**The Reciprocal Effects of Self-View as a Leader and Leadership Emergence**

Cécile Emery

Kim Daniloski

Anne Hamby

**Abstract**

While it is often assumed that an individual's self-view as a leader has an impact on that individual's emergence as a leader, there is currently no empirical evidence of this effect in the literature. The following paper uses longitudinal social network analysis to study both the impact of an individual's self-view as a leader on leadership emergence and how the process of leadership emergence influences an individual's self-view as a leader over time. Our results suggest a reciprocal process: an individual's self-view as a leader influences the number of leadership nominations an individual receives over time, and the number of leadership nominations received over time influences an individual's self-view as a leader.

*Keywords*: leadership emergence, self-concept, longitudinal network analysis

The Reciprocal Effects of Self-View as a Leader and Leadership Emergence

"You can be a leader if you see yourself as a leader" - Schwarzkopf

Emergent leadership is a dynamic social process during which individuals with no formal authority become leaders (Durham, Knight, & Locke, 1997; Neubert & Taggar, 2004). The process of leadership emergence is based on the group's acceptance and recognition of an individual as a leader and depends upon the individual, the followers, the situation, or an interaction between or among these components. Prior work has identified several individual-level characteristics associated with emerging leaders, such as gender, self-esteem, self-monitoring, cognitive skills, and emotional abilities (Mehra, Kilduff, & Brass, 2001; Kellett, Humphrey, & Sleeth, 2002, 2006). Another individual characteristic that warrants examination is an individual's self-view as a leader. Leadership scholars have recently recognized that self-conception as a leader is an important part of development as a leader (van Knippenberg & Hogg, 2003; van Knippenberg, van Knippenberg, De Cremer, & Hogg, 2004; Lord & Hall, 2005). However, despite acknowledgement from scholars of a relationship between self-view as a leader and leadership emergence, this assumption has never been tested. No quantitative studies to date have examined how an individual's self-view as a leader impacts leadership emergence.

The purpose of the current study is three-fold. First, we test the claim that "you can be a leader if you see yourself as a leader" by examining if one's self-view as a leader translates into leadership emergence. We argue that individuals who perceive themselves as leaders are more likely to receive leadership nominations over time. Second, we examine the impact that emerging as a leader has on one's self-view as a leader. We argue that, as individuals become more "popular" in terms of leadership nominations (i.e., emerge as a leader for the group), their perceptions of themselves as leaders are likely to become stronger. Finally, we examine how this process evolves over time. We argue that an individual's self-view as a leader and

an individual's leadership emergence reinforce each other, and both of these effects become stronger over time.

As the first study to model the reciprocal effects of self-view as a leader and leadership emergence, our research makes two contributions. First, we report empirical evidence that self-view as a leader and leadership emergence are closely related social processes. These findings bring an additional piece of evidence to research in leadership, self, and identity by illustrating how self-view as a leader and leadership emergence co-evolve and reinforce each other over time. Second, this study is the first to perform a longitudinal analysis on leadership networks to investigate the emergence of informal leaders in a natural, leaderless group. A network representation of leadership offers a more realistic picture of how leadership roles are shared among group members by including all group members, revealing emergent leaders, and capturing patterns of tie formation. We captured leadership networks for two cohorts, each at four points in time. We used actor oriented models to investigate how the leadership networks evolved over time. This approach allowed us to take into account (1) individual attributes and behaviors affecting network dynamics, (2) the influence of the leadership networks on individual attributes and behavior, and (3) the structural patterns underlying the network of leadership nominations. We believe this analytic strategy answers Ibarra, Kilduff, and Tsai's (2005) call for research on how social identity affects networks and how networks shape social identity by investigating how leadership emergence in a network and social identity (self-view as a leader) co-evolve over time.

## Theory

### The Impact of Self-View as a Leader on Leadership Nominations from Peers

The term "self-concept" appears frequently in contemporary social science. Despite varying uses of the term across disciplines, scholars agree the "self-concept" represents the "totality of the individual's thoughts and feelings having reference to himself as an object"

(Rosenberg, 1979, p.7). Self-concept can include both current and future or "possible" selves, which represent individuals' ideas of what they might become, would like to become, or are afraid of becoming (Markus & Nurius, 1986). Psychologists have long noted the stability of the self-concept and the existence of social processes that operate to perpetuate one's self-concept (James, 1890).

Self-concept is often examined as an antecedent to behavior. When individuals view themselves in a certain way (i.e., see themselves as having certain roles or characteristics), they act in accordance with that perceived self. This causal pattern has been documented across a variety of literatures. In marketing, self-concept has been shown to motivate the purchase of certain brands, which serve a symbolic function (Grubb & Grathwohl, 1967). Psychologists have predicted behavior from the Big Five personality dimensions related to the self-concept (Back, Schmukle, & Egloff, 2009). In the education field, self-concept has been demonstrated as an antecedent to academic achievement and performance outcomes (Midkiff, Burke, Hunt, & Ellison, 1986; Nicholls, 1979). Within the health domain, prior physical self-concept has been found to impact exercise behaviors (Marsh, Papaioannou, & Theodorakis, 2006). Research across a variety of fields suggests that self-concept leads to the performance of behaviors or attainment of an external state that is consistent with internal self-view.

The leadership literature also references the self-concept construct. Shamir, House, and Arthur (1993) showed that charismatic leaders have a transformational effect on their followers by engaging followers' group mission-relevant self-concepts. Hogue and Lord (2007) suggested that gender bias in leadership operates through female leaders' self-concepts as women, because there are aspects of this self-concept that have limiting effects on leadership activities. Schyns and Sczesny (2010) found support for the relationship between leadership-relevant attributes and the strength of occupational self-concept and self-

efficacy beliefs. Hogg, Abrams, Otten, and Hinkle (2004) used social identity theory to explain leadership and group decision making as group processes generated by social categorization and social identity. They call for further developments in this area.

The interplay between self-concept and behavior has not been explicitly tested in the leadership field. However, several authors have conjectured that this relationship underlies leadership emergence. Lord, Brown and Freiberg (1999) indicated that the self-identity that leaders create can have important implications for their followers' behavior, as well as on their followers' leadership perceptions. Van Knippenberg et al. (2004, p.498) pointed out that the "self and identity perspective may be fruitfully applied to understand leadership effectiveness from the angle of the leader (rather than follower) perspective…[and an] important source of such behaviors may be leader self-conception." Recently, Lord and Hall (2005) suggested that identifying oneself as a leader, and therefore adopting a provisional leadership identity, facilitates leadership emergence.

The relationship between an individual's self-concept as a leader and corresponding actions has never been the object of empirical examination in the leadership literature, but it has often been assumed. The process begins when an individual believes that he or she is a leader. The individual then acts in accordance with this self-concept (i.e., exhibits behaviors that are consistent with being a leader). As the individual displays behaviors associated with leadership, other group members, over time and frequency of social interaction, recognize the individual as a leader. Therefore, individuals perceiving themselves as leaders are likely to receive a high number of leadership nominations (i.e., emerge as leaders). Based on this process of converting an internal self-concept into external behaviors, we hypothesize:

*Hypothesis 1*: The stronger an individual's self-view as a leader, the more leadership nominations the individual receives over time.

**The Impact of Leadership Nominations from Peers on Self-View as a Leader**

A theoretically central idea in social psychology is the notion of the self as a social product, or the idea that the self is "not discovered absent of others, but is constituted in relation to others" (Sparrowe, 2005, p. 421). Cooley (1902, p. 183) argued that inter-subjectivity is the social process that shapes the individual self: "in imagining we perceive in another's mind some thought of our appearance, manners, aims, deeds, characters, friends, and so on, we are variously affected by it." This process is commonly termed the "looking glass self," implying that one's self-concept is the internalization of others' conceptions of the individual (Yeung & Martin, 2003). Social identity, a theoretical framework explicating the relationship between identity, group, and intergroup phenomena (Hogg, 2001a, 2001b, 2003; Hogg & Terry, 2000), also incorporates the idea of the looking glass self. The key assumption of social identity theory is that group membership defines one's identity (van Knippenberg & Hogg, 2003) through internal and external feedback extracted from social interactions within groups (Ashford, Blatt, & VandeWell, 2003; Cooley, 1902; Goffman, 1959). People behave in accordance with their self-view. By observing their own behavior (internal feedback), as well as other group members' acceptance or rejection of the behavior in question (external feedback), people maintain or modify their self-view (Ibarra, 1999).

The self as a social construction has guided research in various areas, including religion (Shaffer, 2008), immigrant identity (Wiley, Perkins, & Deaux, 2008), sibling interaction (Gamble & Yu, 2008; Van den bergh, 2006), group conflict (Jackson, 2008), and computer-mediated social identity management (Amaral & Monteiro, 2002). This construct also operates in the leadership domain (Lord & Brown, 2004; Lord & Hall, 2005; van Knippenberg et al., 2004). Hollander (1992) noted that an individual's leadership self-concept must be consistent with followers' perceptions in order for the individual to fulfill a leadership role. Leaders adjust their self-concept through interactions with, and feedback

from, group members (Hogue & Lord, 2007; Lord & Brown, 2004; Lord, Brown, & Freiberg, 1999; van Knippenberg et al., 2004). Similarly, Lord and Hall (2005, p. 596) state that social processes "serve to validate the leader's self-view as a leader. If attempts at leadership are not accepted by others, then it may be much more difficult to establish a self-view as a leader."

We believe that the "looking glass self" also plays a particular role in leadership emergence. Leadership emergence is a process in which a cluster of people come to view particular individuals as leaders within their group. These emergent leaders can have a significant influence in directing activities, creating aspects of culture, and influencing system outcomes (Wheelan & Johnston, 1996). During the leadership emergence process, the group-selected leaders realize that others perceive them as such. This perception of designated position leads them to view themselves as leaders. Individuals who receive an increasing number of leadership nominations observe and internalize their role (Lord & Hall, 2005) and solidify their self-view as a leader. Formally, we hypothesize:

*Hypothesis 2*:  The more leadership nominations an individual receives, the stronger

the individual's self-view as a leader becomes over time.

**Self-Concept and Leadership Emergence:  A Reciprocal Process**

Few research efforts have examined the reciprocal nature of the interactive processes between self-concept and performance. We argue that self and peer perceptions co-evolve to create a reinforcing mechanism driving leadership emergence. People who perceive themselves as leaders are more likely to receive leadership nominations over time. As these individuals become more popular in terms of leadership nominations (i.e., more and more group members perceive them as leaders), their view of themselves as a leader strengthens. The cycle repeats and reinforces both the individual's self-view as a leader and peers' perception of the individual as a leader.

One model of self-concept and performance that formally incorporates this co-evolutionary process is the Reciprocal Effects Model (REM; Marsh, 1990, 1993; Marsh & Craven, 1997). In the REM, a "causal relationship between a specific component of self-concept…and performance in a related area…is conceived as dynamic and reciprocal" (Marsh & Craven, 2006, p. 134). Individuals who think of themselves as capable in a particular domain tend to be successful in that domain. Their success leads them to have a positive self-concept in the particular domain. Support for the REM has been found in academic achievement (Byrne, 1996; Marsh, Byrne, & Yeung, 1999), exercise behavior (Marsh, Papaioannou, & Theodorakis, 2006), and sport performance (Marsh, Chanal, Sarrazin, & Bois, 2005; Marsh & Perry, 2005).

Importing ideas from the REM into the leadership literature is interesting since the reciprocal effects of self-view as a leader and leadership emergence are often assumed but infrequently tested. If a reciprocal relationship exists between self-view as a leader and leadership emergence, the effects should mutually reinforce each other and become stronger over time. Therefore, we hypothesize:

*Hypothesis 3*: The impact of an individual's self-view as a leader on the number of leadership nominations the individual receives will become stronger over time (i.e., H1 will become stronger over time) and the impact of the number of leadership nominations an individual receives on the individual's self-view as a leader will become stronger over time (i.e., H2 will become stronger over time).

We used a longitudinal form of social network analysis to formally test these reciprocal effects. Longitudinal social network analysis enables the examination of how the personal characteristics of individuals within a group co-evolve with the emergence of leaders in that group, while controlling for the structural effects present in a network.

**Method**

**Research Approach: Leadership as a Network of Perceptions**

Researchers of small group phenomena are increasingly using social network analysis to gain richer insight into group-level processes. For example, Sanders and Nauta (2004) made the case that it is helpful to focus on group-level mechanisms for explaining differences between individuals, and used social network analysis techniques to examine the relationship between social cohesiveness of a team and short-term absenteeism in the workforce. More recently, Huang (2009) used social network analysis to reflect the ways in which group members perceive each other and communicate. Selfhout et al. (2010) performed a longitudinal analysis of friendship networks among late adolescents to investigate the effects of the Big Five personality traits on the friendship selection processes.

To capture how leadership was distributed among group members, we "mapped" people's perceptions of leaders into a network where nodes represented individuals and arrows represented leadership nominations. The direction of the tie distinguished between leaders, who received the tie, from followers, who sent the tie. Therefore, an emergent leader was represented by a node receiving a high number of ties (i.e., leadership nominations).

Representing leadership as a network offers several advantages (Gronn, 2002; Mehra, Kilduff, & Brass, 2001). A network representation of leadership better preserves information about the actual pattern of leadership within a group (Mehra, Smith, Dixon, & Robertson, 2006), does not force the emergence of a single leader, includes all group members in the analysis (leaders and followers), and is able to capture higher order hierarchical structures (Carson, Tesluk, & Marrone, 2007). Leadership networks are best analyzed using social network techniques, and such techniques have already been applied to study leadership using cross-sectional data. For example, Balkundi, Barsness and Michael (2009) use social network analysis to examine formal leaders' relations with subordinates in an advice network and their

impact on team effectiveness and team visibility. They indicated the need for future, longitudinal research exploring how subordinates central in informal networks (i.e., emergent leaders) influence other subordinates in the advice network.

Since leadership emergence occurs over time, a longitudinal perspective and analysis of leadership networks provides the best opportunity to understand the process as it occurs in the real world. This offers the benefit of increased external and face validity. In this paper, we go beyond past research in leadership and social networks by adopting a longitudinal approach to understand how self-view of leadership and leadership emergence are dynamically related. As Katz et al. (2004) note in their overview of social network research, the main pitfall of a cross-sectional approach is that when network data are collected after groups have formed or worked together, it is difficult to understand the causal relationships within the networks. To avoid this pitfall, we take a longitudinal approach and examine a sample from the very beginning of their interaction as a group.

**Participants**

To test our hypotheses on the reciprocal effects of leadership emergence and self-view as a leader, we collected data from two cohorts of 83 students involved in a study abroad program in 2008 (40 participants) and 2009 (43 participants). Each group was put in the same social context (host city, university, living facilities, etc.) and had to satisfy the same requirements in terms of class, assignments, field projects, and travelling. Data for each group were collected at four periods of time at one month intervals, allowing us to capture the process of leadership emergence. All participants agreed to take part in the study and were present at each round of data collection. There were no missing data.

**Co-Evolution of Leadership and Self-View as a Leader**

**Leadership nominations.** Participants were required to visit several cities in Europe as part of their study abroad program. As a result, they traveled almost every weekend. The

program did not offer organized travel, so the students had to make their own arrangements (transportation, lodging, booking tickets to attractions, etc.). The majority of the students had never organized travel abroad, and the task was challenging. The situation facilitated the emergence of informal leaders to whom other group members could look for guidance and direction on the planning process.

To identify emergent leaders at each time period, participants were asked who they perceived as a leader when it came to travelling in the past month. No specific definition of the term "leader" was provided; we allowed individuals to operate from their own personal definitions. This approach is used when the intent is to capture respondents' personal and implicit theories of leadership (Carson et al., 2007; Mehra et al., 2006) and is consistent with the theoretical conception of a leader as someone who is perceived as such by others (Calder, 1977; Meindl, 1993; Van der Mescht, 2004).

Respondents were free to nominate as many leaders as they deemed appropriate from a list containing all participants' names from their respective cohorts. Answers were coded into a 83x83 binary adjacency matrix, where each cell, $X_{ij}$, corresponded to $i$'s relation to $j$ as reported by $i$. For example, if Jane perceived Bob as a leader, then the cell(Jane, Bob) was coded as 1; otherwise, the cell(Jane, Bob) was coded as 0. To separate the cohorts, we used 'structural zeros' (symbolized as a '10' in the adjacency matrices; Snijders et al., 2010) to indicate that leadership nominations between members of the different cohorts was not permitted. For example, if Jane was in cohort 1 and Bob was in cohort 2, it was impossible for Jane to nominate Bob as a leader since they did not belong to the same group. Therefore, cell(Jane, Bob) was coded as 10. Four matrices (one for each point in time) were constructed to display the nominated travel leaders.

--------------------------------

Insert Figure 1 about here

--------------------------------

**Self-view of leadership.** Participants were asked to assess their self-view of leadership at each time period: "How much of a leader did you see yourself as when it came to travel in the past month?" Respondents answered using a five-point scale ranging from "not at all" to "extremely." Self-report measures have been shown to be a reliable way of measuring leader self-perception, with several studies demonstrating their predictive validity. For example, self-reports of leadership self-perception have been found to be predictive of the amount of leadership experiences individuals had during their youth (Amit, Popper, Gal, Mamane-Levy, & Lisak, 2009), leadership self efficacy (Van der Mescht, 2004), and attitude toward leadership and leadership emergence (Kolb, 1999).

**Empirical Model Specification**

Actor-based models use a longitudinal strategy to examine the interdependence between network evolution and the evolution of individual attributes (Snijders, Steglich, & Schweinberger, 2007). Using this method, the "complete network structure as well as relevant actor attributes are studied as joint dependent variables in a longitudinal framework where the network structure and the individual attributes mutually influence one another" (Steglich, Snijders, & Pearson, 2010, p. 1). In other words, changes in the network (i.e., changes in pattern of leadership nominations), as well as changes in individual attributes (i.e., changes in individuals' views of themselves as leaders) are both dependent variables in our analysis.

The co-evolution of network and individual attributes arises when relationships in the network are influenced by individuals' attributes (a selection process) and individual attributes are influenced by the relationship in the network (an influence process; Snijders, 2009; Snijders, Steglich, & van de Bunt, 2010). To model both processes, actor-oriented models assume that individuals are responsible for the evolution of networks and attributes

by optimizing two objective functions. The first objective function represents an actor's evaluation of a certain network configuration compared to the current state of the network (Snijders, 2009). To optimize their evaluation, actors can create, delete, or maintain ties with other actors. In other words, actors are responsible for selecting other group members, i.e., nominating them as leaders. In the current study, actors can change the individuals they nominate as leaders to create their preferred leadership network. The second objective function models an influence process: it represents how actors' evaluations of themselves are influenced by the relationship in the network. Actors can increase, decrease, or maintain their score on these attributes to maximize their objective function. In the current study, actors can change their self-view as a leader.

**Modeling the selection process.** The selection process modeled how an actor's self-view as a leader influenced the evolution of leadership nominations. We tested whether actors who strongly perceived themselves as leaders were more likely to receive an increasing number of nominations over time (i.e., were more likely to emerge as leaders, H1).

Since leadership emergence cannot solely be attributed to self-view of leadership, we included three types of control variables in our analysis. First, we included individual attributes that have been shown to impact leadership emergence. Second, we controlled for the effect of prior friendship networks. Third, we included several network effects representing common patterns of tie formation that are known to shape the evolution of a network.

*Individual attributes: demographic.* We included a variable representing gender, as previous research has demonstrated that men emerge as leaders when an activity is task-oriented and women emerge as leaders when an activity is socially-oriented (Karakowsky & Siegel, 1999). We also included a variable for each cohort in order to control for cohort effects.

*Individual attributes: cognitive.* Prior work has demonstrated a consistently positive relationship between intelligence and leadership emergence (Lord, de Vader, & Alliger, 1986; Taggar, Hackett, & Saha, 1999). We used grade point average (GPA) as a proxy for cognitive abilities (Valacich, Jung, & Looney, 2006).

*Individual attributes: emotional.* Research has shown people with greater empathy (i.e., the ability to perceive other's emotions as if they were one's own) are more likely to emerge as leaders (Kellet et al., 2002, 2006; Wolff, Pescosolido, & Druskat, 2002). Empathy was assessed using the "perceiving emotions" sub-scale of the Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, Caruso, & Sitarenios, 2003; Mayer, Roberts, & Barsade, 2008).

*Individual attributes: social.* High self-monitors are more skilled at social interactions and are more likely to use collaboration and compromises to resolve conflicts (Zaccaro, Foti, & Kenny, 1991). Because of their social skills, high self-monitors tend to emerge as leaders (Zaccaro et al., 1991; Mehra et al., 2001). To control for social abilities, we included Snyder's 25-item self-monitoring scale (1974; Cronbach's alpha = .696).

Tables 1 summarizes the descriptive statistics for our individual attribute variables.

--------------------------------

Insert Table 1 about here

--------------------------------

*Prior friendships.* We controlled for the effect of an initial friendship network on the emergence of leaders. The initial friendship network was assessed before the study abroad program began by asking participants who they considered friends. In this particular network, a tie would be present between Jane and Bob if Jane saw Bob as a friend. This time-constant network was included to control for the impact of previous friendships on the subsequent perception of leaders.

*Network effects.* The formation of a network is characterized by the tendency to self-organize into a variety of structures. Such structures, or patterns formed by ties in the network, imply that the presence of certain ties is highly dependent on the presence of other ties. We controlled for several common patterns of tie formation that are known to shape the evolution of a network. *Outdegree* describes the tendency of individuals to selectively nominate leaders (i.e., to not randomly nominate others as a leaders). *Reciprocity* captures the tendency of ties to be mutually shared. In our study, it refers to the tendency to reciprocate leadership nominations. *Transitivity* is a representation of network closure (Holland & Leinhardt, 1971). In our study, transitivity implies that if Jane nominates Bob as a leader, and Bob nominates Fred as a leader, then Jane will nominate Fred as a leader. *Cyclic ties* denote the tendency for a relationship to be cyclical (Snijders et al., 2010) and measures "anti-hierarchical closure" (Snijders et al., p.21). In our study, this denotes a triadic formation in which Jane nominates Bob as a leader, Bob nominates Fred as a leader, and Fred nominates Jane as a leader. Finally, *popularity* signifies that actors who receive a large number of ties become more popular over time and continue to receive an increasing number of ties. In our models, popularity captured the emergence of leaders and their tendency to receive more nominations over time.

**Modeling the influence process.** The influence process was defined to model how the network of leadership nominations influenced an individual's self-view as a leader. The influence process contained three basic effects: a shape effect, the effect of self-view as a leader on itself, and the effect of nominations on self-view as a leader. The first two effects model basic tendencies in determining the shape of the long-term distribution of behavior change that, as a requirement of actor-oriented models, should always be included as controls (Ripley & Snijders, 2010). The shape effect expresses the basic drive toward high values on an individual attribute. The effect of self-view on itself represents the effect of an individual

attribute or behavior on itself (i.e., a feedback effect). Positive feedback effects imply that the effect of an individual attribute or behavior on itself is addictive; in other words, as the value of the attribute increases, the individual craves more and more of that attribute. When the feedback parameter is negative, the attribute or behavior reaches a point of diminishing return.

Our main interest in modeling the influence process was to capture how an individual's self-view as a leader was affected by the network of leadership nominations. We accomplished this by including the effect of nominations on self-view. The effect of nominations on self view represents the effect of the network on an individual attribute or behavior. A positive parameter implies that actors who are more "popular" (i.e., who *receive* a greater number of ties) have a stronger tendency toward high values on the individual attribute or behavior (Snijders et al., 2010). In this case, it allowed us to test whether individuals' views of themselves as leaders increased as a function of peer leadership nominations (H2).

**Results**

To examine hypotheses 1 and 2, we modeled the co-evolution of the leadership nomination network and individual attributes across all four time periods. We conducted our analysis using SIENA (Simulation Investigation for Empirical Network Analysis), a statistical software for running actor-oriented models. Results are reported in Table 2, which contains the coefficients, standard errors, and significance levels for the variables influencing the co-evolution of the emergence of travel leaders and individuals' self-view as a leader.

--------------------------------

Insert Table 2 about here

--------------------------------

When interpreting the co-evolution of a network and individual attributes, there are two processes to consider: the selection process and the influence process (Snijders et al. 2010).

**The Selection Process**

The selection process represents how the network changes as a function of itself (i.e., network effects) and the actors' individual attributes (i.e., self-view as a leader and our covariates).

**Network effects.** We found strong evidence that structural effects played a role in the emergence of leaders. The outdegree parameter was negative ($\beta$ = -.787; $p$ < .05), which implies, on average, that actors tended to reduce the number of people they perceived as leaders over time. That is, as experiences and exchanges with others increased over time, group members refined their perception of group leaders. The reciprocity parameters ($\beta$ = .518; $p$ < .05) suggest there was some tendency toward reciprocating leadership nominations within the group. A positive parameter for transitivity ($\beta$ = .242; $p$ < .01) and a negative parameter for cyclic ties ($\beta$ = -.152; $p$ < .01) suggests that leadership networks were strongly hierarchical (p.12, Snijders et al., 2009). Finally, a positive popularity effect ($\beta$ = .019; $p$ < .01) implies that emergent leaders tended to become more popular over time.

**Prior friendships.** The positive coefficient ($\beta$ = .226; $p$ < .01) on initial friendship networks indicates that individuals were more likely to nominate those they had indicated they were friends with before the start of the trip as leaders.

**Individual attributes.** Our models report *receiver effects*, which capture the tendency for actors who score high on a covariate to *receive* a greater number of ties (i.e., leadership nominations over time) compared to individuals scoring low on the same covariate. None of the individual-level attributes we controlled for (cognitive, emotional, and social capabilities, gender, and cohort) reached significance. The coefficient on our primary variable of interest

in the selection process, self-view as a leader, was positive ($\beta$ = .099; $p < .01$). This indicates that people who strongly perceived themselves as leaders were more likely to receive leadership nominations over time, supporting H1.

**The Influence Process**

The influence process models how actors' individual attributes change as a function of themselves and of the network (Snijders et al., 2010). The effect of self-view on itself was negative ($\beta$ = -.245; $p < .01$), meaning individuals eventually reached a point of diminishing utility to increasing their self-view as a leader. The shape effect was not significant.

Our main coefficient of interest was the effect of nominations on self-view as a leader. The coefficient for this parameter was positive and significant ($\beta$ = .040; $p < .05$), implying that people receiving a greater number of leadership nominations (i.e., a greater number of incoming ties) have a higher tendency to view themselves as leaders. This supports H2.

To examine our third hypothesis, (i.e., that the effects of H1 and H2 become stronger over time), we reproduced our model of the co-evolution of the network and individual attributes for each of the four time periods separately in order to more closely examine how our parameters of interest (e.g., the impact of leadership nominations on self-view as a leader) developed and evolved over time (see Figure 2).

--------------------------------

Insert Figure 2 about here

--------------------------------

Results are reported in Table 3. The coefficients on our two main constructs of interest, "Self-View Leader" and "Effects of Nominations on Self-View," increased over time, both in absolute value and significance. These results suggest that a reciprocal relationship exists between self-view of leadership and leadership emergence, as the effects

mutually reinforce each other and become stronger over time, supporting H3. To statistically

examine whether our parameters of interest changed over time, we performed a score test for

parameter heterogeneity across the different waves (Lospinoso, Schweinberger, Snijders, &

Ripley, 2010). We failed to reject the null hypothesis of time homogeneity at a 5% level,

implying that the modeled selection and influence processes did not significantly change over

time. This test suggests H3 is not supported. Therefore, support for H3 is mixed.

--------------------------------

Insert Table 3 about here

--------------------------------

**Discussion**

In this paper, we used a longitudinal approach to investigate the role taking and peer

perceptual processes that determine leadership emergence. We found that people who

perceived themselves as leaders were more likely to receive leadership nominations over time

(supporting H1), and individuals receiving more leadership nominations over time were more

likely to see themselves as leaders (supporting H2). As no quantitative studies to date have

examined how an individual's self-view as a leader impacts leadership emergence (Ibarra et

al., 2005), we believe this study makes two main contributions to the literature. Firstly, we

provide empirical support for claims that (1) perceiving oneself as a leader helps one become

a leader and (2) emerging as a leader reinforces one's self-view as a leader. Secondly, we

demonstrate that longitudinal social network techniques can be used to enhance our

comprehension of the social process of leadership emergence.

We believe these results have applied implications for practitioners and human

resource consultants. First, our finding that self-view as a leader impacts the leadership

emergence of young adults suggests that leadership training needs to go beyond teaching

effective behaviors to novice leaders (Dvir, Eden, Avolio, & Shamir, 2002). Time should also

be dedicated to strengthening trainees' self-views as a leaders. As noted by Lord and Hall (2005), developing leadership skills requires proactive behaviors which are facilitated "by seeing oneself as a potential leader and adopting a provisional identity" (p.596). Individuals with solidified leadership identities will act in accordance with their self-concept and exhibit observable leadership behaviors. Second, our finding that leadership nominations from peers impact one's self-view as a leader highlights the importance of feedback in shaping leadership identity. While positive feedback (i.e., a greater number of leadership nominations) reinforces and solidifies one's self-view as a leader, negative feedback may have the opposite effect (Lord & Hall, 2005). Social feedback is important in shaping one's self-view as a leader.

We also found mixed evidence that the impact of leadership self-view on leadership emergence and the impact of leadership emergence on leadership self-view became stronger over time (H3). While we found a trend toward greater and stronger coefficients on our variables of interest (the impact of self-view on leadership networks and, in parallel, the impact of leadership networks on self-view), a test of parameter heterogeneity revealed no significant changes over time. Our results suggest that a "smooth" process of leadership emergence and construction of self-view took place across the four time periods.

We believe two elements can explain our weak support for the reinforcing process between leadership emergence and self-view (H3). First, our time frame may not have been long enough. We collected data in one month intervals over a period of four months. It is possible that four months is not long enough to strongly shape one's self-view as a leader. Second, our social context may help explain this result. Compared to organizational settings, in which emergent leaders may experience social advancement, formal recognition, and financial rewards, emergent leaders in the social context of this study gained only social recognition as leaders. This finding raises a few interesting questions. Can we identify social

settings in which the reinforcing process of leadership emergence and self-view as a leader is stronger?  Are there triggers, such as feedback, that accelerate, or decelerate, the reinforcing process?

**Limitations and Future Directions**

One limitation of the study is its social context. Respondents were students involved in a study-abroad program, and this context does not necessarily represent the challenges of real-world organizations. One major difference between our context and a workplace organization is the existence of a prior organizational structure. In our group of students, each individual began on equal footing and had equal opportunity to gain acceptance as a leader by the group. In many organizations, the emergence of individuals who gain their leadership role from the group's recognition (i.e., informal leaders) occurs in a hierarchical context (i.e., within the context of a formal leadership structure) oriented toward performance. While it is unknown how a hierarchical structure will impact the reciprocal effects of self-view as a leader and leadership emergence, it is likely these processes may be triggered or restricted by organizational factors. For example, it is possible that one's self-view as a leader may be impacted by whether one is endowed with a formal leadership role. It may also be difficult for individuals with no formal leadership role to gain acceptance as leaders by the group. Future studies may build upon our efforts by examining the relationship between self-view as a leader and leadership emergence in organizational contexts and other leadership domains.

One outcome from our study was that individual attributes (i.e., emotional, cognitive, and social capabilities) were not significantly related to leadership emergence. The extant research provides conflicting results regarding the impact of individual differences on leadership emergence. Some work (e.g., Wolff, Pescosolido, & Druskat, 2002; Zaccaro, Foti, & Kenny, 1991) has found support for this relationship. Other work, however, has noted that situational factors may moderate the relationship between individual factors and leadership

emergence (e.g., Judge et al. 2002). One possible explanation for our findings is that our student population created a restriction of range on our measures of individual abilities. Our sample was a relatively homogenous group of undergraduate business students selected for a study abroad program based on their GPA. It is possible the range of their individual differences was relatively narrow and not large enough to contribute to meaningful differences in leadership emergence.

While the current study demonstrates reciprocal effects between self-view as a leader and leadership emergence, the process by which this occurs is still an open question. Future studies may address the role of mediators in this process. The process through which cues from peers translate into one's self-view as a leader, how individuals come to know that they have been identified as emergent leaders by the group, and how the individual internalizes this information to become part of their self-concept is also open for examination in the leadership literature.

Finally, future efforts may investigate the boundary conditions of the processes examined in this paper. The reinforcing relationship between self-view as a leader and leadership emergence may operate unexpectedly under various situational and individual conditions. A finer understanding of the conditions under which this model operates effectively would have important real-world implications.

**Conclusion**

As emphasized by Balkundi and Kilduff (2005), synergies between leadership research and social network approaches require "a new integration of network theory and methods to account for not just structural patterns, but also the focused activities of powerful individuals" (Balkundi & Kilduff, 2005, p.957). In this paper, we illustrated how leadership and group research can benefit from longitudinal analysis of leadership networks. Tracking leadership networks over time using actor-oriented models can account for (1) the individual

characteristics and behaviors that influence network dynamics, (2) the network dynamics that shape individual behavior and social identity, and (3) the structural patterns that underlie the evolution of a group (Ibarra et al., 2005). The method of applying longitudinal actor-oriented models to the analysis of small group networks has the potential to open new investigations by addressing complex questions on the simultaneous roles of leaders' and followers' values and identities in leadership emergence.

References

Amaral, M., & Monteiro, M. (2002). To Be Without Being Seen: Computer-Mediated

Communication and Social Identity Management. *Small Group Research*, *33*, 575-589.

doi:10.1177/104649602237171

Amit, K., Popper, M., Gal, R., Mamane-Levy, T., & Lisak, A. (2009). Leadership-shaping

experiences:  a comparative study of leaders and non-leaders. *Leadership &*

*Organization Development Journal, 30*, 302-318. doi:10.1108/01437730910961658

Ashford, S. J., Blatt, R., & VandeWell, D. (2003). Reflections on the looking glass:  A review

of research on feedback-seeking behavior in organizations. *Journal of Management, 29*,

773-799. doi:10.1016/S0149-2063(03)00079-5

Back, M. D., Schmukle, S. C., & Egloff, B. (2009). Predicting actual behavior from the

explicit and implicit self-concept of personality, *Journal of Personality and Social*

*Psychology, 97*, 533-548. doi:10.1037/a0016229

Balkundi, P., Barsness, Z., & Michael, J. (2009). Unlocking the influence of leadership

network structures on team conflict and viability. *Small Group Research, 40*, 301-322.

doi:10.1177/1046496409333404

Balkundi, P., & Kilduff, M. (2005). The ties that lead: A social network approach to

leadership. *Leadership Quarterly, 16*, 941-961. doi:10.1016/j.leaqua.2005.09.004

Byrne, B. M. (1996). Academic self-concept:  Its structure, measurement, and relation to

academic achievement. In  B. A. Bracken  (Ed.), *Handbook of self-concept* (pp. 287–316).

New York, NY:  Wiley.

Calder, B. J. (1977). An attribution theory of leadership. In B. M. Staw, & G. R. Salancik

(Eds.), *New directions in organizational behavior* (pp. 179–204). Chicago, IL:  St.

Clair.

Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams:  an

investigation of antecedent conditions and performance. *Academy of Management

Journal, 50*, 1217-1234. doi:10.2307/20159921

Cooley, C. H. (1902). *Human nature and the social order*. New York, NY:  Scribners.

Durham, C. C., Knight, D., & Locke, E. A. (1997). Effects of leader role, team-set goal

difficulty, efficacy, and tactics on team effectiveness. *Organizational Behavior and

Human Decision Processes, 72*, 203-231. doi:10.1006/obhd.1997.2739

Dvir, T., Eden, D., Avolio, B . J., & Shamir, B. (2002). Impact of transformational leadership

on follower development and performance: A field experiment. *Academy of

Management Journal, 45*, 735-744. doi:10.2307/3069307

Gamble, W. C., & Yu, J. J. (2008). Adolescent Siblings' Looking Glass Self-Orientations:

Patterns of Liabilities and Associations with Parenting. *Journal of Youth and

Adolescence, 37*, 860-874. doi:10.1007/s10964-008-9276-9

Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, NY:  Doubleday.

Gronn, P. (2002). Distributed leadership as unit of analysis. *Leadership Quarterly, 13*, 423-

451. doi:10.1016/S1048-9843(02)00120-0

Grubb, E. L., & Grathwohl, H. L. (1967). Consumer self-concept, symbolism and market

behavior: A theoretical approach. *Journal of Marketing, 31*, 22-27.

doi:10.2307/1249461

Hogg, M. A. (2001a). A social identity theory of leadership. *Personality and Social

Psychology Review*, *5*, 184–200. doi:10.1207/S15327957PSPR0503_1

Hogg, M. A. (2001b). From prototypicality to power:  A social identity analysis of

leadership. In S. R. Thye, E. J. Lawler, M. W. Macy & H. A. Walker (Eds.), *Advances

in Group Processes* (pp. 1–30). Oxford, UK:  Elsevier.

Hogg, M. A. (2003). Social identity. In M. R. Leary & J. P. Tangney (Eds.), *Handbook of Self and Identity* (pp. 462–479). New York, NY:  Guilford.

Hogg, M., Abrams, D., Otten, S., & Hinkle, S. (2004). The social identity perspective: Intergroup relations, self-conception, and small groups. *Small Group Research*, *35*. doi:10.1177/1046496404263424

Hogg, M. A., & Terry, D. J. (2000). Social identity and self-categorization processes in organizational contexts. *Academy of Management Review*, *25*, 121–140. doi:10.2307/259266

Hogue, M., & Lord, R. G. (2007). A multilevel, complexity theory approach to understanding gender bias in leadership. *Leadership Quarterly, 18*, 370-390. doi:10.1016/j.leaqua.2007.04.006

Holland, P. W., & Leinhardt, S. (1971). Transitivity in structural models of small groups. *Comparative Group Studies, 2*, 107-124.

Hollander, E. P. (1992). Leadership, followership, self, and others. *Leadership Quarterly, 3*, 43-54. doi:10.1016/1048-9843(92)90005-Z

Huang, M. (2009). A conceptual framework of the effects of positive affective relationships on group knowledge networks. *Small Group Research, 40*, 323-346. doi:10.1177/1046496409332441

Ibarra, H. (1999). Provisional selves:  Experimenting with image and identity in professional adaptation. *Administrative Science Quarterly, 44*, 764-791. doi:10.2307/2667055

Ibarra, H., Kilduff, M., & Tsai, W. (2005). Zooming in and out:  Connecting individuals and collectivities at the frontier of organizational network research. *Organization Science*, *16*, 359-371. doi:10.1287/orsc.1050.0129

James, W. (1890). *The principles of psychology*. New York, NY: Holt.

Jackson, J. (2008). Reactions to social dilemmas as a function of group identity, rational

    calculations, and social context. *Small Group Research*, *39*, 673-705.

    doi:10.1177/1046496408322761

Judge, T. A., Colin, A. E., & Ilies, R. (2004). Intelligence and leadership: A quantitative

    review and test of theoretical propositions. *Journal of Applied Psychology*, *89*, 542-552.

    doi:10.1037/0021-9010.89.3.542

Karakowsky, L., & Siegel, J. P. (1999). The effects of proportional representation and gender

    orientation of the task on emergent leadership behavior in mixed-gender work groups.

    *Journal of Applied Psychology, 84*, 620-631. doi:10.1037/0021-9010.84.4.620

Katz, N., Lazer, D., Arrow, H., & Contractor, N. (2004). Network theory and small groups.

    *Small Group Research, 35*, 307-332. doi:10.1177/1046496404264941

Kellett, J. B., Humphrey, R. H., & Sleeth, R. G. (2002). Empathy and complex task

    performance:  Two routes to leadership. *Leadership Quarterly, 13*, 523-544.

    doi:10.1016/S1048-9843(02)00142-X

Kellett, J. B., Humphrey, R. H., & Sleeth, R. G. (2006). Empathy and the emergence of task

    and relations leaders. *Leadership Quarterly, 17*, 146-162.

    doi:10.1016/j.leaqua.2005.12.003

Kolb, J. (1999). The effect of gender role, attitude toward leadership, and self-confidence on

    leader emergence: Implications for leadership development. *Human Resource

    Development Quarterly, 10*, 305-320. doi:10.1002/hrdq.3920100403

Lord, R. G., & Brown, D. J., (2004). *Leadership processes and follower self-identity*.

    Mahwah, NJ:  Lawrence Erlbaum Associates.

Lord, R. G., Brown, D. J., & Freiberg, S. J. (1999). Understanding the dynamics of

    leadership:  The role of follower self-concepts in the leader/follower relationship.

*Organizational Behavior and Human Decision Processes*, *78*, 167-203.

doi:10.1006/obhd.1999.2832

Lord, R. G., de Vader, C. L., & Alliger, G. M. (1986). A meta-analysis of the relation

between personality traits and leadership perceptions: An application of validity

generalization procedures. *Journal of Applied Psychology, 71*, 402-410.

doi:10.1037/0021-9010.71.3.402

Lord, R. G., & Hall, R. J. (2005). Identity, deep structure and the development of leadership

skill. *Leadership Quarterly, 16*, 591–615.

Lospinoso, J. A., Schweinberger, M., Snijders, T. A. B., & Ripley, R. M. (2010). Assessing

and Accounting for Time Heterogeneity in Stochastic Actor Oriented Models. *Advances

in Data Analysis and Computation. Special Issue on Social Networks.* Submitted.

Marsh, H. W. (1990). A multidimensional, hierarchical self-concept: Theoretical and

empirical justification. *Educational Psychology Review, 2*, 77–171.

doi:10.1007/BF01322177

Marsh, H. W. (1993). Academic self-concept: Theory, measurement, and research. In J. Suls

(Ed.), *Psychological perspectives on the self* (pp. 59–98). Hillsdale, NJ: Erlbaum.

Marsh, H. W., Byrne, B. M., & Yeung, A. S. (1999). Causal ordering of academic self-

concept and achievement: Reanalysis of a pioneering study and revised recommendations.

*Educational Psychologist, 34*, 154–157. doi:10.1207/s15326985ep3403_2

Marsh, H. W., Chanal, J. P., Sarrazin, P. G., & Bois, J. E. (2005). Self-belief does make a

difference: A reciprocal effects model of the causal ordering of physical self-concept and

gymnastics performance. *Journal of Sport Sciences, 27*, 53–70.

Marsh, H. W., & Craven, R. (1997). Academic self-concept: Beyond the dustbowl. In G.

Phye (Ed.), *Handbook of classroom assessment: Learning, achievement, and adjustment*

(pp. 131–198). Orlando, FL: Academic Press.

Marsh, H. W., & Craven, R. (2006). Reciprocal effects of self-concept and performance from a multidimensional perspective. *Perspectives on Psychological Science, 1*, 133-163. doi:10.1111/j.1745-6916.2006.00010.x

Marsh, H. W., Papaioannou, A., & Theodorakis, Y. (2006). Causal ordering of physical self-concept and exercise behavior:  Reciprocal effects model and the influence of physical education teachers. *Health Psychology, 25*, 316-328. doi:10.1037/0278-6133.25.3.316

Marsh, H. W., & Perry, C. (2005). Does a positive self-concept contribute to winning gold medals in elite swimming? The causal ordering of elite athlete self-concept and championship performances. *Journal of Sport & Exercise Psychology, 27*, 71–91.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist, 41*, 954-969. doi:10.1037/0003-066X.41.9.954

Mayer, J. D., Salovey, P., Caruso, D. R., & Sitarenios, G. (2003). Measuring emotional intelligence with the MSCEIT. *Emotion, 3*, 97-105. doi:10.1037/1528-3542.3.1.97

Mayer, J. D., Roberts, R. D., & Barsade, S. G. (2008). Human abilities:  emotional intelligence. *Annual Review of Psychology*, *59*, 507–536. doi:10.1146/annurev.psych.59.103006.093646

Mehra, A., Kilduff, M., & Brass, D. J. (2001). The social networks of high and low self-monitors:  implications for the workplace performance. *Administrative Science Quarterly, 46*, 121-146. doi:10.2307/2667127

Mehra, A., Smith, B. R., Dixon, A. L., & Robertson, B. (2006). Distributed leadership in teams:  the network of leadership perceptions and team performance. *Leadership Quarterly, 17*, 232-245. doi:10.1016/j.leaqua.2006.02.003

Meindl, J. (1993). Reinventing leadership:  A radical, social psychological approach. In J. K. Murnighan (Ed.), *Social psychology in organizations* (pp. 89–118). Englewood Cliffs, NJ:  Prentice Hall.

Midkiff, R. M., Burke, J. P., Hunt, J. P., & Ellison, G. C. (1986). The role of self-concept of academic attainment in achievement-related behaviors. *Psychological Reports*, *58*, 151-159.

Neubert, M. J., & Taggar, S. (2004). Pathways to informal leadership: The moderating role of gender on the relationship of individual differences and team member network centrality to informal leadership emergence. *Leadership Quarterly, 15*, 175-194. doi:10.1016/j.leaqua.2004.02.006

Nicholls, J. (1979). Development of perception of attainment and causal attributions for success and failure in reading. *Journal of Educational Psychology*, *71,* 94–99. doi:10.1037/0022-0663.71.1.94

Ripley, R. M., & Snijders, T. A. B. (2010). *Manual for SIENA Version 4.0*.

Rosenberg, M. (1979). *Conceiving the self.* New York, NY: Basic Books.

Sanders, K., & Nauta, A. (2004). Social cohesiveness and absenteeism: the relationship between characteristics of employees and short-term absenteeism within an organization. *Small Group Research, 35*, 724-741. doi:10.1177/1046496404267186

Schyns, B., & Sczesny, S. (2010). Leadership attributes valence in self-concept and occupational self-efficacy. *The Career Development International, 15*, 78-92. doi:10.1108/13620431011020907

Selfhout, M., Burk, W., Branje, S., Denissen, J., van Aken, M., & Meeus, W. (2010). Emerging late adolescent friendship networks and big five personality traits: A social network approach. *Journal of Personality*, *78*, 509-538. doi:10.1111/j.1467-6494.2010.00625.x

Shaffer, D. R. (2008). *Social and personality development*. Belmont, CA: Wadsworth, Cengage Learning.

Shamir, B., House, R. J., & Arthur, M. B. (1993). The motivational effects of charismatic

    leadership: A self-concept based theory. *Organization Science, 4*, 557-594.

    doi:10.1287/orsc.4.4.577

Snijders, T. A. B. (2009). Longitudinal methods of network analysis. In B. Meyers (Ed.),

    *Encyclopedia of Complexity and System Science* (pp. 5998-6013). New York, NY:

    Springer Verlag.

Snijders, T. A. B., Steglich, C. E. G., & van de Bunt, G. G. (2010). Introduction to actor-

    based models for network dynamics. *Social Networks, 32*, 44-60.

    doi:10.1016/j.socnet.2009.02.004

Snijders, T. A. B., Steglich, C. E. G., & Schweinberger, M. (2007). Modeling the co-

    evolution of networks and behavior. In K. van Montfort, H. Oud & A. Satorra (Eds.),

    *Longitudinal models in the behavioral and related sciences* (pp. 41-71). Mahwah, NJ:

    Lawrence Erlbaum.

Sparrowe, R. T. (2005). Authentic leadership and the narrative self. *Leadership Quarterly*,

    *16*, 419-439. doi:10.1016/j.leaqua.2005.03.004

Snyder, M. (1974). Self-monitoring of expressive behavior. *Journal of Personality and Social*

    *Psychology, 30*, 526-537. doi:10.1037/h0037039

Steglich, C. E. G., Snijders, T. A. B., & Pearson, M. (2010). Dynamic Networks and

    Behavior: Separating Selection from Influence. *Sociological Methodology*, To be

    published. doi:10.1111/j.1467-9531.2010.01225.x

Taggar, S., Hackett, R., & Saha, S. (1999). Leadership emergence in autonomous work

    teams: antecedents and outcomes. *Personnel Psychology*, *52*, 899–926.

    doi:10.1111/j.1744-6570.1999.tb00184.x

Valacich, J. S., Jung, J. H., & Looney, C. A. (2006). The effects of individual cognitive

    ability and idea stimulation on idea-generation performance. *Group Dynamics:  Theory,*

    *Research, and Practice*, *10*, 1-15. doi:10.1037/1089-2699.10.1.1

Van den bergh, B. R. H. (2006). Influences of distal and proximal family environment

    variables on the pre-adolescents' self-concept. In A. P. Prescott (Ed.), *The concept of self*

    *in education, Family and Sports* (pp. 153-177). New York, NY: Nova Science.

Van der Mescht, H. (2004). Phenomenology in education:  A case study in educational

    leadership. *Indo-Pacific Journal of Phenomenology, 4*, 1-16.

van Knippenberg, D., & Hogg, M. A. (2003). A social identity model of leadership

    effectiveness in organizations. *Research in Organizational Behavior, 25*, 243-295.

    doi:10.1016/S0191-3085(03)25006-1

van Knippenberg, D., van Knippenberg, B., De Cremer, D., & Hogg, M. A. (2004).

    Leadership, self, and identity:  A review and research agenda. *Leadership Quarterly*,

    *15*, 825-856. doi:10.1016/j.leaqua.2004.09.002

Wheelan, S.A., & Johnston, F. (1996). The role of informal member leaders in a system

    containing formal leaders. *Small Group Research*, *27*, 33-55.

    doi:10.1177/1046496496271002

Wiley, S., Perkins, K., & Deaux, K. (2008). Through the looking glass: Ethnic and

    generational patterns of immigrant identity. *International Journal of Intercultural*

    *Relations*, *32*, 385-398. doi:10.1177/1046496496271002

Wolff, S. B., Pescosolido, A. T., & Druskat, V. U. (2002). Emotional intelligence as the basis

    for leadership emergence in self-managing teams. *Leadership Quarterly*, *13*, 505-522.

    doi:10.1016/S1048-9843(02)00141-8

Yeung, K. T., & Martin, J. L. (2003). The looking glass self:  An empirical test and

    elaboration. *Social Forces*, *81*, 843-879. doi:10.1353/sof.2003.0048

Zaccaro, S. J., Foti, R. J., & Kenny, D. A. (1991). Self-monitoring and trait-based variance in

leadership: An investigation of leader flexibility across multiple group situations.

*Journal of Applied Psychology*, *76*, 308-315. doi:10.1037/0021-9010.76.2.308

Table 1

*Means, Standard Deviations, and Correlations for the Individual Attribute Variables*

| Variables | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Self-View Time 1 | 2.277 | 1.040 | --- | | | | | | |
| 2. Self-View Time 2 | 2.434 | 1.026 | .572 ** | --- | | | | | |
| 3. Self-View Time 3 | 2.289 | 1.006 | .494 ** | .715 ** | --- | | | | |
| 4. Self-View Time 4 | 2.831 | 1.177 | .447 ** | .485 ** | .618 ** | --- | | | |
| 5. Gender | .868 | .341 | .208 | .131 | .291 ** | .156 | --- | | |
| 6. GPA | 3.452 | .271 | -.188 | -.187 | -.159 | -.216 | -.228* | --- | |
| 7. Empathy | 99.75 | 14.67 | .05 | .11 | .073 | -.083 | .157 | .086 | --- |
| 8. Self-Monitoring | 12.69 | 3.23 | .041 | .008 | .017 | .015 | .061 | -.228* | -.253* |

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

Table 2

*Co-Evolution of Network and Behavior across Time Periods*

| Parameter | coeff. | s.e. | sig |
|---|---|---|---|
| **Selection Process** | | | |
| *Network Effects* | | | |
| Outdegree | -.787 | .351 | * |
| Reciprocity | .518 | .086 | ** |
| Transitivity | .242 | .017 | ** |
| Cyclic Ties | -.152 | .03 | ** |
| Popularity | .019 | .004 | ** |
| | | | |
| *Individual Attribute Effects* | | | |
| Gender | -.129 | .083 | |
| Group | .069 | .062 | |
| GPA | -.076 | .116 | |
| Empathy | -.003 | .002 | |
| Self-monitoring | .003 | .062 | |
| Self-view as leader | .099 | .046 | ** |
| | | | |
| *Independent Network* | | | |
| Prior friendships | .226 | .07 | ** |
| | | | |
| **Influence Process** | | | |
| Shape Effect | -.065 | .152 | |
| Effect of self-view on itself | -.245 | .06 | ** |
| Effect of nominations on self-view | .040 | .02 | * |

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

Table 3

*Co-Evolution of Network and Behavior over Time Periods*

| Parameter | Time 1 - Time 2 | | | Time 2 - Time 3 | | | Time 3 - Time 4 | | |
|---|---|---|---|---|---|---|---|---|---|
| | coeff. | s.e. | sig | coeff. | s.e. | sig | coeff. | s.e. | sig |
| **Selection Process** | | | | | | | | | |
| *Network Effects* | | | | | | | | | |
| Outdegree | -.779 | .594 | * | -.692 | .546 | | -.455 | .586 | |
| Reciprocity | .450 | .151 | ** | .482 | .143 | ** | .376 | .155 | ** |
| Transitivity | .300 | .029 | ** | .213 | .025 | ** | .237 | .032 | ** |
| Cyclic Ties | -.170 | .052 | ** | -.150 | .048 | ** | -.096 | .045 | * |
| Popularity | .019 | .006 | ** | .021 | .006 | * | .025 | .006 | ** |
| *Individual Attribute Effects* | | | | | | | | | |
| Gender | -.130 | .143 | | .009 | .136 | | -.325 | .152 | * |
| Group | .042 | .099 | | .008 | .090 | | .013 | .103 | |
| GPA | -.037 | .191 | | -.007 | .186 | | -.091 | .196 | |
| Empathy | .000 | .003 | | -.001 | .003 | | -.010 | .004 | ** |
| Self-monitoring | -.013 | .015 | | -.004 | .015 | | .024 | .017 | |
| Self-view as leader | .041 | .099 | | .161 | .075 | * | .175 | .077 | * |
| *Independent Network* | | | | | | | | | |
| Prior friendships | .242 | .119 | * | .221 | .109 | * | .322 | .117 | ** |
| **Influence Process** | | | | | | | | | |
| Shape effect | -.221 | .205 | | -.543 | .317 | | .331 | .240 | |
| Effect of self-view on itself | -.283 | .092 | ** | -.345 | .140 | ** | -.181 | .085 | * |
| Effect of nominations on self-view | .075 | .039 | | .079 | .038 | * | .081 | .037 | * |

* p<.05; ** p<.01
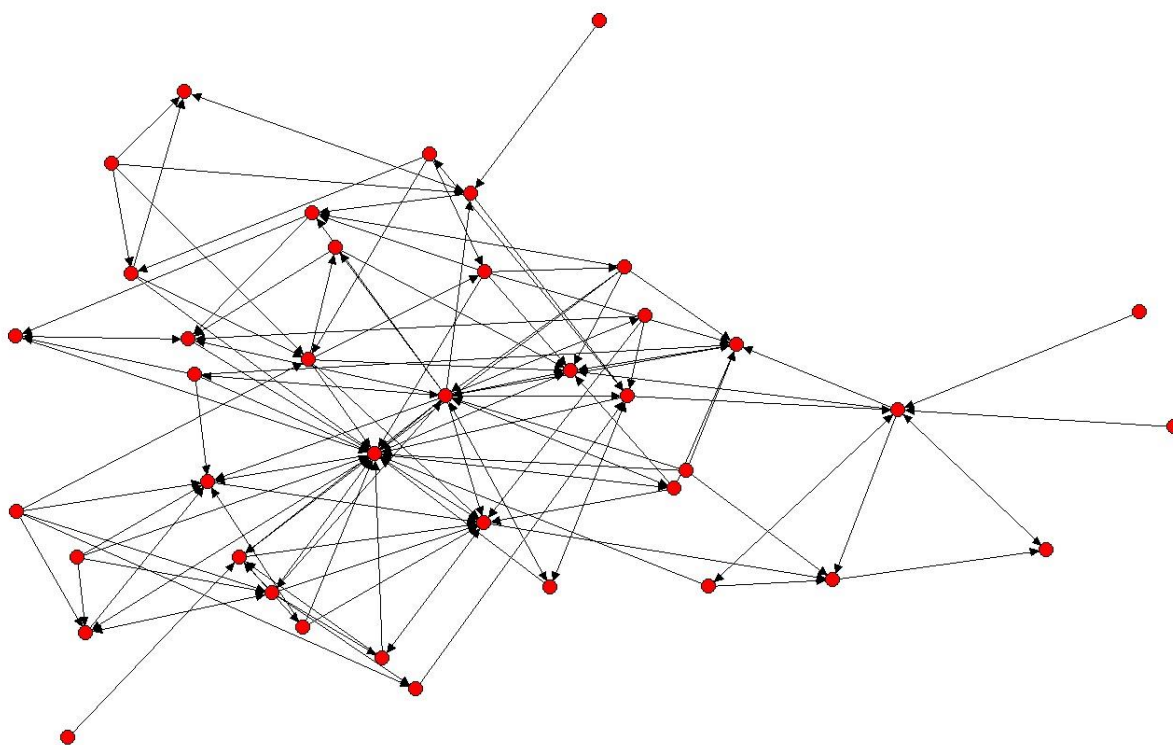
*Figure 1*: Illustration of a Leadership Network (Group 1, Time 1)

Leadership              Leadership              Leadership              Leadership
Nominations T1          Nominations T2          Nominations T3          Nominations T4

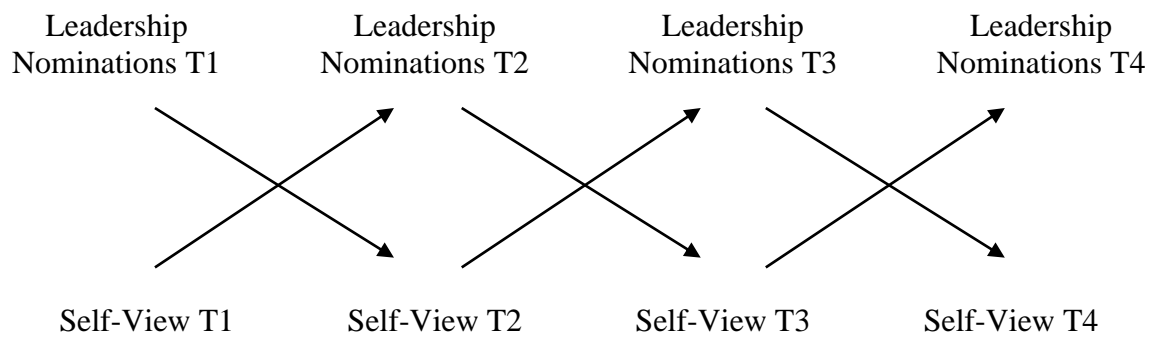Self-View T1            Self-View T2            Self-View T3            Self-View T4

*Figure 2:* Representation of Time Heterogeneity Hypothesis

Author Bios

**Cécile Emery** recently completed her PhD in Management at the Institute of Management, University of Lugano, Switzerland. Her research combines leadership theories with advanced social network techniques to better understand the process of leadership emergence.

**Kim Daniloski** is a PhD candidate in marketing at Virginia Tech. Her research interests include the emergence of leaders and preferences within social networks and the impact of individual and social factors on health risk behaviors.

**Anne Hamby** is a PhD candidate in marketing at Virginia Tech. She is interested in understanding how identity is socially constructed and the factors that contribute to adolescent risk behavior.