - 1)}
\]

### Emergent Leaders and Followers

We identified individuals who received more than fifty percent of the votes in the group (i.e. a leadership index of more than 0.50) as emergent leaders and were coded as 1. Conversely, individuals who received a leadership index of less than .50 were deemed as followers and were coded as 0. All the followers in our sample had an index of 0.33 or less. In our measurement of leader emergence, each member could select more than one individual as the leader and, thus, there could be more than one emergent leader in a group. In our sample, there were at least one and no more than two emergent leaders in each group.

### Control Variables

The control variables for this study were the emergent leader’s gender, gender composition of a team and group size. Previous research ([(27)]; [7]) has suggested that these variables could potentially influence the followers’ behaviors; hence, we controlled for their effects on the dependent variables.

### 4. Results

Prior to testing the proposed hypotheses, we conducted a confirmatory factor analysis on the leadership competing roles instrument. Table 3 presents these results. The fit statistics support its previously validated factor structure (CFI=.92; TLI=.90; and IFI=.9). Further, the measures exhibited significant factor loadings on their corresponding constructs, indicating convergent validity ([1]). Moreover, the normalized residuals were less than 2.0. Also, the value 1.0 was not found in the confidence interval for the relationship between the constructs, indicating discriminant validity ([1]). The reliabilities of the four constructs—adaptive behavior (\( \alpha = 0.86 \),
goal-oriented behavior (α=0.87), stability-oriented behavior (α=0.81), and human resource behavior (α=0.703)—exceeded the recommended 0.70 criterion [37].

We tested our hypotheses using HLM’s growth curve analysis, which allows us to capture the nested nature of the data by having time and individual-varying predictors (e.g., virtualness) as a level 1 unit and individuals within a group as level 2 units. This analysis enabled us to examine the changes in relationships over time as proposed in hypotheses ([45]). To separate the high- and low-performing teams, the performance scores from both deliverables were summed, and a median split performed. The results of our analyses revealed some expected, and several surprising findings.

4.1 High-performing teams

Hypotheses 1a through 1d posited that for high performing teams, the positive influence of emergent leaders’ virtualness and their behaviors on followers’ goal-oriented behaviors will reduce over time. Our results partially supported this hypothesis though there were no three-way interaction effects between time, leaders’ virtualness and behaviors (H1a: adaptive: $β=0.00032; p=ns$; H1b: goal: $β=0.00006; p=ns$; H1c: stability: $β=0.00014; p=ns$; H1d: human resource: $β=0.00063; p=ns$) on followers’ goal-oriented behaviors. Comparing the deviance statistics of these models (df=10) and the unconditional growth model (df=4) indicated that the unconditional growth model was a better fit to the data (adaptive: $Δχ^2=7.19, p=ns$; goal: $Δχ^2=8.83, p=ns$; stability: $Δχ^2=8.31, p=ns$; human resource: $Δχ^2=7.35, p=ns$). Our results showed that, interestingly, it was time that played a key role in influencing followers’ goal behaviors (time effects for: adaptive: $β=0.36; p<0.05$; goal: $β=0.49; p<0.05$; stability: $β=0.50; p<0.05$; human resource: $β=0.38; p<0.05$).

Hypotheses 2a through 2d predicted that for high performing teams, the positive influence of emergent leaders’ virtualness and their behaviors on followers’ stability-oriented behaviors will weaken over time. The analysis indicated that there was significant improvement over the unconditional growth model (adaptive: $Δχ^2=8.91, p=ns$; goal: $Δχ^2=8.52, p=ns$; stability: $Δχ^2=7.49, p=ns$; human resource: $Δχ^2=7.68, p=ns$). While we did not predict the effects of time, the analyses indicated that it was time that resulted in followers engaging in more stability (time effects for: adaptive: $β=0.52; p<0.05$; goal: $β=0.65; p<0.05$; stability: $β=0.62; p<0.05$; human resource: $β=0.52; p<0.05$) behaviors.

4.2 Low-performing teams

Hypotheses 3a through 3d were supported. We had proposed that for low-performing teams, the positive influence of emergent leaders’ virtualness and their behaviors on followers’ goal-oriented behaviors would increase over time. Our analyses indicated that there were indeed positive three-way interaction effects between time, leaders’ virtualness and their various behaviors—adaptive (H3a: $β=0.00093; p<0.05$), goal (H3b: $β=0.00090; p<0.05$), stability (H3c: $β=0.00099; p<0.05$) and human resource (H3d: $β=0.00097; p<0.05$)—on followers’ goal-oriented behaviors. These results suggest that across time, followers responded with more goal-oriented behaviors as emergent leaders’ virtualness and their behaviors increased. Further, the deviance statistics of these models indicated significant improvement over the unconditional growth model (adaptive: $Δχ^2=14.26, p<0.05$; goal: $Δχ^2=14.79, p<0.05$; stability: $Δχ^2=14.17, p<0.05$; human resource: $Δχ^2=14.41, p<0.05$).

Hypotheses 4a through 4d suggested that for low-performing teams, the positive influence of emergent leaders’ virtualness and their behaviors on followers’ stability-oriented behaviors would increase over time. In line with our expectations, the results indicated a three-way positive interaction between time, leader’s virtualness and their various behaviors—adaptive (H4a: $β=0.00072; p<0.05$), goal (H4b: $β=0.00066; p<0.05$), stability (H4c: $β=0.00074; p<0.05$) and human resource (H4d: $β=0.00070; p<0.05$)—on followers’ stability-oriented behaviors. However, the deviance statistics indicated that the unconditional growth models were a better fit over the models with the interaction effects (adaptive: $Δχ^2=8.91, p=ns$; goal: $Δχ^2=8.52, p=ns$; stability: $Δχ^2=7.49, p=ns$; human resource: $Δχ^2=7.68, p=ns$). Following the procedure recommended by Singer and Willet (2003) [45], we dropped the control variables that had no significant effects and conducted our analyses again. This time round, the deviance statistics demonstrated that the models demonstrated significant improvements (adaptive: $Δχ^2=8.91, p=ns$; goal: $Δχ^2=8.52$) and marginal (stability: $Δχ^2=7.49, p=0.065$; human resource: $Δχ^2=7.68, p=0.055$) over the unconditional growth model. Therefore, Hypotheses 4a through 4d were supported.

4.3 Post-hoc analysis

We conducted a post-hoc analysis, using an
independent-samples t-test, to determine whether there were any differences between followers’ goal and stability behaviors in high- and low-performing groups. Results indicated that there were no differences for both time 1 (goal: \( F=0.69; p=ns \); stability: \( F=3.26; p=ns \)) and time 2 (goal: \( F=3.20; p=ns \); stability: \( F=2.21; p=ns \)).

5. Discussion

There are two primary results from our current study: First, and partially supporting our expectations, in high-performance teams, followers’ leadership behaviors were only affected by time; they were not affected by the interaction of leaders’ virtualness and their own leadership behaviors. Second, and in line with our expectations, in low-performance teams, followers engaged in more goal and stability behaviors over time in response to the leaders’ virtualness and their leadership behaviors (However, these relationships resulted in dysfunctional team performance). Taken together, our results suggest that mimicking the task behaviors of emergent leaders who are virtual is not a formula for successful team performance, especially in self-managed work teams with no appointed leader. Instead, self-initiated and autonomous behaviors regardless of perceived leaders actions or proximity were the keys to successful performance. These results are further elaborated below.

First, for high performing teams, our results are partly consistent with our predictions. The followers did not vary their behaviors with respect to their emergent leaders’ virtualness and behaviors. Instead, the behaviors of the followers were only influenced by time such that they displayed more goal and stability behaviors in the later than in the earlier project phase, suggesting that the followers embraced an independent and proactive approach towards their tasks. Such findings are in concert with the assertion made by other researchers ([39]), who highlighted the importance of self-leadership for facilitating teamwork. In a more virtual context, the lack of contextual indicators coupled with the timing issues in asynchronous messages impede information from being interpreted quickly and accurately, resulting in greater tendencies for misunderstandings and mistrust ([9]; [38]; [17]; [19]). Members are thus likely to face greater challenges in keeping track of project progress, milestones, and other task execution issues initially. With the greater likelihood of process losses in more virtual settings ([17]; [19]), it is thus essential for members to be self-starters right from the start by enacting various leadership behaviors without directives from others so as to overcome coordination issues and deal with the uncertain environment associated with a more virtual setting. Recent human resource management research has also suggested the importance of employees taking a proactive approach and demonstrating initiatives in handling the task, managing stress and dealing with the work environment ([14]). These findings are at odds with Smircich and Morgan’s ([1982, [47]) view of leadership, which looks to leaders as those who define the task and followers as those who are reliant on such direction. While such a view of leadership may indeed be applicable in some contexts, in this study where leaders where virtual and the teams were self-managed, intrinsic leadership rather than extrinsic leadership was the key to success. However, our results suggest a potential research avenue. In high performing virtualness teams, if emergent leaders do not influence followers’ behaviors throughout the project, what kind of influence do these leaders have on followers?

Second, consistent with our predictions, we found that in low-performing groups, followers displayed more goal and stability behaviors in response to greater leader virtualness and leadership behaviors (adaptive, stability, goal and human resource) over time. While our findings were similar to previous research in face-to-face contexts (e.g., [11]; [10]), it showed that such a dependency relationship fails to improve performance in the context of virtual, self-managed teams. Thus, adopting a reactive approach in self-managed teams, especially where the leaders are virtual, may not be sufficient to deal with the coordination and knowledge integration issues stemming from this context.

To sum up, in contrast with much previous research demonstrating the important role played by emergent leaders in influencing followers’ behaviors, our findings suggest that in a self-managed team composed of members with varying degrees of virtualness, it is vital for members to direct their own behaviors if the team is to perform well. Thus, in organizational settings, it is essential for managers to adopt appropriate actions such as empowering team members to make decisions, providing training for team members to engage in leadership behaviors, and incorporating appropriate incentives for self-directed leadership behaviors.

The current study represents a preliminary step in the direction of a more holistic perspective of successful shared leadership patterns by investigating the relationship between emergent leaders and followers in high- and low-performing teams over time. However, the design of this study was not without limitations. The results must be understood in light of the larger organizational context. The subjects employed in this study were not actual task groups.
working in organizations, but rather students with limited or no working experience and assembled for a semester to accomplish a group project. Consequently, generalizations must be made with caution. Future research is needed to establish whether similar findings can be obtained in an organizational setting. Along a related vein, the current study was conducted in a context where all students have the same major, i.e., business. Future work involving distributed teams composed of members with diverse academic and life experiences should be pursued to determine how the results will differ. Such teams are likely to involve a different set of dynamics given the absence of face-to-face interactions and the possibility of time zone differences.

In sum, our study elucidates the factors that affect team performance in virtual settings. Much previous research has corroborated the assertion that shared leadership is a predictor of positive team outcomes in both virtual and face-to-face teams ([40]). Our results provide some support for this notion, with the addition of a contingent factor, i.e., self-leadership. As noted by prior researchers ([39]), the combination of self-and shared leadership can promote team effectiveness in certain settings. Our findings suggest that followers need to be proactive and self-starters by engaging in their own leadership behaviors, particularly in contexts where their emergent leaders vary in virtualness, so as to realize team success. Simply mimicking the task behaviors of leaders in such contexts is likely to lead to low team performance.

6. Conclusion

As articulated by Zigurs (2003, [55]), “Virtual teams come in many flavors, and virtuality as a characteristic can be defined on many dimensions” (p. 329). This study focuses on one variation of virtualness—members who do not have time zone differences and yet differ with respect to the extent of technologies used in their collaboration ([18]). While there is a growing body of research that examined shared leadership (e.g.,[41]), an understanding of the temporal relationship between followers and emergent leaders who vary with respect to virtualness is lacking. Furthermore, while research on leadership in self-managed work groups recognizes the importance of emergent leaders in affecting followers’ goals and efficacy, this stream of research has not distinguished the impact of such leadership behaviors on team performance. The current study addresses this gap. Our study can be seen as a contribution to the online and traditional leadership research by illuminating, in high- and low-performing teams, how followers’ behaviors respond to changes in the virtualness and the behaviors of their leaders over time.

References


