Doerr Innovation Award:
Uncovering What Makes an Emergent Leader Effective: An Empirical, Longitudinal Study and Practical Recommendations

Final Report

Shannon L. Marlow, Ph.D.
Table of Contents

Introduction .......................................................................................................................... 2
  Project Objectives ............................................................................................................ 2
  Importance of Topic ......................................................................................................... 2
  Hypotheses ....................................................................................................................... 3

Method ................................................................................................................................ 3
  Sample ............................................................................................................................... 3
  Procedure .......................................................................................................................... 4
  Measures ............................................................................................................................ 4

Results .................................................................................................................................. 5
  Hypothesis 1 ....................................................................................................................... 5
  Hypothesis 2 ....................................................................................................................... 5
  Hypothesis 3 ....................................................................................................................... 5
  Hypothesis 4 ....................................................................................................................... 6
  Exploratory Analyses ....................................................................................................... 6

Discussion ............................................................................................................................ 7
  Emergent Leadership ......................................................................................................... 7
  Emergent Leadership and Teamwork ............................................................................... 8
  Practical Implications ....................................................................................................... 9

Best Practices for Effective, Emergent Leadership .............................................................. 9

References ............................................................................................................................ 11
Introduction

Project Objectives

The overarching aim of this effort is to uncover why certain individuals are more predisposed, in the context of self-managed diverse teams without formally appointed leaders, to emerge as leaders. Further, it will provide insight into how leadership emergence and certain leader characteristics and behavior lead to more effective team functioning and performance. Finally, the results of this effort will be used to summarize best practices and principles for students or employees wishing to gain leadership experience in self-managed teams. Specifically, the best practices will summarize behaviors and approaches to engaging in more effective leadership behaviors in diverse, self-managed teams.

Importance of Topic

Self-managed teams, or teams lacking external and formal leaders, are becoming increasingly implemented in modern organizations (Nijholt & Benders, 2010); in such teams, leadership is considered shared in that responsibilities are distributed throughout the team (Carson, Tesluk, & Marrone, 2007). Scientific evidence has indicated that, in the absence of a clearly defined leader, one individual is likely to emerge as a recognized leader (Taggar, Hacket, & Saha, 1999). Given the increasing prevalence of self-managed teams, it is critical that researchers and practitioners alike understand the mechanics of emergent leadership. Specifically, research illustrates that leaders serve a critical purpose in facilitating team effectiveness via a variety of different means such as facilitating group motivation, synchronizing individual team member contributions, and clarifying team responsibilities (Salas, Sims, & Burke, 2005). Thus, addressing why and how leaders emerge within self-managed teams will provide insight into how to promote conditions that facilitate leader emergence and, in turn, how emergent leaders can lead teams to success.

The proposed effort will examine whether emergent leaders with learning orientations (i.e., the predisposition to view challenging tasks as enjoyable and as a learning opportunity; VandeWalle, Brown, Cron, & Slocum, 1999) are more likely to facilitate teamwork. Evidence suggests that such individuals have a tendency to engage in behavior that may lead to failure, simply for the sake of learning, as opposed to avoiding behavior that may lead to errors due to fear of embarrassment (Dweck, 1986). Thus, emergent leaders with learning orientations may more readily facilitate psychological safety (i.e., a collective belief that the team is safe for interpersonal risk-taking; Edmondson, 1999), a team state consistently identified as facilitating team performance (Frazier et al., 2016). The behavioral component of a learning orientation is argued to manifest via feedback-seeking behavior or behavior geared towards discussing errors and improving subsequent taskwork attempts (Taylor, Fisher, & Ilgen, 1984). Discussion of errors, although potentially embarrassing, is critical for the team to learn from mistakes and improve (Taylor et al., 1984). As teams observe the leaders for signals regarding how to behave in the team setting (Tyler & Lind, 1992), leaders exhibiting feedback-seeking behaviors may demonstrate that the team environment is safe for risk-taking and open discussion of errors. Leaders with learning orientations are argued to be more likely to engage in feedback-seeking behavior; this behavior, in turn, will promote psychological safety. Finally, this heightened level of psychological safety will lead to enhanced performance via the more open discussion and acknowledgement of mistakes, enabling the team to collectively improve. Such results will have a host of practical implications regarding how to select individuals likely to fill leadership roles and, more broadly, how to increase the likelihood of an emergent leader’s success.
Although there is ample theory and evidence identifying some of the traits associated with emergent leadership, there are still gaps in present understanding. In particular, the proposed research aims to examine emergent leadership and how it may facilitate a team state known to be critical to team success, psychological safety. This has yet to be explored in the extant literature and, more broadly, the literature on how emergent leadership and team dynamics relate remains nascent. This study represents a first step towards developing a program of research in this domain. Moreover, this study will also explore leader emergence in a longitudinal context; this is a critical aspect of understanding leader emergence, as few studies have accounted for temporal influences in self-managed teams (Kalisch & Luria, 2016).

Hypotheses

The following hypotheses are grounded in scientific theory and evidence. Moreover, they will provide insight into the characteristics and behaviors needed for leader emergence within self-managed teams as well as what leads to more effective team behaviors.

**Hypothesis 1:** Teams in which leaders emerge more quickly will develop psychological safety sooner than in teams in which leaders emerge less quickly

**Hypothesis 2:** Teams with emergent leaders having more of a learning orientation will exhibit higher psychological safety than teams with emergent leaders with less of a learning orientation

**Hypothesis 3:** The relationship between an emergent leader’s learning orientation and the team’s psychological safety will be mediated by the leader’s feedback-seeking behavior

**Hypothesis 4:** Teams with emergent leaders having more of a learning orientation will exhibit higher performance than teams with emergent leaders with less of a learning orientation

**Method**

**Sample**

The participants were Rice University senior-level engineering undergraduate students. The engineering department at Rice University encourages project-based learning in team settings, consistent with the professional practice of engineering (Borrego et al., 2013). Specifically, the Oshman Engineering Design Kitchen (OEDK), a Rice University initiative, develops engineering students by allowing them to prototype and implement solutions for real-world engineering problems generated by industry partners. Teams are paired with an industry client (e.g., Shell, Texas Children’s Hospital) and teams work with them over the course of the semester to design a prototype to meet their specific requests. The students work in self-managed and autonomous teams with no formally appointed leader over a year long project.

Participants were recruited at the beginning of the fall semester (August 2017 – December 2017). Data was collected from the first semester at three time points. Specifically, the first survey was administered during the first week of class in August; the second survey was administered in October; the third survey was administered in a window of time spanning late November to early December. Participation was voluntary. If all surveys were completed, participants were compensated with either a $50 Amazon gift card or $50 in cash, depending upon their preference. Moreover, if all members on the team participated they were entered into
a raffle to win an additional $50 Amazon gift card or $50 in cash; twelve teams in total were selected to receive the additional $50 for each member of the team.  

Of 156 potential participants, a total of 143 participants nested within 26 teams responded to the survey at Time 1. At Time 2, 139 participants completed the survey; at Time 3, 130 participants completed the survey. This indicates a participant retention rate of 90% and an overall response rate of 83%. Although there was not a 100% response rate from each participating team, the lowest response rate consisted of 33% of members. In all other cases, at least 67% of the team provided a response for each survey. The average team response rate was 87%. The team response rate range is consistent with previously accepted cutoffs (van Mierlo, Vermunt, & Rutte, 2009). Teams ranged in size from 3 to 10 participants, with an average of 5.6 ($SD = 1.17$) members.

The participants who responded to each survey ranged in age from 19 to 24 years ($M = 21.1, SD = 0.62$). The sample included 91 males (70%) and 39 females (30%). Moreover, 50.8% of participants were Caucasian ($N = 66$), 36.9% of the sample was Asian ($N = 48$), 3.1% African American ($N = 4$), 0.8% American Indian or Alaskan Native ($N = 1$), and 8.5% indicated ($N = 11$) “other.” Regarding nationality, the majority of participants were American ($N = 107, 82.3$%). Additional participants reported Chinese ($N = 10, 7.7$%), Malaysian ($N = 2, 1.5$%), Singaporean ($N = 1, 0.8$%), Canadian ($N = 2, 1.5$%), Korean ($N = 1, 0.8$%), Mexican ($N = 1, 0.8$%), Puerto Rican ($N = 1, 0.8$%), Saudi Arabian ($N = 1, 0.8$%), Taiwanese ($N = 1, 0.8$%), and Thai ($N = 1, 0.8$%) citizenship. An additional two (1.5%) participants reported dual citizenship (American and Mexican; American and Canadian, respectively).

**Procedure**

A longitudinal, survey-based approach was used to address the proposed research. Data was collected at three time points. Measures pertaining to demographics, personality traits, and learning orientation were administered at Time 1. All other measures (i.e., leader emergence, psychological safety, information sharing behavior, feedback seeking behavior, and self-report perceptions of performance) were collected at Time 2 and Time 3. Surveys were provided online and could be taken at any time within a week of survey launch through an online survey database (Qualtrics). Informed consent was required before participants could complete each survey.

**Measures**

All measures are presented in Table 1

**Table 1**

<table>
<thead>
<tr>
<th>Measures Used in Study</th>
<th>Time Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Measure</strong></td>
</tr>
<tr>
<td>Learning Orientation</td>
<td>A measure adapted from VandeWalle’s (1997) measure by Bunderson and Sutcliffe (2002)</td>
</tr>
<tr>
<td>Five-factor Model of Personality</td>
<td>International Personality Item Pool (IPIP) Big-Five factor markers (Goldberg, 2001)</td>
</tr>
</tbody>
</table>
Feedback-seeking behaviors | Round-robin (i.e., each team member evaluates his or herself and independently assesses every other member of the team) feedback-seeking behavior measure (Vandewalle, Ganesan, Challagalla, & Brown, 2000) | II (α = .95) III (α = .95)

Leader Emergence | Round-robin measure of leader emergence (Kent & Moss, 1990) | II (α = .97) III (α = .98)

Leader Performance | Round-robin measure of leader effectiveness measure (Johnson, Murphy, Zewdie, & Reichard, 2008) | II (α = .93), III (α = .94)

Team Performance | Self-report evaluation of performance (Hackman, 1987) | II (α = .73), III (α = .75)

Psychological Safety | A measure created by Edmondson (1999) | II (α = .65), III (α = .74)

Results

Hypothesis 1

Hypothesis 1 suggested that the rate at which a leader emerges will predict initial levels of psychological safety. To test this claim, I assessed the relationship between the initial level of leader emergence (i.e., the extent to which other members of the team perceived the most highly rated individual as the leader) and psychological safety at both time points. I included the team’s composite score for each personality trait within this model to control for the possibility these would influence psychological safety. There was not a significant correlation between initial level of leader emergence and initial psychological safety ($r = -.06$, $p < .05$) or later psychological safety ($r = .15$, $p < .05$). Moreover, I regressed initial levels of psychological safety, and then final psychological safety, onto all relevant hypothesized independent variables. I included familiarity within this model to control for the possibility that familiarity explains the team’s level of psychological safety. The leader’s initial level of agreed-upon emergence was not a significant predictor of initial psychological safety ($\beta = 0.03$, $p = .92$). Therefore, Hypothesis 1 was not supported.

Hypothesis 2

Hypothesis 2 predicted that the perceived leader’s learning orientation would predict the team’s level of psychological safety. However, the leader’s learning orientation was not significantly correlated with initial ($r = .15$, $p > .05$) or final ($r = -.25$, $p > .05$) psychological safety. Contrary to the hypothesis, however, the leader’s learning orientation was not associated with initial psychological safety ($\beta = 0.10$, $p = .65$) and was negatively and significantly associated ($\beta = -0.36$, $p < .05$; see Table 3) with final psychological safety when examined with regression.

Hypothesis 3

Hypothesis 3 argued that the relationship between an emergent leader’s learning orientation and the team’s psychological safety would be mediated by the leader’s feedback-seeking behavior. However, as there was no evidence for a relationship between the learning
orientation of the leader and initial \( r = -0.16, p = .45 \) or final feedback-seeking behavior \( r = -0.07, p = .72 \), this suggests there is no mediating effect. Therefore, Hypothesis 3 was not supported.

**Hypothesis 4**

Hypothesis 4 suggested that a leader’s learning orientation would predict team performance. However, the leader’s learning orientation was not significantly correlated with initial \( r = 0.05, p > .05 \) or final \( r = -0.06, p > .05 \) team performance. Thus, Hypothesis 4 was not supported.

**Exploratory Analyses**

The present results indicate that a leader’s learning orientation does not positively impact team psychological safety or team performance as predicted. However, as noted throughout, the leader is argued to play an integral role in facilitating and contributing to the development of various team climates such as psychological safety. In accordance with this theory, I examined additional characteristics and behaviors of the leader that may have impacted psychological safety to provide more insight into how this critical team state can be developed.

**Leader Impact on Team Outcomes.** To determine if the leader personality influenced the experiences of the team, I first assessed the correlations between the various personality traits of the leader and team outcomes. The correlations between the majority of the big five traits (i.e., agreeableness, extraversion, conscientiousness, and emotional stability) and learning orientation and the team outcomes were not significant. However, leader effectiveness emerged as a significant predictor of several team outcomes. Leadership effectiveness at the final time point led to greater final performance \( r = 0.54, p < .01 \) and psychological safety \( r = 0.48, p < .05 \). None of the leader predictors (i.e., effectiveness, feedback-seeking behavior, leader’s learning orientation) were significant predictors of initial psychological safety. However, final feedback-seeking \( \beta = 0.45, p < .05 \) and leader effectiveness \( \beta = 0.22, p < .05 \) led to a higher level of final psychological safety, suggesting the leader’s behavior is important later in a team’s life cycle. Finally, a linear regression model confirmed that final leader effectiveness was significantly related to final performance even after controlling for initial performance \( \beta = 0.39, p < .05 \).

**Emergence.** Interestingly, the majority of the big five traits were not significantly correlated with leader emergence at Time 1. However, learning orientation \( r = .27, p < .001 \) and feedback-seeking behavior \( r = .61, p < .001 \) were both significantly correlated with leader emergence at the initial time point. Entering these variables into a hierarchical linear model revealed the same pattern of findings. Both learning orientation \( \beta = .21, p < .005 \) and initial feedback-seeking behavior \( \beta = .72, p < .001 \), when accounting for all variables, were positively associated with initial emergence. Moreover, extraversion was also a significant, positive predictor \( \beta = .15, p < .05 \). Notably, gender had no effect on leadership emergence, suggesting that a female was equally as likely to emerge as a leader than a male.

At the final time point, learning orientation continued to be significantly correlated with leader emergence \( r = .22, p < .05 \) and final feedback-seeking behavior \( r = .66, p < .01 \). This same pattern of results was found when leader emergence was regressed onto all personality and behavioral characteristics, with learning orientation \( \beta = 0.10, p < .05 \) and final feedback-seeking behavior \( \beta = 0.72, p < .001 \) remaining significant. Initial emergence also predicted later
emergence ($\beta = 0.83, p < .001$). Gender continued to remain non-significant in predicting emergence.

**Effectiveness.** In terms of initial leader effectiveness, learning orientation ($r = .28, p < .01$) and initial feedback-seeking behavior ($r = .57, p < .01$) were positively and significantly correlated. However, only initial feedback-seeking behavior remained significant ($\beta = 0.67, p < .001$) when all other independent variables were accounted for within a hierarchical linear model. Finally, I examined the impact of leader personality and feedback-seeking behavior on final leader effectiveness. Learning orientation ($r = .26, p < .01$), final feedback-seeking behavior ($r = .60, p < .01$), and initial effectiveness ($r = .76, p < .01$) were all positively correlated with final leader effectiveness. Conducting a hierarchical linear regression revealed that final feedback-seeking behavior ($\beta = 0.35, p < .001$) and initial effectiveness ($\beta = 0.54, p < .001$) were positively and significantly associated with final leader effectiveness.

**Discussion**

The goal of this effort was to identify the behaviors and traits that led to leader emergence as well as the emergent leader behaviors needed for effective teamwork. I discuss the findings for each of these primary inquiries below.

**Emergent Leadership**

The current findings indicate the traits and behaviors that predict leadership emergence. Previous work suggests more extraverted team members are more likely to be recognized as leaders within the context of a self-managed groups without a formally appointed leader (Campbell, Simpson, Stewart, & Manning, 2003; Cogliser et al., 2012). Extraverted individuals have a high degree of social dominance which signifies to other team members that they can lead the team to goal achievement (Taggar et al., 1999). The present findings mirror these results, indicating that extraverted individuals are more likely to initially emerge as leaders. However, this trait was not a significant predictor of final leader emergence. This finding may be explained by the idea that extraversion is more visible than other personality traits (Barrick, Patton, & Haugland, 2000). These results mirror this notion; extraversion is the most predictive at the initial time point but is not significant once the team has had a longer time to assess the respective personalities of their team members.

Interestingly, in spite of its unexpected negative influence on final psychological safety, learning orientation positively predicted leader emergence at both time points. Individuals with a learning orientation may emerge as a leader because they are invested in learning (VandeWalle et al., 1999). In a task-based setting such as the one studied within this effort, where the task is unstructured and difficult, the risk of failure may discourage individuals from taking a leadership role. Individuals with a learning orientation, however, perceive the risk of failure as acceptable in pursuit of learning. They may thus be more inclined to take the lead, disregarding the risk of failure where others are too afraid of failure to take responsibility for the task. This may lead to the emergence of these individuals as leaders but may also, as noted above, lead to negative consequences for interpersonal team climates such as psychological safety.

Feedback-seeking behavior was also related to emergence at both time points. This behavior, performance monitoring behavior, is a central behavior associated with leadership (Fleishman et al., 1991). Engaging in behaviors associated with leaders may, unsurprisingly, evoke perceptions of that individual as being a leader. Moreover, although leadership may
change over time, in this context initial emergence was strongly predictive of later emergence. I further note that this same pattern of results was generally observed for effective leadership. Effective leaders were found to engage in feedback-seeking behavior which is consistent with previous theory and research, as monitoring would enable leaders to pinpoint deficiencies in performance (Salas et al., 2005).

**Emergent Leadership and Teamwork**

Although learning orientation was positively related to psychological safety in previous work at the individual (Chiu, Leung, Kong, & Lee, 2011) and group level (Wilkens & London, 2006), the current results suggest that the leader’s learning orientation has a negative effect. This runs contrary to theory. Although a team’s level of learning orientation was positively and significantly associated with initial psychological safety ($r = .44, p < .05$) and was not significantly associated with final psychological safety ($r = -.12, p > .05$), the leader appears to have a distinct and opposite effect. Moreover, the influence of the leader’s learning orientation on psychological safety appears to have a more distal effect than the influence of the team’s learning orientation on psychological safety, taking more time to manifest.

In addition to having a negative influence on psychological safety, a leader’s learning orientation was also negatively correlated with additional outcomes (i.e., leader effectiveness and feedback-seeking behavior). The direction of these relationships is also contrary to theory. Due to these findings, I suggest that the negative influence of the emergent leader’s learning orientation may be explained by the context of this study. The teams included in the present effort were self-managed and very autonomous, responsible for coordinating with clients and modeling their prototype to meet the demands. In other words, these teams worked in a largely unstructured environment. An individual with a learning orientation is interested in learning, willing to take risks to learn, and accepts failure as a component of learning. Relatedly, it is important to distinguish between interpersonal risks (associated with psychological safety) and what might be considered task risks (associated with a learning orientation). Interpersonal risks are those such as suggesting an idea that may not be feasible. Engaging in this behavior, suggesting such an idea, provides the team with an opportunity to discuss the potential of the idea and how to execute it. It also allows the team to determine whether executing this idea will benefit performance. Conversely, an individual engaging in task risks may not necessarily have the benefit of the opinion of the rest of the team and may proceed to execute the idea without first considering whether it is an appropriate course of action, because they have accepted failure as an acceptable outcome. In this environment, the leader taking task risks may negatively affect task performance and signify to the team that such risks are unacceptable. Moreover, this behavior may suggest that the leader is more interested in experimenting individually than helping the team to succeed, ultimately leading to diminished psychological safety.

Finally, the results further indicate that leader effectiveness is important for final psychological safety, as feedback-seeking behavior. I suggest that leader effectiveness may signify to the team that the leader is both invested in the team succeeding and supports the team. This perception of leader support may lead to the additional perception that the team is a safe environment, promoting psychological safety. Feedback-seeking behavior may serve a similar role. As noted, the leader is particularly influential in shaping group dynamics. This appears to
be the case in self-managed teams as well, and feedback-seeking behavior appears to show that open conversation about negative and positive aspects of performance indicate a psychologically safe environment. Moreover, leadership behavior only appears to matter after some time has elapsed, perhaps because the demands of the task become more challenging towards the end of the semester.

Practical Implications

There are several important practical implications associated with the present findings. Specifically, effective leadership and feedback-seeking behavior both emerged as significant leadership predictors of psychological safety. As in the case of teams with formally appointed leaders, leadership also appears to play an integral role in self-managed teams. In other words, leadership remains critical for team success even when leadership is in the form of an emergent leader with no official authority. Thus, in industries where it is common to place teams in self-managed structures, ensuring the recognized leader is engaging in effective leadership behaviors (such as feedback-seeking behavior) and is perceived as an effective leader by the rest of the team is critical for both psychological safety and team performance.

Finally, it appears individuals with a learning orientation are likely to emerge as leaders. This phenomenon may have one negative, unforeseen consequence in an unstructured environment such as the one studied here: it may negatively influence psychological safety. Although it is unclear why the level of a leader’s learning orientation is negatively related to psychological safety, it is important to ensure that in teams where such an individual is perceived as a leader he or she engages in behaviors that promote, rather than decrease, psychological safety.

Best Practices for Effective, Emergent Leadership

Best practices were developed to summarize the practical implications associated with this study and provide helpful insight to individuals wishing to gain leadership experience in self-managed teams. The scientific literature on emergent leadership and teamwork was referenced to develop an initial set of best practices. Findings from this study were further used to refine and add to the best practices. Finally, an informal, roundtable meeting with undergraduate students was held to solicit feedback on the initial set of best practices. The students discussed their experiences in self-managed teams in undergraduate classes and described common problems. They also reviewed the initial set of guidelines and offered suggestions regarding how to make the guidelines more intuitive and relevant for students. The final best practices are presented in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Best Practices for Effective, Emergent Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Be assertive (yet respectful); more extraverted and socially dominant team members are recognized as leaders early on.</td>
</tr>
<tr>
<td>2. Seek feedback from your teammates about task performance; this will lead to recognition as a leader and to more effective teamwork.</td>
</tr>
</tbody>
</table>
3. Establish the group norm of speaking up and offering ideas freely; this promotes psychological safety and encourages other team members to act similarly, especially when this behavior is demonstrated by the perceived leader.

4. Set deadlines and goals; this behavior helps the team stay on track to achieve their goals but will also lead to recognition as a leader.

5. Manage your interest in the task and/or learning so that it does not interfere with team comfort; make sure everyone is on the same page before making executive decisions or experimenting with different approaches to the task.

6. Establish leadership norms early on; leadership responsibilities can be shared or tackled primarily by one person, but determine how this will be handled early on.

7. Address conflict as soon as it arises; schedule meetings with team members to discuss any misunderstandings or problems before they negatively impact teamwork.

8. Maintain regular, clear team communication; keep your team members updated about any changes and schedule reoccurring meetings to make sure everyone is on the same page.

9. Be prepared for changes in leadership; as task demands shift over time, leadership may also shift. Discuss these changes with team members so everyone is on the same page and understands who is doing what.

10. Ask team members to share their ideas; to foster psychological safety, encourage team members to speak up. Do not immediately dismiss or ridicule their ideas, instead offer helpful feedback to develop their ideas further.
References


