

PUTTING EMERGENCE BACK

Putting emergence back in leadership emergence: A dynamic, multilevel, process-oriented framework.

Bryan P. Acton¹, Roseanne J. Foti¹, Robert G. Lord², & Jessica A. Gladfelter¹

1 Virginia Tech, United States

2 Durham University, United Kingdom

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Author Note

Correspondence concerning this article should be addressed to Bryan P. Acton, Department of Psychology, Virginia Tech, *Email address:* bacton@vt.edu.

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Abstract

The study of leadership emergence has increased substantially over the past few decades. However, due to a lack of integrative theory, we believe limited advancement has been made regarding the *full process* of leadership emergence. To address this concern, first, we conceptualize the leadership emergence process from a complexity perspective and define emergence as a dynamic, interactive process grounded in three principles of emergent phenomena. Second, we review how previous research has modeled leadership emergence by focusing on the content areas of the lower-level elements, the mechanisms that facilitate their emergence, and the dynamism of the process once it has emerged. Third, based on the findings from the review, we introduce a process-oriented framework of leadership emergence. Fourth, we offer propositions to guide developing and testing emergent leadership processes, and we conclude with recommendations for future leadership process research. Our hope is that by realigning the study of leadership emergence with complexity and multilevel theory, we can reorient this area to focusing more on the process mechanisms within emergence, connecting back to research progress made over 60 years ago.

Keywords: Leadership emergence; Leadership theory; Multilevel theory; Emergence; Theory integration.

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Introduction

After reviewing leadership trends for the past 100 years, Lord, Day, Zaccaro, Avolio and Eagly (2017) identified several directions for leadership research in the future. They predicted that leadership will be more multidisciplinary, will emphasize the co-production of leadership by multiple individuals, and will have an emergent and shared nature. Thus, the *process* of leadership, specifically frameworks for explaining interactional dynamics, will be particularly important to the future of leadership. Such dynamics have been acknowledged by a variety of leadership theories, including shared leadership (Pearce & Sims, 2002), collective leadership (Hiller, Day, & Vance, 2006), distributed leadership (Day, Gronn, & Salas, 2004), team leadership (Morgeson, DeRue, & Karam, 2010; Zaccaro, Rittman, & Marks, 2001) and relational leadership (Uhl-Bien, 2006). Consistent with the growing emphasis on short-lived, self-managed groups in which leadership is not ascribed but rather emerges informally (Morgeson et al., 2010), we focus on *leadership emergence* – the process by which individuals become influential in the perceptions of others (Lord & Maher, 1990; Schneider & Goktepe, 1983; Taggar, Hackett, & Saha, 1999). Understanding the fine-grained cognitive and social dynamics by which leaders emerge in informal group settings is an important piece of the leadership puzzle that can offer us unique insights into the drivers of leader and follower cognitions and actions.

In the traditional leadership emergence research paradigm, “group participants might be measured on a number of traits that could possibly be related to leadership behaviors. Members of the group then interact while carrying out a task. Then magic happens and a leader emerges from the group at the end of the discussion period” (Guastello, 2007, p. 357). Thus, leadership

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emergence is an outcome of an unmeasured magical process, which we hope to demystify.

Moreover, this leader-focused perspective does not follow from the current view of leadership as a mutual social influence process. Leadership emergence does not reside in a person but rather in an interactive dynamic, within which any particular person will participate as a leader or a follower at different times and for different purposes. Accordingly, we advance the study of leadership emergence by conceptualizing emergence from a multilevel theory and complexity science perspective (Kozlowski & Klein, 2000; Lichtenstein & Plowman, 2009; Morgeson & Hofmann, 1999; Sawyer, 2001) for the purposes of developing a process oriented perspective of leadership emergence. In a process perspective, the space between individuals (Uhl-Bien & Ospina, 2012), developments over time (Day & Thornton, 2018), double interacts (DeRue, 2011), and aggregation to group levels (Dinh et al., 2014) are as important as the linkages between individuals.

When studying emergent phenomena such as leadership emergence, researchers typically study the outcome of the process. In the case of leadership emergence, this involves studying who emerged as a leader in a group. For example, measuring perceptions of who emerged as a leader using questionnaires measures the outcome of the leadership process. However, by using multilevel theory (e.g. Kozlowski & Klein, 2000) to represent leadership emergence, it becomes clear that if we want to understand the magic, we need to focus on the underlying process of emergence. That is, the actual mechanisms of an emergent phenomenon. In terms of leadership emergence, this involves studying how the process occurs—through the self-reinforcing micro-level interactions that occur within and are conditioned by a higher-level unit over time (Kozlowski & Klein, 2000). In this view, leadership emergence is more than a trait, an exchange,

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or a symbol – leadership *emerges through* dynamic interactions (Lichtenstein, Uhl-Bien, Marion, Seers, Orton, & Schreiber, 2006) at multiple levels.

In 1953, Bales proposed that the leadership emergence process begins with a group member making proactive statements to facilitate accomplishment of the group task. If this member was encouraged, or at least not given negative feedback, then this member would continue to make statements, building upon the initial suggestions. Other group members begin to expect further effective behavior from this member, and these expectations raise the status of that group member and thus his or her leadership position in the group (Bales, 1953). Bales used 12 categories of behavior to investigate how the process of group decision-making arose from the interactions of group members. He found that group interactions tended to move from a relative emphasis upon problems of orientation, to problems of evaluation, and subsequently to problems of control, and concurrent with these transitions, the relative frequencies of both negative reactions and positive reactions tend to increase. While Bales does not refer to the decision-making process as an emergent process, his work can be considered a study of emergence because he examines dynamic interactions (e.g., verbal interactions) *of all group members* as they unfold over time to produce a group decision. Moreover, in his later writing, Bales stated, “it is clear that from the first, I was a believer in some kind of theory of dynamic non-linear systems” (Bales, 1999, p. 164).

As such, this early work captures three crucial components of emergence described by researchers *60 years later* (Kozlowski, Chao, Grand, Braun, & Kuljanin, 2013). The first component is that emergence is multilevel, composed of individual units (i.e., group members) who together form larger collectives (i.e., small groups). Second, it includes the mechanisms that underlie the dynamic interactions of the process (i.e., sharing information). Third, it captures

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temporal dynamics, or the notion that emergence takes time to move through problem phases.

This early work reflects the inherently multilevel and dynamical nature of group processes. Most importantly, it includes a crucial element largely lacking in theories of leadership emergence: “a narrative theory of what individuals do, think, feel and so forth that gives rise to a higher-level outcome” (Grand, Braun, Kuljanin, Kozlowski, & Chao, 2016, p. 2).

Our review has two overarching contributions. First, we heed the call of previous reviews to, “develop integrative perspectives that consider how disparate leadership theories relate or operate simultaneously to influence the emergence of leadership phenomena” (Dinh et al., 2014, p. 55). Second, as noted by Kozlowski et al. (2013), “the extent that emergence is shown any attention at all in such research, it is indirect with respect to models of measurement and data aggregation for representing higher order constructs” (p. 600). By developing an integrative framework of leadership emergence, we specify the underlying theoretical rationale for how the elements at the lower level interact to create a social structure at the higher level. Moreover, we depict social structure as not just existing at a surface level in terms of functional behaviors of leaders, but in terms of deeper constructs such as roles and identities as they develop over time.

The remainder of our review has four sections. First, to organize the review we conceptualize the leadership emergence process from a complexity perspective and define emergence as a dynamic, interactive process. In doing so, we introduce three principles of emergent phenomena which are derived from previous works on multilevel theory (Klein & Kozlowski, 2000; Kozlowski & Klein, 2000; Kozlowski et al., 2013). Second, we review how previous research has modeled leadership emergence by focusing on the content areas of the lower-level elements, the mechanisms that facilitate their emergence, and the dynamism of the process once it has emerged. Third, based on the findings from the review, we develop a process-

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oriented framework of leadership emergence that builds on prior work (e.g., DeRue, 2011) and extends it to a deeper level. Fourth, we offer suggestions to guide developing and testing emergent leadership processes, and we conclude with recommendations for future leadership process research.

Emergence Theory

The relationship between the individual and the collective is a fundamental one. The notion of emergence has a long history with roots in the philosophy of science, biology, physics, sociology, and more recently, it has been integrated with complexity theory (see Sawyer, 2001 and Kozlowski et al., 2013 for reviews). New research on chaos (Guastello, 2007), self-organization (Vallacher, van geert, & Nowak, 2015), adaptive systems (Grossberg, 2013), nonlinear dynamics (Newell & Molenar, 2014), and artificial life (Olson, Knoester, & Adami, 2016) are all part of this growing interest in complex systems. The interest has spread from the scientific community to popular culture, with the publication of general interest books about research into complex systems (Holland, 1995, 1998).

According to the philosopher David Blitz (1992), the term ‘emergent’ was coined by the pioneer psychologist G. H. Lewes (1874). Emergence is one of the most ubiquitous processes, and yet one of the least understood. This has resulted in many different perspectives and definitions of emergence. Recently, Goldstein (1999, 2000) identified six properties of emergent phenomena across disciplines: qualitative novelty (features not previously observed at the micro level), coherence (integrated wholes that maintain identity over time), global/macro level (locus of the phenomena at a higher level), dynamic (new attractors arise over time), ostensive (recognizable phenomena), and supervenience (the asymmetrical relation between two levels). In complex systems, self-organization is the process through which order in the form of new

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structures arises from disorder and entropy at lower levels. According to Hirsh, Mar, and Peterson (2012), if the environment changes to produce greater entropy for a system thus challenging its structural coherence, then that system must adopt new patterns of self-organization that are capable of accommodating the environmental changes. Emergent phenomena are the self-generated novel structures that confer adaptability to complex systems. Thus, from an emergence perspective, we define leadership emergence *as the multilevel interactional process driven by deep level cognitive and perceptual processes of group members that form a collective patterning of leader and follower interactions over time.*

In the area of social emergence, Sawyer (2001) contrasts two emergence paradigms, similar to Bedau's (1997) notion of strong vs. weak emergence. The first paradigm is collective emergence, which holds that group behavior is constituted by individual action, yet cannot be reduced to the individual level. This holistic view of emergence argues that emergent phenomena result in qualitative changes that are different from, and irreducible to, their parts. This conceptualization is consistent with emergence principles in philosophy (Epstein, 1999), sociology (Durkheim, 1895, 1964), and physics (Anderson, 1972), as well General Systems Theory (von Bertalanffy, 1956, 1968).

The second paradigm is individualist emergence, which accepts the existence of emergent phenomena; however, the emergent outcome can always be reduced to individuals and their relationships (Russell, 1927). This conceptualization is consistent with how social properties emerge from individual action (Axelrod, 1997; Homans, 1958). Classic examples of this second conceptualization of emergence include traffic jams (Wilensky & Resnick, 1999) and bird flocks (Reynolds, 1987). For example, the bird flock emerges out of three simple interaction rules followed by individual birds: (1) avoid collisions, (2) match speeds with your neighbors, and (3)

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move towards the center of mass of your neighbors. No central director or leader is needed. The flocking is emergent because it is not caused by any one bird but by all the birds interacting together; the formation in the flocking is made up of all the birds but “transcends” them as well. Both conceptualizations of emergence agree on the importance of analyzing processes of emergence through time. Importantly, Corning (2012) reconciles these two positions by positing that reductionism, or detailed analysis of the parts and their interactions, is essential for answering the “how” question; whereas, holism is equally necessary for answering the “why” question. In order to answer the “why” question, a broader, multileveled paradigm is required.

Thus, the notion of levels is central to understanding the emergent phenomena. As noted by Kozlowski et al. (2013), “the goal is to understand the process of emergence through system dynamics across multiple levels – simultaneously” (p. 585). Similarly, leadership research highlights the multilevel nature of the construct (DeRue, 2011; Lord & Dinh, 2014). We use Wiley’s (1988) notion of four levels of subjectivity to bridge the micro to the macro level and to deduce the process mechanisms inherent in micro-level dynamics that yield the higher level phenomenon. Wiley’s four levels of subjectivity allow a better understanding and appreciation of the fundamentally interactive nature of leadership emergence through an emphasis on the importance of interaction, structure, and context. The different levels discussed by Wiley are: (1) intrasubjective (individual), (2) intersubjective (interactive), (3) generic subjective (social) and (4) extrasubjective (macroculture).

The first level, intrasubjective, is concerned with the constantly emerging nature of the self. At this level, characteristics of the individual are expected to vary systematically within person, across events, or over time, as in the development of a leadership identity. The next level – intersubjective level is primarily one of interaction and concerns the relation and impact of one

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individual to another. Of all the levels involved in leadership, the one arguably most in need of advancement is the dyad, which according to Yammarino and Gooty (2017), is “the most neglected and poorly understood level of analysis in leadership research” (p. 229).” The intersubjective level moves beyond any single individual and is “emergent upon the interchange and synthesis of two, or more, communicating selves” (Wiley 1988, p. 258). At this level, the process as well as the substance of leadership sensemaking is shaped during interactions. As Wiley notes, however, the intersubjective level is often neglected in social theory, yet seems essential to describe powerful influences on sensegiving and sensemaking essential to leadership emergence. The level above interaction is that of social structure. Generic subjective focuses on the demands, constraints, and objectives placed on the individual as a function of the immediate social setting. The generic subjective occurs as concrete selves are left behind and the understanding is seen as “a reified social structure, including interaction patterns, role relationships, common purpose, and taken-for-granted beliefs” (Ashforth, Rogers, & Corley, 2011, p. 1146) which often reflect a group identity (Van Knippenberg, 2018). Finally, the most abstract level is the extrasubjective level of culture. At this level, focus shifts from the subjective experiences of individuals to pure meaning, which is an abstract idealized reality.

We believe the study of emergent leadership phenomena is ripe for further exploration using the insights of complexity perspectives on emergence and Wiley’s idea of the leveled character of social reality. Given that emergent phenomena are multilevel and process-oriented, we use both of these perspectives to introduce three emergence principles, which served as foci for our review of the leadership emergence literature. To be clear, these principles are not new and are largely derived from previous works within multilevel theory (Kozlowski & Klein, 2000), which have been used primarily to further the study of group/team dynamics. In relying on

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these works, we first identify the individual-level elements at which leadership emergence is thought to originate. The individual level elements are analogous to Wiley's conceptualization of the self. Then we identify the process mechanisms by which the individual elements are integrated, bridging Wiley's levels of intersubjective and generic subjective. Finally, Kozlowski et al. (2013) also discuss the importance of addressing the potential variation in the emergent outcome over time and we include this aspect as the third principle. As we do this, we pay particular attention to deeper levels of emerging structures such as relational and collective identities (Brewer & Gardner, 1996) because they often support more obvious surface structures such as social exchanges (Flynn, 2005) and leadership behavior (Johnson, Venus, Lanaj, Mao, & Chang, 2012).

Finally, it is important to note that, while not explicitly incorporated into these emergence principles, the leadership emergence process is expected to be situated within a greater context of both informal relationships as well as formal organizational structures. As Kozlowski and colleagues (2013) note, "although it is not a core characteristic of emergence per se, contextual factors at the higher-level shape and constrain the process dynamics of emergence" (p. 585). In our review and subsequent integrative framework, we focus on identifying the central principles that drive the bottom-up process of leadership emergence. Accordingly, while not within the aims of this paper, we do acknowledge that these emergence principles are situated within a greater organizational context.

Emergence principle #1: Elemental properties of the emergent process. According to multilevel theory, every emergence process is characterized by its lower-level elements or components. Elements can represent everything from neurons and cognitions to attitudes, behaviors, information, and events, which meaningfully impact the emergence process

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(Kozlowski et al., 2013; Morgeson & Hoffman, 1999; Roberts, Hulin, & Rousseau, 1978; Vallacher et al., 2015). These elemental properties are critical to understanding an emergent process because they serve as the micro-level building blocks to a higher-level outcome (Klein & Kozlowski, 2000). Elemental properties represent the intrasubjective level of Wiley's (1988) theory of levels. Leadership emergence theories that address this component of emergence serve to answer the questions of what elements are relevant to the emergence process, how much of each element impacts the process, and what type of effect it has on the emergence process.

Emergence principle #2: Mechanisms involved in the emergence process. Identifying the elemental properties by themselves only captures the lower-level “ingredients” to the emergence process, but it does not capture *how* and *why* these various elements function together to form the higher-level emergent outcome. According to multilevel theory, in order to have an understanding of the process of emergence, it is necessary to both define what the elemental properties are as well as to define the processes by which they are coordinated (Cronin, Weingart, & Todorova, 2011; Kozlowski & Klein, 2000). Self-organization provides an explanation for the emergence of higher-order patterns as individual elements adjust to one another (Vallacher et al., 2015). Self-organization is rarely a one-step process, but rather typically involves many iterations of mutual adjustment among elements before they are sufficiently organized to promote a system-level property (Hopfield, 1984). Similar to Wiley's (1988) intersubjective level of interaction, the elements are transformed through interaction. In order for a theory to satisfy emergence principle two, specific works must outline the “rules” that determine how the leadership emergence process unfolds. Moreover, mechanisms can occur at various levels (Lichtenstein, 2014), which allows researchers to make links across multiple units of analysis, such that insights from one level might be applied to others.

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Emergence principle #3: Form/function of the emergence outcome. Any emergence process cannot be adequately understood without defining the appropriate form/function of the eventual outcome. Kozlowski and Klein (2000) made a point of emphasizing that emergent outcomes are not fixed, but variable in nature; they often evolve and change. Thus, the third principle is critical in understanding an emergent process because it describes the dynamics of the phenomenon after it has emerged. According to Kozlowski (2015), while emergent phenomena like leadership emergence are often treated as stable once they emerge, they may in fact demonstrate “within-team variability over time, growth trajectories, and/or other types of trajectories (i.e., cycles)” (p. 275). This idea is consistent with Wiley’s (1988) notion that emergence does not just happen once and then stop, as well as Lichtenstein’s (2014) distinction between dynamic states and emergent outcomes. It can also be seen in the notion of leadership functions being spread across group members (Morgeson, DeRue, & Karam, 2010) or across organizations (DeChurch, Burke, Shuffler, Lyons, Doty, & Salas, 2011) and time.

Therefore, when theorizing about an emergent process, it is critical to incorporate these temporal considerations, which involve the emergent outcome after it has emerged. In order for a theory or research to satisfy emergence principle three, it also must describe the changes in the emergent outcome over time. This can include the form of change that the outcome demonstrates (e.g. discrete, non-linear changes), and other temporal characteristics of the outcome (e.g. how quickly changes occur). Kozlowski and colleagues (2013) state that both the emergent process and resulting outcome cannot be fully understood without discussing one another. Accordingly, the elements (principle one), the interactions (principle two) and the dynamics of the emergent outcome (principle three) are all necessary to gain a complete understanding of any emergent property. Overall, by applying these three principles derived from multilevel theory to the study

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of leadership emergence, we argue that important insights can be gained regarding the underlying processes driving leadership emergence.

Systematic Review and Article Mapping

To perform the review, the existing leadership emergence literature was mapped onto the three emergence principles. We first performed an extensive electronic literature search using *Web of Science*. Specifically, we searched for the following terms in the title, abstract, and keywords of articles: “leadership emergence”, “leader emergence”, “emergent leadership”, “emergent leader”, “leadership process”, “leadership dynamics”, “multilevel leadership”, “informal leadership”, “shared leadership”, “distributed leadership”, and “team leadership”, and eliminated any sources not related to psychology or business. Articles from other areas were included if they were deemed to make a unique contribution to understanding the process of leadership and were consistent with the psychology and business literature in their conceptualization of emergence. This original search list included 709 articles. Then, using the references from these articles, we identified and included any additional articles that were not in the initial search if they specifically discussed leadership emergence. Our final sample included articles published between 1941 and 2016.

Next, we applied the following selection criteria. First, articles had to be original research, whether qualitative, quantitative, theoretical, or methodological, thus eliminating works such as letters, editorials, and book chapters. Review articles were only included if they made specific contributions to understanding leadership emergence beyond summarizing what previous works found. Second, we eliminated articles based upon their relevance to leadership emergence. To do so, we first removed articles that did not include information about leadership perceptions or the development of collective leadership as an *outcome*. Finally, any article that was primarily focused on formal leaders, or did not discuss informal leadership, was removed.

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After eliminating articles that did not fit the above criteria, 189 articles remained (a full list of the articles considered and chosen is available upon request).

Mapping Procedure and Categories

Article information. We created a database including year, journal, authors, and the title of the journal article. Additionally, articles were recorded as empirical or conceptual, and within the empirical category, they were recorded as either longitudinal or cross-sectional. To be clear, we relied on a stricter definition of longitudinal, in that articles had to include the leadership emergence outcome for at least three time points, following previous recommendations (Ployhart & Vandenberg, 2010; Singer & Willet, 2003).

Principles. The first and fourth authors mapped articles to the three emergence principles previously described. They reviewed the first 100 articles from the original list together to obtain sufficient evidence of agreement in the article review process, then continued reviewing and mapping the remaining articles independently. After eliminating all non-emergence articles, the remaining 189 were mapped onto the three emergence principles (elements, process mechanisms, and form/function of the emergent outcome) using the criteria described below.

Specifically, an article was identified as fitting *Principle one* if it identified an individual characteristic (i.e. element) that impacts leadership emergence. Specifically, these were person-level properties that were described as having an effect on who emerged as a leader/follower (i.e. not simply a control variable). Consistent with Hollander's (1974) treatment of "leadership elements", we mapped each element as either leader-focused or follower-focused (or both). An article was mapped onto *Principle two* if it described and/or tested the process of leadership emergence. This principle included articles that described the phases or steps leading to leadership emergence and identified the mechanisms which focus on the "how" of leadership

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emergence. In addition, we identified the specific process mechanisms described in each principle two paper (between two and four mechanisms); we then categorized each mechanism across the three primary levels of emergence (individual, relational, or collective). Next, we grouped the process mechanisms identified in all articles into subcategories within each level. Finally, an article was mapped onto *Principle three* if it examined or described the temporal dynamics of leadership emergence over time. This included both the form of change and other characteristics of the outcome over time (e.g. linearity).

Principles were not considered mutually exclusive, as articles could fit multiple principles. For example, Hall, Workman, and Marchioro (1998) investigated both the gender of the leader, as well as the behavioral flexibility and information processing that occurs within the process of informal leadership perceptions; thus, this article was mapped onto both principle one and principle two. Similarly, sub-categories within principles are not necessarily mutually exclusive. For instance, in principle one, articles may have described multiple elements of leader emergence (e.g. personality and gender).

Results of the Systematic Review

Overall, Principle one represented the largest category, containing 139 articles. Principle two contained 47 articles, and Principle three contained 28 articles (see Figure 1).¹ Not surprisingly, there was an increasing trend of publications on leadership emergence over time from 1941 to 2016 (see Figure 1). Articles were mainly empirical (157) as opposed to conceptual. Within the empirical articles, they were mainly cross-sectional (137), as opposed to longitudinal.

¹ This total exceeds 189 because 12 percent of articles were mapped onto more than one principle.

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Principle #1. Of the 139 total articles representing principle one, 95% were empirical, and only 7% of the empirical articles were longitudinal. The overwhelming majority of articles included leader elements (137), with only 11 including follower elements. There were nine articles that contained both follower and leader elements. When categorizing the elements into smaller subcategories (for both follower and leader elements), personality (N=46), gender (N=43), and behavior (N=38) were the three most prevalent elements investigated. Over time, the frequency of behavioral elements was the most consistent across years, with a noticeable proportion between the years of 1950-1979. Additionally, studies which included behavioral elements noticeably increased from 1990 to 1999, decreased from 2000 to 2009, before rising again in recent years. The study of gender as an element increased a large amount from 1980-1999 before remaining stable from 2000 to 2009 and then decreasing from 2010 to 2016. Finally, the frequency of personality as an element increased substantially over the years of 1990-2009 and has remained relatively stable. Overall, the frequency of Principle one articles has increased over time. For a list of the major element subcategories along with the associated findings, see Table 1.

Principle #2. There were a total of 47 articles mapped onto Principle two. Of the Principle two articles, 53% were conceptual, and of the empirical articles, 32% were longitudinal. When examining the level of the emergent process, we found that 21 of the articles included individual-level process mechanisms, 40 included relational-level process mechanisms, and 27 articles included collective-level process mechanisms. Many of the articles discussed the process mechanisms at more than one level, with 16 articles at the individual and relational level, 14 articles at the relational and collective level, and five articles being mapped on all three levels.

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At each of the three levels of the emergence process, we grouped process mechanisms into subcategories by identifying common themes. We developed the subcategories by identifying the process mechanisms that were conceptually similar and were discussed as holding a similar purpose within the emergence process. When examining the 21 process mechanisms at the individual level, the top two process mechanism sub-categories were *self-schema/identity work* (12) and *task contribution* (6). When examining the 59 process mechanisms at the relational level, the top two process mechanisms were *adapting to follower/task expectations* (23), and *leadership prototype activation* (10). Finally, when examining the 46 process mechanisms at the collective level, the top three process mechanisms were *collective patterning of interactions* (12), *resolving tensions* (10), and *social identification* (6). Overall, the frequency of Principle two articles generally increased over time. A list of the major theoretical perspectives which discussed the process of leadership emergence, along with their primary process mechanisms, organized by level, appears in Table 2.

Principle #3. There were a total of 28 articles that mapped onto Principle three. Of those articles, 18% were conceptual and of the empirical articles, 48% were longitudinal. From the various findings in Principle three, three themes were identified: (1) dynamism of leadership emergence over time (N=17), (2) the form of change (i.e. linearity) (N=11), and (3) the life cycle of the team (N=7). Overall, the frequency of Principle three articles increased sharply from 1970 to 2009 before decreasing slightly from 2010 to 2016. A full list of the principle three findings appears in Table 3.

General themes. From the initial findings, we identified general themes and trends for the principles. Across all articles, twice as many articles were categorized as principle one, than were categorized as reflecting the other principles, illustrating the field's lack of theory about

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process. Specifically, as is the case with other areas within leadership research (Dinh et al., 2014), these results suggest an overemphasis on the role of person factors on leadership emergence and an underemphasis on process mechanisms and the dynamics of the construct.

For Principle one, the articles were leader-focused, with most of the elements centered on personality, behavior, and gender. In contrast, articles that were mapped onto Principle two emphasized the role of the follower; at the relational level, *adapting to follower expectations* was one of the most frequent process mechanism subcategories identified, highlighting the importance of the follower in the leadership process. This evidence provides further support for the increasing importance of the study of followership (Uhl-Bien, Riggio, Lowe, & Carsten, 2014). Overall, Principle two had the greatest percentage of conceptual articles compared to the other principles. We presume this was due to the complexity of studying leadership process mechanisms empirically (Fischer, Dietz, & Antonakis, 2016).

Principle three had the most limited work. These articles were mainly mapped as empirical. Although a main component of this principle required a discussion of the *emergent state* over time, many of the articles did not assess informal leadership longitudinally (using our criteria). Overall, the results from Principle three reflect the field's lack of exploration of time (Day, 2014), as well as a lack of discussion about the form change in emergence (Wang, Zhou, & Liu, 2014).

Integrative Framework of Leadership Emergence

As the results from the literature review illustrate, 25% of papers discussed the underlying process mechanisms of leadership emergence (see Table 2). By using the information gathered primarily from these works, we now introduce our process-oriented framework of leadership emergence which aims to address three major objectives. First, as a central component

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of any emergent process is its multilevel nature (Kozlowski et al., 2013), we incorporate all three levels (individual, relational, and collective) of leadership emergence into our theoretical framework. Although previous theories have discussed informal leadership processes across multiple levels (DeRue & Ashford, 2010), our review indicated that previous theories tended to focus on one or two of these levels, rather than incorporate all levels (DeRue, 2011 being a notable exception); this tendency reflects trends found in the leadership literature as a whole (Batistič, Černe, & Vogel, 2017). Accordingly, in our theoretical framework, we include mechanisms that have been discussed primarily at the individual level (e.g. self-schema activation), relational level (e.g. claiming & granting), and collective level (e.g. tension reduction) in one comprehensive framework of leadership emergence.

Second, as emergent properties are defined by the mechanisms that drive the bottom-up process (Kozlowski et al., 2013), we structure our theoretical framework to incorporate the most frequently occurring process mechanisms, as identified in the review, starting at the individual level. From doing so, we identify the two fundamental mechanisms of leadership emergence: self-structures and enacted structures. We elaborate on these specific categories in the following section.

The format of the framework is as follows. We first introduce the categories of self-structures and enacted structures which are used to describe the fundamental mechanisms in the emergence process. Next, we describe the emergence process as it occurs across levels, over time. Across these three levels, we describe the process first in terms of the role of self-structural properties, followed by the role of enacted structural properties in the system. We incorporate the most common process mechanisms and theories for each level, as was found in the review. Finally, in developing a process-oriented framework, we introduce propositions that could be

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used to guide future empirical estimation and the development of testable formal models (see Grand et al., 2016 and Vancouver, Weinhardt, & Schmidt, 2010 for examples). We begin this process by providing specific propositions that represent the emergence process at each level. These propositions are listed in Table 4.

Fundamental Mechanisms

In describing the basic nature of organizations, Weick (1979) stated that they are made up of “interlocked behaviors that are embedded in conditionally related processes” (p. 2). This reflects the findings of the literature review, as papers described the emergence process in Principle two using the mechanisms of either behaviors and subsequent interactions occurring across individuals, or the deeper-level self and information processes occurring within individuals which reflect their ongoing interactions (see Table 2). Specifically, we labeled these two categories of leadership emergence mechanisms as self-structures and enacted structures. Self-structures refer to cognitions related to how individuals produce, process, and understand information about the self (e.g. self-identity, self-schema, self-concept; Nowak, Vallacher, Tesser, & Borkowski, 2000). Enacted structures refer to the behaviors, expressions, and communications that are performed to support an ongoing social construction process between leaders and followers (Weick, 1995). We believe self-schemas and self-identities reflect the deep structure of leadership emergence because they are a fundamental input into self-regulation (Lord & Brown, 2004; Markus & Wurf, 1987); self-regulation in turn, produces adaptive behaviors (Kanfer et al., 2017), which we view as the surface structure indication of leadership emergence. According to Lord, Gatti, and Chiu (2016), the sensemaking perspective helps move beyond the static view of “leadership as individuals” to a richer understanding of leadership as a socially constructed process that is situationally embedded, and occurs across multiple levels,

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over time. For example, Ashford and Schinoff (2016) emphasize the situational embeddedness and social construction of identities as being part of a sensemaking process. Thus, by using the organizational sensemaking literature to organize the results from the literature review, previous theories describing separate processes occurring at different levels can be integrated into a complete, bottom-up representation of the leadership emergence process that relates to the emergence of both surface and deep structures.

As theories describing organizational sensemaking continued to develop, the idea of organizational “sensegiving” was added to represent a complementary process to sensemaking. We argue that both sensemaking and sensegiving are central processes necessary to understand the leadership emergence process. *Sensemaking* represents the process by which individuals perceive and ultimately organize complex information into a coherent narrative (Weick, Sutcliffe, & Obstfeld, 2005), and the narrative they construct often reflects their personal identity-work (Ibarra & Barbelescu, 2010). In contrast, *sensegiving* represents the process by which a constructed meaning is conveyed to others (Hill & Levenhagen, 1995), and this may also be reflected in stories from which authentic leadership is inferred by others (Shamir & Eilam, 2005). Sensegiving becomes particularly important within a collective leadership context where each individual has enacted a unique understanding of leadership and followership. As sensegiving concerns how individuals influence others into adapting their definition of organization reality (Gioia & Chittipeddi, 1991), we incorporate both sensegiving and sensemaking into the enacted structure portion of our theoretical framework in describing the process by which individuals develop a shared reality of leadership. Finally, although both sensemaking and sensegiving help an individual construct their individual meaning within a collective (i.e. self-processes), both are viewed as social activities (Maitlis, 2005), in that

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individuals use action to construct both self-understandings (sensemaking), as well as shape the understandings of others (sensegiving). Therefore, while sensegiving and sensemaking inform both self-structures and enacted structures, they occur within the processes related to enacted structures.

Throughout the explication of our process-oriented theoretical framework of leadership emergence, Table 5 is intended to serve as a visual representation. This table illustrates the specific self-structural changes and enacted structural changes that occur in a hypothetical four-person group (A, B, C, D). This table is also intended to represent the progression from the individual to the relational to the collective levels.

Individual Level

Self-Structures

The largest portion of the theories at the individual level (57%) discussed the role of self-views, self-schema, and self-identity (Emery, Daniloski, & Hamby, 2011; Hall & Lord, 1995; Lord, Brown, & Freiberg, 1999). According to these perspectives, how individuals proceed to act as both leaders and followers within a collective is largely a function of how they view themselves as a leader within a given domain (Hannah, Woolfork, & Lord, 2009). According to this view, individuals have expectations for leadership prior to interacting with others. Work on leader and follower identity suggests that individuals specifically rely on self-schemas, which are cognitive structures that shape the affective, cognitive, and behavioral responses of individuals in each context (Lord et al., 1999; Markus & Wurf, 1987). Self-schemas are domain specific (e.g. leadership domain), and they serve to help individuals retrieve necessary information to adapt to changing goals within a given social context (Cross & Markus, 1994). Therefore, some individuals will have a self-schema for leadership, and these self-schemas will guide both their perceptions of others and their behavioral responses within a leadership context.

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A critical understanding about self-schemas is that they are activated by specific situational cues and primes (Lord et al., 2016). Therefore, depending on the particular social context, people will shift between leader and follower schemas (i.e. only one will be activated at a particular moment). For example, if a person is working with someone of higher social status, they may activate a follower self-schema, while they may activate a leader self-schema when interacting with someone of lower status (Epitropaki et al., 2017). Within the context of informal collectives, leadership self-schemas are likely to be activated as a function of both the task environment and the other individuals within the collective (i.e. social situation).

In addition, previous research has demonstrated that there will be meaningful between-person variability in the strength of self-schema within a given domain depending on the prior experience of individuals. According to Markus (1977), the strength of a self-schema is indicated by the extent that individuals can: (a) process information about the self in the given domain with relative ease, (b) retrieve behavioral evidence from the domain, (c) predict their own future behavior in the domain, and (d) resist counter schematic information about themselves. Individuals that have a well-developed leadership self-schema would be high on these factors and would be viewed as “schematic” in the leadership domain (Lord et al., 1999). This point is critical as research shows that the relative strength of leadership self-schemas meaningfully impacts whether people will adopt leadership roles (Smith, Brown, Lord, & Engle, 1998) or produce leadership behaviors (Johnson et al., 2012). Accordingly, we argue that individuals with a more developed leadership self-schema related to a given context will be more likely to enact a leadership role early in the leadership emergence process.

Finally, by adopting recent process approaches to leader identity (Lord et al., 2016), further understanding can be generated about the role of self-structures in the leadership

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emergence process by differentiating them from self-identities. Specifically, although previous works discuss leader and follower identity as critical self-structures in the emergence process (e.g. Emery et al., 2011), more recent works suggest that leader identities do not develop until an individual's leadership self-schema becomes contextualized into the ongoing social processes within the collective (Epitropaki et al., 2017; Lord et al., 2016; Lord & Chiu, 2017).

As this conscious, situated identity is constructed, each person uses their previous experience, self-schema, and salient values to enact an identity that is socially validated over time (Ashforth & Schinoff, 2016). DeRue (2011) recognized that leadership claims and grants have consequences for leadership identity development, and he maintains that leadership structure emergence has individual, relational, and collective identity consequences. Our review extends this idea by emphasizing that identity development involves a deeper structure than leadership claims and social grants of leadership discussed by DeRue and Ashford (2010). Constructing situated identities in any area, including leadership, is a complex self-regulatory process that engages many self-motives, involves affect and cognitive processes, and involves crafting a self-narrative that will be socially accepted. Interestingly, individuals have dedicated neural structures, called default networks, for grounding the self in task, social, and historical contexts (Raichle et al., 2001).

In representing the role of self-structures early in the leadership emergence process, it is important to incorporate the factors that will impact the activation of a specific leader self-schema within a context. Although concepts such as gender are central to the self-concept of most individuals and are therefore chronically available (Markus, Crane, Bernstein, & Siladi, 1982), leader self-schemas are not presumed to be chronically available, but instead are activated as a function of additional factors (Lord et al., 1999). First, as previously described, leader and

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follower schema activation will be a function of both the task and the other individuals in the collective—what we label as the social situation. To be clear, as these are informal adhoc groups, at this point in the emergence process, other informal relational structures have not developed yet (e.g. friendship network; Carter et al., 2015). Thus, in the schema activation process, the social situation reflects what is described as a self-focused dynamic construal process in which the individual uses cues related to the task and the individuals within their group, to activate a specific self-schema (Freeman & Ambady, 2011). These cues (e.g. race of others, task requirements) make up the social context variable, and can be described as what Oc (2018) labeled as *discrete task and social factors*. Second, research suggests that the activation of particular self-schemas is impacted by whether individuals are motivated to process self-related information (Bober & Grolnick, 1995). For example, within the leadership context, individuals that are more committed to collective or organizational goals are more likely to activate appropriate leadership self-schemas (Lord et al., 2016). This individual-level cognitive structure can differ among group members reflecting a dynamic group level leadership structure or mental model, a point we will return to later.

Based on the above rationale we now turn to the first step in developing specific propositions which represent aspects of the micro processes associated with leadership emergence. Although the various propositions operate holistically and reflect the dynamics of a complex system, they necessarily must be developed individually. Thus, while multiple individuals can emerge simultaneously within a collective, we start by focusing on individuals. We begin by representing the process of leadership self-schema activation for one person at a specific time point using the following proposition.

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Proposition 1: The activation of a leadership self-schema at a particular point in time will depend on context at that time, prior experience in similar contexts, and motivational states.

As noted by Epitropaki, et al. (2017) and DeRue (2011), at the individual level, the dynamic interplay between leader-follower identities is critical. Thus, in addition to schemas regarding leadership, self-schemas regarding followership are equally important. We posit that the activation of a follower self-schema is based on factors similar to those specified in Proposition 1.

Proposition 2: The activation of a followership self-schema at a particular point in time will depend on context at that time, prior experience in similar contexts, and motivational states.

Enacted Structure

At the individual level, the primary process mechanism underlying enacted processes was the contribution towards the group task (29%; Bales, 1958; Hollander, 1958; Stogdill, 1959). These behaviors are viewed, as a reflection of individuals' conception and future expectations for leadership within a given group (Hollander, 1974). The group context signals what needs to be considered to deduce appropriate sensegiving behaviors. Sensegiving behaviors provide direction and foster integration that enables group effectiveness (Kozlowski, Watola, Jensen, Kim, & Botero, 2009). Stein and Heller (1979) stated that "the development of task leadership roles is the major thesis of emergent leadership theories" (p. 1994). Consequently, we argue that the performance of these acts is a critical component in the sensegiving process within leadership emergence (see Table 5). Weick's (1969; 1979) notion of enacted sensemaking represents this stage of the emergence process.

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In studying how individual behaviors change over the leadership emergence process, research found that early in the emergence process, people focus solely on task requirements, whereas later on, they change their behaviors based on how the original actions are perceived by others within the collective (Strickland & Guild, Barefoot, & Paterson, 1978). This supports the claim that, at an early stage in the emergence process, individuals are performing actions based on their prior experiences within that context, not the social confirmation or denial of others. Thus, initially the amount and type of leadership acts performed by individuals are expected to be largely a function of their leadership self-schema. Specifically, we argue that the probability of a leader behavior by a particular person at one time depends on both leader and follower self-schemas.

Proposition 3: The probability that an individual will perform a leadership behavior at a specific time will be based on whether the activation of their leader self-schema is greater than their follower self-schema at that time.

Although for expositional purposes in propositions 1-3, we represent these social processes as not yet developing past the individual level, relational and group contexts may be part of the situation that activates leader or follower schemas. Subsequently “reflected-appraisal” processes will play a critical role at the relational level of the emergence process (Lord & Brown, 2004). Further, the social processes involved in constructing situated identities emerge through a series of actions that play out over time (DeRue, 2011) and involve resolution of the ambiguity regarding oneself in a given situation (Asforth & Schinoff, 2016). This could be represented by cumulating (more precisely, integrating) propositions 1-3 over a given time period.

Relational Level

Self-Structure

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At the relational level, many theories in the literature review describe the emergence process using leaders' adjustment to the expectations of followers (39%); additionally, other works focused on the *negotiation* of leader-follower identities among members of the collective (DeRue, 2011; DeRue & Ashford, 2010; Marchiondo, Myers, & Kopelman, 2015). In terms of the self, these works describe leadership emergence as the process of mutual identity construction occurring across individuals with differing expectations for leadership. Once the emergence process reaches the relational level, the expectation is that individuals have begun to incorporate social feedback in forming a socially-constructed leader identity; thus, we argue that the formation of a socially embedded leader identity serves as evidence that the emergence process has begun to emphasize the relational level. This is not a discrete transition, but a gradual shift in emphasis, that merges intra-individual with inter-individual identity processes.

The critical change that occurs in moving from the individual to the relational level is that an individual's leader self-identity has an increasingly important social component. For example, in DeRue and Ashford's (2010) model of "claiming and granting", whether an individual's "claim" of leadership is "granted" by others within a collective is critical to determining whether they will maintain a leader identity. However, there is ambiguity regarding such processes. For example, whether an individual's actions fit with a leadership prototype is a matter of degree, not an all or nothing process (Lord, et al., 2001; Rosch & Lloyd, 1978), and different individuals may hold different leadership prototypes, creating ambiguity in how they interpret and respond to group activities. By combining these works with works on followership self-schemas (Lord, Brown, & Freiberg, 1999), we argue that at a deeper level, this process of social confirmation is driven by in part by the self-schemas of followers. Specifically, if the actions of a leader activate a follower self-schema in others, then the leader identity of the prospective leader is socially

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confirmed (Shondrick & Lord, 2010). Furthermore, other works categorized at the relational level describe the important role of followers' implicit leadership theory (Ocker, Huang, Benbunan-Fich, & Hiltz, 2011) in the schema activation process. Importantly, what is occurring over time is the creation of a relation among actors and perceivers that involves the bidirectional effects of identity activation for both parties to a social exchange. Typically, relations stabilize by creating an attractor (a double interact) that depends on the active identities of both parties. This is represented in propositions 4-6, which although developed separately, operate as a system that evolves over time.

At a basic level, implicit leader theories (ILT) refer to follower prototypes for leaders within a given context (Lord, Foti, & De Vader, 1984). According to this work, an individual is more likely to perceive someone else as leader if the prospective leader's behaviors coincide with the follower's expectations for leadership (Nye & Forsyth, 1991). Taken together, in the process of leadership emergence, we argue that if there is a match between the characteristics and behaviors of the prospective leader and the leadership prototype of perceivers, then they will apply the category "leader" to the social target depending on the goodness of fit to their ILT. Finally, it is important to note that this process *is occurring within each dyad*, signifying that this dyadic process is occurring across multiple individuals simultaneously within the overall collective. Based on this rationale, we represent the extent of leadership perception towards one perspective leader by one perspective follower as the match between the prospective leader's characteristics and the prospective follower's ILT.

Proposition 4: Leadership perception for a specific individual at a specific time will be based on the match between the perceiver's ILT and the prospective leader's perceived characteristics.

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Enacted Structure

However, leadership perception is not a passive one-directional process. Perceiving another as a leader has implications for the perceiver as well as actor, and it is likely to partially activate a corresponding follower's self-schema. The confirmation of the prospective leader's self-identity, ultimately involves the activation of compatible roles that make sense of each party's identity in this situation and give sense to the other party. In other words, underlying a double-interact in terms of surface behaviors related to claiming and granting, is a deeper double-interact that reflects the meaning of mutually reinforcing identities. Further, this meaning is discovered by both parties as it is enacted over time. This idea is reflected in Sluss and Ashforth's (2007) discussion of relational identities as encompassing both self-identities and role-based identities (e.g. follower). Thus, at the relational level, individuals begin to act not simply because of self-schemas, but also based on whether others perceive and respond to them as a leader at that time.

At the relational level, many theories discussed the enactment of leadership emergence through a variation of what Weick (1979) referred to as double interacts (10%). According to these works (DeRue, 2011; Li et al., 2007; Marchiondo et al. 2015), interacts occur when the behavior of one individual becomes contingent upon the behavior of another within the system. Leadership at its basic nature represents interpersonal influence (Kaiser, Hogan, & Craig, 2008), and double interacts are viewed as the "basic unit for describing interpersonal influence" (Weick, 1979, p. 89). According to Weick (2001), double interacts serve as the precursor for collective understandings, because individuals justify their interactions using the collective as an explanation. For example, within the leadership context, if person A is reflecting on their interactions with person B, they could use the explanation that "person B is a leader within our

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group, and that is why I interacted with them in that way". Thus, these interacts help inform each person's understanding of leadership within the collective. Alternatively, individuals may not think explicitly about such roles, but rather respond implicitly as leader and follower identities are constructed over time through enactive processes.

Whether constructed implicitly or explicitly, affectively or cognitively, identities developed through double interacts reflect attractors that make sense of the past and can guide future interacts. Thereby a patterning of leader-follower interactions takes place (DeRue, 2011). According to Shondrick and Lord (2010), the social construction of leadership occurs when (1) a potential leader perceives or infers a group of individuals to be his or her followers *and* when (2) individuals in a group begin to view themselves as being led by that prospective leader. It is through these interacts that individuals begin to rely on both active self-schemas, situated provisional identities, as well as the perceptions and reactions of others. Thus, as previously argued, at the relational stage individuals begin to transition from leader and follower self-schemas, to leader and follower identities, as their self-schemas become socially confirmed through the double interacts.

Specifically, at the dyadic level, the probability that a single person will have a leadership identity will be a function of their activation of leadership self-schema, in addition to the leadership perception of a prospective follower. Furthermore, the probability that a person will activate a follower identity will be a function of their followership self-schema in addition to whether they perceive the other person as a leader. Finally, as self-schema activation incorporates self-perceptions within that given domain (Markus & Wurf, 1987), we represent the probability of activating leader and follower identities in propositions 5 and 6, respectively. It is important to note that proposition 5 includes a component pertaining to leaders and another

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pertaining to followers, thus reflecting the mutual dependence in a double interact. Proposition 6 reflects self-schema activation by the prospective follower as well as their perceptions of their dyadic partner, which is an internal representation of a double interact held by this prospective follower. Together, propositions 5 and 6 are defined at a level that integrates one's self-identity with both the activation of internal knowledge structures, that is, self-schemas, and the leadership perception process.

Proposition 5: The probability that a leader identity is activated for a person depends on that person's activation of their leadership self-schema and their dyadic partner's leadership perception of them at that time.

Proposition 6: The probability that a follower identity is activated for a person depends on that person's activation of their followership self-schema and their perception that their dyadic partner is a leader at that time.

These interacts represent the micro elements of the process by which leaders and followers negotiate their individualized internal representations of leadership (i.e. leadership self-structures). These elements are not static, but as the indexing by time implies, they evolve over time, as do leadership perceptions (see proposition 4). It is important to recognize that follower self-schemas have many positive attributes such as being productive, going above and beyond, and being a team player (Sy, 2010) that may be part of leadership processes as well. Though one initially may have been guided by a follower schema, individuals who excel on these factors may be perceived by others as exhibiting leadership, and communication of these social perceptions may be part of the process that activates one's leadership schemas. In other words, leadership may at times be recognized by others before being recognized in oneself (Alvesson & Sveningsson, 2003; Paunova, 2015).

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This mutual form of enactment can be further represented by the phenomenon of synchronization, which is a fundamental component to dynamical systems (Blasius, Huppert, Stone, 1999). Synchronization represents the process by which two separate systems coupled within the same environment demonstrate identical or compatible dynamics over time (Rulkov, Sushchik, Tsimring, & Abarbanel, 1995). A classic example of synchronization is the fact that metronomes operating at different tempos will synchronize to the same tempo when placed on a common base (Pantaleone, 2002). Jiang and colleagues (2014) found that leader-follower relationships were characterized by neural synchronization that occurred over time. Specifically, they measured the communication frequency and neural synchronization of groups performing a leaderless group problem solving task and found that quality of communication predicted neural synchronization in emergent leader-follower relationships. This is critical, as during the process of sensemaking, double interacts enable individuals to develop shared understandings of the social environment (Weick, 2001). Thus, we argue that these leader-follower interactions form synchrony in behavior over time, which begins to manifest as stable leader-follower relationships that are grounded in situated identities, as well as the formation of shared internal representations of leadership within the collective (self-structure).

At this point in the emergence process, leadership may not have fully emerged, as these double interacts may not developed into a *stable pattern* of interactions. Weick (1979) argues that these interacts cannot be viewed as stable until both (1) the leaders actions become predictable and (2) the followers subsequent actions become predictable (Weick, 1979). In other words, the perceptions of both the leader and follower cross thresholds and both individuals become mutually interdependent. We believe that once these two requirements are met, leader and follower identities begin to solidify, and stable leader-follower relationships are formed.

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Over time, we represent the relational processes of leadership emergence as individuals performing actions as a function of their self-schema (proposition 3), as well as if past acts have been confirmed, which we argue is a direct function of the leadership perceptions of prospective followers. Therefore, through this confirmation process (driven by leadership perceptions and self-schema activation) stable leader and follower identities begin to form as role-based attractors in a dynamic, dyadic system and these attractors guide subsequent dyadic social interactions. But the interactions reflect only a surface structure that is supported by the deeper emergences of synchronized identities as specified in propositions 4-6. We should stress that for expositional convenience, we have depicted these micro elements of structure at the relational level as being independent of the collective level. We relax that assumption as we discuss leadership and identity structures at the collective level.

Collective Level

Self-Structure

One of the common collective process mechanism found in papers from our literature review was social identification (13%). Most of these papers specifically included the “social identity theory of leadership” (Hogg, 2001). This theory builds from the relational level by describing how individuals begin to view leadership in terms of specific group prototypes, rather than their individualized leader prototypes (Reicher, Haslam, & Hopkins, 2005). At this point in the emergence process, for one individual to emerge as a group leader, it is not enough for their behavior to activate follower self-schemas in others; in addition, emergence begins to occur once a prospective leader’s actions fit to the group’s leadership prototype (van Knippenberg, van Knippenberg, De Cremer & Hogg, 2004). Accordingly, at the collective level, once a patterning of interactions results in followers contextualizing their follower schemas into a stable follower

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identity, this advances the emergence process. Furthermore, if all followers develop a follower identity in the context of a single prospective leader's actions, then that individual is likely to be exemplifying the leadership group prototype, the shared cognitive representation that the collective has for leadership (Reicher et al., 2005).

At the collective level, the process of social identification represents the critical "identity work" that underlies the emergence process. According to van Knippenberg (2011), social identification represents the process by which the interests of the group become central to each individual's self-identity. Thus, over the emergence process, through social identification, individuals are expected to shift from viewing leadership through their leadership self-schemas to viewing leadership through the lens of their group. This process may be gradual and automatic as connectionist systems that support categorization processes incorporate the group context into contextualized implicit leadership theories (Lord, Brown, & Harvey, 2001). The primary motivational driver of this process is uncertainty reduction (Hogg, 2007). According to this perspective, viewing leadership differently than others within the collective creates uncertainty about the future. As individuals seek to predict and control their social world (Leotti, Iyengar, & Ochsner, 2010), this uncertainty leads to internal tensions which provokes anxiety and stress (Hogg, 2001). Thus, to reduce the negative effects of uncertainty, individuals incorporate to a collective understanding of leadership.

As each group member begins to identify with the collective level, their potential leader and follower identity becomes a function of both their leader and follower dyadic self-identities, as well as the *collective* leadership perceptions of others within the group. That is, the probability that they will have a leader identity at the collective level becomes a function of both their leader self-identities, as well as the collective leadership perceptions that others in the group have of

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them. Additionally, the probability that an individual will activate a follower identity will be a function of their follower self-schema, as well as whether they—and others—perceive someone else as a perspective leader at that time. We represent this process in propositions 7 and 8 which include an aggregation across group members of the dyadic level leadership perceptions, to reflect the collective leadership identity of one person at a specific time point.

Proposition 7: At the collective level, the probability that a person's leader identity is activated depends on both their individual leadership self-schema activation, as well as the leadership perceptions of others towards them.

Proposition 8: At the collective level, the probability that a person's follower identity is activated depends on both their individual followership self-schema activation, as well as the followership perceptions of others towards them.

Propositions 7 and 8 represent an independent aggregation across dyads, or what has been labeled compositional aggregation (Dinh et al., 2014; Kozlowski & Klein, 2000; Lord et al., 2011). If, however, the processes underlying dyadic identity formation interact and form a new construct at the collective level, which in the next paragraph we maintain is likely, then collective leadership identities should be qualitatively different than dyadic leader identities, a process that would be termed compilational aggregation. Compilational aggregation would also require adding a component which reflects the interdependence of dyadic processes, which is addressed in the following section on enacted structures.

In connecting the individual-level schemas to the formation of collective identities, social identification represents a meso process whereby individuals transition from external categorization to internal identification. According to social identity theory (Tajfel & Turner, 1986), social categorization is externally-oriented as it concerns others, and social identification

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is internally-oriented as it concerns the self (Jenkins, 2000). We argue that this distinction is critical to understanding the process of leadership emergence because the interpretation of leadership changes orientations as the process crosses levels. Specifically, at the lower levels, individuals view their interactions with others within the collective as external to their self-concept. However, if the process of social identification occurs, each person is expected to think about these collective interactions internally—in reference to themselves. We argue that the shift from external categorization to internal categorization begins to capture when leadership has emerged (i.e. collective structure has formed). Further, when an emergent leader identifies with a group and embodies the group prototype, her or his own self-schema becomes more consistent with the group level cognitive structure.

Enacted Structure

At the collective level, other common process mechanisms were the collective patterning of interaction (26%), and tension reduction (22%). Furthermore, these mechanisms were primarily discussed in papers that used complexity perspectives (e.g. Lichtenstein et al., 2006; Uhl-Bien, Marion, & McKelvey, 2007). According to these works, the emergence process is represented by a patterning of leader-follower interactions over time. However, complexity approaches go beyond leader-follower interactions by discussing the collective mechanisms that operate at the group level to drive the emergence process. The major mechanism at the group level is the idea of tension reduction, in that the patterns of leader-follower interactions serve to adaptively reduce tension and ultimately reach collective goals (Hazy, 2008). This reflects the idea of collective identity, as individuals seek to resolve the internal tension of uncertainty experienced when competing conceptions of leadership occur (Hogg, 2001, 2007).

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In addition to the internal tension of uncertainty, the tension caused by having to adapt to the external environment can be viewed as the primary external tension within the leadership emergence process (Schneider & Somers, 2006). To illustrate how both these internal and external tensions drive the leadership emergence process, we pair complexity theory with two other non-linear dynamical systems: neural networks (Hopfield, 1984) and spin glass structures (Stein & Newman, 2013). According to theory on Hopfield networks, over time a collective of neurons explore different patterns of activation to reach the minimum amount of energy required to produce an outcome (Hopfield, 1984). Regarding the emergence process, we argue that this represents the external tensions, as a collective must perform a specific pattern of leader-follower interactions to meet the environmental requirements. Consequently, we argue that over time, a collective will enact specific patterns of double interacts between leaders and followers until the most efficient pattern is found.

To extend the idea of neural networks to the internal tensions that drive leadership emergence, it helps to incorporate the concept of spin glass structures, a common phenomenon used in complexity theory (Stein & Newman, 2013). Spin glasses are disordered magnetic materials which contain elements of polarity (i.e. positive or negative state). Through local interaction of each unit with adjacent units, the specific atoms within the structure move from disorder to a coherent global pattern. Thus, the structure resolves the internal tension caused by disequilibrium across atoms by moving to a global state of equilibrium. Not only is this transition to equilibrium fundamental in spin glass structures, but this is a central tenet to complexity leadership perspectives (Schneider & Somers, 2006). Accordingly, we argue that just as individual atoms within a spin glass structure change positions to align with the other atoms in the structure (or in terms we have developed create double interacts), through a series of interacts

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(Weick, 1969), dyads shift their structure to align with other dyads in the collective. For example, in a group of four people (A, B, C, D), if A and B are in a leader-follower relationship, C will be more likely to develop a follower relationship to A. That is, the A-B double interact tends to "flip" the A-C double interact; as this happens throughout a group, a stable leadership structure emerges. Furthermore, this alignment to the collective reduces the internal tensions driven by uncertainty (Hogg, 2001).

To reflect this between-dyad interaction, we would modify proposition 4, which involves the match of leader characteristics to follower's ILT, to form proposition 9 which takes into account this group context by introducing a bias component that reflects this effect of other dyadic relations in a group. We assume that the biases involving different pairs of dyads are encountered over time as attention shifts from one dyadic comparison to another.

Proposition 9: The collective leadership perception towards one individual in a group at one time depends on the match of the prospective leader's characteristics to each group member's ILT's, as well as the additional biasing effect of the other dyadic leadership relations in the group.

Proposition 9 thus translates the dyadic process into a group context and reflects what Klein, Dansereau, and Hall (1994) have termed a parts within wholes relationship. We are arguing then that the group context changes how dyadic leadership perceptions function through this biasing function that operates sequentially as a particular dyad AC is compared to other dyads AB or AD. Over time this comparison can introduce variability into how A is perceived by C, but eventually this variability will be reduced as a more uniform structure evolves and there are shared perceptions of person A by group members B, C, and D. At this point a group-level attractor exists, and the biasing function becomes uniform across possible pairs of dyads,

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reflecting the evolved common understanding or group context. In other words, group as well as dyadic identities are activated. Importantly, the bias created by the group context also changes the meaning of Propositions 5 – 8, which now are based on a leadership perception process involving group as well as dyadic properties. Therefore, when leadership emerges to a collective phenomenon, the bias operates at each dyadic level, as a function of the solidified collective outcome.

Finally, to fully represent how the leadership emergence process occurs over time, it is crucial to incorporate the idea of entropy in dynamical systems. According to general systems theory, entropy represents the degree of disorder within a dynamic system (Skyttner, 2005). Within the realm of psychology, Hirsh and colleagues (2012) describe entropy as great uncertainty about “which state currently defines a system” (p. 305). We argue that this accurately represents the process of leadership emergence where high entropy would occur in a system where individuals did not differentiate between who they expected to perform a leadership role at a given moment, and the leadership perceptions of one person towards each member of the group would be relatively equal across all individuals; that is for all group members as perceived by that one individual.

Entropy will increase in proportion to the number of competing possibilities that must be selected from. Low entropy levels are represented by tight distributions, where one outcome is much more probable to occur compared to other outcomes, whereas high entropy levels are represented by flat probability distributions where any outcome is close in likelihood for all outcomes (Hirsh et al., 2012). We represent entropy in terms of collective leadership identities to capture a schematic understanding that reflects the combined individual, dyadic, and collective levels; and we use identity rather than behavior or self-schema to represent a deeper,

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contextualized understanding of the self rather than moment to moment variation in surface-level, task-related behaviors.

The relative entropy is a function of the relative probability each individual will activate a leader identity at a certain time. If many individuals have a high probability of leadership identity activation, the collective will have high levels of leadership entropy (See Figure 2 for illustration). This represents the level of entropy within a collective at *one point in time*. Thus, a critical component of non-linear dynamical systems is that they are expected to shift in levels of entropy over time (Prigogine, 1978). Furthermore, these changes in entropy represent important structural changes for emergent properties (Hirsh et al., 2012). Regarding the leadership emergence process, if the collective has low entropy at a particular time, this would mean that there was a clear collective understanding of who is the leader within that specific event. However, if over time, the members of the collective begin to realize that this individual was not fulfilling group objectives (external tension), this may cause members to experiment with new leadership roles. If this occurred, the level of both uncertainty and entropy would increase within the collective. However, if the collective then finds a new structure of leadership that can resolve these external tensions, they will adopt this new attractor state with perhaps different persons identifying as the group leaders; thus, entropy levels will decrease once this new attractor state is reached.

Finally, this theorizing about the collective changes in leadership over time aligns closely with the review findings regarding *Principle 3*. Specifically, in reviewing previous works that theorize or test the post-emergent dynamics of leadership, works focused at the collective level described important changes occurring over time in the collective leadership structure. As illustrated in Table 3, while early works studying the nomination of *individuals* has found that

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leadership can demonstrate stability over time if the task environment does not change, works on teams and networks has found that the collective continues to demonstrate significant changes in the leadership structure (Klein, Ziegert, Knight, & Xiao, 2006). Furthermore, as these changes are a function of multiple dynamic inputs, the form of change is expected to be non-linear, with different elements affecting the collective structure at different points in the groups life cycle (Uhl-Bien, Marion & McKelvey, 2007).

To summarize, we argue that leadership emergence is represented by a dynamic multi-level process, starting with deep structure elements of self-schema activation and translating into contextualized identities as function of social feedback. The fundamental mechanism is a double-interact in which each party both perceives the other and activates a self-identity that is consistent with this perception, and when these processes align over the group, entropy is low and a stable group-level attractor also exists. This collective leadership structure continues to adapt to a dynamic environment. However, the emergent structure is formed by the interaction of each individual's deep-level social cognitive processes, which drive the sensegiving and sensemaking mechanisms of leadership emergence.

In developing this conceptual framework describing the leadership emergence process, we believe that we have made six primary contributions. First, this framework captures how the emergence process can develop at individual, dyadic, and group levels, either sequentially or simultaneously. Second, we have specified key variables based on an extensive and careful review of the literature that capture both deep and surface level structures. Third, we have translated processes into propositions which can guide future empirical estimation and reflect the dynamics of leadership structure emergence on both an intrapersonal and interpersonal basis. Fourth, the overall framework is indexed by time to reflect its dynamic nature and facilitate

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future works which aim to incorporate a temporal component that address changes over time.

Fifth, we have focused on the link between leadership and identity because identity is a powerful schema that guides behavior, skill acquisition, motivation, and social perceptions. In other terms, we have taken a deep-structure approach to understanding dynamic emergent processes. This provides an important complement to the previous works that have approached emergence from a multilevel perspective, while focusing on the interactions among individuals which reflect the deep level processes our framework introduces (e.g. DeRue, 2011). Finally, we have also grounded the process in theories of leadership perception at an individual level and uncertainty or entropy at the group level (i.e. bridging levels). Together these six contributions advance our understanding of leadership emergence and provide a basis to further develop process approaches.

Avenues for Future Research

In the previous sections, we reviewed the extant literature and developed a framework to articulate the basic elemental content of what is exchanged and the process mechanisms describing how it is exchanged, resulting in the emergence of leadership. As noted by Kozlowski (2015), this type of emergent framework delves into the deep details, where leadership emergence is not a “box” in a model (Kozlowski & Chao, 2012). Rather, “it is a specification of the actual psychological and/or behavioral action at the lowest level of analysis that contribute to the emergence of the phenomenon” (p. 16). As our framework focuses on delineating the underlying mechanisms of the leadership emergence process, we propose that future research implement two types of computational modeling to further develop and ultimately test our framework: agent-based modeling (ABM) and equation-based modeling (EBM). However, it is important to establish that our process oriented framework represents narrative theory that can

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only be used to assist in the larger process of formulating a computational model; it is not intended to be directly translated into either type of computation modeling. Therefore, in explaining the unique benefits of both ABM and EBM (Parunak, Savit, & Riolo, 1998), we note where the current paper leaves off, and where future work would serve to continue the development of modeling tools which study the leadership emergence process.

As ABM can be used to test the rules that lower level “agents” (e.g. persons) follow when forming a higher-level unit (Bonabeau, 2002), we argue that it can be used to simulate the enacted processes of our framework in a dynamic fashion. Castillo and Trinh (2018) provide a detailed explication of the benefits and uses of ABM to study leadership. In order to develop an ABM of the leadership emergence process, specific assumptions would have to be stipulated regarding the rules that agents follow within the system. The current paper represents what Kozlowski and colleagues (2013) and Grand and colleagues (2016) would describe as Step 1 of a larger process, which they define as “a narrative theory of what individuals do, think, feel, that gives rise to a higher level outcome.” (Grand et al., 2016, p. 1354). Accordingly, to develop an associated agent based model, this process requires the next step of translating this narrative theory into a series of if- then statements which outline how each agent would behave within the overall system. For example, in following the model developed in Grand and colleagues (2016), our current framework would likely be separated into two categories of statements: one related to leader/follower *actions*, and one related to leader/follower *perceptions*. Subsequently, individual statements could be introduced such as: *if an agent’s leader self-schema is greater than their follower self-schema, then they perform a leadership behavior*. Finally, it is necessary to include a series of group-level statements, which stipulate the process by which the group reaches consensus (i.e. leadership has emerged), and the simulation ends.

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Additionally, as EBM has been effectively used to simulate the complex intra-individual motivational and self-related processes within organizational phenomena (Vancouver & Weinhardt, 2010; Vancouver & Weinhardt, 2012), we argue that EBM can be uniquely used to simulate the deep-level mechanisms driving the surface level interactions to which our framework emphasizes. Specifically, Vancouver & Weinhardt (2012) argue that EBM—using a system dynamics perspective—is a preferred method for testing phenomena at the “intra-agent” level, which is a level that our framework specifically targets (i.e. cognitive processes). However, in the previous works that implemented these types for modeling procedures, it is critical to note the current paper is not sufficient to develop this type of model. Instead, EBM requires the development of formal mathematical expressions which are used to represent the system of interest. Unlike the protocol for developing an ABM simulation, the EBM protocol using a system dynamics perspective would involve first defining the key variables in the system, then specifying the mathematical relations among these variables (Vancouver & Weinhardt, 2012). It should also be noted that for both ABM and EBM, the appropriate temporal frame would have to be defined in order for the model to be performed. As the current framework provides single level propositions which define the critical variables in the leadership emergence system, it may align more closely with the development of an EBM model using a system dynamics perspective. However, we formed the propositions such that future works could use the current paper for the development of formal models which then could be adapted to either form of computational modeling. In doing so, we believe that ABM and EBM can offer unique and complementary benefits for studying both the deep-level and surface-level components in our overall leadership emergence framework.

Limitations

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In this article, we developed a framework that emphasizes the importance of a multilevel process to understand leadership emergence. Although the framework's underlying structure was designed to include the most fundamental processes of leadership emergence, we view our framework as a starting point for future research to continue unpacking the dynamics of leadership emergence. As our mapping process cannot empirically evaluate the underlying process mechanisms in leadership emergence, we hope that future works can build off our framework by statistically evaluating the relative importance of process mechanisms using techniques such as computational modeling (Poile & Safayeni, 2016). In addition, by focusing our literature search on psychology and management areas, we may have excluded theory and research on emergent leadership in other domains such as education.

Finally, it's important to note that in our process-oriented framework, we did not incorporate the full dynamic nature of context. Specifically, it is well established that the bottom-up processes of emergence and the top-down processes of context are related in a dynamic and reciprocal fashion (Kozlowski et al., 2016). Furthermore, the leadership emergence process is now understood to be embedded within greater social networks (Carter et al., 2015). For example, leadership is both embedded with informal social networks (e.g. advice networks), as well as formal hierarchical organizational structures (e.g. formal leaders). The current paper did not intend to address these exogenous contextual effects, but rather to address Carter and colleagues' call for "research that identifies the endogenous rules or principles governing leadership emergence" (Carter et al., 2015; p. 614). Finally, although contextual effects are not directly incorporated into our framework, top-down constraints are indirectly reflected by the incorporation of contextual adjustments in leadership prototypes (Foti, Knee & Backert, 2007; Lord et al., 2001; Sy et al., 2010).

Conclusions

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Our review shows the diversity of approaches in the area of leadership emergence. Although this diversity has brought forth novel perspectives that enrich our knowledge of leadership emergence, it also presents several challenges that future research must address. Notably, in our framework, we have incorporated and integrated process mechanisms from the micro-level perspectives (cf., self-schema and identity) to the macro level (cf., complexity theory). We have argued that attention to these dynamic processes as they unfold over time and across different levels of analysis is critical because it helps capture the complexity that defines real individual, group, and organizational systems. Therefore, efforts to advance leadership theory and research will require that we pay attention to the processes that underlie these phenomena as they occur at multiple levels of analysis. These levels exist both across social units and within individuals as we move from surface structures emphasizing behaviors to underlying identity structures. By developing a framework that focuses on the process of leadership emergence involving both leadership and identities, we help bridge a disconnect between leadership emergence and its associated processes (Dinh et al., 2014), thus paving the way for a major advancement within the field of leadership.

We close with a quote from Hunt and Dodge (2000) who wrote, “to know where we are going with leadership research, we must know where we are, and where we have been—we must look backward and forward at the same time” (p. 453). As has been noted multiple times in the past, the idea of informal leadership processes being distinct from their associated outcomes is not a new idea. Nevertheless, as our review indicated, it seems that the field has largely forgotten about the progress made 60 years ago in the study of leadership processes. Emergence theory describes processes that are dynamic, integrating relationship across all moments in time. In

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other words, the past influences the future and the future influences the past. We hope that our review, highlights this progress and creates a basis for further advancement.

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TABLES & FIGURES

Table 1.

Key Findings for Emergence Principle #1—Elements of Emergence.

Element Category	Findings/Components	Leader/Follower	Key References
Behavior	<ul style="list-style-type: none"> • Various behaviors, such as participation in group discussions, task facilitation behaviors, and listening behaviors lead to leader emergence • The more effective listening behaviors the higher the likelihood that the person will emerge • The more often individuals communicate tends to predict higher probability of emergence. The quality of communication is theorized to be more important as the task progresses 	Leader	Bass, 1949; Carter, Haythorn, Shriver & Lanzetta, 1951; French & Stright, 1991
Emotional competency, intelligence, and recognition	<ul style="list-style-type: none"> • Emotional stability, intelligence and competency have been shown to predict greater emergence, but the particular emotional skills differ based on the group requirements • Specifically, emotion recognition capability has been positively related to leader emergence • These individuals high in emotional intelligence have also been proposed to be better at task coordinating which drives their tendency to emerge as leader • Additionally, these individuals are more adept at recognizing when the expectations of followers are changing, a critical mechanism in the emergence process 	Leader	Côté, Lopes, Salovey, & Miners, 2010; Emery, 2012; Hong, Catano & Liao, 2011; Walter, Cole, van der Vegt, Rubin & Bommer, 2012; Wolff, Pescosolido, & Druskat, 2002
Gender	<ul style="list-style-type: none"> • Men are more likely to emerge as task-oriented leaders, while women more likely to emerge as social-oriented leaders. Men are more likely to emerge in shorter-term groups, with less complex interaction • Women and Men are theorized to have different expectations as followers. Additionally, women tend 	Leader/follower	Eagly & Karau, 1991; Karakowsky & Siegel, 1999; Kent & Moss, 1994; Lord, Phillips & Rush, 1980

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	to give higher leadership ratings than men		
Intelligence, cognitive ability, and knowledge	<ul style="list-style-type: none"> • Individuals with higher levels of intelligence are more likely to emerge as leaders, but this relationship is stronger for perceptual measures of intelligence rather than paper-and-pencil tests • Higher cognitive ability (g) has been positively related to leader emergence • It has been theorized that knowledge/ability, cognitive skills like problem solving and wisdom, attentional capacity, and cognitive capacity all are important for leader emergence • The likelihood of emergence is seen to be a function of the fact that many have schemas for leadership that emphasize intelligence and skill in their leaders 	Leader	Judge, Colbert, Ilies, 2004; Rubin, Bartels, & Bommer, 2002; Taggar, Hackett, & Saha, 1999
Masculinity/femininity/androgyny (Gender Role)	<ul style="list-style-type: none"> • Masculine and androgynous subjects are more likely to emerge as leaders than feminine individuals • These features of a person are seen to prime categories most closely associated with leadership • As masculinity is a common schematic category for leaders, theory suggests that women with more androgynous looks may no longer be less likely to be seen as a leader 	Leader	Kolb, 1997; Moss & Kent, 1996
Motivation to Lead	<ul style="list-style-type: none"> • Individuals higher in motivation to lead (MTL) are more likely to emerge as leaders, with the various micro-components of MTL being more influential depending on task type • MTL is also seen to drive how individuals respond to feedback, with individuals high on MTL 	Leader	Elprana, Felfe, Stiehl, and Gatzka, 2015; Hong, Catano & Liao, 2011; Oh, 2012

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	theorized to be more resistant to setback when attempting to perform leadership role		
Personality	<ul style="list-style-type: none"> • The traits of extraversion, openness, and conscientiousness positively predict leadership emergence. Neuroticism negatively predicts leadership emergence • Individuals high on agreeableness are more likely to view others as leaders • Alignment between follower personality and leader behavior impacts likelihood of leadership nominations 	Leader/follower	Emery, Calvard, & Pierce, 2013; Judge, Bono, Ilies, & Gerhardt, 2002; Lord, De Vader, & Alliger, 1986
Physical features	<ul style="list-style-type: none"> • Physical fitness, attractiveness and height have all been positively related to leader emergence • These features theorized to be associated with greater emergence due to evolutionary advantages associated with them 	Leader	Atwater, Dionne, Avolio, Camobreco, & Lau, 1999; Cherulnik, 1995; Judge & Cable, 2004
Race	<ul style="list-style-type: none"> • Race-occupation fit has been found to predict leader emergence • The extent to which a task is congruent with a type of race increases perceptions of leadership • Prototypes to identify leaders differ based on race, which in turn drive leadership perceptions 	Leader/follower	Festekjian, Tram, Murray, Sy, & Huynh, 2014; Sy et al., 2010
Self-efficacy	<ul style="list-style-type: none"> • Higher self-efficacy has been positively related to leader emergence • Individuals with higher self-efficacy are theorized to be more confident and thus more likely to pursuit leadership roles 	Leader	Serban, et al., 2015; Smith & Foti, 1998
Self-esteem/confidence	<ul style="list-style-type: none"> • It has been theorized that higher levels of confidence and courage, can lead to leadership emergence • Individuals with higher self-esteem/confidence seen to be more willing to take on risks associated with leadership role 	Leader	Amos & Klimoski, 2014; Ensari, Riggio, Christian, & Carlsaw, 2011

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Self-monitoring	<ul style="list-style-type: none"> Higher self-monitors (HSM) are more likely to emerge as leaders than low self-monitors (LSM), and this is largely because of a greater tendency of HSM's to initiate structure in the group Higher self-monitors also are better at recognizing and adapting to the expectation of others, one of the central process mechanisms of emergence 	Leader	Day, Schleicher, Unckless, & Hiller, 2002; Dobbins, Long, Dedrick, & Clemons, 1990; Cronshaw & Ellis, 1991; Kent & Moss, 1990;
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Note. The presented 12 element categories are the elements which had an article frequency count of three or greater. The other element categories with two or less were not included but will be provided upon request.

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Table 2. Key Findings for Emergence Principle #2—Process Mechanisms.

Theory Category	Findings/Components	Primary Process Mechanisms Sub-Category	Primary Level(s) of Process	Enacted-Structure & Self-Structure	Key References
Primarily Individual Level Theory Categories					
Information Processing Perspectives	<ul style="list-style-type: none"> • Leadership emergence is characterized by two underlying processes, (1) recognition, in which we each individual recognizes the traits they associate with leadership, and (2) association, in which the subsequent team context (e.g. performance outcomes), is then used to associate leadership qualities with each individual • A dynamic process of recognition, and association begins to unfold over the course of the groups' development 	Follower self-identity/self-schema; information processing; leadership prototype activation; self-identity activation, self-schema, and self-view	Individual; Relational	Self-Structures	Foti, Knee & Backert, 2008; Lord, Brown, Harvey & Hall, 2001
Reinforcement Approaches	<ul style="list-style-type: none"> • Leader emergence occurs as a function of the relative task contribution of each individual • Individuals are seen to encode and respond to the requirements of the task, and the expectations of others within the collective in a dynamic fashion 	Adjustment to social cues/follower expectancies & feedback; behavior, communication, and/or task contribution; information exchange	Individual; relational	Enacted Structures	Murphy, 1941; Strickland, Guild, Barefoot, & Paterson, 1978
Primarily Relational Level Theory Categories					
Relational Discrepancy Theory	<ul style="list-style-type: none"> • Individuals evaluate on-going dyadic relationships based on both their own ability to satisfy internal self-ideals, as well as the ability of another to satisfy these ideals • Over time, the behavior of every individual will be interpreted as either discrepant or non-discrepant to a person's overall ideals 	Adjustment to social cues/follower expectancies & feedback; follower self-identity/self-schema	Individual; Relational	Self-Structures	Robins & Boldero, 2003

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	In cases where an individual's behavior is discrepant to internal ideals, but the behavior of another is not discrepant, that another person will likely emerge as a leader				
Social-Interactionist Perspectives	<ul style="list-style-type: none"> Individuals co-construct their identities as either a leader or a follower constantly, based on their interpretation of each social interaction The leader-follower identities are formed through a series of "claims" and "grants", which are behavioral expressions of leader or follower identities 	Claiming & granting/ double interacts; identity negotiation/construction	Relational	Self-Structure & Enacted Structure	DeRue, 2011; DeRue & Ashford, 2010; Marchiondo, Myers, & Kopelman, 2015
Primarily Collective Level Theory Categories					
Social Network Approaches/Social Exchange Perspectives	<ul style="list-style-type: none"> Leadership networks emerge through the inherent social dependencies that exist within a network Rather than interacting with each individual as a function of individual exchanges, each person begins to view their interaction in terms of the greater social network For example, based on current friendship networks, or advice networks, a person may choose to enact leadership or follow someone else 	Coevolution of leadership and social networks; evaluation of other dyadic relationship within the collective	Relational; Collective	Enacted Structures	Carter, DeChurch, Braun, & Contractor, 2015; Contractor, DeChurch, Carson, Carter, & Keegan, 2012
Complexity Approaches	<ul style="list-style-type: none"> Leadership goes through a series of phases, (1) disequilibrium: a period of unstable conditions and uncertainty, (2) amplifying action phases: promising opportunities for stability are offered, (3) recombination process, through a series of collective experimentations with the different opportunities, the group tests 	Collective patterning of interaction; coupling/signaling; shift to attractor states/phase transitions; resolving tensions	Collective	Enacted Structures	Guastello, 2007; Hazy, 2008; Uhl-Bien, Marion, & McKelvey, 2007

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	the different possibilities for collective leadership, (4) the group or organization uses environmental feedback to settle into a new, stable, qualitatively different leadership structure				
Idiosyncrasy Credits	<ul style="list-style-type: none"> Prospective leaders perform functions that others within the group confirm or deny—either earning or losing “leadership credits” Those that emerge as leaders early earn idiosyncrasy credits and are thus allowed more freedom to perform future leadership function 	Adjustment to social cues/follower expectancies & feedback; conformity to group norms; earning idiosyncrasy credits	Relational; Collective	Enacted Structure	Hollander, 1958; Hollander, 1974; Stone & Cooper, 2009
Quantum Perspective	<ul style="list-style-type: none"> Over a series of moment-to-moment interactions, the perceivers determine whether the attributes perceived in others are “compatible” with their leadership schema Every individual could potentially emerge as a leader, but all of the potential end-states are only manifested based on the environmental “attractors” (i.e. situational factors) within the immediate environment 	self-schema activation; shift to attractor states/phase transitions	Individual; Relational; Collective	Self-Structure	Lord, Dinh, & Hoffman, 2015
Social Identity Theory	<ul style="list-style-type: none"> The process of leadership emergence is carried out through the micro-processes of information processing, prototypically, and social attraction Over time, individuals will process leadership relevant information about others, they will then compare these to their previous leadership prototypes, followed by them being socially attracted to team members that match their prototypes. This match will ultimately cause a spiral of 	Resolving tension; social identification	Collective	Self-Structures	Hogg, 2001 Haslam & Reicher, 2007; Van Knippenberg & Hogg, 2003

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	associating the leadership characteristics with the individuals in a leadership role. These spirals are ultimately expected to result in a stable emergent leadership structure				
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Table 3.

Key Findings for Emergence Principle #3—Post Emergence Dynamics.

Theory Category	Findings/Components	Key References
Stability in Leadership Emergence Outcome	<ul style="list-style-type: none"> • Leadership nominations theorized to change substantially within a short period of time • Leadership found to be stable at the individual level once the task requirements become stable • Stability is a function of the task—changing tasks leads to emergence being more unstable • Collective leadership outcome (e.g. network) has been found to shift meaningfully over time 	Barlund, 1962; Bell & French, 1950; Emery, 2012; Katz, Blau, Brown, & Strodtbeck, 1957;
Form of Change/Non-Linear Dynamics	<ul style="list-style-type: none"> • The relationship between individual difference characteristics and leadership emergence is non-linear in nature, with the task type, and group type, and other individual differences all interacting with each relationship • As group experiences changes in the external environment (shocks), there will be dramatic fluctuations in structure as the collective shifts between attractor states. Group will thus display non-linear form of change over time • Non-linear regression models have been found to have improved fit over linear models for relationships between individual difference variables and leadership emergence 	Foti, Knee, and Backert, 2008; Guastello, 1998; Guastello, 2007; Uhl-Bien, Marion, & McKelvey, 2007
Early vs. Later in Group Life Cycle	<ul style="list-style-type: none"> • Varying leadership styles and behaviors by team members often have more of an impact on early levels of informal leadership, and have more of a maintenance role later on • Surface level diversity is more impactful early on for informal leadership outcomes, and deep-level diversity is more impactful later on 	Carte, Chidambaram, & Becker, 2006; Small & Rentsch, 2010; Kalish & Luria, 2016

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Table 4.

Propositions underlying the multilevel process-oriented leadership emergence framework.

<i>Individual Level</i>	
<i>Proposition 1</i>	<i>The activation of a leadership self-schema at a particular point in time will depend on context at that time, prior experience in similar contexts, and motivational states.</i>
<i>Proposition 2</i>	<i>The activation of a followership self-schema at a particular point in time will depend on context at that time, prior experience in similar contexts, and motivational states.</i>
<i>Proposition 3</i>	<i>The probability that an individual will perform a leadership behavior at a specific time will be based on whether the activation of their leader self-schema is greater than their follower self-schema at that time.</i>
<i>Relational Level</i>	
<i>Proposition 4</i>	<i>Leadership perception for a specific individual at a specific time will be based on the match between the perceiver's ILT and the prospective leader's perceived characteristics.</i>
<i>Proposition 5</i>	<i>The probability that a leader identity is activated for a person depends on that person's activation of their leadership self-schema and their dyadic partner's leadership perception of them at that time.</i>
<i>Proposition 6</i>	<i>The probability that a follower identity is activated for a person depends on that person's activation of their followership self-schema and their perception that their dyadic partner is a leader at that time.</i>
<i>Collective Level</i>	
<i>Proposition 7</i>	<i>At the collective level, the probability that a person's leader identity is activated depends on both their individual leadership self-schema activation, as well as the leadership perceptions of others towards them.</i>
<i>Proposition 8</i>	<i>At the collective level, the probability that a person's follower identity is activated depends on both their individual followership self-schema activation, as well as the followership perceptions of others towards them.</i>
<i>Proposition 9</i>	<i>The collective leadership perception towards one individual in a group at one time depends on the match of the prospective leader's characteristics to each group member's ILT's, as well as the additional biasing effect of the other dyadic leadership relations in the group.</i>

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Table 5.

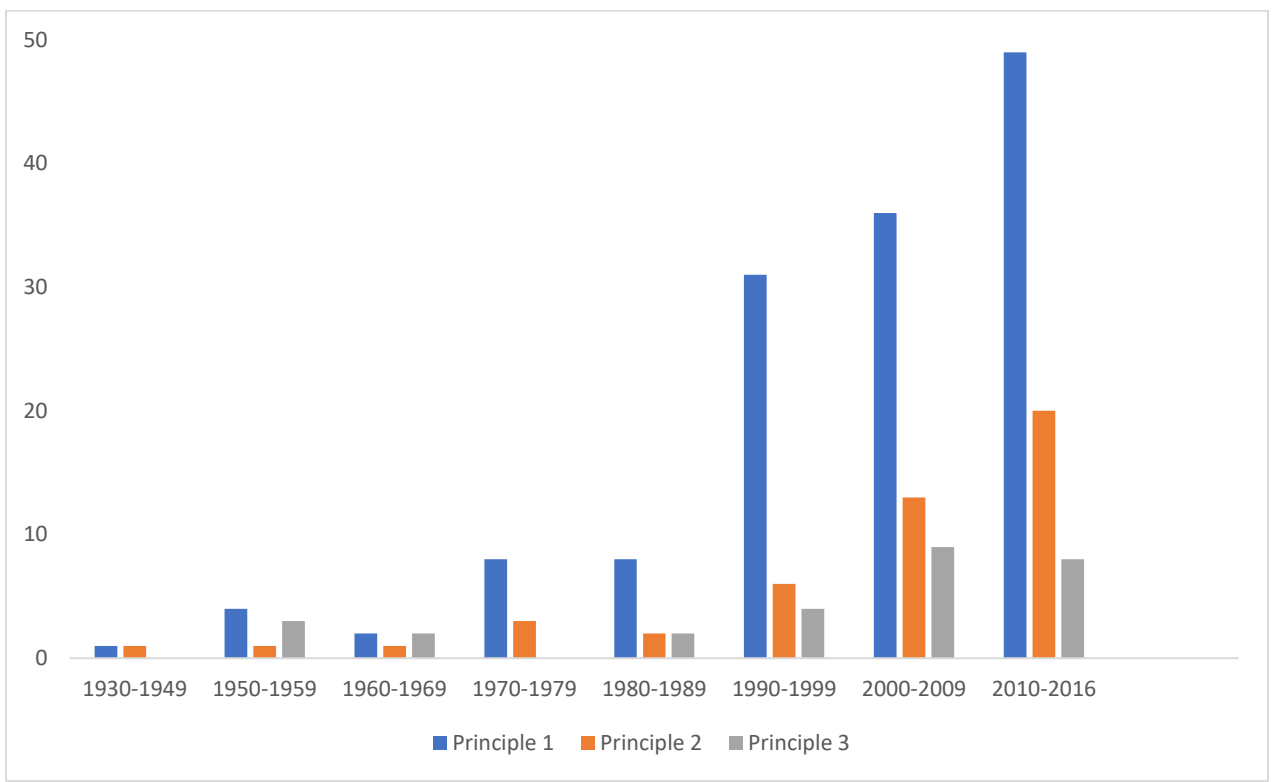
Emergence, Sensegiving, Sensemaking, and Self-identity in 4-person groups (A, B, C, D)

Self-Structure			Enacted Structure		
A's Self-identity	B's Self-identity	Identity Level (Brewer & Gardner, 1996)	Sensegiving	Sensemaking	Level of Analysis
Contextually primed leadership self-schema	Leader or follower self-schema activated	<i>Individual</i>	Leadership enactment based on match to self-schema and context (A)		<i>Individual</i>
Socially confirmed (or rejected) self-identity	Follower self-schema activated to support confirmation of A's leadership	<i>Relational (role relationships define social structure)</i>		Confirmation or denial of leadership act based on match to B's prototype	<i>Relational</i>
Exemplifies group prototype	B-D have adopted follower identity	<i>Collective definition of leader (exemplar model, but over time it can become prototype)</i>	Higher level structure emerges from local (AB, AC, AD etc.) relations (Hopfield, 1982)	Confirmation of denial based on shared, enacted understanding	<i>Group (interactions over time create meso structure)</i>

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Figure 1.

Frequency count of leadership emergence articles by principles from 1941 to 2016.



Note: The number of articles across principles one, two, and three will be greater than 189, due to some articles mapped onto multiple principles.

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Figure 2.

Illustration of differing levels of leadership entropy in the collective leadership identity (LI) activation process.

