Leadership emergence in face-to-face and virtual teams: A multi-level model with agent-based simulations, quasi-experimental and experimental tests

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ABSTRACT

With leadership as a major predictor of team performance in both face-to-face and virtual teams, research on differences in leadership emergence in these contexts seems warranted. We offer a multi-level model analyzing the roles of degree of team virtuality and density of social network ties as boundary conditions on leadership emergence, viewed as a fundamentally social–cognitive process. Using agent-based modeling and simulations, our results suggest that virtuality moderates the relationships between cognitive ability, extraversion, and self-efficacy (as independent variables) and leadership emergence (as dependent variable); and density of network ties serves as a moderator for the associations of cognitive ability and self-efficacy with leadership emergence. Subsequent quasi-experimental and experimental tests support the role of density of network ties as a moderator for the association of extraversion with leadership emergence. Implications of these findings and future paths for research bridging the fields of leadership, team virtuality and social networks are discussed.

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Introduction

Organizations of today are characterized by increased dynamism and complexity. The competitive challenges that have appeared as a result of these conditions have made organizations consider alternatives to traditional work environments and face-to-face teams. As a result, research interest in virtual (or non-co-located) teams has grown exponentially (Avolio, Kahai, Dumdum, & London, 2001; Avolio, Sosik, Kahai, & Baker, 2014). Although the tasks, goals, or mission they are designed to accomplish can be similar to those of conventional teams, the way virtual teams go about accomplishing their tasks and the constraints they face along the way are essentially different. In this context, leadership characteristics, behavior, and tactics will need to be reconsidered, as some can become more relevant than in the traditional context and would need to be scaled up, while others would need to be toned down (Kahai, 2012).

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Leadership can be viewed as a combination of skills and knowledge structures (including cognitive abilities, cognitions, and meta-cognitions) that contribute to performance (e.g., Fleishman et al., 1991; Mumford, Antes, Caughron, & Friedrich, 2008; Mumford, Friedrich, Caughron, & Byrne, 2007; Zaccaro, Gilbert, Thor, & Mumford, 1991). However, the development of these depends on a set of abilities, motives and personality characteristics (Mumford, Zaccaro, Connelly, & Marks, 2000; Mumford et al., 2007; Zaccaro et al., 1991). A significant base of studies has indicated a relationship between leader attributes, such as general cognitive ability, or personality and performance. For the purpose of this study, however, we focus on the relationship between a combination of skills and knowledge structures of individual team members and their relationship with leadership emergence.

Joshi, Lazarova, and Liao (2009) suggest that technology-enabled and geographically dispersed settings provide exciting opportunities for extending theory and research on leadership in teams. Avolio et al. (2001) have also suggested that when analyzing an organization's shift towards the use of virtual teams, their impact on organizational processes and outcomes must be understood. Researchers must identify how leadership and technology interact to influence performance antecedents and determine whether the emergence of leadership parallels what has been found in face-to-face settings (Avolio et al., 2014).

Virtual teams can often be created without a formally designated leader, and since there are many different roles to fill, more than one leader can emerge (Wickham & Walther, 2009). Research suggests that different personal characteristics may make a leader emerge in face-to-face versus virtual teams. Based on a review of the literature on teams in general and virtual teams in particular, four major variables have been selected that can render a potentially significant contribution to leadership emergence in both team types—cognitive ability, personality, self-efficacy, and comfort with technology—and have been integrated into a multi-level model of leadership emergence.

Research has also suggested that synergy between leadership studies and social network approaches is essential and would be extremely beneficial for both literatures (Balkundi & Kilduff, 2006). Through networks, entities gain information, exercise influence, and look for social support (Kilduff & Tsai, 2003). Studies suggest that informal leaders can be just as powerful as formal ones and can alter organizational functioning through their emergent social network structures and the exercise of social influence (Balkundi & Kilduff, 2006). Because reviews of social network research reveal little empirical work on leadership and social networks (Brass, Galaskiewicz, Greve, & Tsai, 2004), we address this issue by analyzing leadership emergence in teams, in relation to the density of network ties that develop as team members engage in project-oriented teamwork (see Fig. 1).

As such, the current research contributes to the literature in three key ways: (1) bridging the fields of leadership, social networks and virtual teams to build a multi-level model of leadership emergence, (2) providing a rigorous test of the model by means of multiple methods and research designs (an agent-based computational model simulation, a quasi-experimental study and a laboratory experiment), and (3) assessing the convergence among the tests to enhance our understanding of leadership emergence.

Conceptualization and hypotheses development

Leadership emergence

Leadership emergence can be defined as a fundamentally social–cognitive process (Lord & Maher, 1990; Mumford et al., 2008), as well as the result of followers' perceptions of how well the leader fits their idealized image of the prototypical leader (Gershenoff, 2003; Hogan, Curphy, & Hogan, 1994). The information-processing theories of leadership categorization (Lord, Foti, & Phillips, 1982) suggest that leadership is an outcome of traits associated with, behaviors displayed, and outcomes produced by the leader,
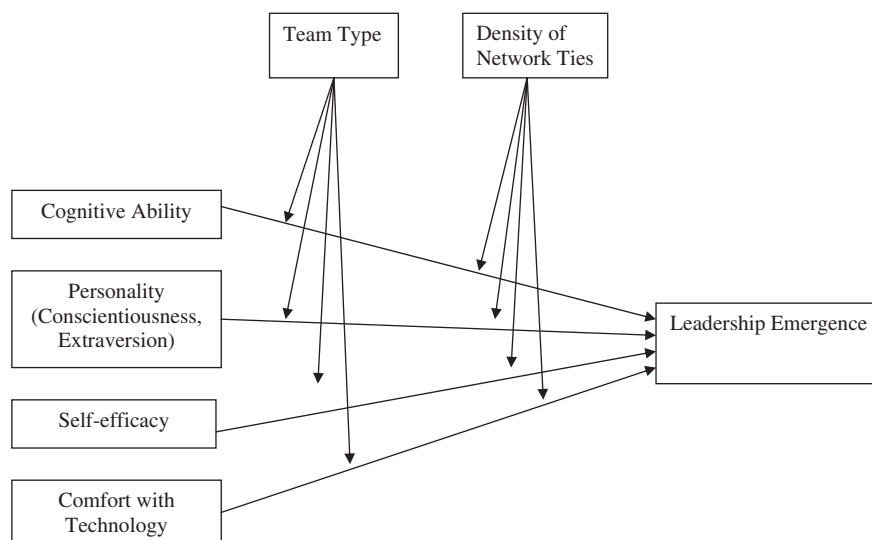

Fig. 1. A multi-level model of leadership emergence in face-to-face and virtual teams.