Leveraging the Social Network to Support Engagement in an Academic Environment

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LEVERAGING THE SOCIAL NETWORK TO SUPPORT ENGAGEMENT IN AN ACADEMIC ENVIRONMENT

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
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Doctor of Philosophy

in

The Department of Leadership and
Human Resource Development

by
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This work is dedicated to the memory of my beloved grandfather and namesake, a man of great ingenuity and unshakable integrity. From my earliest childhood recollections, he served as my role model, supported my innate curiosity about the world, and instilled an abiding thirst for knowledge that ultimately set me upon this path.
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ABSTRACT

The primary purpose of this study was to determine the relationship between selected social network characteristics and engagement among faculty at a research university (RU/VH). In 2013, a restructuring initiative targeted seven departments from different colleges at a public research university (RU/VH) located in the Gulf Coast region of the United States with a student population of more than 30,000. These departments were restructured to form a new academic college within the university. The archival sample for this study includes the faculty of the newly formed college who were in attendance at the initial college faculty meeting.

Network data were collected using a roster-recall methodology and engagement data were collected using the Utrecht Work Engagement Scale (UWES-9). Of the 184 potential respondents, 71 responded to the survey, resulting in a response rate of 38.6%. Of those responding, the completion rate was 95.8%, yielding 67 usable cases. Network size and centrality were both highly variable. Size ranged from 3 to 47; with a mean of 21.54 (SD = 9.657). Centrality ranged from .461 to 2.699, with a mean of 1.552 (SD = .5446). A comparison of mean values for engagement found that the sample values were consistently and significantly higher than the published norms (Ego Engagement - t=8.39, df=66, p < .001 and Mean Alter Engagement - t=33.89, df=66, p < .001).

Based on these findings the researcher concluded that the low response rate was most likely the result of deliberate non-participation on the part of some faculty members in the sample. The resulting selection bias appears to have affected the study variables in an assortment of ways: Social network size was decreased, ego engagement scores were increased, and Social network centrality was rendered unreliable by non-response. Non-participation could be reasonably interpreted as a sort of protest vote against the organizational change and the
paradoxically high engagement scores would then indicate that the organizational change was highly unpopular. Thus, decision making based on the raw data would have grossly over-estimated the popularity of the restructuring.
CHAPTER 1: INTRODUCTION

Humans are inherently social creatures at a very basic, instinctual level held over from an earlier time in evolution, when rejection and exclusion from the protection and resources of the community was nearly synonymous with death (Kerr & Levine, 2008; Wesselmann & Nairne, 2012). The ability (or inability) to develop and maintain a network of social connections has been shown to have a profound effect on mental health and sense of well-being (Baumeister & Leary, 1995; Durkheim, Spaulding, & Simpson, 2010; Frese, 1999; Kerr & Levine, 2008; Lin, Ye, & Ensel, 1999; Pescosolido & Georgianna, 1989). This fundamental desire to form mutually supportive social relationships is carried into the workplace, where the relative “health” of the professional social network can have an effect on the ability to engage with work (Bakker, Emmerik, & Euwema, 2006; Bakker, Le Blanc, & Schaufeli, 2005; Cohen & Wills, 1985; Fowler, Wareham-Fowler, & Barnes, 2013; González-Morales, Peiró, Rodríguez, & Bliese, 2012; Kawachi & Berkman, 2001).

The need to belong to a group drives cooperative social behavior in both private relationships and the workplace (Cacioppo, Fowler, & Christakis, 2009; Fowler et al., 2013; Kawachi & Berkman, 2001; Kerr & Levine, 2008). Social support, regardless of the source (e.g., supervisors or coworkers), has reliably been found to be associated with higher levels of engagement (Maslach & Leiter, 2008). Conversely, Maslach, Schaufeli, and Leiter (2001, p. 407) link an absence of social support to burnout, which is viewed by the authors as the antithesis of psychological engagement (Maslach et al., 2001; Saks & Gruman, 2014). Taking this relationship a step further, O’Reilly, Robinson, Berdahl, and Banki (2014) found that ostracism (i.e., the complete withdrawal of social support) had a stronger negative association with employee well-being and work-related attitudes than overt harassment, indicating that
employees who do not receive adequate social support within an organization are more likely to seek employment elsewhere to satisfy that need.

Why is engagement important? In simple terms, engaged employees are socially connected to, emotionally invested in, and enthusiastic about their work (W. A. Kahn, 1990; Rich, Lepine, & Crawford, 2010). From the perspective of employees, they want to do a good job because having a positive, fulfilling state of mind helps them engage and connect with the goals and values of their organization. This attitude is often reflected in their performance and behavior at work and accompanied by a substantial decrease in the risk of turnover (Bakker, Demerouti, & Verbeke, 2004; Christian, Garza, & Slaughter, 2011; Rich et al., 2010; Schaufeli, Salanova, González-Romá, & Bakker, 2002; Simpson, 2009). From the perspective of an employer, an engaged employee holds great promise for creating and maintaining a competitive advantage for the organization (Macey & Schneider, 2008; Rich et al., 2010; Tolchinsky, Paul D.Wenzl, 2014). As a result, much of the recent research on engagement has focused on identifying ways to improve the work environment and help individual workers become (or stay) engaged as a means of improving performance and retaining top talent (Bakker & Demerouti, 2007; Griffin, 2015; Harter, Schmidt, & Hayes, 2002; Masson, Royal, Agnew, & Fine, 2008; Saks, 2006; Saks & Gruman, 2014; Seligman, Ernst, Gillham, Reivich, & Linkins, 2009; Shuck & Wollard, 2010; Simpson, 2009). These studies emphasize the importance of social support in maintaining engagement and promoting positive workplace behavior. However, they fail to explore the underlying social network systems that provide support and contribute to the spread of engagement between individuals within the organization. Thus, there is a distinct need to address this knowledge gap and understand the characteristics of social networks that provide social support and affect work engagement.
Context and Contribution

This research was conducted at a public research university (RU/VH) (highest tier research activity) public research university with a student population of more than 30,000 (academic year 2013-14) located in the Gulf Coast region of the United States (Carnegie Classification of Institutions of Higher Education, 2015). In 2013, a restructuring initiative targeted seven departments from different colleges on campus, which were then rescaled, reorganized, and grouped together to form a new academic college within the university, which provided the setting for this study.

This study expands upon previous research linking social support and engagement by examining the role of the social network in providing support and spreading engagement in an academic workforce. Public higher education in the United States is ideal for examining the relationships between social network and engagement for several reasons. First and foremost, universities in the United States must struggle to compete with other institutions and the private sector to attract and maintain a workforce of highly qualified academic professionals when the primary source of compensation (i.e., salary) is often greatly restricted. For example, in 2015, state appropriations for public higher education funding reached an all-time low in Louisiana, Nevada, and Vermont. With few exceptions, academic departments are understaffed, salaries are stagnant, and more cuts are expected on an annual basis for the foreseeable future (Pell Institute, 2015, p. 16). Second, as with other high skill- and knowledge-worker oriented industries, such as the medical and STEM fields, creating an engagement-rich environment to foster collaboration, innovation, and creativity has become a strategic priority for universities in this competitive environment. Meanwhile, for individual members of the faculty, competition is stiff, budgets are tight, and the stress experienced trying to manage hectic academic workloads is palpable, often
leading to disengagement, burnout, and, if left unchecked, turnover (Du Plooy & Roodt, 2010; Rajak & Chandra, 2017; Soltis, Agneessens, Sasovova, & Labianca, 2013).

In light of these challenges, institutions of higher education have been forced to seek new ways to bolster support for faculty researchers and instructional staff, thus boosting morale and retaining top talent in spite of a tight budget. To that end, the study of social support and psychological engagement provides valuable insight for administrators hoping to help academic employees buffer workplace stress, maintain peak performance, and enjoy a positive and fulfilling work experience in a less than ideal work environment (Cohen & Wills, 1985).

This study draws on the Job Demands-Resources (JD-R) model of engagement and emotional contagion theory to examine the mechanisms that link engagement and supportive social network systems within the workplace. It contributes to the literature in two ways. First, it examines the relationship between social network characteristics (size and centrality) and engagement to improve the theoretical understanding of how social support affects engagement. Second, it examines engagement through the lens of emotional contagion theory as a means to explain the spread of engagement between coworkers through social networks in the workplace. Together, these contributions provide a theoretical basis for capitalizing on the effects of social relationships in the workplace as a means to facilitate employee engagement. From a scientific standpoint, findings from this research provide a new perspective on the underlying relationships that connect engagement and social network support structures. From a practical standpoint, this study examines social dynamics that employers, particularly those in the intellectual economy, might use to cultivate informal support structures, fostering engagement and thereby reducing turnover (Christian et al., 2011; Cohen & Wills, 1985; Hallberg & Schaufeli, 2006; Macey & Schneider, 2008; Schaufeli, Bakker, & Salanova, 2006).
Purpose of the Study

An array of empirical evidence supports associations between social support, engagement, and the related beneficial individual and organizational outcomes. However, less is known about the underlying social network systems that provide support and spread engagement within the workplace. Therefore, the primary purpose of this study was to determine the relationship between selected social network characteristics and engagement in the workplace among academic personnel at a research university (RU/VH) undergoing some type of expansion or reorganization.

Research Questions

The following research questions were examined:

1. What are the characteristics of ego networks among faculty at a research university (RU/VH), specifically in terms of size, centrality, ego engagement, and mean alter engagement?

2. What is the level of ego engagement among faculty at a research university (RU/VH) as measured by the Utrecht Work Engagement Scale (UWES) instrument?

3. Do relationships exist between ego engagement and the network measures of size, centrality, and mean alter engagement among faculty at a research university (RU/VH)?

The established relationship between network characteristics and social support, and the relationship between social support and engagement, served as the basis for the following research hypotheses:

a. Hypothesis 1a: Network size has a positive relationship with ego engagement;

b. Hypothesis 1b: Network centrality has a positive relationship with ego engagement;
c. Hypothesis 1c: Mean alter engagement has a positive relationship with ego engagement.

4. Does a model exist explaining a significant portion of the variance in ego engagement as measured by UWES scores from the following ego network characteristics: size, centrality, and mean alter engagement?

Since a relationship is hypothesized to exist between ego engagement and the network characteristics of size, centrality, and mean alter engagement, the following research hypothesis was established in conjunction with this research question:

a. Hypothesis 2: A model exists explaining a significant portion of the variance in ego engagement (as measured by the UWES instrument) from the network characteristics of size, centrality, and mean alter engagement.

**Definition of Terms**

Operational definitions are provided below for the terms used in this study:

- Crossover refers to the process that occurs when the psychological well-being of one person affects the well-being of another person (Bakker & Demerouti, 2009; Westman, 2013). While this term is nearly synonymous with emotional contagion, this study uses “crossover” to describe direct transmission between dyads and “contagion” to describe the corresponding process between interrelated individuals in a social network.

- Emotional Contagion refers to the spread of ideas, attitudes, or behavioral patterns within a group through imitation and conformity. Emotional contagion is characterized by “the tendency to automatically mimic and synchronize expressions, vocalizations, postures, and movements with those of another person and, consequently, to converge emotionally” (Hatfield, Cacioppo, & Rapson, 1993, p. 96; Locher, 2002).
• Network Centrality (hereafter Centrality) is often used to provide an estimate of a given ego’s relative importance within the underlying network (Burt, Kilduff, & Tasselli, 2013; Westaby, Pfaff, & Redding, 2014). While there are many different methods for measuring centrality, this study uses Betweenness Centrality, which examines the extent to which a given ego acts as a “bridge” to other ties in the ego network. This method is useful because it enables a direct comparison of centrality between egos without requiring information from outside of the immediate ego network (de Arruda et al., 2014; Everett & Borgatti, 2005).

• Network Size (hereafter Size) is often defined as the sum of all ties, or “alters,” connected with a given individual, or “ego,” to create an ego network. This study focuses on the ego network level; therefore, only outbound ties, e.g., those reported by the ego to be alters, are considered (Van Der Gaag & Webber, 2008).

• Engagement is generally viewed as the degree to which an employee is emotionally and psychologically invested in, and passionate about, his or her chosen occupation, profession, and/or organization, including his or her willingness to invest discretionary effort into work that extends beyond job requirements. This term has been operationalized as “a positive, fulfilling, work-related state of mind that is characterized by Vigor, Dedication and Absorption” (Macey & Schneider, 2008; Maslach et al., 2001, p. 417; Schaufeli et al., 2006, 2002; Seligman et al., 2009; Shuck & Wollard, 2010).

• A Social Network is a social structure comprised of individuals (or organizations) that are connected based on a shared relationship, common interest, or other association (House, 1987; Wasserman & Faust, 1994). This study focuses on the ego network level; therefore, only direct outbound ties are considered in the measurement of network characteristics (Van Der Gaag & Webber, 2008).
Social Support refers to the aid and assistance exchanged through interpersonal transactions, which are the intrinsic functional content (i.e., the emotionally or instrumentally sustaining quality) of the social relationships represented by the social network (Glanz, Rimer, & Viswanath, 2008; House, Umberson, & Landis, 1988; Zhu, Woo, Porter, & Brzezinski, 2013).

**Significance of the Study**

At its most basic level, the purpose of this study is to elucidate the underlying relationships between social network characteristics, social support, and engagement. As it is intended to be primarily descriptive and exploratory in nature, the results, regardless of outcome, have significant implications for future research on this subject. Simply put, the findings of this study either serve to narrow the perceived gaps in the literature or demonstrate that the perceived gaps described herein did not exist in the first place.

These relationships may be leveraged to develop a more objective measurement of social support, insofar as it relates to engagement. A more objective measurement would allow the use of social network analysis to identify the antecedents of engagement in the social network, a method that is potentially more accurate and less invasive for participants than subjective social support survey instruments. Understanding the underlying relationships that connect engagement and social network support structures, as well as the contagion effect within the ego network, informs both science and practice. This research may enable the creation of both proactive employee enrichment programs and remedial interventions to identify and correct deficient support structures, thereby improving performance and reducing turnover (Christian et al., 2011; Cohen & Wills, 1985; Hallberg & Schaufeli, 2006; Macey & Schneider, 2008; Schaufeli et al., 2006). Conversely, even if one or more of these relationships are not supported, or are found to be too weak to be of practical significance, this study still provides insight into the relationships
between network characteristics and engagement. Those relationships, in turn, may be used to guide future research by providing a basis for selecting intervention variables and explore methods that encourage engagement in the workplace.
CHAPTER 2: REVIEW OF LITERATURE

This study draws from, connects, and expands two previously independent bodies of literature: engagement theory and emotional contagion theory. These bodies of literature are used as a framework to examine the relationships between network characteristics as a means of social support, psychological engagement, and the spread of engagement between ties within the ego network. Correspondingly, this review consists of three sections.

The first section summarizes the conceptual evolution of engagement theory and identifies current research trends in the field. This body of literature establishes the theoretical basis for linking engagement with social network structures that provide social support within the workplace. Next, the relationships between social network characteristics (size and centrality) and engagement are described, specifically addressing how social support affects engagement. The concept of social support is addressed in the second section, in which the literature detailing both the historical and contemporary development of the concept is reviewed. The role of the social network in providing social support is discussed, and an overview of the network characteristics used in the study is provided. The final section introduces and examines the concept of emotional contagion. This theory is used to strengthen the theoretical framework of the study and provide a conceptual basis for exploring the spread of engagement from person to person throughout a network and the effect of that spread on coworkers. Finally, the summary further clarifies the connections between the bodies of literature, providing empirical support for the conceptual models used in the study.

Engagement

William Kahn (1990) is widely credited with developing the first theoretical framework for conceptualizing personal engagement nearly three decades ago. Kahn viewed engagement as
a personal connection with the work role, by which a person is physically, cognitively, and emotionally harnessed to the performance of job tasks as a form of self-expression (W. A. Kahn, 1990). Engaged employees channel their personal energy into their labors and are more psychologically present, or “attentive, connected, integrated, and focused in their role performances” (W. A. Kahn, 1992, p. 322). The concept of engagement as a psychological construct languished for nearly a decade before being resurrected by Maslach and Leiter (1997), who framed employee engagement as the positive antithesis of job burnout. At the time, much of the focus was on understanding burnout and finding solutions to help organizations avoid its negative consequences (e.g., absenteeism, reduced productivity, and increased turnover).

The inception of the positive psychology movement at the turn of the century gradually shifted the focus from the diagnosis and treatment of burnout as an undesirable state to a more positive, humanistic approach focused on nurturing strength and providing a rich, rewarding experience in the workplace by cultivating engagement (Bacon, 2005; Mills, Fleck, & Kozikowski, 2013; Preskill & Donaldson, 2008; Seligman & Csikszentmihalyi, 2000). This view of engagement as the positive antipode or antithesis of burnout has dominated much of the succeeding discussion and research (Demerouti, Mostert, & Bakker, 2010; Hallberg & Schaufeli, 2006; Macey & Schneider, 2008; Maslach et al., 2001; Schaufeli et al., 2002; Seligman et al., 2009; Shuck & Wollard, 2010). Rather than pursue remedial interventions designed to coax an already unhappy employee into a temporarily less unhappy (and thus more productive) state of mind, the objective is to proactively engage highly skilled workers. This engagement serves not only to retain workers long term, but also to enable them to reach peak levels of performance.

Kahn (1990) originally defined engagement as the “harnessing of organization members’ selves to their work roles; in engagement, people employ and express themselves physically,
cognitively, and emotionally during role performances” (p. 694). Furthermore, Kahn (1990) sought to delineate “the psychological conditions in which people personally engage and disengage at work” to better understand the physical, cognitive, and emotional connection between the person and his or her role performance in the workplace (p. 695). Currently, engagement is viewed as the degree to which an employee is emotionally invested in and passionate about his or her work, which generally includes the willingness to invest discretionary effort beyond job requirements. This concept has been operationally defined by Maslach and colleagues (2001). They defined engagement as “a positive, fulfilling, work-related state of mind that is characterized by Vigor, Dedication and Absorption” and confirmed in numerous subsequent studies (Macey & Schneider, 2008; Maslach et al., 2001, p. 417; Schaufeli et al., 2006, 2002; Seligman et al., 2009; Shuck & Wollard, 2010). Schaufeli and colleagues (2002) further clarify that “engagement refers to a more persistent and pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behavior,” as opposed to a temporary or transient state (p. 74).

The prevailing method for examining engagement is the Job Demands-Resources model (see Figure 1). This model identifies the demands placed on the employee by his/her job duties (e.g., sustained mental and/or physical effort) and the resources (e.g., social support and/or autonomy) made available within the organization to support them in those duties. The balance between job demands and resources is thought to be what drives an individual to be more or less psychologically engaged with his or her work and thus motivated toward peak performance (Bakker & Demerouti, 2007; Bakker et al., 2004; Demerouti & Bakker, 2011; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). According to this model, social support plays an extrinsic motivational role as a job resource through the satisfaction of basic needs and as a
potential buffer against job strain caused by chronic job demands within the work environment (Bakker & Demerouti, 2007; Cohen & Wills, 1985; Maslach et al., 2001). Bakker and Demerouti (2007) identify social support as a vital job resource necessary to fulfill the need to belong. The presence of social support will “foster the willingness to dedicate one’s efforts and abilities to the work task,” thus leading to engagement, while its absence “evokes a cynical attitude towards work” (Bakker & Demerouti, 2007, p. 314).

![Diagram of the Job Demands-Resources Model](image)

Figure 1: The Job Demands-Resources Model (Bakker & Demerouti, 2007, p. 313)

Connecting Engagement and Social Support

The role of social support in creating the conditions necessary to sustain engagement is well established (Brauchli, Schaufeli, Jenny, Füllemann, & Bauer, 2013; W. A. Kahn, 1990, 1992; Maslach et al., 2001; Schaufeli et al., 2006). Engagement has been shown to have a strong positive relationship with social support, which has a general beneficial effect on a day-to-day basis and also provides a protective “buffering” effect during times of stress (Baumeister & Leary, 1995; Boren, 2013; Cohen & Wills, 1985; Frese, 1999; Schaufeli & Bakker, 2004). Other
researchers have linked social support to health, happiness, well-being, and job performance (Cowardin-Lee & Soyalp, 2011; Fowler & Christakis, 2009; Lin et al., 1999; Westaby et al., 2014). Social support, regardless of the source (e.g., supervisors or coworkers), has reliably been found to be associated with higher levels of engagement (Maslach & Leiter, 2008). Conversely, Maslach, Schaufeli, and Leiter (2001) describe a “consistent and strong body of evidence” linking (a lack of) social support to burnout, which is viewed by the authors as the antithesis of psychological engagement (Maslach et al., 2001, p. 407; Saks & Gruman, 2014). A more extreme example of this relationship may be found in a series of studies conducted by O’Reilly, Robinson, Berdahl, and Banki (2014), in which they compare the relative effects of ostracism and harassment on employee turnover. They found that ostracism (i.e., the complete withdrawal of social support) had a stronger negative association with employee well-being and work-related attitudes than overt harassment (O’Reilly et al., 2014). Ostracism, unlike harassment, was also a significant predictor of actual turnover three years after the assessment period, indicating that employees who do not receive adequate social support within an organization are more likely to seek employment elsewhere to satisfy that need (O’Reilly et al., 2014).

Social Support

The study of social support can trace its intellectual lineage to the prominent French sociologist Emile Durkheim, whose work, notably the seminal monograph Suicide, laid the foundation for social network theory and established sociology as a distinct academic discipline (Berkman, Glass, Brissette, & Seeman, 2000; Durkheim et al., 2010; House, 1987). The concept of social support in use today emerged from the mental health literature on stress and psychosocial factors in the etiology of health and illness in the mid-1970s. This concept has often been used to describe three distinct aspects of social relationships synonymously: social
integration (i.e., their existence or quantity), social networks (i.e., their formal structure), and their functional content (e.g., the real or perceived availability of resources and support) between connected individuals (Glanz et al., 2008; House, 1987; House, Landis, & Umberson, 1988).

The different types of resources exchanged through supportive interpersonal transactions can be categorized and differentiated conceptually by the types of supportive behaviors exhibited: emotional, instrumental, or informational. However, while this typology works well on paper, in practice it is difficult to study the types as separate constructs because any given relationship is likely to provide more than one type of support (Cohen, Gottlieb, & Underwood, 2001; Cohen, Underwood, & Gottlieb, 2000; Glanz et al., 2008). For this reason, social support is used in a broad sense to refer to the real or perceived availability and exchange of all social resources present in the social network (i.e., a blend of emotional, informational, and/or instrumental support), without seeking to differentiate between types of support or pinpoint specific resources (Cohen et al., 2000; Glanz et al., 2008; Zhu et al., 2013).

The participants in this study were not asked to directly report a sense of support but rather asked for ties of acquaintanceship. The network characteristics thought to be indicative of social support are derived from those acquaintanceship ties as low-inference variables in the descriptive and exploratory portions of this study. In particular, the network variables of size and centrality are used to examine the underlying relationships in the ego networks created within the context of the broader social network as indirect measures of social support as it relates to engagement (Cohen et al., 2001; Glanz et al., 2008; House, 1987; House, Umberson, et al., 1988; Wasserman & Faust, 1994; Zhu et al., 2013).
Role of the Social Network

For the sake of clarity, the term “social support” as used here refers to the functional content of social relationships within a social network. The “social network” illustrates the formal social structure comprised of individual actors or “egos,” which are connected by shared relationship “ties” to “alters.” More specifically, this study examines the “ego network” level limited to alters directly tied to given individual egos within the broader social network, as opposed to an examination of the entire network itself. It is the social support of this ego network that is examined using social network characteristics (size, centrality, and mean alter engagement) as indirect measures of social support as they relate to ego engagement.

Network size is often used as a measure of social integration (i.e., the existence and quantity of social relationships). Social integration is a strong determinant of health and well-being because it directly affects the availability of social support from the network. Simply put, large networks have the potential to provide more support than small networks (Chan & Lee, 2006; House, 1987; Seeman & Berkman, 1988). Robert Kahn and Antonucci (1980) regard a network in “both its existence and its size as predictors of well-being and of the ability to cope successfully with stress” (p.275). Network size is viewed as an important indicator of readily accessible social resources that often bear beneficial effects for health, well-being, and the accomplishment of life tasks, and has been strongly linked with measures of subjective well-being and perceived social support (Lin et al., 1999; Wrzus, Hanel, Wagner, & Neyer, 2013; Zhu et al., 2013). Thus, for the purposes of this study, network size is considered a strong indicator of social support. This study, which focuses on the ego network level, defines size as the sum of outbound ties identified by the participant, chosen from a complete roster of everyone else in the
network being examined. In other words, network size represents people directly connected to a given individual from the perspective of that individual.

The second network characteristic of interest is centrality. This measure is often used to provide an estimate of a given ego’s relative importance within the underlying network (Burt et al., 2013; Westaby et al., 2014). The inclusion of centrality is based on the underlying assumption that faculty members located in structurally advantageous central positions (whether formal or informal) within a college are instrumental to the flow of information, support, and contagion effects across a network. While there are many different methods for measuring centrality, each method attempts to resolve the same basic question, “which network nodes are the most important?” within the context of the larger social network. This characteristic can be assessed by looking at the number and direction of ties to and from a given node (degree centrality), the weighted value of second degree connections (eigenvector centrality), the network flow using that node as the shortest path (closeness centrality), or some combination thereof. Since this study focused on the ego network level, it was important to use a measure that enabled a direct comparison of centrality between egos without having to include information outside of the immediate ego network. Thus betweenness centrality was chosen, because it is specifically designed to do just that: it examines the extent to which a given ego acts as a “bridge” to connect other ties in the ego network (de Arruda et al., 2014; Everett & Borgatti, 2005). The expectation is that high betweenness centrality should equate to improved access to social support, directly for faculty members themselves and indirectly for those connected with them (Burt et al., 2013; Westaby et al., 2014).

The final characteristic of interest in this study is mean alter engagement. This characteristic uses the average engagement score of people directly connected to a given
individual in the network to examine the effects of engagement being transmitted between tied individuals via emotional contagion (Al-Qaheri & Banerjee, 2013; Davin, Gupta, & Piskorski, 2014; Fowler & Christakis, 2010). The expectation is that, in addition to the social support represented by the previously mentioned network characteristics, there is a crossover effect between connected individuals within the ego network, and that a higher level of engagement will indirectly facilitate and maintain psychological engagement in connected colleagues.

**Emotional Contagion**

The second body of literature deals with the concept of emotional contagion as a basis for explaining the transmission of states such as engagement between ties in the social network. Emotional contagion is not an alternative to social support, which produces a work environment conducive for engagement, but rather a reinforcement mechanism acting through social support to further encourage and explain the presence of engagement within the network. In order to understand emotional contagion, it bears repeating that humans are inherently social creatures at a very basic, instinctual level (Kerr & Levine, 2008; Wesselmann & Nairne, 2012). This evolutionary emphasis placed on forming mutually supportive social relationships has equipped humans with a keen awareness of threats to social status within the group and shaped humanity’s innate ability to empathize with the emotions and experiences (positive and negative) of others on both conscious and subconscious levels (Barsade, 2002; Druckman & Bjork, 1994; Kelly & Barsade, 2001; Kerr & Levine, 2008; Stiff, Dillard, Somera, Kim, & Sleight, 1988; Totterdell, 2000; Wesselmann & Nairne, 2012). For example, individuals who have tenuous bonds with society (e.g., few close relationships and/or ostracized from their social networks) are more prone to exhibit signs of psychological distress such as anxiety, depression, and egoistic suicide than those with more social support (Christakis & Fowler, 2007; Durkheim et al., 2010; Fowler
et al., 2013; Kawachi & Berkman, 2001; Lin et al., 1999; Pescosolido & Georgianna, 1989). The need to belong to a group drives cooperative social behavior in both private relationships and the workplace (Cacioppo et al., 2009; Fowler et al., 2013; Kawachi & Berkman, 2001; Kerr & Levine, 2008). Therefore, this study draws on the theory of emotional contagion (alternately referred to as mood or affect contagion) to explain the mechanism by which people subconsciously empathize, mimic, and synchronize emotions with each other in a social environment (Hatfield, Bensman, Thornton, & Rapson, 2014).

The word “contagion” is generally associated with the spread of disease, but in the study of collective behavior it is used to describe the spread of ideas, attitudes, or behavioral patterns within a group through imitation and conformity (Locher, 2002). The early theoretical work of pioneers on the subject, such as LeBon, Park, and Blumer, focused on the acute collective behavior of crowds and the self-perpetuating circular reaction (i.e., positive feedback loop) between the individual and the group. This circular reaction permits the rapid dissemination of a mood, impulse, or behavior and encourages brief periods of irrational behavior (Le Bon, 1926; Locher, 2002). As the field developed and became more empirically driven, the methodology expanded to include techniques borrowed from diverse disciplines such as computer science, economics, and epidemiology (Borge-Holthoefer, Baños, González-Bailón, & Moreno, 2013; Goel, Watts, & Goldstein, 2012; Leskovec, McGlohon, Faloutsos, Glance, & Hurst, 2007; Locher, 2002; McAuley & Leskovec, 2014). Meanwhile, the focus of research has gradually branched away from short-term collective behaviors toward the examination of the empathetic response and contagion effects on moods, emotional states, and longer-term behaviors. Thus, contagion is a suitable mechanism to explain the crossover of engagement between peers in an
ego-network (Barsade, 2002; Fowler & Christakis, 2009; Goel et al., 2012; Hatfield et al., 1993; Rosenquist, Fowler, & Christakis, 2011; Torrente, Salanova, & Llorens, 2013).

The empathetic response was observed and described by famed economist Adam Smith as early as the 18\textsuperscript{th} century. Smith (1790) noted that, by imagination, we are able to place ourselves in the situation of another and conceive to a lesser degree their torments and sensations, and thus become capable of taking their perspective both mentally and emotionally. Stiff et al. (1988) designated this cognitive process of “perspective taking” as the first step toward emotional contagion, in which the observer “experiences an emotional response parallel to, and as a result of, observing another person’s actual or anticipated display of emotion,” thus contributing to prosocial behavior (p. 199). Interestingly, a study conducted by Bakker and Demerouti (2009) found the act of perspective taking to be a significant moderator in the crossover of engagement between working couples. In other words, people with the ability to adopt the point of view of others are more likely to “catch” engagement as an emotional contagion.

Hatfield and colleagues (2014) contend that emotional contagion is a basic building block of human interaction, best conceptualized as a family of cognitive, psychophysiological, behavioral, and social phenomena characterized by “the tendency to automatically mimic and synchronize expressions, vocalizations, postures, and movements with those of another person and, consequently, to converge emotionally” (Hatfield et al., 1993, p. 96). Hatfield, Rapson, and Le (2009) break this process down into three stages:

1. Mimicry: the subtle and subconscious mirroring of facial expressions, voice, and posture;
2. Feedback: the shift of emotional states on the basis of their own expressive behavior;
3. Contagion: the gradual convergence and eventual synchronization of both expressive behavior and the underlying emotional state.

Within the context of day-to-day social activity, emotional contagion is an immediate, automatic, and subconscious response to subtle emotional differences (Barsade, 2002; Hatfield et al., 1993; Kelly & Barsade, 2001). Notable examples of this contagion effect include five studies conducted on longitudinal social network data collected by the large-scale Framingham Heart Study, which found clusters indicating the “dynamic spread” of emotions such as happiness, loneliness, and depression. The studies also identified behaviors such as the prevalence of eating habits associated with weight gain and the prevalence of smokers/non-smokers within the social network (Cacioppo et al., 2009; Christakis & Fowler, 2007, 2008; Fowler & Christakis, 2009; Rosenquist et al., 2011). This process of automatic and subconscious mimicry, feedback, and emotional convergence has been proposed to be the mechanism by which the transfer of engagement takes place, both between individuals as crossover and across the workplace through the social network as an emotional contagion (Barsade, 2002; Fowler & Christakis, 2010; Hatfield et al., 2009).

The expectation is that egos connected with highly engaged alters are more likely to exhibit and maintain high levels of engagement themselves, as has been the case with several studies which, as stated previously, have demonstrated the contagion effect with emotions such as happiness, loneliness, and depression (Cacioppo et al., 2009; Fowler & Christakis, 2009; Fowler et al., 2013; Rosenquist et al., 2011). Within the context of this study, it was anticipated that even casual contact between acquaintances would be sufficient to facilitate a crossover of engagement via emotional contagion, and that within a supportive social environment such
engagement would solidify into a relatively stable and self-sustaining state of psychological engagement.

**Summary**

Empirical support for connecting these two bodies of literature (engagement theory and emotional contagion theory) may be found in several studies that demonstrate the effects of social support on achieving and maintaining engagement (Bakker & Demerouti, 2007, 2008; Bakker, Demerouti, & Sanz-Vergel, 2014; González-Romá, Schaufeli, Bakker, & Lloret, 2006; Masson et al., 2008; Schaufeli, Bakker, & Van Rhenen, 2009; Soltis et al., 2013). As well as, studies showing the crossover of emotional states similar to engagement between connected individuals (dyads) and the tendency for such states to propagate through the social network as an emotional contagion, indirectly influencing the emotional states and behaviors of others in the network (Bakker & Demerouti, 2009; Bakker, Demerouti, & Schaufeli, 2005; Bakker et al., 2006; Christakis & Fowler, 2013; Fowler & Christakis, 2010; Hatfield & Rapson, 2013; Rosenquist et al., 2011; Torrente et al., 2013; Westman, 2013).

Theoretical support for using the network characteristic of size as a measure of social support is provided by Chan and Lee (2006), who have identified network size as “a key determinant of health and wellbeing” based on the perceived social support associated with a large social network (p. 90). This notion that the size of the network influences the perceived quantity and variety of resources potentially available to the ego was later confirmed by Zhu and colleagues (2013), who found a significant positive correlation between network size and perceived social support. Individuals with structurally advantageous central positions are instrumental to the flow of information and support across the network thus they should have greater access to social support for both themselves and those connected with them (Burt et al.,
2013; Westaby et al., 2014). Faculty members with high centrality should be more likely to exhibit stable engagement levels, due to the receipt of consistent social support through their connections, and, by the same token, provide consistent social support to their ties.

Applied within the context of this study, engaged faculty members should be able to cultivate stronger social networks, which in turn sustain and facilitate future levels of psychological engagement in both themselves and their connected colleagues. Thus, subjects with high levels of engagement are also more likely to exhibit robust social network characteristics (size and centrality) indicative of social support. Therefore, they are also more likely to contribute to the support and spread of engagement among their connected peers, as indicated by an increase in mean engagement, than if they were not well engaged.
CHAPTER 3: METHODOLOGY

This chapter identifies the target population for the study, describes the steps taken to obtain the sample, reviews the instruments used for measurements, and outlines the procedures used to complete the study as detailed in the data analysis plan.

**Purpose and Research Questions**

An array of empirical evidence supports associations between social support, engagement, and the related beneficial individual and organizational outcomes. However, less is known about the underlying social network systems that provide support and spread engagement within the workplace. Therefore, the primary purpose of this study was to determine the relationship between selected social network characteristics and engagement in the workplace among faculty at a research university (RU/VH). Specifically, this study addresses the following research questions and their associated hypotheses:

1. What are the characteristics of ego networks among faculty at a research university (RU/VH), specifically in terms of size, centrality, ego engagement, and mean alter engagement?
2. What is the level of ego engagement among faculty at a research university (RU/VH) as measured by the Utrecht Work Engagement Scale (UWES) instrument?
3. Do relationships exist between ego engagement and the network measures of size, centrality, and mean alter engagement among faculty at a research university (RU/VH)?

The established relationship between network characteristics and social support, and the relationship between social support and engagement, served as the basis for the following research hypotheses:

a. Hypothesis 1a: Network size has a positive relationship with ego engagement;
b. Hypothesis 1b: Network centrality has a positive relationship with ego engagement;

c. Hypothesis 1c: Mean alter engagement has a positive relationship with ego engagement.

4. Does a model exist explaining a significant portion of the variance in ego engagement as measured by UWES scores from the following ego network characteristics: size, centrality, and mean alter engagement?

Since a relationship is hypothesized to exist between ego engagement and the network characteristics of size, centrality, and mean alter engagement, the following research hypothesis was established in conjunction with this research question:

a. Hypothesis 2: A model exists explaining a significant portion of the variance in ego engagement (as measured by the UWES instrument) from the network characteristics of size, centrality, and mean alter engagement.

**Population and Sample**

The target population for this study was faculty in a research university environment undergoing some type of expansion or reorganization. The research was conducted using an accessible population at a public research university (RU/VH) with a student population of more than 30,000 (academic year 2013-14) located in the Gulf Coast region of the United States (Carnegie Classification of Institutions of Higher Education, 2015). In 2013, a restructuring initiative targeted seven departments from different colleges on campus, which were then rescaled, reorganized, and grouped together to form a new academic college within the university. The sample for this study includes the faculty of the newly formed college who were in attendance at the initial college faculty meeting. The functional roles of social network
characteristics (i.e., size, centrality, and mean alter engagement) and engagement (as measured by the UWES instrument) were examined within this newly formed academic environment.

**Instrumentation**

The social network and engagement data used for this project were initially collected as part of a *Research Interest Survey* (Appendix B) conducted for the purpose of assessing the research interests and levels of collaboration between faculty and instructional staff within a particular university college in the spring of 2013. The data were collected on a voluntary basis via a hardcopy survey instrument, which was administered during a mandatory faculty event with the goal of capturing as much of the population as possible.

Social network data were collected using a roster-recall methodology to identify social networks within the college. The roster method, “perhaps the most common type of instrument for measuring interpersonal networks,” minimizes false negatives by providing a list of potential ties to prompt a respondent’s memory (Butts, 2008, p. 20). The roster is also frequently augmented with a “recall” element, which encourages respondents to include additional ties that may have inadvertently been omitted, to help ensure a complete network is identified (Butts, 2008; Giuliani & Pietrobelli, 2011; Ter Wal & Boschma, 2009, 2011). The resulting roster-recall instrument is “a prime example of primary data collection” for network data (Ter Wal & Boschma, 2009, p. 8). Giuliani and Pietrobelli (2011) refer to the roster-recall method as the “best and most recommended way to collect network data” for populations of this size because it “minimizes the risk of data loss due to a respondent’s poor memory, as each interviewee has the complete list of other actors in the cluster to consult before answering questions about relationships” (p. 21).
This approach differs from other network collection methods by asking the participants about the existence of relationships between themselves and other identifiable actors in the network using a complete list (roster) of everyone in college (e.g., “Do you know John Smith?” or “Have you worked with Jane Doe?”), as opposed to general categories or groups of actors (e.g., “How many friends do you have?”). In this instance, participants were asked to identify other members of the faculty that they know (Known network) and/or have collaborated with (Collaborator network) using the following criteria:

a. Who do you know? (i.e., spoken to for more than a few minutes);

b. With whom have you worked or collaborated on a research project/idea development?

For the purposes of this study, only the data for the Known network were used, because the Collaborator network was deemed to be too sparse. The network characteristics of interest (size and centrality) are calculated based on the self-reported relationship data using UCInet software (Borgatti, Everett, & Freeman, 2002).

Network Characteristics

Two commonly used social network characteristics were examined as indirect measures of social support as it relates to psychological engagement: size and centrality. This study, which focuses on the ego network level, defines size as the sum of outbound ties identified by the participant, chosen from a complete roster of everyone in the college. In other words, size represents people directly connected to a given individual from the perspective of that individual. Network size is often used as a measure of social integration (i.e., the existence and quantity of social relationships), which is a strong determinant of health and well-being because it directly affects the availability of social support from the network. Kahn and Antonucci (1980) regard a
network in “both its existence and its size as predictors of well-being and of the ability to cope successfully with stress” (p. 275). Network size is viewed as an important indicator of readily accessible social resources. Thus, network size can be considered a strong indicator of social support for the purposes of this study.

The second network characteristic of interest is centrality. Whereas network size can be viewed as a measure of *quantity* that gives each tie equal weight, centrality as it is used here is a measure of *quality*, which seeks to measure the power and influence of a given individual relative to the larger network (Borgatti, Mehra, Brass, & Labianca, 2009; Brass, 1981). While there are numerous centrality measures to choose from, this study uses Betweenness Centrality, which examines the extent to which a given ego acts as a “bridge” to connect other ties in the ego network. This particular centrality measure is used because it enables a direct comparison of centrality between egos without the need to include information from outside of the immediate ego network (de Arruda et al., 2014; Everett & Borgatti, 2005). Centrality is calculated based on the ego’s contribution to the connection of alters in the ego network. Thus, if two given alters are directly connected to each other, the value of that pair is 0 (i.e., they need no bridge); if the alters are only connected to each other through the ego, the contribution is 1 (i.e., this is the only bridge); if the alters are connected through both the ego and one or more other alters, the contribution is divided evenly over the number of other nodes serving as a bridge (i.e., there is more than one bridge) (Borgatti et al., 2002; Everett & Borgatti, 2005).

The inclusion of centrality in this study is based on the underlying assumption that faculty members located in structurally advantageous central positions (whether formal or informal) within a college are instrumental to the flow of information, support, and contagion effects across a network. Thus, high centrality should equate to improved access to social
support, directly for faculty members themselves and indirectly for those connected with them (Burt et al., 2013; Westaby et al., 2014).

One final characteristic of interest, mean alter engagement, is unique to this study. This characteristic is calculated using the numerical average (mean) engagement score of people directly connected to a given individual in the network to examine the effects of engagement being transmitted between tied individuals via emotional contagion (Al-Qaheri & Banerjee, 2013; Davin et al., 2014; Fowler & Christakis, 2010). The expectation is that, in addition to the social support represented by the previously mentioned network characteristics, there is a crossover effect between connected individuals within the ego network, and that a higher level of engagement will indirectly facilitate and maintain engagement in connected colleagues.

Utrecht Work Engagement Scale (UWES)

The Utrecht Work Engagement Scale (UWES) is a short questionnaire designed to measure work engagement—"a positive work-related state of fulfillment that is characterized by vigor, dedication, and absorption" (Macey & Schneider, 2008; Maslach et al., 2001, p. 417; Schaufeli et al., 2006, 2002; Seligman et al., 2009; Shuck & Wollard, 2010). Originally comprised of 24 items, the UWES was refined to 17 items and then tested extensively (N = 14,521, from 10 different countries). The testing resulted in an extremely robust 9-item instrument, the UWES-9, which has high factorial validity as demonstrated using confirmatory factor analysis. The UWES-9 measures the three dimensions of work engagement: vigor, dedication, and absorption, each of which demonstrates good internal consistency and test-retest reliability (Schaufeli et al., 2006).

The UWES-9, which was used for this study, consists of three sets of three items, each set designed to measure one of the three dimensions. The median Cronbach’s α for items in the
UWES-9 instrument is $\alpha=.91$ across the national samples, and the $\alpha$ for the total database is $\alpha=.90$, well within the accepted value for internal consistency (Henson, 2001; Schaufeli & Bakker, 2004). All items are scored using a 7-point anchored scale (0=never to 6=every day), and subscales are calculated by averaging the scores of their respective items. The engagement scores (ego engagement and mean alter engagement) from the UWES-9 were tabulated using SPSS. These variables were then investigated as outlined in the analysis section.

Data Collection Strategy

The archival social network and engagement data used for this project were initially collected as part of a Research Interest Survey. The data collection was originally attempted using an online survey link disseminated via an email with a description of the study. However, due to a technical issue, the online survey link did not work correctly and the data had to be collected using paper survey instruments at a mandatory faculty retreat. The Institutional Review Board (IRB) granted permission to obtain and use data from the Research Interest Survey (Appendix A). A sanitized survey instrument using placeholder names to protect the privacy of the actual participants is included in Appendix B.

Data Analysis

The data analysis is split into three sections that address descriptive statistics, bivariate analysis, and multivariate analysis, respectively. The first section of the data analysis is primarily descriptive in nature, covering the network variables and engagement variables used in this study. The second section explores correlations between individual variables using bivariate analysis. The final section will be used to draw together the information presented in the previous sections, and use multiple linear regression to determine if a model exists that uses size,
centrality, and mean alter engagement to explain a significant portion of the variance in ego engagement as measured by UWES scores.

**Section One: Descriptive Research Questions**

This section describes the population and sample used in the study and examines the ego networks within the sample in terms of size, centrality, ego engagement, and mean alter engagement. The raw data and statistics were checked against the original survey instrument to search for coding errors. Graphical techniques were used to enable a visual diagnosis of normality, dispersion, and shape (skewness and kurtosis) and to identify potential out of range values and outliers. Using the UWES-9 data, ego engagement scores for individual participants were generated, as well as measures of central tendency and standard deviation for each subscale (vigor, dedication, and absorption). The raw data and statistics were checked against the original survey instrument to search for coding errors. Graphical techniques were used to enable a visual diagnosis of normality, dispersion, and shape (skewness and kurtosis) and to identify potential out of range values and outliers. Specifically, this section addresses the first two research questions:

1. What are the characteristics of ego networks among faculty at a research university (RU/VH) university specifically in terms of size, centrality, ego engagement, and mean alter engagement?

2. What is the level of ego engagement among faculty at a research university (RU/VH) as measured by the Utrecht Work Engagement Scale (UWES) instrument?
Section Two: Correlational Research Questions

This section explores whether the relationships identified in the literature review existed between UWES scores (ego engagement) and the network measures of size, centrality, and mean alter engagement. Pearson product-moment correlation coefficients were used to determine how social support and emotional contagion influence engagement. Specifically, this section addresses the third research question and its associated hypotheses:

3. Do relationships exist between ego engagement and the network measures of size, centrality, and mean alter engagement?

The established relationship between network characteristics and social support, and the relationship between social support and engagement, served as the basis for the following research hypotheses:

a. Hypothesis 1a: Network size has a positive relationship with ego engagement;

b. Hypothesis 1b: Network centrality has a positive relationship with ego engagement;

c. Hypothesis 1c: Mean alter engagement has a positive relationship with ego engagement.

Section Three: Multivariate Research Questions

This section draws together the information presented in the previous sections and uses multiple linear regression to determine if a model exists explaining a significant portion of the variance in ego engagement as measured by UWES scores (Dependent Variable) from the following ego network characteristics: size, centrality, and mean alter engagement (Independent Variables). Specifically, this section addresses the fourth research question and its associated hypothesis:
4. Does a model exist explaining a significant portion of the variance in ego engagement as measured by UWES scores from the following ego network characteristics: size, centrality, and mean alter engagement?

Since a relationship is hypothesized to exist between the network characteristics of size, centrality, and mean alter engagement, the following research hypothesis was established in conjunction with this research question:

a. Hypothesis 2: A model exists explaining a significant portion of the variance in ego engagement (as measured by the UWES instrument) from the network characteristics of size, centrality, and mean alter engagement.
CHAPTER 4: RESULTS

As previously described, the data analysis is split into three sections that address descriptive research questions, correlational research questions, and multivariate research questions, respectively. The descriptive section briefly reviews the population, data collection, and sample description. Then the descriptive analysis, those dealing with network variables (size and centrality) and engagement variables (ego engagement and mean alter engagement), are addressed using the appropriate descriptive statistics and network maps to explore each study variable. In the second section, bivariate analysis is used to determine if the relationships identified in the literature review existed between the network variables and the engagement variables. The third and final section draws together the information presented in the previous sections, using multiple linear regression to determine if a model exists that explains a significant portion of the variance in ego engagement as measured by UWES scores based on the network and engagement variables.

Section One: Descriptive Research Questions

Population and Sample

The target population for this study was faculty in a research university environment undergoing some type of expansion or reorganization. This research was conducted using an accessible population at a public research university (RU/VH) with a student population of more than 30,000 (academic year 2013-14) located in the Gulf Coast region of the United States (Carnegie Classification of Institutions of Higher Education, 2015). In 2013, a restructuring initiative targeted seven departments from different colleges on campus, which were then rescaled, reorganized, and grouped together to form a new academic college within the university.
The archival social network and engagement data used for this project were initially collected as part of a Research Interest Survey. The data collection was originally attempted using an online survey link disseminated via an email with a description of the study. However, due to a technical issue, the online survey link did not work correctly and the data had to collected using paper survey instruments at a mandatory faculty retreat for the faculty of the newly formed college.

The raw data and statistics were checked against the original survey instrument to identify coding errors. The descriptive statistics used for each variable to calculate frequencies, ranges, and measures of central tendency are discussed in detail in the relevant sections. Of the approximately 184 potential respondents in the target population, data were collected from 71 employees using the survey instrument described in Chapter 3. Of those collected, three were removed for being incomplete and data for one non-faculty staff member was removed for being outside of the target population. The resulting response rate was 38.6%, and the instrument completion rate was 95.8%. To preserve the sample size, mean imputation was used to replace a single missing value in one case (deemed to be missing completely at random), resulting in a total sample n= 67.

**Network Variables**

**Size**

Network size is often used as a measure of social integration (i.e., the existence and quantity of social relationships) and is a strong indicator of access to social resources (Cohen et al., 2000; Glanz et al., 2008; R. L. Kahn & Antonucci, 1980; Zhu et al., 2013). Size has also been strongly linked with measures of subjective well-being and perceived social support, which often bear beneficial effects for health, well-being, and the accomplishment of life tasks (Lin et al.,
Simply put, large networks have the potential to provide more support than small networks (Chan & Lee, 2006; House, 1987; Seeman & Berkman, 1988).

Network size is defined as the sum of all ties or “alters” connected with a given individual or “ego” to create an ego network. All data in this study were collected at the ego network level. Therefore, this variable represents the number of people directly connected to a given individual, from the perspective of that individual. As such, it is measured as the sum of outbound ties with alters as reported by a given ego in the sample. The expectation is that a large network should be indicative of improved access to social support. For the purpose of this study, size was measured using the normalized score to facilitate comparison between egos in the sample.

Descriptive statistics (see Table 1) were used to report frequencies, ranges, and measures of central tendency. Graphical techniques were used to help with the visual diagnosis of normality, dispersion, and shape (skewness and kurtosis) and to identify potential out of range values and outliers. No issues were detected other than a slightly leptokurtic shape in the histogram. Values for kurtosis were within ±1.0 standard error and not deemed to be a threat to the validity of the tests used in this study. Out of an abundance of caution, a Shapiro-Wilk test of normality was also conducted to verify that no significant deviation from normal distribution was present.

Table 1: Descriptive Statistics for Network Variable: Size Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US

| N-Valid | 67 |
| Minimum Value | 3 |
| Maximum Value | 47 |

(Table 1 continued)
(Table 1 continued)

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<tr>
<td>Median</td>
<td>20.00</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>9.657</td>
</tr>
<tr>
<td>Skewness</td>
<td>.363</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>.293</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-.554</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>.578</td>
</tr>
</tbody>
</table>

As a complement to the descriptive statistics, ego network maps were created using the smallest and largest ego networks in the sample to use as examples for the discussion (see Figure 2 and Figure 3, respectively). Additionally, a full network map of the entire sample population (see Figure 4) was created to further illustrate the relative sizes of the ego networks within the sample. Each circle represents a single study participant (each the ego of his or her own network), and the relative size of the circle indicates the size of his/her respective ego network based on the number of outbound ties with alters reported.

![Network Map](image)

Figure 2: Case #24 - Smallest Size Ego Network Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Circles to Indicate the Size of Each Ego in the Network

Network size is a measure of social integration and an important indicator of access to social resources, as well as strongly linked with measures of subjective well-being and perceived social support (Cohen et al., 2000; Glanz et al., 2008; R. L. Kahn & Antonucci, 1980; Lin et al., 1999; Wrzus et al., 2013; Zhu et al., 2013).
Figure 3: Case #2 - Largest Size Ego Network Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Circles to Indicate the Size of Each Ego in the Network

As such, it may be tempting to interpret case #24 (see Figure 2) with its remarkably small ego network size (n=3) as an individual in distress, a veritable pariah, devoid of social support. Conversely, case #2 (see Figure 3), the largest ego network (n=47), might be viewed as an individual who is exceedingly well-connected and integral to the fabric of the social network. The most plausible explanation for these results is that the smaller network is that of a newly hired faculty member who simply has not had sufficient time to meet and acquaint themselves with very many of their new colleagues. In contrast, the larger network would be that of a more senior faculty member who, by virtue of time served within the organization, has developed a more robust network of professional contacts. As such, it may be tempting to interpret case #24 (see Figure 2) with its remarkably small ego network size (n=3) as an individual in distress, a veritable pariah, devoid of social support.
Figure 4: Network Map Illustrating Ego Network Size Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Circles to Indicate the Size of Each Ego in the Network
Conversely, case #2 (see Figure 3), the largest ego network (n=47), might be viewed as an individual who is exceedingly well-connected and integral to the fabric of the social network. The most plausible explanation for these results is that the smaller network is that of a newly hired faculty member who simply has not had sufficient time to meet and acquaint themselves with very many of their new colleagues. In contrast, the larger network would be that of a more senior faculty member who, by virtue of time served within the organization, has developed a more robust network of professional contacts.

In both cases, however, it is important not to over-interpret the importance of these results outside the context of the other variables. Network size, in and of itself, is a low inference observation that measures the existence and quantity of social relationships; it is not a value judgment on the relative strength or utility of those relationships. The individual in the former example may have strong, supportive relationships with all three alters, who collectively provide all the support necessary for him or her to feel well-connected within the organization. Thus, this individual sees no need to pursue other contacts outside of that small, yet perfectly adequate, social group. The latter may have been a newly hired associate professor who made the most of those contacts on the same day that the survey was completed. The point is that there are any number of plausible scenarios that would explain these particular results, but network size alone does not provide a great deal of information for interpretation.

The question then becomes “What is it good for then?” This question harkens back to the very first sentence in Chapter 1, “humans are inherently social creatures….” One key observation that can be made is that these network size results are greater than zero, meaning that none of the participants reported being completely isolated. The need to belong to a group, whether large or small, drives cooperative social behavior in both private life and the workplace.
(Cacioppo et al., 2009; Fowler et al., 2013; Kawachi & Berkman, 2001; Kerr & Levine, 2008). Case #24 (see Figure 2), while having a tenuously small ego network, is nevertheless connected to the larger network via those connections, which in turn makes the flow of information through those connections all the more important. For this person, a loss of one or more of these vital connections could drastically reduce the flow of support and information from the wider network, which could potentially lead to social isolation. Case #2 (see Figure 3) appears to be exceedingly good at networking. However, without including another measure, such as centrality, to provide additional context, it is difficult to tell whether the sheer number of connections are meaningful or indicates a plethora of superficial connections that ultimately have very little value in terms of social support. On the bright side, however, with so many alters in his or her ego network, there is very little risk of this person being socially isolated from the flow of information and support.

Centrality

Centrality seeks to resolve the basic question “which network nodes are the most important?” within the context of the larger social network. Similarly, individuals who occupy structurally advantageous central positions within their ego network often act as bridges or a path of least resistance for the flow of information between their connected alters. As such, egos with high centrality are instrumental to the flow of information and support across the network and, as a result, often have greater access to social support for both themselves and those connected with them (Burt et al., 2013; Westaby et al., 2014). In this study, it was expected that highly centralized egos will give and receive consistent social support through their network connections and thus are more likely to exhibit stable engagement levels.
Since this study focused on the ego network level, it was important to use a measure that enables a direct comparison of centrality between egos without needing information from outside of the immediate ego network. Betweenness centrality was chosen as the most appropriate measure because it is specifically designed to do just that: it examines the extent to which a given ego acts as a “bridge” to other ties in the ego network (de Arruda et al., 2014; Everett & Borgatti, 2005). The expectation is that high betweenness centrality should equate to improved access to social support, directly for faculty members themselves and indirectly for those connected with them (Burt et al., 2013; Westaby et al., 2014). For the purpose of this study, centrality was measured using a normalized score to facilitate comparison between egos in the sample. Descriptive statistics (see Table 2) were used to find frequencies, ranges, and measures of central tendency. Graphical techniques were used to help with the visual diagnosis of normality, dispersion, and shape (skewness and kurtosis) and to identify potential out of range values and outliers. No issues were detected.

Table 2: Descriptive Statistics for Network Variable: Centrality Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US

<table>
<thead>
<tr>
<th>N-Valid</th>
<th>67</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>.461</td>
</tr>
<tr>
<td>Maximum</td>
<td>2.699</td>
</tr>
<tr>
<td>Mean</td>
<td>1.539</td>
</tr>
<tr>
<td>Median</td>
<td>1.552</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.5446</td>
</tr>
<tr>
<td>Skewness</td>
<td>.022</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>.293</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>.743</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>.578</td>
</tr>
</tbody>
</table>

As a complement to the descriptive statistics, ego network maps were created using the least and most central ego networks as examples for the discussion (see Figure 5 and Figure 6, respectively).
Additionally, a full network map of the entire sample (see Figure 7) was created to further illustrate the relative differences in centrality among the ego networks. Each square represents a single study participant (each the ego of his or her own network), and the relative size of the square indicates the centrality of his/her respective ego network, based on the normalized flow betweenness of that ego.

Unlike network size, betweenness centrality seeks to gauge the relative importance of an individual’s position based on the extent to which he or she acts as an intermediary between others in the network. A closer look at these two cases (#33 least central and #23 most central) shows people with drastically different work environments, as illustrated by their ego networks. While the least central ego, case #33 (see Figure 5), does not have the smallest network in terms of size (n=8), its low centrality means the individual is actually far more isolated from the flow of information and support available through his or her ego network. In layman’s terms, this person is completely out of the loop and the social support associated with engagement is conspicuously missing, as if support and information flows around, rather than through, him or her, effectively isolating him/her from his/her ego network and, by extension, the network as a whole.

This isolation from the network is concerning because it may become a de facto form of ostracism, eventually eroding the individual’s sense of belonging within the organization. As discussed previously, O’Reilly and colleagues (2014) found that ostracism has a stronger negative association with employee well-being and work-related attitudes than overt harassment.

They also found that ostracism is a significant predictor of actual turnover. At the other end of the spectrum, case #23 was not only the most central ego in the sample, but also featured a robust ego network size (n=35).
Figure 5: Case #33 – Least Central Ego Network Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Squares to Indicate the Centrality of Each Ego in the Network

This individual’s ego network map (Figure 6) displays a prime example of someone in a structurally advantageous position within the network.

As with network size, it is important not to over-interpret the importance these results outside the context of the other variables. While centrality is thought to be a probable indicator and potential antecedent of social support, it does not necessarily translate directly into improved ego engagement (Burt et al., 2013; Westaby et al., 2014). As Saks (2006) put it, even though current models of engagement “indicate the psychological conditions or antecedents that are necessary for engagement, they do not fully explain why individuals will respond to these conditions with varying degrees of engagement” (p. 603). In other words, the relationships between these variables need to be fully explored and tested before a firm conclusion can be drawn from these results.
Figure 6: Case #23 – Most Central Ego Network Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Squares to Indicate the Centrality of Each Ego in the Network
Figure 7: Network Map Illustrating Ego Network Centrality Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Squares to Indicate the Centrality of Each Ego in the Network
Engagement Variables

Ego Engagement

Engagement is viewed as the degree to which an employee is emotionally invested in and passionate about his or her work, which generally includes the willingness to invest discretionary effort beyond job requirements. Engaged employees channel their personal energies into their labors and are more psychologically present, or more “attentive, connected, integrated, and focused in their role performances” (W. A. Kahn, 1992, p. 322). In simple terms, engaged employees are socially connected to, emotionally invested in, and enthusiastic about their work (W. A. Kahn, 1990; Rich et al., 2010). They want to do a good job because engagement helps them connect with the goals and values of their organization, a connection that is often reflected in their performance and behavior at work (Bakker et al., 2004; Christian et al., 2011; Rich et al., 2010; Schaufeli et al., 2002; Simpson, 2009).

Maslach and colleagues conceptualized engagement as the positive antipode to burnout in their seminal work on job burnout (Maslach et al., 2001). Engagement was later operationalized by Schaufeli and Bakker (2004), who created the Utrecht Work Engagement Scale. Subsequently, the scale was rigorously validated in numerous studies (Macey & Schneider, 2008; Saks, 2006; Saks & Gruman, 2014; Schaufeli et al., 2006, 2002; Seligman et al., 2009; Seppälä et al., 2009; Shuck & Wollard, 2010). In this study, engagement was measured utilizing the UWES-9, an extremely robust 9-item survey instrument, which consists of three sets of three items. Each set of items is designed to measure one of the three dimensions of work engagement: vigor, dedication, or absorption. This study uses the UWES-9 to measure engagement for both individuals (ego engagement) and their ego networks (mean alter engagement).
Descriptive information for each of the items on the UWES instrument as well as the overall engagement scores and the three subscale scores are presented in Table 3 were used to identify frequencies, ranges, and measures of central tendency for each survey item, subscale, and individual engagement score (ego engagement). The finalized scores for ego engagement and each of the three subscales were tabulated using SPSS (see Table 4). Subscales were calculated by averaging the scores of their respective items, and the final ego engagement score was calculated by averaging the scores of all nine survey items.

Table 3: Descriptive statistics for UWES-9 Survey Results, Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US. All Items Are Scored Using a 7-point Anchored Scale (0=never to 6=every day)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>N=67</th>
<th>Min</th>
<th>Max</th>
<th>Mean⁴</th>
<th>Std. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1: At my work, I feel bursting with energy</td>
<td></td>
<td></td>
<td>2</td>
<td>6</td>
<td>4.36</td>
<td>.980</td>
</tr>
<tr>
<td>Item 2: At my job, I feel strong and vigorous</td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>4.58</td>
<td>.940</td>
</tr>
<tr>
<td>Item 3: I am enthusiastic about my job</td>
<td></td>
<td></td>
<td>2</td>
<td>6</td>
<td>4.90</td>
<td>.987</td>
</tr>
<tr>
<td>Item 4: My job inspires me</td>
<td></td>
<td></td>
<td>2</td>
<td>6</td>
<td>4.90</td>
<td>1.032</td>
</tr>
<tr>
<td>Item 5: When I get up in the morning, I feel like going to work</td>
<td></td>
<td></td>
<td>2</td>
<td>6</td>
<td>4.75</td>
<td>.927</td>
</tr>
<tr>
<td>Item 6: I feel happy when I am working intensely</td>
<td></td>
<td></td>
<td>0</td>
<td>6</td>
<td>4.99</td>
<td>1.094</td>
</tr>
<tr>
<td>Item 7: I am proud of the work that I do</td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>5.33</td>
<td>.805</td>
</tr>
<tr>
<td>Item 8: I am immersed in my work</td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>5.06</td>
<td>.886</td>
</tr>
<tr>
<td>Item 9: I get carried away when I’m working</td>
<td></td>
<td></td>
<td>2</td>
<td>6</td>
<td>4.45</td>
<td>1.091</td>
</tr>
<tr>
<td>Vigor_Sub</td>
<td></td>
<td></td>
<td>2.67</td>
<td>6.00</td>
<td>4.5572</td>
<td>.81730</td>
</tr>
<tr>
<td>Dedication_Sub</td>
<td></td>
<td></td>
<td>3.00</td>
<td>6.00</td>
<td>5.0398</td>
<td>.83186</td>
</tr>
<tr>
<td>Absorption_Sub</td>
<td></td>
<td></td>
<td>2.67</td>
<td>6.00</td>
<td>4.8308</td>
<td>.81727</td>
</tr>
<tr>
<td>Ego Engagement</td>
<td></td>
<td></td>
<td>2.78</td>
<td>6.00</td>
<td>4.8093</td>
<td>.74229</td>
</tr>
</tbody>
</table>

⁴ All Items Are Scored Using a 7-point Anchored Scale (0=never to 6=every day)

A more complete descriptive analysis of the Ego Engagement and corresponding subscales is presented in Table 4. The overall ego engagement scores ranged from a low of 2.780 to 6.00 with a mean of 4.810 and SD=.742. The subscale with the highest mean score was Dedication (mean=5.040, SD=.832). To complement the descriptive statistics, ego network maps re-created using the lowest and highest ego engagement scores as examples for the discussion.
(see Figure 8 and Figure 9, respectively). Additionally, a full network map of the entire sample (see Figure 10) was created to further illustrate the relative differences in engagement within the sample. Each upturned triangle represents a single study participant (each the ego of his or her own network) and the relative size of the upturned triangle indicates the engagement score of the respective ego.

Table 4: Descriptive Statistics for Engagement Variable: Ego Engagement with Vigor, Dedication, Absorption Subscales Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US

<table>
<thead>
<tr>
<th></th>
<th>Vigor</th>
<th>Dedication</th>
<th>Absorption</th>
<th>EgoEngagea</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=67</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>2.670</td>
<td>3.000</td>
<td>2.670</td>
<td>2.780</td>
</tr>
<tr>
<td>Maximum</td>
<td>6.000</td>
<td>6.000</td>
<td>6.000</td>
<td>6.000</td>
</tr>
<tr>
<td>Mean</td>
<td>4.557</td>
<td>5.040</td>
<td>4.831</td>
<td>4.810</td>
</tr>
<tr>
<td>Median</td>
<td>4.670</td>
<td>5.330</td>
<td>5.000</td>
<td>4.890</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.817</td>
<td>.832</td>
<td>.817899</td>
<td>.742</td>
</tr>
<tr>
<td>Skewness</td>
<td>-.185</td>
<td>-.784</td>
<td>-.548</td>
<td>-.525</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>.293</td>
<td>.293</td>
<td>.293</td>
<td>.293</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-.279</td>
<td>-.085</td>
<td>-.270</td>
<td>-.107</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>.578</td>
<td>.578</td>
<td>.578</td>
<td>.578</td>
</tr>
</tbody>
</table>

a All Items Are Scored Using a 7-point Anchored Scale (0=never to 6=every day)

Figure 8: Case #49 – Lowest Ego Engagement Score Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Upturned Triangles to Indicate the Engagement of Each Ego in the Network
Figure 9: Case #52 – Highest Ego Engagement Score Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Upturned Triangles to Indicate the Engagement of Each Ego in the Network
Figure 10: Network Map Illustrating Ego Engagement Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Upturned Triangles to Indicate the Engagement of Each Ego in the Network
Mean Alter Engagement

The final characteristic of interest, mean alter engagement, is unique to this study. It was included to test the concept of emotional contagion as a basis for explaining the transmission of states such as engagement between ties in the social network. Emotional contagion is generally defined as the spread of ideas, attitudes, or behavioral patterns within a group through imitation and conformity (Locher, 2002). The contagion effect is thought to function based on the natural tendency to “mimic and synchronize expressions, vocalizations, postures, and movements with those of another person and, consequently, to converge emotionally” (Hatfield et al., 1993, p. 96).

This contagion process of automatic and subconscious mimicry, feedback, and emotional convergence has been proposed to be the mechanism by which the transfer of engagement can take place within the social network (Barsade, 2002; Fowler & Christakis, 2010; Hatfield et al., 2009). Within the context of day-to-day social activity, emotional contagion is viewed as an immediate, automatic, and subconscious response to subtle emotional differences (Barsade, 2002; Hatfield et al., 1993; Kelly & Barsade, 2001). Within the context of this study, contagion is conceptualized to function as a self-perpetuating positive feedback loop between the individual (ego) and the group (alters) which acts as a reinforcement mechanism to explain the dissemination of emotional states and longer-term behaviors, such as engagement through the ego network (Barsade, 2002; Fowler & Christakis, 2009; Goel et al., 2012; Hatfield et al., 1993; Rosenquist et al., 2011; Torrente et al., 2013).

It is anticipated that even casual contact between acquaintances is sufficient to facilitate a crossover of engagement via emotional contagion. The expectation is that, in addition to the effects of social support represented by the previously mentioned network characteristics, there
is also a crossover of engagement between connected individuals within the ego network due to the contagion effect. Thus egos connected with highly engaged alters are more likely to exhibit and maintain high levels of engagement themselves, as has been shown in several studies that have demonstrated the contagion effect with emotions such as happiness, loneliness, and depression (Cacioppo et al., 2009; Fowler & Christakis, 2009; Fowler et al., 2013; Rosenquist et al., 2011).

This characteristic is calculated using the numerical average (mean) engagement score of people directly connected to a given individual in the ego network. The finalized scores for ego engagement were tabulated using SPSS as described previously (see Table 4), then converted into attribute data and matched to their respective egos within the social network data using UCI net software (Borgatti et al., 2002). The resulting combined network-attribute dataset allowed the calculation of ego network-centric statistics and creation of the network and ego network maps found throughout this chapter. Descriptive statistics (see Table 5) were used to identify the frequencies, ranges, and measures of central tendency. Graphical techniques were used to help with the visual diagnosis of normality, dispersion, and shape (skewness and kurtosis) and to identify potential out of range values and outliers.

Table 5: Descriptive Statistics for Engagement Variable: Mean Alter Engagement

<table>
<thead>
<tr>
<th>N-Valid</th>
<th>67</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>4.393</td>
</tr>
<tr>
<td>Maximum</td>
<td>5.414</td>
</tr>
<tr>
<td>Mean</td>
<td>4.761</td>
</tr>
<tr>
<td>Median</td>
<td>4.756</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.172</td>
</tr>
<tr>
<td>Skewness</td>
<td>.696</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td>.293</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.557</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>.578</td>
</tr>
</tbody>
</table>
Some leptokurtosis was noted, which is not surprising given a mean score with a narrower range, but it was not deemed to be a threat to the validity of the tests because normalized values could be used to resolve the issue.

To complement the descriptive statistics, ego network maps were created using the lowest and highest mean alter engagement scores in the sample as examples for the discussion (see Figure 11 and Figure 12, respectively). Additionally, a full network map of the entire sample (see Figure 13) was created to further illustrate the relative differences in mean alter engagement within the sample. Each downturned triangle represents a single study participant (each the ego of their own network) and the relative size of the downturned triangle indicates the magnitude of mean alter engagement score of the respective ego.

Figure 11: Case #48 – Lowest Mean Alter Engagement Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Downturned Triangles to Indicate the Mean Alter Engagement of Each Ego in the Network

Ego engagement scores collected using the UWES-9 survey instrument were employed as the dependent variable for this study. As with the other variables, the cases with the lowest and highest scores were selected to use as examples (Case #49 and Case #52, respectively).
Unlike the network variables discussed so far, ego engagement scores can be compared against published statistical norms (see Table 6) from the UWES test manual (Schaufeli & Bakker, 2004).


<table>
<thead>
<tr>
<th>Scoring Category</th>
<th>Vigor</th>
<th>Dedication</th>
<th>Absorption</th>
<th>EgoEngage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>≥ 5.66</td>
<td>≥ 5.70</td>
<td>≥ 5.34</td>
<td>≥ 5.51</td>
</tr>
<tr>
<td>High</td>
<td>4.81 – 5.65</td>
<td>4.71 – 5.69</td>
<td>4.21 – 5.33</td>
<td>4.67 – 5.50</td>
</tr>
<tr>
<td>Average</td>
<td>3.26 – 4.80</td>
<td>2.91 – 4.70</td>
<td>2.34 – 4.20</td>
<td>2.89 – 4.66</td>
</tr>
<tr>
<td>Low</td>
<td>2.01 – 3.25</td>
<td>1.34 – 2.90</td>
<td>1.18 – 2.33</td>
<td>1.78 – 2.88</td>
</tr>
<tr>
<td>Very Low</td>
<td>≤ 2.00</td>
<td>≤ 1.33</td>
<td>≤ 1.17</td>
<td>≤ 1.77</td>
</tr>
<tr>
<td>Mean</td>
<td>4.01</td>
<td>3.88</td>
<td>3.35</td>
<td>3.74</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.13</td>
<td>1.38</td>
<td>1.32</td>
<td>1.17</td>
</tr>
<tr>
<td>Range</td>
<td>.00 – 6.00</td>
<td>.00 – 6.00</td>
<td>.00 – 6.00</td>
<td>.00 – 6.00</td>
</tr>
</tbody>
</table>
Figure 13: Network Map Illustrating Mean Alter Engagement Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Downturned Triangles to Indicate the Mean Alter Engagement of Each Ego in the Network
The criteria used to create the five scoring categories for the establishment of statistical norms for the UWES instrument are shown in Table 7. A comparison of case #49 against these statistical norms placed it in the upper edge of the “Low” category (EgoEngage=2.78), despite having a fairly robust network size and centrality (n=30, Centrality=1.945), both of which are nearly a full standard deviation above the mean (see Table 1 and Table 2, respectively). A similar comparison made with case #52 found that this individual not only had the highest engagement score in the sample, but in fact had a perfect score on the survey instrument (EgoEngage= 6.0), while also scoring lower than Case #49 on both size and centrality (n=25, Centrality=0.8710) and below the mean centrality for the sample. It should be noted that these results do not appear to support the study hypotheses regarding these relationships.

Table 7: Scoring Category Criteria by Percentile, Upper and Lower Bound, taken from the Work Engagement Scale Preliminary Manual (Schaufeli & Bakker, 2004, p. 36)

<table>
<thead>
<tr>
<th>Scoring Category</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>95&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
<td>≤ Score ≤ 95&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
</tr>
<tr>
<td>High</td>
<td>75&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
<td>≤ Score &lt; 75&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
</tr>
<tr>
<td>Average</td>
<td>≤ Score &lt; ≤ Score &lt; 75&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>5&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
<td>≤ Score &lt; 25&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
</tr>
<tr>
<td>Very Low</td>
<td>≤ Score &lt; Score &lt; 5&lt;sup&gt;th&lt;/sup&gt; Percentile</td>
<td></td>
</tr>
</tbody>
</table>

Mean alter engagement is derived from the ego engagement scores. Therefore, it shares the statistical norms established by the UWES test manual (see Table 6). Cases #48 and #58, the lowest and highest scores, respectively, were selected for use as examples. Given that mean alter engagement shares a distribution with ego engagement, these cases can be compared against published individual statistical norms (see Table 6) from the UWES test manual (Schaufeli & Bakker, 2004). Case #48 had the lowest mean alt engagement (MeanAltEngage=4.39) in the sample, which placed it firmly in the “Average” category, while that individual’s personal engagement score (EgoEngage = 5.56) was in the “Very High” category. This individual’s ego
network size and centrality are both slightly below the mean (N=15, Centrality=1.44, respectively). These results again indicate an inverse relationship between the study variables and ego engagement. The mean alter engagement for Case #58 was “High” (MeanAltEngage=5.41) and his or her ego engagement was “Average” (EgoEngage=4.11). In combination with the small network size (N=7), which is 1.5 standard deviations below the mean and slightly above the mean centrality (Centrality=1.75), this result indicates the individual is on the periphery of a small, but highly engaged, network, perhaps indicating a new employee within a small, tightly knit department within the college.

A comparison of mean values for engagement subscales (Vigor=4.557, Dedication=5.040, Absorption=4.831, from Table 4), and engagement variables (EgoEngage=4.81, MeanAltEngage=4.761, from Table and Table 5 respectively) to the published group statistical norms (Table 8) found that the sample values were consistently and significantly higher than the norms when measured by a one-sample t-test (Vigor t=3.78, Dedication t=7.47, Absorption t=11.52, df=66, p < .001, EgoEngage t=8.39, df=66, p < .001 MeanAltEngage t=33.89, df=66, p < .001), as recommended in the UWES user manual (Schaufeli & Bakker, 2004).

Table 8: Group Statistical Norms of UWES-9 (N=12,631), taken from the Work Engagement Scale Preliminary Manual (Schaufeli & Bakker, 2004, p. 38)

<table>
<thead>
<tr>
<th></th>
<th>Vigor</th>
<th>Dedication</th>
<th>Absorption</th>
<th>EgoEngage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.18</td>
<td>4.28</td>
<td>3.68</td>
<td>4.05</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.24</td>
<td>1.36</td>
<td>1.43</td>
<td>1.19</td>
</tr>
<tr>
<td>Range</td>
<td>.00 – 6.00</td>
<td>.00 – 6.00</td>
<td>.00 – 6.00</td>
<td>.00 – 6.00</td>
</tr>
</tbody>
</table>

Section Two: Correlational Research Questions

In this section, bivariate analysis is used to determine if the relationships identified in the literature review existed between the UWES scores (ego engagement) and the network measures of size, centrality, and mean alter engagement. As shown in Table 9, Pearson product-moment
correlation coefficients were used to examine how social network characteristics are related to engagement within the sample. No significant correlations were found between the study variables.

Table 9: Relationship between EgoEngage and Selected Network Characteristics Among Faculty in a Newly Formed College at a Research University (RU/VH) in the Southern US, Using Pearson Product-Moment Correlation Coefficient

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pearson Correlationa</th>
<th>N</th>
<th>Sig. (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>-.096</td>
<td>67</td>
<td>.220</td>
</tr>
<tr>
<td>MeanAltEngage</td>
<td>-.075</td>
<td>67</td>
<td>.273</td>
</tr>
<tr>
<td>Centrality</td>
<td>-.038</td>
<td>67</td>
<td>.380</td>
</tr>
</tbody>
</table>

*a Using Pearson Product-Moment Correlation Coefficient

Based on the bivariate analysis, the following results were found regarding the research hypotheses:

Hypothesis 1a: Network size has a positive relationship with ego engagement.
This hypothesis is not supported.

Hypothesis 1b: Network centrality has a positive relationship with ego engagement.
This hypothesis is not supported.

Hypothesis 1c: Mean alter engagement has a positive relationship with ego engagement.
This hypothesis is not supported.

Section Three: Multivariate Research Questions

This section addresses the multivariate analysis used to determine if a model exists that explains a significant portion of the variance in ego engagement as measured by UWES scores using the network measures of size, centrality, and mean alter engagement. Since the literature fails to specify the expected order of entry of these variables into the model, full entry was employed. As shown in Table 10, multiple linear regression was used to examine how network
characteristics influenced engagement within the sample. No significant predictors were found, indicating no significant model exists using these variables.

Table 10: Relationship between EgoEngage and Selected Network Characteristics Using Linear Regression with Full Model Entry

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable: EgoEngage</td>
<td>df</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>3</td>
<td>.236</td>
<td>.416</td>
<td>.742</td>
</tr>
<tr>
<td>Residual</td>
<td>63</td>
<td>.566</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Significance of Entered Variables | | | | 
| Predictors            | Beta | t    | Sig. |
| Size                  | -.129| -.908| .367 |
| MeanAltEngage         | -.106| -.811| .420 |
| Centrality            | .024 | .174 | .863 |

Based on the results of the multivariate analysis, the following conclusions can be made regarding the research hypothesis exploring the existence of a model:

Hypothesis 2: A model exists explaining a significant portion of the variance in ego engagement (as measured by the UWES instrument) from the network characteristics of size, centrality, and mean alter engagement.

This hypothesis is not supported.
CHAPTER 5: DISCUSSION

This chapter summarizes the purpose, methodology, and results of the study. Based on those results, the chapter draws conclusions, discusses the implications, and makes several recommendations.

Summary

An array of empirical evidence supports associations between social support, engagement, and related beneficial individual and organizational outcomes. However, less is known about the underlying social network systems that provide support and spread engagement in the workplace. Therefore, the primary purpose of this study was to determine the relationship between selected social network characteristics and engagement in the workplace among faculty members at a research university (RU/VH). Specifically, this study sought to address the following research questions and associated hypotheses:

1. What are the characteristics of ego networks among faculty at a research university (RU/VH), specifically in terms of size, centrality, ego engagement, and mean alter engagement?
2. What is the level of ego engagement among faculty at a research university (RU/VH) as measured by the Utrecht Work Engagement Scale (UWES) instrument?
3. Do relationships exist between ego engagement and the network measures of size, centrality, and mean alter engagement among faculty at a research university (RU/VH)?

The established relationship between network characteristics and social support, and the relationship between social support and engagement, served as the basis for the following research hypotheses:

a. Hypothesis 1a: Network size has a positive relationship with ego engagement;
b. Hypothesis 1b: Network centrality has a positive relationship with ego engagement;

c. Hypothesis 1c: Mean alter engagement has a positive relationship with ego engagement.

4. Does a model exist explaining a significant portion of the variance in ego engagement as measured by UWES scores from the following ego network characteristics: size, centrality, and mean alter engagement?

Since a relationship is hypothesized to exist between ego engagement and the network characteristics of size, centrality, and mean alter engagement, the following research hypothesis was established in conjunction with this research question:

a. Hypothesis 2: A model exists explaining a significant portion of the variance in ego engagement (as measured by the UWES instrument) from the network characteristics of size, centrality, and mean alter engagement.

Results

In keeping with the previous chapters, the results were organized in three sections by type of analysis: descriptive, bivariate, and multivariate. The first section, descriptive analysis, discussed the population, data collection, and sample description, presenting descriptive statistics and network maps to explore each of the study variables in turn. One notable finding was that the engagement scores in the sample (including three subscales and the total scores) were consistently and significantly higher than the norms compared using a one-sample t-test (p < .001), as recommended in the UWES user manual (Schaufeli & Bakker, 2004).

The second section, the bivariate analysis, used the Pearson product-moment correlation coefficient to determine if the relationships identified in the literature review existed between the
network variables and the engagement variables. In addition, this section examined how social support and emotional contagion influenced engagement within the sample. The following conclusions can be drawn regarding the relationships between network characteristics and social support, and the relationship between social support and engagement:

Hypothesis 1a: Network size has a positive relationship with ego engagement.
This hypothesis is not supported.

Hypothesis 1b: Network centrality has a positive relationship with ego engagement.
This hypothesis is not supported.

Hypothesis 1c: Mean alter engagement has a positive relationship with ego engagement.
This hypothesis is not supported.

The third section focused on the multivariate analysis, which used multiple linear regression with full model entry to determine if a model exists that explains a significant portion of the variance in ego engagement as measured by UWES scores from the network and engagement variables. The following conclusions can be drawn regarding the existence of a model:

Hypothesis 2: A model exists explaining a significant portion of the variance in ego engagement (as measured by the UWES instrument) from the network characteristics of size, centrality, and mean alter engagement.
This hypothesis is not supported.

**Conclusions, Discussion and Recommendations**

Conclusion One

The response rate for the survey instrument was low. This conclusion is based on the following findings:
• Of the 184 potential respondents, only 71 responded to the survey, resulting in a response rate of 38.6%.

• However, of those responding to the survey, the completion rate was 95.8%, yielding n=67 usable cases in the sample.

Data collection took place at the inaugural meeting of the newly formed college. Meeting attendance was mandatory, which meant that most of the faculty members, if not the entire roster, were readily available in a controlled environment. Survey participation was requested and strongly encouraged by administrators, who specifically set aside time in the agenda for its completion. Additionally, nearly all participants starting the survey provided complete usable data for the study, suggesting that issues with the instrument design such as structure, format, content, and complexity can reasonably be ruled out as factors in the low response rate.

Thus, if absence from the meeting and instrument design flaws can be effectively ruled out as the predominant factors for non-responsiveness, then the implication is that the low response rate may have been the result of willful non-compliance. Non-compliance, in turn, could be interpreted as indicative of a participation bias, possibly based on resistance to the organizational change taking place within the college. More specifically, it is likely that those participants who chose to respond to the survey instrument were likely more personally and/or professionally invested in the success of the new college and/or more supportive of the reorganization process itself than those who chose not to participate.

It should be noted that, while these two motivations may align, they are neither perfectly concurrent nor mutually exclusive. Thus, having an investment in the outcome of the change should not be confused with being supportive of the organizational change itself. For example, faculty members with low mobility and limited employment alternatives would be highly
invested in the successful outcome of the reorganization whether they “support” it or not. Conversely, some faculty members in leadership positions may be supportive of the effort for no other reason than a sense of professional obligation to their department or coworkers, even if the changes may result in a de facto demotion and thus work against their own personal interests. These motivations may positively align for faculty members who see an opportunity for professional growth in the disruption of the status quo, and negatively align for those who see neither the benefit of, nor the need for, change.

Regardless of the exact motivation behind the choice to not participate in the study, some headway could be made to alleviate this issue in future studies by redoubling follow-up efforts to capture data from as much of the accessible population as possible. This could be accomplished by providing additional opportunities to complete the survey instrument, and, if necessary, individually targeted collection efforts to capture data from recalcitrant non-responders. Given the somewhat socially volatile situation surrounding the organizational change, these follow-up efforts would need to be completed in close proximity to the event.

Conclusion Two

The network size in the sample was highly variable, as shown by the following findings:

- Network size ranged from a low of 3 to a high of 47; the mean was 21.54; the SD was 9.657; and the variance was 93.25.

The chief implication here is that the network variables used for the analysis may have been stunted and/or skewed by the low response rate. Given the interdependent nature of network data, each case has the potential to interact with, and thus affect, all other cases in the sample. For example, size was measured as the sum of outbound ties identified by the participant. Therefore, if the participant reported a tie that was not represented in the network
data, then that tie was not accounted for when measuring network size or calculating the derived network variables of centrality and mean alter engagement. Thus, while size appears to be the most evidently affected variable, it is also very possible that other network variables may also have been affected.

Under different circumstances, it may have been possible to offset some of the effects of the low response rate by using a more generous measure of network size. For example, a study focused on the full network (instead of the ego network level used here) could employ an inbound or undirected measure of size to capture more ties. While this approach to network size would have provided a more inclusive measurement, it would not have eliminated the bias completely and it would have been a less appropriate measure for the ego network. Alternatively, a raw size measurement could have been utilized instead of filtering out the outbound ties to non-responsive alters in the network. This approach would have potentially doubled or even tripled the size of some ego networks, perhaps correcting for some of the non-response bias in this particular variable. However, without the corresponding engagement data for the non-responsive alters, the point would be moot, as correlations between such mismatched data would be impossible.

Conclusion Three

1. The network centrality was highly variable. However, non-responsiveness in the sample is very likely to have had a definite, but unquantifiable effect on centrality. This conclusion is based on the following findings:

   - Network centrality ranged from a low of .461 to a high of 2.699, with a mean of 1.552, SD of .5446, and variance of .297.
As with network size, the chief implication here is that the network variables used for the analysis may have been stunted and/or skewed by the low response rate. However, unlike network size, which can only decrease as a result of non-participation, it is unclear what the exact effect of non-respondiveness would have on centrality. Given the interdependent nature of the network data, it is very likely that the observed centrality scores in this sample deviate, perhaps significantly from true values as the result of bias incurred by a distortion in the social network caused by non-respondiveness. Which is to say that the researcher does not fully trust the accuracy of this measurement. For example, if there was some reasonable degree of certainty that the suspected selection bias on centrality created a predictably systematic skew in the distribution, the bias could be statistically accounted for and the data still potentially yield valid correlations. That kind of predictably systematic bias is most likely not the case, as some centrality scores could be higher, some lower, or some could break even as a result of the non-participation effect.

To illustrate this effect, imagine a participant with a centrality score at or close to the mean. If several alters with high centrality are then removed from the participant’s ego network (non-responders), then his or her centrality score will be increased, as he/she effectively “absorbs” more influence in the remaining network. Conversely, if several ties with low centrality are removed, the participant’s centrality score will drop because he or she is no longer serving as a central connection between those missing (non-responsive) alters. A more realistic outcome is less lopsided than these examples. Since any given participant in the sample is likely to lose a mix of high and low centrality alters, there may or may not be a noticeable change in the mean score for the sample. Individual scores, on the other hand, may end up varying widely in either direction depending on the distribution of the missing data. At this time, there is no
plausible method for determining the exact effect of this bias on centrality, other than to say that a near certainty exists that the bias is present and, as a result, the sample values deviate from actual values to some unknown degree.

As with network size, it may be possible for a study focused on the full network (instead of the ego network level used here) to employ a measure of centrality that is more resilient to the effects of missing nodes. Since this study was focused on the ego network level, betweenness centrality was used to enable a direct comparison of centrality between egos without including information from outside of the immediate ego network. While this approach was appropriate for the organizational level being studied, it appears to be particularly vulnerable to non-response bias, as shown by Monte Carlo studies examining the effect of missing nodes on various network measures (J. A. Smith & Moody, 2013; J. A. Smith, Moody, & Morgan, 2017).

Based on these conclusions, the researcher recommends further study along the lines of the Monte Carlo studies described previously using census level data of an analogous population (e.g., the entire faculty of a mid-sized college at a (RU/VH) university). This could then be used to establish a broad set of baseline network characteristics and other attributes relevant to the academic population, such as department, field of study, tenure status, engagement etc. Such data could be used to examine, among many other things, the effects of systematic non-responsiveness defined using those attributes. For example, “administrators” would logically exhibit a high level of centrality by virtue of their position in the organization. First, that premise could be tested, and then members of that group could be systematically removed to examine the effect on the remaining members of the network to provide insight into the vulnerabilities of certain network measures to this type of bias. A similar Monte Carlo method could also be applied based on departments, programs, and content areas to examine professional interactions.
between colleagues, such as the incidence of interdisciplinary research, and identify barriers to collaboration such as information silos within the organization. An even more ambitious undertaking might be to turn the study described previously into a longitudinal study of that particular college to examine the long-term ebb and flow of the organization as circumstances change over time.

Conclusion Four

The engagement scores in the sample group were high, based on the following findings:

- A comparison of mean values for engagement subscales and total ego engagement scores found that the sample values were consistently and significantly higher than the published norms, as measured by a t-test (Vigor t=3.78, df=66, p < .001, Dedication t=7.47, df=66, p < .001, Absorption t=11.52, df=66, p < .001, EgoEngage t=8.39, df=66, p < .001, MeanAltEngage t=33.89, df=66, p < .001).

If taken at face value, these findings would seem to indicate a highly engaged workforce within the newly formed college. However, within the context of the suspected participation bias previously described, these results take on a somewhat different interpretation. If the organizational change was particularly unpopular among the majority of affected faculty, and other non-response factors such as meeting attendance and design flaws can be ruled out, then non-participation in the survey could be reasonably interpreted as a sort of protest vote against the organizational change.

If that is the case, then the participants who were most likely to refuse participation in the survey are logically also the most likely to have low scores on the engagement instrument. Thus, if a participation bias is present in the data, it would most likely be evident in this variable and present in results as a higher than expected engagement score for the group, as those with
potentially lower scores opted not to participate. Aside from the fairly understandable consequences for the validity of this study, there is also a more practical implication here. For instance, if a similar instrument was used by upper administrators to indirectly measure the level of support for the organizational change taking place, it might cause them to grossly overestimate the popularity of the undertaking and as a result misjudge its effect on the morale of the faculty involved.

Conclusion Five

2. No relationships were found between network characteristics and ego engagement. This conclusion is based on the following findings:

- Pearson product-moment correlation coefficients for each of the study variables, size, centrality, and mean alter engagement, were found no significant relationships to ego engagement.

   Based on the results of the bivariate analysis, the hypothesized relationships between the independent variables of size, centrality, and mean alter engagement with the dependent variable of ego engagement were not supported. One plausible explanation for these results is that confounding factors resulting from a probable participation bias at the time of data collection are masking the presence of relationships between the variables. Specifically, the low response rate appears to be the result of deliberate non-participation on the part of some faculty members in the sample, presumably based on a resistance to the organizational change taking place within the college. The resulting selection bias appears to have affected the study variables in an assortment of ways: size was decreased, engagement scores were increased, and centrality was rendered unreliable by non-response. These effects would most likely mask or confound any relationships between the variables and render correlations (if any were found) spurious. In
particular, it is important to take into account differing levels of sensitivity to non-response when dealing with a mixed methodology involving social network analysis and a more traditional survey instrument such as the UWES-9.

For reference, the relevant bivariate hypotheses are as follows:

Hypothesis 1a: Network size has a positive relationship with ego engagement.
This hypothesis is not supported.

Hypothesis 1b: Network centrality has a positive relationship with ego engagement.
This hypothesis is not supported.

Hypothesis 1c: Mean alter engagement has a positive relationship with ego engagement.
This hypothesis is not supported.

Conclusion Six

No model was found to exist explaining a significant portion of the variance in ego engagement from network characteristics. This conclusion is based on the following findings:

- A multiple linear regression with full model entry found no significant relationships or model explaining the variance in ego engagement from the variables size, centrality, and mean alter engagement.

Based on the results of the multivariate analysis, the hypothesized model using the independent variables of size, centrality, and mean alter engagement with the dependent variable of ego engagement was not supported. As with the bivariate analysis discussed previously, one plausible explanation for these results is that confounding factors resulting from a probable participation bias at the time of data collection are masking the hypothesized relationships between the variables. Specifically, the low response rate appears to be the result of deliberate non-participation on the part of some faculty members in the sample, presumably based on a
resistance to the organizational change taking place within the college. The resulting selection bias appears to have affected the study variables in an assortment of ways: size was decreased, engagement scores were increased, and centrality was rendered unreliable by non-response. As these effects would likely mask or confound the hypothesized relationships between the variables and confound any attempt at modeling using this particular set of data, future research is warranted to test similar relationships under more ideal conditions.

For reference, the relevant multivariate hypothesis is as follows:

Hypothesis 2: A model exists explaining a significant portion of the variance in ego engagement (as measured by the UWES instrument) from the network characteristics of size, centrality, and mean alter engagement.

This hypothesis is not supported.

**Closing Thoughts**

It bears repeating that the primary purpose of this study was to determine the relationship between selected social network characteristics and engagement in the workplace among academic personnel at a research university (RU/VH) undergoing some type of expansion or reorganization. Ironically, the chief limitation of the study was the low response rate, which was most likely exacerbated by the reorganization being studied. As this study was archival in nature, very little can be done to correct the response rate after the fact, but this does not mean that useful information cannot be gleaned from the results. Moving forward, researchers conducting similar studies can learn from these results to improve their research design.

Given the somewhat socially volatile nature of organizational change, follow-up efforts, such as additional opportunities to complete the survey instrument, and individually targeted collection, are extremely important to improve the response rate and must be completed in close
proximity to the event. Network measures should be carefully selected to be both appropriate to
the level of the organization and resilient to factors such as non-response in order to ensure the
hypothesized relationships between the variables can be tested with as little bias as possible.
Such selection could be informed by Monte Carlo studies to help determine the effects of non-
response on these variables with this type of population. Future research could still be warranted
to test similar relationships under more ideal conditions to better inform policy and decision
making in similar organizations.

While the hypothesized correlations and model in this study were not supported, these
results are far from conclusive given the limitations imposed by the archival sample used. The
results do not preclude the possibility that the spread of engagement as an emotional contagion
could be detected in the ego network using other means. Additionally, the possibility still
remains that engagement may propagate as an emotional contagion through the social network,
as has been observed with other behaviors and emotional states. These possibilities leave ample
room for additional research in this area.

In particular, the near-ubiquitous popularity of online communication and social media
technology in the last decade has moved the study and application of contagion theory into new
territory. While direct verbal and non-verbal communication remains an established medium for
contagion (via facial, vocal, and postural mimicry), two recent studies indicate the possibility
that the contagion effect can take place, although greatly diminished, via social media without
direct face-to-face interaction and in the absence of nonverbal cues typically associated with
mimicry. This possibility implies that direct face-to-face contact is not strictly necessary in order
for contagion to take place between connected individuals so long as text communications they
are exposed to adequately convey the emotional content (Coviello et al., 2014; Kramer, Guillory,
The study conducted by Cornell researchers Kramer, Guillory, and Hancock (2014) was particularly controversial because the experiment manipulated the “News Feed” of unsuspecting Facebook users (n=689,003) to monitor and control their exposure to emotional content without their explicit consent. Although it should be noted that Facebook's terms of service allow this type of research, the more sinister implication—particularly in light of recent allegations of interference in the 2016 presidential election—is that these social network systems can be used to manipulate the emotions and behaviors of vast numbers of people without their knowledge or consent. Thus, it is imperative to study and understand these phenomena in order to safeguard the individual freedoms of thought and expression, as well as, social institutions such as democracy from manipulation.
REFERENCES


Appendix A: IRB Approval

Project Report and Continuation Application
(Complete and return to IRB, 130 David Boyd Hall.
Direct questions to IRB Chairman Robert Mathews: 678-8602)

Project Title: LSU College of Human Science and Education (CHSE) Research Interest Survey

Please read the entire application. Missing information will delay approval.

1. Project Funded By: LSU Proposal #

2. Project Status: Check the appropriate blank(s) and complete the following:
   - Active, subject enrollment continuing; if subjects enrolled: __________
   - Active, subject enrollment complete; if subjects enrolled: __________
   - Active, subject enrollment complete; work with subjects continues
   - Active, work with subjects complete; data analysis in progress
   - Project start postponed
   - Project complete; end date __________
   - Project cancelled; no human subjects used

3. Protocol: (Check one)
   - Protocol continues as previously approved
   - List (on separate sheet) any changes to approved protocol

4. Unplanned Events:
   - Did anything occur that encouraged risks to participants?
     - Yes
     - No
   - If such events occurred, describe them and how they affect risks to your study, in an attached report.
   - Have there been any previously unreported events? YN
     - Yes
     - No

5. Consent Form and Risk/Benefit Ratio:
   - Does new knowledge or adverse events change the risk/benefit ratio? YN
     - Yes
     - No
   - Is a corresponding change in the consent form needed? YN
     - Yes
     - No

6. Attach a brief factual summary of project progress/results to show continued participation of subjects
   - Justified; or provide a final report on project findings

7. Attach current consent form (only if subject enrollment in continuing); check the appropriate blank
   - Form is unchanged since last approval
   - Approval of revision requested hereinafter (identify changes)

Signature of Principal Investigator: _______________________________ Date: 11/17/13

IRB Action:  ✔ Continuation approved, Approval Expires: 11/18/13

Signed: _______________________________ Date: 11/18/13

Form date: April 16, 2008
APPENDIX B: SURVEY INSTRUMENT

LSU College of Human Science & Education (CHSE)
Faculty Engagement Survey

Principal Investigator: Dr. Tracey Rizzuto, LSU SHREWD, trizzut@lsu.edu, (225) 578-2453

INTRODUCTION
The purpose of this research project is to follow up on a previous assessment to identify changes in collaboration patterns and work engagement in CHSE faculty and instructional staff since the college was reorganized in 2014. Knowledge from this study will be used to promote research collaboration within the College. Participation in this survey is voluntary; responses will be kept confidential. You will be asked to indicate your consent to participate.

WHY ARE YOU INVITED TO PARTICIPATE?
You are being invited to participate because of your affiliation as an LSU CHSE research faculty or instructional staff member.

RESPONSIBILITIES/EXPECTATIONS
You will be asked survey questions (approximately 5 minutes to complete) about engagement activities, and collaborative affiliations within the College.

POTENTIAL RISKS AND POSSIBLE BENEFITS
There are no known risks associated with this study. All information provided will be confidentially managed. General patterns that emerge across all survey responses may be presented to the CHSE faculty and published in academic literature. Participants’ identities will remain confidential unless disclosure is otherwise authorized by the respondent or required by law. Participants may benefit from this research by helping to strengthen the research capacity of the College.

STATEMENT OF VOLUNTARY PARTICIPATION
"From the statements above, I understand that I am voluntarily electing to participate in this study, and that I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb."

By providing your electronic signature below, you are consenting to participate in this research study. You may print a copy of this signed and dated consent form for your records. "The study has been described to me above, and I have been informed about avenues for obtaining additional information regarding this study."

Print Name: ________________________________

Signature: ________________________________

Please complete all pages
Research Collaborations

To assess the capacity for growth in Intra-college collaborations, please tell us about your CHSE networks.

1. Who do you know? (i.e., spoken to for more than a few minutes)
2. With whom have you worked or collaborated on a research project/idea development?

Please mark the names of people you know and/or who are collaborators. Leave blank if you do not know the person and/or have not collaborated.

<table>
<thead>
<tr>
<th>Name</th>
<th>I Know This Person</th>
<th>Collaborator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>☒</td>
<td></td>
</tr>
<tr>
<td>Anders Andersen</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Clark Kent</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Don Draper</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Erika Mustermann</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Frank Underwood</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Gustavo Fring</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Hank Schrader</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Hrvoje Horvat</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Jane Alleman</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Jane Doe</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Jesse Pinkman</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Joe Bloggs</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>John Q. Publick</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>John Smith</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Juan Perez</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Margaret Sanger</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Marie Curie</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Marilyn Monroe</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Mary Sue</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Pero Perić</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Piet Pompies</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Rajwinder Kaur</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Rick Grimes</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Saul Goodman</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Ted Beneke</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Tuco Salamanca</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Walter White</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Wilford Brimley</td>
<td>□</td>
<td></td>
</tr>
</tbody>
</table>

Please complete all pages
Engagement Activities

The final set of questions aim to assess the degree of engagement you feel at work, and the types of activities you engage in to promote community transformation. Please indicate your level of agreement with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never (0)</th>
<th>Almost Never</th>
<th>Couple Times a Year</th>
<th>Rarely/ Almost Monthly or Less</th>
<th>Sometimes/ Few Times a Month</th>
<th>Often/Few Times a Week</th>
<th>Very Often/ Few Times Weekly</th>
<th>Always/Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>At work, I feel bursting with energy.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>At my job, I feel strong and vigorous.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I am enthusiastic about my job.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>My job inspires me.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>When I get up in the morning, I feel like going to work.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I feel happy when I am working intensely.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I am proud of the work I do.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I am immersed in my work.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I get carried away when I am working.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Thank you for your participation in this survey!!

Please complete all pages
Glenn M. Gibeson IV was born in Kansas City, Missouri. As a child, he lived with his family in several parts of the United States, attending no less than 13 schools before graduating from Byng High School in Ada, Oklahoma, in 1994. He served in the United States Navy as a nuclear machinist before receiving an honorable discharge in 1999. Following his naval service, he received his bachelor’s degree in Sociology from East Central University in 2001. In the aftermath of Hurricane Katrina, he was recruited into the newly formed Disaster Science and Management program and received a Master’s of Public Administration from Louisiana State University in 2009. After graduation, he worked in the Governor’s Office of Homeland Security and Emergency Preparedness (GOHSEP) and at the National Incident Management Systems and Advanced Technology (NIMSAT) Institute at the University of Louisiana, Lafayette. Inspired in part by the research he conducted at NIMSAT, he returned to Louisiana State University in 2012 to fulfill his lifelong goal of earning a PhD. At LSU he studied leadership development and industrial/organizational (I/O) psychology within the School of Human Resource Education and Workforce Development (SHREWD) under the prestigious Economic Development Administration (EDA) graduate assistantship. Glenn currently lives in Baton Rouge with his beloved wife Tina, and a glaring of black rescue cats, while pursuing research interests in leadership and high-skilled workforce development. In particular, he is researching the development and application of high-performance work systems to promote employee engagement, improve work-life balance, and support creative innovation.