Spring 5-2018

These Relationships Save Lives:The Association Between The Nature of Relationships And Experience of Support In The Workplace For The AMBER Alert Training and Technical Assistance Program

Kimberly Rutigliano
Southern Methodist University, krutigliano@smu.edu

SOUTHERN METHODIST UNIVERSITY

SIMMONS SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

THESE RELATIONSHIPS SAVE LIVES:
THE ASSOCIATION BETWEEN THE NATURE OF RELATIONSHIPS AND EXPERIENCE OF SUPPORT IN THE WORKPLACE FOR THE AMBER ALERT TRAINING AND TECHNICAL ASSISTANCE PROGRAM

By

Kimberly A Rutigliano

An Applied Dissertation submitted to
Department of Education Policy and Leadership
in partial fulfillment of the
requirements for the degree of
Doctor of Education

Degree Awarded:

Spring, 2018

SOUTHERN METHODIST UNIVERSITY

SIMMONS SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Kimberly A. Rutigliano, titled These relationships save lives: The association between the nature of relationships and experience of support in the AMBER Alert Training and Technical Assistance program and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Education.

_____Date: ( )

Ashley Tull, Ed.D, Co-Chair

_____Date: ( )

Sondra N. Barringer, Ph.D., Co-Chair

_____Date: ( )

Charlotte Barner, Ed.D. Committee Member

_____Date: ( )

James Walters, AMBER Program Director, National Criminal Justice Training Center, ex officio

_____Date: ( )

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

_____ Date: ( )

Co-Chair Sondra N. Barringer, Ph.D

_____ Date: ( )

Co-Chair: Ashley Tull, Ed.D..

ABSTRACT

My research looks at organizational behavior as a resource to be leveraged for human learning. Two theoretical constructs guided this research, Team Member Exchange theory (TMX) and Social Network Analysis theory (SNA). The data for this research were derived from a case study of a subpopulation of the AMBER Alert organization in Mexico.

While no results were statistically significant, there was a weak association between the perceived support on the team (TMX) and the perceived strength of dyadic relationships (SNA) based on measures of outbound degree centrality ($r>0.3$). Graphical SNA analysis provided a more useful observation for a small group ($N=14$) than the statistical analysis. The image revealed that five out of seven nodes with high TMX were located in the core group of the network (71.4%). Those with more and stronger dyadic connections (SNA) also tended to have higher perception of the quality of exchange relationships (TMX).

My research demonstrated the exchange relationships working in this organization. The impact of peer relationships in a team has potential applications in both a university and an employer sponsored learning space. In this case, implementation of informed adult education practices brings significant societal value because it serves to improve job outcomes in an industry with much more than profit at stake. These relationships save lives.

Keywords: Team Member Exchange (TMX), Social Network Analysis (SNA), Exchange Behavior, Workplace Relationships, AMBER Alert,

ACKNOWLEDGEMENTS

This spring I started working out with a personal trainer for the first time. I have found that the experience was strikingly similar to working through multiple revisions of a significant piece of academic writing for the first time. Just like in gym, despite having used my writing muscles for my entire life, there were tools and techniques that I was unaware of. In both cases, repetition became tedious but built strength and it took an outside expert to push me to a level of effort and determination that I did not know I was capable of. At every point where I thought for sure I was finished, my esteemed faculty showed me that there was more required, and somehow I found I had more to give.

Much like with my current exercise regimen, I am unsure to what extent I will continue academic writing after this season of my life is done, but I am sure that I have a new level of skill and confidence to work through future attempts on my own because of what the experts have shown me. Thank you to my faculty committee: Charlotte Barner, Sondra Barringer, and Ashley Tull who have trained me for much more than just to write a dissertation. May I be the kind of academic professional who is a credit to their disciplined instruction.

Special credit is due to Jim Walters, who introduced me to the AMBER Alert Training and Technical Assistance program and saw the connection between this heroic effort that he coordinates and the humble work I do. He agreed to sponsor me in this journey from before I ever applied to a doctoral program and has always gone above and beyond in support of me, personally and professionally, like the amazing public servant and leader that he is.

I felt like I had no choice but to start working out this spring due to the stress and weight gain that the doctoral process caused me. I only persisted as long as I did without requiring medical or psychological intervention because of the group therapy provided by my cohort and the love of my family. I could not ask for better peers and professional colleagues than the champagne turkeys. I saw them striving alongside me and it made me work harder. I saw them crying alongside me and I was reassured that I am neither crazy nor alone in this experience.

Speaking of crying, I owe a huge debt of gratitude to my children, who will someday understand that I chose this age and stage of their lives to pursue this goal intentionally, but who nevertheless told me tearfully every month for 29 straight months of coursework that they didn't want for me to go to class and watched pitifully as I wrote through many beautiful weekends when they wanted my attention.

This means, of course, that I am even more deeply in debt to my adoring husband, who took care of every single aspect of managing our home and family for three years so that I could pursue this dream. We have agreed that as compensation, he is not required to read my dissertation. He doesn't have to know what it says to tell the world that he is proud of me and to make me feel like the luckiest woman alive.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

- AMBER – referring to the international AMBER Alert Organization, a system of child abduction investigation notification and resolution processes that evolved from a US program, and is now active internationally. For the purposes of this research, AMBER is assumed to reference the governance structure for all the AMBER program employees (coordinators) in North America (US, Canada, Mexico).
- (AATTAP) AMBER Alert Training and Technical Assistance Program – an initiative of the NCJTC that creates and disseminates curriculum for training and technical assistance to members of the AMBER Organization "The mission of the AMBER Alert Training and Technical Assistance Program (AATTAP) is to safely recover missing, endangered, or abducted children through the coordinated efforts of law enforcement, media, transportation, and other partners by using training and technology to enhance response capacities and capabilities and increase public participation" (AATTAP, 2018).
- (NCJTC) National Criminal Justice Training Center - a US entity that provides training materials and facilitation to a variety of law enforcement agencies including the oversight of the AMBER Alert Training and Technical Assistance Program (AATTAP) in the US, Canada and Mexico
- (SBI) Southern Border Initiative– Specialized training plan for the AATAP For the 10 states along the US/Mexico border; (California, Arizona, New Mexico, and Texas on the US side and Baja California, Sonora, Chihuahua, Cuahuila, Nuevo Leon, and Tamulimpas on the Mexican side); "AATTAP has trained over 700 state, local and federal child protection officials in the U.S. and Mexico and has conducted joint training programs and table top exercises involving U.S. and Mexican officials working together to address issues related to cross border abductions, trafficking and exploitation. Since 2016, AATTAP has participated in six regional meetings in the U.S. and Mexico, including a trinational AMBER Alert conference" (AATTAP, 2018, p2).
- (TMX) Team Member Exchange – a measure which "assesses the reciprocity between a member and his or her team with respect to the member's contribution of ideas, feedback, and assistance to other members and, in turn, the member's receipt of information, help, and recognition from other team members" (Seers, 1989 p 21).
- (SNA) Social Network Analysis– "the social environment can be expressed as patterns or regularities in relationships among interacting units…The focus on relations and the patterns of relations requires a set of methods and analytic concepts that are distinct from the methods of traditional statistics and data analysis" (Wasserman & Faust, 1994, p3). "Networks are structures of interdependence involving multiple organizations or parts thereof, where one unit is not merely the formal subordinate of the other in some larger hierarchical arrangement. Networks exhibit some structural stability but extend beyond formal established linkages and policy legitimated ties. …The institutional glue congealing networked ties may include authority bonds, exchange relations and coalitions based on common interest, all within a single multiunit structure" (O'Toole 1997, p45).
- (SNG) Social Network Graph – "the mathematical concept of a graph involved the concept of points (or nodes) connected by lines …and graph theory comprises a set of

procedures for analyzing the presence, direction, and strength of the lines which connect these points" (Scott, 1988, p113).

These relationships save lives: The association between the nature of relationships and experience of support in the AMBER Alert Training and Technical Assistance Program

I. INTRODUCTION

> A new constellation of forces is being recognized as crucial to economic success: …the cooperation of local government, **proximity to centers of higher education,** a highly skilled labor pool, extensive ties to research institutes and trade associations, and cooperation among firms with …overlapping interests (Powell, 1990, p 313)

Linkages of various kinds between universities and industry are increasingly being seen as advantageous to both parties (Barringer & Slaughter, 2016; Bekkers & Freitas, 2008; Bruneel, d'Este, and Salter, 2010; Mathies, & Slaughter, 2013). Mueller, (2006) proposed that university-industry relations allowed for the commercialization of knowledge and would therefore support economic growth. As an educator responsible for university continuing and professional education, I believe the question is not so much whether the university should concern itself with connecting with industry to contribute to human resource development, training, and vocational learning, but how to best participate in the movement to meet these business demands. My directive as a higher education administrator is to take advantage of this opportunity to serve a different kind of student and to sustain and grow the resources of the university, specifically through teaching and training applied skills.

Mathies and Slaughter reported that literature tying universities to industry and economic development generally focused on technology transfer relationships (such as corporate research and development and the resulting patents) but they did include both consultancy and training opportunities among the channels most frequently linking higher education and business industries (2013). They found that most literature investigated firm managers initiating university connections to meet business needs rather than examining the ways universities could connect with businesses. As a student of higher education policy and leadership and a professional responsible for growing business development outreach on behalf of the university, my research interests are practical and applied in the corporate environment, rather than within the traditional higher education setting. To that end, my research looks at organizational behavior as a resource to be leveraged for human learning. The impact of peer relationships in a team has potential applications in both a university and an employer-sponsored learning space. I believe that academic research can provide the justification for university-industry educational partnership expenditures in the areas of consultancy and training by documenting the team relationship conditions that relate to learning and developing training that reinforces these behaviors.

Business needs are not limited to private industry. Partnership models between researchers and practitioners have been justified in industries such as mental and public health and criminology, that cross for-profit and non-profit, public and private organization types and in large networked government organizations like school districts (Bryk et al., 2015; Coburn & Penuel, 2016). Providing the context and industry-specific subject matter expertise was the corporate partner's role in these partnerships. The university's role was to provide research-based expertise in delivering adult education. In brief, universities must be the experts in the learning process, not just course content, so that we are teaching students how to learn (Aoun, 2017). In that way, the benefit the university brings to the partnering company or agency lies in enhancing the delivery of the overall educational program through optimum engagement in the

learning process, and not simply providing training (Knowles, 1973; Garrison, 1997; Callahan, 2007; Bryk et al, 2015.)

Existing research demonstrated the power of relationships to influence positive outcomes in education and business. In business, positive outcomes have included increased productivity, profitability, and employee retention (Baldwin, Bedell, & Johnson, 1997; Harter, Schmidt, & Keyes, 2003; Koys, 2001). In education, positive outcomes have included student satisfaction, grades, graduation rates, and loyalty to the institution (Fletcher and Tienda, 2009; Rizzuto, LeDoux, and Hatala, 2009; Rovai, 2002; Skahill, 2003). Both contexts benefited from information sharing, increased trust, and the development of collective identity, as both inherent benefits and as drivers of performance (Baldwin, Bedell, & Johnson,1997; Fletcher and Tienda, 2009; Harter, Schmidt, & Keyes, 2003; Koys, 200; Rizzuto, LeDoux, and Hatala, 2009; Rovai, 2002).

In their review of the Gallup studies, Harter, Schmidt, and Keyes highlight the discrepancy between the training most often provided by employers and that which was needed for long-term success. They found that training provided by employers had been focused on the tactical and industry-specific job needs, but long-term employee success and retention was tied to engagement, leadership, and other relational aspects often vaguely referred to as soft skills (2003). Human Resources Development (HRD) activities and outcomes, like training and employee retention, influenced organizational effectiveness (Koys, 2001). HRD advocates have been saying for decades that in order to better achieve these outcomes, workforce education should be based on emerging educational best practices such as peer learning, networked improvement communities, communities of practice, and project teams (Baldwin, Bedell, & Johnson, 1997; Bryk et al, 2015).

These best practices were informed by research in relationship-based learning theories such as Bandura's (1969) social learning, Berger & Luckmann's constructivism (1991), and adult learning theory i.e. andragogy (Knowles, 1973). Conversely, traditional and outdated teaching practices that inform skills-based training were developed from classical education theories and are based on animal behavior in a laboratory setting or making assumptions from theories of how children learn (Knowles, 1973; Garrison, 1997; Callahan, 2007). To move beyond short-term, transactional training, which was intended to address task performance in the context of a current role, HRD activities should provide quality adult education that helps learners build broader potential beyond the task at hand by teaching them to acquire new skills (Knowles, 1973, Swanson & Arnold, 1996, Aoun, 2017). I believe that a university could provide expertise in this regard by partnering with companies to bring newer educational models to the workplace.

Uzzi and Lancaster (2003) proposed that research into organizational learning should address how to strategically develop relationships to increase information transfer. In my research, I explored the practice of leveraging relationships for the purpose of improving a practitioner-training program. By establishing an empirical basis, I was able to evaluate the ways in which adults learn from their peers in the context of a team. I presumed relationships inherently exist on a team, but these relationships must have value if they are to successfully impact team learning. I questioned to what degree individuals were satisfied with the quality of the exchanges they had within their team. To better understand these relationships, I applied two theories to team behaviors. First, Team-Member Exchange (TMX) Theory provided a relationship-based measure for researching an individual's perception of their team (Seers,

1989). Measuring the perceived quality of the interactions provided insights into potential for leveraging these relationships for both positive education and business outcomes. However, TMX alone did not describe what the peer-relationships looked like within the team. The second theory, Social Network Analysis (SNA) theory, was selected as a method by which to observe and quantify these various individual relationships. Understanding the strength of the network offered insights into the pathways by which information, assistance, and resources were provided (Balkundi & Harrison, 2006; Knoke & Yang, 2008; Mathies, & Slaughter, 2013; Powell, 1990; Streeter & Gillespie, 1992).

The university can provide a guide by which to create, evaluate, and elevate the employee training programs that are taking place in a business environment using the theories of TMX and SNA. As previously stated, not all employees work in private industry business environment. According to the Bureau of Labor Statistics, in 2016 the federal government employed 21,861,000 workers in more than 328 occupations, not including the postal service (BLS, 2018). State and local governments employ many more. To test the application of TMX and SNA theories, I used the AMBER Alert (AMBER) program as a case study. AMBER coordinators[1] in the US and Mexico, where my subjects were based, work under the same guidelines as established within the original US AMBER model[2] (J. Walters, personal communication, August 20, 2015). The AMBER program was born out of the 1996 abduction and murder of 9-year-old Amber Hagerman in Arlington, TX and as of February 2006, all 50 states plus the US territories of Puerto Rico and the US Virgin Islands had plans in place under the federal Protect Act and AMBER name (Zgoba, 2004; DOJ, 2012). Since 2006, the AMBER program spread to Belgium, Canada, France, Germany, Greece, Mexico, Netherlands, Portugal, and the UK (DOJ, 2012). As of January 2018, 910 abducted children have been recovered as a result of the AMBER Alert Program. (AATTAP, 2018)

To coordinate efforts and communicate best practices within a network of AMBER coordinators, the US Department of Justice created a national initiative for training and technical assistance for AMBER through the National Criminal Justice Training Center (NCJTC). The AMBER Alert Training and Technical Assistance Program (AATTAP) was designed "to safely recover missing, endangered, or abducted children through the coordinated efforts of law enforcement, media, transportation, and other partners by using training and technology to enhance response capacities and increase public participation" (AATTAP, p. 1, 2018). The AATTAP is based in the US, but supports AMBER coordinators' training generally and internationally.[3] I became involved with the AATTAP and NCJCT as a consultant in 2015. Since

[1] AMBER Coordinators can be a law enforcement professional or an attorney who has been designated to be responsible for an AMBER plan at the local, regional, state, or federal level.

[2] "AATTAP has worked closely with the US Embassy, Mexico City, the US DOJ Office of Overseas Prosecutorial Development, Assistance and Training (OPDAT), Procurador General de la República of Mexico (PGR), and state AMBER Alert Coordinators to develop protocols to create Protocolo Alerta AMBER, a federally administered comprehensive child recovery program **which is consistent with programs in the U.S**. and Canada"(AATTAP, 2018, p 2). Emphasis added.

[3] For the purpose of this research, references to AMBER generally apply to AMBER coordinators in the North American AMBER Organization (US, Canada and Mexico) even though my subjects all happen to be Mexican, because the US based training and technical assistance department (AATTAP) supports them with similar educational opportunities and programs. There is not a training division specifically for Mexican *Alerta* AMBER operations.

that time, I have been tasked with proposing training solutions to improve communication with the goal of successful resolution of cross-border child abductions in the international organization.

For my academic research, AMBER served as an example of a workplace with continuing education and training practices in the area of law enforcement, and it had a highly standardized and well-supported training organization[4]. According to the NCJTC, their AMBER trainers were experts in the tactical demands of the work to be done, but the curriculum and training they offered did not take relationships into account (J. Walters, personal communication, August 20, 2015). As a representative of the university partnership with this organization, I proposed that collaborative relationships and successful communication were the building blocks necessary to achieve the ultimate goal of more successfully resolved child abduction cases. Therefore, the assessment of relationships in this organization provided a basis for evaluating the ways the training model could potentially be manipulated to develop new relational HRD practices designed to impact coordinator engagement, retention, and productivity. If coordinators were better connected and networked and more unified as a team, more children would be recovered, meaning that improving these relationships would save lives.

According to the literature, the two theories of TMX and SNA had not been researched together before, but the authors of the TMX theory saw reason to combine them within the field of education. The founders of TMX theory proposed that "applied researchers need to study the networks of exchange relationships within work groups, as well as how training employees in the development of exchange relationships can best help employees learn how to coordinate their own efforts" (Seers, Petty & Cashman 1995, p. 36). My research provided an opportunity to fill this academic gap within the current higher education and business research by combining individual and group level relationship measures to formulate a more robust and comparative picture of team exchange behavior.

To begin this process of addressing my problem of practice, and establish a baseline for evaluating the AMBER training opportunity, I developed a study to provide a descriptive analysis of the current state of exchange relationships between team members belonging to a subset of a larger network. I evaluated this subset as a whole population to explore TMX, SNA and intersection of the two theories to generate ideas to explore later in the larger organization. To evaluate coordinator relationships, I asked the following research questions:

1. *How do people experience support within the workplace?*
2. *What are the relationships that exist within the workplace?*
3. *What is the nature (perceived strength) of the relationships?*
4. *What is the association between people's experience of support within the workplace and the presence and nature of relationships?*

The following pages comprise this study, wherein I answer each of the above research questions based on survey responses from 14 AMBER Alert coordinators. A thorough analysis of their experience, while not generalizable to the whole international AMBER organization or

[4] "Across all onsite training and technical assistance events, over 26,600 participants have received more than 403,809 hours of training, Additionally, more than 23,000 participants have completed training through online learning, with over 94,000 hours of online training delivered, resulting in 98% of users providing "good" or "excellent" overall ratings" (AATTAP, 2018)

the general population, does provide an example of the way relationships function in this organization. Each chapter that follows focuses first on the TMX experience in the workplace, then on the SNA of the relationships identified, and finally seeks to bring the two concepts together to look at the intersection of team and individual level perceptions to provide a full picture of the subjects' perception of their relation to the organization. This study provides an example of my ongoing research into the nature of relationships and training in the AMBER organization and serves as a basis for future analysis of the educational model used therein, but does not attempt to answer questions about the efficiency or outcomes of the training and technical assistance currently provided.

II. LITERATURE REVIEW

In order to investigate this problem of practice described in my introduction, I first explored prior research on TMX Theory, SNA Theory, and looked for any previous academic inquiry into the AMBER organization. TMX research provided evidence demonstrating the power of workplace relationships to influence positive business outcomes. This theory was selected as appropriate for my research context over other relationship models because previous studies had validated the theory, finding that it applied well to the kind of team environment present in my case study (Banks et al. 2014; Witt et al., 1999) and deemed the instrument to be appropriate for practitioner use (Seers, Petty & Cashman, 1995; Abu Bakar & Sheer, 2013). SNA theory provided methods by which to observe and quantify individual relationships within a group. I chose this theory as appropriate to my study over other organizational models because previous research characterized organizations with structural patterns like those exhibited in my case study as networks (Morgan, 1997; Powell, 1990). The previous AMBER research underscored the relevancy of improving speed and efficacy in business practices in the context of this case example.

Theoretical Framework 1: Team Member Exchange (TMX)

The literature provided examples of TMX used with teams of various sizes and structures in business environments, such as research and development and telecommunications teams, professional and industrial industries (Banks et al. 2014), and limited application in academic environments (Lucas, Voss, & Krumwiede, 2015; Rose, 2012). For the purposes of my study, TMX was investigated as a tool for evaluating team identity, cohesiveness, and productivity of AMBER coordinators in the SBI as functioning as a matrix or project team, although they could have been considered an embedded sub team within the larger organization. To review the TMX literature, I first provided an overview of the genesis of the theory, mentioned the application to higher education, discussed the key difference between content and form in the analysis, and then provided a deeper explanation of three key concepts of the theory. I then did the same for my second theoretical framework, Social Network Analysis (SNA).

Origins and Definition of TMX

Banks et al. (2014) contended that researchers often study workplace relationships as one of two social exchange constructs, Leader-Member Exchange (LMX) and/or Team-Member Exchange (TMX), thereby grounding these paradigms solidly in the context of social exchange theory. Social Exchange theory originated from psychology and economics and attempted to characterize and rationalize social behaviors as mutually beneficial transactions. (See Emerson, 1976 for a more complete overview). The literature on social exchange theory, which reflected properties of LMX and TMX by definition, investigated complex measures of trust, reciprocity, conflict, role, and communication. These concepts were often viewed in the context of either (1) the relationship, (2) the tangible or intangible resource passing between the members, or (3) the form of exchange (Banks et al, 2014).

LMX theory was important only in so much as it was the original paradigm and provided the genesis for the development of TMX, the theory that was utilized in the study. Graen and Cashman (1975) developed the LMX construct to examine dyadic relationships between leaders and their subordinates. LMX proposed that the reciprocal exchange of ideas, feedback, and assistance between the leader and the individual worker constitute the "building blocks of organizational structure" by which role-making and leadership develop (Seers, Petty &

Cashman, p.3, 1995). Seers developed TMX as both a theoretical construct and a formal instrument as a means of evaluating similar interactions between peers within a work team (1989). By Seer's own admission, TMX "was conceived to be somewhat analogous" to LMX, but intended to address role-making and team dynamics at the peer level rather than between workers and their supervisor (Seers, Petty, & Cashman, p.3, 1995). Like LMX, TMX relations were defined as having high or low exchange quality. High TMX, or better quality social exchanges between a member and his or her team, were characterized by trust and mutual respect, whereas low TMX, or poor quality social exchange between a member and his or her team, were characterized by acting on the basis of employment contract obligations rather than relationships (Biggs, Swailes, & Baker, 2016).

Previous TMX Application to Higher Education

I found limited references to TMX in the education literature or included in research applied in an academic context. Three recent studies indicated the promise of bringing this construct into the field because, as Lucas, Voss, & Krumwiede say, "students' experience with their educational institution may help or hinder their classroom performance, for the same reasons for which employees' experience with their organizations on this measure affect their motivation and sense of trust in their leadership" (2015, p. 97). Lucas, Voss, & Krumwiede's work created a self-report tool for students to respond to TMX statements as well as other measures of communication and exchange behavior (2015).

Additionally, universities are places of employment and function like businesses in that regard. One study did indirectly assess TMX among university faculty and professional staff by measuring citizenship behaviors and found that relationships between these behaviors and satisfaction, loyalty, and productivity among university staff was similar to what was seen in other professions (Rose, 2012). Only one study dealt specifically with professional training or workforce development. This qualitative work did not utilize a TMX scale, but showed that employee socialization created an environment conducive to learning (Commeiras, Loubes, & Bories-Azeau, 2013) They found that the "integration of concepts from [TMX] helps refine the understanding of the organizational socialization of trainees" (p 170).

A Structural Approach

As mentioned previously, exchange-based social theories evaluated either the exchange *content*, the tangible or intangible resource passing between the members, or the *form* of exchange in the relationship (Banks et al, 2014; Wasserman & Faust, 1994). Exchange content, or what Lau and Cobb (2010) and Settoon, Bennett, and Liden (1996) called *citizen behaviors*, included actions such as training a new team member, providing needed information or assistance, and extending social rewards. In this context, these citizen behaviors act as commodities that can be traded between the individual and the organization (Settoon, Bennett, & Liden, 1996).

Beyond the content exchanged, many TMX researchers looked at the impact of the exchange on the team or organization. These researchers were concerned with how variables in TMX level related to performance, changed over time, or compared to other measures of interpersonal relationships, like LMX (Banks et al, 2014; (Biggs, Swailes, & Baker, 2016; Liden, Wayne & Sparrow, 2000; Dierdorff, Bell, & Belohlav, 2011). These meta-analysis of TMX impact on an organization independent of content exchanged were valuable to my analysis, which did not differentiate the types or relative differences in what content was being exchanged.

My evaluation of exchange relationships extended only to the perceived strength the subject ascribed to the exchange. This approach was more common in the literature. Therefore, a deep investigation into the content of the exchange was not necessary for the purposes of this study.

Key Concepts of the Theory

Through my analysis of the literature, I identified three primary characteristics of TMX to guide our understanding of TMX for the purposes of this research: collective relationship, assumed reciprocity, and creating positive outcomes for the organization.

TMX involves a collective relationship. TMX measured the quality of team exchange relationships (Seers, 1989). As a means for evaluating coworker relationships, TMX rated how an individual perceived the quality of the open and mutual exchanges that passed between them and the team as an entity with a generalized collective identity; not with a specific individual like LMX (Seers, 1989). This social exchange took the form of both direct interchanges and the impression or effect of those interchanges. Forms of exchange included advice, assistance, encouragement, or other interpersonal transmissions that either built up or broke down the individual's role in relation to the team (Seers, 1989). TMX viewed individuals as relating with one another as representatives of the collective, not multiple unique personalities (Banks et al., 2014). According to TMX theory, a member of the team formed a generalized perception of the peer group experience, his or her role, and relationship to the team because of the support, resources, and information that passed between them and the team as a whole. The *exchange* of resources superseded individual personalities or other personal attributes as having the power to create and sustain the relationship. Therefore the ability to exchange resources determined individual member's role on the team and their perceived quality of the team relations (Seers, 1989, Seers, Petty, & Cashman, 1995).

One of the benefits found in TMX assessment was that having collective group identity allowed for more consistent role reinforcement and identification within the team (Seers, Petty, & Cashman, 1995). The question then became, who was part of the team? When using TMX theory, the literature showed different outcomes for different kinds of teams. Seers, Petty, and Cashman (1995) tested the differences between self-managing groups and more traditional hierarchical work teams and found higher quality exchange among the self-managing groups. Witt et al. (1999) found that where an individual identified strongly with the team, his or her commitment was steadfast regardless of exchange quality. However, sometimes an individual maintained membership in multiple teams. Results showed that TMX quality had a stronger impact on commitment among members of a matrix, or cross functional, team who primarily identified with a different team in the organization other than the specific team being studied (Witt et al., 1999). For example, TMX had a special potency for a project team when the individual members still retained stronger ties to their functional area teams. Specifically, when an individual did not identify strongly with the project team being studied, but rather with another outside constituency, the result was that his or her commitment to the project team suffered greatly under conditions where TMX was low and improved dramatically if TMX was high. However, these individuals never reached the levels of TMX of those who principally identified with the team being studied (Witt et al., 1999).

A peer-led organization may benefit from circumstantially higher TMX by virtue of acting as a self-managing work group. The absence of a shared supervisor "provides both the need and the opportunity for members of the group to focus their efforts towards establishing and

maintaining a high degree of collaboration" (Seers, p. 121, 1989). A matrixed team with shared goals and objectives but no shared point of authority, as opposed to a dedicated in-tact team with a single leader, showed higher need for TMX (Witt, 1999). This behavior would similarly translate to voluntary service roles, like professional organizations, or committees that emerge when members from affiliated organizations form work teams to collaborate together on a project.

The literature on collective identity in TMX and in particular its meaning for cross functional teams was important to my research because my study was situated within a complex organization with high turnover and indirect reporting lines. Individual AMBER coordinator appointments were subject to change. The Seers Petty and Cashman (1995) and Banks et.al (2014) studies indicate that the individual will have a perception of the team as an entity, and this collective identity will allow for consistency in that person's role identification with the team that can withstand changes in individual members. AMBER coordinators reported to different local, state, or federal authorities and were brought together in ad hoc teams based on initiatives or needs. The implication of the Witt (1999) and Seers (1989) studies was that team exchange was more powerful, and a focus on relationships would therefore be more important for this group than in a more traditionally managed team.

TMX assumes reciprocity. TMX measured inherently reciprocal, voluntary behavior, whereby an individual contributed to the collective in a valuable way and received the information, help, and recognition he or she needed to be successful from the team in return (Abu, Bakar, & Sheer, 2013; Seers, 1989; Seers, Petty & Cashman, 1995; Settoon, Bennett, & Liden 1996). In TMX assessment, the workers rated the quality of their relationships to the rest of the team in terms of their willingness to give as well as receive information, resources, or assistance from their own perspective. This subjective perception, not empirical measurement of the actual transfer of resources, provided a value measure for the exchange (Abu, Bakar, & Sheer, 2013). TMX described the individual's perception of his or her role within the team (Seers, 1989). This means that one individual could experience high TMX on a team because he or she felt positively about the level of exchange in the group while another member of the same team could report experiencing low TMX, despite receiving the same level of resources. Later I will further discuss this phenomenon as a limitation of TMX theory. As a predictor of organizational behavior and business outcomes, however, perception mattered more than an empirical measure, since the employee's experience of working conditions ultimately defined his or her workplace engagement (Harter, Schmidt, & Keyes, 2003).

The literature that focused on reciprocal exchange and in particular its subjective nature was important to my study because these aspects were what I identified as being most analogous to SNA and were essential to my comparative analysis of the two theories. Because TMX measured the perception of both what the team member gave and what the team member received, there was directionality in the exchange relationship with the collective in much the same way that there was directionality in one to one relationships. While the Abu, Bakar and Sheer (2013) study highlighted the subjective nature of these perceptions, the collection of research evaluated by Harter, Schmidt and Keys (2003) had already addressed the issue of attitudes and perceptions about workplace experiences, rather than actual empirical measures, as a driver of workplace outcomes.

Exchange relationships create outcomes for the organization. Lau & Cobb used TMX to tie the relationship characteristics of trust and conflict to exchange behaviors, and connected

exchange behaviors to team and interpersonal outcome measures. Their research suggested that these relationships, which they called *reciprocal exchanges*, worked better than external, individual goals to increase overall team performance. The team performed better because the relationships acted as drivers of voluntary helping, or citizenship behaviors, which increased shared resources within the team (2010). Settoon, Bennett, and Liden also link reciprocity in exchange behavior to organizational commitment (1996). Another study, examining how TMX increased these citizen behaviors, used high TMX as a proxy for effective team cooperation (Abu, Bakar, & Sheer, 2013). The cooperation that comes from relationship-based trust (as measured by TMX) exceeded outcomes for behaviors that could be mandated or formally required in a work environment specifically because of the voluntary nature of the exchange (Lau & Cobb, 2010).

High TMX teams supported team members with resources beyond the basic exchanges necessary for job function, and their supportive interactions fueled positive workplace outcomes (Linden, Wayne & Sparrowe, 2000). TMX, an indicator of high quality working relationships, was empirically shown to improve employee performance ratings (Jordan, et al., 2002), and specifically increased individual job performance, job satisfaction, and organizational commitment, and reduced turnover intention (Banks et al., 2013; Linden Wayne & Sparrowe, 2000). Seers found that "the quality of the team–member exchange relationship indicates the effectiveness of the member's working relationship to the peer group" (1989, p. 119). High TMX teams engaged in more cooperative communication within the team, which reinforced a sense of cohesion, both of which impacted effective performance (Abu, Bakar, & Sheer, 2013).

Because one of the goals of my research was to influence an organization to make an investment in its employees, it was critical to my study that the measure selected could be shown to influence business outcomes for the organization. The Banks (2013), Linden, Wayne and Sparrowe (2000), and Jordan (2002) studies reinforced the tie between TMX and specific and measureable positive workplace outcomes. The Abu, Bakar, & Sheer (2013) and Lau and Cobb (2010) studies were particularly important to my study because they indicated that this behavior was a voluntary response to the relationships, not the result of policy. The voluntary, relational basis for the behaviors driving TMX outcomes was relevant in this case because the training organization (NCJTC) cannot manage or mandate employee behavior, or control employee hiring or placement in the AMBER organization. The idea that individual perceptions influence collective results was one of the ways that my study was able to look at the intersectionality between one to one relationships and team relationships.

Limitations of TMX Theory

The literature consistently repeated that TMX measured the participants' *perception* of the quality of their exchange relationships, not the actual presence or absence of these behaviors (Abu, Bakar, & Sheer, 2013). Standardized questions on the TMX assessment such as asking whether the respondent believed that "*my team sees my potential*" or "*people on my team are willing to finish work assigned to others*" were written to provide insight into the way the subject experienced the team relationship, but not offer an unbiased or empirical measure of the actual exchanges that took place within the group. The nature of the TMX assessment questions allowed for one member of a team to report a low level of exchange while another member reported a high level of exchange in the same environment. Responses might have varied depending on one's personal expectations regarding what constituted a high versus low level of helping behavior, appreciation or awareness of the behavior, memory, or even mood (Seers,

1989). Thus, TMX results may or may not have corresponded to an empirical measure of specific exchange behaviors and perception may or may not correspond to reality.

What this limitation meant for my research was that I had to be very clear about what was being measured and why those measurements were important and valuable. For this reason, I formulated my research questions to ask how an individual experienced support in the workplace, not whether support was given. The value of the employee experience to business outcomes was supported in the literature summarized by Harter, Schmidt, and Keyes (2003).

A limitation of using TMX as a measure to answer a research question regarding support in the workplace was that there are varying definitions of what constitutes support. There was discrepancy in the research regarding the relative importance of the type of content exchanged or the classification of the relation. Graen, Hui, & Taylor (2006) clarified that the TMX relationship was one of shared leadership, distinctive from the idea of friendship. However, they found that both kinds of relationships, leadership and friendship, were associated with team effectiveness. Seers himself said this should be explored (1989).

While the nuance of what kinds of exchange content may drive perceptions of high TMX was interesting, it was out of scope for this research. To address this limitation for the purposes of this study, I assumed that subjects responded to TMX inquiry from their professional training organization based on professional colleague behavior, and not personal friendship behavior. This lack of detail in the investigation was appropriate based on the parallel outcomes in previous studies for friendship or coworker relationships and exchange content (Graen, Hui, & Taylor, 2006).

Another limitation of TMX theory was that the TMX instrument measured an individual's generalized perception of the quality of exchange relationships on a specific team as defined by the researcher, not the subject. Furthermore, the boundaries of the team prescribed by the researcher may be different than the individual's definition of the team. If the individual did not identify with the team the researcher chose to study, this could limit the value and applicability of results. For example, low TMX within a team defined as an overall organization may not correlate with high turnover or low morale as expected based on the literature if the employee received his or her support and identity primarily from a team defined at the department level. Alternately, a very dissatisfied employee disrupting the workplace at the organizational level might still have reported a high level of TMX if the parameters of the assessment focused specifically on a team the researcher defined as a sub-population within the organization wherein that individual felt well-supported.

One way that my research design mitigated this limitation was to adopt a definition provided by the organization. AMBER identified ten states as belonging to a special organizational category, the Southern Border Initiative (SBI), thereby setting them apart as a team within the organization. My research parameters were limited to this team, which ultimately divided further into a sub team based on country. Ultimately, my results focused specifically on describing this team as defined and acknowledged coordinator loyalties may lie with other teams. The research on project teams supported this application (Witt, et al, 1999).

Finally, the collective nature of TMX theory left no room to validate the importance of individual one-to-one relationships. A particularly salient experience, either negative or positive in nature, with an influential individual might have carried greater weight than a generalized feeling toward the overall team, making it possible that the experience could have biased the

individual's perception of the whole organization. The quality of the exchange relationship existed relative to the team, not relative to *members* of the team. Not accounting for personal connections limited the TMX model if using TMX alone.

This limitation was a key driver of my research design. I wondered if specific dyadic relationships between peers on a team could actually form the basis for the perception of the overall team experience. My research may be able to contribute to this gap in the research by addressing peer exchange relationship analysis at the nexus of individuals and teams. I propose to do this by looking at individual relationships as occurring within a network. For this reason, I paired TMX with SNA and compared and combined the results of the two approaches across each section.

In summary, I found that TMX research provided evidence that workplace relationships influenced positive business outcomes (Banks et al., 2013; Linden Wayne & Sparrowe, 2000). High TMX acted as a proxy for trusting relationships, and given that trust was associated with speed of business processes, organizations could derive value from building relationships (Lau & Cobb, 2010). High TMX also acted as a proxy for committed workplace relationships (Abu, Bakar, & Sheer, 2013). Given that commitment was associated with lower employee turnover, and that retention impacted the speed of business processes, organizations could derive value from building relationships. The limitations of the model have been addressed in the research design by answering questions specific to the perception of individuals on a carefully defined team and coupling the TMX theory with another theoretical framework (SNA) to address a level of relationship that could not otherwise be addressed. To that end, I will now turn to an overview of Social Network Analysis as a framework for understanding relationships in the AMBER organization.

Theoretical Framework 2: Social Network Analysis (SNA)

Since emerging in the late 19th century, the social network paradigm found utility in a variety of fields (Scott, 1988; Streeter & Gillsepie, 1992; Thomas, 2000). While a formal model of SNA may arguably still be under development, (Freidkin, 1991; Wasserman & Faust, 1994), concepts and measures of network forms became commonplace in academic disciplines in the social sciences such as anthropology and sociology, economics, business management, industrial relations, and organizational behavior, as well as biological science and health applications (Knoke & Yang, 2008; Powell, 1990). Galaskiewicz, proposed that "a scientific theory of organizations must be generalizable, causal, logical and predictive" (p8, 2007). A social network approach was an appropriate theory by which to organize my research, which was intended to be applied in future efforts to create better workplace training models, because "networks offer a highly feasible means of utilizing and enhancing such intangible assets as tacit knowledge and technological innovation… thus allowing ideas to be translated into action quickly" (Powell, 1990, p. 322).

The idea that networks escalated the speed of information transfer applied especially well to the AMBER example, where both knowledge and time were essential to success (Griffin, 2007). Social network models were also applied in other research by using networks as a dependent variable to predict how social structures facilitate relationships or as an independent variable to predict how relationships influence social and organizational outcomes (Biancani & McFarland, 2013; Galaskiewicz, 2007). I chose the descriptive, rather than the predictive approach because my ultimate goal was not to prove one level of relationship created the

conditions that caused the other, but to compare outcomes and identify patterns across group and individual relationship measures using the two theories.

Origins and Definition of SNA

According to Streeter & Gillespie (1992), "a social network can be defined as any bounded set of connected social units…presumed to be embedded in larger social systems" (p. 2). Baldwin et al echoed previous claims that there was no single and agreed upon Social Network Analysis (SNA) theory and methodology, but generalize SNA as emphasizing the pattern of relations as a stronger predictor of outcomes than the attributes of the individuals or the exchange (1997). In his etiology of network forms, Powel (1990) conceptualizes networks as a form of "collective action" that was neither market or hierarchically constrained, "but rather an open ended arrangement in which cooperation can be sustained over the long run" (p. 322). Whereas Powel (1990) was defining networks based on their differences relative to an economic or hierarchical orientation, network models can be applied to exchanges at all levels of organization and relationship. At the micro level of analysis, networks could be ego-centric, meaning one actor and his or her relations formed a network, dyadic, meaning a network measuring shared relations between sets of pairs, or triatic, meaning a network made up of relations between groups of three (Knoke & Yang, 2008).

Social networks were shown to be useful for conceptualizing how different types of groups are held together and how they transfer resources (Powell, 1990). Social networks have a natural application in an educational context. Uzzi and Lancaster (2003) found that information transferred via network ties was strongly related to organizational learning. Whereas the transfer of tangible resources was more easily explained by formal transactional relationships or market forces, the transfer of intangible resources, like the distribution of information, knowledge and skills, was more likely to occur in an exchange relationship or network model (Powell, 1990).

Previous SNA Application in Higher Education

According to Biancani and McFarland (2013) the study of social networks in higher education had less than a 50 year history, but resulted in the contribution of 293 texts in 94 journals from 1966 to 2012. Based on these findings, all relevant uses of SNA in higher education research to date were able to be divided into two network populations of either faculty or students for outcomes relevant to them personally or related to the institution or discipline with which they were affiliated. However, Biancani and McFarland, argued that "SNA has the potential to illuminate both the inner workings of the university as well as how it interrelates with society" including external relations such as "ties between universities and industry and the effect these may have on the nature of scholarship" (2013, p. 151).

According to Barringer and Slaughter's recent investigations into the role of university trustees, no social network research in education currently addresses the relationships between universities and corporations specifically (2016). While my research serves as an example of a university /industry partnership, my actual work detailing a network of individuals receiving training and technical assistance as learners in the workplace would be most analogous to literature Biancani and McFarland categorized as student population research. Biancani and McFarland found several researchers whose work evaluated the impact of student social networks on academic achievement and demonstrated that network size or density, usually defined as number of friendships, was related to students' achievement of personal and academic goals, learning outcomes, or persistence (Fletcher and Tienda, 2009; Rizzuto, LeDoux, and

Hatala, 2009; Rovai, 2002; Skahill, 2003). This growing body of social network research in education supports well known theoretical models in student affairs research which reinforced the importance of peer group integration, such as Tinto's integration framework (1993) which held that social relationships, or ties, between students created shared values, and impacted outcomes such as academic persistence and commitment to the institution. (Thomas, 2000). My research extended these student affairs concepts to relationships between adult learners in a corporate training environment.

A Structural Approach

In SNA, the network system was defined by the type and patterns of connections that took place between individuals, and the emphasis on this pattern, not the characteristics of the individuals, made SNA a unique method to investigate relationship behavior (Balkundi & Harrison, 2006; Galaskiewicz, 2007; Powell, 1990; Scott, 1988). In this way SNA was able to be used to describe both the individual, in terms of a single node and his or her relations, as well as the collective, in terms of a pattern made up of all the individual nodes and lines. Researchers analyzed these patterns by evaluating both network form and network content. Network form refers to the structure of the interactions, such as intensity, frequency, and directionality of relations in the network. Network content indicated the primary reason for the relation, such as offering friendship, resources, or information (Wasserman & Faust, 1994, Knoke & Yang, 2008). A researcher could evaluate aspects of network form, regardless of content type, but when taken together, "network analysis describes structure and patterns of relationships, and seeks to understand both their causes and consequences" (Streeter & Gillespie, 1992, p. 1). For example, to collect data on network form, social network researchers commonly asked the subjects whether a relation was present or absent, to indicate how strong they perceived the relation to be, known as a *valued scale*, and how frequently they interacted with the other actors in the network (Knoke & Yang, 2008). Network form may evaluate the type of relation in terms of tie strength (sometimes referred to as *embedded* versus *arms' length* or *weak ties*, for example) without delving into the content exchanged (Uzzi, 1997; Granovetter, 1977).

If measuring content in addition to form, the researcher attempted to define the type of tie that existed between the two nodes from the subjective viewpoints of the actors and ascribed purpose, motive, or meaning to the interaction (Knoke & Yang, 2008). For example, by measuring content, Baldwin, Bedell, & Johnson identified a *friendship network* as being different than a *communication network* within the same cluster of nodes (1997) and Klein et al concurrently reviewed advice, friendship, and adversarial networks in teams (2004). This sort of analysis often became very complex, as it attempted to differentiate complicated human emotions and motivations. When specific content was not evaluated, researchers still assumed that the relation depended on some form of exchange (information, advice, money, affect, trust, etc.) although these motivations were not differentiated or defined for the purpose of the study (Knoke & Yang, 2008).

This ability to look at a network's form independent of content was important to my analysis, which did not differentiate the types of networks or evaluate relative differences in what content was being exchanged. My evaluation of structural relationships extended only to the presence or absence of ties and the perceived strength the subject ascribed to the relation. This approach was justified by the literature described by Balkundi & Harrison (2006) who noted that ties based on the exchange of information or resources essential to complete a task at work likely intermingle with affect-laden relations like friendships. Other researcher also theorized

that one kind of relation may impact the formation of the other and both kinds of ties supported and enforced shared values (Borgatti & Foster, 2003; Ibarra, 1993; Lincoln & Miller, 1979). Therefore, a deep investigation into the content of the exchange was not necessary for the purposes of this study.

Key Concepts of the Theory

According to Knoke and Yang (2008), three assumptions guided their understanding of social networks: 1. Structural relationships were dynamic and continuously changing, 2. Structural relationships created information pathways that influenced the social construction of beliefs and likelihood of behaviors, norms and shared values; 3 Structural relationships were more important than demographical commonalities in explaining patterns of behavior. I organized relevant research into these concept groupings and aligned them with similar tenants in TMX theory, accordingly

SNA involves a continuously changing relationship. Powel identified variations in the timing of the formation of a network structure, where "in some cases, the formation of networks anticipates the need for this particular form of exchange; in other situations, there is a slow pattern of development which ultimately justifies the form; and in still other circumstances, networks are a response to the demand for a mode of exchange that resolves exigencies that other forms are ill-equipped to handle" (1990, p.323). In addition to how an organization's identity as being a network can evolve, the structure of the network itself was subject to change. The structural relationships present in a social network could change because of an alteration in either of the key elements that compose the network; the nodes and the lines. This would result from changing the actors themselves or changing the connections between them. Depending on the level of analysis, actors were defined as individual persons or as an entity. Relations, or ties, were defined as the exchanges that took place between actors, or nodes. A pair of actors experiencing a relation constituted a dyad (Knoke & Yang, 2008). Therefore, "a relation is not an attribute of one actor, but a joint dyadic property that exists only so long as both actors maintain their association" (Knoke & Yang, 2008, p. 7). Ultimately, a multitude of such ties comprised a network, with some actors having more and stronger connections than others. The structure of these relations gave each actor a place within the network and the network was defined by the selection of these actors.

Both the presence and absence of ties mattered to the analysis of the network. Relations between actors created a pattern of ties as well as indicating the absence of a tie. The importance of the absence of a relationship to economic and market forces was explored in depth by Ronald Burt as a concept he called a *structural hole* (2009). Without delving deeply into the complexity of this theory, Burt viewed these holes as positive, in that they created entrepreneurial opportunity for the node adjacent to the hole to exercise power by having access to unique information that others do not (Burt, 2009). My study viewed structural holes as negative, if applicable, because they indicate node isolation or at least a lack of integration into the flow of communication and resources within the group, and the goal of my network is not opportunity for an individual but collective sharing of resources. I do acknowledge and agree with Galaskiewicz's (2007) assessment that cultural and personality factors would influence an individual's willingness to exploit a structural hole and while determining the relevancy of the structural holes in this context was outside the scope of my study.

Whether looking at patterns of individual or group actors, all networks have limits to their scope in term of how many actors can be included and what kids of relation can be evaluated. In order to evaluate a network, these boundaries must first be defined. Researchers employed multiple investigative strategies to establish network boundaries, identify sample participants, and measure relations. Boundary specification commonly used the following typology of realist versus nominalist and positional versus relational strategies (Knoke & Yang, 2008).

As explained by Knoke and Yang (2008), realist strategies used the subjective experience of the actors to define the participants of the network wherein *membership* in the group was dictated by whom most of the other members accepted. This kind of strategy made sense in defining a friendship network or informal social clique. Conversely, researchers employed a nominalist strategy when drawing clear and formal boundaries to frame inclusion in a study. Nominalist strategies were often used when studying an organization that had known membership criteria, for example when including all employees or all elected officials in an organization's network.

Subjects were also selected by a positional strategy, employed by selecting members based on shared attributes such as their title or role. For example, a network could be positionally constrained if members were selected merely by consulting the directory to identify managers within a larger organization. Relational strategies selected subjects by having actors nominate other actors for inclusion in the network, such as by a snowball sampling method. Event-based strategies relied upon a specific time and place of an activity to dictate who was or was not included in the network, such as if studying relations among all people who attended a certain sporting event (Knoke & Yang, 2008).

Literature that reinforced the idea that networks change and evolve based on the participants was important to my research because it ensured that this approach was appropriate for a case study of a complex organization where members self-organized for situationally defined teams based on initiatives or needs but maintained different reporting lines to local, state, or federal authorities and were subject to political realignment of their positions. The multiple network boundary strategies, explained in the Knoke and Yang (2008) study, allowed me to frame a sub group or multiple sub groups within a larger network as the needs of the research dictated.

Social networks reinforce reciprocated norms and values. Powell (1990) conceptualized networks as being characterized by reciprocal, voluntary exchanges. Norms and beliefs transmitted in relationships included exchanges of knowledge, skills and abilities, style, risk tolerance, quality standards, trust, and other intangibles that are difficult to place value on or to communicate and enforce through a corporate hierarchy (Powell, 1990). When voluntarily reciprocated in interpersonal exchange, these ideas can move powerfully within a network structure and elevate individuals to positions of prominence. In both friendship and advice networks, Klein and colleagues (2004) found shared values to be a better predictor of holding a prominent position in the network than shared demographic similarities.

Thomas (2000) found different kinds of network measures to impact student academic outcomes (GPA), goal commitment, and persistence, as well as students' social integration and institutional commitment. More specifically, the results showed that it was important to "maximize the number of student relationships that are viewed as mutual" because "reciprocated

relations boost the likelihood of a student being named as a relation by others, which in turn has a positive and direct impact on students' sense of affective social integration, commitment to the institution, and intention to persist" (p610).

Mathies, & Slaughter (2013) explain the importance of networks as tools to create information pathways that influenced the social construction of beliefs and likelihood of behaviors, norms and shared values. They compare the connections, or "interlocks," between trustees or board members to "information portals" that members use to "to trade information, best practices, and innovative strategies" (p 1289). The held these connections to be "instrumental to organizational success in that … familiarity and experience with one another in multiple settings may increase trust and the flow of information both among trustees and between the corporations and universities they govern" (p 1289). Networks create complex communication channels and novel linkages that allow for new information to be disseminated and new interpretations to be considered (Powell, 1990). Building on his research on embeddedness, Uzzi found that ideas or resources could spread quickly even to geographically distant clusters of individuals through a few intermediaries and that this shared knowledge base had implications for creativity and innovation. This diffusion of information was facilitated by project or cross functional teams, wherein the larger macro network is made up of cliques or clusters that are connected to each other because actors have memberships in multiple teams. This interconnectivity is compatible with other prominent concepts in network research in that it leverages *weak ties* (Granovetter, 1977) and brokers *structural holes* (Burt, 2009) to create a sense of a *small world* (Uzzi & Spiro, 2005) The Thomas (2000), Klein et al (2004), and Mathies, & Slaughter (2013) studies, along with the Powel (1990) and Uzzi & Spiro (2005) articles, all showed that reciprocity in relationships, in terms of having both relations offered by an individual as well as that individual being identified as a relation by others, and maintaining a diversity of relationships was important to the structure and outcomes of the network. This was valuable to my research which evaluated differences in the perceived ties given and received at various levels of strength in the coordinator network. This set of literature also reinforced the ability of a network, more so than another more hierarchical structure, to reinforce exchange of intangible assets like values, norms, standards, and education. This aspect of the theory tied especially well to the idea of TMX, to which I intended to compare the network exchanges, and the lack of hierarchical control excised by the training organization (NCJCT) over the AMBER coordinator population.

Social networks create outcomes for the organization. Knoke and Yang proposed that the structure of relations present in a network can better explain patterns of behavior or attitudes than commonalities in the individual demographic characteristics of the actors alone and therefore, these connections had consequences, both for the individual and for the network (2008). In the context of business organizations, presumably the consequences of these behaviors or attitudes were tied to business goals. Powel surmised the reason why networks have the potential to improve business outcomes succinctly saying, "Trust reduces complex realities far more quickly and economically than prediction, authority, or bargaining" (1990, p 305). Uzzi found that trust and embeddedness were related and that embedded ties made a network more efficient by producing economies of time. He cautioned that embeddedness was liability to a more isolated actor when a network structure changed because of a lack of diversity in multiple ties did not allow them to adapt and adjust with the network. Uzzi proposed that the ideal network structure is a combination of embedded and *arms length* (or weak) ties because the benefit from the close

relationships but are not isolated from new information and protected from changing actors (1997).

A network structure was able to achieve business goals by improving the effectiveness of the team, and the literature provided examples of multiple potential variables for measuring team effectiveness. Some studies focused on intangible social and emotional satisfaction of team members while others measured the tangible job-product outcomes (Kozlowski & Bell, 2003). Balkundi & Harrison (2006) reviewed research that debated indicators of team effectiveness. They examined whether the contribution of strong networks to team measures of viability, which they defined as retention leading to team functionality over time, or measures of team-task performance, which they defined as how well the team performed its assigned objectives, were better at gauging efficacy (Baldwin et al., 1997; Kozlowski & Bell, 2003). Their research ultimately showed that regardless of how effectiveness was measured, better networked teams were stronger (Balkundi & Harrison, 2006).

Because my research into organizational behavior was being applied to workplace training practices and conducted from an educator's lens, it was critical to my study that the measure selected could be shown to provide value for an educational organization. Powel proposed that these business outcomes would be especially relevant for educational endeavors because "the open-ended, relational features of networks, with their relative absence of explicit quid pro quo behavior, greatly enhance the ability to transmit and learn new knowledge and skills. (1990, p 304). The Thomas (2000) study confirmed that relationships among students in terms of number of student acquaintances and their structural location had important impacts on outcomes, such as satisfaction, academic performance (GPA), and persistence. The Powell (1990), comments and Thomas (2000) results help explain why this model was appropriate for this task. The Balkundi & Harrison (2006) research was particularly relevant to my study because they indicated that these behaviors were an outcome of network structure, not contingent on network content, which I was not evaluating.

Limitations of Social Network Theory

One limitation of Social Network Theory was the unknown potential impact of negative relationships. SNA measured the strength of a tie, but it was not possible for SNA to indicate if having that tie was healthy for the individual or good for the network's goals. While most of the social network research reviewed viewed strong relationships as positive, close relations can be either positive or negative depending on goals and perspective. Previous research on this phenomenon has been conducted in an area referred to in the literature as *dark networks* which evaluated network relationships that work covertly or furthered illegal or immoral ends such as drug smuggling or terrorist activities (Brinton, Milward, & Raab, 2006; Raab & Milward, 2003; Xu & Chen, 2008). I attempted to mitigate this limitation in my research in the way that I positioned relationships in the survey language; for example, describing a person who scored a value of 5 on a Likert scale of 1 to 5 for strength of relationship as *a close colleague or even a friend*, not just as someone with whom the subject interacted most frequently. In this way, my study was able to presume that strong relations were positive.

Another limitation of SNA was the restricted number of potential subjects in a given study. Whether using ego-centric or complete network strategies, there was a limit to the number of actors a researcher could reasonably investigate (Knoke & Yang, 2008). The network must be bounded in such a way that the subject will complete the survey or interview in a timely manner.

Therefore, a researcher cannot include too many actors in a nominally defined network. Alternately, if the participant was asked to define the boundary of the network using the realistic or nomination strategies previously discussed, they could not be expected to generate an exhaustive list of members. Research into a large organization would likely require compilation of multiple, smaller investigations. This small population size limited the opportunity to generate statistically significant findings in my SNA study.

SNA was also limited by the ever-changing nature of relations. Unfortunately, the time taken to conduct an investigation could invalidate the results. Networks only remained relevant as long as the boundaries were accurately defined, and thus, the membership could continually shift. I found this to be true in my research when turnover in the organization and positional definition of the actors changed in the course of the study.

My study addressed elements of both the individual and the collective, but overall sought to drive team level outcomes and rewards. Thus, my study operated from the orientation of valuing network closure, as measured by high density, to describe relationships that serve the collective, unlike the social capital argument that structural holes in non-redundant and less dense networks produce greater opportunity for the individual (Burt, 2017). Accordingly, a limitation of my study is that individual opportunity to amass social capital or leverage innovation due to structural holes was not explored.

Overall, when analyzing social networks, form (rather than content) was the essential component to evaluate the network's success. Brass proposed that it was the social network structure that mitigated the transmission of information and resources within a team (1984). Social network structures had important implications for team interactions because the ties between individuals either facilitated or constrained the flow of information and other resources within the team (Brass, 1984; Balkundi & Harrison, 2006). One of the benefits of a holistic social network approach was that it described the patterns of connectedness between the individuals regardless of the outcomes the organization chose to measure, the content exchanged, or the type of industry or team being studied (Borgatti & Foster, 2003; Ibarra, 1993; Lincoln & Miller, 1979). I found this to be complimentary to TMX, where various forms of exchange content and team structures could be analyzed within the same theoretical lens.

Addressing a Gap by Combining the Levels of Analysis: TMX and SNA Together

Similar to the way that TMX research encompassed both the type of relationship between the entities and the resource exchanged, various social network theories can be said to be looking at both the pattern, or form, of connections between individuals and the content being transferred. Historically, researchers found that teams with denser networks performed better on goals and were more unified in remaining together (Balkundi & Harrison, 2006). Remaining together indicates cohesion, one of the dimensions of team viability (Baldwin et al., 1997; Kowlowski & Bell, 2003). These outcomes were similar to the results found for teams scoring high on measures of TMX (Abu, Bakar, & Sheer, 2013). Balkundi & Harrison (2006) found that the pattern of ties was more important to creating a dense network than the content exchanged. This leads back to a central theme in the TMX literature, namely the idea that exchange content can vary but produce similar effects (Seers, Petty & Cashman, 1995). For this reason, I chose not to investigate the type of content exchanged, for example, friendship versus advice or recognition, and rather looked at general patterns of connections in the network's form relative to the network actors' experience of TMX.

Literature confirmed that historically "very few studies…look at cross level effects of an individual actor on the collective (Rosseau, 1985 as cited in Balkundi & Harrison, 2006, p. 62). A hypothesis that network centrality would be positively related to the use of exchange behaviors was not supported by Brass & Burkhardt in their study of power in networks, but they were not looking at TMX specifically (1993). By comparing TMX and social network outcomes for this population, my research was positioned to draw conclusions about this intersection.

My assumption was that resources, in terms of human capital, revenue, and information, were exchanged throughout the organization in accordance with the network form. I hypothesized that where resources flowed well, relationships prospered and these relationships impacted an individual's perception of the team. Therefore, strong dyadic relationships (SNA) should be correlated with an overall perception of strong team relationships (TMX) and both should improve the ease and outcomes of business practices. Herman and Dasborough (2008) also reinforce the potential to look at TMX through this lens, stating that "the findings in relation to workplace friendship and TMX are new in the team literature, yet they are congruent with social network theory" (p. 23).

Case Study Application

By exploring these concepts within the AMBER organization, my research makes a unique contribution to the literature on the larger AMBER population. Relatively few academic researchers studied the AMBER program, and those that did generally addressed its utilization and public perception in the United States. These studies evaluated AMBER's effectiveness in achieving the understood original intent of the program: to address the most egregious, rare, and high profile cases of child abduction by a stranger, as opposed to the incredibly common and relatively mundane occurrence of familial abduction. They also evaluated AMBER alerts' impact on public opinions about the state of child safety and the value of the AMBER program (Griffin et al., 2007; Griffin & Miller, 2008; Griffin, 2010; Griffin et al., 2015; Jessup & Miller, 2015; Sicafuse & Miller 2010; Sicafuse & Miller, 2012). Their research questions primarily explored three areas of inquiry: 1) the psychological and cognitive factors such as media credibility, memory function, and willingness to report that influence public engagement in AMBER processes (Miller & Clinkinbeard, 2006; Miller et al., 2009; Greer et al., 2012); 2) speculation on AMBER's potential preventative impact through strengthening social values or deterring perpetrators (Miller et al., 2009); or 3) concern for unintended negative outcomes (Griffin & Miller, 2008; Griffin, 2010; Griffin et al., 2015; Jessup & Miller, 2015; Sicafuse & Miller 2010; Sicafuse & Miller, 2012). Most researchers mentioned the need for more comprehensive, empirical research on the program. I found no academic research on the Mexican *Alerta* AMBER program, which was not surprising given that it was only signed into existence within the past six years. However, as previously discussed, the norms, standards, and processes from the US AMBER program were applied in the creation of the Mexican *Alerta* AMBER program, and since the Mexican program was modeled on the US program, the same theoretical arguments apply to my case study context.

It was clearly and consistently argued throughout the research that speed was key to victim recovery. Almost all available AMBER research cited the Hanfland, Keppel, & Weiss study (1997) which found that 70% of kidnapped and murdered children were killed within three hours of abduction. The almost universal acceptance of this benchmark created a shared standard of analysis whereby to be deemed successful: any child recovery system must be fast. Timothy Griffin, a contributing author on much of the research in the field and a detractor who looks

critically at AMBER's purported success, called this core belief in the life or death severity in efficient use of time the "underlying logic" (2007, p. 378) of the whole AMBER system and says AMBER had a "daunting need" for "rapid synchronization" (2010, p.1053). Within broader research on the effectiveness of the AMBER program through a study of US AMBER Alerts issued between 2003 -2007, Griffin found an average delay in the cases he studied of over 15 hours (2010). He identified speed as one of the "inherent constraints" of AMBER program effectiveness because in his analysis, timeliness was construed as a lucky or unlucky compounding variable, not as a vital factor to endeavor to control (2010, p. 1054).

Reviewing the literature for research in TMX, SNA and AMBER together revealed common themes related to team performance. The literature verified a need for the AMBER program to improve recovery time performance (Griffin et al., 2007; Griffin & Miller, 2008; Griffin, 2010). By looking at TMX and SNA, previous research revealed evidence where groups were able to drive efficiency using these measures (Abu Bakar & Sheer, 2013; Balkundi & Harrison, 2006; Baldwin, Bedell & Johnson, 1997). This could add a significant value if the AMBER organization acted upon those opportunities to make the work of their coordinators more efficient when they were called together in work teams within the context of the difficult and complicated scope of a cross-border child abduction investigation. My study provided the basis to understand the relationships at work in this organization. The desired implication was to then craft education and training interventions to build these networks and increase TMX to help them function as a more effective team.

III. RESEARCH METHODS

Existing research provided evidence that high TMX, or an individual's positive perception of overall quality of exchange relationships on a team, had positive outcomes for cooperative communication, group cohesion, effective performance, job satisfaction, organizational commitment, and turnover intention (Abu Bakar & Sheer, 2013; Banks et al, 2013; Jordan, et. al, 2002; Linden Wayne & Sparrowe, 2000). Social network analysis (SNA) research also showed that having high centrality in a social network facilitated an actor's capacity to engage in exchange behaviors and experience power and prestige in exchange relationships (Baldwin et al 1997; Brass & Burkhardt, 1993; Valente et al, 2008). I did not find any previous research that demonstrated an attempt to combine and compare these measures other than Abu Bakar and Sheer (2013) who credited the "central notion" of social network theory in developing "a multilevel model of perceived cooperative communication" (p. 447) which they then compared with TMX and LMX.. I believe that when used together, the two measures will create a fuller understanding of the experience of network members and that this understanding may provide valuable insight into how continuing education and training practices could be developed to facilitate improved relations on a team. Therefore, I asked the following research questions:

1. *How do people experience support within the workplace?*
2. *What are the relationships that exist within the workplace?*
3. *What is the nature (perceived strength) of the relationships?*
4. *What is the association between people's experience of support within the workplace and the presence and nature of relationships?*

To address my first research question, I used TMX to measure the relationship of each individual coordinator to the group as a whole. Their TMX scores served to evaluate their perception of the quality of their role in the team. To address my second research question I used SNA to measure the relationships of each individual coordinator to various other coordinators as specific individuals and peers in the work group. I assessed the presence of 1:1 contacts using unvalued network density, degree centrality, and visual analysis of Social Network Graphs (SNGs), all of which will be elaborated on below. I addressed my third research question by using a valued network approach and analyzed degree centrality and SNGs to assess the strength and frequency of 1:1 contacts. To address my final research question I compared TMX and SNA results by correlating subject responses based on the direction of the exchange (inbound and outbound) and overlaying the sentiment onto the SNG representation. I do not know, but propose that the perceived quantity and strength of individual, one-to-one relations measured by SNA and the generalized opinion of the quality and strength of the one-to-many team relationship measured by TMX will be related

Subjects and Data Collection

Using the AMBER organization as a case study, my research investigated the prevalence and patterns of professional relationships in the workplace in two ways. First, I assessed the current level of TMX in a specific part of the AMBER organization, the Southern Border Initiative (SBI). Second, I used SNA to document where dyadic relationships, or one to one connections between individuals, existed within the same group and to evaluate the value individuals ascribed to those connections. My intention was to bring together and compare these

two theoretical constructs to offer a more complete view of the coordinators' experience of the team at an individual and group level by comparing the responses for the two different relationship measures and looking for patterns in their combined outcomes.

The Case Study

The AMBER organization was appropriate and relevant to continuing education research at the time of this study because the National Criminal Justice Training Center (NCJTC) was considering a proposal to invest in formally and informally building relationships within the coordinator network as a function of their training and technical assistance plans (Rutigliano, 2015). There were formal and informal relationships at work in the organization, but how they contributed to learning was untested. As an educator, I was interested in the organization's ability to provide effective human resource development (HRD), as discussed in the introduction. The idea that their training and technical assistance program could focus on relationships as drivers of organizational performance provided a unique application of the role and purpose of continuing and professional education.

Before investing in curriculum resources and designing training exercises for improving these professional relationships, I wanted to first understand the current base of existing social networks in the organization using a case study approach (Yin, 2017). Given that high TMX was correlated with employee attitudes and behaviors benefiting the organization (Banks et al, 2013; Linden Wayne & Sparrowe, 2000), if I also found that the individuals exhibiting the highest levels of TMX held central positions in a network, then an argument could be made that strengthening the dyadic relationships between coordinators, and thereby strengthening the network, could create conditions that correspond to higher TMX for more individuals. If more individuals exhibit high TMX, improved business outcomes should result.

At the time of the study, the AMBER Alert Training and Technical Assistance Program (AATTAP) provided resources to over 300 US AMBER Alert coordinators, clearinghouse managers, and law enforcement representatives at the state, local, and regional level and also supported special North American outreach initiatives to Canada and Mexico (AATTAP, 2018). In addition to Tribal and Canadian programs, the AMBER Alert program had a vested interest in the success of its most recent branch, *Alerta* AMBER Mexico, established in 2012. For the ten US and Mexican states along the US/Mexico border,[5] their nearest neighbors were as likely to be international as nationally based. To that end, they launched the *Southern Border Initiative* (SBI*)* (AATTAP, 2018).

My research employed the nominalist strategy, as described in the literature review above, to pre-define my network as a population of AMBER coordinators who worked in the ten states included in the SBI, while acknowledging that this group is actually at the meso-level of the organization and part of a larger whole. This allowed me to set the parameters for who was included in the team rather than allowing the subjects to set this boundary individually based on their own definitions. I further refined the subject base by using positional selection to request responses specifically from state level (rather than local or regional) AMBER plan coordinators. This helped in addressing discrepancies in the US and Mexican systems and prevented subjects from suggesting support staff or other coordinators who were not peers in the network as

[5] SBI States included California, Arizona, New Mexico, and Texas on the US side and Baja California, Sonora, Chihuahua, Cuahuila, Nuevo Leon, and Tamulimpas on the Mexican side.

members of the team. See Appendix A for a map of the AMBER organization detailing placement of coordinators.

The parameters of the network offered a limited network size as compared to evaluating the full AMBER network, but "small settings have considerable advantages in sharply delineated membership boundaries, fully enumerated populations, and often access via permission from a top authority" (Knoke & Yang, 2008, p. 10). This was important to my case because it gave me the opportunity to consult with the organization before determining if a subject qualified for inclusion in the study and I was able to access all of the participants in the defined network. This was possible because my academic research acted as an extension of an investigation that I was conducting as a bilingual practitioner and consultant with the National Criminal Justice Training Center (NCJTC) mentioned above.

The full macro-level population of the AMBER program internationally was not used because the AATTAP only supported AMBER programs in North America, not worldwide. Therefore, this research was limited to the US, Canada and Mexico. I initially selected all SBI states on both sides of the US/Mexico border for inclusion in the network because this aligned with an identified strategic priority of the organization and I could leverage existing consulting experience working with this population, but ultimately I worked only with the Mexican subjects, and evaluated them as a whole network population. I will address this winnowing in the *survey process* section below.

This case was ideal for the application of my research questions because it fit the key elements of a network as defined by Streeter & Gillespie (1992). Specifically, it had (1) criteria of membership (or boundaries) to the group, (2) connectedness (direct or indirect, actual or potential links to at least one other member) between individuals, and (3) definition of a social unit (person, organization, agency, country, etc.) as the *node* being mapped. For the purposes of this study, the network was clearly bounded to coordinators responsible for a state level AMBER plan in one of the six Mexican border states included in the AMBER Alert Training and Technical Assistance Program's Southern Border Initiative. All coordinators could be presumably linked to at least one other member because of the mandated dual federal/state management of the program within each state in Mexico, and in fact no nodes were isolated. The social unit was the individual coordinator as a personal actor in the network.

To create this network, I first utilized the assistance of the NCJTC to compile a list of all State AMBER plan coordinators in 10 states making up the SBI. Through an informed consent process, I notified participants that the information obtained would be evaluated both for consultative work and research purposes and gave them the opportunity to confirm or deny their willingness to have their response used. Participants were assured that their identities would be anonymized and that only final reports and not raw data would not be provided to the state or federal offices to which they reported. No incentives were given.

Survey Process

Data was collected using a survey that included a ten-item assessment of TMX created by Seers, Petty, and Cashman (1995) and a series of SNA prompts regarding the presence, strength, frequency, and mode of contact of potential relations with other actors in the network. See Appendix C for the Seers Petty and Cashman instrument and Appendix B for the combined TMX and SNA survey questions used in this study. The survey was made available to all participants in their native language in an online platform which participants accessed via an

email invitation. Security and confidentiality was maintained by using participants' preferred address, managing the recruitment process as an educational initiative of the AATTAP rather than through their supervisors in the state and federal management structures, and removing identifying information from the data. This step enhanced, rather than compromised the survey design because participants were asked to respond to questions about their relationship to specific peers in their work organization by name. Promising anonymity in reporting helped participants experience less risk in providing feedback than they would have if their identity would have been made available to their employer with their response (Dillman & Bowker, 2001; Dillman, Smyth & Christian, 2014).

Participants responded to a survey that included both a previously developed assessment of TMX (Seers, Petty, & Cashman, 1995) and a list of all other AMBER coordinators in the states making up the SBI in accordance with the complete network approach (as opposed to the egocentric network approach) of SNA (Knoke & Yang, 2008). The survey document produced a quantitative score to questions of TMX as well as rated the presence or absence of specific network members and the strength of the existing connections on a Likert scale. The survey also provided space for some brief qualitative feedback. The survey was translated to Spanish, digitized, and made available online with links sent by email directly to the participants. Subjects were reminded to complete the survey by phone, email, and SMS Messaging (Dillman & Bowker, 2001; Dillman, Smyth & Christian, 2014).

I determined that a survey would best allow me to combine elements of the normal and standardized TMX scale and questions to gauge frequency and intensity of contact as commonly used in studies of social networks for participants dispersed across a large geographic region. I chose to administer the questions in a web-based format. This was appropriate because online survey tools available allowed participants to give Likert scale responses in a similar format and with comparable instruction to a print version of the same survey (Dillman, Smyth & Christian, 2014; Dillman & Bowker, 2001; Fowler Jr, 2013; Murnane & Willett, 2010). Additionally, because it was a web-based survey, the survey instrument was able to be programmed so participants were only presented with questions about the strength and frequency of social exchanges with only those subjects who they indicated that they knew. This eliminated unnecessary and non-applicable questions, shortening time to completion and minimizing the risk of incorrect or contradictory responses (Dillman & Bowker, 2001; Dillman, Smyth & Christian, 2014) Participants in this case all had access to the technology needed to complete the survey electronically.

Surveys were issued to 26 participants in four US and six Mexican SBI states, over a period of two months. Ultimately the proposed network was reduced to 16 possible subjects using a rule-based frame that included only AMBER coordinators in the six Mexican states. While access to research participants in both Mexico and the United States was provided, Mexican coordinators ultimately comprised a better sample. Clear definition of roles and authority allowed the survey to be executed in a more consistent way for Mexican coordinators than for US coordinators. Mexican coordinators could more easily be identified and contacted because of the hierarchical structure of the centrally managed and federally administrated AMBER system in Mexico as opposed to the locally organized and regionally controlled AMBER system in the US. Although sponsoring agencies hoped for solutions to be generalizable for both countries, data from the Mexican participants was more reliable and response rates were higher, making this network definition preferable from a research perspective.

All of the Mexican subjects responded to the survey, and two of the 16 subject's responses had to be excluded from analysis. One subject was incorrectly identified by name in the survey and one subject's response was only partially complete, so 14 complete and accurately identified responses comprised the sample used to examine the dynamics of this organization (response rate = 87.5%). See Appendix B for a copy of the survey. Given the inclusion of 100% of the identified population, I framed this study as an analysis of the complete network of Mexican SBI coordinators, but acknowledge that future applications should view this population as a non-random sample acting at the meso-level as one of many subgroups within the full population of the international AMBER organization, or as having further micro divisions within the SBI population, (federal versus state or regional coordinators, for example).

Subject Demographics

Subjects in the study were Mexican nationals who worked as AMBER coordinators in one of the six Mexican states along the US/Mexico border at the time of the study. They were all college educated adults between 25 and 64 years old and 78.6% had been in their post for at least a year. The majority of subjects were female. Of the 14 surveys completed, three respondents identified as male (21.43%) and 11 identified as female (78.57%). Additionally, from my qualitative investigation into the organization, I was aware that one of the respondents that selected male in the survey response actually presented and identified as female in an interview context. If this subject had been correctly coded, the percentage of females would have been even higher (85.7%). Both because of the suspected coding error in the data and because of the limited number of males in the population, no gender-based analyses were conducted.

I evaluated descriptive information about respondents from the TMX and SNA lenses by state, by age range grouping, by education level, and by length of time with the organization. Participant's names and specific ages were anonymized and state names were replaced with numbers to protect the identity of the respondents. Given so few subjects, if the state where the respondent worked had been identified by name, the identity of the coordinator would have been easily discernable[6]. Of six Mexican states, three states had three respondents (21.4%) each, two states had two respondents (14.3% each) and one state had only one respondent (7.1%). The two unusable responses came from subjects E and J. Subject E was located in state 2, and if he had been included every state would have had at least 2 representatives. Subject J was from state 4, and if she had been included, four of the six states would have had three participants represented. The distribution of usable survey responses by state was detailed in Table 1 below.

[6] Each Mexican state should have two AMBER Coordinators - one reporting to the State Attorney General and one reporting to the Federal Attorney General. Collectively they are responsible for the State AMBER plan in the Mexican state to which they have been assigned. Some state governments added a third coordinator at the state level.

Table 1

States Represented by Participants

State	Number of Respondents	Percentage of total respondents
1	3	21.4
2	1	7.1
3	2	14.3
4	2	14.3
5	3	21.4
6	3	21.4

Participants ranged in age from 25 to 64 years old, with a mean age of 39. I identified three age brackets to facilitate comparisons based on the age of participants. These age groupings, which were chosen by looking for qualitative break points in the data, facilitated comparison between subjects in the group when evaluating TMX or SNA responses relative to demographic characteristics. Table 2 showed the first grouping of five respondents (35.7%) reported themselves to be age 33 or under, six respondents (42.9%) fell between the ages of 34 – 48 and the last three respondents (21.4%) identified themselves as 49 or older.

Table 2

Age of Participants

Age group	Number of subjects	Percent of respondents
Group 1: 33 or younger	5	35.7%
Group 2: 34-48 years	6	42.9%
Group 3: 49 or older	3	21.4%

The survey provided options for participants to select from four categories of education level. These education level descriptors allowed for consistent qualification of education experience for subjects living in either the US or Mexico.[7]All 14 responses fell in two of the four categories, with six respondents (42.9%) reporting having an undergraduate education and eight

[7] In Mexico, University programs usually include both coursework and a thesis or a degree project. Upon completion of the coursework for an undergraduate program, students may receive a certificate or diploma (called *egresado/pasante*) but are not fully licensed (*licenciatura*) until fulfilling all degree requirements. Depending on the requirements of their professional field, a student might conclude their studies as an *egresado* and not actually graduate with the degree. Because of this discrepancy I do not mention graduate status specifically.

respondents (57.1%) reporting having a postgraduate education. No participant reported an education level below attending a university. (Zero respondents identified in Group 1 or Group 2). The distribution of survey responses for education level was detailed in table 3 below.

Table 3

Education Level of Participants

Education group	Number of subjects	Percent of respondents
Group 1: high school	0	0
Group 2: technical diploma	0	0
Group 3: undergraduate education	6	42.9%
Group 4: postgraduate education	8	57.1%

Because high TMX reduced turnover for an organization (Banks et al, 2013; Linden Wayne & Sparrowe, 2000), length of time with the organization was important to examine. As shown in Table 4 below, the survey provided options for participants to select from four categories of duration in their position from a drop-down menu. Providing four categories for experience paralleled the four options given for education and was intended to standardize response format and allow for within group comparisons of TMX or SNA responses relative to demographic characteristics. No participants were newly employed less than six months' time, but three respondents (21.4%) reported having been with the organization between six months and one year. There were five respondents (35.7%) who reported having been with the organization between 1 – 3 years and six respondents (42.9%) reported having been with the organization more than three years.

Table 4

Participants' Length of Experience in the Organization

Time with the organization	Number of subjects	Percentage of respondents
Group 1: less than 6 month	0	0
Group 2: between 6 months and 1 year	3	21.4%
Group 3: between 1 – 3 years	5	35.7%
Group 4: more than 3 years	6	42.9%

Challenges in Data Collection

The initial research design called for two investigative processes: one in English for the SBI coordinators in the US and one in Spanish for the SBI coordinators in Mexico. I anticipated that the US-based process would be simpler and more straightforward given the political

limitations of working through the Mexican government system. However, I found that although the Mexican guidelines slowed the process, they were ultimately more conducive to identifying and contacting subjects. Both data collection processes had unique sets of challenges and ultimately only the Mexican investigation was successful.

In the Mexican survey process, despite the backing of the NCJTC and a verbal commitment from the Office of the Mexican Attorney General, getting access to the participants proved more difficult than expected. The original timeline called for having the electronic survey translated to Spanish and built in a Mexican platform in April 2017 to allow for online data collection to have begun in time to follow up with subjects in person at a conference event that May. The survey was ready to be deployed in time for the event, but I lacked sufficient written permission from the appropriate authorities to survey participants on site as planned and officials did not release a list of participants and their email addresses until almost two months later. Lacking the official list of participants or permission to distribute surveys, I used the conference to collect contact information from the anticipated Mexican respondents directly and to inform the general population about my research plans.

In the US survey process, the challenge was to consistently define and correctly identify participants. An initial version of the survey was prepared and tested by research associates to verify functionality in the online platform in early June 2017, again in advance of a conference event. While attending that meeting, I discovered multiple new or different US contacts from those whose names had been included in the survey, thus requiring significant changes to both English and Spanish surveys. There was no centralized repository of accurate contact information for US AMBER coordinators and the organization experienced turnover whereby participants changed status or left the organization during the course of the investigation. US coordinators also chose to forward the survey email to support staff to reply on their behalf, which did not capture the personal sentiment and relationships of a specific individual that the survey was designed to measure.

Both surveys finally deployed on July 10, 2017 to a total of 10 US and 16 Mexican subjects and multiple reminders and follow up calls were necessary to attempt to elicit an acceptable response rate. Data collection closed after one month with an overall response rate of 69.2% (18 of 26) responses for the complete SBI grouping including both US and Mexican subjects. Responses were not evenly distributed between the two countries and not all responses were usable. As previously mentioned, 14 of 16 Mexican respondents' surveys were complete and usable. Only four of ten US surveys were completed, two subjects opted out, three started but did not complete, one never responded. Of those four complete surveys, two were potentially answered by someone other than the intended respondent, making the US data only 20% usable. The decision was made on August 16 to proceed with an analysis of only the Mexican data, which had a usable response rate of 87.5%. Focusing on the Mexican coordinators resulted in a smaller population size, but was more useful for the purposes of my research. In SNA, defining boundaries clearly and systematically mattered more than what boundaries were actually defined (Knoke & Yang, 2008). In TMX, subject identification with the team identified by the researcher impacted results (Witt et al,1999) and the Mexicans were less familiar with their US counterparts and more likely to experience a team relationship with their fellow countrymen.

Instrumentation

The survey I used included a combination of TMX, SNA, and qualitative elements. The online survey required the participant to confirm that they were at least 18 years old and willing to participate in the research study. Next, participants were asked to select responses from a drop-down menu for five demographic questions (age, gender, state of residence, level of education, and length of time in their position). All subjects in my network were Mexican nationals, so race was not an important demographic consideration. For the first part of the evaluation, subjects were presented with ten questions from an existing normed and standardized survey to assess TMX on a Likert scale of 1 to 5. In their meta-analysis of the literature, Banks and colleagues noted that the majority of TMX studies reviewed used this scale (2014). Next, the survey included five open-ended qualitative questions such as *What does it mean to you to be part of the AMBER program?*. For the second stage of analysis (SNA), subjects in the Mexican survey were presented with the names and corresponding states of all 26 AMBER coordinators in both the US and Mexican states in the SBI. If they identified that they knew a subject, they were then asked a series of additional questions about the relationship. The first of these more detailed questions for identified ties required the subject to rate their perception of the strength of the relationship on a scale of 1 to 5. Descriptive qualifiers of these numerical scores are found in table 5 below. These descriptive qualifiers intended to ensure a common interpretation of the meaning of each numerical value and provide more consistency in the valuation of responses. Finally, they were asked about the frequency and modes of contact with that person, and how the relationship impacted their work. See Appendix B for a copy the survey including all questions.

Table 5

Social Network Survey Response Qualifiers

Likert Score	Description
1	I am aware that they work for the organization, but do not know them personally
2	We have met before and participated in meetings together but do not work together directly
3	We have worked together on a project before
4	We are colleagues who have worked together on various projects
5	I would consider this person a close associate or even a friend

In conclusion, in this study two distinct theoretical lenses were applied to the experience of SBI AMBER Coordinators. Subjects responded to survey questions about TMX, a measure of how the individual relates to the team, and SNA, a measure of individual's one to one relationships at work within in the team. After analyzing the status of the team based on each measure, I compared the results and looked for relationships between the perceived quality of overall team exchanges, as measured by TMX, and the presence and perceived strength of individual relationships, as measured by SNA.

Methods of Data Analysis

The survey provided more opportunities to analyze the SBI Coordinators than were necessary for the purposes of this study, therefore I focused on three aspects of data that corresponded directly to my research questions. First, I looked at data demonstrating individual and group outcomes for TMX, which indicated how individuals offered and received support in the workplace. Next, I analyzed individual and group outcomes for SNA, which demonstrated the presence or absence and perceived strength of relationships on the team. Finally, I completed a comparative analysis of TMX and SNA results, which together served to explain the interface between an individual's generalized sense of cooperative team exchange and individual, dyadic connections between specific team members.

Experience of Support Within the Workplace (TMX Data Analysis)

TMX described the role of an individual in relation to the group as a single, unified entity. An individual's TMX scores were used to evaluate the perceived quality of exchange relationships on the team. TMX was related to satisfaction, cohesion, and affiliation within a team and was found to be a predictor of improved quality of relationships and employee and team effectiveness (Banks et al, 2013; Linden Wayne & Sparrowe, 2000; Seers, Petty & Cashman, 1995). To outline the methodological process by which I applied TMX to this data, I will provide background on the instrument used, explain how the data was scored, and detail the levels of analysis. I will then do the same for SNA.

Background on the TMX survey assessment. Questions used to measure TMX in my survey came from an assessment of TMX designed by Anson Seers and colleagues and later validated as part of a larger study (Seers, Petty & Cashman, 1995). Seers (1989) explained how they identified these ten questions as a complete assessment tool suitable for evaluating TMX and described what he intended those questions to measure, but the published work by Seers et al. does not explain exactly how the scores were calculated. The original (1989) survey included TMX as one of several factors being investigated. The assessment was intended to address a gap in the research by measuring exchange relationships among peers whereas previous research had only focused on the exchange between a member of the team and his or her leader, known as Leader Member Exchange or LMX (Seers, Petty & Cashman, 1995). LMX mattered to the TMX assessment because Sears and Graen (1984) adapted an existing LMX instrument to create the TMX assessment used. Their questionnaire was altered to address *member* rather than *leader* in its language. The researchers then added new items and identified which of the items "best defined a reliable scale" using "principle axis factor analysis with varimax rotation," (p. 123) wherein they looked at three factors: items referencing quality of relationships, effectiveness of team members, and cohesiveness of the team as a whole.

These questions were designed to be administered with a questionnaire using "typical Likert scales." (p. 126) and items for each factor were averaged into unit-weighted scales. Researchers then "reviewed factor loadings for all three factors across 34 questions" (p. 123). Based on the factor analysis used to validate the initial 34 item survey, researchers found that just ten items, Questions 24-29 and 31-34 from the original questionnaire, were sufficient and appropriate across all three factors to adequately assess TMX. In a later work by many of the same authors (Seers, Petty & Cashman, 1995) researchers successfully adapted the original 34 item questionnaire to the proposed 10 item survey of TMX and recommended it for practitioner

use. The full list of questions appears in Appendix C. This set of questions serves as the TMX portion of my survey.

Ultimately the goal of the ten-item instrument developed by Seers, Petty and Cashman was to measure an individual's general perception of the quality of exchange relationships between themselves and the team as a whole (1995). However, the (Seers, 1989) article clarified that TMX questions were divided between two kinds of investigation, with half of the questions regarding member's perception of their contribution to the team and half of the questions addressing the support received from the team. Seers said "the reciprocal exchange quality of an employee's relation to the team was measured with a 10-item scale with internal consistency of [varies] = .83 at both the pretest and posttest. Half of these items asked about the member's contributions to the team while the other half asked about what the member received from the team" (Seers, Petty & Cashman, 1995, p. 26).

Some survey design enhancements were required on my part to use the assessment. The survey would have to be administered in Spanish, so I had the questions translated by a native speaker, but kept the language as faithful as possible to the original assessment. Also, because the articles did not provide instructions with regard to specific Likert scale numbers on the questionnaire or the calculations used to obtain the overall TMX score from the ten questions, I assumed a 1-5 point scale responses to the questions. I came to this determination based on the fact that the means reported for the TMX data in the Seers, Petty and Cashman (1995) study were 2.78 and 2.69. I also used Z Scores to assess level of TMX relative to the other subjects rather than relative to an external standard because no indication was given regarding how the assessment was to be scored. It can be assumed, however that all items were intended as equally positive.

Scoring the TMX portion of the survey. TMX provided a norm-referenced, rather than criterion-referenced measure. In the absence of an established scale or external measure of value for the TMX scores, a decision was made to compare this population relative to itself. In this way, it was possible to situate these otherwise meaningless results in a relative context. I relied on a commonly accepted statistical method of normalizing the population with standard scores or Z Scores. To create a Z Score, the mean for the raw data was set to zero and the Z Score indicated how many standard deviations above or below the mean the individual data point fell. In practice, 99.73% of all cases fall between -3 and +3 standard deviations (DiStefano, Zhu & Mîndrilă, 2009). This kind of scoring worked for my investigation because it provided each subject with a ranking of TMX relative to the rest of the population being evaluated. This allowed me to speak about members of the population as high or low TMX, when in fact most of their raw scores were above 3 on a 5-point scale and to evaluate them as having high or low TMX relative to the group without knowing if their TMX would be high or low according to an external criterion. I divided TMX Z Scores into four categories based on the distribution of the data and color coded the results where green =*High TMX* (Average TMX Z Score => +1.0), yellow = *Moderately High TMX* (Average TMX Z Score = 0<Z<1), orange = *Moderately Low TMX* (Average TMX Z Score between -1=Z<=0) and red =*Low TMX* (Average TMX Z Score <=-0).

TMX data analysis. In summary, Part 1 of the data analysis focuses on the theoretical lens of TMX and was used to answer research question one *How do people experience support within the workplace?* In part one, I looked at the responses to TMX factors at an individual level for each of the 14 respondents and then for each of the ten questions. While these individual

micro-level variations provided interesting and meaningful insights, I focused on the average and sum TMX Z Scores for the subsets of the questions and for the participants when evaluating TMX because I was interested in an overall measure of the macro-level, or whole team, employee exchange quality in this section of the analysis. In analyzing TMX results, I looked for variation in experience of TMX by state, by age range, by education level, and by time with the organization. To understand average TMX I evaluated how this differed across different demographic sub groups using t-tests.

Relationships Within the Workplace (SNA Data Analysis).

Social networks were defined as bounded groups of defined members (nodes or actors) connected to varying numbers of other members (Streeter & Gillepsie, 1992). These relations (or ties) defined each actor's place in the network, with some actors being more central than others (Scott, 1988). SNA describes these structural relations in terms of their form and content and previous research proposed that this structure of relations motivated behavior more than shared attributes of the group members (Wasserman & Faust, 1994). SNA predicted that these connections have consequences, both for the individual and for the network as a group (Knoke & Yang, 2008). I used SNA to show that a network existed in this case and to measure the centrality of individual AMBER coordinators. By looking at the position of individual coordinators and the overall density of the unvalued network, I hoped to gain a better understanding of the connections that existed within the organization in answer to research question two, *what are the relationships that exist within the workplace*? The participants' answers to survey questions about perceived strength of relations provided value directed ties in the network, and this valued network was used to answer research question three, *what is the nature (perceived strength) of relationships in the workplace*.

Background on the SNA survey. No standard instrument for collecting social network data was available due to the existence of multiple kinds of networks and multiple acceptable ways of defining subjects in a network. Also, data collection methods used in the literature were relative to the network type and boundary specification strategy of the study. Instruments developed to analyze the form of a network generally asked whether a relation was present or absent, provide a valued scale for the subject to indicate the perceived strength of the relation (intensity) and how often they engage in the relation (frequency), and assess directionality by comparing the responses of multiple actors (Knoke & Yang, 2008). The response of one actor was sufficient to establish a non-directional tie between two nodes, and the responses of two actors were compared to illustrate a directional tie (i.e. actor A reported a relation with actor B but actor B may not have reported a relation with actor A). In social network analysis "crosstabulating the directionality and value dimensions generates four basic types of social network data: binary non-directed, binary directed, value non-directed, and value-directed ties" (Knoke & Yang, 2008, p. 52) Binary ties were also referred to as non-valued networks. Valued ties formed the basis of valued networks. My survey provided a list of names of 26 SBI AMBER Coordinators in the US and Mexico *a priori* (a nominalist strategy) so that the participants would provide an ego centric response to value directed ties of a complete network.

Network measures applied to the SNA portion of the survey. Social network data has often been analyzed numerically in terms of network density and actor centrality (Scott, 1988). *Density* measured the extent to which all the members were connected among themselves, or the ratio of reported dyadic ties over the maximum possible number of dyadic ties (Knoke & Yang, 2008). *Centrality* measures explained which actors were located in a critical position of

importance or influence in a network, sometimes called prominence. Prominent actors had more ties (Wasserman and Faust 1994). These individuals were shown to add value in the implementation of organizational change strategies (Valente et al, 2008). These ties were represented in graphical outputs, called Social Network Graphs (SNGs) that allowed social networks to be analyzed visually.

Network Density. Network Density was calculated for ego-centric or full networks, and its relevancy varied according to the overall size of the network (Knoke & Yang, 2008). A network was said to have a high density to its pattern when there were a large number of connections, called ties, between members, called nodes, relative to the total possible number of potential connections. High density was associated with an effective network (Balkundi & Harrison, 2006; Stretter & Gillespie, 1992). Balkundi & Harrison found that "a meta-analysis of 37 studies of teams in natural contexts suggests that teams with densely configured interpersonal ties attain their goals better and are more committed to staying together" (2006, p. 49). Network Density provided a means to evaluate the team as a complete network at the macro, or collective level.

Actor Centrality. Individual actors were described as embedded, or central, in the network when they were the intermediary to many connections and embeddedness was associated with power, prestige, and access to resources (Baldwin et al 1997). Centrality measures quantified an individual actor's visibility to other actors in the network (Wasserman & Faust 1994). Centrality was most commonly calculated by four methods: degree, closeness, betweenness, and eigenvector centrality (Knoke & Yang, 2008, Valente et al., 2008). Other proposed measures of centrality were debated in the literature (Bonacich, 1987; Freidkin, 1991), and the popular UCINET 6 software used for SNA offered eight options for measuring centrality (Borgatti, Everett, & Freeman, 2002; Valente, et al., 2008). Multiple centrality measures produced different, but similar results. This was important consideration in SNA methodology. If the centrality measures were too similar there would be no need for so many variations to achieve the same calculation, and if they were too different, they could not all be said to be measuring centrality. Valente et al. argued that "the amount of correlation between degree, betweenness, closeness, and eigenvector indicates that these measures are distinct, yet conceptually related" (2008, p. 6). I will now look briefly at the purposes and properties of each of these four centrality measures in turn.

Degree centrality, the number of links a node had, was the most commonly used method for explaining actor placement in the network. Degree centrality counted the number of connections a node had to all other nodes in a social network, in effect answering the question *who has the most relations?* in the most clear and simple terms but not differentiating as to the value or strength of those relations (Knoke & Yang, 2008). *In-degree centrality* measured the number of other actors who indicated a relation to a specific node in the network. High in-degree centrality was taken as an indication of the prestige or power of that individual (Brass & Burkhardt, 1993). *Out-degree centrality* explained the inverse direction of ties by identifying how many other actors a given node reported having a relation to, whether or not those choices were reciprocated. Degree centrality had both inbound and outbound components and addressed the position of all actors in a network relative to each other, not just those with certain characteristics. This made degree centrality a desirable measure to balance the intersecting micro and macro paradigms of individual and team level analysis and made it more analogous to TMX.

Closeness centrality, a measure of distance, indicated how quickly an actor could connect to others in the network. Closeness centrality was calculated by adding the path length between the node and all other actors in the network. Closeness was defined as the reciprocal of the sum of all the shortest distances from a given node to all other actors (Streeter & Gillespie, 1993). Closeness was measured in reverse of other measures of centrality. An actor with higher *degree* centrality was more visible in the network but an actor with lower *closeness* centrality can reach more other nodes across the network in fewer steps with greater ease and less dependency on others. For this reason, the closeness measure of centrality was said to indicate an actor's independent access to others in the network (Brass & Burkhardt, 1993).

Betweenness centrality measured how actors in a network acted as intermediaries and facilitated an exchange between unconnected nodes. These nodes were regarded as having high centrality, or prominence, because they bridged the gap where there was otherwise a break in the flow of exchange in the network by creating a link between otherwise unconnected nodes. Actors with high measures of betweenness centrality can exercise a large amount of control in the flow of resources, particularly information, in a network (Knoke & Yang, 2008; Brass & Burkhardt, 1993).

Early research in network analysis appeared to equate centrality with power, but further research showed that to not necessarily be the case in an exchange network where the power of one's centrality was relative to the respective power and position of other actors (Bonacich, 1987). When analyzing the relationship between power and actor centrality, Bonacich surmised that "one's status is a function of the status of those one is connected to" (1987, p. 1181). His proposed measure of eigenvector centrality, and subsequent adaptations and improvements to his original calculation, all dealt with the issue of the relative influence of other actors on the power of centrality and the idea that it was not *how many* people one knew, but *who* they knew that mattered.

Social Network Graphs (SNGs). Researchers conducted visual analysis of networks by reviewing data as a graphical output. In SNGs, points represented actors and their relations were shown as lines with directionality demonstrated by arrowheads. Directional ties were represented with arrow heads at the end of the lines whereas non-directed ties were represented by lines without arrow heads (Knoke & Yang, 2008). These visual representations of network relationships were well established and understood to be useful throughout SNA research (Scott, 1988; Streeter & Gillespie, 1992). Variations in the characteristics of the nodes, such as by size, shape and color, were used to visually represent characteristics of the actors. Variations in the size or color of the lines and arrow heads were manipulated to visualize strength or type of tie (Knoke & Yang, 2008).

SNA data analysis. I used UCINET software to analyze the presence or absence of reported ties (Borgatti, Everett, & Freeman, 2002). I calculated the density of the network (the ratio of the connections reported relative to the total number of possible connections) to show how the relationships that were present compared to the relationships possible from this data. Density was useful to this analysis because dense networks were associated with stringer teams (Balkundi & Harrison, 2006). Next, I introduced the concept of actor centrality, focusing on in-degree centrality as a means of evaluating relationships in this case. Actor centrality was a key measure of SNA in the literature, and a majority of those reviewed by Wasserman and Faust (1994) used in-degree as their centrality measure (Balkundi & Harrison, 2006). In-degree centrality was expressed as simply a count of the number of relations a node received from other

actors in the network and was the same as the number of inbound ties, whereas the number of outbound ties was the same as out-degree centrality (Knoke & Yang, 2008).

Analysis of the non-valued network. I calculated the difference in the two directions of inbound versus outbound degree centrality and discussed what that variation might mean in the context of these relationships. Based on the average difference in ties and distribution of data in my network, I classified the difference between inbound and outbound ties in three ways; (1) having a difference of degree strength less than three ties, (2) having three or more outbound ties than inbound ties, or (3). having three or more inbound ties than outbound ties. Actors could report a similar number of inbound and outbound ties (difference less than three), meaning that they perceived a fairly accurate understanding of their relations and therefore their place in the network, assuming they identified a relation with the same people that claimed to have a relation with them. Actors could have reported having relations with three or more people than reciprocated these relations (more outbound than inbound ties) indicating that they were less regarded or less memorable, and potentially less powerful or important, actors then their peers or that they had an overblown perception of their relations and therefore their place in the network. Third, actors could have reported having relations to three or fewer other actors than the number of relations they receive (more inbound than outbound ties). This indicated that they were more well-known or powerful actors than their peers or that they were less accurate in their perception of their workplace relations and therefore their place in the network (Bonacich, 1987; Brass & Burkhardt, 1993; Knoke & Yang, 2008).

I concluded my analysis of the non-valued network by showing the graphical representation of the network as a Social Network Graph (SNG), sometimes called a sociogram (Hanneman & Riddle, 2005). These UCINET outputs allowed for visual interpretation of the network on the basis of the subject's demographic factors. This visual interpretation of SNGs was especially useful given my small network size. All nodes and lines were clearly visible and the pattern showed the relationships in an intuitive way.

Analysis of the valued network. Next, I used the participant's survey responses regarding the strength of the relation identified to provide the basis for the valued network to answer research question three: *What is the nature (perceived strength) of the relationships?* To compare the perception of strength of relationships in the network, I produced outputs wherein the lines reflected the strength of the relations and calculated degree centrality scores for all actors. In the valued network, inbound tie strength, or actor in-degree centrality, was calculated as the summation of the weighted responses of the degree to which other individuals indicated a relation with the subject (as opposed to just the presence of a tie). Outbound tie strength, or out-degree centrality, was the weighted response of the degree to which the actor perceived that they had relations to other nodes in the network (Knoke & Yang, 2008).

I looked again for variation in network placement and degree centrality by state, by age range grouping, and by time with the organization in the valued network as had been done with the non-valued network. Comparing the differences between the two networks served as an indicator whether the differences found were more substantial due to the quantity of relationships (as measured by the non-valued network) or the quality (in terms of strength and frequency) of those relationships (as measured by the valued network). This allowed me to discuss whether a subject's perception of how well they knew other actors was an important consideration.

I concluded the analysis of the valued network by using visual representation to compare the SNGs of the valued network to the SNGs produced for the non-valued network. The visual analysis using the graphic outputs showed tie strength by changing the size of the lines and arrowheads connecting the nodes to facilitate evaluating the perceived strength of the relationships. The UCINET Software (Borgatti, Everett, & Freeman, 2002) produced SNGs where lines ended in arrowheads to represent the directionality of the relation. Reciprocal ties were represented by one line with an arrow head on each end and in the valued network the strength of the tie was demonstrated by increasing the weight of the line and size of the affiliated arrow. I varied the attributes of color, size, and shape to add meaning to the identity of the nodes (Hanneman & Riddle, 2005).

Relationship Between TMX and SNA

As previously explained in the literature, TMX and SNA theories were designed to measure different kinds of relations, TMX is a measure of one in relation to a group and SNA is a measure of one to one ties. Intuitively, it made sense that an individual's relationships with peers on the team might be related to their perception of the generalized quality of team exchanges. By comparing SNA and TMX outcomes for the AMBER SBI, I intended to draw conclusions about how individual relationships were related to generalized roles and group identity.

Dividing TMX into in and outbound components. Whereas the TMX results focused primarily on aggregate measures using average TMX Z Score for each subject, for comparative analysis I divided the TMX questions into the two directional subsets as described by Sears (1989). Conceptually, I aligned TMX given, which measured exchange behaviors the actor perceived as contributed to others, with Outbound Degree Centrality (out-degree) which measured relations the actor reported extending to others. Likewise, I aligned TMX received, which measured exchange behaviors the actor perceived as being given to them by the team, with Inbound Degree Centrality (in-degree), which measured the relations others reported extending to the actor. From the Seers study (1989), I identified questions 1, 3, 6, 8 and 9 as the five questions relating to the support, resources, or information a subject reported contributing to the team. I grouped them together and referred to them collectively as *TMX given*. I identified questions 2,4,5,7, and 10 as the five questions relating to the support, resources or information a subject reported receiving from the team. I grouped them together and referred to them collectively as *TMX received*. I compared TMX given with *out-degree* centrality and TMX received with in-degree centrality in both the valued and non-valued networks using scatterplot images and correlation coefficients.

I varied this conceptual model, next comparing TMX received with out-degree centrality (rather than in degree centrality) in the valued network and also comparing average TMX Z Score (rather than just the subsets of TMX given and TMX received) with in-degree and out-degree centrality in both the non-valued and valued networks. Finally, I produced a comparative chart of all the subjects who demonstrated positive outcomes on the assorted measures of TMX and SNA and looked for commonalities across the results.

Graphical overlay of results. Using UCINET software, I returned to the previous SNGs created in the SNA results. Since the two SNG images (non-valued and valued) were so similar, and the relationships in the valued network were slightly more highly correlated than those in the non-valued network, I only used the valued network for comparative analysis with TMX.

Likewise, I returned to using the average TMX Z Score as the principle means of measuring TMX for the comparative part of the analysis, whereas in the proceeding statistical comparison I had divided TMX into questions regarding exchange *given* and questions regarding exchanged *received*,.

I overlaid the SNG of the valued network with TMX scores based on the groupings identified in the TMX results by changing the color of the node to indicate the subject's placement in a TMX grouping. TMX was color coded in the same way that it had been in previous charts where *High TMX* (Average TMX Z Score over +1.0) was green, *Moderately High TMX* (Average TMX Z Score between 0.1- 0.9) was yellow, *Moderately Low TMX* (Average TMX Z Score between 0. and -.9) was orange, and *Low TMX* (Average TMX Z Score of -1 or less) was red.

Limitations

My academic research was related to my existing professional consultative work. While the access to research this population would not have been possible without this connection, it did create some level of bias both for the researcher and for the subjects. The NCJTC provided assistance to access appropriate Mexican officials and leveraged political capital to endorse the investigation. The NCJTC also provided conference invitations and speaking engagements that afforded access to the participants and increased their confidence in the research and willingness to participate in the online survey. This relationship was of benefit because at these events, I had the opportunity to engage participants directly and obtain their preferred contact information. US and Mexican government agencies also provided attendance lists that included participants' contact information. Working thorough the professional training organization also created limiting factors in the study. My bias was to view this as an educational opportunity, rather than an issue to be taken on within the management structure or by political means and the study was designed through this lens. I knew some of the subjects and their opinions about the benefit of their professional networking opportunities from previous practitioner work. Some participants had spoken with me previously and were accustomed to seeing my work as associated with their career development and may not have been able to trust the anonymity of their responses as purely academic research. Response bias was likely higher as a result of the perception that this work reflected directly on the reputation of their organization or could impact their professional success. These biases are not problematic beyond what would be normal for a researcher who used previous education and experience to formulate an opinion about how a study should be design or the levels of social desirability response bias inherent for subjects responding to questions about their job performance and workplace team dynamics.

Finally, this study did not have sufficient subjects to produce statistically significant outcomes to predict TMX on the basis of demographic characteristic and did not include alternative qualitative methods of analysis to account for any conditions (demographic, political, or situational) which may have contributed to the perceptions of the individuals. Given the small network size, a mixed methods or purely qualitative investigation of the nature of relationships might have provided richer detail for the descriptive investigation into the organization. To produce predictive and generalizable results, the study would have needed to be designed to account for a much larger population.

My study utilized two different theoretical constructs and sought to evaluate the intersectionality of those measures. Therefore, data were evaluated methodologically in three

areas of analysis: an assessment of participants' reported TMX, of participants' reported SNA, and of the combination of the two approaches. For the first two part of the analysis, standard and normal methods were available from the literature to guide the plan of analysis. For the third area of investigation, a gap in the literature, I identified commonalities between the two theories and combined elements of the first two parts of the analysis.

IV. RESULTS

Much like the methods were organized by detailing each of the three areas of analysis in turn, this results section was similarly divided into three discussions. First, I described the TMX results, a measure which "assesses the reciprocity between a member and his or her team with respect to the member's contribution of ideas, feedback, and assistance to other members and, in turn, the member's receipt of information, help, and recognition from other team members" (Seers, 1989, p. 21) to answer research Question one, *how do people experience support within the workplace*? Next I discussed the SNA Results, which provide data to support an analysis of research questions two and three, *what are the relationships that exist within the workplace? and What is the nature (perceived strength) of the relationships?* Finally, I engaged in a relational comparison of the linkages, commonalities and differences between the TMX and SNA results. This combination of individual and group level outcomes in exchange relationships across both theories allowed me to answer research question four, *what is the association between people's experience of support within the workplace and the presence and nature of relationships*

TMX Analysis

To analyze the TMX results, I chose to look at how individual participants reported their experience of exchange relationships in their workplace on both a per-question and per-person basis. I then reviewed the results demographically by age group, education level, length of time with the organization, and state of residence of the participant. The same training and technical assistance curriculum was available to all participants and survey results captured employee perceptions without differentiated intervention or treatment. My literature review confirmed that studying TMX added value to this analysis because TMX was demonstrated to be an indicator of team identification and high-quality working relationships that increased overall team performance and fueled positive workplace outcomes (Lau & Cobb, 2010; Linden, Wayne & Sparrowe, 2000; Seers, 1989; Seers, Petty & Cashman, 1995). TMX results cover the following areas of analysis: TMX survey responses, utilization of Z Scoring, Z Score distribution by participant, Z Score distribution by question, and finally a comparison of means for TMX for the group with bivariate descriptive statistics for age, education, time with the organization, and state of residence.

TMX Survey Responses

Raw data responses for the TMX portion of the survey were available for all 14 subjects, each of whom answered the ten questions from the TMX assessment for a total of 140 individual data points. Of the responses, 99 responses (70.7%) rated TMX as either 4 or 5 (positive) and 33 of 140 (23.6%) rated TMX as 3 (neutral). Only eight responses (5.7%) were coded as 1 or 2 out of 5 (negative). More than twice as many respondents reported positive TMX experiences than neutral or negative experiences combined. The number of subjects responding to each option (1 through 5) on each of the ten-question sis itemized in table 6 below.

Table 6

Survey Questions Assessing Participant TMX

TMX Assessment	Frequency of subject responses per score (1-5)				
Question	1	2	3	4	5
1 - How often do you make suggestions about better work methods to other team members?	0	1	6	4	3
2 Do other members of your team usually let you know when you do something that makes their jobs easier (or harder)?	1	0	3	5	5
3 How often do you let other members of your team know when they have done something that makes your job easier or harder?	1	0	2	7	4
4 How well do other members of your team recognize your potential?	1	0	3	5	5
5 How well do other members of your team understand your problems and needs?	0	1	2	8	3
6 How flexible are you about switching job responsibilities to make things easier for other team members?	0	0	2	6	6
7 In busy situations, how often do other team members ask you to help out?	1	0	4	7	2
8 In busy situations, how often do you volunteer your efforts to help others on your team?	0	0	4	5	5
9 How willing are you to help finish work that had been assigned to others?	0	0	5	3	6
10 How willing are other members of the team to finish work that was assigned to you?	1	1	2	6	4
Sum of responses	5	3	33	56	43

The average TMX score from the 144 individual responses was 3.9. This outcome was the same for central tendency measures of mean, median, and mode. The lowest average TMX score for an individual question was 3.64 on Questions 1 and 7. The highest average TMX score

was 4.29 on Question 6 (*How flexible are you about switching job responsibilities to make things easier for other team members*?). The range was 0.65. These raw TMX scores showed a similarly positive result (average responses above 3 on a scale of 1 to 5) for all ten questions.

Z score conversion. What the raw data for Likert scale responses to the ten TMX questions did not indicate was how these results compared to the general population or what constituted *high* or *low* TMX in normalized terms. For that reason, I chose to evaluate the responses relative to each other, using Z Scores. As explained in the methods section, an overall mean Z Score was mathematically impossible to calculate, but Z Scores for each factor were used to calculate a median Z Score per question and mean Z score per respondent, and averages for various sub groups of questions and respondents. These data are detailed in table 7 below. See Appendix D for a table noting the high and low TMX Z Scores and calculating ranges of scores for each question. First, I looked at the average TMX Z Score per individual and per question at a micro-level before proceeding with an overall valuation of average TMX Z Scores for different subgroups based on demographic and other groupings. Table 7 below showed the 14 participant's Z Scores labeled and divided into four categories. These categories were established based on the distribution of the data relative to degree of difference from the mean (zero). Z Scores less than -1 were considered *low TMX* (red). Z Scores in range of -0.9 to 0, were considered *moderately low TMX* (orange). Z Scores in the range of 0 to +0.9, were considered *moderately high TMX* (yellow) and Z Scores over +1 were considered *high TMX* (green). Subjects were labeled and analyzed as members of one of these four groups and group means were calculated.

Table 7

Per subject Z Score Distribution for each question and participant mean

Subject	ZscoreQ1	ZscoreQ2	ZscoreQ3	ZscoreQ4	ZscoreQ5	ZscoreQ6	ZscoreQ7	ZscoreQ8	ZscoreQ9	ZscoreQ10	ZscoreAverage
A	1.461	0.939	1.000	0.063	0.086	0.983	0.354	1.120	1.013	0.180	0.72
B	-1.769	-2.566	-2.733	-2.566	-2.327	-0.393	-2.621	-1.293	1.013	-2.344	-1.76
C	1.461	0.063	1.000	0.063	0.086	-0.393	-0.638	-1.293	-1.169	-1.503	-0.23
D	0.385	0.939	0.067	0.939	1.293	0.983	0.354	1.120	-0.078	0.180	0.62
F	-0.692	0.939	-0.867	0.939	1.293	0.983	-0.638	1.120	1.013	1.022	0.51
G	-0.692	0.063	0.067	-0.814	0.086	-0.393	-0.638	-1.293	-1.169	-0.661	-0.54
H	-0.692	-0.814	0.067	-0.814	0.086	-1.770	0.354	-1.293	-0.078	0.180	-0.48
I	0.385	0.063	0.067	-0.814	-1.120	-0.393	0.354	-0.086	-1.169	-0.661	-0.34
K	-0.692	-0.814	0.067	0.939	0.086	-1.770	0.354	-0.086	1.013	1.022	0.01
L	-0.692	-0.814	-0.867	0.063	0.086	-0.393	0.354	-0.086	-1.169	0.180	-0.33
M	0.385	0.063	0.067	0.063	0.086	-0.393	0.354	-0.086	-0.078	0.180	0.06
N	1.461	0.939	1.000	0.939	1.293	0.983	1.346	1.120	1.013	1.022	1.11
O	-0.692	0.939	0.067	0.063	-1.120	0.983	-0.638	-0.086	-1.169	0.180	-0.15
P	0.385	0.063	1.000	0.939	0.086	0.983	1.346	1.120	1.013	1.022	0.8

TMX Z Score by participant. The intention of Z Scoring was to group the participants and discuss them in comparative terms of high and low TMX. Research showed that TMX was an indicator of an individual's experience of support in the workplace (Sears, 1989, Sears Petty & Cashman, 1995). Based on the TMX literature, subjects with positive TMX Z Scores (above zero) can be said to experience more support in the workplace than subjects with negative TMX Z Scores for the purposes of this analysis. Remembering that 94.3% of the reported raw scores were coded as 3 or higher (neutral to positive), Z Scores that were described as high TMX or low TMX served only to evaluate those participants relative to others in the group, not relative to an external scale or measure. This differentiation allowed me to answer research Question 1, *How*

do people experience support within the workplace? on a per subject basis. Next, I analyzed any patterns in these four groups of TMX experience based on subject demographics.

TMX Z Score outcomes as grouped by demographics. As seen in Table 7 above, all but two subjects, 85.7% of respondents, fell into either the moderately high TMX or moderately low TMX categories. While the scoring paradigm split the subjects into two distinct cohort groups (those above or below zero), there was relatively little difference, demographically speaking, between the moderately high TMX and moderately low TMX clusters. Both groups represent a diverse cross section of respondents.

The moderately high TMX subjects (K, M, F, D, A, P) ranged from 28 to 64 years old (mean 40.6), were twice as likely than not to have postgraduate education (four out of six responses), and on average had been with the organization longer than three years (50%). Only one of six identified as a new employee (6 months to 1 year). There were five different states represented in this group. Of the ten questions, this group had the highest TMX scores in their responses to Question 8, *In busy situations, how often do you volunteer your efforts to help others on your team?* (sum of. Z Scores= 4.308). This indicated that they perceived themselves to be proactively offering to contribute to an exchange relationship. This group had the lowest TMX Z Scores (sum of. Z Scores= 1.232) in their responses to Question 1 *(How often do you make suggestions about better work methods to other team members*?). However, it should be noted the lowest overall Z Score sum reported for this group was still in the positive range.

The moderately low TMX subjects (G, H, I, L, C, O) range from 25 to 49 years old (mean 38.3), 50% had a postgraduate education, and were evenly split in range of tenure; with two of six having been with the organization between 6 months – 1 year, two with the organization for 1 to three years, and two with the organization more than three years. There were also five different states represented in this group. This group had the highest TMX Z Scores relative to any other question in their responses to Question 3, *How often do you let other members of your team know when they have done something that makes your job easier or harder* (sum of Z Scores= 0.401). This indicated that they believed that they were making an effort to engage and express their needs. This group had the lowest TMX Z scores (sum of Z Scores= -5.903) in their responses to Question 9, *How willing are you to help finish work that had been assigned to others*? This demonstrated that members of the group with moderately low TMX were less agreeable than members of the group with higher TMX to engage in this key exchange behavior.

Considering the data in the rows of Table 7 above to compare individual Z Scores by subject clearly revealed one high TMX and one low TMX participant. Subject B was less than 33 years old, had been with the organization between 1 – 3 years and did not have a postgraduate education. She worked in a state with two other subjects. The only question that subject B answered in a more positive way than her peers was question 9, *How willing are you to help finish work that had been assigned to others*? on which she was one of the highest rating respondents in the team. This indicated that the team member with the least powerful degree of TMX perceived herself to be very willing to engage, but was perhaps not as skilled at doing so in terms of proactively volunteering (Question 8) or making suggestions (Question1).

The high TMX respondent, Subject N, was between 34-48 years old, with a post graduate education and longer than three year tenure with the organization. She worked in a state with two

other subjects. Subject N responded in the highest range of any subject across all questions, and was the only participant with all Z Scores greater than 1.0 on every question.

I used a line graph to illustrate the way the sum of Z scores per participant was distributed across the team. When viewed on a number line in figure 1 below, the similarity between the "slightly high TMX" and "slightly low TMX" groupings were made even clearer. One respondent (subject B) had a sum Z Score of -17.6. The high sum of Z Scores of 11.12, as previously stated, belonged to subject N. Other than these two individuals, the rest of the scores were much more tightly coupled. Half of the scores, seven out of 14, fell in the range of +5 to -5. Of the scores that fell out of this range, two were less than one point away (-5.44 and +5.11), meaning that 64.3% of respondents were neutral as compared to the group. This aligns with the raw data, where the most common Likert response was 4 out of 5 and which was positive overall.

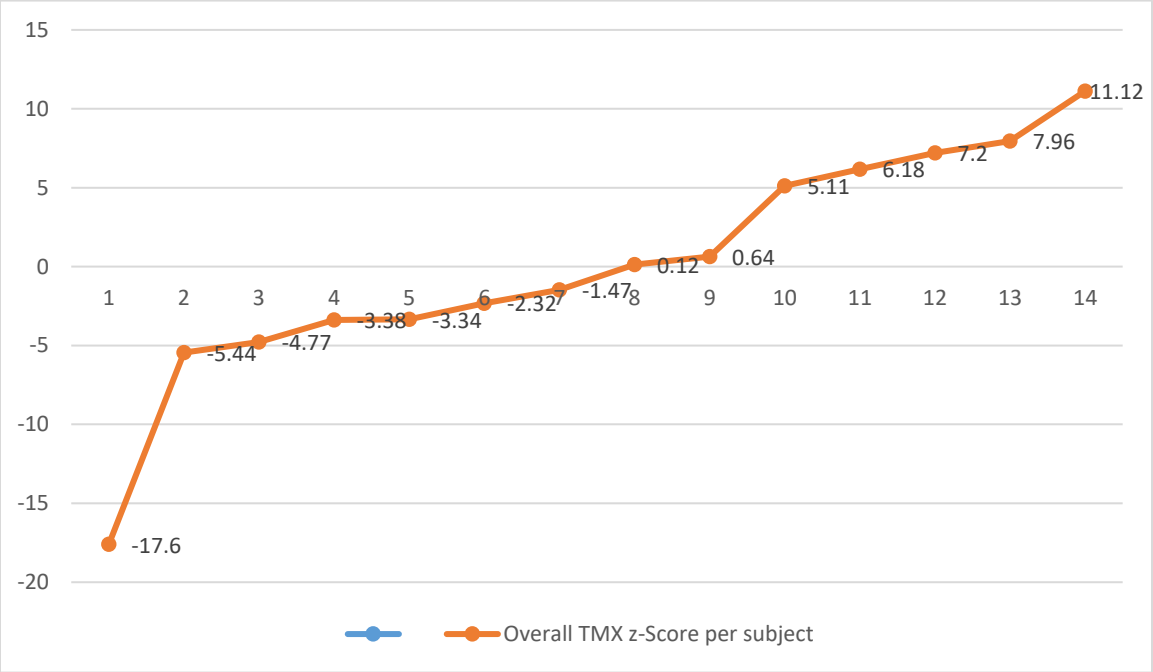


Figure 1. Line graph of per subject sum of TMX Z Scores distribution

Another way of visualizing TMX Z scores on a per person basis was demonstrated with a bar chart or histogram. The frequency table of Z Score sums for each of the ten questions was summarized on the following histogram, Figure 2.

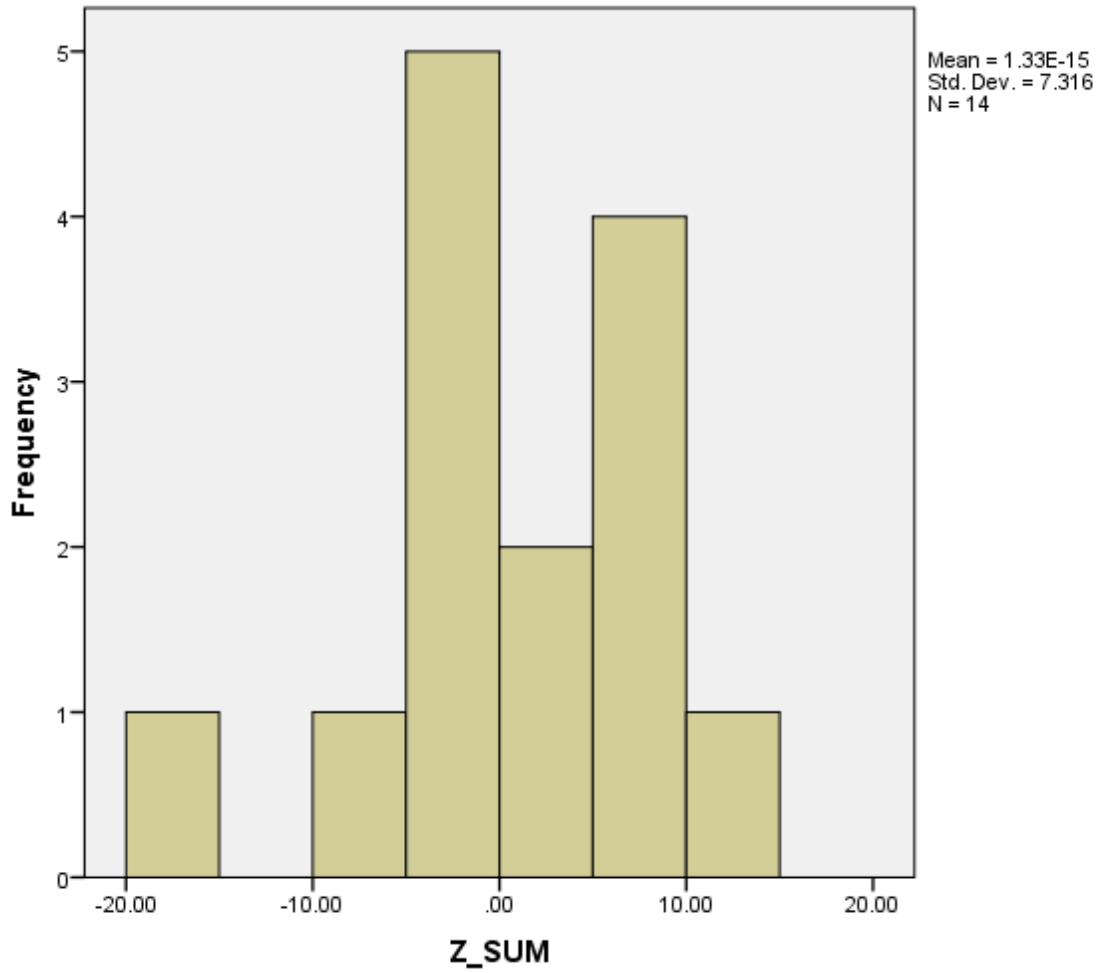


Figure 2. Histogram of Per Participant Frequency of Z Score sums

Figure 2 clearly showed the distance in the one negative outlier, subject B, who was more than ten points removed from the cluster of other responses and showed the largest category of the responses falling just below zero and corresponding with Moderately Negative TMX, as discussed previously.

TMX Z Score distribution by question. Having reviewed TMX Z Scores on a per person basis, I then turned to a per question analysis, Histograms were also used to display the distribution of frequency tables for Z Scores for each of the ten TMX questions. See Appendix E for histograms of all frequency tables. Viewing TMX on a per question basis allowed me to confirm if the mean or sum TMX Z score for an individual participant was representative of the overall sentiment of the individual towards the team and not skewed by differing reactions to certain aspects of TMX. In addition to discrepancies in sentiment for an individual, I also looked for patterns in the response across the team for variations in perceived exchange quality based on the type of question being asked.

When viewed graphically on the histograms, most questions (70%) shared the same response pattern, which revealed a single outlier at the lower end of an otherwise monotonic distribution. This outlier was previously identified as subject B. Question 4 was selected as a representative example of the seven questions revealing this distribution of responses and

appeared in Figure 3 below. The other six histograms demonstrating this response pattern can be found in Appendix E.

The remaining three questions had different response patterns than those represented by the histogram example shown in Question 4. Two questions, 6 and 8, evidenced responses consistently distributed across two or three values for all subjects. Both histograms are shown in Figure 3 below. Question 9 was unique in having a bimodal distribution, also shown in Figure 3 below.

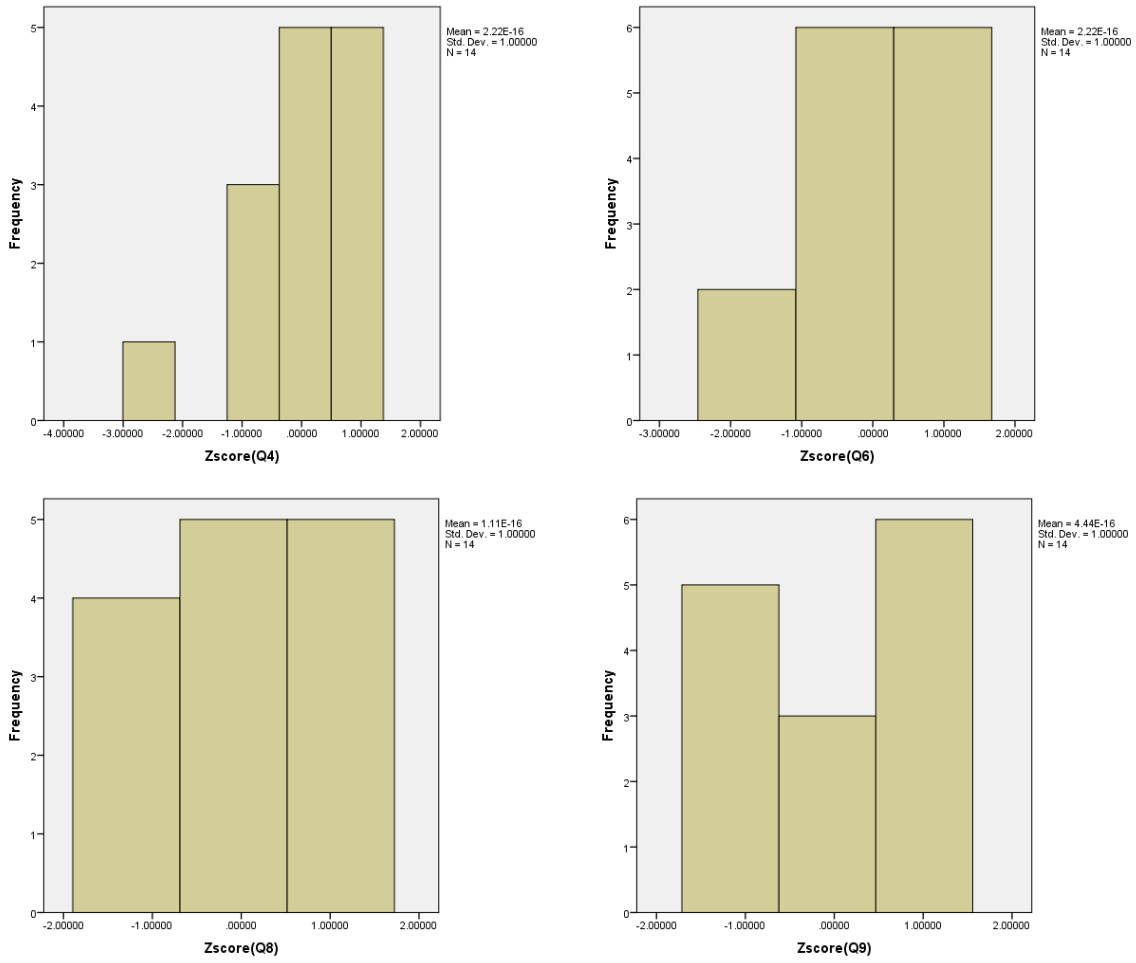


Figure 3. A representative sample of histograms depicting per question frequency of Z Scores

Median Z Score per question. Having compared average TMX Z Scores across subjects, I wanted a parallel analysis of average TMX per question. Because of the nature of a Z Score calculation, the mean for each question would always be zero; however, a measure of central tendency per question can be identified using the median Z Score. There were four questions (1, 6, 8 and 9) that had negative median Z Scores. The other six questions (2, 3, 4, 5, 7, 10) had positive median Z Scores. These results were detailed in Table 8 below. The seven questions with histograms showing Z scores near zero and one outlier response (Questions 1, 2, 3, 4, 5, 7, 10), which were typified by the example shown in the question 4 histogram in figure 3 above, demonstrated that the majority of the group was expressing neutral or positive TMX sentiment,

but average TMX Z Scores would be pulled down by one outlier. This was confirmed in that six of those seven questions had positive median Z scores in table 8 below. Table 8 also showed that the three questions that did not share this common distribution, Questions 6,8, and 9, all had negative median z scores.

Table 8

Descriptive Statistics of Subjects' TMX Z Scores per Question

	Z Score (Q1)	Z Score (Q2)	Z Score (Q3)	Z Score (Q4)	Z Score (Q5)	Z Score (Q6)	Z Score (Q7)	Z Score (Q8)	Z Score (Q9)	Z Score (Q10)
Median	-0.15	0.06	0.07	0.06	0.09	-0.39	0.35	-0.09	-0.08	0.18
Minimum	-1.77	-2.57	-2.73	-2.57	-2.33	-1.77	-2.62	-1.29	-1.17	-2.34
Maximum	1.46	0.94	1.00	0.94	1.29	0.98	1.35	1.12	1.01	1.02
Range	3.23	3.51	3.73	3.51	3.62	2.75	3.97	2.41	2.18	3.37

There was the lowest variability in the range of response on these three questions with nonstandard distributions and negative median z scores (6, 8, and 9). Question 9, *How willing are you to help finish work that had been assigned to others?* had the tightest range of scores (2.182). This aligned with what was expected given the average TMX of those in the moderately negative and moderately positive categories with 87% of responses falling between -0.9 and +0.9 and the negative scores being slightly stronger.

Four questions with negative median Z scores (1, 6, 8, and 9) all reference aspects of TMX having to do with the subject's behavior towards other members of the team. This highlighted the fact that TMX measured reciprocal exchange and acknowledged both a giving and a receiving component to the team member's relations with the group. Seers' ten item assessment of TMX recommended for practitioner use (1995) was designed to measure the exchange behaviors passing between the member and his or her team in equal measure; meaning that five of the ten questions were phrased so as to evaluate the subject's perception of their contribution of resources to the team and five questions were phrased so as to measure the subject's perception of the team's contributions of resources to them. Often these questions can be seen as direct pairs.

One of these sets of paired questions about perception of one's own exchange behavior versus what was perceived of others was presented in Questions 7 and 8. Question 7, *In busy situations, how often do other team members ask you to help out*? received the highest median Z Score (z= 0.354) whereas Question 8, *In busy situations, how often do you volunteer your efforts to help others on your team*? received a negative median Z Score of -0.086. Similarly, in paired

Questions 9 and 10 (*How willing are you to help finish work that had been assigned to others?* versus *How willing are other members of the team to finish work that was assigned to you*), the perception of receiving high TMX behavior from peers as evidenced in Question 10 had a positive median Z Score of 0.180 whereas the Z Score a respondent assigned to themselves for giving high TMX behaviors in Question 9 was -0.078. It should be noted that despite returning a negative Z score, this Question's raw data was not negative but rather neutral. In this case a Likert response of 3 out of 5 was selected by five respondents (35.7%), resulting in a low Z Score for the majority on that question. This does not include subject B, however, who had otherwise consistently reported the lowest score but gave herself the highest score in the group on this question. Question 6, *How flexible are you about switching job responsibilities to make things easier for other team members*? received the lowest median Z Score (z=-0.393). See Appendix D for a table of the high and low TMX Z Scores and Ranges of Scores for each question.

What does this mean in terms of TMX for the group? These individual variations in TMX between questions or participants provided an understanding of how TMX worked at a micro level in the organization and described the nuance of how different people experienced support within the workplace (research question 1). This analysis of 140 variants for 14 subjects on ten items created a level of complexity that was less useful to answer the broad scope of Question 1 from a statistical standpoint. I wanted a single measure of support for the purposes of comparison, so I selected mean Z Scores per participant subgroup as my continuous variable in T-Tests across different demographic groups. Calculating a mean within subgroups was possible because the average for a cluster of subjects will not include all scores. Therefore, grouping subjects on the basis of demographic characteristics provides a basis for bivariate statistical comparison. Because I could calculate means at the subgroup level, I could compare means. This allowed me to make a statement regarding how the group collectively experienced support overall with an indication of the generalizability of those responses.

Bi-Variate Descriptive Statistics

Individual t-tests were run to compare means for group level comparisons by age range (between three groups), by time with the organization (between three groups), by education level (between two groups), and by state (between six groups). A full listing of these results appears in Appendix F.

TMX by age, education level and length of time with the organization. Using the qualitative demographic age breaks previously identified, the three groups of participants experienced varying levels of TMX relative to age. The middle age bracket (34 – 48) reported the highest levels of TMX with a positive mean Z Score of +2.89. The youngest group of respondents (33 and under) scored lower, (mean Z Score=. -1.45) while the oldest team members (49 and over) reported the lowest levels of TMX, with a negative mean score of -3.37. The differences between the age groups were not statistically significant (Group 1 and Group 2, p=0.119; Group 1 and Group 3, p=0.771; Group 2 and Group 3, p=0.396).[8]

When asked about their level of education, no subjects identified as Group 1 (high school) or Group 2 (technical diploma). Means were therefore compared only across Groups 3 and 4. Team members with a post graduate education reported higher levels of TMX (Average Z

[8] A full listing of these results appears in Appendix F

Score = 2.55) as compared to an average TMX Z Score of -3.39 for those without a postgraduate education, but the difference was not statistically significant (p=0.138). It was possible that education relates to other demographic factors, however these analyses were outside of the scope of the current study.

When responding to length of time in their position, no subjects identified as Group 1 (less than 6 months with the organization). Means were therefore compared between groups 2 and 3 (p=0.806), Groups 2 and 4 (p=0.686) and Groups 3 and 4 (p=0.486). Those subjects with longer than 3 year tenure with the organization reported higher levels of TMX (Z Score = +.165) as compared to a negative average TMX Z Score of -1.868 for those who had been serving between 1-3 years and average TMX Z Score of -0.189 for those with less than 1 year of experience in their role. The differences between groups based on length of time with the organization were not statistically significant at p=0.05.

Data showed that that for the Mexican SBI population, as a subject became older in chronological age their perception of the exchange relationship decreased. This was evidenced in that Group 2, age 34-48, had an average TMX Z Score of 2.89 and Group 3, over 49 years old, had an average TMX Z Score of -3.36. However, when a coordinator becomes older in terms of time within the organization their perception of the exchange relationship increased, (the highest TMX Z Score was in group 4; longer than 3 years with the organization). Taken together, these results indicated that I should anticipate that subjects in this population who were between 34-48 years old, with a post graduate education who had been in their position longer than three years would have the highest levels of TMX.

TMX by state represented. When considering TMX relative to the place where the team member works, respondents working in states 2 and 6 reported above average TMX (Average Z Score = +6.18 and 5.87, respectively) whereas the team members working in the other four states reported lower than average TMX, with states 1 and 4 having the lowest scores of -4.24 and -4.07, respectively. Table 9 summarizes the number of participants responding from each of the six states and the average TMX Z Score when these results were grouped by state. Means were compared between each stare and the other 5 states. See Appendix F for these calculations. None of these comparisons were statistically significant.

Table 9

TMX Results by Participant's State Represented

State	Number of Participants	Average TMX Z Score
1	3	-4.2411
2	1	6.1825
3	2	-.1656
4	2	-4.0744
5	3	-.8598
6	3	5.8667

When considering where these states were located geographically in relation to one another, there was not a logical distribution of outcomes based on proximity. The state with the lowest perception of exchange relationships, State 1, was the most central in the region and therefore enjoyed geographic proximity to resources not afforded to their counterparts in other states. However, the state with the next lowest Z Score, State 4, was the furthest distance removed, both from the federal headquarters of the program and from the other states. I was unable to investigate causes for this outcome, but potentially these results could be analyzed in future research relative to population density, geographic conditions or frequency of child abduction cases.

There were no significant differences in TMX Z Score at p=0.05 by age, education, tenure with the organization, or state of residence. This was not surprising given the n of 14. However, since this was a descriptive analysis of a specific segment of the organization this team configuration was evaluated as a whole network population, not as a sample selected with the intention to generalize to the larger AMBER population. See Appendix F for a full table of t-test results.

Summary of TMX results. TMX measured the perception of the quality of reciprocal exchanges each individual coordinator had with the group as a whole. In the analysis of TMX results I found that 70.7% of all responses were either 4 or 5 on a Likert scale of 5 and highlighted variation in responses using Z Scores to describe TMX relative to the group. Using Z scores to distribute the data relative to a standard deviation revealed that these subjects fell into four brackets, or levels, of TMX, all within two standard deviations of the mean. Applying descriptive terms to these groupings allowed me to describe one subject (B) having *low TMX* (less than -1), six subjects having *moderately low TMX* responses of -0.9 to 0, six subjects having *moderately high TMX* responses of 0 to +0.9, and one subject (N) having *high TMX*, as defined as average Z Score greater than +1. Demographically, subjects between 34-48 years old, with a post graduate education, and who had been in their position longer than three years had the highest levels of TMX. Individual Z Score sums ranged from +11.12 to -17.6, but as evidenced in the histograms, the majority reported a neutral or positive raw score.

From part one of this analysis, it was possible to understand the ways this group answered research Question 1, *How do people experience support within the workplace?* TMX measures reciprocal, voluntary behavior, whereby an individual contributes and receives the support (information, help, and recognition) they need to be successful within the team (Abu, Bakar &Sheer, 2013). An average survey response of 3.9 on a 5 point Likert scale indicated that generally, the majority of subjects reported a positive experience of their workplace. Z Scores allow for in group comparisons. TMX Z scores showed seven nodes (A, D, F, K, M, N, and P) that had higher TMX relative to the rest of the organization, with node N as the strongest positive outlier and half of the group experienced lower TMX relative to the rest of the organization, with node B as the strongest negative outlier. This indicated that with the exception of two outliers, the group was fairly consistent in their experience of support in the workplace but could be divided into equal camps of those who experience more support and those who experience less support relative to the rest of the group. When looking at TMX Z score by question, I found that six questions had positive median Z scores. The four questions with negative median Z scores all reference aspects of TMX having to do with the subject's behavior towards other members of the

team. This indicates that on this team individuals perceive a better quality of exchange being extended to them than they offer. This indicates a high level of perceived support from the team.

Social Network Analysis

Studying SNA added value to this research because the literature showed that the structure of relations created information pathways that facilitated or constrained the flow of resources within a team and therefore, better explained patterns of behavior or attitudes than shared demographic characteristics (Balkundi & Harrison, 2006; Brass, 1984; Knoke & Yang, 2008). These SNA results were evaluated in response to two of my four research questions. I discussed Research Question 2, *What are the relationships that exist within the workplace?* in relation to network density, the presence or absence of binary inbound and outbound ties in the non-valued network, and the Social Network Graph (SNG) analysis of the comparative distribution of ties by age, length of time with the organization and state of residence. I answered Research Question 3, *What is the nature (perceived strength) of the relationships?* based on the reported strength of valued directed ties as measured by actor in-degree and out-degree centrality in the valued network and SNG analysis of their comparative distribution by age, length of time with the organization and state of residence.

The Non-Valued Network

The non-valued network was created based on subjects' binary yes or no response to SNA prompts asking whether or not they knew another actor in the SBI. The non-valued network was evaluated based the perceived presence or absence of a tie, meaning whether a coordinator reported that a relation existed, not the relative strength of that relation. It demonstrated the presence of relationships on the team (Research Question 2) at the time of the study.

Quantifying the presence or absence of ties in the non-valued network. With 14 nodes in the non-valued network, the total possible number of ties was 364, which would occur if every one of 14 individuals each claimed to know all 13 other members of the network (182 outbound ties) and all 13 other members of the network each claimed to know each of them (182 inbound ties). I found 158 ties in the SBI network (actors reported 72 inbound and 86 outbound ties). See Appendix G for the matrix of reported ties in the non-valued network[9]. This data showed what relationships exist within this workplace in response to Question 2. The meaning of these numbers of ties to network form were best understood in terms of calculating network density and evaluating the reciprocity of relations as evidenced by comparing inbound versus outbound ties.

Network density. The ratio of 158 out of a possible 364 ties results in an overall network density of 43.4%, meaning that less than half of the possible relations between team members were actively engaged. Previous research associated higher density with a more effective network (Balkundi & Harrison, 2006). The literature did not provide a definition of what constituted a strong network, rather only reinforcing that higher density was preferred because stronger networks with more densely configured teams attained their goals better and were more committed to staying together (Balkundi & Harrison, 2006). This network, at less than 50% density, had the opportunity to be much stronger.

[9] The matrix of ties has been altered to reflect only connections to *other* individuals by replacing the value of 1 (in the non-valued network, or whatever value ascribed in the valued network) with a zero in the cells where a subject responds to prompt as to whether or not they know themselves.

Inbound versus outbound ties. The network was symmetrical, meaning that overall actors reported the same number of outbound ties offered as the number of inbound ties they received. However, the individual actors had differences in their in-degree and out-degree centrality scores. For the purposes of the non-valued network, I did not focus on either the actor in-degree or out-degree centrality as a standalone measure, but rather the difference between the perceived existence of inbound and outbound ties. Half of the actors had a difference of either zero or 1 in their count of inbound and outbound ties and the average difference for the group was mean =2.7 and median = 1.5 ties.

Table 10

Presence and absence of ties (Degree Centrality) in the Non-valued network

Node	Inbound Ties	Outbound Ties	Difference
A	10	7	3
B	4	4	0
C	4	2	2
D	3	11	-8
F	4	8	-4
G	5	11	-6
H	8	6	2
I	5	4	1
K	9	5	4
L	5	4	1
M	3	2	1
N	9	4	5
O	2	0	2
P	1	4	-3
TOTAL	**72**	**72**	**0**

By using an inductive approach to categorize the distribution of inbound and outbound centrality scores reported in Table 10, I described the way this difference manifested in three ways; (1) balanced perception of relationships (between zero and two degrees difference in inbound and outbound ties), (2) overstated relationships relative to the rest of the group (putting

out three or more ties than they receive) or (3) understated relationships relative to the rest of the group (receiving three or more inbound ties than they put out).

My data showed seven individuals in the first category; which I defined as having ales than two degrees of difference in in-degree and out-degree centrality scores. I observed this breakpoint in the data based on difference in ties wherein 50% of the subjects feel in this category. These nodes were expected to have either a perfectly balanced or a fairly realistic sense of their relationships. As seen in Table 10 above, Node B had no difference between her number of inbound and outbound ties. Nodes I, L and M reported a relation to one less individuals (outbound ties) than claimed to have a relation to them (inbound ties), for a difference of positive one tie. Nodes C, H and O reported a relation to two less individuals (outbound ties) than claimed to have a relation to them (inbound ties), for a difference of positive one tie.

There were four individuals in the second category, having overstated the quantity of their ties relative to the perceptions of others by negative 2 ties or more. Nodes D, F, G and P reported being connected to between three and eight more individuals in the network (outbound ties) than other individuals acknowledged being connected to them (inbound ties).

There were three individuals in the third category, understating their relations relative to other's perception of knowing them by positive three ties or more. Nodes A, K and N reported being aware of three, four and five less individuals (outbound ties) respectively than claimed to know of them (inbound ties). See Appendix I for results for these measures of centrality.

The two largest discrepancies are in the negative scores, or subjects that perceived themselves as having many more relations than were reciprocated to them. At this level of analysis, node D was the example of the largest discrepancy in a subject's reported inbound and outbound ties. Node D was between 34-48 years old, had been with the organization more than 3 years and did not have a postgraduate education. Because of the coding error that disqualified Node E, she was the only participating subject from her state. The data for node D showed an in-degree centrality of 3 (meaning three other actors claimed to know this person) but an out-degree centrality of 11. This actor claims to know all but two other people in the network (Nodes O and P). This difference of negative 8 degrees was the most striking disparity in an actor's perceptions of their network of relations as compared to the way others perceived them. Node D may be more acutely aware of others who work for the organization than her peers or may have reviewed written materials carefully to be aware of the names of other employees. She may be leveraging the kind of network centrality better measured by eigenvector or closeness centrality to know of people without having developed these relationships personally. Node G showed similarly asymmetrical in- and out-degree centrality measures with a difference of negative 6 ties.

SNGs of the non-valued network. As explained in the SNA literature, SNGs showed actors represented by nodes and their relations were shown as lines with arrowheads demonstrating directionality of the relation (Knoke & Yang, 2008). Viewing the SBI network in this way allowed me to visualize and discuss the relationships between each coordinator. This proved especially useful in this context given the limited opportunity to produce statistically significant values with a small network size (N=14) and to focus on descriptive analysis of this population rather than generalizable results. The presence of relationships between the 14 Mexican SBI coordinators in my study were represented by the following SNGs, Figure 4. This visual image provided evidence to further answer research Question 2: *What are the relationships that exist within the workplace*?

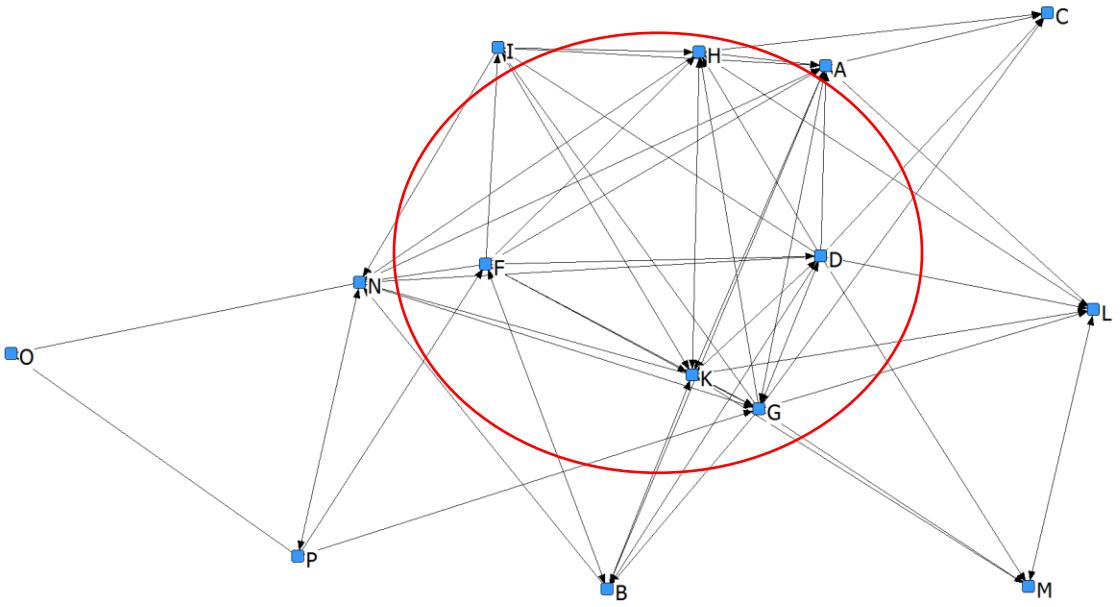


Figure 4. The non-valued network

Figure 4 showed 14 unique nodes with a presence or absence of ties. Visually, eight nodes (A, D, G, F, H, I, K, N) were more central to the network with multiple inbound and outbound ties, indicated with a red circle in Figure 4 above. Of the remaining six nodes, five (B, C, L, M, P) were further outside of the network with 4 to 6 total inbound and outbound ties, and one node (O) was almost completely excluded from the network. A greater depth of understanding of the network can be added by viewing the nodes while highlighting their demographic characteristics. The following image, Figure 5, showed demographic characteristics in the non-valued network wherein age was differentiated by shape (groups from youngest to oldest where 1=circle, 2 = square, 3 = triangle), length of time with the organization was denoted by size (smallest to largest as tenure increases) and state identity was color coded (where red=1, blue=2, purple=3, white=4, green=5, and yellow=6).

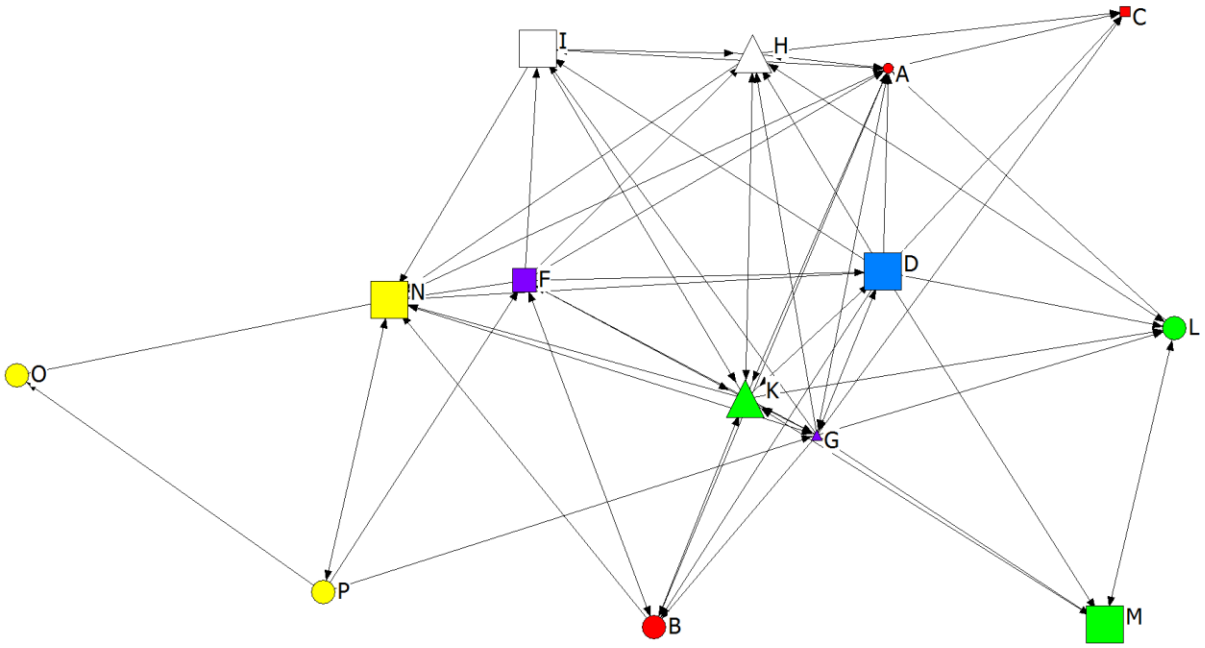


Figure 5. The non-valued network with nodes coded for age, state, and length of time with the organization

Figure 5 showed that respondents in state 1 (red) and State 6 (yellow) were less central to the network than those in other states. All six states were represented within the eight most central nodes previously identified. In the states that only had one or two representatives, States 2, 3, and 4, all respondents were centrally positioned. The two participants from States 3 and 4 (purple and white) and the only respondent from State 2 (blue), were in the network core. In the three states with three subjects represented (States 1, 5, and 6) only one respondent was central to the network and the other two were on the outside. This indicated that as more representatives join the network, a representative helped broker relationships on behalf of others in their state.

This SNG showed that in general, where there were multiple coordinators within a state, their oldest member enjoyed more centrality than their younger peers, and younger employees also tended to be the most recently employed. In Figure 5, node shape indicated age group. The five circles were for Group 1 (33 and younger), six squares were for Group 2 (34-48), and three triangles were Group 3 (age 49 and older). This showed that younger members (circles) tended to be further removed from the network, with 80% (all but node A) outside the core. Node A was a clear outlier in that Node A (a circle) was younger than node C (a square) but enjoyed a more privileged position in the network. Node A was less than 33 years old, had been with the organization between 6 months and 1 year and had a postgraduate education. She was one of three participating subjects from her state. Age seems less relevant for the middle age group (square) which had two members inside the core group and two members outside. The oldest members (triangles) were all within the core of the network regardless of the number of other coordinators in the state or their length of time with the organization. I will look at Node G as an example of this fact when discussing length of time in position.

In Figure 5, network distribution was coded by length of time with the organization where node size was smallest for the three nodes in Group 2 (nodes A, C, and G who had been in their position between 6 months to 1 year), and grew larger to indicate more time in the

organization. Nodes were medium sized for the five members of Group 3 (1 to 3 years), and largest for Group 4, made up of nodes M, D, H, I, N, and K, who had been in their position more than three years. This image showed that overall, individuals with the longest tenure (largest shapes) were more central within the network. In fact, all of the individuals who had been with the organization longer than 3 years were placed within the core of the network, but being new was not necessarily a disadvantage. For the smallest (most recently employed) nodes, two out of three (A and G) found a place in the core of the network. I discussed node G in the previous analysis as an individual with an outsized perception of their relationships (Node G had a degree centrality difference of 6 with 5 inbound ties and 11 outbound ties) and it was her high number of outbound ties that drew her closer to the center of the SNG. Node C, the only one of the three actors employed less than 1 year who did not make it into the core of the network, was a 34-year-old with a graduate education and participated along with two other representatives from her state, one of whom was node A.

Being in the middle group in terms of length of time in the organization, neither a new employee nor having the longest experience, seemed to be the weakest position. Only one of the five individuals who had been with the organization between 1 and 3 years was included in the network core. Mid-level tenured professionals (middle sized) as a group were located 80% outside the core group and only node F was centrally located. Node F was a 47-year-old who had been with the organization between 1 and 3 years and who had a postgraduate education. She was one of two participating subjects from her state.

Having thoroughly analyzed the presence of relationships using the non-valued network to respond to research Question 2, *What are the relationships that exist within the workplace?* I found that relationships do exist in the workplace. The data confirmed that the 14 nodes in the network were related to each other on multiple levels, but at 43.4% density, not all workplace relations were optimized. The 14 nodes shared 158 ties, leaving 206 missing connections in the network where relationships were either not extended or not reciprocated. From the relationships documented in the study, a group of eight nodes was visibly clustered near the center of the SNG. These coordinators reported between 9-17 combined inbound and outbound ties to other coordinators (13.63 ties on average), meaning that they likely had reciprocal relationships with between six and seven of the 13 other coordinators in a 14-person network. This showed that these team members had twice as many relationships in the workplace as compared to the less connected coordinators, who reported between 2 and 9 combined inbound and outbound ties. These coordinators, who appeared as nodes near the edges of the SNG had an average of 5.83 ties to other coordinators and likely had two or three reciprocal team relationships in the workplace on average. I then moved on to answer research Question 3: *What is the nature (perceived strength) of the relationships?.* Strength of relationship was measured by having subjects respond to a survey question regarding the perceived strength of the ties they identified. This valued, directional data was used to create a valued network.

The Valued Network

A valued network analysis did not just document the presence or absence of ties, but showed the individual's perception of the strength of the tie (Knoke & Yang, 2008). Each respondent was asked if they knew the other members of the group and then, if they answered yes, was asked to rate the strength of that tie on a Likert scale from 1 to 5. See Appendix H for the matrix of reported value of ties in the valued network. A description of the substantive meaning of the rating scale appeared in the methods section. I evaluated the difference between

outbound tie strength, or out-degree centrality, and inbound tie strength, or in-degree centrality, as reported in Table 11 below, and then moved on to focus on in-degree centrality as my primary method of statistical analysis for the relationships detailed in the valued network.

Quantifying strength of ties in the valued network. Inbound and outbound degree centrality was calculated for each of the 14 nodes based on their reported valuation of the relations they identified with the other 13 nodes in the network[10]. Subjects responded to questions about the perceived strength, frequency, and mode of contact in accordance with normal practice for SNA survey design, as described in the methods section. Subject perception of strength of relationship was used as the measure of tie strength for the valued network rather than self-report of frequency of contacts. Frequency also indicated strength of tie but was less aligned with TMX. Using subjects' valuation of strength or relation selected measure based on perception, whereas using frequency of contact would have reflected a more external standard of valuation. These results for the count of inbound and outbound ties appeared in table 11 below.

Table 11

Degree Centrality in the Valued Network as measured by strength of inbound and outbound ties

Node	Inbound Tie Strength	Outbound Tie Strength	Difference
A	29	19	**10**
B	7	6	**1**
C	10	7	**3**
D	5	18	**-13**
F	13	21	**-8**
G	13	27	**-14**
H	19	17	**2**
I	13	13	**0**
K	19	8	**11**
L	13	8	**5**
M	8	6	**2**

[10] As in the non-valued network, the matrix of responses for perceived strength of relations has been altered to delete the value of the relation that coordinators ascribed to their relationship with themselves so that their weighted centrality scores only reflect their ties to others. Qualitatively, the differences in the value that various coordinators ascribed to their perceived relation with themselves makes for an interesting area of discussion in a future study, but was not useful for determining the extent of the nature and strength of relationships in the workplace.

N	19	14	**5**
O	6	0	**6**
P	5	15	**-10**
TOTAL	179	179	**0**

Difference between inbound and outbound ties. Table 11 highlighted the two measures of inbound and outbound degree centrality for each subject as well as the difference between them. Like the non-valued network, there were also differences in coordinators' perceptions of the strength of ties between individual nodes in the valued network. I discussed these kinds of differences in the non-valued network as falling into three categories. The first possibility was actors reporting a similar number of outbound and inbound ties and therefore having a realistic view of their place in the network. I assigned this label to those actors reporting a strength of inbound and outbound ties with a difference of three degrees or less by using the same process of looking for breakpoints in the data relative to central tendency as was done in the non-valued network. The second possibility was that some actors reported more outbound than inbound ties, indicating that others did not reciprocate their relations and they may have an inflated perception of their place in the network. In the valued network, this occurred when actors reported a difference of negative three or more degree strength between outbound then inbound ties, as opposed to simply two or less ties reported in the non-valued network. In the non-valued network, the third option referred to actors reporting three or more inbound than outbound ties, which indicated a place of prestige in the network. Again, in the valued network, this grouping indicated having reported stronger inbound than outbound ties, not simply more ties.

Group one categorized five nodes in the network. As seen in Table 11 above, only one individual, node I, had no difference in-degree centrality for the strength of outbound ties they reported than the strength of inbound ties reported by others. While not a perfectly balanced perception of relations, four of 14 individuals (B, C, H, M) reported a strength of outbound ties that was three or less degrees different than the strength of inbound ties reported by others. By this assessment, these four individuals were not perfectly aware of the strength of their connections within the network but had a balanced perception of their relationships based on similar perceptions of inbound and outbound tie strength.

Table 11 showed that nodes D, F, G and P reported connections to other individuals (outbound ties) between 8 and 14 degrees stronger than other individuals reported being connected to them (inbound ties). Node D and G both also appeared in this category in the analysis of the non-valued network, but their placement had switched. In this case, Node D had the second highest degree difference, with a degree centrality strength of 5 for inbound ties but 18 for outbound ties (difference of negative 13), whereas she had the greatest disparity in her perception in the non-valued network. In the non-valued network, node G had the second greatest difference in centrality, and in the valued network she was the most different with a degree centrality strength of 13 for inbound but 27 for outbound ties (difference of negative 14).

The remaining nodes represent the opposite situation, being named as a relation by more individuals than to whom one reported extending. Nodes L, N and O reported connections to

other individuals (outbound ties) that were five to six degrees weaker than other individuals reported being connected to them (inbound ties) and nodes A and K reported connections to other individuals (outbound ties) valued ten and 11 degrees weaker than the strength to which other individuals reported being connected to them (inbound ties). Node N had the highest difference in perceived presence of ties in the non-valued network whereas Node K had the most understated view of his strength of relations in the valued network. Node K was more than 49 years old, had been with the organization more than 3 years and had a postgraduate education. He was one of three participating subjects from his state. These results reinforced the differences discussed in the non-valued network and identified nodes N and K as influential actors.

Taking the time to calculate and discuss the differences between in-degree and out-degree centrality was important because it indicated a disconnection between subjects' perception and reality in reciprocal relationships. For example, if a subject reported a close relation or friendship (outbound tie at a level 5) with another actor but that other actor reported being only vaguely aware that the subject worked for the organization (inbound tie at a level of 1), this indicated the subject either had a skewed perception of his or her dyadic relationships in the network or was exhibiting response bias. This disparity was seen between subjects P and O. Perspective was an important theoretical concept in TMX, which measured an individual's perception of the quality of their exchanges with the team. I suspected that an awareness of any biases or misconceptions in perception of relationships, which could be evidenced in differences between in-degree and out-degree centrality, might be useful in the final comparative analysis to explain high or low TMX that was out of scope with relationships demonstrated by SNA.

In-degree centrality in the valued network. Based on this analysis, the most central, and presumably powerful, prestigious, or influential actors in this network were nodes A (in-degree = 29), H, K and N (all having in-degree = 19). These results were shown previously in Table 11. Node A received an in-degree centrality that was more than double the average in-degree centrality in the network (mean in-degree centrality = 12.8). Nodes F, G, I, and L also received a slightly above average number of ties (in-degree centrality = 13). This listing of key actors based on in-degree centrality almost perfectly mirrored the one found in the graphical analysis in Figure 5 where nodes A, D, F, G, H, I, K, and N appeared near the core of the network.

In this case, in-degree centrality demonstrated that Nodes A, H, K, and N received the highest tie strength in the network and nodes F, G, I, and L also received strong ties. This was important for further analysis because if the network provided the structure by which actors conduct exchange behaviors, theoretically these nodes should have the strongest pathways and therefore be likely to have the strongest level of exchange. In results section 3, I will compare the subjects' perceived quality of exchange (TMX) to this exchange potential.

The in-degree centrality measure included two exceptions as compared to the SNG analysis: Nodes D and L. Node L, who had not stood out in previous analysis, was less than 33 years old, did not have a postgraduate education, and had been with the organization between 1-3 years. She was one of three coordinators represented in her state. Node L was not included in the graphical center group in the visual representation of the network, but came visibly near. Node D, however, had inbound centrality strength of only 5, one of the two weakest in the group. Her prominence in the graphical analysis was directly related to her outbound centrality (18), which was the fourth highest in the group.

The in-degree centrality of each actor in the valued network indicated the perceived strength of the relationships, as asked in research Question 3, from the viewpoint of other actors. In-degree centrality provided a more accurate picture of their actual power or influence in the network, but out-degree centrality may have provided a better measure of their perception of their place in the network. Due to the frequent disparity between the in and out-degree measures, the TMX measure was divided into TMX Given and TMX Received based on a similar differentiation of inbound and outbound exchange properties for the comparative assessment in the section that follows. This ability to look at degree centrality easily in terms of directionality of in-degree and out-degree as well as its utility at evaluating both individual and group levels measures for a whole network made it most similar to TMX and substantively the best measure of centrality for this research design.

Closeness and eigenvector centrality comparison. Although in-degree was reported to be the most widely used measure, and what I deemed most appropriate for my purposes in this study, centrality in a network can be measured in a variety of ways (Wassermann & Faust, 1994). Out-degree centrality was already discussed as critical to evaluating the difference in the perception of inbound and outbound ties. Two other commonly uses methods of assessing actor centrality in a network (closeness and eigenvector) were calculated for my research but will not be analyzed in detail. As discussed in the literature review, all of these measures calculate centrality, and the results from these other methods did not produce outcomes that were notably different or offered relevant alternate analyses to the centrality value as measured by using degree centrality. Outbound 2-step Closeness centrality, which indicates the actors' ability to cross the network based on their relations, showed six of the same eight central nodes as being able to connect fully with all 14 actors in two steps. Nodes P and B could also reach all 14 actors in the network in two steps, and would have replaced nodes H and I in the core group using this calculation. Nodes H and I were able to reach 13 and 12 out of 14 nodes respectively. Therefore, closeness centrality would not have been as effective as degree centrality in this design but could have utility in a future study of a larger network that viewed this population as a subset of AMBER in Mexico or North America. Closeness centrality measures would correspond well to the notion of clusters in a larger network creating a sense of a *small world* wherein teams benefit from both specialized knowledge and resources and the intermingling of new and innovative practices (Uzzi & Spiro, 2005).

Eigenvector centrality is used to answer questions of power in terms of which actors are connected to the most influential actors. Node G had the strongest outbound eigenvector score (1.0) and Node A had the highest inbound eigenvector score (1.0). These eigenvector result were reflected in the high number of outbound ties reported by Node G and high number and strength of inbound ties received by Node A. Nodes A and G provide excellent examples of individual actors leveraging weak ties and taking advantage of structural holes (Burt, 2009; Granovetter, 1977). In this study, however, I was concerned with the scope of the network, in terms of the overall presence of relationships and their perceived value, not access to power. Additionally, the research design did not include subjects who were not state level coordinators, such as federal employees in management roles at a national level who would have been important to any discussion about powerful actors. Degree centrality was therefore not only the simplest and most universally understood measure, but was most substantively valuable, both for the design of this research and the intended practitioner audience.A chart showing the full listing of centrality scores for the valued network can be found in Appendix J.

SNGs of the valued network. Evaluating the network relative to the strength of the ties, rather than merely their presence or absence, changed the placement of the nodes, the shape of overall image, and offered additional opportunities for interpretation in the SNG of the valued network. When the relative strength of ties was taken into account, the picture of the network changed only slightly. Figure 6 below showed that the same eight nodes (A, D, F, G, H, I, K, N) still formed the core of the valued network, but Node G had moved into a centric position and Node L appeared closer aligned to the core than in the non-valued network.

Figure 6 utilized the same pictorial elements to depict the valued network that Figure 4 used to depict the non-valued network wherein age was coded by node shape (circle for 33 and younger, square for 34-48, and triangle for ages 49 and older) and length of time with the organization was coded by size. A node was smallest for Group 2 (6 months to 1 year), medium for group 3 (1 to 3 years), and largest for Group 4 (more than 3 years). Other than a slight reorganization of form, these distributions were the same as in the non-valued network.

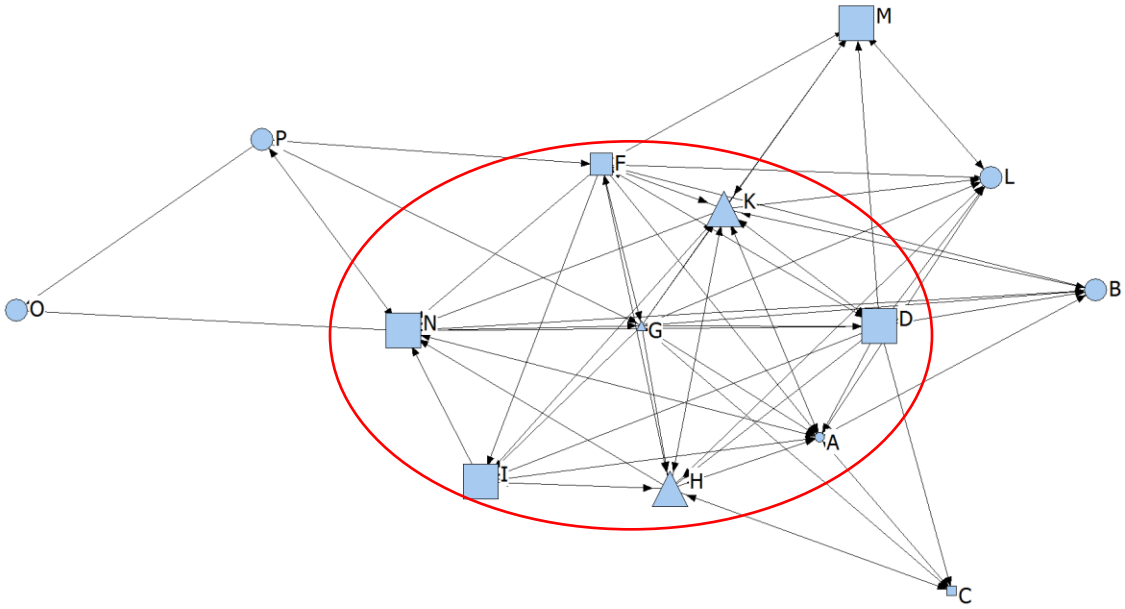


Figure 6. SNG of the valued network

Just as in the non-valued network, I started with changing node size and shape to represent demographic characteristics of individuals, regardless of state grouping and indicated a visual core grouping with the red circle. Figure 6 showed that, with the exception of Node A, the youngest subjects (circles) were all less central nodes in the network and the oldest subjects (triangles) were always included in the central core. Two early career professionals (smaller) were still central to the network (A and G).

Except for Node M, the individuals with the longest tenure (largest nodes) were more centrally placed within the network. Node M, who had been with the organization more than three years, was between 34-48 years old, and did not have a postgraduate education. Node M was working in a state with two other coordinators.

Except for Node F, who was discussed previously, individuals with mid-range length of time with the organization (medium size) were least central. This image changed the interpretation of the non-valued network where, in the weighted network, the nodes rearranged

so that the younger members (circles) moved to be more central to the network, and Nodes H and N (older, mid-level tenured employees) were further removed. Node L appeared to be closer to the center of the valued SNG than in the non-valued image.

Next, I added color to the nodes to represent the states in which the coordinators worked. This allowed for evaluation of stare groupings within this regional SBI team. State identity was color coded on Figure 7 below in the same way as was done with the non-valued network in Figure 5 (red=1, blue=2, purple=3, white=4, green=5, and yellow=6) and demonstrated that in every state but one, all of the coordinators know each other.

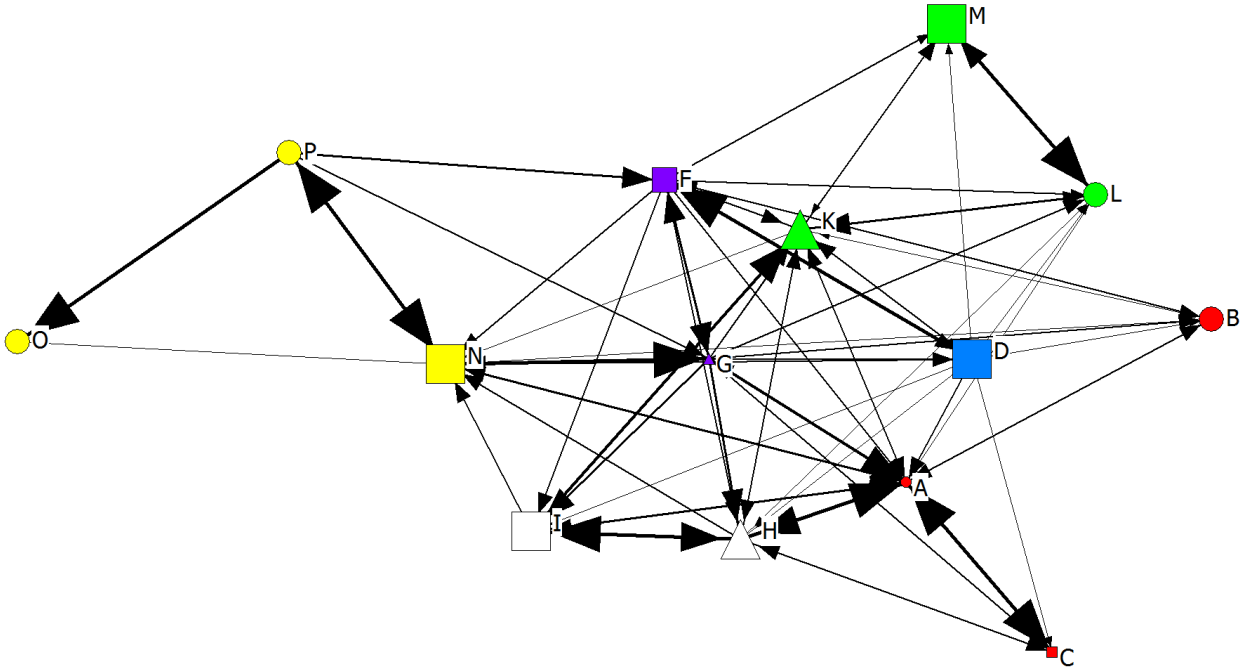


Figure 7. The valued network with coding for age, tenure, and state of residence

Figure 7 demonstrated that the nodes moved in the valued SNG as compared to the non-valued SNG such that Node B was located closer to her in-state peers rather than near to those from across the network. This highlighted the absence of any recognition between Node C and Node B and in State 1 (red). Much as the level of analysis in the non-valued network was visually enhanced by the addition of demographic factors to code the nodes in the SNG in figure 5, the power of the valued network was displayed by attention to the lines in figure 7. When the lines were weighted to emphasize the strength of the ties, analysis was further simplified.

Graphical interpretation of strength of ties in the valued network. Looking at the size of the lines and arrow heads in Figure 7, it was not surprising to see that the strongest relationships, represented by the largest arrows, existed between pairs who were partnered within the same state (i.e. Node A with Node C, Node I with Node H, Node M with Node L, Node P with Node N). Figure 7 showed that Nodes A and C in State 1 and Nodes P and N in State 6 were the only two pairs of actors who mutually share the strongest possible regard for one another. Node P also extends this maximum level of regard for Node O, who does not indicate even being aware that Node P works for the organization (no arrow head). It may be that Node P suffered from response bias and felt compelled to report that strong relationships existed between all coordinators in her state.

Nodes H and I had not been discussed specifically in previous analysis. Node H was paired with Node I as the two representatives responding for State 4. Node H was in age Group 3 (49 or older), did not have a postgraduate education, and had been with the organization for more than three years. Node I was between 34-48 years old, had a postgraduate education, and had also been with the organization for more than three years. The placement of Nodes H and I on the SNG image indicates a strong working relationship wherein they express a similarly high regard for one another. The strength of this mutual tie likely allowed both to be included in the core of the network but other than their tie to one another they primarily leveraged different interstate relationships.

Arrow size as shown in Figure 7 also confirmed that Node G was most centrally placed based on her perceived relations to other members of the network, as previously theorized. Outside of her own state, only one other member (Node N) indicated that they know this person well, as indicated by the large arrow on the line connecting Node N to Node G. This stood in contrast to Node A, who enjoyed strong regard from the highest number of other members, with inbound ties from multiple states demonstrated by line and arrow head size. A state by state comparison was useful at this level of analysis.

State by state analysis of the valued network SNG). In State 1 (red) there was evidence of a strong connection between Node A and Node C, both newer to the organization, as compared to a weaker tie between Node A and Node B. As previously mentioned, there was no connection between Nodes B and C, despite the fact that Node B was the senior member of the team from state 1 in terms of length of time with the organization. I have discussed that Node A was younger in age and recently employed with the organization (less than one year) but received especially high in-bound tie strength responses from multiple individuals. The relationship matrix and corresponding SNG showed that she was one of only three individuals (including Node G and F) who reported contacts in every state.

In State 2 (blue) there was only one representative. This node was well-tenured with the organization (more than 3 years) and had developed relationships with coordinators from four of the other five states but did not report a relation to anyone in State 6. She showed a particularly strong regard for Node F, but was only vaguely aware of most other members of the network, including the two individuals in neighboring State D. As noted in the methods section, there was a second respondent from State 2, Node E, but that subject's responses were unusable because of a coding error in the survey which invalidated all inbound responses. This actor did report a relation to eight out of 13 possible outbound ties, including State 6. Had node E been included in the analysis, it would have made an impact on network.

State 3 (purple) had two of the most central nodes in the network (F and G). They demonstrated a solid working relationship between one another and had differing strong connections with individuals in multiple other states between them. Node G's especially high perception of her outbound ties gave her centrality in the network and was an interesting area of continued analysis given the importance of perception, as opposed to an empirical measure of exchange, in the TMX theory.

State 4 (white) also had two individuals with a relatively strong tie between them and placed within the core of the organizational network. Despite being older and having been with the organization longer, they were not quite as central to the network as their neighbors in State 3, but Node H especially possessed a high number of strong inbound ties. A third coordinator

from this state, Node J, responded only to the TMX portion of the survey and was therefore excluded from analysis. Nothing could therefore be known about Node J's potential impact on the network.

In State 5 (green), Node M was only recognized by two individuals in the network other than their in-state team, despite being one of four members with the longest time in the organization. This may be because Node M aligned so strongly (largest arrow head) with Node L, but barely acknowledged a connection to Node K, (indicated by the smallest possible arrow head) who was in the core of the network. Node K had the most ties of anyone in State 5 and was able to connect the group to all other states except State 6, to which they had no ties.

State 6 (yellow) was made up of Nodes N, O, and P. Node O was the least connected member of the network and had no outbound ties. This indicates that she recognized no names in the network other than herself, including the other 2 coordinators from the state where she worked. This was surprising and may indicate survey fatigue on the part of this subject since the subjects in State 6 were the final names listed in the survey. Nevertheless, without Node N, State 6 was only connected to State 3 through Node P's outbound ties. Node N was the connector that tied State 6 to the rest of the network. No actors from any other state reported inbound ties to Nodes O or P, whereas Node N was recognized by at least one individual (inbound ties) in every other state. She also demonstrates a balance of strong and weak ties, which is argued to be ideal in maintaining network viability as network conditions change (Granovetter, 1977; Uzzi, 1997). In contrast, Node O has an above average outbound tie strength (valued out-degree centrality = 15) but only has 4 outbound ties, including the two other coordinator sin state 6 and ties to 2 nodes in State 3 who did not reciprocate the relation. Node O is deeply embedded in her relationship with node N, but lacks sufficient *arms length* ties to remain connected to the flow of information and resources if the network memberships were to change (Uzzi, 1997).

In conclusion, research question three, *what is the nature (perceived strength) of the relationships?* was answered by evaluating the data for inbound and outbound tie strength found in table 11 and interpreting network represented in the SNG in Figure 7. Data revealed varying degrees of perceived relationship strength ranging from a value of 5 to 29 in total inbound tie strength and rating of 0 to 27 in total outbound tie strength. From the relationship values reported in the study, the SNG showed the same group of eight nodes was visibly clustered near the center of the image. These more connected coordinators reported a combined tie strength of between 23-48 and valued the strength of their relationships at a combined tie strength of 33.38 on average. Given that these same coordinators reported an average of 13.63 relations in the non-valued network assessment, this indicated the perceived strength of relationships held by these more connected coordinators was equivalent to a score of 2.4 out of 5. The less connected nodes, however, reported a combined tie strength between 6 and 21, with a value of 15.17 on average. Given that these same coordinators reported 5.83 ties on average in the assessment of whether a relationship was present (question 2), the perceived strength of relationships held by these less connected coordinators was equivalent to a score of 2.6 out of 5.

This indicated that the coordinators who were visually in the middle of the SNG and reported more ties did not, on average, perceive the *nature of their relationships* to be stronger overall than the coordinators who were visually on the perimeter of the SNG and reported less ties. This was not surprising, given that the most central actors all reported both strong and weak ties and the quantity of weak ties would have driven down their average tie strength. This did not necessarily decrease the power of their relationships, however, as a body of literature discussed

the value of weak ties. (For more information see Granovetter's theory, 1977, 1983). Also, ties reported were usually mutual and strongest between coordinators from the same state. Because every state had at least one representative who was found in the core of the network and every one of those well connected or core coordinators but one (Node D who was alone in the analysis due to the exclusion of Node E) shared a close tie with one of the lesser connected coordinators from their same state, those on the periphery would have a strong relationship to drive up their average tie strength. In answer to research Question 3, this indicated that the nature of relationships in the network was similar for both those who were core and peripheral to the network on average. Survey qualifier statements detailed in table 5 indicated that a value of 2.4 or 2.6 out of 5 for the perceived strength of these relationships meant that most of these ties reflect relations to individuals that the subject had met in person and may have participated with in meetings but may not have worked with directly on a case. This outcome holds value for future research because it indicated that valued relationships were developed in the context of meetings, like training classes, not only in real work situations.

For the next part of this analysis, I looked at the ways the TMX and SNA concepts could work together. Research showed that networks facilitate or constrain the flow of resources within a team, allowing for the transmission of norms and values as well as explaining patterns of behavior (Brass, 1984; Balkundi & Harrison, 2006; Knoke & Yang, 2008) with embedded ties working particularly well to transfer public information (Uzzi & Lancaster, 2003). Some of what actors transmitted in a network could be called exchange content or exchange behaviors (like sharing information, advice, help, and recognition) just as was found in TMX. Dense networks were found to help a team to access resources and attain their goals better and be more committed to staying together (Baldwin et al 1997; Balkundi & Harrison, 2006; Brass & Burkhardt, 1993; Valente et al, 2008). These same outcomes were found for teams with high TMX (Lau & Cobb, 2010; Linden, Wayne & Sparrowe, 2000; Seers, 1989; Seers, Petty & Cashman, 1995). Because a general perception of quality exchange relationships between an individual and a team produced similar outcomes for the workplace as a collection of dyadic relationships that were perceived as strong, I asked research Question 4, *What is the association between people's experience of support within the workplace and the presence and nature of relationships?* In the following section I embark on a comparison of the TMX and SNA results.

Comparison of TMX and SNA Results

To compare the results of TMX and SNA I wanted to take advantage of what I understood to be commonalities in the conceptual basis of the two assessments. Both TMX and SNA measured an individual's perception of relationships, and these relationships were made up of both giving and receiving (exchange) behaviors. In both theories, more exchange indicated a better, stronger relation. Both theories also had a way to account for the directionality of the relationship being evaluated. The literature for both theories indicated that individual level perceptions had consequences for the group as a whole. I expected to find a correlation between actors who perceived that they engaged in more dyadic connections in the network (SNA) and actors who perceived higher generalized exchange quality (TMX).

How TMX Was Used for the Comparative Analysis

As described in the methods section, my research utilized a previously developed, ten item assessment of TMX (Seers, 1989; Seers, Petty & Cashman, 1995). While the assessment was presented as one complete instrument to measure a single concept, individual questions

addressed the directionality of the exchanges between an individual and their team that drove the perception of the relationship. Half of the questions (five) were intended to evaluate what the subject contributed to the team and the other half were intended to evaluate what the subject received from the team. Together the ten questions give a full picture of reciprocal exchange (Seers, Petty & Cashman, 1995).

For comparative analysis with SNA, I connected TMX questions relating to the support, resources or information a subject reported contributing to the team (questions 1, 3, 6, 8 and 9, which I referred to collectively as *TMX given*) with the SNA measure of outbound ties. *Out-degree centrality*, measured the number of other actors with whom a node reported having a relation (Knoke & Yang, 2008). Results for TMX Given are reported in Table 12 below. I aligned the TMX questions relating to the support, resources, or information a subject reported receiving from the team (questions 2,4,5,7, and 10, which I referred to collectively as *TMX received*) with the SNA measure of inbound ties. *In-degree centrality* measured the number of other actors who identified a relation with a specific node in the network (Knoke & Yang, 2008). Results for TMX Received were reported in Table 13.

TMX given. There were some notable difference in TMX results when looking only at the questions that reflect TMX *given* as opposed to the full measure of TMX. I used the same category ranges, based on standard deviation distribution for the analysis of the measures of TMX given and TMX received as had been used in the depiction of the scores for average TMX Z Score. The average TMX Z Scores previously reported in Table 7 had demonstrated that an equal number of subjects (six) fell in each of the *moderately low* TMX and *moderately high* TMX categories. As seen in Table 12 below, however, there are eight subjects in the *moderately low* range for TMX given and only three subjects in the *moderately high* range.

Table 12

Person-by-person Z Score distribution for TMX Given

Subject	ZscoreQ1	ZscoreQ3	ZscoreQ6	ZscoreQ8	ZscoreQ9	Average GIVEN
B	-1.769	-2.733	-0.393	-1.293	1.013	-1.035
H	-0.692	0.067	-1.770	-1.293	-0.078	-0.753
G	-0.692	0.067	-0.393	-1.293	-1.169	-0.696
L	-0.692	-0.867	-0.393	-0.086	-1.169	-0.641
K	-0.692	0.067	-1.770	-0.086	1.013	-0.294
I	0.385	0.067	-0.393	-0.086	-1.169	-0.239
O	-0.692	0.067	0.983	-0.086	-1.169	-0.179
C	1.461	1.000	-0.393	-1.293	-1.169	-0.079
M	0.385	0.067	-0.393	-0.086	-0.078	-0.021
F	-0.692	-0.867	0.983	1.120	1.013	0.312
D	0.385	0.067	0.983	1.120	-0.078	0.495
P	0.385	1.000	0.983	1.120	1.013	0.900
A	1.461	1.000	0.983	1.120	1.013	1.116
N	1.461	1.000	0.983	1.120	1.013	1.116

Table 12 showed that Subject B had the lowest average Z Score for TMX given, just as for Average TMX overall. However Subject A joined Subject N as having the highest Z Scores when TMX given was isolated.

TMX received. While individual subjects' position within a group varied, there was no difference in the distribution of TMX results when considering only the questions that reflect TMX *received* as opposed to the full measure of TMX. Therefore, as represented in Table 13 below, the group still had one low TMX actor (Subject B), one high TMX actor (Subject N) and the rest of the group evenly split with 42.9% moderately low TMX (subjects C, G, H, I, L, O) and 42.9% moderately high TMX (subjects A, D, F, K, M, P).

Table 13

Person-by-person Z Score distribution for TMX Received

Subject	ZscoreQ2	ZscoreQ4	ZscoreQ5	ZscoreQ7	ZscoreQ10	Average RECEIVED
B	-2.566	-2.566	-2.327	-2.621	-2.344	-2.485
I	0.063	-0.814	-1.120	0.354	-0.661	-0.436
G	0.063	-0.814	0.086	-0.638	-0.661	-0.393
C	0.063	0.063	0.086	-0.638	-1.503	-0.386
H	-0.814	-0.814	0.086	0.354	0.180	-0.201
O	0.939	0.063	-1.120	-0.638	0.180	-0.115
L	-0.814	0.063	0.086	0.354	0.180	-0.026
M	0.063	0.063	0.086	0.354	0.180	0.149
K	-0.814	0.939	0.086	0.354	1.022	0.317
A	0.939	0.063	0.086	0.354	0.180	0.324
P	0.063	0.939	0.086	1.346	1.022	0.691
F	0.939	0.939	1.293	-0.638	1.022	0.711
D	0.939	0.939	1.293	0.354	0.180	0.741
N	0.939	0.939	1.293	1.346	1.022	1.108

The data shown in table 13 had the same distribution as the results found in the full ten item assessment of average TMX Z score detailed in table 7. This indicated that what a subject perceives that they receive from the team more closely aligns with their overall perception of the quality of the reciprocal team exchanges, whereas they do not align their perceived contribution as closely with total reciprocal exchange.

How SNA Was Used for the Comparative Analysis

In order to produce a SNG output using UCINET, the matrix of relationships must contain a value for all cells, including for the inbound and outbound tie corresponding to the individual indicating a relation to himself. When discussing in-degree and out-degree centrality, however, it did not make intuitive sense to count the coordinator's acknowledgement that he or she was aware of their own identity as a tie, so these relations were deleted, as shown in the matrix of relations in Appendix G and H, and therefore do not appear in the ties reflected in tables 10 and 11. Nevertheless, the calculations done in the software packages were not altered in this way. Therefore, the measure of in- and out-degree centrality previously listed for SNA

results was not used for correlating degree centrality with TMX given and TMX received in the comparative analysis of SNA with TMX, but rather the UCINET input table where the relation to oneself was valued at 1. See Appendix K for a detailed output of the correlation calculations.

I organized my previous social network analysis by beginning with the non-valued network and then evaluated the valued network relative to the non-valued network results. To compare TMX and SNA, I proceeded in the same manner, first comparing TMX given to actor in-degree centrality and TMX received to actor out-degree centrality in the non-valued network using scatterplots and correlation coefficients and then repeating the same actions for the valued network.

Comparing TMX and SNA in the non-valued network. The scatterplot of the relationship between average Z TMX Score for questions corresponding to TMX given and out-degree centrality in the non-valued network, shown in figure 8 below, took no obvious linear form. The scatterplot of the relationship between average TMX Z Score for questions corresponding to TMX received and in-degree centrality in the non-valued network was virtually flat and a low correlation was expected.

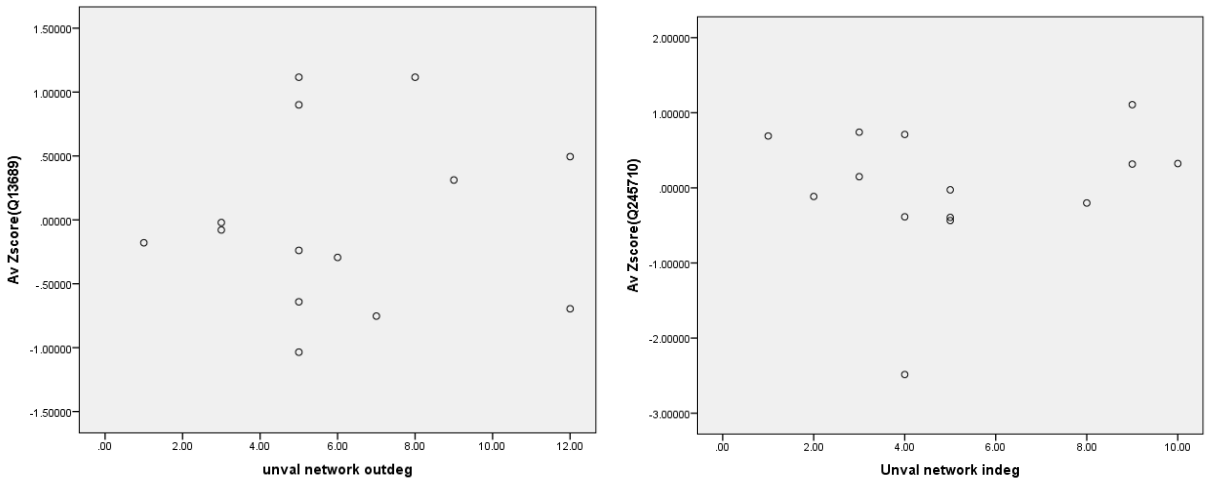


Figure 8. Scatterplots for Actor out-degree centrality relative to TMX given and Actor In-degree centrality relative to TMX Received in the non-valued network.

Correlations in the non-valued network. Table 10 showed the data for the presence and absence of ties (degree centrality) for all subjects for the non-valued network and appeared in the SNA results. Table 14 below depicted the correlation of TMX Given and those measures of out-degree Centrality (r=0.079) was somewhat weaker than the correlation of TMX Received and data for in-degree centrality (r=0.149).

Table 14

Correlations between TMX given or received and in- or out-degree centrality in the non-valued network

	TMX Given and Out-degree Centrality	TMX Received and In-degree Centrality
Correlation Coefficient (r value)	0.079	0.149
Significance (p value)	0.788	0.612

This indicated that while conceptually complimentary, these measures may not be interrelated in the subjects' perceptions. None of the correlations between various measures of TMX and degree centrality in the non-valued network were statistically significant. The same exploration was then conducted in the valued network.

Comparing TMX and SNA in the valued network. As seen in Figure 9 below, the scatterplot of the relationship between average TMX Z Score for questions corresponding to TMX Given and out-degree centrality in the valued network showed some positive linear traits. The scatterplot of the relationship between average TMX Z Score for questions corresponding to TMX received and in-degree centrality in the valued network was virtually flat and a low correlation was expected.

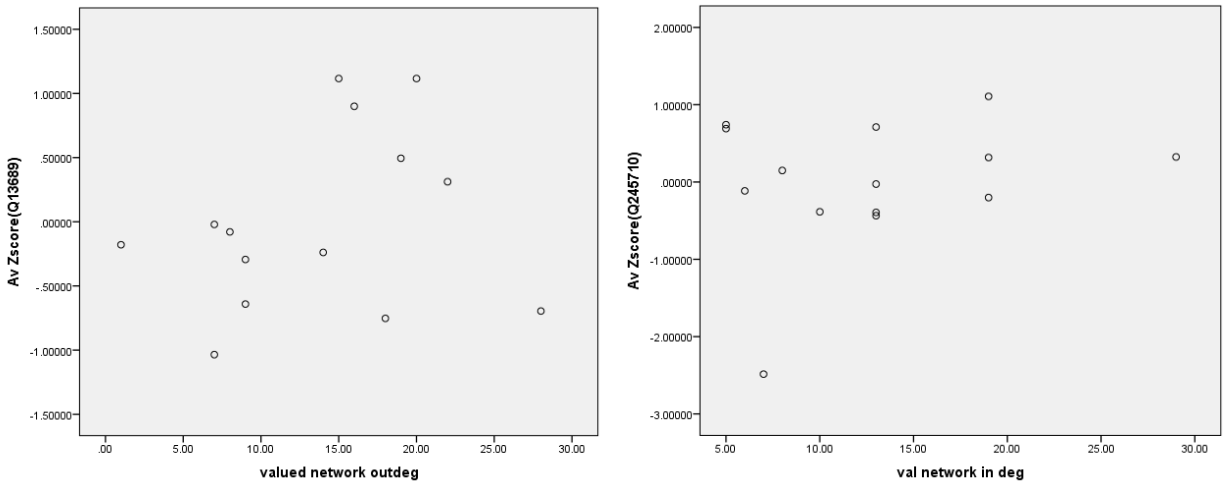


Figure 9. Scatterplots for actor out-degree centrality relative to TMX given and actor in-degree centrality relative to TMX Received in the valued network

Correlations in the valued network. A listing of the presence and absence of ties (degree centrality) for the valued network appeared in the SNA results in Table 11. When these results were compared to the corresponding directions of TMX, the correlation of TMX Given and Out-degree Centrality (r=0.251) was similar to the correlation of TMX received and in-degree

centrality (r=0.223), as shown in Table 15 below. While somewhat stronger than correlations in the non-valued network, none of the correlations between various measures of TMX and Degree Centrality in the valued network were statistically significant.

Table 15

Correlations between TMX given or received and in or out degree centrality in the valued network

Valued Network	TMX Given and Out-degree Centrality	TMX Received and In-degree Centrality
Correlation Coefficient (r value)	0.251	0.223
Significance (p value)	0.386	0.443

Although conceptually TMX given and relations given (outbound ties) were similar exchange behaviors, I felt it was possible that the individual's perception might function differently. The difference in the average TMX Z Score results for TMX Received as opposed to overall average TMX Z Scores indicated that an individual's perception high quality exchange on this team was weighted heavily based on what they perceived they received. I wondered if an individual who believed they knew more people (reported more outbound ties) or perceived they had stronger relationships might have also perceived that they received more support from the team. I therefore reversed the relationships based on the idea that perception mattered more than reality, testing if stronger perception of dyadic relationships (out-degree in the valued network) might correlate with a stronger perception of support coming in from the overall team (TMX received). This correlation produced a larger coefficient and evidenced a weak relationship (r=0.319). This supported my thought process regarding subject perception being stronger than behavior, but was not statistically significant (p=0.266).

I wondered if, given the concept of TMX as a generalized perception of the quality of the relationships, the full TMX Z Score might be a more valuable tool than the five question subsets to produce correlations. I compared average TMX Z Score with in-degree and out-degree centrality in the non-valued and valued networks and they were not statistically significant. TMX Z Scores correlated with outbound centrality (r=.154) and inbound centrality (r=.152) at p=0.6 in the non-valued network. TMX Z Scores were correlated with in-degree centrality (r=0.246, p=0.396) and correlated with out-degree centrality on the valued network (r=.309, p=0.283).

Ultimately, the results did not show a strong trend of network degree centrality increasing as TMX increased, and strong or significant correlations were not found between TMX and SNA for the group. There were no significant correlations at p=0.05 between TMX (given, received, or overall) and network centrality (in-degree or out-degree, or valued or non-valued network). This was not unlike the finding that there were differences in TMX Z Score based on demographic considerations. A network of 14 made statistically significant results difficult to produce and the lack of significance was not surprising given this number. However, statistical significance was not a paramount consideration since this team was not selected as a sample with

the intention to generalize to the larger population, but rather to allow for a descriptive analysis of a specific segment of the AMBER organization.

Finding Positive Deviants across All Measures

Since there was no consistent measure that served to correlate TMX and SNA across all subjects, I looked at those few subjects who did have strong results across all of the measures: positive TMX Z Score, above average in-degree and out-degree centrality scores, and visual placement in the core of the SNG. An overview of those subjects appears in Table 16 below.

Table 16

Outcomes for subjects with highest scores on TMX and SNA measures

Node	Subjects with positive average TMX Z Scores (above zero)	Subjects with a higher than average In-Degree centrality	Subjects with a higher than average Out-Degree centrality	Subjects visually in the SNGs Core
A	**X**	**X**	**X**	**X**
D	X		X	X
F	**X**	**X**	**X**	**X**
G		X	X	X
H		X	X	X
I		X	X	X
K	X	X		X
L		X		
M	X			
N	**X**	**X**	**X**	**X**
P	X		X	

To compare TMX and SNA conclusions, I looked for shared characteristics between those expressing the desired combination of exchange behaviors. For an actor to have both high TMX and high network centrality (as measured by in-degree and out-degree results) showed that they perceive high quality exchanges between themselves and the team and they have stronger individual inbound and outbound ties with team members. These strong, positive team players should also be visible as central in their network placement in the SNGs.

Table 16 showed that when you take the subjects with TMX Z Scores above zero (A,D,F,K,M,N,P), those with a higher than average in-degree centrality in the valued network (A, F, G, H, I, K, L, N) and a those with higher than average out-degree centrality (A, D, F, G, H, I, N, P) and compare them with subjects in the network core (A,D, F, G, H, I, K, N) three "superstars" emerge. Subjects A, F, and N returned above average results across all four measures[11]. One could presume that these three coordinators would share certain demographic traits that could serve to identify strong team players or certain behaviors that could be replicated and reinforced through training.

Unfortunately, if there was a shared success factor between them, it was not one of the demographic elements evaluated in this study. Appropriately, given that networks are argued to be better predictors of shared norms and behaviors than demographic factors (Baldwin, 1997; Biancani & McFarland, 2013, Klein, 2004; Knoke & Yang, 2008), they seem to have very few demographic traits in common. Subjects F and N were in age group 2 (between 34-48 years old) but subject A was less than 33 years old. Subjects A and N were from states with three participating representatives, but F came from a state with two. Subject A had been in her position less than 1 year, subject F between 1-3 years, and subject N more than 3 years. Subjects A and F have moderately high TMX Z Scores (between 0-1) and subject N had a high TMX Z score (greater than 1.0). Subjects A and N had more Inbound than outbound ties, but subject F had more outbound than inbound ties.

Subjects G, H, and I scored highly on all SNA measures, but did not report positive TMX Z Scores. Subject G was the most noticeably absent from this *star* group. With her status as an outlier in perceived outbound ties in the non-valued network and outbound tie strength in the valued network, she reported especially strong one to one coordinator relationships. This high out-degree centrality earned her a place in the absolute center of the valued network as seen in the SNGs. Her average TMX Z score, however, falls in the moderately low range for both TMX given and TMX received. Again, her lack of awareness of how others perceive their relationship with her, as evidenced in the discrepancy between in-degree and out-degree centrality, may be reflected in her lower than average TMX. This would make sense, given that TMX seemed to be driven by the aspect of support received.

Visual Analysis of TMX and SNA Together

In previous SNG analysis of the valued and non-valued networks, as shown in figures 4,5,6 and 7, the nodes rearranged and the shape of the picture shifted but the same eight nodes (A, D, F, G, H, I, K, N) formed the core of the network in both measures. As seen in Table 15 above, the valued network produced somewhat stronger correlation ($r>0.2$ on average) than the non-valued network, so I conducted my visual analysis of the combined theories using only the valued network SNG. I coded the valued network nodes based on the average TMX Z Score for each participant.

The following image, Figure 10, displayed nodes' whose demographics were coded using the same pictorial elements as the other SNGs. Age was indicated by node shape (circle = age group 33 and younger, square = age group 34-48, and triangle = age group 49 and older) and length of time with the organization was shown by size, with smallest nodes having the least

[11] Subjects D and K also demonstrated both higher than average TMX and higher than average outcomes on two of the three centrality measures. They could be considered among the exemplars if the parameters were changed only slightly.

time with the organization (6 months to 1 year), and largest having the most time with the organization (more than 3 years). Unlike the previous figures, rather than color coding the nodes based on state identity, in Figure 10 the color represents TMX level. The color spectrum was previously identified in the TMX results section to indicate low, moderately low, moderately high, and high TMX groups as red, orange, yellow and green, respectively.

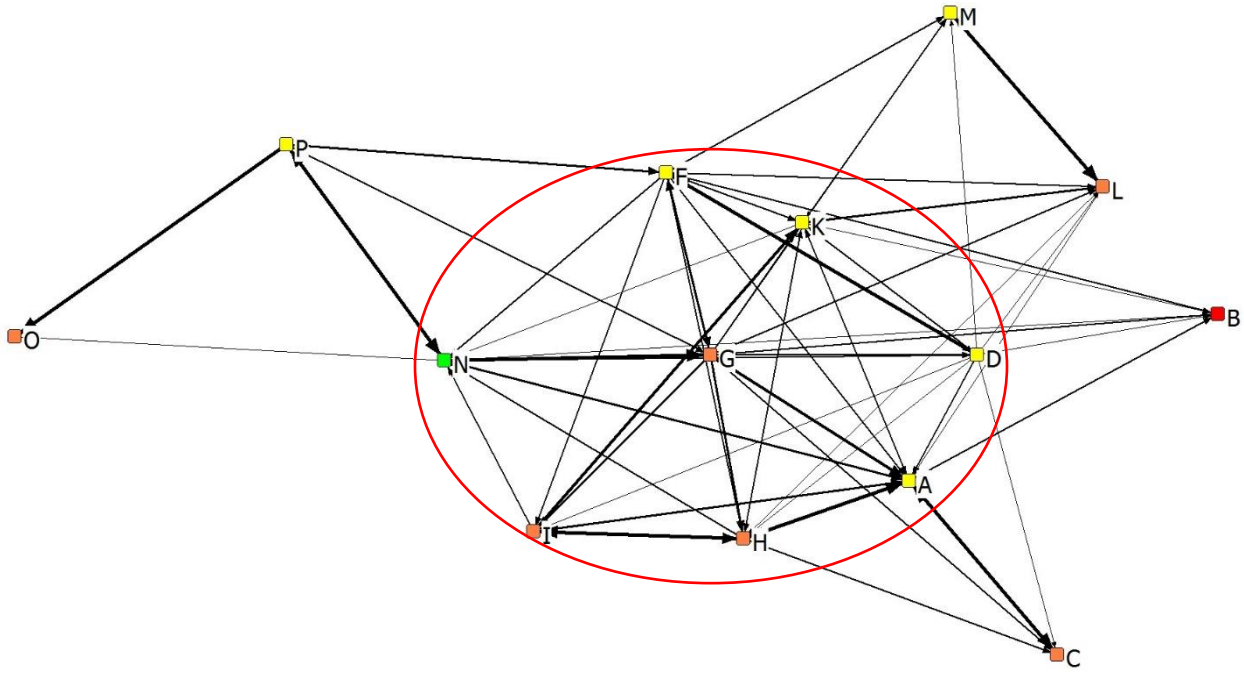


Figure 10. Valued network color coded by TMX Z Score

In the TMX results analysis, the color groups with TMX Z Scores less than 0 were referred to as low TMX (red) or moderately low TMX (orange).The color groups with TMX Z Scores greater than 0 were referred to as moderately high TMX (yellow) and high TMX (green). As expected, the only *high TMX* subject (node N) appeared in figure 10 as a node central to the network, and the only *low TMX* subject (Node B) appeared as a node on the outer perimeter of the network.

Visually, subjects that reported moderately high levels of TMX relative to the group (K, M, F, D, A, P) tended to be located closer to the core of the network. Of these six moderately high TMX subjects, four were found in the core group of eight nodes (A, D, G, F, H, I, K, N) that seen in the center of the network (66.7%). Conversely, when the subjects reporting moderately low TMX Z Scores (subjects G, H, I, L, C, O) were overlaid on the valued network SNG, their nodes were just as likely to be centrally located as not. Of the six subjects with moderately low TMX, three (G, H, I) were in the core group of eight nodes, and three (C, L, O) were not. Including the positive and negative outliers (N and B) with the moderately high and low subjects, five out of eight core nodes had positive TMX Z Scores (62.5%) and three out of eight core nodes (37.5%) had negative TMX Z scores. Similarly, four out of six nodes external to the core had negative TMX Z Scores (66.7%) and only 2 out of six nodes external to the core (33.3%) reported positive TMX Z scores. This visual analysis showed that those with more and stronger dyadic connections also tended to have higher perception of the quality of exchange

relationships and provided a more useful observation for a small group (N=14) than the statistical analysis.

The TMX results showed that subjects belonging to the group with the longest tenure with the organization reported the highest average levels of TMX (Z Score = +.165) and the SNA results showed that all but one of these subjects who had been with the organization longer than 3 years were placed within the core of the network. When taken together, the visual overlay of TMX on the SNG does not show a perfect alignment between individual subjects in the core and high TMX for our oldest group. Node M (outside the core) had moderately high TMX and Nodes H and I (inside the core) had moderately low TMX. However, the overall conclusion from the results for this team aligned with the literature that argued TMX and SNA impact retention (Abu, Bakar, & Sheer, 2013; Banks et al., 2013; Balkundi & Harrison, 2006; Baldwin et al., 1997; Lau & Cobb, 2010; Kozlowski & Bell, 2003; Linden Wayne & Sparrowe, 2000).

In answer to research Question 4, *What is the association between people's experience of support within the workplace and the presence and nature of relationships*, while no correlation results were statistically significant, there was a weak association between the perceived support on the team (TMX) and the perceived strength of dyadic relationships (SNA) based on measures of outbound degree centrality (r=.309, p=0.283). There were some individuals with higher outcomes relative to the rest of the team across multiple measures of TMX and SNA, but I did not find consistent attributes shared between those participants. This indicated that at this small network size, demographic and centrality measures were not able to provide evidence of a significant and generalizable association between people's experience of support within the workplace and the presence and nature of relationships. However, there was a visual difference in the high TMX and low TMX Z Scores in the SNG analysis, with five out of the seven nodes with positive TMX Z Scores (71.4%) being located in the core group of the network. This indicated that for this group, high TMX, or the positive perception of support from exchange relationships on the team, was associated with having more and stronger dyadic relationships with individual team members as evidenced by SNG placement in the core of the network.

DISCUSSION AND CONCLUSIONS

My research was intended to set the stage for a university continuing and professional education unit to partner with an external entity to manage HRD practices in accordance with the principles of adult education research and emerging best practices. I proposed that both adult learning and good business practices are fundamentally relational and that for organizations to receive the greatest return on investment on HRD, they should capitalize on the network of relationships in an organization and build exchange behaviors in their employee network. Two theoretical constructs guided this research, Team Member Exchange theory (TMX) and Social Network Analysis Theory (SNA). Government and non-profit organizations employ large numbers of workers as well as to corporate business industries (BLS, 2018). The data for this research was derived from a case study of a population within the larger AMBER organization, specifically the SBI states in Mexico. Using this context, my study set out to answer the following four (4) research questions:

1. *How do people experience support within the workplace?* Measuring TMX scores for a population using an established assessment demonstrated how people experience support in this workplace.
2. *What are the relationships that exist within the workplace*? The binary SNA data in the non-valued network, the SNG image of the network, and the density of the network, or ratio of existing ties, revealed the presence of relationships within the workplace.
3. *What is the nature (perceived strength) of the relationships?* The degree centrality of each individual actor was calculated using the valued network data and a SNG image depicting the strength of ties in the network was produced to describe the nature (perceived strength) of the relationships.
4. *What is the association between people's experience of support within the workplace and the presence and nature of relationships?* I compared various groupings of the TMX results and degree centrality measures for each individual to assess the association between the presence and nature of relationships and people's experience of support within the workplace.

Conclusions About TMX

The AMBER team, like most organizations, wants to be more effective. Logically, an effective team is made up of productive employees. Research showed that TMX was related to performance. Employees reporting high TMX acted as team players who contributed to the team in a meaningful way and receive the collaboration and support they need in return (Seers, 1989, Seers Petty & Cashman, 1995). In this investigation, I found the AMBER organization employees reported high TMX scores overall, with an average of 3.9 out of 5 across all responses and less than 6% of responses corresponding to scores of 2 or less (negative response). While so few instances of low (less than neutral) TMX response in an organization gives reason to celebrate, it was more valuable to evaluate these employees as low or high relative to one another within the group. This was possible through the use of Z Scores.

TMX Analysis by Subject

One subject was more than one degree of standard deviation removed from the mean (zero) on the low end of the distribution (Z Score less than -1) and one subject was more than one degree of standard deviation removed from the mean (Z Score more than +1) on the high end

of the distribution. In accordance with a standard deviation, we would expect a large data set to produce Z Score results where 99% of subjects receive Z Score s between -3 and +3, three standard deviations from the mean. In this analysis, 85.7% of subjects were within one standard deviation. This indicates that there was low variation and a strong commonality in the exchange experience among the team. Looking for differences within the group with Z Scoring revealed one positive and one negative outlier who had a much stronger perception of the quality of exchange (much higher and much lower, respectively) and everyone else equally split between two groups, categorized as either moderately low TMX or moderately high TMX. For the sake of comparative TMX and SNG analysis, I combined those with positive Z Scores and those with negative Z Scores, including the outliers, discussing them simply as either those with above average, or positive, TMX and those with below average, or negative, TMX.

TMX Analysis by Question

While the focus of my study in answer to research Question 1 was intended to evaluate how this team experienced support in the workplace overall, I did provide data outlining each of the ten items used to assess TMX, ultimately dividing them into five questions relating to TMX given and five questions relating to TMX received in the combined TMX and SNA results. Because Z Scores cannot be used to produce a per-question mean, the questions could not easily be ranked for high to low average TMX relative to each other. However, questions were previously evaluated relative to one another based on median TMX Z Score. A per subject mean TMX Z Score was calculated, and the data showed that subjects fell in the low TMX, moderately low TMX, moderately high TMX, and high TMX categories based on their mean TMX Z Score.

The questions with the combination of the most moderately high and high TMX subjects' responses were 2, 3, and 4. Not surprisingly, given the previous review of positive and negative median scores in the results section, Questions 2 and 4 evaluated TMX received by asking how well other members of the team communicate needs and recognition. It was previously determined that these subjects reported higher TMX for aspects of support received than for aspects of support given. Question 3, *How often do you let other team members know when they have done something that makes your job easier or harder?* was the only question evaluating TMX Given that had a positive median score. However, the questions with the highest number of respondents in the high TMX category (green) were Question 6 and Question 9, where six of 14 respondents (42.9%) fell in the high TMX category. This was an interesting observation because Questions 6 and 9 both address TMX Given and were previously noted as questions having negative median TMX scores in the results section.

This was supported by the histogram in Figure 3 which indicated that Question 9 had a bimodal distribution. This interpretation indicated a strong split between opinions, which carried forward in that Question 9, *How willing are you to help finish work that had been assigned to others?,* with the highest number of most high TMX responses, was also the question with the highest number of respondents in the low TMX category (red). Of 14 respondents, five (35.7%) fell in the low TMX category on this question. SNA Core group placement did align somewhat with the way a subject answered Question 9 in that of six respondents in this category, four were part of the eight central nodes reported high TMX Z Scores on Question 9. Of the remaining four nodes in the core group, there were two core nodes (G and I) who reported low TMX Z Scores on Question 9 and two that fell in the moderate ranges.

The question with the most combined low and moderately low TMX responses was Question 8, *In busy situations, how often do you volunteer your efforts to help others on your team*?, which was also previously identified as a question with a negative median score. I found this interesting given that in the responses to Questions 6 and 9 team members reported such a high perceived willingness to assist their peers, but Question 8 revealed the low evidence of proactively volunteering that help. This may reveal a response bias in that subjects believe that they should say they would help in question 6, (*How flexible are you about switching job responsibilities to make things easier for other team members*) but then confess that behaviorally this did not actually happen in response to question 8.

Ultimately, what I saw in the TMX results for this team indicated a high degree of social desirability response bias, in my opinion. With the exception of one subject, participants gave almost exclusively positive or neutral scores (3, 4, or 5 on the Likert scale) to all the TMX survey questions. Even utilizing Z scores, there was only a 0.108 difference in mean Z score between the subgroup with *moderately high TMX* and the sub group with *moderately low TMX*. Clear differences in the experience of support in the workplace only began to emerge when TMX questions were divided between aspects of the perceived quality of exchange behaviors given and received. Subjects reported more generous perceptions of others' behavior, but confessed themselves less likely to engage in those behaviors. This may reflect a desire to maintain a positive perception of the organization that only breaks down slightly in response to direct questions regarding their own behavior.

Conclusions About SNA

My data showed that a network of relationships was present in the AMBER team, with every node having at least one tie. The Mexican SBI coordinators were a team, in that regard, and a sub-team within the larger organizational network. For this team, whether analyzing the valued or non-valued networks, there were certain individuals who had a balance between inbound and outbound ties (realistic perception of reciprocal relationship), individuals with more outbound than inbound ties (overstated perception of non-reciprocated relationships) and individuals with more inbound than outbound ties (not reciprocated or undervalued perception of relationships reported by others). For the most part, the nodes were distributed between these three categories in the same way in both the valued and non-valued networks. This showed that the same people who were not aligned in their perception of having a relationship were likely to have a discrepancy in their perception of the strength of that relationship.

SNA by State

The data showed that generally there was more than one subject represented from each state (with Node D being an exception due to the exclusion of Node E's responses) and the older team members maintained more or stronger relationships for their state (with Node A being an exception in red State 1). Possibly, these more established individuals could assist younger or newer team members in building relationships. This may be what was happening in State 3 (purple) and 4 (white) where two subjects participated and both the younger and older member related strongly to one another and each held a place in the core of the network.

Documenting ties between Nodes A, B, and C in State 1 and Nodes N, O and P in state 6 revealed structural holes in the network. State level analysis highlighted the absence of relations in the network in a different way. Not only were individual nodes not connected to other individual nodes, but when considering their identity as representatives of a state, relationships

between within and states could be evaluated. In both cases we see examples of coordinators working in the same state who do not have a relationship. In state 6, the lack of ties between Nodes O and P to nodes in other states in the network created structural holes that Node N may have been able to capitalize on in growing her own status in the organization (Burt, 2009, 2017). However, the power this may have given N as an individual (as evidenced by her high centrality) was not as important or beneficial for the purposes of this study as the damaging effect of the isolation of State 6 in overall connections in the network. The implication of losing node N from the organization would leave State 6 without critical access to information and resources. Without Node O as the connector, Node O would become completely isolated from the rest of the network, tied only to Node P and Node P would have to go through her connections in State 3 (Nodes F and G) to reach any other state in the network.

SNA Using Centrality

I selected degree centrality, and in-degree centrality specifically, as the primary method of evaluating strength of relationships in the network for reasons previously discussed such as its ease, ubiquitous use, objectivity, etc. (Wasserman & Faust, 1994) as well as its appropriateness for my network size and the parallel analysis with TMX. In a future analysis, however, other centralities might prove more beneficial. The overall AMBER organization is large and the importance of the power of the person to whom the coordinator is connected and who else they can access from their connections or using or their ability to make connections across disparate groups might provide the organization with a better sense of who has power in these relationships. These aspects would be measured by the eigenvector, closeness, and betweenness centralities. Those individuals with high betweeness centrality in the larger organization would be key in the transmission of training and technical assistance resources or in norms and standards regarding attitudes about initiatives. Betweenness centrality would be an important consideration if investigating the ways that structural holes were mitigated in the larger organization

Overall, what I saw in the SNA results confirmed my suspicions that relations would be the strongest between coordinators who worked in the same states and that within a group from one state an individual who had been involved longer or who was perhaps more outgoing could forge connections that tied his or her peers to the rest of the network. The difference between reported in-bound and out-bound ties or tie strength was an unanticipated discovery and, I believe, indicates that the AMBER organization has not formally or officially demonstrated that coordinator relationships have value in the workplace. It appeared that actors were reporting ties based on their true individual perceptions of the relationships and not attempting to convey the organization as well connected. I suspect that if AMBER had made inroads to create these connections and they were seen as politically valuable, response rates would have been biased to report higher number of outbound ties and tie strength values.

Conclusions About the Relationship Between TMX and SNA

Given the small network size (N=14), I had the opportunity to discuss each subject at some point in the analysis by making note of their demographic characteristics substantively and individually. This was done where their responses varied from the pattern being discussed in the assessment of either TMX, SNA, or the combination of the two theories. See Appendix L for a table with an overview of how each of the subjects scored on each element analyzed.

I found unexpected associations between aspects of TMX and SNA. As detailed in the results section, the subject's perception of TMX given, or the actor engaging in exchange behaviors toward the team, should have been conceptually analogous to the subject's perception of outbound ties, or relations extended to individuals on the team. However, I found a stronger association between the subject's perceptions of quality exchange behaviors coming to them from the team (TMX received) and their reported outbound ties. This indicated that team members were more likely to engage in more or stronger relations when they perceived that it benefited them, although I could not say whether the ties reinforce the perception of reciprocal exchange or the high exchange quality motivates the formation of ties.

In conclusion, small group size and variations in the kinds of relationships (number per state, demographics) made group level generalities and statistically significant results difficult to produce in this study. The real value in the assessment of TMX and SNA for this AMBER team was in the deep and clear understanding of how all the subjects engaged with each other as presented in the graphical representations of the network. SNGs, depicted in Figures 4-7, showed that the team had a core group of eight members with more and stronger dyadic relationships than the other six actors in the network. Networks have been shown to be stronger predictors of group behavior than shared demographic characteristics (Baldwin, 1997; Biancani & McFarland, 2013, Klein, 2004; Knoke & Yang, 2008). As expected, this core group of members reported overall higher perceived quality of relationships exchanged with the team in general, as measured by average TMX Z Score. This intersection of team perception and network placement was shown in Figure 10.

LIMITATIONS

The primary limitation to these results was that after three levels of analysis, with a full picture of how people experience support within the workplace from the TMX results for Question 1, a picture of what relationships exist within the workplace from the non-valued SNA results for Question 2, and the perceived strength of the relationships from the valued SNA results for Question 3, there was no statistical correlation between the presence and nature of relationships (SNA) and peoples' experience of support within the workplace (TMX) for Question 4. While the 14-person descriptive analysis can tell much about the state of relationships in the Mexican SBI, when it comes to larger questions of the relationship between the perceived strength and frequency of dyadic relationships and general perception of the quality of exchange with a team, my research cannot provide generalizable answers. Other applied researchers should investigate the networks of exchange relationships within much larger work groups for generalizable insights as to how training employees to develop stronger exchange relationships might help employees learn how to become more productive teams, as Seers, Petty & Cashman recommended (1995).

Limitations related specifically to the analysis of TMX results were that TMX was not able to be evaluated relative to an external norm or standard and scores were comparable only to others within the group. Then, within the group, the analysis was restricted to comparing the measures on a per subject basis, rather than including an evaluation of the whole team/network. By using Z Scores, average TMX, average TMX Given, or average TMX Received scores for the whole group would always be zero. I mediated this limitation using median scores for part of the analysis, but a more thorough group level valuation could be beneficial. Future research could example the full AMBER organization and provide an average for this larger group to which smaller populations or individuals could be compared or could analyze means for teams at the meso-organizational level if the macro-level population was identified at the national or international level.

The primary limitation in interpreting the SNA results was the oversimplification of using the difference between in-degree and out-degree centrality as a proxy for reciprocity in relationships. Given a more robust research design and time for analysis, it would be interesting to evaluate the actual degree to which the reported inbound and outbound relations connect the same subjects to one another, not just whether a subject had a balanced number and degree of in and outbound ties. Future research should look at the reciprocity of specific peer to peer relationships. This would be a stronger confirmation of the value of one to one relationships.

The scope of the study was limited to a finite number of subjects and interpretation of those subjects' responses. There are a multitude of other ways that this data could be interpreted and evaluated, given more time. As mentioned, there is room for more and deeper investigation of the subject demographics either using qualitative measures or by analyzing the bivariate relationships between independent variables. Also, if networks are presumed to be imbedded in a larger social structure (Streeter & Gillepsie, 1992) and networks are predictive (Baldwin, 1997; Biancani & McFarland, 2013, Klein, 2004; Knoke & Yang, 2008), then diagraming the network of relationships at the larger level of the social structure where this population is embedded would provide more impactful insights. Future research should provide additional detail by looking deeper into the details of this population and by looking at these subjects as an embedded team group in a larger population.

Finally, this study attempted to document the relationships in an organization, but the available data provided only a picture of the organization at the time the survey was conducted. As discussed in the SNA literature review, group affiliation is not a static construct. Collecting additional data and conducting a time series analysis would provide a more robust picture of the nature of relationships in the organization because it would account for the fact that relationships change. Future research should return to this population and document the ways that the network changes over time.

IMPLICATIONS FOR POLICY AND PRACTICE

Acknowledging that future analysis would need to be conducted with a much broader group of coordinators for this kind of statistical exercise to provide real value to the national or international organization, there is still much to be surmised and recommended to the AMBER organization and for educational professionals based on this study. As a higher education professional working with an outside organization, I view the responses from this assessment as providing a clear path forward for continued partnership. With regard to utilizing TMX as a theoretical construct to evaluate the AMBER, *I recommend that they start by looking at differences by question to improve on specific measures of group cohesion or affinity that could be increased across the board*. Specifically, AMBER should delve deeply into the four questions that generated negative median TMX Z scores. The fact that team members scored lower on aspects of TMX *Given* is a beneficial starting place for the proposal that training provides a valuable lever for improving the organization because the necessary action can focus on the individual's behavior and not their perception of the attitudes held by others. HRD curriculum and activities for this organization should be tailored to focus on building a culture that facilitates processes for volunteering to take on responsibilities for others who are struggling, as represented by TMX Questions 6, 8, and 9, which received low median scores and revealed division in the team. Question 9, *How willing are you to help finish work that had been assigned to others?,* especially warrants discussion based on the ways it showed conflicting outcomes in the results of this study. Further investigation should look for differences based on this divisive attribute of TMX, as it seems to be a key differentiator in exchange behavior for this group.

Regarding SNA, *I recommend that the AMBER organization works to first grow the number of ties and then to strengthen the network and therefore the perception of relationships on the team*. There is opportunity to improve ties between the Mexican coordinators discussed in this study, who are not yet at 50% network density. However, there is an even greater need to increase ties in the international team. Due to challenges with the survey process, sufficient results were not available for SBI coordinators in the US to analyze their data in this study, but information about US/Mexico relations was present in the Mexican data. The study was designed to measure cross border international relationships in the SBI initiative, and as such the Mexican coordinators did answer questions regarding their ties with the US coordinators as part of this SBI network research. In this data, which is not analyzed in the current study, the 14 Mexican coordinators reported a total of seven outbound ties to the ten US coordinators, none of which had a tie strength greater than 2. *AMBER should take immediate action to address the critical lack of relations between the US and Mexico, which persisted within and despite the supposed importance of an established initiative of the organization.* There is also a need to better understand the coordinator relations in the US, which may have contributed to the difficulty in studying this population.

Given that AMBER is a case study, the rationale for my research was not intended just to benefit this organization. Demonstrating how a university continuing and professional education unit partnered with an external organization to enhance HRD practices by leveraging the relational aspects of adult education research and emerging best practices has implications for other kinds of workplace environments and for academic-business education partnerships broadly. Continued research on the predictive power of networks and the opportunity for impacting employee productivity and retention because higher TMX is found in more central actors and denser networks has value across industries. Continued research on the strength and

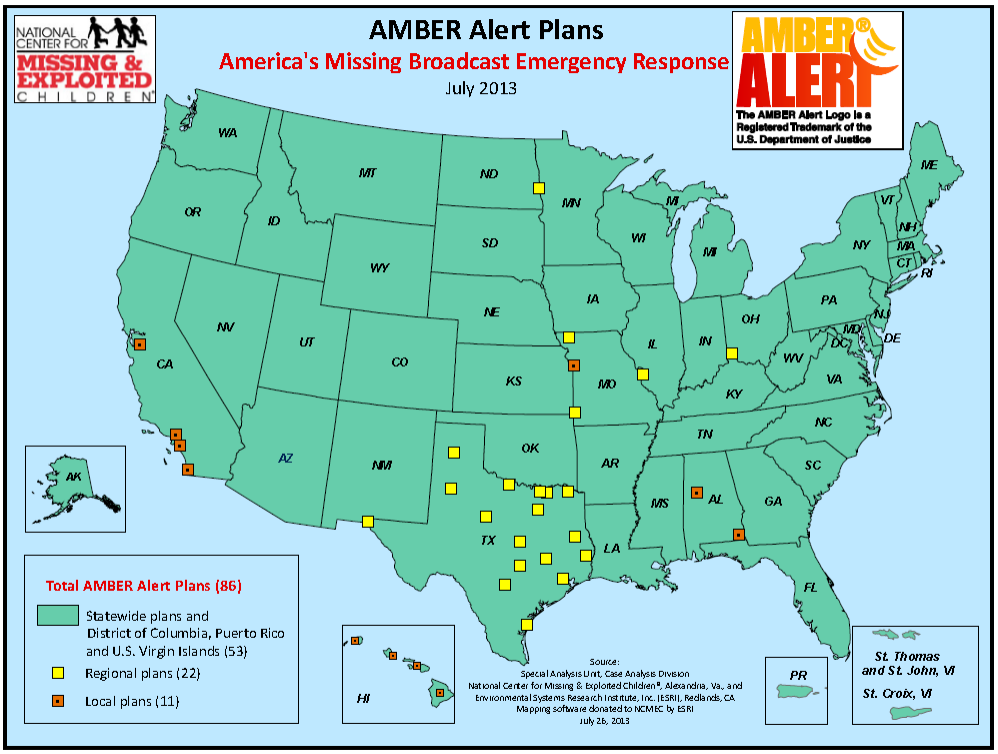
quantity of ties that mitigate the structural holes in networks to ensure consistent and equal distribution of public information has value in an educational context where the goal is not for one actor to leverage access to private information for an economic or political advantage, but to disseminate training resources universally (Uzzi, 1997; Uzzi & Spiro, 2005).

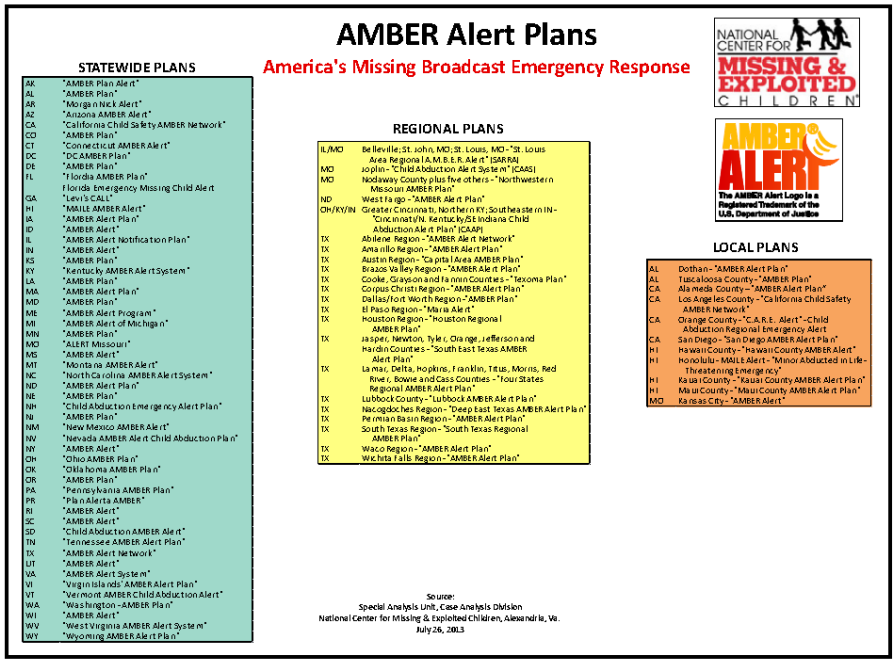
Considering the body of literature on dark networks, there is also a cautionary tale for organizations with regard to valuing the power of networks and keeping them in the light. Not only can networks be used for unhealthy or even illegal means, they can simply be secret and undercover (Brinton Milward, & Raab, 2006). Given the tendency for actors working in criminal or secret means to self-organize as networks, it seems logical that negative actors could create conflicting networks in the organization or manipulate the network to limit the flow of resources and exercise power to drive internal competition rather than cooperation. Public acknowledgement of the existence of networks among employees would help drive positive utilization of forces that are otherwise already present and with the capability of being driven underground or abused.

To that end, I am most interested in the idea of positive deviants as a driver of best practice (Bryk et al, 2015; Morgan., Gregory, & Roach, 1997). This brief analysis, coupled with awareness of literature in the field of strengths-based research (Harter, Schmidt, & Keyes, 2003), indicates that the AMBER organization is unlikely to find a recipe for the ideal coordinator, but *I recommend they use measures of TMX and SNA to identify where coordinators with strong interpersonal relationships and strong positive perception of the quality of exchange relationship on the team are and use them.* As best practice in adult education moves toward models of peer interaction and networked learning communities (Bryk et al, 2015), the AMBER organization could be in alignment with the best that adult education has to offer by understanding their organizational network and using this insight to develop a networked learning community with the help of key individuals in the organization.

My research described the exchange relationships working in this organization. It is not generalizable to other populations because of the size of the team network evaluated, but as a case study does provide a model for exploring these ideas in a larger population. The literature shows that networks in general are predictive of behaviors and outcomes in a way that is more powerful than evaluating shared demographic characteristics (Baldwin, 1997; Biancani & McFarland, 2013, Klein, 2004; Knoke & Yang, 2008.) My research demonstrated a network functioning in this organization. Further analysis can add value to the higher education field because it exemplifies a way that universities can use theoretical applications to partner directly with industries in tangible ways that extend well beyond the classroom. Developing continuing education and training using relational principles for adult learning provides a niche for university collaboration. My research provides the basis for an ongoing improvement to the AMBER Alert Training and Technical Assistance Program, demonstrating how the university could provide relevant, meaningful, context-specific, HRD resources to organizations. In this case, implementation of informed adult education practices brings significant societal value because it serves to improve job outcomes in an industry where much more than profit is at stake. These relationships save lives.

APPENDIX A - AMBER MAP





APPENDIX B: SURVEY DOCUMENT

Survey for AMBER Coordinators

Thank you for agreeing to participate in this research. I will be asking you about your relationships with others with whom you work. First you will have the chance to respond to some questions about how you experience the AMBER team in general. Then you will be asked to identify specific people with whom you work. Your responses will help the AMBER program create training that supports team relationships.

First, please tell us a little about yourself:

Age: _____ Gender:_____ Race: _____ State where you work: _____

Highest Level of Education:_____ How long have you been in your position: _____(years)

Section 1

For the next 10 questions please think about your team as all AMBER coordinators in the 10 states that are part of the AMBER Alert Southern Border Initiative (Baja California, Sonora, Chihuahua, Nuevo León, Coahuila, Tamaulipas in Alerta Amber México, and California, Arizona, New Mexico, y Texas in the US). Rate your experience on a scale of 1 to 5 where 1 is the lowest score and means that you never see or engage in this behavior and 5 is the highest score and means that you always see or engage in this behavior

(1) Never	(2) Rarely	(3) Sometimes	(4) Usually	(5) Always

1. How often do you make suggestions about better work methods to other team members?
2. Do other members of your team usually let you know when you do something that makes their jobs easier (or harder)?
3. How often do you let other members of your team know when they have done something that makes your job easier or harder?
4. How well do other members of your team recognize your potential?
5. How well do other members of your team understand your problems and needs?
6. How flexible are you about switching job responsibilities to make things easier for other team members? **[this can mean adjusting your regular job priorities to assist with cases belonging to another coordinators)**
7. In busy situations, how often do other team members ask you to help out?
8. In busy situations, how often do you volunteer your efforts to help others on your team?
9. How willing are you to help finish work that had been assigned to others?
10. How willing are other members of the team to finish work that was assigned to you?

Now please share some details of your experience on the AMBER [COUNTRY] team:

1. What does it mean to be part of the AMBER Team?
2. How do you fit in the AMBER team? What is your role?
3. Please describe a time you really felt like part of the AMBER team
4. Were you aware that your state is considered part of the Southern Border Initiative? What experiences to you have relating to the group of 10 US/Mexico Border States as a special AMBER team?

Section 2

Now, based on a list of AMBER Coordinators, I will be asking you a series of questions about each of the state coordinators in the AMBER US and Mexico Southern Border Initiative that you may or may not work with regularly. Please answer the following series of questions for each person that the survey prompts.

1. Do you know [NAME} Y/N

IF NO – go to next name on list / IF YES:

2. On a scale of 1 to 5, where 1 is the lowest score and means that you only know of them and 5 is the highest score and means that you consider them to be a friend, please rate how well you would say you know [NAME}

(1) I am aware that they work for ALERTA Amber and know of them but do not know them personally	(2) we have participated in the same group meetings or messages. We have been introduced but I have not worked with them directly on a project or case	(3) we are co-workers who have interacted directly at work before. (meaning that at least one time you were assigned to the same case or shared a project)	(4) we are colleagues who work together regularly on multiple projects or cases.	(5) I would consider them a a close colleague or friend

3. Which of the following modes of communication do you use to interact with [NAME]
    a. Email (Y/N)

IF YES / FOR EACH

How often would you say you communicate with [NAME} by [Email]?

(1) Once or twice per year or less	(2) Once Every 2 or 3 months	(3) More than once per month	(4) More than once per week	(5) Daily or more

b. SMS/text/WhatsAp (Y/N)

How often would you say you communicate with [NAME} by [SMS/text/WhatsAp]?

(1) Once or twice per year or less	(2) Once Every 2 or 3 months	(3) More than once per month	(4) More than once per week	(5) Daily or more

c. Phone (Y/N)

How often would you say you communicate with [NAME} by [phone]?

(1) Once or twice per year or less	(2) Once Every 2 or 3 months	(3) More than once per month	(4) More than once per week	(5) Daily or more

d. In person (Y/N)

How often would you say you communicate with [NAME} in person?

(1) Once or twice per year or less	(2) Once Every 2 or 3 months	(3) More than once per month	(4) More than once per week	(5) Daily or more

Please share some details of your relationship with [NAME]:

4. How did you meet [NAME]?
5. How long have you known [NAME]?
6. Describe your relationship with [NAME]
7. Does this relationship help you to do your job? Why or why not?

Part 3

1. Are there people who you work with in the US as part of the Southern Border Initiative who are important to the success of this team other than the state level coordinators on this list?
2. How would you compare your relationships with your AMBER [COUNTRY] team to your relationships with these team members listed as being part of the Southern Border Initiative?
3. Who do you consider to be your primary AMBER team? (State, region, country, southern border initiative, other)

SPANISH VERSION

Cuestionario para Coordinadores del Programa Alerta Amber México en la frontera norte de la Repùblica Mexicana.

Gracias por aceptar participar en esta investigación. Le preguntaré acerca de sus relaciones laborales- personales que tiene con el resto de su equipo de trabajo.

Primero tendrá la oportunidad de responder a algunas preguntas sobre el trabajo como equipo en el programa ALERTA AMBER

Después se le pedirá que identifique quiénes son las personas con las que trabaja de forma local y regional

Sus valiosas respuestas ayudarán al Programa ALERTA AMBER en Estados Unidos a crear capacitaciones y entrenamientos específicos que apoye y mejoren las relaciones entre estados y regiones.

El tiempo estimado para contester esta encuesta será de: 30 minutos.

Antes que nada, compartanos un poco acerca de Usted:

Edad: _____ Genero:_____ Último Grado de estudios: _____

Estado en el que trabaja: _____

¿Cuanto tiempo llevas en trabajando en este puesto?: _____ (años)

Primera Sección

Nos gustaría para las siguientes preguntas considere a los 10 coordinadores bajo la iniciativa de la Frontera Sur y el Programa de Alerta Amber (que son del Baja California Sonora, Chihuahua, Nuevo León, Coahuila, Tamaulipas en el Programa Alerta Amber México, y de California, Arizona, New Mexico, y Texas en los Estados Unidos) como parte de su equipo por favor.

Para las siguientes diez (10) preguntas considere responder en la escala del uno (1) al cinco (5) donde uno (1) es NUNCA y cinco (5) es SIEMPRE.

(1) Nunca	(2) Casi nunca	(3) Algunas veces	(4) Casi siempre	(5) Siempre

Las preguntas son:

1. ¿Con qué frecuencia hace sugerencias sobre mejores métodos de trabajo a sus otros miembros en su equipo?

2. ¿ Otros miembros de su equipo generalmente le comparten cuando Ud. hacen algo que facilita o compleje su trabajo?

3. ¿Con qué frecuencia Ud. le comparte a otros miembros de su equipo cuando han hecho algo que hace su trabajo más fácil o más difícil?

4. ¿Qué tan bien los otros miembros de su equipo reconocen su potencial?

5. ¿Qué tan bien los otros miembros de su equipo entienden sus problemas y necesidades?

6. ¿Cuán flexible es usted para cambiar sus responsabilidades laborales para apoyar a otros miembros miembros del equipo? [Esto puede significar ajustar sus prioridades laborales regulares para ayudar con los casos que pertenecen a otros coordinadores)

7. En situaciones de mucho trabajo, ¿con qué frecuencia los otros miembros del equipo le piden ayuda?

8. En situaciones de mucho trabajo, ¿Con qué frecuencia se ofrecen voluntariamente para ayudar a otros en su equipo?

9. ¿Qué tan dispuesto está Ud. a ayudar a terminar el trabajo que se había asignado a otros?

10. ¿Qué tan dispuestos están otros miembros del equipo para terminar el trabajo que se le asignó a Ud.?

Podría compartir algunas de sus experiencias como parte del Programa Alerta Amber México:

1. ¿Qué significa para Ud. ser parte del Equipo del Programa Alerta Amber México?

2. ¿Como encaja Ud. en el Equipo del Programa Alerta Amber México:? ¿Cuál es su rol?

3. ¿Podría describer un momento en el cual Ud. se siento parte del Programa Alerta Amber México:?

4. ¿Esta Usted conciente que forma parte de un programa que se llama Iniciativa de la frontera sur en Estados Unidos ? Podria compartirnos que experiencias relevantes ha vivido como parte de este grupo en los 10 estados entre México y Estados Unidos como parte del Programa Alerta Amber y Alerta Amber México

Segunda Sección

En esta sección trabajaremos con la lista de coordinadores del Programa Alerta Amber en los Estados Unidos bajo la iniciativa de la Frontera Sur y el Programa de Alerta Amber en México y les pediré que contesten las preguntas a cerca de cada uno de ellos (nueve en total).

1. Conoce Ud. a [NOMBRE} S/N

SI LA RESPUESTA FUE NO – Vaya al siguiente nombre de la lista / SI LA RESPUESTA FUE SI: :

2. En la escala del 1 al 5, donde 1 significa que solo lo conoce o no lo conoce y donde cinco (5) siendo el más alto score significa que lo considera a esta persona como un amigo o un colega muy cercano a [NOMBRE]

(1) Soy consciente de que trabajan para el programa ALERTA Amber y los ubicó pero no lo conozco personalmente.	(2) Hemos participado en los mismos eventos, reunions o grupos de trabajo. Se quien es el de forma personal sin embargo no hemos trabajado en un caso de forma conjunta.	(3) Somos colegas que trabajo de forma directa en el trabajo al menos una vez en algun caso o Proyecto.	(4) Somos colegas que nos encontramos más de una ocasion trabajando en múltlipes proyectos o casos.	(5) Lo considero como un(a) colega muy cercano o incluso un(a) amigo.

Cuál de los siguientes medios de comunicación utiliza Usted. para interactuar con [NOMBRE]:

a. Correo electrónico (S/N)

Si la respuesta fue SI (para cada uno de los miembros de su lista):

¿Qué tan frecuentemente Usted. se comunica con [NOMBRE] por correo electrónico ?

(1) Una o dos veces al año o inclusive menos.	(2) Una vez cada 2 o 3 meses.	(3) Más de una véz al mes.	(4) Más de una vez por semana	(5) De forma diara

b. SMS/WhatsApp (S/N)

¿Qué tan frecuentemente Usted se comunica con [NOMBRE] por [SMS/WhatsApp]

(1) Una o dos veces al año o inclusive menos.	(2) Una vez cada 2 o 3 meses.	(3) Más de una véz al mes.	(4) Más de una vez por semana	(5) De forma diara

c. Teléfono (S/N)

¿Qué tan frecuentemente Usted se comunica con [NOMBRE] por teléfono?

(1) Una o dos veces al año o inclusive menos.	(2) Una vez cada 2 o 3 meses.	(3) Más de una véz al mes.	(4) Más de una vez por semana	(5) De forma diara

d. En persona (S/N)

¿Qué tan frecuentemente Usted se comunica con [NOMBRE] en persona?

(1) Una o dos veces al año o inclusive menos.	(2) Una vez cada 2 o 3 meses.	(3) Más de una véz al mes.	(4) Más de una vez por semana	(5) De forma diara

Por favor, comparta algunos detalles de su relación con [NOMBRE]:

1. ¿Cómo conoció a [NOMBRE]?

2. ¿Cuánto tiempo ha conocido a [NOMBRE]?

3. Describa su relación con [NOMBRE]

4. ¿Ud. considera que tener una relación laboral mas estrecha con [NOMBRE] le ayuda a hacer major su trabajo? ¿Por qué si o Por qué no?

Tercera Sección

1. ¿Dentro de programa Alerta Amber Estados Unidos, ha trabajado Usted o a encontrado personas de valor que no sean directamente los coordinadores estatales o regionales que considere importante mencionar para el éxito de su trabajo dentro del programa Alerta Amber Mexico? Podría mencionar sus nombres por favor

2. ¿Como compararía su r elación laboral entre sus contrapartes en la frontera norte del país (Baja California Sonora, Chihuahua, Nuevo León, Coahuila, Tamaulipas, incluyendo los estados de: California, Arizona, New Mexico, Texas en los Estados Unidos) respecto a su relación laboral del resto del Mexico?.

3. A quien consideras que son las personas que integran tu equipo más cercano en el Programa de Alerta Amber México?. (La respuesta puede ser estatal, regional, nacional o bien internacional).

APPENDIX C: SEERS' RECOMMENDED TEAM-MEMBER EXCHANGE QUALITY SCALE ITEMS

1. How often do you make suggestions about better work methods to other team members?

2. Do other members of your team usually let you know when you do something that makes their jobs easier (or harder)?

3. How often do you let other team members know when they have done something that makes your job easier (or harder)?

4. How well do other members of your team recognize your potential?

5. How well do other members of your team understand your problems and needs?

6. How flexible are you about switching job responsibilities to make things easier for other team members?

7. In busy situations, how often do other team members ask you to help out?

8. In busy situations, how often do you volunteer your efforts to help others on your team?

9. How willing are you to help finish work that had been assigned to others?

10. How willing are other members of your team to help finish work that was assigned to you?

Seers, A., Petty, M. M., & Cashman, J. F. (1995). Team-member exchange under team and traditional management a naturally occurring quasi-experiment. *Group & Organization Management*, *20*(1), 18-38.

APPENDIX D: RANGE OF REPORTED TMX Z SCORES BY QUESTION

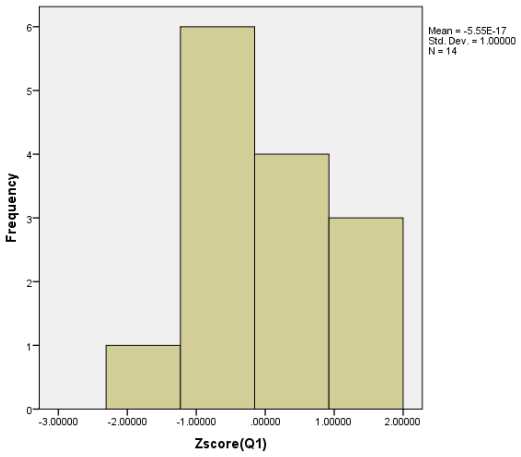
Per question raw TMX Z Scores distribution (mean and SD not valid for Z Score)

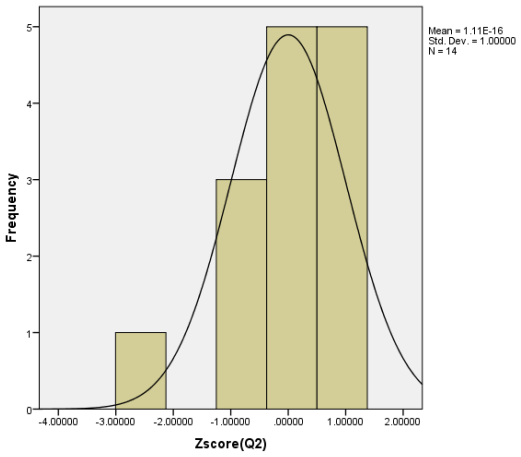
Question	Lowest individual reported Z Score	Highest individual reported Z Score	RANGE Of Z cores
1 - How often do you make suggestions about better work methods to other team members?	-1.769	**1.461**	3.23
2 Do other members of your team usually let you know when you do something that makes their jobs easier (or harder)?	-2.566	0.939	3.505
3 How often do you let other members of your team know when they have done something that makes your job easier or harder?	**-2.733**	0.999	3.732
4 How well do other members of your team recognize your potential?	-2.566	0.939	3.505
5 How well do other members of your team understand your problems and needs?	-2.327	1.293	3.62
6 How flexible are you about switching job responsibilities to make things easier for other team members?	-1.77	0.983	2.753
7 In busy situations, how often do other team members ask you to help out?	-2.621	1.346	**3.967**
8 In busy situations, how often do you volunteer your efforts to help others on your team?	-1.293	1.121	2.414

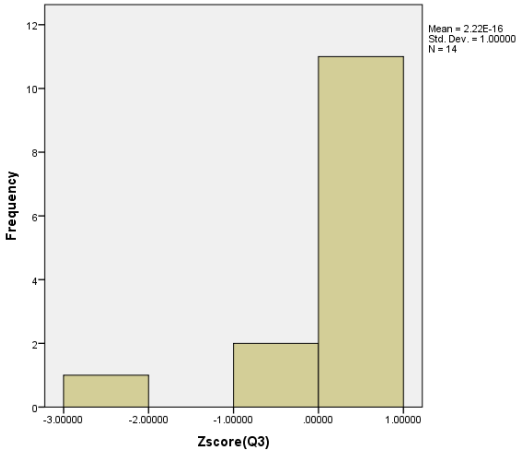
9 How willing are you to help finish work that had been assigned to others?	-1.169	1.013	2.182
10 How willing are other members of the team to finish work that was assigned to you?	-2.344	1.022	3.366

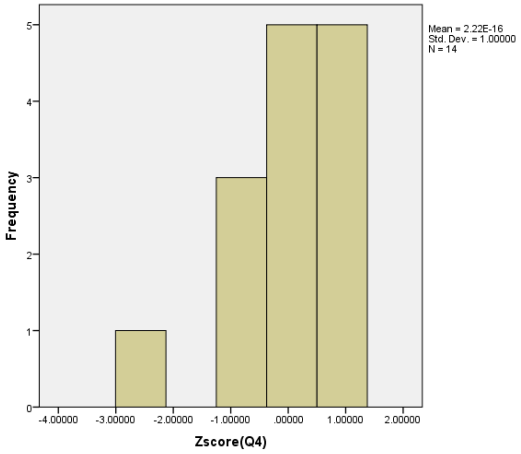
:

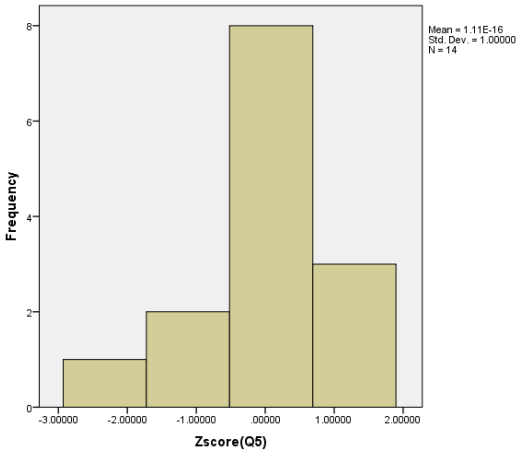
APPENDIX E : HISTOGRAMS OF Z SCORE FREQUENCY PER TMX QUESTION

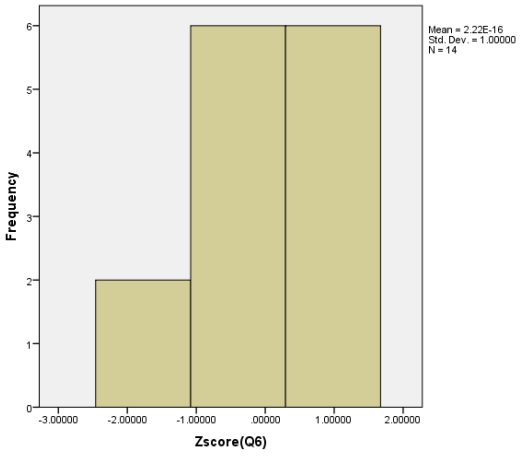


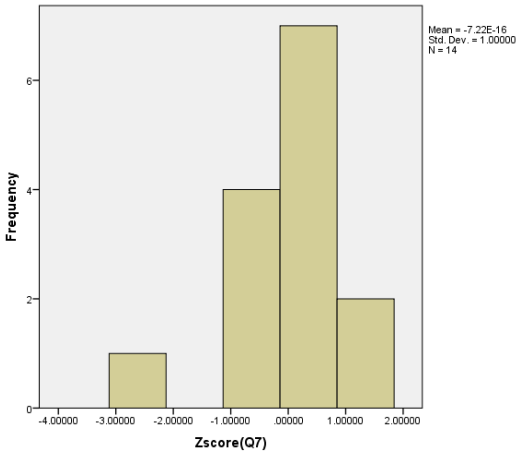


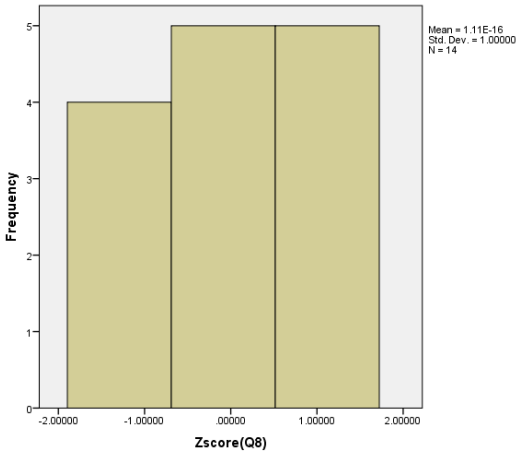


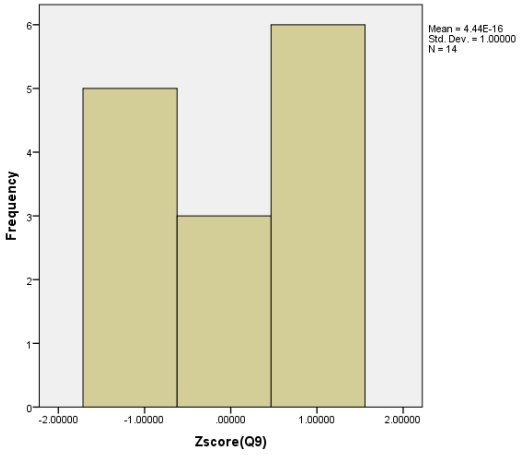


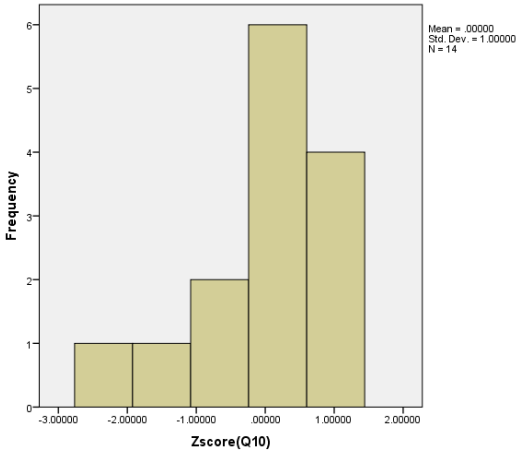





Mean = -7.22E-16
Std. Dev. = 1.00000
N = 14
Frequency
Zscore(Q7)


Mean = 1.11E-16
Std. Dev. = 1.00000
N = 14
Frequency
Zscore(Q8)


Mean = 4.44E-16
Std. Dev. = 1.00000
N = 14
Frequency
Zscore(Q9)


Mean = .00000
Std. Dev. = 1.00000
N = 14
Frequency
Zscore(Q10)

APPENDIX F: SUMMARY OF T-TESTS FOR TMX Z SCORES BY DEMOGRAPHIC VARIABLE GROUPINGS

Summary of T-Tests for TMX scores by demographic variable groupings

	Average TMX Z SCORE A	Average TMX Z SCORE B	P
Comparisons by Age	Group 1 (33 and younger) = 1.4508	Group 2 (34-48) = 2.8922	0.396
	Group 1 (33 and younger) = 1.4508	Group 3 (49 and older) = -3.3663	0.771
	Group 2 (34-48) = 2.8922	Group 3 (49 and older) = -3.3663	0.119
Comparisons by education level	Group 3 (university) = -3.3937	Group 4 (postgrad) = 2.5452	0.138
Comparisons by length of time with the organization	Group 2 (6 months to 1 year) = -0.1889	Group 3 (1 – 3 years)= -1.8682	0.806
	Group 2 (6 months to 1 year) = -0.1889	Group 4 (longer than 3 years) = 1.6513	0.686
	Group 3 (1 – 3 years)= -1.8682	Group 4 (longer than 3 years) = 1.6513	0.486
Comparisons by State	State A = -4.2411	State B = 6.1825	0.546
	State A = -4.2411	State C = -0.1656	0.714
	State A = -4.2411	State D = -4.0744	0.987
	State A = -4.2411	State E = -.8598	0.669
	State A = -4.2411	State F = 5.8667	0.283
	State B = 6.1825	State C = -0.1656	0.614
	State B = 6.1825	State D = -4.0744	0.075
	State B = 6.1825	State E = -.8598	0.106
	State B = 6.1825	State F = 5.8667	0.970
	State C = -0.1656	State D = -4.0744	0.539

	State C = -0.1656	State E = -.8598	0.881
	State C = -0.1656	State F = 5.8667	0.857
	State D = -4.0744	State E = -.8598	0.192
	State D = -4.0744	State F = 5.8667	0.123
	State E = -.8598	State F = 5.8667	0.111

APPENDIX G: MATRIX OF REPORTED TIES IN THE NON-VALUED NETWORK

Node	A	B	C	D	F	G	H	I	K	L	M	N	O	P
A		1	1	0	0	1	1	1	1	0	0	1	0	0
B	1		0	0	1	0	0	0	1	0	0	1	0	0
C	1	0		0	0	0	1	0	0	0	0	0	0	0
D	1	1	1		1	1	1	1	1	1	1	1	0	0
F	1	1	0	1		1	1	1	1	0	0	1	0	0
G	1	1	1	1	1		1	1	1	1	1	1	0	0
H	1	0	1	0	0	0		1	1	1	0	1	0	0
I	1	0	0	0	0	0	1		1	0	0	1	0	0
K	1	0	0	1	0	0	1	0		1	0	1	0	0
L	1	0	0	0	0	0	1	0	1		1	0	0	0
M	0	0	0	0	0	0	0	0	1	1		0	0	0
N	1	0	0	0	0	1	0	0	0	0	0		1	1
O	0	0	0	0	0	0	0	0	0	0	0	0		0
P	0	0	0	0	1	1	0	0	0	0	0	1	1	

APPENDIX H: MATRIX OF REPORTED TIES IN THE VALUED NETWORK

node	A	B	C	D	F	G	H	I	K	L	M	N	O	P
A		2	5	0	0	2	4	2	2	0	0	2	0	0
B	2		0	0	2	0	0	0	1	0	0	1	0	0
C	5	0		0	0	0	2	0	0	0	0	0	0	0
D	2	1	1		5	1	1	1	2	1	1	2	0	0
F	2	2	0	2		3	2	2	2	2	2	2	0	0
G	4	2	2	2	3		3	3	2	2	2	2	0	0
H	5	0	2	0	0	0		5	2	1	0	2	0	0
I	3	0	0	0	0	0	4		4	0	0	2	0	0
K	2	0	0	1	0	0	2	0		2	0	1	0	0
L	1	0	0	0	0	0	1	0	3		3	0	0	0
M	0	0	0	0	0	0	0	0	1	5		0	0	0
N	3	0	0	0	0	5	0	0	0	0	0		1	5
O	0	0	0	0	0	0	0	0	0	0	0	0		0
P	0	0	0	0	3	2	0	0	0	0	0	5	5	

APPENDIX I: OTHER MEASURES OF CENTRALITY IN THE NONVALUED NETWORK

Subject	Out2Step	In2Step	OutEigenvector	InEigenvector
A	13	12	0.627	1
B	12	11	0.45	0.374
C	8	11	0.201	0.478
D	13	11	1	0.287
F	13	7	0.893	0.242
G	13	11	1	0.478
H	12	12	0.451	0.804
I	11	11	0.368	0.523
K	13	12	0.518	0.824
L	10	12	0.326	0.489
M	6	9	0.157	0.233
N	13	12	0.382	0.874
O	0	10	0	0.193
P	13	9	0.423	0.163

APPENDIX J : OTHER MEASURES OF CENTRALITY IN THE VALUED NETWORK

Subject	Out2Step	In2Step	OutEigenvector	InEigenenvector
A	14	12	0.706	1
B	14	11	0.288	0.242
C	9	11	0.342	0.531
D	14	11	0.75	0.134
F	14	7	0.809	0.215
G	14	11	1	0.426
H	13	12	0.643	0.749
I	12	11	0.523	0.538
K	14	12	0.32	0.603
L	11	12	0.182	0.297
M	7	10	0.087	0.164
N	14	12	0.705	0.565
O	0	10	0	0.111
P	14	9	0.564	0.201

APPENDIX K: CORRELATION CALCULATIONS OF TMX AND DEGREE CENTRALITY

Correlations of TMX Given and Out-Degree Centrality in the Non-Valued Network

		Av Zscore(Q13689)	unval network outdeg
Av Zscore (Q13689)	Pearson Correlation	1	0.079
	Sig. (2-tailed)		0.788
	N	14	14
unval network outdeg	Pearson Correlation	0.079	1
	Sig. (2-tailed)	0.788	
	N	14	14

		unval network outdeg	sum Zscore(Q13689)
unval network outdeg	Pearson Correlation	1	0.079
	Sig. (2-tailed)		0.788
	N	14	14
sum Zscore (Q13689)	Pearson Correlation	0.079	1
	Sig. (2-tailed)	0.788	
	N	14	14

Correlations of TMX Received and In-Degree Centrality in the Non Valued Network

		Av Zscore(Q245710)	Unval network indeg
Av Zscore(Q245710)	Pearson Correlation	1	0.149
	Sig. (2-tailed)		0.612

	N	14	14
Unval network indeg	Pearson Correlation	0.149	1
	Sig. (2-tailed)	0.612	
	N	14	14

		Unval network indeg	sum Zscore(Q245710)
Unval network indeg	Pearson Correlation	1	0.149
	Sig. (2-tailed)		0.611
	N	14	14
sum Zscore(Q245710)	Pearson Correlation	0.149	1
	Sig. (2-tailed)	0.611	
	N	14	14

Correlations of TMX Given and Out-Degree Centrality in the Valued Network

		Av Zscore(Q13689)	valued network outdeg
Av Zscore(Q13689)	Pearson Correlation	1	0.251
	Sig. (2-tailed)		0.386
	N	14	14
valued network outdeg	Pearson Correlation	0.251	1
	Sig. (2-tailed)	0.386	
	N	14	14

		sum Zscore(Q13689)	valued network outdeg

sum Zscore(Q13689)	Pearson Correlation	1	0.251
	Sig. (2-tailed)		0.386
	N	14	14
valued network outdeg	Pearson Correlation	0.251	1
	Sig. (2-tailed)	0.386	
	N	14	14

Correlations of TMX Received and IN-Degree Centrality in the Valued Network

		Av Zscore(Q245710)	val network in deg
Av Zscore(Q245710)	Pearson Correlation	1	0.223
	Sig. (2-tailed)		0.443
	N	14	14
val network in deg	Pearson Correlation	0.223	1
	Sig. (2-tailed)	0.443	
	N	14	14

		val network in deg	sum Zscore(Q245710)
val network in deg	Pearson Correlation	1	0.223
	Sig. (2-tailed)		0.443
	N	14	14
sum Zscore(Q245710)	Pearson Correlation	0.223	1
	Sig. (2-tailed)	0.443	
	N	14	14

Correlations of TMX Given and Out Degree Centrality in the Valued Network when excluding outliers

		Av Zscore(Q13689)	Av Zscore(Q245710)	valued network outdeg
Av Zscore(Q13689)	Pearson Correlation	1	.706*	.164
	Sig. (2-tailed)		.010	.611
	N	12	12	12
Av Zscore(Q245710)	Pearson Correlation	.706*	1	.198
	Sig. (2-tailed)	.010		.537
	N	12	12	12
valued network outdeg	Pearson Correlation	.164	.198	1
	Sig. (2-tailed)	.611	.537	
	N	12	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations of subjects BCHILMNO (5 degree or less difference between centralities)

		Av Zscore (Q13689)	Av Zscore (Q245710)	Unval network indeg	unval network outdeg	val network in deg	valued network outdeg	av Zscore all
Av Zscore(Q13689)	Pearson Correlation	1	.780*	.358	-.235	.342	.159	.916**

	Sig. (2-tailed)		.023	.385	.575	.407	.708	.001
	N	8	8	8	8	8	8	8
Av Zscore(Q245710)	Pearson Correlation	.780*	1	.400	-.098	.527	.279	.966**
	Sig. (2-tailed)	.023		.326	.818	.180	.504	.000
	N	8	8	8	8	8	8	8
Unval network indeg	Pearson Correlation	.358	.400	1	.783*	.964**	.897**	.405
	Sig. (2-tailed)	.385	.326		.022	.000	.003	.319
	N	8	8	8	8	8	8	8
unval network outdeg	Pearson Correlation	-.235	-.098	.783*	1	.755*	.874**	-.160
	Sig. (2-tailed)	.575	.818	.022		.030	.005	.704
	N	8	8	8	8	8	8	8
val network in deg	Pearson Correlation	.342	.527	.964**	.755*	1	.920**	.480
	Sig. (2-tailed)	.407	.180	.000	.030		.001	.229
	N	8	8	8	8	8	8	8
valued network outdeg	Pearson Correlation	.159	.279	.897**	.874**	.920**	1	.245
	Sig. (2-tailed)	.708	.504	.003	.005	.001		.559
	N	8	8	8	8	8	8	8

av Zscore all	Pearson Correlation	.916**	.966**	.405	-.160	.480	.245	1
	Sig. (2-tailed)	.001	.000	.319	.704	.229	.559	
	N	8	8	8	8	8	8	8

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX L: OVERVIEW OF SUBJECT CHARACTERISTICS DISCUSSED IN RESULTS

Subject	Age group	Number of reps in state	Time in position group	Z score category	Centrality Difference (unvalued)	Centrality Difference (valued)	Incore y/n	above avg centrality y/n
A	1	3	2	Moderately high	3	10	Y	Y
B	1	3	3	low	0	1	N	N
C	2	3	2	Moderately low	2	3	N	N
D	2	1	4	Moderately high	-8	-13	Y	N
F	2	2	3	Moderately high	-4	-8	Y	Y
G	3	2	2	Moderately low	-6	-14	Y	Y
H	3	2	4	Moderately low	2	2	Y	Y
I	2	2	4	Moderately low	1	0	Y	Y
K	3	3	4	Moderately high	4	11	Y	Y
L	1	3	3	Moderately low	1	5	N	Y
M	2	3	4	Moderately high	1	2	N	N
N	2	3	4	high	5	5	Y	Y
O	1	3	3	Moderately low	2	6	N	N

P	1	3	3	Moderately high	-3	-10	N	N
	1=<33 ; 2=34-48; 3=>49		1=less than 6 months * 2=6m-1y; 3=1-3y; 4=>3y		1=Balanced; 2=More OUT than IN; 3=More IN than OUT			

REFERENCES

AATTAP (2018). AMBER Alert Training and Technical Assistance Program: Program Fact Sheet. Retrieved from: https://ncjtc.fvtc.edu/Portals/2/Resources/RS00003868.pdf on January 30, 2018 and March 10, 2018.

Abu Bakar, H., & Sheer, V. C. (2013). The mediating role of perceived cooperative communication in the relationship between interpersonal exchange relationships and perceived group cohesion. *Management Communication Quarterly*, *27*(3), 443-465.

Aoun, J. E. (2017). *Robot-Proof: Higher Education in the Age of Artificial Intelligence*. MIT Press.

Balkundi, P., & Harrison, D. A. (2006). Ties, leaders, and time in teams: Strong inference about network structure's effects on team viability and performance. *Academy of Management Journal*, *49*(1), 49-68.

Baldwin, T. T., Bedell, M. D., & Johnson, J. L. (1997). The social fabric of a team-based MBA program: Network effects on student satisfaction and performance. *Academy of management journal*, *40*(6), 1369-1397.

Bandura, A. (1969). Social-learning theory of identificatory processes. *Handbook of socialization theory and research*, *213*, 262.

Banks, G. C., Batchelor, J. H., Seers, A., O'Boyle, E. H., Pollack, J. M., & Gower, K. (2014). What does team–member exchange bring to the party? A meta-analytic review of team and leader social exchange. *Journal of Organizational Behavior*, *35*(2), 273-295.

Barringer, S. N., & Slaughter, S. (2016). University trustees and the entrepreneurial university: Inner circles, interlocks, and exchanges. In Higher Education, Stratification, and Workforce Development (pp. 151-171). Springer, Cham.

Bekkers, R., & Freitas, I. M. B. (2008). Analyzing knowledge transfer channels between universities and industry: To what degree do sectors also matter?. Research policy, 37(10), 1837-1853.

Berger, P. L., & Luckmann, T. (1991). *The social construction of reality: A treatise in the sociology of knowledge* (No. 10). Penguin Uk.

Biancani, S., & McFarland, D. A. (2013). Social networks research in higher education. In Higher education: Handbook of theory and research (pp. 151-215). Springer, Dordrecht.

Biggs, D. M., Swailes, S., & Baker, S. (2016). The measurement of worker relations: The development of a three-component scale. *Leadership & Organization Development Journal*, *37*(1), 2-12. Retrieved from http://proxy.libraries.smu.edu/login?url=http://search.proquest.com/docview/1764647963?accountid=6667

Bonacich, P. (1987). Power and centrality: A family of measures. *American journal of*

sociology, *92*(5), 1170-1182.

Borgatti, S.P., Everett, M.G. and Freeman, L.C. (2002). Ucinet for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.

Borgatti, S. P., & Foster, P. C. (2003). The network paradigm in organizational research: A review and typology. *Journal of management*, *29*(6), 991-1013.

Brass, D. (1984). Being in the Right Place: A Structural Analysis of Individual Influence in an Organization. *Administrative Science Quarterly, 29*(4), 518-539. doi:10.2307/2392937

Brass, D. J., & Burkhardt, M. E. (1993). Potential power and power use: An investigation of structure and behavior. *Academy of management journal*, *36*(3), 441-470.

Brinton Milward, H., & Raab, J. (2006). Dark networks as organizational problems: Elements of a theory. *International Public Management Journal*, *9*(3), 333-360.

Bruneel, J., d'Este, P., & Salter, A. (2010). Investigating the factors that diminish the barriers to university–industry collaboration. Research policy, 39(7), 858-868.

Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to Improve: How America's Schools Can Get Better at Getting Better*. Harvard Education Press. 8 Story Street First Floor, Cambridge, MA 02138.

Bureau of Labor Statistics (BLS) (2018). Employment projections database. National Employment Matrix. Retrieved from: https://data.bls.gov/projections/nationalMatrix?queryParams=999100&ioType=i

Burt, R. S. (2009). *Structural holes: The social structure of competition*. Harvard university press.

Burt, R. S. (2017). Structural holes versus network closure as social capital. In *Social capital* (pp. 31-56). Routledge.

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher*, *45*(1), 48-54.

Commeiras, N., Loubes, A., & Bories-Azeau, I. (2013). Identification of organizational socialization tactics: The case of sales and marketing trainees in higher education. *European Management Journal*, *31*(2), 164-178.

Department of Justice (DOJ) (2012) The AMBER Alert – A National Overview" Washington, DC: Fassett, B and Walters, J.

Dierdorff, E. C., Bell, S. T., & Belohlav, J. A. (2011). The power of "we": Effects of psychological collectivism on team performance over time. *Journal of applied psychology*, *96*(2), 247.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, Phone, Mail, and Mixed-Mode*

Surveys: The Tailored Design Method. Wiley.

Dillman, D. A., & Bowker, D. K. (2001). The web questionnaire challenge to survey methodologists. *Online social sciences*, 53-71.

DiStefano, C., Zhu, M., & Mindrila, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. *Practical Assessment, Research & Evaluation*, *14*(20), 1-11.

Emerson, R. M. (1976). Social exchange theory. *Annual review of sociology*, *2*(1), 335-362.

Fletcher, J. M., & Tienda, M. (2009). High school classmates and college success. *Sociology of education*, *82*(4), 287-314.

Fowler Jr, F. J. (2013). *Survey research methods*. Sage publications.

Friedkin, N. E. (1991). Theoretical foundations for centrality measures. *American journal of Sociology*, *96*(6), 1478-1504.

Galaskiewicz, J. (2007). Has a Network Theory of Organizational Behaviour Lived Up to its Promises?[1]. *Management and Organization Review*, *3*(1), 1-18.

Graen, G., & Cashman, J. F. (1975). A role-making model of leadership in formal organizations: A developmental approach. *Leadership frontiers*, *143*, 165.

Graen, G., Hui, C., & Taylor, E. (2006). Experience-Based Learning about LMX Leadership and Fairness in Project Teams: A Dyadic Directional Approach. *Academy of Management Learning & Education*, *5*(4), 448-460. Retrieved from http://www.jstor.org/stable/40214403

Granovetter, M. S. (1977). The strength of weak ties. In Social networks (pp. 347-367).

Granovetter, M. (1983). The strength of weak ties: A network theory revisited. Sociological theory, 201-233.

Greer, J. D., Pan, P. L., Flores, D., & Collins, M. C. (2012). Priming and source credibility effects on individual responses to AMBER and other mediated missing child alerts. *The Social Science Journal*, *49*(3), 295-303.

Griffin, T., & Miller, M. K. (2008). Child abduction, AMBER alert, and crime control theater. *Criminal Justice Review*, *33*(2), 159-176.

Griffin, T. (2010). An empirical examination of AMBER Alert 'successes'.*Journal of Criminal Justice*, *38*(5), 1053-1062.

Griffin, T., Miller, M. K., Hoppe, J., Rebideaux, A., & Hammack, R. (2007). A preliminary examination of AMBER Alert's effects. *Criminal Justice Policy Review*, *18*(4), 378-394.

Griffin, T., Williams, J. H., Wooldredge, J., & Miller, D. (2015). Does AMBER Alert

'save lives'? An empirical analysis and critical implications. *Journal of Crime and Justice*, 1-22.

Hanfland, K. A., Keppel, R. D., & Weis, J. G. (1997). *Case management for missing children homicide investigation*. Olympia: Attorney General of Washington.

Hanneman, R A. and Riddle, M. (2005). Introduction to social network methods. Riverside, CA: University of California, Riverside (published in digital form at http://faculty.ucr.edu/~hanneman/)

Harter, J. K., Schmidt, F. L., & Keyes, C. L. (2003). Well-being in the workplace and its relationship to business outcomes: A review of the Gallup studies. *Flourishing: Positive psychology and the life well-lived*, *2*, 205-224.

Herman, H. M., & Dasborough, M. T. (2008). A study of exchange and emotions in team member relationships. *Group & Organization Management*, *33*(2), 194-215.

Ibarra, H. (1993). Network centrality, power, and innovation involvement: Determinants of technical and administrative roles. *Academy of Management journal*, *36*(3), 471-501.

Jessup, C., & Miller, M. K. (2015). Fear, Hype, and Stereotypes: Dangers of Overselling the AMBER Alert Program. *Alb. Gov't L. Rev.*, *8*, 467.

Jordan, M. H., Feild, H. S., & Armenakis, A. A. (2002). The relationship of group process variables and team performance: A team-level analysis in a field setting. *Small Group Research*, *33*(1), 121-150.

Klein, K. J., Lim, B. C., Saltz, J. L., & Mayer, D. M. (2004). How do they get there? An examination of the antecedents of centrality in team networks. Academy of Management Journal, 47(6), 952-963.

Knoke, D., & Yang, S. (2008). *Social network analysis* (Vol. 154). Sage.

Koys, D. J. (2001). The effects of employee satisfaction, organizational citizenship behavior, and turnover on organizational effectiveness: A unit-level, longitudinal study. *Personnel psychology*, *54*(1), 101-114.

Kozlowski, S. W., & Bell, B. S. (2003). Work groups and teams in organizations. *Handbook of psychology*.

Lau, R. S., & Cobb, A. T. (2010). Understanding the connections between relationship conflict and performance: The intervening roles of trust and exchange. *Journal of Organizational Behavior*, *31*(6), 898-917.

Liden, R. C., Wayne, S. J., & Sparrowe, R. T. (2000). An examination of the mediating role of psychological empowerment on the relations between the job, interpersonal relationships, and work outcomes. *Journal of applied psychology*, *85*(3), 407.

Lincoln, J. R., & Miller, J. (1979). Work and friendship ties in organizations: A comparative

analysis of relation networks. *Administrative science quarterly*, 181-199.

Lucas, A. D., Voss, R. A., & Krumwiede, D. W. (2015). Institutional Communication Dynamics in Instructional Effectiveness: Development of a Student Self-Report Measure of FVP, LMX, and TMX in a Pedagogical Context. *Journal of Learning in Higher Education*, *11*(1), 91-98.

Mathies, C., & Slaughter, S. (2013). University trustees as channels between academe and industry: Toward an understanding of the executive science network. Research policy, 42(6-7), 1286-1300.

Metcalfe, A. S. (2006). The corporate partners of higher education associations: A social network analysis. *Industry and Innovation*, *13*(4), 459-479.

Miller, M. K., & Clinkinbeard, S. S. (2006). Improving the AMBER Alert system: Psychology research and policy recommendations. *Law & Psychol. Rev.*, *30*, 1.

Miller, M. K., Griffin, T., Clinkinbeard, S. S., & Thomas, R. M. (2009). The psychology of AMBER Alert: Unresolved issues and implications. *The social science journal*, *46*(1), 111-123.

Morgan, G., Gregory, F., & Roach, C. (1997). Images of organization.

Mueller, P. (2006). Exploring the knowledge filter: How entrepreneurship and university–industry relationships drive economic growth. Research policy, 35(10), 1499-1508.

O'Toole Jr, L. J. (1997). Treating networks seriously: Practical and research-based agendas in public administration. *Public administration review*, 45-52.

Powell, W. W. (1990). Neither Market nor Hierarchy. Research in Organizational Behavior, 12, 295-336.

Raab, J., & Milward, H. B. (2003). Dark networks as problems. *Journal of public administration research and theory*, *13*(4), 413-439.

Rizzuto, T. E., LeDoux, J., & Hatala, J. P. (2009). It's not just what you know, it's who you know: Testing a model of the relative importance of social networks to academic performance. *Social Psychology of Education*, *12*(2), 175-189.

Rose, K. (2012). *Organizational citizenship behaviors in higher education: Examining the relationships between behaviors and performance outcomes for individuals and institutions*. University of Arkansas.

Rousseau, D. M. (1985). Issues of level in organizational research: Multi-level and cross-level perspectives. *Research in organizational behavior*, *7*(1), 1-37.

Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *The Internet and Higher Education*, *5*(4), 319-332.

Rutigliano, K (2015). Proceedings from DOJ Southern Border Initiative August 20 – 21 Focus Group. Dallas, TX

Scott, J. (1988). Social network analysis. *Sociology*, *22*(1), 109-127.

Seers, A. (1989). Team-member exchange quality: A new construct for role-making research. *Organizational behavior and human decision processes*, *43*(1), 118-135.

Seers, A., & Graen, G. B. (1984). The dual attachment concept: A longitudinal investigation of the combination of task characteristics and leader—member exchange. *Organizational Behavior and Human Performance*, *33*(3), 283-306.

Seers, A., Petty, M. M., & Cashman, J. F. (1995, March). Team-member exchange under team and traditional management: a naturally occurring quasi-experiment. *Group & Organization Management*, *20*(1), 18+. Retrieved from http://go.galegroup.com/ps/i.do?p=GRGM&sw=w&u=txshracd2548&v=2.1&it=r&id=GALE%7CA16640190&sid=summon&asid=3d0d05f83f1796ef12c817fb77be243a

Settoon, R. P., Bennett, N., & Liden, R. C. (1996). Social exchange in organizations: Perceived organizational support, leader–member exchange, and employee reciprocity. *Journal of applied psychology*, *81*(3), 219.

Sicafuse, L. L., & Miller, M. K. (2012). The effects of information processing and Message quality on attitudes toward the AMBER Alert system. *Applied Psychology in Criminal Justice*, *8*(2).

Sicafuse, L. L., & Miller, M. K. (2010). Social psychological influences on the popularity of AMBER alerts. *Criminal Justice and Behavior*, *37*(11), 1237-1254.

Skahill, M. P. (2002). The role of social support network in college persistence among freshman students. *Journal of College Student Retention: Research, Theory & Practice*, *4*(1), 39-52.

Streeter, C. L., & Gillespie, D. F. (1992). Social Network Analysis. *Quantitative Methods in Social Work: State of the Art*, 201.

Swanson, R. A., & Arnold, D. E. (1996). Part one: What is the purpose of human resource development? The purpose of human resource development is to improve organizational performance. *New directions for adult and continuing education*, *1996*(72), 13-19.

Thomas, S. L. (2000). Ties that bind: A social network approach to understanding student integration and persistence. The journal of higher education, 71(5), 591-615.

Tinto, V. (1993). Leaving college: Rethinking the causes and cures of student attrition (2nd ed.). Chicago: University of Chicago Press.

Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative science quarterly*, 35-67.

Uzzi, B., & Lancaster, R. (2003). Relational embeddedness and learning: The case of bank loan managers and their clients. *Management science*, *49*(4), 383-399.

Uzzi, B., & Spiro, J. (2005). Collaboration and creativity: The small world problem. *American journal of sociology*, *111*(2), 447-504.

Valente, T. W., Coronges, K., Lakon, C., & Costenbader, E. (2008). How correlated are network centrality measures?. *Connections (Toronto, Ont.)*, *28*(1), 16.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications* (Vol. 8). Cambridge university press.

Witt, L., Hochwarter, W. A., Hilton, T. F., & Hillman, C. M. (1999). Team-Member Exchange and Commitment to a Matrix Team. *Journal Of Social Behavior & Personality*, *14*(1), 63-74.

Xu, J., & Chen, H. (2008). The topology of dark networks. *Communications of the ACM*, *51*(10), 58-65.

Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage publications.

Zgoba, K. (2004). The Amber Alert: the appropriate solution to preventing child abduction?. *The Journal of Psychiatry & Law*, *32*(1), 71-88.