**Connecting in a digital world:
How information and communication technologies
shape the leader-subordinate experience**

by

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Abstract

The present study investigated how the use of information and communication technologies (ICT) impacts leader-member exchange (LMX) quality and its resulting organizational outcomes. The primary hypothesis of interest was to determine if heavy use of ICT for communicating with one's leader directly results in lower LMX quality. Additionally, it was hypothesized that technology acceptance, transformational leadership, and personality facets may serve as moderators of the ICT-LMX relationship. Data were collected across two time-points from a US sample of 227 participants from Amazon's Mechanical Turk. Hypotheses for the direct and moderating effects between ICT use and LMX were not supported. However, LMX was a significant predictor of leadership satisfaction, communication satisfaction, and turnover intentions. Structural equation modeling also revealed that technology acceptance partially mediates the relationship between both ICT use and media quality on the prediction of LMX quality, resulting in a good fitting SEM model. Based on analyses, when controlling for the effects of technology acceptance, ICT use does in fact directly negatively impact LMX quality, such that the more ICTs are used to communicate between leader and subordinate, the less likely they will have a high-quality relationship. While technology may have a negative impact on relationship quality, this finding does not occur in isolation and the impact of other factors is necessary to further explain this effect. Additional findings and implications are also discussed.

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Table of Contents

List of Abbreviations

FTF	Face to Face
HIT	Human Intelligence Task
ICT	Information and Communication Technology
IER	Insufficient Effort Responding
IPO	Input-Process-Output
JDS	Job Diagnostic Survey
LMX	Leader-Member Exchange
MLQ	Multifactor Leadership Questionnaire
MTurk	Amazon's Mechanical Turk
SEM	Structural Equation Modeling
SPSS	Statistical Package for the Social Sciences
TAM	Technology Acceptance Model
VDL	Vertical Dyad Linkage

Introduction

Within the workplace, relationships between subordinates and leaders make up a significant component of organizational interactions. Leader-follower interactions are comprised of interpersonal dynamics that often influence the attitudes and behaviors of various organizational members (Henderson, Liden, Glibkowski, & Chaudhry, 2009). Due to the importance of the relationship between leaders and subordinates, a great deal of research has focused on predicting and developing high-quality relationships that exist between the two (Dulebohn, Bommer, Liden, Brouer, & Ferris, 2012). Specific to organizational settings, research has focused on the quality of interpersonal exchanges that occur between supervisors and subordinates, resulting in the creation of social exchange theory (Eisenberger, Armeli, Rexwinkel, Lynch, & Rhoades, 2001). According to social exchange theory, leaders and followers send and receive communications to each other that convey interpersonal and work-relevant information and expectations regarding the organizational context (Eisenberger et al, 2001). This process of communication can convey both positive and negative information, which inherently alters the nature of the relationship between leader and follower depending on the valence and quality of interactions shared. When high-quality exchanges are expressed by one member, reciprocity norms suggest that members expect to also receive positive exchanges from others they interact with (Wayne, Shore, & Liden, 1997). Thus, leaders and followers are motivated to send positive exchanges to each other with the hopes of receiving similar exchanges in return.

Based on the tenets of the social-exchange literature, leader-member exchange (LMX) theory describes the communication sending-receiving process between leader and follower as a series of "exchanges," which are finite and limited resources (Graen & Uhl-Bien, 1995). Because

exchanges are limited, communications that are sent from leaders are not distributed to followers equally and may lead to disparate treatment of subordinates depending on the quality of social exchanges sent by the leader. Individuals that receive positively-valanced exchanges from the leader often become part of the "in-group", with associated benefits such as increased organizational citizenship behaviors, job performance, and organizational commitment (Dulebohn, Bommer, Liden, Brouer, & Ferris, 2012; Gerstner & Day, 1997; Ilies, Nahrgang, & Morgeson, 2007). Conversely, subordinates that receive negatively-valanced exchanges—or a lack of communication entirely—are termed "out-group" members, which has been linked to increased turnover intentions and actual turnover, role conflict, and role ambiguity (Dulebohn et al., 2012; Gerstner & Day, 1997).

A foundational aspect of LMX theory suggests that these interactions take place within the vertical dyad linkage (VDL), where social exchanges and communication are shared between supervisor and subordinate (Dansereau, Graen, & Haga, 1975; Schriesheim, Castro, & Cogliser, 1999). Leaders and subordinates can be examined both individually and together to determine how context and processes affect both members of the VDL paradigm. While LMX specifically can be measured through both participants within the VDL, the current study is particularly interested solely in subordinates' perception and attitudes toward LMX quality. This explicit focus on subordinate perceptions has been the intent of a variety of studies aimed at measuring the impact leaders have on those that work under them, and how subordinates react to and engage with leader behavior (Bakker-Pieper & de Vries, 2013). According to a study by Kangas (2013), when subordinates initially interact with a leader for the first time, they experience a progression of elements that determine the quality of their relationship. Subordinates first enter this relationship with preconceived expectations about leadership in general, then engage in

formal and informal communication, then experience the decision-making of their leader, and finally experience a variety of work-related incidents (Kangas, 2013). In line with this process, Dienesch and Liden (1986) posit that subordinate perceptions of LMX quality begin after the first communication exchange between leader and subordinate and then develop as more workplace interactions occur. Therefore, communication and interaction between leader and subordinate are precursors to the formation of subordinate perceptions of LMX quality (Dienesch & Liden, 1986).

Communication plays a critical role in LMX theory, leader-follower interactions, and the subsequent perceived quality of the leader-follower relationship (Ruben & Gigliotti, 2016). Regardless of the organizational setting, leaders must utilize various forms of communication in order to send or receive social exchanges with those that work under them. Considering that personal communication is a necessary and critical component to social exchanges that drive the quality of leader-member relationships, the theoretical construct of LMX has been conceptualized as a communication-based descriptor of leadership itself (Ruben & Gigliotti, 2016). In a review of communication-based publications in *The Leadership Quarterly* by Fenner and Piotrowski (2018), LMX was the most frequently used leadership theory for explaining communication-related phenomena that occur surrounding the leadership domain. Fenner and Piotrowski also suggest that leadership models should be used more frequently to address gaps in the communication literature surrounding organizational communication content areas. Given the strong foundation LMX theory provides for communication within leader-follower relationships, the overall framework for the current study used this social exchange model to investigate the effects of technology-based communication on relevant leadership outcomes. More specifically, the present study examined how technology-based communication type and frequency, leader

behavior, subordinate personality, and subordinate attitudes toward technology impact subordinates' perceptions of LMX quality and, consequently, how these perceptions lead to relevant organizational outcomes.

One of the most impactful changes in modern work settings includes higher percentages of the workforce performing their work in either a virtual or distanced proximity to their direct supervisor (Mourino-Ruiz, 2010). Virtual work teams are rapidly spreading throughout common business practices and account for a large proportion of organizational operations around the globe (Bell & Kozlowski, 2002; Purvanova & Bono, 2009). According to the Society for Human Resource Management (2012), over 66% of multinational organizations use some form of virtual work teams, with an even higher percentage expected in the near future (Gilson, Maynard, Young, Vartiainen, & Hakonen, 2015). This shift in how organizational teams connect and perform provide unique challenges for how leaders interact and communicate with subordinates and ultimately what leader behaviors lead to successful virtual-work outcomes. While there is a growing body of literature that seeks to explain virtual workplace communication, previous studies have primarily focused on team-centric theories that account for social interactions mediated through technology that occur in broad team contexts (Charlier, Stewart, Greco, & Reeves, 2016). While these studies are useful for explaining variables that pertain specifically to workgroups, the current study included a narrower focus on the VDL context, where subordinates and leaders interact on a one-on-one basis and directly share communication on a personal level. The reason for this is to separate the effects that team members have on individuals from the direct leader-subordinate relationship that occurs in the virtual work context. This focus is especially useful for investigating how leaders directly impact the attitudes and perceptions of those that work under them (Neufeld, Wan, & Fang, 2010).

Information and Communication Technologies

With the frequent advent of new technology, information and communications technology (ICT) within the workplace is constantly expanding throughout organizations to help connect individuals to one another (Boswell & Olson-Buchanan, 2007). ICT includes internet browsers, phones, email, video conferencing, and other forms of digital communication. Given the drastic increase of technological reliance within organizations, this sparsely researched area is of critical importance for both theory and practice within the leadership domain (Brynjolfsson & Hitt, 2000). While the use of new ICT has the potential to improve the overall performance and efficiency of organizations, it also carries a significant amount of concern in terms of misuse and negative outcomes that result from being constantly connected to work and relying on the heavy use of technology (Boswell & Olson-Buchanan, 2007; Weatherbee, 2010). For example, Gaudioso, Turel, and Galimberti (2017) found that the overuse of technology in the workplace can lead to negative workplace outcomes such as work-family conflict, distress, and exhaustion through the mechanisms of techno-invasion and techno-overload. According to the authors, these technology-based stressors lead to negative strains on employees unless proper buffers or coping mechanisms are in place to deter negative outcomes.

Because the modern work environment encourages employees to be constantly connected through technology, supervisors and subordinates are increasingly leveraging the use of ICT to stay connected and exchange information frequently (Hill, Kang, & Seo, 2014). This heavy reliance on technology often results in higher workgroup productivity and increases in overall firm performance, but the effects on human capital are less well-known within the extant literature (Arvanitis & Loukis, 2009). Some research suggests that communication through ICT often results in less-positive worker outcomes than those associated with face-to-face (FTF)

interactions (Cascio, 2000; Hambley, O'Neill, & Kline, 2005). Although LMX theory would suggest that frequent communication between leader and subordinate may positively influence their relationship quality, the opposite has been found. Harris, Harris, Carlson, and Carlson (2015) found that information and communication overload as well as technology systems feature overload are all significantly negatively related to LMX quality. That is, relationship quality may likely be reduced over time when a leader and subordinate communicate via ICT on a highly frequent basis, not accounting for other factors.

It is important to mention that ICT has varying capacities to affect workers for either better or worse. According to media richness theory, the exchange of information through different forms of digital media varies based on the richness of the media used (Daft & Lengel, 1984). When information is shared via media that are high in richness, such as FTF communication and telephone conversations, a greater sense of information understanding occurs. However, these findings are limited in scope because media richness is most often used to investigate the nature of organizational tasks and the resulting media that best suits them, such as task complexity, decision making, task uncertainty, and information interpretation and recall (Badger, Kaminsky, & Behrend, 2013; Kahai & Cooper, 2003; Sheer & Chen, 2004; Tan, Tan, & Teo, 2012). More recently, computer-mediated communication literature has sought to investigate the effects of media richness in workplace relationship contexts in addition to task-related phenomena. Leonard, Scotter, and Pakdil (2009) theorized that individuals may vary in terms of their preference for rich versus lean media (i.e., written or text-based communication), which then impacts their communication effectiveness and resulting relationships with others they work with. Additionally, Hill, Kang, and Seo (2014) found that LMX directly interacts with ICT use when predicting positive psychological empowerment such that high LMX quality

relationships and the use of ICT (rather than FTF) led to stronger feelings of psychological empowerment. While these findings are quite varied in focus, they suggest the importance of examining the impact of media richness on resulting relationship quality between individuals utilizing ICT. It should also be noted that most of the traditional studies of ICT media richness have examined effects relating to the nature of the information sharing process, task types, and media characteristics (Mennecke, Valacich, & Wheeler, 2000). However, the present study is focused more narrowly on the impact media richness has on leader-subordinate relationships. For this reason, more recent theoretical approaches to media richness were used because they more closely align with social exchange theories of communication and relationship quality (Dulebohn & Hoch, 2017).

The richness of communication media can be conceptualized as a continuum, where FTF interactions are perceived as being the most engaging communication format, followed by video conferencing, phone calls, then text-based chat (e.g., instant messaging and texting), and finally email (Hambly, O'Neill, & Kline, 2005). Overall, more positive team outcomes are associated with richer ICT media with several caveats (Hambly, O'Neill, & Kline, 2005). Hambley, O'Neill, and Kline found that the use of ICT did not impact task performance, and while FTF and videoconferencing led to higher mean team cohesion, fewer differences were found between less-rich media formats. These inconclusive findings create the need for more clarification on the effects of different ICT types on leader-member outcomes. Other studies have indicated that different types of ICT may result in subordinates feeling more distanced from their supervisor, leading to lower perceptions of relationship quality (Brunelle, 2013). Brunelle identified that workers who are physically distant from their leaders and who experience psychological distance, which is linked to excessive mobile communication formats, are more likely to

experience a negative impact on LMX relationship quality. For these reasons, it is expected that the frequent use of ICT methods, especially those with less rich media, will result in lower ratings of LMX quality compared to FTF interactions.

> *Hypothesis 1a: Higher use of ICT for leader-member communication will lead to lower subordinate perceptions of LMX quality compared to FTF.*

> *Hypothesis 1b: Richer ICT formats (e.g., video conferencing, phone) will have lesser negative effects on LMX quality than less rich media (e.g., text-based chat, email).*

Mitigating Negative ICT Effects

Fortunately, the use of ICT in virtual and distance work relationships does not always lead to negative outcomes. This is especially true when the use of technology is bolstered by favorable contextual factors as well as adaptive individual differences and attitudes (Day, Paquet, Scott, & Hambley, 2012; Harris, Harris, Carlson, & Carlson, 2015; Sevinc & D'Ambra, 2010). Specifically, Day et al. (2012) identified that ICT effects often depend on the demands that stem from ICT use as well as the support that is offered to meet those demands. When organizations provide workers with ICT-specific support, the negative effects of strain, stress, and burnout can be substantially mitigated (Day et al., 2012). Research has also suggested that other factors can lessen the negative impact of ICT use, including attitudes toward technology, social norms surrounding technology use, the workplace context surrounding computer-mediated communication, and individual differences (Holden & Karsh, 2010). The following section will address the present study's moderating variables of interest in reducing the negative effects of ICT use on leader-subordinate relationship quality.

Technology Acceptance. The current workforce is in constant contact with technology, regardless of type, increasing the amount of work that must be completed on computers and

other devices (Joshi, Lazarova, & Liao, 2009). When individuals are fairly comfortable with operating a variety of technology types, they may be potentially spared from the negative effects of technology on work outcomes. Magni and Pennarola (2008) propose a model where those who are accepting of new technology are less likely to experience negative workplace relational effects. Therefore, when subordinate technology acceptance is high, the negative effects of digital leader-member interaction on LMX ratings should be significantly reduced. The relationship between technology acceptance and LMX is virtually unknown, with only one study using cross-sectional correlation data to examine LMX and technology acceptance, finding a positive relationship (Magni & Pennarola, 2008). Drawing from both social exchange theory and technology acceptance theory, technology use and attitudes towards technology have a high potential for explaining how leader-member relationships form when communication is primarily conducted through technological means. Given the drastic increases of technological reliance within organizations, this sparsely researched area is of critical importance for both theory and practice (Brynjolfsson & Hitt, 2000). Based on the sparse previous analyses on technology acceptance and LMX, the current study aims to clarify the role technology acceptance plays in the perceptions of subordinates based on communication forms.

> *Hypothesis 2: Technology acceptance will moderate the relationship between*
>
> *technology use and LMX ratings, such that the negative relationship will become*
>
> *positive at high levels of technology acceptance.*

Transformational Leadership. Previous research has found that technology use in leader-member relationships affects the quality of interactions. Indeed, Brunelle (2013) found that physical distance between leader and subordinate, requiring mostly technology-based communication, resulted in lower subordinate perceptions of LMX. However, leadership style

9

moderated this relationship in that the deleterious effects of distance on LMX were reduced when leaders exhibited high levels of transformational leadership (Brunelle, 2013). This finding suggests that leadership behavior may play an important moderating role when leaders and subordinates interact through digital means. For instance, leaders that use democratic styles of leadership might also be able to mitigate the negative effects of digital interactions on LMX, based on the findings of Brunelle (2013). This finding is especially important for leaders and subordinates that work primarily through digital communication because research suggests that virtual employees encounter a significantly different leadership work environment than those that operate face-to-face (Serban et al., 2015). Similarly, Purvanova and Bono (2009) found that leaders in both virtual and face-to-face settings tend to use the same amount of transformational leadership behaviors on average.

Some evidence suggests that ICT may be particularly susceptible to the positive effects of transformational leadership style. Indeed, increasing one's transformational leadership behaviors has a stronger effect on team performance for those using computer-mediated communication, suggesting that the transformational method of leadership is especially critical in virtual relationships (Purvanova & Bono, 2009). The authors suggest that leaders using technology-based communication may often choose to employ more transformational leadership behaviors to successfully adapt to the challenges of virtual work when FTF communication is limited. Consequently, leaders that fail to increase their transformational leadership in the virtual workspace may experience less-effective relationships with subordinates, particularly as it relates to LMX quality. Wang, Law, Hackett, Wang, & Chen (2005) demonstrated the importance of transformational leadership behavior and its direct and strong ($r = .71$) impact on increasing LMX quality for both subordinate and leader. Further, this increase in LMX due to increased

transformational leadership also led to significantly higher task performance and enacted organizational citizenship behaviors (Wang et al., 2005).

Additional studies have also found that transformational leadership is especially well-suited for increasing leader-follow communication effectiveness within remote work relationships (Neufeld, Wan, & Fang, 2010). Remote workers that experience higher levels of transformational leadership are more likely to describe communication with their leader as more effective and rate leader performance higher compared to those that experience higher levels of transactional contingent reward leadership (Neufeld, Wang, & Fang, 2010). These findings suggest that transformational leadership behaviors may potentially moderate between technology-based communication and LMX quality, where higher levels of transformational leadership may lessen the negative effects of technology-based communication on LMX subordinate ratings.

Hypothesis 3: Transformational leadership will moderate the relationship between technology use and LMX ratings, such that the negative relationship will become positive at high levels of transformational leadership.

Personality. The impact that individual differences have on describing the interaction of persons, situations, and behavior is of critical importance for the present study. According to Funder (2006), personality explains unique variability as to how individuals react and respond to situations and contexts in differing ways. For example, even with strong evidence of the impacts of communication technology on LMX and the mitigating influence of leadership behaviors, personality provides necessary explanation of how individual subordinates may react differently to this context-behavior interaction. Within the context of the present study, it is expected that not all individuals will react to technology-based communication the same way nor will their

resulting leadership perceptions and ratings occur uniformly across individuals. Thus, personality may explain how subordinates use ICT while maintaining a positive LMX quality with their leader.

Some evidence suggests that subordinates respond to virtual communications differently depending on their personality (Salter, Green, Duncan, Berre, & Torti, 2010). Specifically, subordinates with high agreeableness and openness to experience were more likely to rate leaders more favorably after reading leaders' virtual communications than subordinates with lower scores on these personality factors. Similarly, personalities are closely related to workers' communication styles and directly impact LMX (Bakker-Pieper & de Vries, 2013). While the primary focus of this study examined how communication styles display incremental validity over personality aspects on the prediction of LMX, the authors outline the integral relationship between communication and personality for explaining subordinate perceptions of leadership (Bakker-Pieper & de Vries, 2013). Another important finding of this study was the direct relationships between the Big Five personality factors and subordinate-rated LMX perceptions, such that extraversion, conscientiousness, openness to experience, and agreeableness are all significantly positively related to LMX ratings. Consequently, all Big Five traits are also highly related to expressive and precise communication styles, showing further evidence that personality plays a significant role in the communication domain (Bakker-Pieper & de Vries, 2013; Oren, Tziner, Sharoni, Amor, & Alon, 2012). However, not all evidence points to such strong relationships between personality and LMX quality.

Some research suggests a minimal—or even null—relationship between personality and LMX. Kalshoven, Den Hartog, and De Hoogh (2011) found no significant relationship between the Big Five personality traits and subordinate ratings of LMX; however, this may have been due

to low sample size. Other theorists have also found that the relationships between Big Five traits do not consistently vary with LMX. For example, subordinate LMX ratings are only moderately positively correlated with conscientiousness and agreeableness (Kamdar & Van Dyne, 2007). Overall, most studies do show some amount of consistency that the Big Five personality traits are related to LMX: extraversion, conscientiousness, openness to experience, and agreeableness are all positively related to LMX, and neuroticism is negatively related to LMX (Bakker-Pieper & de Vries, 2013; Berneth, Armenakis, Field, Giles, & Walker, 2007; Liao, Yang, Wang, Drown, & Shi, 2013). Given the differing findings regarding the influence of personality on subordinate-rated LMX, the current study will explore not only the direct relationship between each personality facet and LMX, but also the moderating effect of each uniquely and in conjunction when explaining the relationship between technology-based communication and LMX ratings. Based on theoretical perspectives and previous findings, agreeableness and extraversion should both positively impact how an individual interacts with others, since these are often more pronounced for individuals who value high-quality relationships with others, especially in leader-subordinate contexts (Oren et al., 2012).

> *Hypothesis 4: Personality will moderate the relationship between ICT use and LMX ratings, such that the negative relationship will become positive at high levels of agreeableness and extraversion.*

Outcomes of LMX

While the primary purpose of this study is to investigate the impact that ICT and leader-subordinate communication have on LMX, it is also important to understand how these antecedents and resulting changes in LMX also relate to outcomes that are relevant to organizational functioning and workforce management. Theorists have suggested that virtual and

distance workers currently, and will continue to, influence and shape the effectiveness of many organizations (Dulebohn & Hoch, 2017). In their framework, Dulebohn and Hoch posit that the virtual work context should be conceptualized as an input-process-output (IPO) model. In the present study, inputs will include the use of ICT for leader-subordinate communication, which then interacts with organizational/interpersonal processes (such as LMX, transformational leadership, and personality), and ultimately affects the outcomes of communication and leader satisfaction, leader effectiveness, and turnover intentions. Regarding technology-based communication and ICT, very few studies have employed this holistic IPO model to examine the effects of virtual/distant work on leaders and subordinates. Only one study to date has explored how communications technology impacts performance through the mechanisms of emotional intelligence and effective communication (Graham, 2009). However, Graham's article was theoretical in nature and did not empirically investigate the nature of these relationships. Given the lack of studies on the IPO of ICT, individual differences, leadership, and their resulting outcomes, the current study will examine how these interact to impact subordinates' satisfaction with different levels of communication, satisfaction with their leader, and ultimately their intentions to remain with their current organization.

Communication Satisfaction. Among the existing literature on the effects of ICT on the workforce, many studies choose to include the outcome variable of both organizational communication climate satisfaction as well as supervisory communication satisfaction (Downs & Hazen, 1977; Mueller & Lee, 2002). Mueller and Lee discovered that LMX positively affects subordinates' communication satisfaction involving organizational, interpersonal, supervisory, co-worker, corporate, and climate communication. As a construct overall, communication satisfaction can be thought of as a person's satisfaction with the information flow that occurs

14

within some form of a relationship (Downs & Hazen, 1977; Tsai, Chuang, & Hsieh, 2009). Similar to reciprocity norms within LMX, communication satisfaction involves a person's affective response to having his/her communication expectations met while exchanging information flows back and forth (Mueller & Lee, 2002; Hecht, 1978). Employees may establish an information flow with any part of an organization, such as corporate entities, supervisors, coworkers, and subordinates and therefore can indicate their level of satisfaction with the information flow between themselves and others they communicate with. This outcome is especially important to consider when examining how ICT is used between leaders and subordinates and ultimately how leadership relationships alter subordinates' perceptions of communication satisfaction with both their leaders and the overall organization. When both virtual workers are given a conducive environment to communicate through technology and supervisors and upper management interact effectively with ICT, virtual workers indicate higher levels of organizational communication and communication climate satisfaction than traditional FTF office workers (Akkirman & Harris, 2005). Based on these results and the findings of Mueller and Lee (2002), LMX should positively impact multiple aspects of subordinates' communication satisfaction.

> *Hypothesis 5: LMX will be significantly positively related to subordinates' high*
> *satisfaction with supervisory communication, as well as the organizational*
> *communication climate.*

Satisfaction with Leader and Leader Effectiveness. From the perspective of the subordinate, behaviors and communication coming from the leader can have a significant impact on the perceptions of those under them. For example, implicit leadership theory outlines that subordinates hold stable expectations of leadership in general, often called leadership prototypes,

which they use to evaluate displayed leadership behaviors and perceived effectiveness (Eden & Leviatan, 1975). Similarly, LMX and social exchange theory encompass leader and subordinate expectations of exchanges via the sharing of information and social interactions, which can substantially impact the perceptions of subordinates (Epitropaki & Martin, 2005; Gerstner & Day, 1997). In their review of the construct of LMX, Gerstner & Day (1997) revealed that LMX quality was positively related to subordinates' perceptions of satisfaction of the leader and leader-rated subordinate effectiveness. Others have confirmed that subordinate perceptions of leader satisfaction and leader performance are highly related to subordinate ratings of LMX, such that higher subordinate LMX ratings lead to subordinates perceiving higher satisfaction with leaders and rating leaders as being high performers (Bakker-Pieper & de Vries, 2013; Martin, Guillaume, Thomas, Lee, & Epitropaki, 2016; Eliophotou Menon, 2014). There is also considerable evidence that communication styles and transformational leadership behaviors may also increase subordinates' perceptions of leader satisfaction and effectiveness ratings, occurring through the conduit of increased leader-subordinate relationship quality (de Vries, Bakker-Pieper, & Oostenveld, 2010). These findings suggest that LMX should be positively related to both leader satisfaction and leader effectiveness as rated by the subordinate.

Hypothesis 6: LMX will be significantly positively related to subordinates' high leadership satisfaction and ratings of leader effectiveness.

Turnover Intentions. Subordinates' turnover intentions—the intention to leave one's organization—is perhaps the most frequently examined consequence of LMX (Dulebohn et al., 2012). Highly consistent findings suggest that the higher LMX rating a subordinate indicates, the less likely they are to have intentions to leave their organization (Gerstner & Day, 1997; Harris, Harris, & Brouer, 2009). According to Eisenberger et al. (2001), meeting the communication

reciprocity norms involved in LMX interactions creates higher subordinate affective commitment to the organization, making it less likely that they will plan to leave the organization. A great deal of research has examined not only the direct influence of LMX quality on turnover intentions, but also indirect relationships through constructs like job satisfaction, empowerment, and organizational commitment (Harris, Wheler, & Kacmar, 2009; Joo, 2010; Mardanov, Heischmidt, & Henson, 2008). For the present study, LMX should be directly related to subordinates' turnover intentions, where higher subordinate ratings are associated with lower turnover intentions.

> *Hypothesis 7: Subordinate-rated LMX will be significantly negatively related to subordinates' turnover intentions.*

Integrated Model

The previously mentioned hypotheses of the current study involve the examination of antecedents, moderators, and outcomes of LMX theory, drawing from a variety of sources that account for the effects of context, subordinate personality, and leader behavior. In order to better understand how these constructs interact when explaining LMX and its outcomes, an integrated structural equation model (SEM) will be run to test the function of this model in a variety of ways. First, the communication-moderator-LMX-outcome path will be investigated for each moderator type: technology acceptance, transformational leadership, and personality. The reason for testing these models separately is to determine how these relations are expressed uniquely without the influence of other moderators. Next, a fully-integrated model will be run with all moderators present in the model to test the relative contribution of each respectively. Results will be able to provide evidence for the fit of the proposed mediated-moderation models and overall model, which can be found in *Figure 1*.

Hypothesis 8: The integrated SEM (moderated-mediation) model will result in a good fit for the observed data.

Research Question 1: Which (if any) of the proposed moderated-mediation models will produce a superior significant result (i.e., technology acceptance, transformational leadership, personality) compared to the others?

Method

Participants

In total, $N = 227$ individuals completed both waves of the study. This number includes only individuals who indicated their MTurk worker ID for both surveys, correctly answered all insufficient effort response (IER) items, and successfully completed the HIT assigned in MTurk. This group ($N = 227$) is comprised of US citizens with 57.7% being female, an average age of 39 years old, and an average organizational tenure of 8.8 years, with an average of 5.3 years with their current direct supervisor (i.e., leader) (see *Table 1a* and *1b* for all demographics).

Of those that participated in wave one of the study, $N = 500$ individuals completed the survey and MTurk HIT. After removing those who responded incorrectly to the IER items or did not correctly list their worker ID, 469 individuals were counted with complete data and were invited to participate in wave two. For those invited, 231 participants completed the wave two HIT, where 227 passed the IER items and provided their MTurk ID. This final group of $N = 227$ is the group that was used for all analyses.

Procedure

Participants were recruited through the use of Amazon's Mechanical Turk (MTurk). Mturk consists of an online platform where requesters (i.e., researchers) can post research studies which can then be accepted by participants for monetary compensation. In terms of the data

quality from studies conducted through Mturk, research has demonstrated that when the study's survey length and pay offered are reasonable, participants provide high-quality data that is similar in reliability compared to traditional methods (Buhrmester, Kwang, & Gosling, 2011). This tool is specifically well-suited for collecting data from participants with a wide range of backgrounds and work experiences. According to a study by Michel, O'Neill, Hartman, and Lorys (2018), MTurk has been found to sample a diverse group of organizational members that closely aligns with workplace population norms. Additionally, Mturk also results in a more demographically diverse sample compared to other internet samples and is especially more diverse than studies conducted on American college student populations (Buhrmester, Kwang, & Gosling, 2011). Mturk has also been used in previous studies examining social exchange theory and subordinate perceptions of LMX, adding evidence that this method is conducive for examining the current hypotheses of interest (Covella, McCarthy, Kaifi, & Cocoran, 2017).

The use of MTurk allows researchers to set qualifications that participants must meet in order to participate in and complete a study. The current study required participants to have already completed a minimum of 100 approved Human Intelligence Tasks (HITs) and an approval rate greater than or equal to 95-percent from previous MTurk HITs (Peer, Vosgerau, & Acquisti, 2014). Participants were also pre-screened to ensure they are at least 18 years of age, currently work full-time for an organization (35 hours or more per week), have a direct supervisor, and reside/work in the United States. Even though studies have demonstrated that computer "bots" and human inattention are not serious issues for MTurk samples (Chambers, Nimon, & Anthony-McMann, 2016; Hauser & Schwarz, 2016; Smedema, 2013), items were included to measure insufficient effort responding (IER) and to also detect automated responses, aligning with recommended methods from IER literature (Huang, Curran, Keeney, Poposki, &

DeShon, 2012; Meade & Craig, 2012). For example, "Please select strongly agree for this item" would be an IER item. Any participants that missed an IER item were removed from the study, with no analyses being conducted with their data.

Data were collected in two waves using Qualtrics surveys launched in Mturk, each at least one week apart. This method of time-lagged surveying was utilized to lessen the impact of common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). During the first wave, ICT, technology acceptance, transformational leadership, and personality were measured, with the second wave containing the measure for LMX as well as the outcome variables of interest.

In order to provide sufficient statistical power for the proposed analyses, the obtained sample size of $N = 227$ is adequate to detect existing effects, especially when considering a latent-structure moderated-mediation SEM design (Thoemmes, MacKinnon, & Reiser, 2010).

Measures

Demographics. A variety of demographic variables were included to accurately describe the study participants. Items covered demographics such as gender, age, organizational tenure, and technical proficiency. Participants were also asked to indicate the gender and age of their leader, as well as their length of time working under them.

ICT Use/Richness. Similar to previous studies on virtual work and ICT research, technology use was measured as the relative amount of time an individual spends on communication media with their supervisor (Hill, Kang, & Seo, 2014; Maynard, Mathieu, Rapp, & Gilson, 2012). This was indicated by selecting the percentage of time spent communicating with one's leader on the following media types: printed media, emailing, instant messaging/texting, phone/audio conference, video conference (e.g., Skype, WebEx), and face-to-

face interaction. The prompt for this item asked, "On average, what percentage of your time do you spend on each activity related to communicating with your direct supervisor?" Participants were also asked, "On average, what percentage of your work time do you spend communicating with your direct supervisor?", which was also indicated as a percentage.

Technology Acceptance. Based on the measure validated by Venkatesh and Bala (2008), technology acceptance was assessed through the TAM3. This measure was adapted for the focus of the current study, such that only perceived usefulness, perceived ease of use, perceptions of external control, computer anxiety, perceived enjoyment, and job relevance will be measured, consisting of 21 items. Some example items include "I find emailing to be useful in communicating with my direct supervisor", "I find emailing to be easy to use", and "I have control over using email".

Transformational Leadership and Leader Effectiveness. The Multifactor Leadership Questionnaire (MLQ) was used to measure subordinates' perceptions of their direct supervisors' transformational leadership behaviors as well as their effectiveness (Avolio, Bass, & Jung, 1999). The MLQ measure contains the sub-facets of inspirational motivation, intellectual stimulation, individualized consideration, and idealized influence (attributes and behaviors) which are assessed with 36 items. An overall composite score was computed from the average of the four sub-facets to create an overall estimate of subordinate-rated transformational leadership. Some example items include "My direct supervisor spends time teaching and coaching me" and "My direct supervisor articulates a compelling vision for the future."

Big-Five Personality Traits. Personality traits were measured through the mini-IPIP6 (Sibley et al., 2011). This shortened form measure of the Big-five traits did not include the honesty-humility facet, making the scale 20-items long, with four questions each for the

personality traits of extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. This scale is widely used in psychological research and demonstrates strong evidence to the instrument's validity and reliability as a useful measure of the big-five personality traits (Donnellan, Oswald, Baird, & Lucas, 2006; Sibley et al., 2011). Example items include "I am the life of the party", "I feel others' emotions", and I have frequent mood swings."

LMX. For the purposes of this study, the most suitable measure for LMX is the LMX-7 (Graen & Uhl-Bien, 1995). It consists of 7 items that ask a leader and/or member to rate their perceptions of each other. Each item was rated on a Likert scale of 1-5, with 5 always being the most favorable answer since each item included a unique response score label. All scores averaged to create an aggregate score that results in that individual's total LMX score, indicating their perceived level of relationship quality with their leader. This measure can be evaluated in terms of group ratings, dyad ratings (aggregate of both the leader and subordinate), or individual ratings. Since the current study only intended to capture the subordinate's ratings, the LMX-7 measure is suitable for this purpose.

In terms of dimensionality, Graen and Uhl-Bien (1995) state that LMX-7 captures the three dimensions of respect, trust, and obligation. However, these dimensions are highly correlated, with a reported Cronbach's Alpha of .80, displaying high internal consistency for all seven items. For this reason, Graen and Uhl-Bien characterize LMX-7 as a unidimensional measure.

Communication Satisfaction. Several facets were measured to capture subordinate communication satisfaction. Specifically, one measure of communication satisfaction has been validated and has also been shown to demonstrate a relationship with LMX (Mueller & Lee, 2002). For the present study, the facets of supervisory and corporate climate communication

22

satisfaction were measured. An overall composite score was created to represent subordinates' overall perceptions of communication satisfaction. Overall, the individual facets of communication satisfaction have been shown to be quite stable and each account for unique description of organizational communication satisfaction (Downs & Hazen, 1977). Some example items include, "How satisfied are you with the extent to which written directives and reports are clear and concise?" and "How satisfied are you with the extent to which your supervisor listens and pays attention to you?"

Satisfaction with Leader. The level of satisfaction subordinates perceive with their leader was measured using the Multifactor Leadership Questionnaire (MLQ) revised by Avolio and Bass (2004). This scale has been widely used and validated across organizational fields of study, especially providing consistent results for the sub-facet-level measures of satisfaction (Fried, 1991). Participants will respond on a 5-point Likert scale from "not at all" to "fairly, if not always" on items such as, "[Your leader] uses methods of leadership that are satisfying".

Turnover Intentions. While some studies opt to use a single-item to measure turnover intentions, there is evidence that multi-item measures produce more consistent and comprehensive predictions of turnover behaviors (Tett & Meyer, 1993). For this reason, the five-item measure of Turnover Cognitions was used to evaluate participants' intentions to leave their organization (Bozeman & Perrewé, 2001). Example items include, "I will probably look for a new job in the near future" and "I do not intend to quit my job (reverse scored)."

Results

Descriptives

In total, 227 individuals provided complete data for both wave one and two of the study. The average age of participants was 39 years old, with a job tenure of 8.8 years and an average

5.3-year tenure with their current leader. Participants indicated that 52.4% of their leaders were female, with an average age of 47 years old. Involving technology competence, 9% indicated that they considered themselves as "basic", 38% considered themselves "intermediate", 33% as "advanced", and 19% considered themselves as "experts". Overall, participants communicate with their leader roughly 61% of their total worktime, and these communications occur via ICT around 39% of the time. Of the ICT types, email is used most frequently at 21% of overall communication with leaders, followed by both phone/audio and texting/messaging at 10% each, video conferencing at 5%, and printed media being 2% of all communication types.

Check for Common Method Variance

A two-wave design was utilized in this study to reduce the potential effects of common method variance (CMV). Waves one and two were separated by seven days between the end of wave one and the beginning of wave 2. This separation is meant to temporally and psychologically separate the measurement of the study's predictor and criterion variables of interest (Podsakoff et al., 2003). The average lag between participating in wave one and wave two was over 13 days (M = 13.25, SD = 2.10), and the shortest lag for any participant was 7.08 days. While this week-long separation between measurement periods was likely sufficient to allow participants to lose the short-term memory of their previous responses, the Harman's single-factor test was conducted to check for the presence of CMV (Podsakoff et al., 2003). This involves running all study variables from both waves in an unrotated exploratory factor analysis (EFA) to determine if a single factor emerges. A principle axis factoring extraction method was chosen, aiming to identify eigenvalues greater than one. Results indicate that 16 factors obtained an eigenvalue greater than 1, explaining roughly 73% of the total variance. Of these, five factors obtained an eigenvalue greater than 3, suggesting that a single-factor solution would be highly

24

unlikely given the data. The resulting dataset does not appear to exhibit a significant amount of common method variance due to the study wave lag.

ICT and Media Richness Effects on LMX

Hypothesis 1a was run using simple regression to determine if the use of ICT for communication between leaders and subordinates is linked to LMX ratings. Results indicated that the use of ICT ($M = 48.33$, $SD = 29.71$) was not a significant predictor of LMX quality ($M = 3.66$, $SD = .80$), $F(1,225) = 2.13$, $p = 0.15$, $R^2 = .01$, $b = -.105$. To further investigate this effect, a one-way ANOVA was run on two groups, one being those who's communication format was primarily face-to-face (more than 50% of the time) and those who communicate primarily through ICT. Results indicated that individuals who communicate more through FTF ($M = 3.76$, $SD = .72$) rated significantly higher LMX quality than those who communicate more through ICT ($M = 3.51$, $SD = .90$), $F(1,225) = 5.04$, $p = 0.03$. These results suggest that leader-subordinate communication through ICT may only have a slightly negative effect on LMX quality, if at all, showing only minor evidence for the support of Hypothesis 1a.

To determine if media richness positively impacts subordinate ratings of LMX, regression was also utilized. Based on the analysis, media richness ($M = 2.78$, $SD = 1.97$) does not appear to impact the level of subordinate rated LMX quality, $F(1,225) = 0.01$, $p = 0.91$, $R^2 = 0.00$, $b = 0.02$. When considering only ICT media, the richness of the method of communication does not seem to have a direct impact on LMX quality between leader and subordinate. Thus, there is no support for Hypothesis 1b. Overall, results indicate the direct measures of ICT use and media richness are not significant predictors of LMX quality, leading to the need for an explanatory model between these variables and LMX.

Mitigating the Effects of ICT on LMX

Given that the primary direct relationships between ICT and media richness with LMX were non-significant, moderation/mediation models may provide further insight into the nature of the relationships between these constructs. First, the effect of technology acceptance was tested using a moderation analysis using bootstrapping to estimate confidence intervals for the effect, utilizing the PROCESS macro for SPSS designed by Hayes (2012). Results show that the overall model accounts for a significant amount of prediction of LMX quality, $F(3,223) = 11.36$, $p < .001$, $R^2 = 0.13$. However, technology acceptance is the only significant predictor within the model, $b = 0.37$, $t(225) = 2.01$, $p < .05$, 95% CI [0.007; 0.729]. The result for the interaction between ICT use and technology acceptance did not yield a significant effect, $b = 0.003$, $t(225) = 1.10$, $p = 0.27$, 95% CI [-0.003; 0.010]. These findings do not support Hypothesis 2, since technology acceptance does not significantly moderate the relationship between ICT use and LMX. However, this does show that LMX is directly impacted by perceptions of technology acceptance. While not hypothesized, this is relevant to understanding the nature of the variables of interest.

A moderation analysis was also used to determine if the interaction between ICT use and transformational leadership behaviors significantly impact subordinate's ratings of LMX. Similar to the findings for Hypothesis 2, the overall model is significant, where the variables account for a significant amount of variability in LMX, $F(3,223) = 74.60$, $p < .001$, $R^2 = 0.50$. Also similar to the previous analysis, transformational leadership was directly predictive of LMX, $b = 0.54$, $t(225) = 5.22$, $p < .001$, 95% CI [0.334; 0.738], while the interactive effect was non-significant, $b = 0.003$, $t(225) = 1.62$, $p = 0.11$, 95% CI [-0.001; 0.006]. Thus support was not found for Hypothesis 3.

The final hypothesized moderation models involve the interaction between the personality variables of agreeableness and extraversion with ICT use on the prediction of LMX. Regarding agreeableness, no predictor emerged with a significant effect, and the interaction term between agreeableness and ICT use yielded a non-significant result, $b = 0.003$, $t(225) = 0.195$, $p = 0.85$, 95% CI [-0.003; 0.003]. However, the overall model did account for a significant amount of variability in LMX, $F(3,223) = 3.68$, $p < .05$, $R^2 = 0.47$. Similarly, extraversion also did not significantly interact with ICT use when predicting LMX, $b = 0.001$, $t(225) = 1.08$, $p = 0.28$, 95% CI [-0.001; 0.003], however the overall model significantly predicted LMX scores, $F(3,223) = 4.93$, $p < .01$, $R^2 = 0.06$. Given that neither agreeableness nor extraversion significantly moderated the prediction of LMX by ICT use, Hypothesis 4 did not receive statistical support.

With the null effects for all moderation models, but several significant direct effects within those models, mediation effects were tested to detect if these analyses could explain more variability compared to the hypothesized models. Results indicate that only one variable significantly fully mediates the relationship between ICT use and LMX quality. When entered into a mediation analysis, technology acceptance fully mediates the relationship between ICT use and LMX ratings, such that the weak negative relationship between ICT use and LMX becomes significant and negative when technology acceptance is present, $F(3,223) = 16.42$, $p < .001$, $R^2 = 0.13$. The model is further supported since there are significant relationships between the predictor-mediator variables of ICT use and technology acceptance $b = 0.005$, $t(225) = 4.09$, $p < .001$, and between the mediator-criterion variables of technology acceptance and LMX $b = 0.539$, $t(225) = 5.52$, $p < .001$. Therefore, technology acceptance provides a significant predictive

path describing the effects of ICT use on the quality of leader-member relationships as measured through LMX.

Outcomes of LMX

A series of simple regressions were run to determine what outcome variables can be predicted by LMX ratings. First, communication satisfaction was regressed on LMX to determine if relationship quality significantly predicts subordinates' satisfaction with both leadership and organizational communication. Results confirmed that LMX accounts for a signification about of variability in overall communication satisfaction ($M = 5.14$, $SD = 1.27$), $F(1,225) = 295.48$, $p < .001$, $R^2 = .57$, $b = .753$. At the individual facet level, LMX significantly predicts both leadership communication satisfaction, $F(1,225) = 559.92$, $p < .001$, $R^2 = .71$, $b = .845$, and also company communication climate satisfaction, $F(1,225) = 107.69$, $p < .001$, $R^2 = .32$, $b = .569$. Higher ratings of LMX quality between leader and subordinate are associated with increased perceptions of communication satisfaction overall and at the facet level for leaders and the organization, providing strong support for Hypothesis 5.

A simple regression was also used to determine if LMX significantly predicts subordinates' ratings of how satisfied they are with their leader overall, including the sub-facets of leadership satisfaction, effectiveness, and inspiring extra effort. Overall, results indicate that LMX is a significant positive predictor of subordinate rated satisfaction with their leader ($M = 3.69$, $SD = 0.90$), $F(1,225) = 533.58$, $p < .001$, $R^2 = .70$, $b = .941$. This result holds true for the facet-level regressions as well, all maintaining strong, positive, and significant effects. Based on these analyses, strong support for Hypothesis 6 was found.

The prediction of subordinate turnover intentions was also examined using simple regression. The results suggest that LMX accounts for a significant amount of variability in

turnover intentions ($M = 2.46$, $SD = 1.18$), $F(1,225) = 75.21$, $p < .001$, $R^2 = .25$, $b = -.735$. As LMX quality increases, subordinates indicate fewer intentions to leave their current role, strengthening the likely hood that they will remain at the organization with the leader. This finding provides support for Hypothesis 7.

Integrated Model

Having run several regression and moderation analyses to examine the individual hypotheses, an overall structural equation model (SEM) was hypothesized, suggesting that these variable relationships comprised within one model would be a good fit for the observed data. Using Mplus, an SEM model was tested where LMX is regressed on ICT use and media quality, with tech acceptance, transformational leadership, and personality moderating the ICT-LMX linkage, and finally leader satisfaction, communication satisfaction, and turnover intentions are all regressed on LMX (See Figure 1 for theoretical model) (Muthén & Muthén, 2004). Results for the overall SEM model suggest that the model is not a good fit for the data, $\chi^2(30) = 108.53$, $p < .001$, $RMSEA = 0.107$, 95% CI [0.086; 0.130], $CFI = 0.913$, $TLI = 0.867$, $SRMR = 0.037$. In terms of predicting LMX quality, ICT use displayed a significant negative coefficient, $b = -0.328$, $p < .05$, as well as positive coefficients for media richness, $b = .257$, $p < .05$, technology acceptance, $b = .139$, $p < .01$, and transformational leadership, $b = .626$, $p < .001$. LMX significantly predicted all outcome variables, in line with the findings from simple regression. While the SRMR estimate indicated that the model is most likely a good fit for the model, the chi-square, RMSEA, CFI, and TLI estimates indicate lack of fit, suggesting the improvement over the null model is not ideal (i.e. at least 95%). Taken together, these results provide little support for Hypothesis 8, since these results cannot conclude that the model is a good fit for the data. (See *Figure 2* for the SEM measurement model)

Given the lack of support for all moderation hypothesis (Hypotheses 2-4), these modeled relationships are most likely reducing the goodness of fit for the overall model. To examine which moderator/mediator provides the best fitting model, a series of SEM analyses were run testing each moderator alone with the rest of the model. These analyses are intended to answer the research question of interest, investigating which moderating variable is most influential in predicting LMX quality. For the moderation effect of technology acceptance, an improved fitting model was found compared to the overall model, $\chi^2(12) = 21.50$, $p < .05$, $RMSEA = 0.059$, 95% CI [0.010; 0.099], $CFI = 0.987$, $TLI = 0.976$, $SRMR = 0.031$. Similar to the hypothesized integrated mode, all path coefficient estimates were significant and in the same direction as the hypothesized model, except for the non-significant interactive effect of technology acceptance and ICT use, $b = .042$, $p = .492$. This model indicates a meaningful increase in the goodness of fit estimates compared to the full hypothesized model, suggesting that the technology acceptance model is a good fit for the data (see Figure 3).

A similar analysis was run for transformational leadership, resulting in a model that did not emerge as a good fit for the data, $\chi^2(12) = 78.356$, $p < .001$, $RMSEA = 0.156$, 95% CI [0.124; 0.190], $CFI = 0.925$, $TLI = 0.863$, $SRMR = 0.046$. Every path coefficient estimate was significant and in the same direction as the hypothesized model, except for the interactive effect of transformational leadership and ICT use, $b = .062$, $p = .203$. When the personality moderation model was analyzed, a moderately good fitting result was found, $\chi^2(18) = 36.312$, $p < .001$, $RMSEA = 0.067$, 95% CI [0.035; 0.098], $CFI = 0.974$, $TLI = 0.957$, $SRMR = 0.038$. However, no significant direct effects on LMX were found for either agreeableness, $b = 0.118$, $p = 0..073$, or for extraversion, $b = .126$, $p = 0.062$. Also, neither personality interaction term produced a significant coefficient estimate.

Given the significance of the mediating effect of technology acceptance on the relationship between ICT use and LMX, a technology mediation model was also tested to determine the goodness of fit for the data, where technology acceptance mediates the relationship between ICT use and LMX. The model included the same parameters as the technology acceptance moderation SEM model presented previously, but instead of a moderating effect, technology acceptance was regressed on ICT use and media quality to determine its mediating effects. The resulting model indicated moderate goodness of fit, $\chi^2(9) = 20.146$, $p < .05$, *RMSEA* = 0.074, 95% CI [0.030; 0.117], *CFI* = 0.985, *TLI* = 0.966, *SRMR* = 0.034. Considering all model estimates of fit, this particular model appears to fit the data best compared to others but results in a similar fit compared to the moderation model. Detailed estimates for this model can be seen in Figure 4.

Discussion

ICT Use Effects on LMX

Results from analyses indicated that the use of ICT may not directly affect LMX quality. While the simple regression to test this effect found non-significant results, a one-way ANOVA found a significant difference when participants were split into groups based on their primary communication method (i.e., ICT or FTF). Additionally, when running the hypothesized moderation analyses using bootstrapping techniques, the direct effect of ICT use on LMX quality was significant and negative, suggesting that higher ICT use for communication does negatively impact the relationship between leaders and subordinate when other factors are accounted for. This is consistent with the findings of Harris et al. (2015), which found that the use of ICT and communication overload led to lower ratings of LMX. Additional evidence from the SEM analyses consistently showed that ICT use was directly negatively related to LMX (see Figures

31

1-4). The current study intended to investigate if simply using more ICT resulted in a reduction in LMX quality, but this does not seem to always be the case. Future investigation is needed to confirm these findings.

In order to further investigate the possible mechanism of how ICT use might impact LMX, moderation analyses were proposed based on the theoretical basis of leadership behaviors and individual personality traits having a significant impact on LMX across the extant literature. While transformational leadership, agreeableness, and extraversion were all significantly positively related to LMX, they did not interact with ICT use. Previous studies have shown that transformational leadership influences LMX within virtual teams, but the results from the current study suggest that transformational leader behaviors may not play an interacting or mediating role with ICT when predicting the quality of leader-subordinate relationships. Similarly, the personality variables of agreeableness and extraversion were both positively related to LMX quality yet did not interact with ICT on the prediction of LMX. Although the initial moderation analysis yielded a non-significant result, a follow-up mediation analysis revealed that technology acceptance does mediate, rather than moderate, between ICT use and LMX, such that the presence of technology acceptance causes ICT use to be significant and positively related to LMX. Functionally, the more ICT that is used to communicate between leader and subordinate, the higher the likelihood individuals will accept the use of technology, which then allows for more quality social exchanges between subordinate and leader. The current study also found a direct positive relationship between technology acceptance and LMX, which confirms the findings of Magni and Pennarola (2008). In terms of explaining the relationship between ICT use and LMX, technology acceptance appears to outperform both leader behavior and individual personality facets.

One interesting finding is that media richness was not found to be predictive of LMX quality. In fact, upon examining the correlation table for all study variables, media richness does not correlate with many of the variables of interest. Upon examining the significant correlates of media richness, it appears that younger subordinates and younger leaders are more likely to use richer media, such as video conferencing or live audio communication, and those that use richer media also tend to have higher technology acceptance. Also, those that use richer media to communicate are also more likely to use more ICT methods of communication rather than face-to-face.

Outcomes of LMX

Consistent with previous literature, LMX was significantly predictive of leadership satisfaction, communication satisfaction, and turnover intentions. Perhaps one of the most well-established findings within the LMX domain, increased perceptions of LMX quality are associated with lower subordinate intentions to leave their current job. Even when controlling for the amount of time subordinates spend communicating with their leader and their tenure with the organization, LMX remains a strong predictor of subordinate turnover intentions.

Regarding the outcome of communication satisfaction, the predictive value of LMX is less known in the literature but was significant and positive in the current sample. Given that LMX can be considered a model of leader-subordinate communication, it follows that high relationship quality is directly related to communication satisfaction. The two sub-facets of communication (supervisor and organizational communication climate) were both significantly predicted by LMX. The finding that organizational communication climate satisfaction is related to high LMX quality is substantiated by research that has found that leaders' behaviors can alter how their subordinates perceive the overall organization (Eisenberger et al., 2010). Eisenberger

and colleagues (2010) found that when LMX quality perceptions are high, subordinates consider leaders to embody the organization itself, attributing the behaviors of the leader to the organization overall. For the present study, this aligns with individuals experiencing high LMX and having high organizational communication climate perceptions.

Lastly, LMX was a significant predictor of subordinates' ratings of leadership satisfaction. Strong support was found for the hypothesis that LMX is positively related to subordinates' rating of satisfaction with their leader. Leadership satisfaction was calculated as an aggregate score of the sub-facets of satisfaction, effectiveness, and inspiring extra effort from followers. LMX was significant and positively related to all three facets, explaining 70% of the variability in the overall aggregated variable. This is consistent with previous findings in the literature, where those with high perceptions of LMX are more likely to indicate high-performance scores for their dyadic leader/subordinate, which can even lead to rating bias such as the "halo" effect (Duarte, Goodson, & Klich, 1993). Interestingly enough, technology acceptance was positively related to leadership satisfaction, which may be worth investigating in future studies, since this effect most likely occurs through another mechanism. An exploratory analysis found that LMX significantly moderates the relationship between the two, such that technology acceptance is negatively related to leadership satisfaction at when LMX quality is low. This suggests that further investigation of this effect is warranted.

Integrated SEM Model

The analysis conducted on the integrated SEM model suggests that the hypothesized model, with the three moderation effects, was not a significantly good fit for the model. The overall chi-square test, RMSEA, and CFI/TLI estimates did not support the null hypothesis that the proposed model does not significantly improve fit compared to the null model at the 95%

confidence level. This finding is consistent with the non-significant results for the individual moderation analyses, which likely lowers the fit of the overall model considerably. Modification indices suggested that the removal of the interaction terms would increase the overall model fit.

However, evidence for significantly good fit was found for both the moderation and mediation SEM models for technology acceptance, compared to all other models. This indicates that, given the study variables of interest, technology acceptance most likely serves best as an explanatory mechanism for how ICT use affects LMX quality. It is likely that understanding the direct influences of technology use and attitudes toward it are crucial to determining its impact on worker perceptions and resulting behavior. These findings suggest that ICT use can have a significant positive effect on workplace relationships when individuals have positive experiences interacting with technology.

Future Directions

Since the nature of this study was to investigate relationships between several sparsely linked constructs within the literature, more work is needed to determine the consistency of these results and further refine the described models. In particular, it is still unclear if ICT use is directly related to LMX quality, as various conflicting results were found in the current study. Testing this relationship in a variety of samples and contexts would allow for stronger inferences as to the nature of their connectedness, or lack thereof. Also, the theory, construct, and measurement of technology acceptance has yet to be used in published workplace psychology journals. Given its importance in explaining psychological constructs within this study, more work is needed to examine how this theory might inform other areas outside of the information technology research space. In particular, it appears to be related to the age of workers and may

be useful for examining shifts in workforce populations and the resulting impact on technology use and relevant outcomes.

Limitations

A few limitations should be noted regarding this study. First, the initial time lag between survey waves one and two was initially intended to be two full weeks apart. Due to research time constraints, this period was shortened to seven days. However, the average participant had at least thirteen days between survey completion, which suggests that most individuals still had a substantial gap between taking the surveys. With the potential for common method variance, a Harman's single-factor test was used to determine if the study variables loaded onto a single common factor. Results showed that this was not the case, and that common method variance does not seem to significantly impact the study data.

Of the 500 participants that completed the first survey, roughly 94% provided quality data and were invited back to participate in the second survey wave. However, of those invited to participate, only 49% completed the second survey, with 48% providing quality data. While participant attrition is expected in a multi-wave survey design, this is a considerable amount compared to research norms. The demographic descriptive statistics were examined between the two sample (attrition vs. non-attrition), and means, standard deviations, and correlations between variables appear to remain consistent across groups, indicating that attrition was not systematic. One possible cause for the attrition may have been the request to participants to save a five-digit code from survey one to be entered into the second survey for matching purposes. Several participants indicated in an open-ended field that this was quite uncommon for MTurk workers and was most likely aversive to participants. Based on these comments, MTurk worker IDs were recorded instead to match surveys. However, participants that lost/forgot their code may have

been deterred from taking the second survey since they did not have access to their previous code. In future studies, it is recommended to match data based on worker ID, rather than assigned codes.

Lastly, while the integrated model presented in this study found some statistical evidence for support, it lacks a unifying theoretical explanation for how ICT impact workplace relationships. The results of this study should help to inform theory-building efforts to better understanding holistically how these constructs impact each other. Even with theoretical backing for the individual hypothesized relationships, more work is needed on the systemic integration of such theories.

Conclusion

In an attempt to examine the effects of ICT on leader-member relationships, a conclusive statement cannot be made. While the simple regression of LMX on ICT use yielded non-significant results, moderation and SEM methods did detect a significant negative main effect for this relationship. When controlling for the variability shared between ICT use and technology acceptance, a direct relationship appears to emerge between ICT use and LMX, suggesting the importance of measuring factors that influence our understanding of this direct relationship. Given the nature of these findings, no solid conclusions can be made currently, however evidence warrants further investigation into the nature of their relationship. Especially considering mediating factors such as technology acceptance, ICT use may indeed impact LMX indirectly.

Perhaps the strongest finding in the present study is the supporting evidence that LMX is a strong predictor of the outcome variables of leadership satisfaction, communication satisfaction, and turnover intentions. While the linkage between LMX with turnover and

leadership effectiveness have been widely substantiated, the relationship with communication satisfaction is less pronounced in the literature. These findings help to support the theoretical basis of LMX as a leadership communication domain. As described in this study, communication is a crucial aspect of leader-subordinate relationships, which in turn increases employees' satisfaction with both leader and organizational communication climate.

Results from SEM indicate that the overall model does not provide a good fitting solution, which was most likely due to the lack of moderating effects. However, further review indicated that ICT use and media richness are both strongly and directly linked to LMX, showing that while those who frequently communicate with their leader through technology are more likely to experience lower LMX quality, using richer ICT media results in the opposite. According to model results, these direct relationships are stronger than the mediation through technology acceptance. Further studies should continue to explore both the direct and indirect relationships presented in this model.

While the aim of this study focused on the theoretical model for the effects of ICT on LMX quality, the findings can be applied to both the theory and practice of leadership. Practitioners would benefit from these findings by understanding the marked impact ICT has on workplace relationships and the resulting effects that lead to bottom-line implications. Given the impact and cost of turnover and lack of employee satisfaction within organizations today, understanding the key influence of ICT which impact these outcomes through relationships with their leader is of incredible importance (Abbasi & Hollman, 2000). Accounting for the effects of technology use and quality should be a continued interest for both researchers and practitioners alike moving forward.

References

Abbasi, S. M., & Hollman, K. W. (2000). Turnover: The real bottom line. *Public Personnel Management*, 29(3), 333-342.

Akkirman, A. D., & Harris, D. L. (2005). Organizational communication satisfaction in the virtual workplace. *Journal of Management Development*, 24(5), 397-409.

Arvanitis, S., & Loukis, E. N. (2009). Information and communication technologies, human capital, workplace organization and labour productivity: A comparative study based on firm-level data for Greece and Switzerland. *Information Economics and Policy*, 21(1), 43-61.

Avolio, B. J., Bass, B. M., & Jung, D. I. (1999). Re-examining the components of transformational and transactional leadership using the Multifactor Leadership. *Journal of Occupational and Organizational Psychology*, 72(4), 441-462.

Badger, J. M., Kaminsky, S., & Behrend, T. S. (in press). Media richness and information acquisition in Internet recruitment. *Journal of Managerial Psychology*.

Bakker-Pieper, A., De Vries, R.E., & Social & Organizational Psychology. (2013). The incremental validity of communication styles over personality traits for leader outcomes. *Human Performance*, 26, 1-19.

Bell, B. S., & Kozlowski, S. W. (2002). A typology of virtual teams: Implications for effective leadership. *Group & Organization Management*, 27(1), 14-49.

Bernerth, J., Armenakis, A., Feild, H., Giles, W., & Jack Walker, H. (2007). Is personality associated with perceptions of LMX? An empirical study. *Leadership & Organization Development Journal*, 28(7), 613-631.

Bozeman, D. P., & Perrewé, P. L. (2001). The effect of item content overlap on Organizational

    Commitment Questionnaire–turnover cognitions relationships. *Journal of Applied*

    Psychology, 86(1), 161.

Boswell, W. R., & Olson-Buchanan, J. B. (2007). The use of communication technologies after

    hours: The role of work attitudes and work-life conflict. *Journal of Management*, 33(4),

    592-610.

Brunelle, E. (2013). Leadership and mobile working: The impact of distance on the superior-

    subordinate relationship and the moderating effects of leadership style. *International*

    Journal of Business and Social Science, 4(11).

Brynjolfsson, E., & Hitt, L. M. (2000). Beyond computation: Information technology,

    organizational transformation and business performance. *The Journal of Economic*

    Perspectives, 14(4), 23-48.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source

    of inexpensive, yet high-quality, data?. *Perspectives on Psychological Science*, 6(1), 3-5.

Cascio, W. F. (2000). Managing a virtual workplace. *Academy of Management Perspectives*,

    14(3), 81-90.

Chambers, S., Nimon, K., & Anthony-McMann, P. (2016). A primer for conducting survey

    research using MTurk: Tips for the field. *International Journal of Adult Vocational*

    Education and Technology (IJAVET), 7(2), 54-73.

Charlier, S. D., Stewart, G. L., Greco, L. M., & Reeves, C. J. (2016). Emergent leadership in

    virtual teams: A multilevel investigation of individual communication and team

    dispersion antecedents. *The Leadership Quarterly*, 27(5), 745-764.

Covella, G., McCarthy, V., Kaifi, B., & Cocoran, D. (2017). Leadership's role in employee retention. *Business Management Dynamics*, 7(5), 1-15.

Daft, R. L., & Lengel, R. H. (1984). Information richness: A new approach to managerial information processing. *Research in organizational behavior*, 6, 191-233.

Dansereau, F., JR., Graen, G., & Haga, W. J. (1975). A vertical dyad linkage approach to leadership within formal organizations – A longitudinal investigation of the role making process. *Organizational Behavior and Human Performance*, 13, 46-78.

Day, A., Paquet, S., Scott, N., & Hambley, L. (2012). Perceived information and communication technology (ICT) demands on employee outcomes: The moderating effect of organizational ICT support. *Journal of Occupational Health Psychology*, 17(4), 473.

De Vries, R. E., Bakker-Pieper, A., & Oostenveld, W. (2010). Leadership= communication? The relations of leaders' communication styles with leadership styles, knowledge sharing and leadership outcomes. *Journal of Business and Psychology*, 25(3), 367-380.

Dienesch, R., & Liden, R. (1986). Leader-Member Exchange Model of Leadership: A Critique and Further Development. *The Academy of Management Review*, 11(3), 618-634.

Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The mini-IPIP scales: tiny-yet-effective measures of the Big Five factors of personality. *Psychological Assessment*, 18(2), 192.

Downs, C. W., & Hazen, M. D. (1977). A factor analytic study of communication satisfaction. *The Journal of Business Communication*, 14(3), 63-73.

Duarte, N. T., Goodson, J. R., & Klich, N. R. (1993). How do I like thee? Let me appraise the ways. *Journal of Organizational Behavior*, 14(3), 239-249.

Dulebohn, J. H., Bommer, W. H., Liden, R. C., Brouer, R. L., & Ferris, G. R. (2012). A meta-analysis of antecedents and consequences of leader-member exchange integrating the past with an eye toward the future. *Journal of Management,* 38(6), 1715-1759.

Dulebohn, J. H., & Hoch, J. E. (2017). Virtual teams in organizations. *Human Resource Management Review,* 27(4), 569-574.

Eden, D., & Leviatan, U. (1975). Implicit leadership theory as a determinant of the factor structure underlying supervisory behavior scales. *Journal of Applied Psychology*, 60(6), 736.

Eisenberger, R., Armeli, S., Rexwinkel, B., Lynch, P. D., & Rhoades, L. (2001). Reciprocation of perceived organizational support. *Journal of Applied Psychology*, 86(1), 42.

Eisenberger, R., Karagonlar, G., Stinglhamber, F., Neves, P., Becker, T. E., Gonzalez-Morales, M. G., & Steiger-Mueller, M. (2010). Leader–member exchange and affective organizational commitment: The contribution of supervisor's organizational embodiment. *Journal of Applied Psychology*, 95(6), 1085.

Eliophotou Menon, M. (2014). The relationship between transformational leadership, perceived leader effectiveness and teachers' job satisfaction. Journal of Educational Administration, 52(4), 509-528.

Epitropaki, O., & Martin, R. (2005). From ideal to real: a longitudinal study of the role of implicit leadership theories on leader-member exchanges and employee outcomes. *Journal of Applied Psychology*, 90(4), 659.

Fenner, C. J., & Piotrowski, C. (2018). Linking Leadership Research and Communication Theory: A Comparative Analysis of Multi-Disciplinary Research Trends in Scholarly Databases. *Psychology and Education: An Interdisciplinary Journal*. 1-8.

Fried, Y. (1991). Meta-analytic comparison of the Job Diagnostic Survey and Job Characteristics Inventory as correlates of work satisfaction and performance. *Journal of Applied Psychology*, 76(5), 690.

Funder, D. C. (2006). Towards a resolution of the personality triad: Persons, situations, and behaviors. *Journal of Research in Personality*, 40(1), 21-34.

Gaudioso, F., Turel, O., & Galimberti, C. (2017). The mediating roles of strain facets and coping strategies in translating techno-stressors into adverse job outcomes. *Computers in Human Behavior*, 69, 189-196.

Gerstner, C. R., & Day, D. V. (1997). Meta-Analytic Review of Leader–member Exchange Theory: Correlates and construct issues. *Journal of Applied Psychology*, *82*(6), 827.

Gilson, L. L., Maynard, M. T., Jones Young, N. C., Vartiainen, M., & Hakonen, M. (2015). Virtual teams research: 10 years, 10 themes, and 10 opportunities. *Journal of Management*, 41(5), 1313-1337.

Graen, G. B., Novak, M. A., & Sommerkamp, P. (1982). The effects of leader—member exchange and job design on productivity and satisfaction: Testing a dual attachment model. *Organizational Behavior and Human Performance*, 30(1), 109-131.

Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *The Leadership Quarterly,* 6(2), 219-247.

Graham, C. (2009). Communications Technology, Emotional Intelligence, and Impact on Performance: A Conceptual Exploration of Connections. *Advances in Developing Human Resources*, 11(6), 773-783.

Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied psychology*, 60(2), 159.

Hambley, L., Kline, T. J. B., & O'Neill, T. A. (2005). The effects of leadership style and communication medium on team interaction styles and outcomes. *In Academy of Management Annual Meeting* (pp. 5-19).

Harris, K. J., Harris, R. B., Carlson, J. R., & Carlson, D. S. (2015). Resource loss from technology overload and its impact on work-family conflict: Can leaders help?. *Computers in Human Behavior*, 50, 411-417.

Harris, K. J., Wheeler, A. R., & Kacmar, K. M. (2009). Leader–member exchange and empowerment: Direct and interactive effects on job satisfaction, turnover intentions, and performance. *The Leadership Quarterly*, 20(3), 371-382.

Hauser, D. J., & Schwarz, N. (2016). Attentive Turkers: MTurk participants perform better on online attention checks than do subject pool participants. *Behavior Research Methods*, 48(1), 400-407.

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from http://www.afhayes.com/public/process2012.pdf

Hecht, M. L. (1978) Measures of communication satisfaction. *Quarterly Journal of Speech,* 65, 47-62

Henderson, D. J., Liden, R. C., Glibkowski, B. C., & Chaudhry, A. (2009). LMX differentiation: A multilevel review and examination of its antecedents and outcomes. *The Leadership Quarterly,* 20(4), 517-534.

Hill, N. S., Kang, J. H., & Seo, M. G. (2014). The interactive effect of leader–member exchange and electronic communication on employee psychological empowerment and work outcomes. *The Leadership Quarterly*, 25(4), 772-783.

Holden, R. J., & Karsh, B. T. (2010). The technology acceptance model: its past and its future in health care. *Journal of Biomedical Informatics*, 43(1), 159-172.

Huang, J. L., Curran, P. G., Keeney, J., Poposki, E. M., & DeShon, R. P. (2012). Detecting and deterring insufficient effort responding to surveys. *Journal of Business and Psychology*, 27(1), 99-114.

IBM Corp. (Released 2016). IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.

Ilies, R., Nahrgang, J. D., & Morgeson, F. P. (2007). Leader-member exchange and citizenship behaviors: a meta-analysis.

Joo, B. K. (2010). Organizational commitment for knowledge workers: The roles of perceived organizational learning culture, leader–member exchange quality, and turnover intention. *Human Resource Development Quarterly*, 21(1), 69-85.

Joshi, A., Lazarova, M. B., & Liao, H. (2009). Getting everyone on board: The role of inspirational leadership in geographically dispersed teams. *Organization Science*, 20(1), 240-252.

Kahai, S. S., & Cooper, R. B. (2003). Exploring the core concepts of media richness theory: The impact of cue multiplicity and feedback immediacy on decision quality. *Journal of management information systems*, 20(1), 263-299.

Kalshoven, K., Den Hartog, D. N., & De Hoogh, A. H. (2011). Ethical leader behavior and big five factors of personality. *Journal of Business Ethics*, 100(2), 349-366.

Kamdar, D., & Van Dyne, L. (2007). The joint effects of personality and workplace social exchange relationships in predicting task performance and citizenship performance. *Journal of Applied Psychology*, 92(5), 1286.

Kangas, H. (2013). The development of the LMX relationships after a newly appointed leader enters an organization. *Human Resource Development International*, 16(5), 1-15.

Leonard, K. M., Van Scotter, J. R., & Pakdil, F. (2009). Culture and communication: Cultural variations and media effectiveness. *Administration & Society*, 41(7), 850-877.

Liao, F. Y., Yang, L. Q., Wang, M., Drown, D., & Shi, J. (2013). Team–member exchange and work engagement: does personality make a difference?. *Journal of Business and Psychology*, 28(1), 63-77.

Magni, M., & Pennarola, F. (2008). Intra-organizational relationships and technology acceptance. *International Journal of Information Management*, 28(6), 517-523.

Mardanov, I. T., Heischmidt, K., & Henson, A. (2008). Leader-member exchange and job satisfaction bond and predicted employee turnover. *Journal of Leadership & Organizational Studies*, 15(2), 159-175.

Martin, R., Guillaume, Y., Thomas, G., Lee, A., & Epitropaki, O. (2016). Leader–member exchange (LMX) and performance: A meta-analytic review. *Personnel Psychology*, 69(1), 67-121.

Maynard, M. T., Mathieu, J. E., Rapp, T. L., & Gilson, L. L. (2012). Something (s) old and something (s) new: Modeling drivers of global virtual team effectiveness. *Journal of Organizational Behavior*, 33(3), 342-365.

Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, 17(3), 437.

Mennecke, B. E., Valacich, J. S., & Wheeler, B. C. (2000). The effects of media and task on user performance: A test of the task-media fit hypothesis. *Group Decision and Negotiation*, 9(6), 507-529.

Michel, J. S., O'Neill, S. K., Hartman, P., & Lorys, A. (2018). Amazon's Mechanical Turk as a viable source for organizational and occupational health research. *Occupational Health Science*, 2(1), 83-98.

Mouriño-Ruiz, E. L. (2010). Leader-Member Exchange (LMX) The Impact of Leader-Employee Relationships in the 21st Century Workplace. *Business Journal of Hispanic Research*, 4(1).

Mueller, B. H., & Lee, J. (2002). Leader-member exchange and organizational communication satisfaction in multiple contexts. *The Journal of Business Communication* (1973), 39(2), 220-244.

Muthén, L. K., & Muthén, B. O. (2004). Mplus User's Guide: Statistical Analysis with Latent Variables: *User's Guide. Muthén & Muthén.*

Neufeld, D. J., Wan, Z., & Fang, Y. (2010). Remote leadership, communication effectiveness and leader performance. *Group Decision and Negotiation*, 19(3), 227-246.

Oren, L., Tziner, A., Sharoni, G., Amor, I., & Alon, P. (2012). Relations between leader-subordinate personality similarity and job attitudes. *Journal of Managerial Psychology*, 27(5), 479-496.

Peer, E., Vosgerau, J., & Acquisti, A. (2014). Reputation as a sufficient condition for data quality on Amazon Mechanical Turk. *Behavior Research Methods*, 46(4), 1023-1031.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879.

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, 31(4), 437-448.

Purvanova, R. K., & Bono, J. E. (2009). Transformational leadership in context: Face-to-face and virtual teams. *The Leadership Quarterly*, 20(3), 343-357.

Ruben, B., & Gigliotti, R. (2016). Leadership as Social Influence: An Expanded View of Leadership Communication Theory and Practice. *Journal of Leadership & Organizational Studies*, 23(4), 467-479.

Salter, C., Green, M., Duncan, P., Berre, A., & Torti, C. (2010). Virtual communication, transformational leadership, and implicit leadership. *Journal of Leadership Studies*, 4(2), 6-17.

Sheer, V. C., & Chen, L. (2004). Improving media richness theory: A study of interaction goals, message valence, and task complexity in manager-subordinate communication. *Management Communication Quarterly*, 18(1), 76-93.

Schriesheim, C. A., Castro, S. L., & Cogliser, C. C. (1999). Leader-member exchange (LMX) research: A comprehensive review of theory, measurement, and data-analytic practices. *The Leadership Quarterly*, 10(1), 63-113.

Serban, A., Yammarino, F. J., Dionne, S. D., Kahai, S. S., Hao, C., McHugh, K. A., Sotak, K., Mushore, A., Friedrich, T., & Peterson, D. R. (2015). Leadership emergence in face-to-

face and virtual teams: A multi-level model with agent-based simulations, quasi-experimental and experimental tests. *The Leadership Quarterly*, 26(3), 402-418.

Sevinc, G., & D'Ambra, J. (2010). The Influence of Self-Esteem and Locus of Control on Perceived Email Overload. *In ECIS* (p. 86).

Sibley, C. G., Luyten, N., Purnomo, M., Mobberley, A., Wootton, L. W., Hammond, M. D., Sengupta, N., Perry, R., West-Newman, T., Wilson, M. S., & McLellan, L. (2011). The Mini-IPIP6: Validation and extension of a short measure of the Big-Six factors of personality in New Zealand. *New Zealand Journal of Psychology*, 40(3).

Smedema (Miller), S. (2017). Amazon Mechanical Turk as a Rehabilitation Research Participant Recruitment Tool. *Journal of Rehabilitation*, 83(4).

Society for Human Resource Management (2012). Virtual teams. http://www.shrm.org/research/surveyfindings/articles/pages/virtualteams.aspx. Accessed September 10, 2018.

Tan, W. K., Tan, C. H., & Teo, H. H. (2012). Conveying information effectively in a virtual world: Insights from synthesized task closure and media richness. *Journal of the American Society for Information Science and Technology*, 63(6), 1198-1212.

Tett, R. P., & Meyer, J. P. (1993). Job satisfaction, organizational commitment, turnover intention, and turnover: path analyses based on meta-analytic findings. *Personnel Psychology*, 46(2), 259-293.

Thoemmes, F., MacKinnon, D. P., & Reiser, M. R. (2010). Power analysis for complex mediational designs using monte carlo methods. *Structural Equation Modeling*, 17(3), 510-534.

Tsai, M. T., Chuang, S. S., & Hsieh, W. P. (2009). An integrated process model of communication satisfaction and organizational outcomes. *Social Behavior and Personality: An International Journal*, 37(6), 825-834.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273-315.

Wang, H., Law, K. S., Hackett, R. D., Wang, D., & Chen, Z. X. (2005). Leader-member exchange as a mediator of the relationship between transformational leadership and followers' performance and organizational citizenship behavior. *Academy of Management Journal*, 48(3), 420-432.

Wayne, S. J., Shore, L. M., & Liden, R. C. (1997). Perceived organizational support and leader-member exchange: A social exchange perspective. *Academy of Management Journal,* 40(1), 82-111.

Weatherbee, T. G. (2010). Counterproductive use of technology at work: Information & communications technologies and cyberdeviancy. *Human Resource Management Review*, 20(1), 35-44.

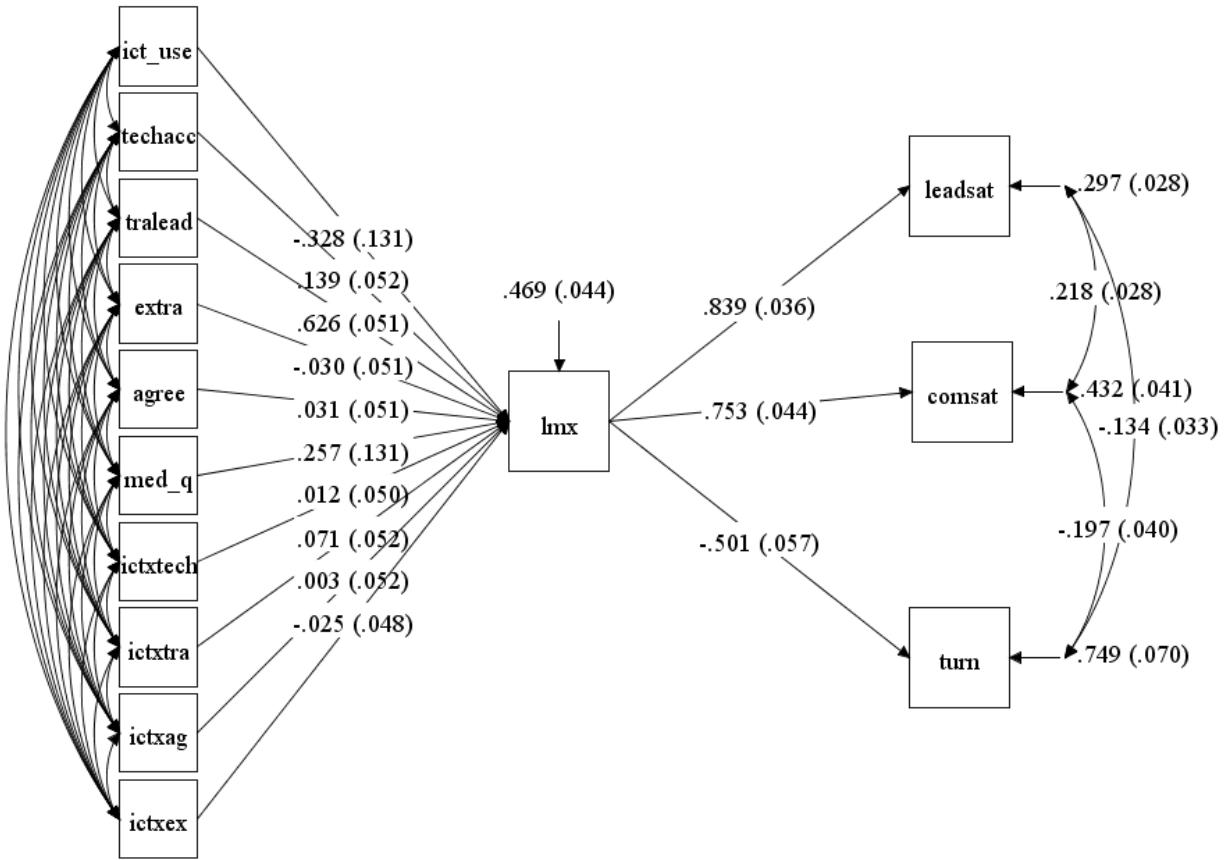Figures and Tables

Figure 1

Integrated Theoretical SEM Model
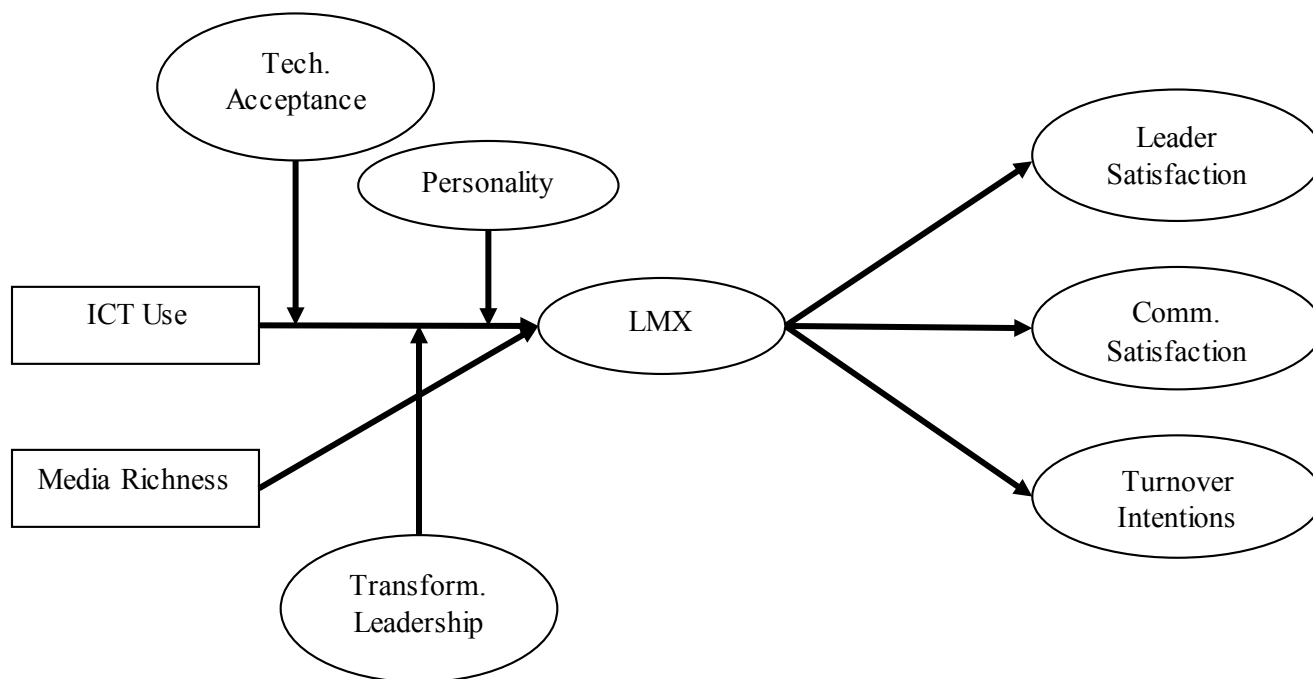
Notes: Tech. Acceptance = Technology Acceptance, Transform. Leadership = Transformational Leadership, Comm. Satisfaction = Communication Satisfaction.

Figure 2

Integrated Moderated-Mediation SEM Statistical Model

ict_use
techacc
tralead
extra
agree
med_q
ictxtech
ictxtra
ictxag
ictxex

-.328 (.131)
.139 (.052)
.626 (.051)
-.030 (.051)
.031 (.051)
.257 (.131)
.012 (.050)
.071 (.052)
.003 (.052)
-.025 (.048)

.469 (.044)

lmx

.839 (.036)
.753 (.044)
-.501 (.057)

leadsat

comsat

turn

.297 (.028)
.218 (.028)
.432 (.041)
-.134 (.033)
-.197 (.040)
.749 (.070)

Notes: Values outside of parentheses are standardized (SDYX) effect estimates; Values inside parentheses are estimate standard errors; med_q = media richness; tech_acc = technology acceptance; tralead = transformational leadership; agree = agreeableness; extra = extraversion; leadsat = leader satisfaction; comsat = communication satisfaction; turn = turnover intentions.

Figure 3

Technology Acceptance Moderation SEM Statistical Model

Notes: Values outside of parentheses are standardized (SDYX) effect estimates; Values inside parentheses are estimate standard errors; med_q = media richness; tech_acc = technology acceptance; leadsat = leader satisfaction; comsat = communication satisfaction; turn = turnover intentions.
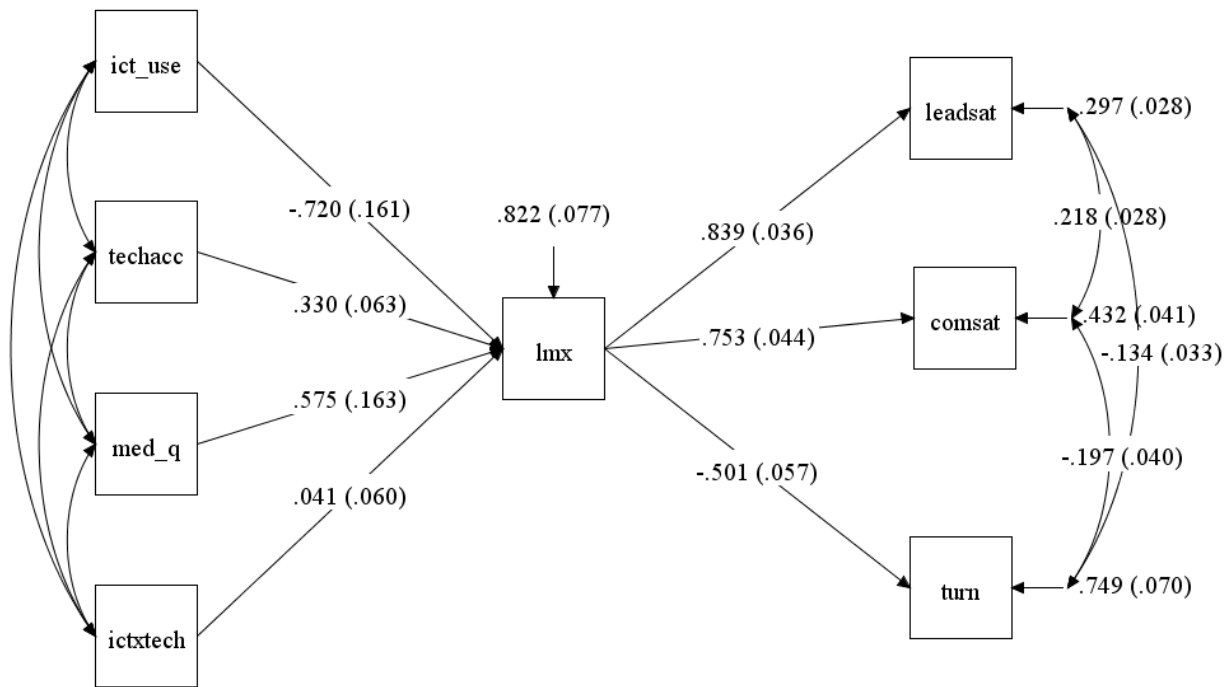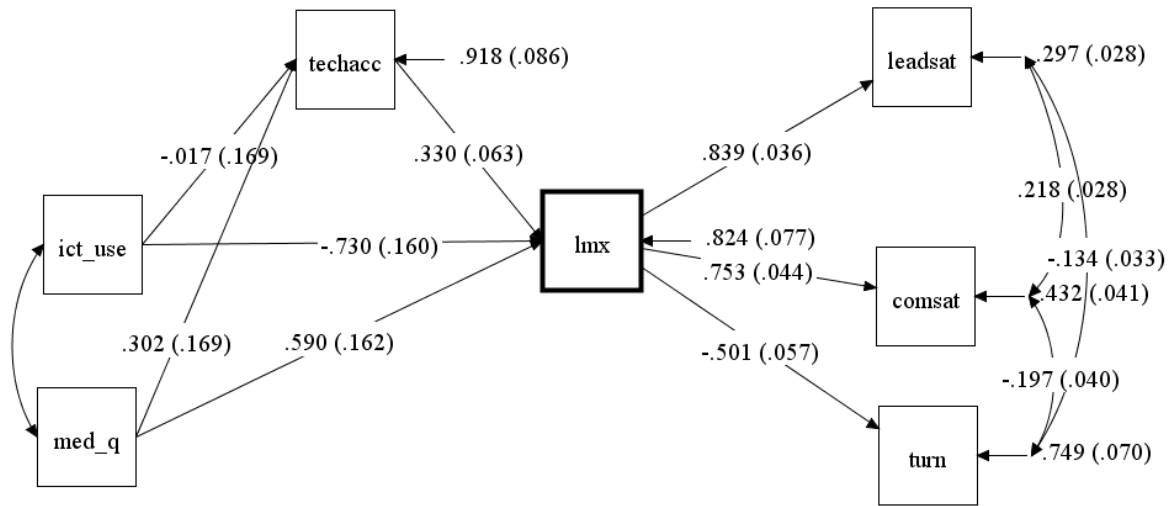
Figure 4

Technology Acceptance Mediation SEM Statistical Model

Notes: Values outside of parentheses are standardized (SDYX) effect estimates; Values inside parentheses are estimate standard errors; med_q = media richness; tech_acc = technology acceptance; leadsat = leader satisfaction; comsat = communication satisfaction; turn = turnover intentions.

Table 1a

Variable Descriptives and Correlations

Variable	M	SD	N	1	2	3	4	5	6	7	8	9	10
1. Gender	-	-	226	1.00									
2. Age	39.33	10.19	227	0.03	1.00								
3. Tenure	8.76	6.79	227	-0.05	.37**	1.00							
4. Comp. Proficiency[1]	2.63	0.90	227	-.24**	-.27**	0.03	1.00						
5. Leader Gender	-	-	226	.52**	0.04	-0.03	-.24**	1.00					
6. Leader Age	46.59	10.79	227	0.07	.34**	0.07	-0.13	0.00	1.00				
7. Comm. w/ Leader[2]	0.30	0.26	227	.15*	-.16*	0.04	.16*	-0.01	0.01	1.00			
8. Task/Social Comm.[3]	2.90	2.06	227	0.00	-.14*	0.08	0.10	0.00	-0.12	.28**	1.00		
9. ICT Use	48.33	29.71	227	-0.11	-0.13	0.02	.23**	-0.11	-.18**	-.15*	-0.05	1.00	
10. Media Richness	2.78	1.97	227	-0.09	-.15*	0.02	.26**	-0.12	-.20**	-0.07	0.03	.93**	1.00
11. Tech. Acceptance	4.13	0.53	227	0.05	-0.09	-.18**	0.11	0.04	-0.05	-.19**	-.15*	.26**	.29**
12. Transform. Lead.[4]	3.40	0.82	227	-0.08	-0.05	-0.08	.17*	-0.08	-0.06	.12**	.18**	-0.06	0.03
13. Openness	5.30	1.31	227	-0.04	-0.02	-.15*	.13*	-0.03	0.04	-0.02	-0.12	0.05	0.04
14. Conscientiousness	5.12	1.33	227	-0.06	0.12	-0.01	0.01	0.00	0.08	0.02	-0.06	-0.07	-0.09
15. Extraversion	3.62	1.53	227	0.02	-0.13	-0.06	.20**	-0.12	-0.07	.17*	0.11	0.00	0.09
16. Agreeableness	5.21	1.24	227	.18**	0.02	-0.04	-0.09	0.05	0.07	-0.02	0.03	-0.03	0.04
17. Neuroticism	3.29	1.47	227	0.10	-.20**	-0.05	-0.11	0.05	-0.10	0.09	0.09	0.04	0.04
18. LMX[5]	3.66	0.80	227	-0.07	0.05	0.00	.15*	-0.06	0.05	0.04	0.12	-0.10	0.01
19. Leader Satisfaction	3.69	0.90	227	-0.04	0.06	-0.01	.16*	0.00	-0.02	0.09	0.10	-0.10	-0.02
20. Comm. Satisfaction	5.14	1.27	227	-0.04	0.07	-0.04	.17**	-0.05	0.04	0.05	0.05	-0.05	0.04
21. Turnover Intentions	2.46	1.18	227	0.03	-0.08	-0.02	0.02	-0.01	-0.04	-0.05	-0.09	.15*	.13*

Notes: * $p < .05$, ** $p < .01$, [1]Computer Proficiency, [2]Percent of workday spent communicating with leader, [3]Task- or Social-oriented communication with leader, [4]Transformational Leadership, [5]Leader-Member Exchange

Table 1b

Variable Descriptives and Correlations

Variable	M	SD	N	11	12	13	14	15	16	17	18	19	20
11. Tech. Acceptance	4.13	0.53	227	1.00									
12. Transform. Lead.[4]	3.40	0.82	227	.27**	1.00								
13. Openness	5.30	1.31	227	.30**	.15*	1.00							
14. Conscientiousness	5.12	1.33	227	.17**	.20**	0.11	1.00						
15. Extraversion	3.62	1.53	227	.14*	.30**	.24**	0.03	1.00					
16. Agreeableness	5.21	1.24	227	.33**	.18**	.25**	0.08	.31**	1.00				
17. Neuroticism	3.29	1.47	227	-.22**	-.23**	-.22**	-.40**	-.23**	-.18**	1.00			
18. LMX[5]	3.66	0.80	227	.31**	.70**	0.09	.21**	.22**	.20**	-.28**	1.00		
19. Leader Satisfaction	3.69	0.90	227	.23**	.77**	.15*	.17*	.25**	.21**	-.22**	.84**	1.00	
20. Comm. Satisfaction	5.14	1.27	227	.32**	.68**	.17**	.21**	.28**	.29**	-.33**	.75**	.85**	1.00
21. Turnover Intentions	2.46	1.18	227	-.14*	-.38**	-0.09	-0.05	-0.02	-0.12	.21**	-.50**	-.55**	-.57**

Notes: * $p < .05$, ** $p < .01$, [4]Transformational Leadership, [5]Leader-Member Exchange