FEELING REMOTE:

FACTORS INFLUENCING ISOLATION IN REMOTE WORKERS

by

Chelsea J. Bell

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Thesis Committee:
Dr. Judith Van Hein, Chair
Dr. Michael Hein
Dr. Richard Moffett

ABSTRACT

This study contributes to the ongoing dialogue surrounding the benefits and drawbacks of remote work programs. The purpose of this research is to understand how communication and interdependence of work tasks influence the level of isolation perceived by remote workers. The responses of an online survey were analyzed using regression analysis, and the results indicated that initiated interdependence, received interdependence, task-related communication, and telecommuting intensity predicted colleague support, the first dimension of workplace isolation. An interaction effect was found between initiated interdependence and telecommuting intensity to predict colleague support. Received interdependence, communicating organizational values, task-related communication, and communication frequency were significant predictors of company support, the second dimension of workplace isolation. An examination of common communication methods revealed that face-to-face communication, phone communication, video conferencing, and instant messaging were predictive of colleague support. Results of this study suggest that performing interconnected work tasks remotely and increasing communication with others may help to counteract workplace isolation -- one of the most cited difficulties faced by remote workers.

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CHAPTER I: REVIEW OF THE LITERATURE

Introduction

From its proposal in the 1970's to current day, support and implementation for remote work has been on the rise with regular telecommuting in the United States increasing 115% from 2005 to 2015 (Global Workplace Analytics & FlexJobs, 2017). The concept of telecommuting has gone by many names, including remote work, telework, distributed work, virtual work, flexible work, and distance work. Just as the label varies, so too does the definition – although most widely recognized conceptualizations acknowledge that telecommuting involves an individual working part of their work week away from the central workplace (Allen, Golden, & Shockley, 2015). This definition of telecommuting will be adopted for the purposes of this study.

Telecommuting has provided a unique solution to the duel demands caused by the novel coronavirus outbreak, as employers look to maintain productivity and protect the health and safety of employees and customers. Telework has been found to increase productivity, cut operation costs, and help bring balance between an employee's work and their personal life (Global Workplace Analytics & FlexJobs, 2017; Spreitzer, Cameron & Garrett, 2017). Although the adoption of remote programs is on the rise, organizations like Yahoo, Best Buy, Reddit, and Aetna have pulled the plug on their programs, citing a need for innovation and collaboration they felt wasn't possible while working remotely (Kessler, 2017; Lee, 2013; Miller & Rampell, 2013; Wilkie, 2019; Truong, 2014; Wright, 2019). Google employees mirrored this concern, citing relationship building and schedule coordination as common issues faced while working with their remote counterparts (Gilrane, 2019). These findings are further echoed by a

recent survey of remote workers that identified collaboration and communication, and loneliness as the top two struggles of working remotely (Buffer, 2020).

This paper aims to contribute to the ongoing dialogue surrounding the benefits and drawbacks of remote work programs. Remote workers are especially vulnerable to isolation in the workplace (Cooper & Kurkland, 2002; Dekker & Rutte, 2007; Elst et al., 2017; Golden, Viega & Dino, 2008), which can lead to decreased job performance (Golden et al., 2008), impede professional development (Cooper & Kirkland, 2002), and lead to negative work-related well-being (Elst et al., 2017). Communication and task interdependence are proposed as variables that influence the levels of workplace isolation perceived by remote workers.

Brief History of Telecommuting

While recent technological innovations have allowed for increased flexibility in how and where an employee works, the concept of flexibility in the workplace is not a new one. Industrialized organizations first deviated from the standardized work week in the 1930's, with W.K. Kellogg Company modifying their three 8-hour shifts into four 6-hour shifts to accommodate employees affected by Depression-era layoffs (Avery & Zabel, 2001; Gomes & Chukha, 2013). The flexibility of the Kellogg Company allowed them to employ 25% more workers during the Depression than they had prior to the economic turmoil (Avery & Zabel, 2001) – a large success early in the history of workplace flexibility. Messerschmitt-Bolkow-Blohm, a German aerospace company, implemented flextime in 1967 in response to employee absenteeism and tardiness due to traffic congestion (Avery & Zabel, 2001). As a result of this initiative, the organization experienced drops in absenteeism, overtime, turnover, and tardiness, and increases in

employee morale (Avery & Zabel, 2001). Modern organizations have reported similar successes in the implementation of their flexible work policies (Society for Human Resources Management, n.d.)

The United States oil crisis of the 1970's prompted innovation around the conservation of resources, with telecommuting proposed as a means to decrease energy consumption in response to this crisis (Avery & Zabel, 2001). The publication of *Workforce 2000,* a report examining key work trends that would shape the end of the 20th century, focused continued attention on workplace flexibility – but with a shift toward meeting organizational needs over the needs of the employee. Following this shift, employee accommodation become less of a central focus (Avery & Zabel, 2001) while compliance with legislature, cost savings, and government programs moved into the spotlight (Allen, Golden, Shockley, 2015; Allied, 2016; Siha & Monroe, 2006).

In more recent years, the adoption of telecommuting has been rising exponentially, with 40% more employers offering telecommuting options from 2010 to 2015 (Global Workplace Analytics & FlexJobs, 2017). One half-time telecommuter has been estimated to save an employer over $11,000 per year, creating a cost-saving incentive for organizations (Global Workplace Analytics & FlexJobs, 2017). Remote work has also provided a unique solution to the global COVID-19 outbreak faced by employers in 2020, with a recent study finding that 67% of employers are offering remote options for positions that were previously non-remote (Seyfarth Shaw LLP, 2020). In response to this crisis, Nationwide, a privately held insurance company, moved 98% of their employees to remote work in the span of five business days and now plans to keep the arrangement after the pandemic due to its success (Clifford, 2020). Other companies

are following suit, as Bay Area tech firms Twitter and Square have both announced that employees will have the choice to work remotely permanently after the pandemic (Baron, 2020). Remote work programs are also an incentive for employees, saving them time and money on their commute and offering greater work-life balance (Global Workplace Analytics & FlexJobs, 2017). Remote workers have cited flexible schedules, working from any location, and time with family as the largest benefits of working remotely (Buffer, 2019). With the numerous perks that remote work offers, it may be surprising that several remote work programs have been disbanded due to difficulties with collaboration and communication.

Task Interdependence

Task interdependence refers to the amount of "connectedness" required between jobs to complete work tasks (Morgeson & Humphrey, 2006). It can be further classified into two independent and directional types: initiated task interdependence and received task interdependence (Kiggundu, 1981; Morgeson & Humphrey, 2006). Initiated task interdependence is conceptualized as the degree that one job creates work for other jobs – in essence assessing how much the job affects the work of others (Kiggundu, 1981; Morgeson & Humphrey, 2006). Received task interdependence, on the other hand, is conceptualized as the degree that one job is influenced by the work of other jobs – or the extent that the job relies on the work of others (Kiggundu, 1981; Morgeson & Humphrey, 2006).

The remote worker may experience increased difficulty when faced with interdependent work tasks. While their office peers can collaborate face-to-face to complete a task, the remote worker must navigate through technology to access their

team members. This lack of face-to-face interaction with interdependent peers has been

called *task virtuality* (Orhan, 2014), which has been found to impact both the physical

and informational isolation of employees (Orhan, Rijsman, & Van Dijk, 2016). Physical

distance between coworkers leads to less information sharing and less attention to

information that is being shared from their distant coworker (Hinds & Weisband, 2003) –

thus stressing the difficulty of virtual, interdependent work. The struggles of connected

work can be so large that researchers have encouraged managers to keep interdependent

tasks within the physical office to see the best results from their distributed teams (Olson

& Olson, 2014). This does not, however, mean that interdependent work is impossible on

a virtual team. This simply serves to emphasize the importance of communication in

virtual task work.

Communication

The purpose of communication is to create shared meaning (Dennis, Fuller, &

Valacich, 2008), but difficulty with technology-mediated communication can also stand

as a barrier to the success of a remote working arrangement. Communication is so

essential in the workplace, in fact, that communication scholars have agreed that the very

existence of organizations hinges upon communication (Keyton, 2017). Communication

in the workplace can be used to socialize, negotiate, structure, control, and coordinate

work activities (Keyton, 2017). It is not surprising, then, that communication is the factor

that *creates* a work team. Employees can be assigned membership to a team, but the team

does not truly exist until interaction and coordination has taken place between its

members (Keyton, 2017).

Communication can also be critical to the completion of work tasks, as employees rely on task-related information provided by their coworkers. Direction-giving language has been found to be the best predictor of communication satisfaction for telecommuters (Madlock, 2013) – showing the importance of communicating task-information to remote workers. Additionally, high levels of task interdependence have been shown to lead to increased information sharing and coordination among team members (Courtright, Thurgood, Stewart & Pierotti, 2015). In summary, task-related communication is vital for remote workers and high task interdependence leads to increased task communication.

As remote workers are by default communicating through technology, these communications may be more strained than those of office workers. Even when individuals are working in the same physical office, communication decreases as physical distance increases between employees' desks (Waber, 2013). In other words, we communicate less often with individuals who are physically distant from us. It is not surprising, then, that remote workers exchange information at a lower frequency than office workers (Fonner & Roloff, 2010). As remote workers are physically distant from their coworkers, it can be expected that their office peers may spend less time communicating with them compared to their peers in the office. This expected decrease in communication leads the researchers to believe that communication plays a role in the level of isolation a remote worker perceives in the workplace.

Workplace Isolation

Marshall, Michaels, and Mulki's (2007) work clarified the construct of workplace isolation, which had previously lacked consensus among researchers. Workplace isolation consists of a worker's feelings of seclusion from his or her colleagues and their

company, with isolation perceptions being formed by "the absence of support from co-workers and supervisors and the lack of opportunities for social and emotional interactions with the team" (Marshall, Michaels, & Mulki, 2007, p. 198). This definition encompasses the feelings of isolation that occur when the need for informal social interactions and companionship are not met, as well as the isolation that occurs when an employee does not receive the support they need from their supervisor or organization (Marshall et al., 2007).

Telecommuters are especially vulnerable to feelings of isolation in the workplace (Cooper & Kurkland, 2002; Dekker & Rutte, 2007; Elst et al., 2017; Golden et al., 2008). Workers who value social and professional interactions may opt out of telecommuting entirely (Mokhtarian & Salomon, 1997). These feelings of workplace isolation can lead to decreased job performance (Golden et al., 2008), impede professional development (Cooper & Kirkland, 2002), and lead to negative work-related well-being (Elst et al., 2017).

Golden et al. (2008) demonstrated a relationship between professional isolation, job performance, and face-to-face interactions. Isolated teleworkers with few face-to-face interactions showed low job performance, while isolated teleworkers with more face-to-face interactions were able to counteract the negative effects of isolation on performance (Golden et al., 2008). These results suggest that face-to-face communication may be able to neutralize some of the negative outcomes created by isolation in the workplace and suggests that telecommuting intensity may moderate the found relationships.

Telecommuting Intensity

Research on remote workers has typically collected telecommuting data in two ways – by grouping participants as "remote workers" or "non-remote workers" and comparing the dichotomous groupings or by collecting telecommuting intensity data (Gajendran and Harrison, 2007). Telecommuting intensity has been defined as the amount of time that work is performed outside of the central office and is typically measured in hours per week or as a proportion of total work time (Allen et al., 2015). Telecommuting intensity has been shown to impact several key work outcomes, including job satisfaction (Golden & Viega, 2005), commitment, and turnover (Golden, 2006). These findings suggest that telecommuting intensity will likely play a role with other vital outcomes, such as those explored in this study.

Hypotheses of the Study

The current study will test a model that proposes that task interdependence and communication are related to perceptions of workplace isolation. This model also proposes that telecommuting intensity moderates the relationships between task interdependence, communication, and workplace isolation. These relationships are consistent with research that demonstrates the links between interdependent work and the need for communication as well as the meaningful impact communication makes on perceptions of isolation. The hypotheses of the study are as follows:

Hypothesis 1: Task interdependence is related to workplace isolation

Hypothesis 1A: Initiated task interdependence is related to colleague support

Hypothesis 1B: Received task interdependence is related to colleague support

Hypothesis 1C: Initiated task interdependence is related to company support

Hypothesis 1D: Received task interdependence is related to company support

Hypothesis 2**:** Communication is related to workplace isolation

Hypothesis 2A: Communication quality is related to colleague support

Hypothesis 2B: Communication of organizational values is related to colleague support

Hypothesis 2C: Task-related communication is related to colleague support

Hypothesis 2D: Communication frequency is related to colleague support

Hypothesis 2E: Communication quality is related to company support

Hypothesis 2F: Communication of organizational values is related to company support

Hypothesis 2G: Task-related communication is related to company support

Hypothesis 2H: Communication frequency is related to company support

Hypothesis 3: There is an interaction between task interdependence and communication

Hypothesis 4: Telecommuting intensity moderates each of the above relationships

Figure 1

Proposed Relationships Between Task Interdependence, Communication, and Workplace Isolation
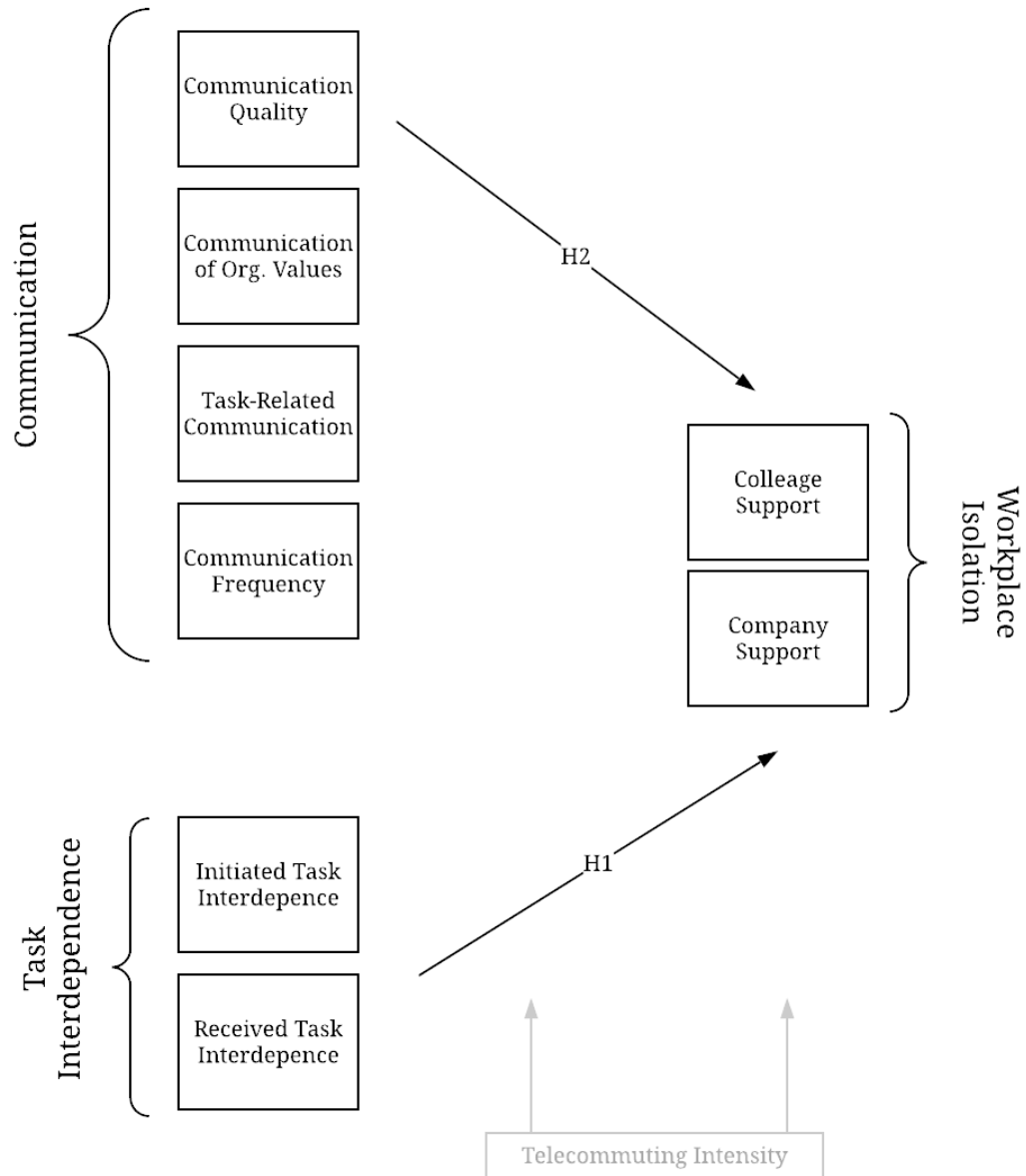
CHAPTER II: METHOD

Participants

The current study focuses on the population of adult employees working full-time in the United States. Participation in this study was dependent on individuals meeting the eligibility requirements of being 18 years of age or older, employed in the United States, and working 30 or more hours per week (Internal Revenue Service, 2019). Both remote and office workers were eligible to participate. A total of 325 participants met these eligibility requirements. A total of 38 participants were removed from analysis due to failing attention checks, missing large amounts of data, or providing unreliable data (i.e., indicating that they work 240 hours per week when there are only 168 total hours in a week). After data clean up, 287 participants were left for analysis.

The final sample was composed of an almost perfect split of females (50.2%) and males (49.8%) who ranged in age from 20 to 72 and averaged out at 36 years of age. Over half of participants indicated their highest education level as a bachelor's degree (51%), with almost all respondents having some college education of varying degrees. Participants most commonly indicated that they had been employed with their company for 5+ years (32%) and had been in their current position for 1-3 years (38.4%). A majority (81%) indicated that they worked from home in their current role, with participants working an average of 21 hours remotely per week. The traditional office was the most cited primary work location among participants (56.8%), followed by home (21.8%). Participants were mostly employees of their organization (75%) compared to contract employees (25%). Complete demographic information can be found in Appendix A.

Procedure

An online survey hosted by Qualtrics Survey Software was distributed to potential

participants via three methods: email, social media, and Amazon's Mechanical Turk (M-

Turk). Emailed participants were employees at a Southeastern transportation company

who were eligible to participate in a remote work pilot through their employer. Emails

were sent after completion of the remote work pilot. The email invitation to employees

clearly indicated that participation in this study would not impact the remote work pilot

and individual responses would not be shared with their employer. Employees of the

Southeastern transportation company made up a small portion of the sample, representing

6% of total participants.

Social media posts briefly describing the survey were posted on the Facebook and

LinkedIn account of the principal investigator to recruit potential participants. Potential

participants then shared the survey link to their social networks, creating a snowball

effect. Respondents recruited via social media made up a modest portion of the sample,

representing 16.3% of total participants.

Lastly, the survey link was shared on Amazon's Mechanical Turk (M-Turk). This

version of the survey was modified slightly to provide participants with a unique

identification number that they could provide to M-Turk after completion of the survey to

receive payment. Respondents recruited via M-Turk represented the largest portion of the

sample at 77.7% of total participants.

Participants were guided to the online survey regardless of where they were

recruited. After clicking the survey link, participants were directed to the consent page

where the purpose, eligibility requirements, risks and benefits, and contact information

for the study was provided. Participants recruited through M-Turk were shown a slightly

modified consent page that described payment details for completion of the survey.

Participants then confirmed that they were 18 years of age or older and gave their consent

to proceed. They were then guided to the screening page, which asked participants to

indicate whether they were employed in the United States and if they worked at least 30

hours per week. M-Turk participants were asked an additional screening question, "Have

you taken this survey before", to help prevent duplicate responses. If eligibility

requirements were not met the participant was directed to a page that informed them that

they did not meet the criteria to participate.

Materials

To test the validity of the proposed relationships between communication, task

interdependence, and workplace isolation participants completed survey items relating to

each variable of interest. The principal investigator created items for study variables that

lacked a pre-existing or reliable scale. See Appendix B for a complete list of survey

items.

Task Interdependence

Task interdependence was measured using six items from Morgeson &

Humphrey's Work Design Questionnaire (2006). Items included "Other jobs depend

directly on my job," and "The job activities are greatly affected by the work of other

people." These items were assessed using a five-point Likert scale where 1 represented

strongly agree and 5 represented *strongly disagree*.

Communication

Communication was assessed by measuring levels of four subdimensions: communication quality, communication of organizational values, task-related communication, and communication frequency. Each category was assessed using a five-point Likert scale where 1 represented *strongly agree* and 5 represented *strongly disagree*.

Communication quality – operationalized as the timeliness, completeness, and accuracy of communication – and communication frequency have been cited as common measures of communication satisfaction (Fonner & Roloff, 2010; Frone & Major, 1988) and were chosen for inclusion in this study.

As our study focuses heavily on interactions and collaboration, it was important to include two communication variables around this theme. The first being task-related communication, which we believe will be related to task interdependence. Second is the communication of organizational values. As organizational culture is the shared meaning that emerges through the interaction of organizational members (Keyton, 2017), the researchers determined measurement of this variable would be important to include in this study. Items were written by the principal investigator for each communication category, resulting in a total of 19 items.

Workplace Isolation

Workplace isolation was assessed using ten items adapted from Marshall, Michaels, and Mulki (2007), with five items measuring colleague support and five items measuring company support. Items for the colleague support sub-scale included "I am well integrated with the department/company where I work," and "I am kept in the loop

regarding company social events/functions." Items for the company support sub-scale included "I have co-workers available whom I can depend on when I have a problem," and "I have enough people available at work with whom I can talk about my job." These items were assessed using a five-point Likert scale from *strongly agree* to *strongly disagree*, which was modified from the original 7-point Likert scale to match the other scales in the data set. Higher levels of colleague and company support indicate lower levels of workplace isolation.

Telecommuting Intensity

Telecommuting intensity was measured in two ways. One survey item asked respondents to indicate *"How many hours during the week, on average, do you work remotely?",* which directly measured telecommuting intensity through hours per week. The second method involved calculating the percentage of a respondent's total work week that was worked remotely. This percentage was calculated by dividing the number of hours a respondent worked remotely per week by the total hours they worked per week (ex: an individual working 40 total hours per week and 20 of those hours remotely has a telecommuting intensity of 50%).

Demographic Variables

Participants were asked to provide their sex, age, education level, tenure at their organization, tenure in their position, experience in their role before telecommuting (if applicable), experience with telecommuting, primary work location, job level, employment type (contract vs. full time employee), number of employees in work group or department, number of hours worked per week on average, commute time (in minutes), and how long they had been telecommuting (if applicable).

CHAPTER III: RESULTS

Preliminary Analysis

One of the first decisions made by the researchers was whether to consider each subdimension of the major variables separately or whether they could be aggregated into larger "communication", "task interdependence" and "workplace isolation" variables. Communication contained four subdimensions: communication quality, communication of organizational values, task-related communication, and communication frequency. Task interdependence contained two subdimensions: initiated interdependence and received interdependence. Initiated task interdependence refers to having others rely on the respondent for their work, while received task interdependence refers to the respondent relying on others for their work. Workplace isolation contained two subdimensions: colleague support and company support. Higher levels of perceived support indicate lower levels of workplace isolation.

To answer the question of whether these subdimensions could be aggregated, the average score was calculated for each of the eight subscales and Pearson product-moment correlations were calculated between all variables. The results of this analysis can be found in Table 1. Examination of the resulting correlation matrix revealed a moderate relationship between initiated and received interdependence ($r = .51$, $p < .05$), a moderate to large relationship between the communication subdimensions (r between .47 and .72, $p < .01$), and a moderate relationship between colleague and company support ($r = .67$, $p < .01$).

While there was a moderate relationship between the subdimensions of each variable, it was apparent that each subdimension exhibited different relationships across the other variables. For example, communication quality exhibited a weak, negative relationship with initiated task interdependence ($r = -.16$, $p < .01$) and no relationship with received interdependence. Telecommuting intensity exhibited a significant negative relationship with colleague support ($r = -.29$, $p < .01$) and no relationship with company support. Telecommuting intensity also showed a significant, negative relationship with communication quality ($r = -.15$, $p < .05$) and task-related communication ($r = -.13$, $p < .05$), but showed no relationship with communicating organizational values or communication frequency. These results suggested that each subdimension should be regarded as an independent factor rather than aggregated into the larger variables of "communication", "task interdependence" and "workplace isolation". All analyses regard subdimensions as independent factors.

Table 1

Correlation Matrix of all Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Initiated Interdependence	__									
2. Received Interdependence	.513*	__								
3. Colleagues	.277*	.351*	__							
4. Company	.145*	.250*	.671*	__						
5. Communication Quality	-.161**	0.007	.348*	.422*	__					
6. Org. Values	.146*	.157*	.520*	.663*	.471*	__				
7. Task-Related Communication	.133*	.230*	.651*	.677*	.575*	.721*	__			
8. Communication Frequency	-0.006	0.092	.459*	.611*	.552*	.637*	.667*	__		
9. Telecommuting Intensity (Hours)	-0.036	-0.070	-.269**	-0.113	-.152*	-0.083	-.122*	-0.021	__	
10. Telecommuting Intensity (Percentage)	-0.060	-0.078	-.285**	-0.112	-.151*	-0.095	-.127*	-0.014	.963*	__

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

Next, reliability analyses were performed on all scales to determine if adequate reliability had been achieved or if items needed to be deleted to achieve adequate reliability. Final Cronbach's alpha values ranged from .70 to .89 across the eight scales. One reverse-coded item, *"I find myself unsure of what work I am expected to get done"*, was removed from the task-related communication scale – raising the Cronbach's alpha value from .66 to .76. The communication quality scale exhibited the lowest Cronbach's alpha level of .70, which is likely due to the two reverse-coded items included in the scale. The removal of these items would not increase the overall reliability, however. The results of the reliability analyses can be found in Table 2. Upon completion of reliability analyses, updated averages were calculated for all scales and Pearson-product moment correlations were calculated again with the updated scale averages (Table 1). Descriptive statistics were then calculated for all variables, as shown in Table 3.

Table 2

Reliability Analyses for All Scales

Scale	Number of Items	Cronbach's Alpha
Interdependence-Initiated	3	0.80
Interdependence-Received	3	0.82
Isolation-Colleagues	5	0.89
Isolation-Company	5	0.85
Communication Quality	5	0.70
Organizational Values	6	0.76
Task-Related Communication	4	0.76
Communication Frequency	3	0.84

Table 3

Descriptive Statistics for all Variables

Variable	n	M	SD
Initiated Interdependence	272	3.74	0.86
Received Interdependence	272	3.76	0.91
Colleagues	272	3.96	0.85
Company	272	3.94	0.72
Communication Quality	272	3.58	0.66
Org. Values	272	4.05	0.54
Task-Related Communication	272	4.10	0.60
Communication Frequency	272	3.97	0.73
Telecommuting Intensity (Hours)	272	20.84	16.36
Telecommuting Intensity (Percentage)	272	0.52	0.40

As shown in Appendix A, most of the sample (80.8%) worked remotely in some capacity in their current role. Respondents worked an average of 21 hours, or 52% of their work week, remotely. On average, the sample agreed that they felt supported by their colleagues and their company – in other words, the sample exhibited low workplace isolation on average. Of the communication variables, task-related communication was rated the highest while communication quality was the lowest. This finding was not surprising as task interdependence encourages interaction among team members (Courtright et al., 2015) and the sample indicated that, on average, both initiated and received interdependence existed within the respondents' work; thus task-related communication is likely to be higher.

Primary Analyses

The hypotheses in this study were largely exploratory, therefore, the direction of each hypothesized relationship was not explicitly stated. Hypothesis 1 examined whether a relationship exists between initiated and received task interdependence and workplace

isolation. Hypothesis 2 examined whether a relationship exists between the four communication subdimensions and workplace isolation. Hypothesis 3 proposed a relationship between task interdependence and communication. Hypothesis 4 suggested that telecommuting intensity moderates the relationships between task interdependence, communication, and workplace isolation. Hypothesis testing was performed separately for the colleague support and company support subdimension of workplace isolation.

Colleague Support

A preliminary correlation analysis (Table 1) indicated that significant, positive relationships existed between initiated ($r = .28$, $p < .01$) and received task interdependence ($r = .35$, $p < .01$) and colleague support. These relationships suggest that as work becomes more connected workers feel more supported by their colleagues. These results provide initial support for hypotheses 1A and 1B. This analysis also revealed significant, positive relationships between each of the four communication subdimensions and colleague support. Task-related communication was most strongly related to colleague support ($r = .65$, $p < .01$) while communication quality was least strongly related ($r = .35$, $p < .01$). These results suggest that as communication increases so too do perceptions of colleague support. These results provide initial support for hypotheses 2A – 2D.

Multiple regression analysis ($\alpha = .05$) was performed to further examine Hypothesis 1 & 2. Using the forced entry method, initiated interdependence, received interdependence, communication quality, communicating organizational values, task-related communication, communication frequency, and telecommuting intensity were used to predict colleague support – the first subdimension of workplace isolation.

The model explained a significant amount of variance in colleague support, $R^2 =$ .53, $F(8, 260) = 36.27$, $p < .01$. The results revealed four significant predictors: initiated interdependence, received interdependence, task-related communication, and telecommuting intensity. In support of Hypothesis 1A, initiated interdependence was found to predict colleague support ($\beta = 0.11$, $t(260) = 2.23$, $p < .05$). This suggests that as others rely on an individual more heavily for their work, that individual feels increasingly supported by their colleagues. Supporting Hypothesis 1B, received interdependence was found to predict colleague support ($\beta = 0.14$, $t(260) = 2.98$, $p < .05$). This suggests that as an individual relies more heavily on others for their work, that individual feels increasingly supported by their colleagues. Taken together, these results suggest that more connected work increases the level of colleague support felt by workers, in turn decreasing their levels of workplace isolation. Supporting Hypothesis 2C, task-related communication was also found to be a significant predictor of colleague support ($\beta = 0.68$, $t(260) = 6.69$, $p < .05$). This suggests that increased communication around work tasks increases perceptions of colleague support. Lastly, telecommuting intensity was found to be a significant predictor ($\beta = -0.42$, $t(260) = -4.53$, $p < .05$), suggesting that working increased hours remotely decreases perceptions of colleague support. This finding serves as initial support for Hypothesis 4, which states that telecommuting intensity will moderate the relationships between task interdependence, communication, and workplace isolation. The results of these analyses can be found in Table 4.

Table 4

Task Interdependence, Communication, and Telecommuting Intensity Predicting Colleague Support

	β	t	p
(Constant)		-0.87	0.39
Initiated Interdependence	0.11	2.15	0.03
Received Interdependence	0.14	2.95	0.00
Communication Quality	-0.03	-0.43	0.67
Org. Values	0.11	1.05	0.30
Task-Related Communication	0.67	6.66	0.00
Communication Frequency	0.11	1.51	0.13
Telecommuting Intensity (Percentage)	-0.43	-4.62	0.00

Next, moderation analyses were performed to examine Hypotheses 3 & 4. Hypothesis 3 examined the interaction between task interdependence and communication. Hypothesis 4 posited that telecommuting intensity will moderate the relationships between task interdependence, communication, and workplace isolation. Telecommuting intensity and all subdimensions of task interdependence and communication were mean centered to begin analysis of these research questions. Interaction terms were then created by multiplying the mean centered predictor variable by the moderator variable.

The centered main effects of interdependence, communication, and telecommuting intensity were then entered into the first step of a hierarchical regression to predict colleague support. Next, the centered two-way interactions between interdependence and communication and interdependence and telecommuting intensity were entered in step two of the regression. Three-way centered interactions between interdependence, communication, and telecommuting intensity were entered in step three. Table 5 contains the results of the hierarchical regression analysis.

The overall model remained significant at each of the three steps of the hierarchical analysis and the addition of two-way interactions significantly increased model fit, $\Delta R^2 =.033$, $\Delta F(10, 254) = 1.90$, $p < .05$ (see Table 6). Examination of the two-way interactions revealed a significant interaction between initiated interdependence and telecommuting intensity, $\beta = -0.42$, $t(254) = -4.37$, $p < .01$. The addition of three-way interactions did not significantly improve model fit, $\Delta R^2 =.022$, $\Delta F(8, 246) = 1.56$, $p = .136$. Additionally, none of the three-way interaction terms were significant, which indicates that telecommuting intensity does not moderate the relationships between communication and task interdependence. Thus, Hypothesis 4 was not supported for the colleague support dimension of workplace isolation.

The significant two-way interaction was further probed using Model 1 in the Process macro for SPSS (Hayes, 2017). Initiated interdependence was entered as the predictor, telecommuting intensity as the moderator, and colleague support as the dependent variable. Mean centering was performed by Process for these variables.

Table 5

Moderation Analysis for Colleague Support

Model		β	*t*	*p*
1	(Constant)		109.21	0.00
	Initiated Interdependence	0.11	2.15	0.03
	Received Interdependence	0.14	2.95	0.00
	Communication Quality	-0.03	-0.43	0.67
	Org. Values	0.11	1.05	0.30
	Task-Related Communication	0.67	6.66	0.00
	Communication Frequency	0.11	1.51	0.13
	Telecommuting Intensity (Percentage)	-0.43	-4.62	0.00
2	(Constant)		104.03	0.00
	Initiated Interdependence	0.13	2.35	0.02
	Received Interdependence	0.16	3.04	0.00
	Communication Quality	0.00	-0.03	0.98
	Org. Values	0.07	0.66	0.51
	Task-Related Communication	0.61	5.64	0.00
	Communication Frequency	0.12	1.54	0.12
	Telecommuting Intensity (Percentage)	-0.42	-4.37	0.00
	InitiatedxQuality	-0.01	-0.09	0.93
	InitiatedxOrgVal	-0.06	-0.51	0.61
	InitiatedxTaskRelated	0.07	0.60	0.55
	InitiatedxFrequency	-0.12	-1.14	0.26
	ReceivedxQuality	-0.12	-1.25	0.21
	ReceivedxOrgVal	-0.01	-0.08	0.94
	ReceivedxTaskRelated	-0.06	-0.51	0.61
	ReceivedxFrequency	0.16	1.56	0.12
	InitiatedxIntensity	0.32	2.51	0.01
	ReceivedxIntensity	-0.01	-0.11	0.91
3	(Constant)		101.87	0.00
	Initiated Interdependence	0.09	1.52	0.13
	Received Interdependence	0.13	2.51	0.01
	Communication Quality	0.00	-0.06	0.96
	Org. Values	0.08	0.71	0.48
	Task-Related Communication	0.61	5.44	0.00
	Communication Frequency	0.14	1.84	0.07
	Telecommuting Intensity (Percentage)	-0.35	-3.48	0.00
	InitiatedxQuality	0.04	0.37	0.71
	InitiatedxOrgVal	-0.09	-0.60	0.55
	InitiatedxTaskRelated	0.19	1.23	0.22

Model		β	t	p
	ReceivedxQuality	-0.12	-1.29	0.20
	ReceivedxOrgVal	0.02	0.16	0.87
	ReceivedxTaskRelated	0.01	0.06	0.95
	ReceivedxFrequency	0.13	1.15	0.25
	InitiatedxIntensity	0.35	2.47	0.01
	ReceivedxIntensity	-0.03	-0.23	0.81
	InitiatedxQualityxIntensity	-0.09	-0.33	0.74
	InitiatedxOrgValuexIntensity	-0.57	-1.52	0.13
	InitiatedxTaskRelatedxIntensity	-0.18	-0.50	0.62
	InitiatedxFrequencyxIntensity	0.50	1.72	0.09
	ReceivedxQualityxIntensity	0.25	1.03	0.30
	ReceivedxOrgValuexIntensity	0.32	0.86	0.39
	ReceivedxTaskRelatedxIntensity	-0.45	-1.21	0.23
	ReceivedxFrequencyxIntensity	0.07	0.25	0.80

Table 6

Model Summary for Moderation Analysis of Colleague Support

Model	R	R^2	Adj. R^2	Std. Error of Est.	Change Statistics				
					$R^2 \Delta$	$F\Delta$	df_1	df_2	Sig. $F\Delta$
1	0.72	0.52	0.51	0.60	0.52	41.16	7.00	264.00	0.00
2	0.75	0.56	0.53	0.59	0.03	1.90	10.00	254.00	0.05
3	0.76	0.58	0.53	0.58	0.02	1.56	8.00	246.00	0.14

Model 1 Predictors: (Constant), Initiated Interdependence, Received Interdependence, Communication Quality, Communicating Org. Values, Task-Related Communication, Communication Frequency, Telecommuting Intensity

Model 2 Predictors: (Constant), Initiated Interdependence, Received Interdependence, Communication Quality, Communicating Org. Values, Task-Related Communication, Communication Frequency, Telecommuting Intensity, InitiatedxQuality, InititiatedxOrgVal, InitiatedxTaskRelated, InitiatedxTaskRelated, InitiatedxFrequency, RecievedxQuality, ReceivedxOrgVal, ReceivedxTaskRelated, ReceivedxFrequency, InitiatedxIntensity, ReceivedxIntensity

Model 3 Predictors: (Constant), Initiated Interdependence, Received Interdependence, Communication Quality, Communicating Org. Values, Task-Related Communication, Communication Frequency, Telecommuting Intensity, InitiatedxQuality, InititiatedxOrgVal, InitiatedxTaskRelated, InitiatedxTaskRelated, InitiatedxFrequency, RecievedxQuality, ReceivedxOrgVal, ReceivedxTaskRelated, ReceivedxFrequency, InitiatedxIntensity, ReceivedxIntensity, InitiatedxQualityxIntensity, InitiatedxOrgValuesxIntensity, InitiatedxTaskRelatedxIntensity, InitiatedxFrequencyxIntensity, ReceivedxQualityxIntensity, ReceivedxOrgValuexIntensity, ReceivedxTaskRelatedxIntensity, ReceivedxFrequencyxIntensity

The overall model was significant, $F(3, 268) = 27.98$, $p < .001$, $R^2 = .24$. Initiated interdependence, telecommuting intensity, and their interaction were each found to be significant predictors of colleague support. Simple slopes analysis revealed that at low levels of telecommuting intensity, or working 12% of the work week remotely, there is no relationship between initiated interdependence and colleague support, $\beta = -.01$, $t(268) = -0.17$, $p = .87$. At average levels of telecommuting intensity, or working 52% of the work week remotely, a significant relationship between initiated interdependence and colleague support exists, $\beta = .27$, $t(268) = 5.05$, $p < .01$. At high levels of telecommuting intensity, or working 92% of the work week remotely, the relationship between initiated interdependence and colleague support is significant and becomes more positive, $\beta = .55$, $t(268) = 7.42$, $p < .01$.

To understand the moderation effects of telecommuting intensity at a deeper level, the Johnson-Neyman technique was performed using the Process macro. Examination of the Johnson-Neyman results revealed that no relationship existed between initiated interdependence and colleague support when working remotely 25% of the work week or less. In other words, when an individual does not work remotely often the amount of work that he or she performs that has an impact on others does not influence perceptions of workplace isolation. When working 30% of the work week remotely, however, initiated task interdependence and colleague support are significantly related, $t(268) = 1.98$, $p = .05$, $\beta = .12$. As telecommuting intensity increases, the relationship between initiated interdependence and colleague support becomes more positive with the highest telecommuting intensity (working remotely 100%) resulting in $\beta = .60$, $t(268) = 7.44$, $p <$

.01. These results suggest that remote workers feel more supported by their colleagues when they have higher levels of initiated interdependence. In other words, performing work that affects others makes a meaningful impact on how isolated remote workers feel. Figure 1 shows the moderating effects of telecommuting intensity on initiated interdependence.

Figure 2
Moderating Effect of Telecommuting Intensity on Initiated Interdependence
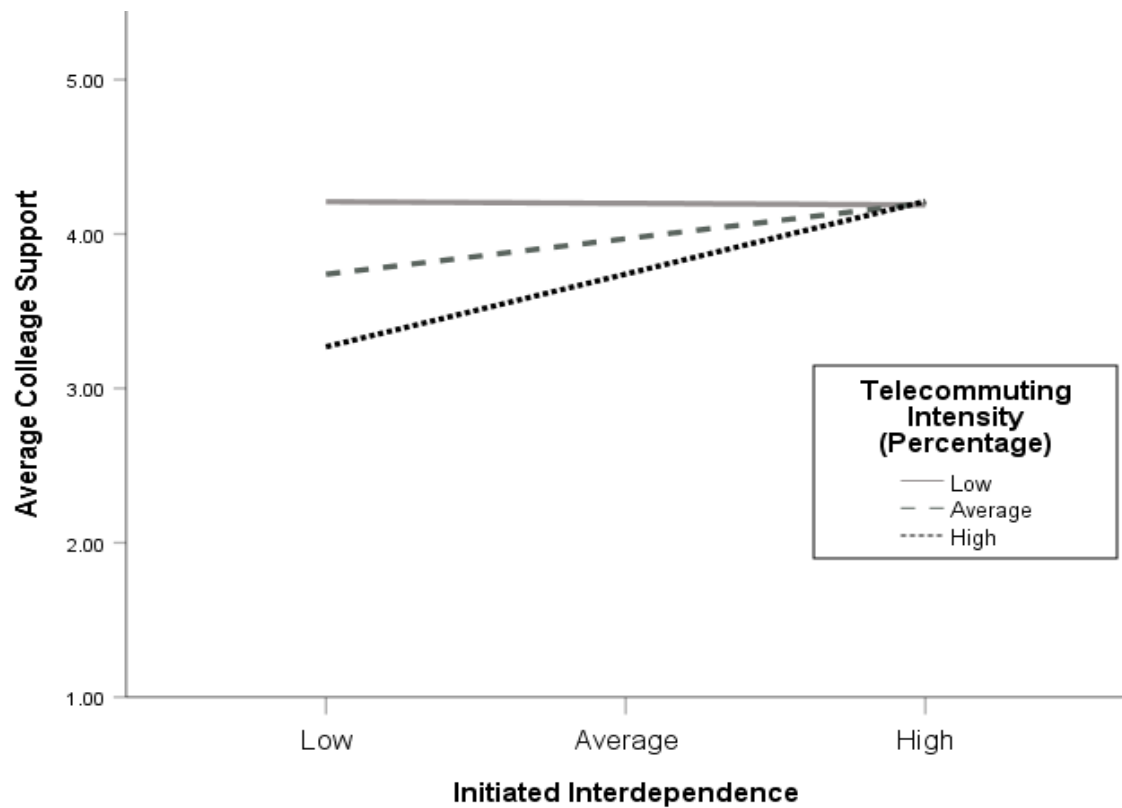
Company Support

A preliminary correlation analysis (Table 1) indicated that significant, positive relationships existed between initiated ($r = .15, p < .05$) and received task interdependence ($r = .25, p < .01$) and company support. This suggests that as work

becomes more connected perceptions of company support increase. These results provide initial support for Hypothesis 1C and 1D. This analysis also revealed significant, positive relationships between each of the four communication subdimensions and company support. Communicating company values was most strongly related to company support ($r = .66, p < .01$) while communication quality was least strongly related ($r = .42, p < .01$). These results suggest that as communication increases, perceptions of company support increase. These results provide initial support for Hypotheses 2E – 2H.

Multiple regression analysis ($\alpha = .05$) was performed to further examine Hypothesis 1 & 2. Using the forced entry method, initiated interdependence, received interdependence, communication quality, communicating organizational values, task-related communication, communication frequency, and telecommuting intensity were used to predict company support – the second subdimension of workplace isolation. The model explained a significant amount of variance in company support, $R^2 = .56, F(7, 264) = 47.38, p < .01$.

Supporting Hypothesis 1D, received interdependence was found to be a significant predictor of company support ($\beta = 0.09, t(260) = 2.33, p < .05$). This suggests that as an individual relies more heavily on others for their work, that individual feels increasingly supported by their company. As support for Hypotheses 2F – 2H, communicating organizational values, task-related communication, and communication frequency were all significant predictors of company support. This suggests that increased communication in general, as well as increases in communication around the values of the organization and work tasks increases perceptions of company support. The results of these analyses can be found in Table 7.

Table 7

Task Interdependence, Communication, and Telecommuting Intensity Predicting Company Support

	β	t	p
(Constant)		-0.82	0.41
Initiated Interdependence	0.00	0.03	0.97
Received Interdependence	0.09	2.31	0.02
Communication Quality	-0.02	-0.28	0.78
Org. Values	0.40	4.69	0.00
Task-Related Communication	0.35	4.23	0.00
Communication Frequency	0.22	3.74	0.00
Telecommuting Intensity (Percentage)	-0.07	-0.89	0.38

Next, moderation analyses were performed to examine Hypotheses 3 & 4 as they related to company support. As previously described, the predictor and moderator variables were mean centered and entered into a hierarchical regression analysis in three steps. The overall model remained significant across all three steps of the regression analysis, but addition of the two-way and three-way interactions did not significantly improve the model fit ($\Delta R^2 = .021$, $\Delta F(10, 254) = 1.24$, $p = .27$ and $\Delta R^2 = .011$, $\Delta F(8, 246) = 0.82$, $p = .58$, respectively). See Table 9. Examination of the interaction terms in Model 2 revealed significant interactions between initiated interdependence and communication of organizational values ($\beta = 0.22$, $t(254) = 2.06$, $p < .05$) as well as received interdependence and communication of organizational values ($\beta = -0.25$, $t(254) = -2.62$, $p < .05$). Model 3 revealed a significant interaction between initiated interdependence and communication frequency ($\beta = -0.22$, $t(246) = -2.17$, $p < .05$). Due to the lack of significant improvement between models and the inconsistency of significant interaction terms, Hypothesis 3 & 4 were not supported for company support. See Table 8 for results of the hierarchical regression analysis.

Table 8

Moderation Analysis for Company Support

Model		β	t	p
1	(Constant)		133.72	0.00
	Initiated Interdependence	0.00	0.03	0.97
	Received Interdependence	0.09	2.31	0.02
	Communication Quality	-0.02	-0.28	0.78
	Org. Values	0.40	4.69	0.00
	Task-Related Communication	0.35	4.23	0.00
	Communication Frequency	0.22	3.74	0.00
	Telecommuting Intensity (Percentage)	-0.07	-0.89	0.38
2	(Constant)		126.09	0.00
	Initiated Interdependence	0.00	0.04	0.97
	Received Interdependence	0.10	2.35	0.02
	Communication Quality	-0.02	-0.36	0.72
	Org. Values	0.39	4.40	0.00
	Task-Related Communication	0.32	3.64	0.00
	Communication Frequency	0.24	3.80	0.00
	Telecommuting Intensity (Percentage)	-0.02	-0.29	0.77
	InitiatedxQuality	0.11	1.31	0.19
	InitiatedxOrgVal	0.21	2.06	0.04
	InitiatedxTaskRelated	-0.08	-0.82	0.41
	InitiatedxFrequency	-0.18	-1.96	0.05
	ReceivedxQuality	0.00	0.03	0.97
	ReceivedxOrgVal	-0.25	-2.62	0.01
	ReceivedxTaskRelated	0.01	0.08	0.94
	ReceivedxFrequency	0.14	1.56	0.12
	InitiatedxIntensity	0.12	1.10	0.27
	ReceivedxIntensity	-0.06	-0.61	0.54
3	(Constant)		122.15	0.00
	Initiated Interdependence	-0.03	-0.54	0.59
	Received Interdependence	0.10	2.15	0.03
	Communication Quality	-0.03	-0.51	0.61
	Org. Values	0.40	4.32	0.00
	Task-Related Communication	0.31	3.33	0.00
	Communication Frequency	0.23	3.62	0.00
	Telecommuting Intensity (Percentage)	-0.02	-0.26	0.79
	InitiatedxQuality	0.11	1.21	0.23
	InitiatedxOrgVal	0.20	1.63	0.11
	InitiatedxTaskRelated	-0.07	-0.56	0.58
	InitiatedxFrequency	-0.22	-2.17	0.03
	ReceivedxQuality	-0.02	-0.23	0.82
	ReceivedxOrgVal	-0.22	-1.90	0.06

Model	β	t	p
ReceivedxFrequency	0.10	1.07	0.28
InitiatedxIntensity	0.16	1.31	0.19
ReceivedxIntensity	-0.06	-0.48	0.63
InitiatedxQualityxIntensity	-0.20	-0.89	0.37
InitiatedxOrgValuexIntensity	-0.30	-0.97	0.33
InitiatedxTaskRelatedxIntensity	-0.06	-0.22	0.83
InitiatedxFrequencyxIntensity	0.17	0.71	0.48
ReceivedxQualityxIntensity	-0.10	-0.50	0.62
ReceivedxOrgValuexIntensity	0.14	0.44	0.66
ReceivedxTaskRelatedxIntensity	-0.02	-0.05	0.96
ReceivedxFrequencyxIntensity	-0.07	-0.33	0.74

Table 9

Model Summary for Moderation Analysis of Colleague Support

Model	R	R^2	Adj. R^2	Std. Error of Est.	Change Statistics				
					$R^2 \Delta$	$F\Delta$	df_1	df_2	Sig. $F\Delta$
1	0.75	0.56	0.55	0.49	0.56	47.38	7.00	264.00	0.00
2	0.76	0.58	0.55	0.48	0.02	1.24	10.00	254.00	0.27
3	0.77	0.59	0.55	0.49	0.01	0.82	8.00	246.00	0.58

Model 1 Predictors: (Constant), Initiated Interdependence, Received Interdependence, Communication Quality, Communicating Org. Values, Task-Related Communication, Communication Frequency, Telecommuting Intensity

Model 2 Predictors: (Constant), Initiated Interdependence, Received Interdependence, Communication Quality, Communicating Org. Values, Task-Related Communication, Communication Frequency, Telecommuting Intensity, InitiatedxQuality, InititiatedxOrgVal, InitiatedxTaskRelated, InitiatedxTaskRelated, InitiatedxFrequency, RecievedxQuality, ReceivedxOrgVal, ReceivedxTaskRelated, ReceivedxFrequency, InitiatedxIntensity, ReceivedxIntensity

Model 3 Predictors: (Constant), Initiated Interdependence, Received Interdependence, Communication Quality, Communicating Org. Values, Task-Related Communication, Communication Frequency, Telecommuting Intensity, InitiatedxQuality, InititiatedxOrgVal, InitiatedxTaskRelated, InitiatedxTaskRelated, InitiatedxFrequency, RecievedxQuality, ReceivedxOrgVal, ReceivedxTaskRelated, ReceivedxFrequency, InitiatedxIntensity, ReceivedxIntensity, InitiatedxQualityxIntensity, InitiatedxOrgValuesxIntensity, InitiatedxTaskRelatedxIntensity, InitiatedxFrequencyxIntensity, ReceivedxQualityxIntensity, ReceivedxOrgValuexIntensity, ReceivedxTaskRelatedxIntensity, ReceivedxFrequencyxIntensity

Exploratory Analyses

To further explore the relationship between communication and workplace isolation, the researchers asked participants to indicate how often they utilized six different communication methods during an average work week. As shown in Table 10, face-to-face and email communication were the most common methods utilized by participants. Video conferencing and "other" were the least common.

Table 10

Average Weekly Use of Six Communication Methods

Variable	n	M	SD
Face-to-face	282	33.08%	26.34%
Phone	282	15.50%	13.68%
Email	282	25.80%	21.48%
Video Conferencing	282	7.58%	9.97%
Instant Messaging	282	13.17%	14.83%
Other	281	4.18%	9.17%

Note. Each participants' total across the six communication methods equaled 100%.

Multiple regression analyses ($\alpha = .05$) were performed to explore whether the various communication methods predicted workplace isolation. The six communication methods were entered to predict colleague support, the first subdimension of workplace isolation. The model explained a significant amount of variance in colleague support, $R^2 = .16$, $F(6, 274) = 8.76$, $p < .01$. Examination of the results revealed four significant predictors: face-to-face communication ($\beta = 0.02$, $t(274) = 3.29$, $p < .05$), phone communication ($\beta = 0.02$, $t(274) = 2.71$, $p < .05$), video conferencing ($\beta = 0.02$, $t(274) = 2.10$, $p < .05$), and instant messaging ($\beta = 0.02$, $t(274) = 2.07$, $p < .05$). These results suggest that perceptions of colleague support increase as face-to-face communication,

phone communication, video conferencing, or instant messaging increases, with face to face communication being the strongest predictor of colleague support. See Table 11.

Table 11

Communication Methods Predicting Colleague Support

	β	t	p
(Constant)		3.582	0.000
Face-to-face	0.022	3.288	0.001
Phone	0.020	2.710	0.007
Email	0.007	1.025	0.306
Video Conferencing	0.017	2.101	0.037
Instant Messaging	0.015	2.065	0.040
Other	0.013	1.536	0.126

Another multiple regression analysis ($\alpha = .05$) was performed using the six communication methods to predict company support, the second subdimension of workplace isolation. The model explained a significant amount of the variance in company support, $R^2 = .08$, $F(6, 274) = 3.69$, $p < .01$. Examination of the results revealed that none of the communication methods were significant predictors of company support. This is to say that changes in any of the six communication methods did not show an influence on perceptions of company support. See Table 12.

These analyses were performed once more looking only at respondents that indicated that they worked at least part of their work week remotely, and similar results were found.

Table 12

Communication Methods Predicting Company Support

	β	t	p
(Constant)		6.883	0.000
Face-to-face	0.001	0.188	0.851
Phone	0.004	0.649	0.517
Email	-0.006	-1.000	0.318
Video Conferencing	0.006	0.798	0.426
Instant Messaging	-0.003	-0.415	0.679
Other	-0.009	-1.146	0.253

CHAPTER IV: DISCUSSION

The purpose of this paper is to contribute to the ongoing dialogue surrounding the benefits and drawbacks of implementing remote work programs. This issue has become increasingly relevant as the number of employees working remotely on a regular basis has increased 57% in response to the COVID-19 pandemic (Iometrics & Global Workplace Analytics, 2020). While this large increase in the adoption of remote work is in direct response to a global health crisis, remote work experts estimate that the number of employees that will be working remotely at least half of the time will jump from 3.6% to 25-30% at the end of 2021 (Lister, 2020). This study aimed to understand the impact of task interdependence, communication, and telecommuting intensity on the level of isolation felt by workers. Remote workers have been found to be at an increased risk of experiencing isolation in the workplace and understanding the variables that influence the perception of isolation is important for employers utilizing remote work practices.

This study hypothesized that a relationship existed between task interdependence and workplace isolation. The results supported this hypothesis. When examining colleague support, both initiated and received interdependence were found to be significant predictors. In other words, connected work of either type, whether it be

performing work that affects others or relying on someone else for work, increases an individual's feeling that they have co-workers with whom they can work through problems, discuss ideas, or develop a friendship. Performing interdependent work likely provides individuals an opportunity to socialize with their co-workers that they may not have received otherwise. An individual performing entirely autonomous work would likely need to exert special effort to connect with co-workers if their work tasks did not require it.

When examining company support, received independence was found to be a significant predictor. This suggests that relying on others for work increased an individual's feelings of being integrated, connected, and supported by their company. These findings are practically relevant, as previous research has suggested that interdependent work may not be well suited for remote workers due to the difficulties of information sharing (Hinds & Weisband, 2003; Olson & Olson, 2014). The results of this study suggest that performing interdependent work tasks remotely may help to counteract workplace isolation -- one of the most cited difficulties faced by remote workers.

This study hypothesized a relationship between communication and workplace isolation. When examining colleague support, task-related communication was found to be a significant predictor. This finding was replicated when examining company support, indicating that communicating about work tasks also increases feelings of being supported by the company. These results support Madlock's (2013) findings that direction-giving language is the strongest predictor of communication satisfaction in remote workers. Communicating with co-workers to complete work tasks likely provides additional opportunities for casual interactions, which in turn helps to create friendships

and perceptions of support. These interactions with co-workers are also likely to keep the individual informed about company events and help the individual to feel integrated into the company. These results suggest that creating an atmosphere where employees feel comfortable asking questions and communicating about their work can make a meaningful impact on how isolated those workers feel. This is especially important in working populations that are at a heightened risk of experiencing workplace isolation, such as remote workers (Cooper & Kurkland, 2002; Dekker & Rutte, 2007; Elst et al., 2017; Golden et al., 2008).

Further supporting the relationship between communication and workplace isolation, communicating organizational values was found to be a significant predictor of perceptions of company support. In other words, having a clear understanding of the values and culture of the organization increases an individual's perception that they are supported by that organization. This result suggests that the creation of a company newsletter, townhall meetings, or any form of communication that shares the values and culture of the organization can make an impact of how supported employees feel by the company.

Communication frequency was found to be a significant predictor of company support. This is to say that receiving enough communication to adequately perform one's job increases feelings of being supported by the company. This finding is particularly interesting because it was not replicated when looking at colleague support – indicating that when employees do not receive enough communication to adequately perform their work they feel isolated by the *company* and not necessarily by their colleagues. This may suggest that communication breakdowns in a department may impact how employees feel

towards the entire company, and not simply towards the individuals involved in the communication issue. Employees may believe that it is the company's responsibility to ensure that work can be performed in an adequate manner. This result emphasizes the importance of checking in with employees to ensure that their communication needs are being met, whether they are working remotely or in the office.

This study hypothesized that telecommuting intensity would moderate each of the previously discussed relationships. While not hypothesized, a direct effect of telecommuting intensity was discovered when predicting colleague support. In other words, working larger portions of the week away from the office leaves the worker feeling that their need for casual interaction and friendship has not been met. When an individual is not working in a physical office there are not opportunities to cross paths with colleagues and chat, gather in common areas, or have a casual conversation in someone's office. The inability to participate in happenstance causal conversation is likely one of the reasons that remote workers perceive lower levels of colleague support. This finding supports previous research that has found that remote workers are at an elevated risk of social isolation, which suggests that special effort should be taken to support remote workers. As previously discussed, interdependent work and increased communication may make a significant impact on how isolated remote workers feel.

In support of the moderated effect of telecommuting intensity, an interaction between initiated interdependence and telecommuting intensity was found to predict colleague support. This result suggests that performing work that affects others impacts how isolated a remote worker feels. This relationship becomes more important as employees work remotely more often.

Exploratory analyses revealed that certain communication methods have an impact on perceptions of colleague support. Specifically, face-to-face communication, phone communication, video conference, and instant messaging were all found to be significant predictors of colleague support – meaning that only email and "other" communication methods were not related. Interestingly, none of the communication methods were predictive of company support. These results support previous research that found that face-to-face communication offset the negative effects of professional isolation on employee performance (Golden et al., 2008).

If an individual's need to interact casually and develop friendships is not met, they will feel isolated from their co-workers. Employees may not perceive email communication as an avenue for casual, friendly interaction like face-to-face communication, phone communication, video conferencing, and instant messaging. Face-to-face communication, phone communication, and video conferencing allow for the transmission of non-verbal cues, such as body language and tone of voice. These cues may allow communicators to build a relationship more easily than could be done over email. While instant messaging does not allow for the transmission of non-verbal cues, it does provide a digital alternate with emojis and gifs. These digitally expressed non-verbal cues along with the ability to communicate in real time makes instant messaging a richer communication method than email.

The results of this study, when taken together, indicate that perceptions of colleague and company support can be bolstered by providing opportunities for employees to interact and communicate – including working on and communicating about interconnected work tasks. Perceptions of colleague support can also be

encouraged by communicating using rich media, such as video conferencing, phone calls, instant messaging, and face-to-face communication.

Limitations and Future Directions

Data collection for this study concluded approximately one month before the nationwide response to COVID-19 in the United States. Since this time, many companies have transitioned their workforce into remote working arrangements – thus the opinions surrounding remote work have likely shifted. Future researchers should examine the impact of COVID-19 on the perceptions of remote workers, specifically if feelings of isolation have changed now that a large portion of the workforce is no longer in the office. The prevalence of communication methods has also likely shifted due to widespread use of video conferencing in workplaces and schools in an attempt to keep employees connected. Future researchers may be interested in examining how the nation's response to COVID-19 has impacted use of common communication methods.

Unfortunately, the generalizability of this study is limited by the fact that racial demographic information was not collected. While differences in perceptions of colleague and company support or isolation were not expected based on race, the researchers were not able to investigate this question because the data was not collected.

Conclusion

In conclusion, this study suggests that connected work and communication play an important role in employees' perceptions of isolation in the workplace. Performing interconnected work and increasing communication with others has been found to predict lower levels of isolation in the workplace. These findings are especially pertinent as the

nation adjusts to the demands of a quickly spreading pandemic. Many employees are finding themselves adjusting to remote work and the isolating effects of working at home. Employers can take action to counteract the isolating effects of remote work by encouraging employees to communicate with each other about their work and work together when they can. Taking these steps will allow employees to work remotely without feeling remote.

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APPENDICES

Appendix A: Descriptive Statistics for Demographic Variables

Variable	Frequency (*n*)	Percent (%)
Sex		
Male	135	49.6
Female	137	50.4
Highest level of education completed		
Less than high school	1	0.4
High school degree or equivalent	14	5.2
Some college but no degree	34	12.5
Associate degree	27	10.0
Bachelor's degree	137	50.6
Graduate degree	58	21.4
Tenure at current organization		
Less than 1 year	31	11.5
1-3 years	80	29.7
3-5 years	67	24.9
5+ years	91	33.8
Tenure in current position		
Less than 1 year	46	17.1
1-3 years	103	38.3
3-5 years	60	22.3
5+ years	60	22.3
Remote Status in current role		
Works remotely in some capacity	219	80.8
Does not work remotely	52	19.2
Primary place of work		
Traditional office	154	57.0
Neighborhood work center or coworking location	13	4.8
Satellite office	19	7.0
Client office	15	5.6
Home	59	21.9
Mobile "on-the-go"	10	3.7
Telecommuting experience in other roles		
Yes, I performed a majority of my work remotely	79	29.2
Yes, I routinely performed my work remotely	53	19.6
Yes, I worked remotely on an "as needed" basis	64	23.6
No, I have not experienced telework	75	27.7

Job status

Salaried	188	69.4
Hourly	83	30.6
Job level		
Entry-level	43	15.9
Individual Contributor	115	42.4
First Line Supervisor	45	16.6
Middle Management	64	23.6
Owner/Executive/C-suite	4	1.5
Employment Relationship		
Contract Employee	67	25.2
Employee of my Organization	199	74.8
Position tenure before telecommuting		
Less than 1 year	98	45.0
1-3 years	66	30.3
3-5 years	31	14.2
5+ years	23	10.6
Telecommuting tenure in current position		
Less than 1 year	56	26.4
1-3 years	84	39.6
3-5 years	46	21.7
5+ years	26	12.3

Appendix B: Online Survey

Screening Questions:

1. I confirm I am 18 years or older.
   a. Yes
   b. No
2. Are you currently employed in the United States?
   a. Yes
   b. No
3. Do you work at least 30 hours per week at your organization?
   a. Yes
   b. No
4. Have you completed this survey before? (M-Turk Only)
   a. Yes
   b. No

Initiated Interdependence

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
5. The job requires me to accomplish my work before others complete their work	○	○	○	○	○
6. Other jobs depend directly on my job.	○	○	○	○	○
7. Unless my job gets done, other jobs cannot be completed.	○	○	○	○	○

Received Interdependence

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
8. The job activities are greatly affected	○	○	○	○	○

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
by the work of other people.					
9. The job depends on the work of many different people for its completion.	○	○	○	○	○
10. My job cannot be done unless others do their work.	○	○	○	○	○

Workplace Isolation - Colleagues

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
11. I have friends available to me at work.	○	○	○	○	○
12. I have one or more co-workers available who I talk to about day-to-day problems at work.	○	○	○	○	○
13. I have co-workers available whom I can depend on when I have a problem.	○	○	○	○	○
14. I have enough people available at work with whom I can talk about my job.	○	○	○	○	○
15. I have people around me at work.	○	○	○	○	○

Workplace Isolation - Company

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
16. I am well integrated with the department/company where I work.	○	○	○	○	○
17. I am kept in the loop regarding company social events/functions.	○	○	○	○	○
18. I am part of the company network.	○	○	○	○	○
19. Upper management knows about my achievements.	○	○	○	○	○
20. My supervisor communicates my achievements to upper management.	○	○	○	○	○

Communication Quality

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
21. I receive a timely response when I reach out to my co-workers.	○	○	○	○	○
22. It takes a long time to get a response from my co-workers. (R)	○	○	○	○	○
23. I receive accurate information when I	○	○	○	○	○

reach out to my co-workers.					
24. My co-workers provide me with complete information.	○	○	○	○	○
25. Communication with my team requires frequent clarification. (R)	○	○	○	○	○

Communication of Organizational Values

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
26. Communication from my organization clearly represents the company's values.	○	○	○	○	○
27. I know how we do things at my organization.	○	○	○	○	○
28. I have learned the unwritten rules of my organization.	○	○	○	○	○
29. I understand how my work contributes to the vision of the organization.	○	○	○	○	○
30. I am provided updates about the business as a whole.	○	○	○	○	○
31. I complete my work in a way that is consistent with the values of my organization.	○	○	○	○	○

Task-Related Communication

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
32. I can receive clarification on work tasks when I need it.	○	○	○	○	○
33. I can brainstorm with my co-workers about my work tasks or projects.	○	○	○	○	○
34. I am made aware of any changes or updates that may impact my work.	○	○	○	○	○
35. I can communicate with my coworkers to gain information to complete a project or solve a problem.	○	○	○	○	○
36. I find myself unsure of what work I am expected to get done. (R)	○	○	○	○	○

Communication Frequency

Items	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
37. The amount of communication I receive is adequate to perform my job.	○	○	○	○	○
38. The amount of communication I receive keeps me informed.	○	○	○	○	○
39. I am satisfied with the amount of communication I receive.	○	○	○	○	○

Communication Methods

During your average work week, estimate the percentage you communicate through each of the methods below (total must equal 100):	
40. Face-to-face	
41. Phone	
42. Email	
43. Video Conferencing	
44. Instant Messaging	
45. Other	
46. Total	

Telecommuting Intensity

47. How many hours during the week, on average, do you work remotely?	

Demographic Questions:

48. What is your sex?
    a. Male
    b. Female
    c. Prefer not to specify

49. Please indicate your age: _____

50. What is the highest degree or level of education you have completed?
    a. Less than high school
    b. High school degree or equivalent (e.g., GED)
    c. Some college but no degree
    d. Associate degree
    e. Bachelor's degree
    f. Graduate degree

51. How long have you worked for your current organization?
    a. Less than 1 year
    b. 1-3 years
    c. 3-5 years
    d. 5+ years

52. How long have you worked in your current position?
    a. Less than 1 year
    b. 1-3 years
    c. 3-5 years
    d. 5+ years

53. On average, how many hours do you work per week? _____

54. Do you ever work remotely (telecommute, work from home) in your current role?
    a. Yes *(Participant directed to complete Demographics – Remote Worker)*
    b. No

55. Which do you consider your primary place of work?
    a. Traditional office
    b. Neighborhood work center or coworking location
    c. Satellite office
    d. Client office
    e. Home office
    f. Mobile "on-the-go" (e.g., hotel, airport, coffee shop)

56. Have you had experience telecommuting in other roles or organizations (not including your current role)? If so, please indicate the highest level of experience with telework you have experienced in the past.
    a. Yes, I performed a majority of my work remotely
    b. Yes, I routinely performed my work remotely
    c. Yes, I worked remotely on an "as needed" basis
    d. No, I have not experienced telework

57. Are you a salaried or hourly employee?
    a. Salaried
    b. Hourly

58. Which of the following best describes your current job level?
    a. Entry-level
    b. Individual Contributor
    c. First line Supervisor
    d. Middle management
    e. Owner/Executive/C-suite

59. Are you considered a contract employee or an employee of your organization?
    a. Contract employee
    b. Employee of my organization

60. How many employee work in your department (or immediate work group)?
    _____

61. What is your average daily commute time (in minutes) when you go to the office?_____

Demographics – Remote Workers:

62. How long were you in your current position before you began telecommuting?
    a. Less than 1 year
    b. 1-3 years
    c. 3-5 years
    d. 5+ years

63. How long have you been telecommuting in your current position?
    a. Less than 1 year
    b. 1-3 years
    c. 3-5 years
    d. 5+ years
    e. I do not telecommute

Appendix C: IRB Approval Letter

IRB
INSTITUTIONAL REVIEW BOARD
Office of Research Compliance,
010A Sam Ingram Building,
2269 Middle Tennessee Blvd
Murfreesboro, TN 37129

MIDDLE TENNESSEE STATE UNIVERSITY

IRBN007 – EXEMPTION DETERMINATION NOTICE

Monday, October 21, 2019

Principal Investigator	**Chelsea Bell** (Student)
Faculty Advisor	Judith Van Hein
Co-Investigators	Michael Hein and Rick Moffett
Investigator Email(s)	*cjb7m@mtmail.mtsu.edu; judith.vanhein@mtsu.edu*
Department	Psychology

Protocol Title	***Attitudes about working from home***
Protocol ID	**20-1040**

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the **EXEMPT** review mechanism under 45 CFR 46.101(b)(2) within the research category *(2) Educational Tests* A summary of the IRB action and other particulars in regard to this protocol application is tabulated as shown below:

IRB Action	**EXEMPT from furhter IRB review***	Date	**10/21/19**
Date of Expiration	12/31/2020		
Sample Size	500 (FIVE HUNDRED)		
Participant Pool	**Adults (18 years or older) - Recruited through MTurk and through social media**		
Exceptions	1. Online informed consent permitted. 2. Approved to use non-standard template for recruitment.		
Mandatory Restrictions	1. Participants must be 18 years or older 2. Informed consent must be obtained from the participants 3. Identifying information must not be collected		
Restrictions	1. All restrictions for exemption apply. 2. Mandatory active informed consent. 3. Participants must be compensated once they consent.		
Approved IRB Templates	1. IRB Online Informed Consent & 2. Email Script, AND Non-MTSU Templates: Abbreviated recruitment script		
Funding	NONE		
Comments	NONE		

***Although this exemption determination allows above defined protocol from further IRB review, such as continuing review, MTSU IRB will continue to give regulatory oversight to ensure compliance.

Institutional Review Board   Office of Compliance   Middle Tennessee State University

Summary of Post-approval Requirements:

The investigator(s) indicated in this notification should read and abide by all applicable post-approval conditions (Visit https://www.mtsu.edu/irb/FAQ/PostApprovalResponsibilities.php for more information)

- PI must close-out this protocol by submitting a final report before **12/31/2020**; if more time is needed to complete the data collection, the PI must request an extension. NO reminders will be sent. **Failure to close-out (or request extension) may result in penalties** including cancellation of the data collected using this protocol or withholding student diploma.
- IRB approval must be obtained for all types of amendments, such as:
  - o Addition/removal of subject population and sample size
  - o Change in investigators
  - o Changes to the research sites – appropriate permission letter(s) from may be needed if the study will be conducted at a non-MTSU location
  - o Alternation to funding
- Modifications to procedures must be clearly described in an addendum request form and the proposed changes must not be incorporated without an approval
- The proposed change must be consistent with the approved protocol and comply with exemption requirements
- Research-related injuries to the participants and other events , such as, deviations & misconduct, must be reported within 48 hours of such events to compliance@mtsu.edu

Post-approval Protocol Amendments:

The current MTSU IRB policies allow the investigators to implement minor and significant amendments that would not result in the cancellation of the protocol's eligibility for exemption. *Only THREE procedural amendment requests will be entertained per year. This amendment restriction does not apply to minor changes such as language usage and addition/removal of research personnel.*

Date	Amendment(s)	IRB Comments
NONE	NONE.	NONE

Post-approval IRB Actions:

Date	IRB Action(s)	IRB Comments
NONE	NONE.	NONE

Mandatory Data Storage Requirement: All research-related records (signed consent forms, investigator training and etc.) must be retained by the PI or the faculty advisor (if the PI is a student) at the secure location mentioned in the protocol application. The data must be stored for at least three (3) years after the study is closed. Subsequently, the data may be destroyed in a manner that maintains confidentiality and anonymity of the research subjects. **The IRB reserves the right to modify/update the approval criteria or change/cancel the terms listed in this notice**. Be advised that IRB also reserves the right to inspect or audit your records if needed.

Sincerely,

Institutional Review Board
Middle Tennessee State University

Quick Links:
- Post-approval Responsibilities: http://www.mtsu.edu/irb/FAQ/PostApprovalResponsibilities.php
Expedited Procedures: http://www.mtsu.edu/irb/FAQ/PostApprovalResponsibilities.php