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A Pre/Post Intervention Study to Assess Social Capital through Bonding and Bridging among Federal Nurse Teleworkers

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A Pre/Post Intervention Study to Assess Social Capital through Bonding and Bridging among

Federal Nurse Teleworkers

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In partial fulfillment of the
requirements for the degree of

Doctor of Nursing Practice

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Abstract

**Background:** The social capital components of bonding (within groups) and bridging (between external groups) are essential to building healthy and effective teleworking relationships that are required to retain staff.

**Objectives:** To identify if delivering a relationship building educational intervention to federal nurse teleworkers who used the internet daily would improve their total Internet Social Capital Scale (ISCS) scores and bonding and bridging subscale scores.

**Methods:** Our study employed a pre/post intervention design, aiming for a convenience sample of 75% \((n=41/55)\) of federal nurse teleworkers. We delivered, via webinar, a 45-minute educational session on telework and techniques to increase bonding and bridging between the two surveys. The Likert scaled ISCS is a 20-item tool composed of the ten-item bonding subscale and ten-item bridging subscale. The respondents completed the pre- and post-ISCS surveys on their own time through PsychData.

**Results:** Forty-four subjects completed the ISCS pre-survey. We matched 28 pairs for those who completed the pre- and post-surveys and attended the intervention. After the intervention, the total mean ISCS score \((M=3.44, SD=0.35; p=0.009)\) and bridging subscore \((M=3.89, SD=0.50; p=0.02)\) were significantly higher than before the intervention (total \(M=3.26, SD=0.50\); bridging \(M=3.43, SD=0.63\)). No significant differences were found between the pre- and post-survey bonding subscale scores.

**Conclusions:** An educational webinar significantly increased federal nurse teleworkers’ perceptions of bonding and bridging on the total ISCS and bridging subscale. We recommend that teleworkers in other federal offices and the health insurance and pharmaceutical industries implement and evaluate a bonding and bridging education program.
Background

Telework is a robust recruitment and retention tool. The United States (U.S.) Office of Personnel Management (OPM) defines telework as “a work arrangement that allows an employee to perform work, during any part of regular, paid hours, at an approved alternative worksite” (United States Office of Personnel Management [OPM], n.d., para. 2). At the end of the fiscal year (FY) 2016, the OPM reported close to 470,000 federal teleworkers (OPM, 2017b, para. 2). Federal agencies that participated in the OPM’s federal telework program during FY 2016 reported they had done so to increase: employee attitudes, recruitment, retention, and performance (OPM, 2017b, p. 16). Additionally, agencies aimed to decrease commuter miles, real estate holdings, and energy use (OPM, 2017b, p. 16). Major, Verive, and Joice (2008) revealed that teleworking increased the performance and retention of federal employees.

As opportunities to telework increase, organizations must be mindful of building and maintaining social capital in a non-traditional office environment. Experts define social capital in numerous ways. Commonly, it is described as “social ties, information, obligations, expectations, and the social norms of a group of people that enable an individual to act” (Gonzales & Nowell, 2017, p. 1102). If there are weak social ties among teleworkers, there is less likelihood that teams will effectively engage or share information (Baker, Moon, & Ward, 2006).

Two specific components of social capital are bonding, which occurs within groups, and bridging, which happens between external groups. Bonding is a relationship cultivated between similarly-situated people, such as a project team or regional office (Kim, Subramanian, & Kawachi, 2006, p. 116). Bonding is a close relationship, attachment, or social connection to others in one’s immediate circle that is characterized by emotions like trust and affection, and
developed based upon things such as mutual interests. Bridging is a relationship developed between people who are at the same hierarchical level but may work in different departments or projects (Kim et al., 2006, p. 116). Bridging is a close relationship, attachment, or social connection to others characterized by emotions such as trust and affection among people outside of one’s immediate circle. Carmeli, Ben-Hador, Waldman, and Rupp (2009); De Clercq, Bouckenooghe, Raja, and Matsyborska (2014); and Van Bogaert, van Heusden, Timmermans, and Frank (2014) discovered that bonding and bridging were positively associated with workplace engagement and employee retention.

Problem Statement

Federal healthcare oversight organizations are continually trying to attract and retain well-qualified candidates, especially those trained as nurses. If federal agencies do not recruit, retain, and socially integrate excellent nurses, their ability to frame meaningful health care policy decisions and conduct effective oversight will be hampered. The social capital components of bonding and bridging, both relationship building concepts, are essential to building healthy, efficient, and effective teleworking relationships that are required to retain staff.

Purpose

The purpose of our study was to identify if a bonding and bridging education intervention delivered to federal government nurse teleworkers, who use the internet daily, improved their Internet Social Capital Scale (ISCS) survey scores. A secondary purpose was to look for differences in the ISCS scores between telework type and length of time teleworked. The long-term purpose of the study was to better assist federal agencies in learning about and increasing the bonding and bridging among its nurse teleworkers to retain engaged nurse leaders.

Aims
The specific aims of our study were to:

1. Develop the bonding and bridging educational seminar intervention for staff.

2. Administer the pre-ISCS survey to nurse teleworkers before implementing an educational seminar intervention for staff.

3. Administer the bonding and bridging educational intervention for staff synchronously and asynchronously via webinar.

4. Achieve at least a 75% (n=41) participation rate for both the pre- and post-ISCS surveys among federal nurse teleworkers across the U.S.

5. Administer the post-ISCS survey to nurse teleworkers after implementing an educational seminar intervention for staff.

6. Evaluate changes in the total mean ISCS scores before versus after the educational intervention.

7. Evaluate changes in the total mean ISCS pre- and post-survey change scores before versus after the educational intervention by telework type and length of time teleworked.

Hypotheses

For federal nurse teleworkers who attended a bonding and bridging educational intervention:

1. There is a difference in ISCS total mean scores and bonding and bridging subscores between the pre- and post- ISCS survey.

2. There is a difference in the pre-survey ISCS total mean scores between routine versus situational teleworkers.

3. There is a difference in the pre-survey ISCS total mean scores between those who have teleworked at the current organization for two years or more versus those who have teleworked for less than two years.
4. There is a difference in total mean ISCS pre- and post-survey change scores between routine versus situational teleworkers.

5. There is a difference in total mean ISCS pre- and post-survey change scores between those who have teleworked at the current organization for two years or more versus those who have teleworked for less than two years.

**Significance**

In the U.S., there is a nursing shortage that has made it increasingly difficult for the federal government to hire competent nurses into administrative oversight roles. The federal government aims to hire nurses to fulfill many of its occupational groups: Nurse, Nurse Consultant, Supervisory Public Health Analyst, and Health System Specialist (OPM, 1977). Many federal agencies use telework as a recruitment and retention tool. The Agency Employee Viewpoint Survey results released by the OPM did not measure nurse specific data on perceptions related to telework, bridging, or bonding (OPM, 2017b).

Our study assessed the bonding and bridging among federal nurse teleworkers to determine how the federal government may be able to engage better and retain quality nurses as they exercise the privilege of telework. The information gleaned from our study will be shared with federal oversight agencies who aspire to keep qualified nurses. Our study contributes to the field of nursing because there has been no data published on federal nurse teleworkers and their perceptions of bonding and bridging. The educational webinar included concrete actions that federal nurse teleworkers could use to increase their relationships with teleworking teammates (Appendix).

**Literature Review**

**History of Telework**
The term “telework” was coined in 1972 by Jack Niles, “The Father of Teleworking” (Dahlstrom, 2013). At the end of the 1970s, Frank Schiff published an article in The Washington Post titled “Working at Home Can Save Gasoline,” and in 1980 the first conference around telework was organized by Gil Gordan (Liquid, Planner, 2013). AT&T held its first telecommuting day in 2014, two years after Yahoo canceled its teleworking privileges. The federal government began a National Telecommuting Initiative in 1996 (Liquid Planner, 2013). In 2001, Congress passed the Transportation and Related Agencies Appropriations Act of 2001 (Public Law 106-346), which required executive government agencies to establish a policy allowing workers to telework to the greatest extent possible without decreasing productivity (OPM, n.d.).

**Telework in the Federal Government**

With the Telework Enhancement Act of 2010, Congress mandated that federal departments share their progress in the execution of telework, which they had been implementing since 2001. At the end of FY 2016, 42% of all federal government employees were eligible to telework, and 51% of those eligible did so (OPM, 2017b, p. 5). Of those who telework, most exercised their right for situational versus routine telework (OPM, 2017b, p. 5). The average time teleworked per two-week pay period was 19 hours (OPM, 2018, p.17). Federal telework programs have demonstrated increased employee retention, performance, morale, health, and ability to manage stress (OPM, 2018, p. 18).

Although telework can be a robust recruitment and retention tool, fewer than 50% of federal agencies used it as such in FY 2016 (OPM, 2017b, p. 6). Departments cited barriers to telework implementation such as a lack of technology and managerial resistance. Federal managers are sometimes resistant to telework because they do not trust their employees to work
while teleworking (Brown, Smith, Arduengo, & Taylor, 2016). However, compared to the private sector, the federal government allows telework at a higher rate than private companies (Caillier, 2012). Federal healthcare telework rates are higher than those in the private healthcare sector (Brown, 2018, personal communication).

Both the federal government and the private sector have used telework as a reasonable accommodation for persons with disabilities for decades. That body of work provides articles on bonding and bridging among teleworkers, and often notes that teleworkers are at a social capital disadvantage when compared to on-site employees. Baker, Moon, and Ward (2006) discussed structural barriers to telework, including physical absence and ensuing social exclusion. Social exclusion and its association with decreased engagement experienced by teleworkers have consistently been documented in the literature (Baker, Moon, & Ward, 2006; Gajendran & Harrison, 2007). Dahlstrom (2013) stated that it takes an exceptional leader to ensure that teleworkers are not isolated.

**Social Capital**

Social capital is an investment in relationships concerning reciprocity and trust and increased well-being (Looman, 2004). Social capital is “the presence of a network that has an identifiable hub, and that operates toward common goals with ongoing consideration for the recipients” (Looman, 2004, p. 418). That network requires “multi-dimensional relationships that fosters reciprocal trust…” and an “…awareness of the needs of others with actions that effectively promote the ability of those needs to be met…” (Looman, 2004, p. 418). Aligning with the constructs of bonding and bridging, Looman (2004) opined that social capital is what “drive[s] individuals and groups to define common objectives that increase the group’s wellbeing” (bonding) and “a distinct awareness of a bigger picture and an ability to draw on
certainty that goodness exists” (bridging) (p. 418). Higher levels of social capital in the workplace buffer against stress (Jay & Anderson, 2018, p. 4).

Fujita et al. (2016) sought to identify if social capital increased work engagement and administered the Workplace Social Capital scale to 440 Japanese subjects across 35 hospitals. The Workplace Social Capital Scale was valid and had reliability – the Cronbach alpha was 0.90 and intra-class correlation 0.60. (Fujita et al., 2016, p. 266). Their results showed a statistically significant ($p < .001$) and a positively associated increase in work engagement with higher levels of social capital (Fujita et al., 2016, p. 267). Subjects were 80.7% female, and most of the healthcare respondents were nurses (Fujita et al., 2016, p. 267).

Social capital has been deconstructed into bonding relationships, bridging relationships, and linking variables to allow for research measurement (Harpham, Grant, & Thomas, 2002). Our study assesses two of three relationship social capital variables – bonding and bridging.

**Bonding and Bridging**

In their study of 76 work teams with 499 employees across 48 organizations, Henttonen, Johanson, and Janhonen (2014) revealed a positive relationship between bonding, bridging, performance effectiveness, and attitudinal outcomes (p. 346). Their data came from the Finnish Maintenance Work Ability barometer survey, which asked a few pointed questions related to bonding and bridging within the overall survey. The items had Cronbach alphas ranging from 0.69 to 0.82 (Henttonen, Johanson, & Janhonen, 2014). They stressed that work teams need both bonding and bridging networks to enhance performance effectiveness and that the developed systems assist the team in defining its identity (Henttonen et al., 2014). Oh, Chung, and Labianca (2004) also asserted that teams need both bonding and bridging experiences, but one should not be developed at the expense of the other, based on their research with 77 Korean
workgroups. The authors used a self-developed intragroup networks and intergroup networks tool, with values on a five-point Likert scale. The authors presented no tool reliability and validity statistics in their paper. In a study of over 1,500 subjects, Reagans, Zuckerman, and McEvily (2004) determined that bridging staff led to higher levels of productivity when compared to bonded staff working together with their day to day colleagues in the office. They utilized available network data to run their analyses and did not use a specific measurement tool. Further supporting the importance of bonding and bridging, Meng, Clausen, and Borg (2018) conducted a study with over 700 dairy workers on 65 teams and found a statistically significant difference in individual work engagement scores in those who felt bonded ($p<0.0001$) and bridged ($p=0.0042$). They utilized the Danish social capital questionnaire (Cronbach alpha 0.95) and the Utrecht Work Engagement Scale 9 (Cronbach alpha 0.86) (Meng, Clausen, & Borg, 2018).

Researchers have studied bonding and bridging among healthcare workers in onsite healthcare settings with encouraging results, possibly due to strong leadership presence co-located with onsite staff. Carmeli, Ben-Hador, Waldmann, and Rupp (2009) developed and implemented their own, unnamed four-item bonding survey with 209 Israeli community center participants in a cross-sectional study. The authors did not include any reliability or validity statistics on their tool. Carmeli et al. (2009) reported a significant positive correlation ($p < .001$) with increased work engagement and retention when subjects felt close to work colleagues, could count on their colleagues, received help from them, and cared for them. The study subjects felt bonded to their peers.

Van Bogaert et al. (2014) studied 1,201 acute care registered nurses in Belgium to determine if their perceptions of strong workplace social capital increased the quality of care
they delivered, workplace environment, and retention. Most of the subjects were full-time, bachelor prepared, female nurses. Van Bogaert et al. (2014) used the Belgian Revised Nursing Work Index, Utrecht Work Engagement Scale, and Intensity of Labor Scale, whose Cronbach alphas range from 0.65-0.90 (p. 4). There was a statistically significant positive association ($p<.001$) between strong workplace social capital and increased delivery of quality care and retention (Van Bogaert, Van Heusden, Timmermans, & Franck, 2014).

**Theoretical Foundation**

Human capital “represents the investment people make in themselves that enhance their economic productivity” (Olaniyan & Okemakinde, 2008, p. 479). Our study employed the Human Capital Theory which asserts that with education and on the job training (like our webinar), individuals will increase their skill level, leading to increased retention and productivity (Becker, 1962; Schultz, 1961). Researchers believe that human capital is a “combination of ability, behavior, and efforts” and that it has three constructs: intellectual capital, social capital, and emotional capital (Davenport, 1999; Gratton & Ghoshal, 2003; Hayat, 2010). Intellectual capital is “the knowledge created as the result of interaction between people with each other as well as at the individual level that is left behind when people leave the organization” (Hayat, 2010, p. 7). In the context of human capital, social capital is the relationships that build, run, and regulate organizations which will define the organization’s productivity (Hayat, 2010). The third construct, emotional capital, resides in humans as feelings such as love, hate, joy, and trust (Fineman, 2000; Hayat, 2010). Increasing intellectual capital, social capital, and emotional capital will increase human capital.

Federal nurses bring each of the human capital constructs to their organization. They come armed with a wealth of knowledge and understand the significance of relationships and
emotions. However, the literature has shown that nurses experience intellectual growth during on the job training, even if they must put important projects on hold to attend the training (Graf, 2006; Greve, Benassi, & Dag-Sti, 2010). Nurses who communicate with, and train alongside one another will, according to the Human Capital Theory, positively increase their work relationships and be better able to read their colleagues emotions (Greve et al., 2010). Culver-Clark and Allison-Jones (2011), in their work with nurses, stated that investments made in human capital resulted in “… increased performance, reduced turnover, and organizational capacity…” – all of which are proposed long-term outcomes of our study (p. 18). Figure 1 illustrates how the Human Capital Theory drove our research.

Variable Definitions

The independent variables in the study included: the 45-minute bonding and bridging educational seminar. The educational offering consisted of information on items known to increase bonding and bridging in the workplace. The dependent variables were the ISCS survey scores, and the bonding and bridging subscale scores. Demographic variables included gender, generation, education status, telework type, and length of time teleworking (Table 1).

Methods

Research Design, Sample, and Sample Size

Our study employed a prospective, single group, pre/post intervention design. We aimed for a convenience sample size of 75% (n=41 out of a possible 55) of the teleworking nurses in a federal entity from August 28, 2018, through December 14, 2018. We purposefully chose a targeted sample of 41 that was higher than the power size estimate in case all the potential subjects did not meet the inclusion criteria or did not complete both surveys. The power size estimate of a paired $n=31$ was calculated for a 0.05 two-tailed Type I error rate, a two-tailed
Type II error rate of 0.200, and with an effect size of 0.500 with one standard deviation of the change. We chose to use a two-tailed test because we wanted to able to detect a change for both directions of the hypotheses.

Subjects were included in our study if they: 1) were a full-time, career or career-conditional agency employee; 2) were a registered nurse; 3) had a signed agreement with their supervisor for routine or situational telework; 4) had teleworked at least once in the past year at the agency; 5) had access to a personal email account; 6) had access to the internet on their own time; 7) were willing and able to complete the pre/post-test on non-government time; and 8) attended the required intervention. Potential subjects were excluded if they were not nurses.

Recruitment

Recruitment spanned six weeks from August 28, 2018, thru October 15, 2018. The student researcher conducted recruitment via phone, email, and face to face conversation. During the contacts, the student researcher explained the study purpose, that participation in the pre/post surveys was voluntary, and to be completed on personal time. The student researcher offered a $5 electronic Starbucks gift card as an incentive for completion of each the pre-test and the post-test survey.

Setting

Data collection occurred across the nation via the PsychData web survey platform, which subjects accessed via the intranet. The federally employed nurses all had signed telework agreements, used the internet daily, and worked across the U.S.

Intervention

The student researcher developed and delivered the 45-minute educational webinar available to all organization staff during a pre-scheduled meeting in Fall 2018. The live
presentation was broadcast across the U.S. via Skype. It covered definitions, the history of telework, telework prevalence, and methods to increase social capital through bonding and bridging. The presentation also included an interactive discussion, allowed for questions, and provided a reference list (Appendix). Best practices identified in the literature such as activities geared toward building trust and professional relationships informed the presentation. The student researcher recorded the webinar for asynchronous electronic delivery, and the presentation slides, reference list, and webinar link were sent via email to all staff within one week of the presentation. The student researcher delivered and recorded the seminar to ensure the webinar was executed as planned and that all listeners received the same intervention.

Instrumentation/Measurement

We used two tools to collect the data in our study. We developed our demographic tool and deployed it during only the pre-survey through the PsychData platform. We captured the following demographics: gender, generation, nurse educational status, telework status, and length of time teleworking within the organization. Gender was coded for male and female. Generation was captured as Baby Boomer, 1946-1964 or Generation X, 1965-1981. The educational status of the nurse was defined by achievement of the highest degree earned in nursing: Associate Degree in Nursing, Bachelor of Science in Nursing, and Graduate degree in nursing. Telework type included routine (three or more days per two-week pay period) or situational (two or fewer days per two-week pay period). The last demographic variable was time teleworked -- less than two years or greater than two years (Table 1).

Our second tool was the ISCS, which was administered via PsychData for both the pre- and post-surveys. The pre-survey was open for one month before the intervention. One month after the intervention, the post-survey was opened, and remained open for one month.
Online bonding and bridging were measured using the valid and reliable (Cronbach alpha=0.90) ISCS survey developed by Williams (2006). Williams (2006) initially administered the ISCS survey to 884 persons. Williams (2006) did not aim to develop two subscales within the ISCS. However, the use of an exploratory analysis yielded nine factors that were distinct to either bonding or bridging; hence, the two distinct subscales within the ISCS were identified. Williams (2006) explained that the “lack of negative interfactor loadings also confirmed, that while separate, the two overarching dimensions were obliquely related” identifying it appropriate to include both subscales in the one ISCS (p. 604). Confirmatory factor analysis and correlations for construct validity were run (Williams, 2006).

To our knowledge, the ISCS was the only reliable and valid tool in the literature which examined bonding and bridging in an online work environment. The ISCS consists of 20 questions, 10 on bonding and 10 on bridging. The tool takes less than 10 minutes to complete. The ISCS uses five Likert response categories including 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. Two items on the bonding subscale were reverse coded. Total mean ISCS scores and bonding and bridging subscores range from 1-5. The tool assesses perception and does not define “good” or “bad” scores. However, the higher the scores, the stronger the perception of small group relationships (bonding) and across group relationships (bridging).

Data Collection Procedure

The student researcher emailed the PsychData internet study link to potential subjects. PsychData was the only data collector. Subjects clicked on the PsychData email link sent to them. After clicking on the link, the subjects automatically saw the Consent Statement. Subjects who agreed with the statement clicked “continue.” The first question asked for a house or
apartment number to be entered on the pre-survey and remembered for the post-survey, which allowed linking of the pre- and post-surveys. Next, the subjects clicked on the “continue” button to move forward in the study. When subjects reached the end of the survey, they clicked on the “finish” button. PsychData automatically saved the data.

Participants could request a $5 electronic Starbucks certificate each for completion of the pre-survey and completion of the post-survey (up to $10 total). The participants who wanted a certificate sent an email to bondingandbridgingstudy@yahoo.com (listed in both the Consent Statement and on the last page of the survey) requesting the electronic Starbucks certificate. The Starbuck’s certificate was emailed directly by Starbucks to the email address identified in the request.

Data Analysis Plan

PsychData produced an EXCEL data file for SPSS v25.0. We checked the data from the generated EXCEL spreadsheet to ensure it downloaded correctly from SPSS. We removed duplicate entries from the EXCEL spreadsheet and paired the pre- and posts surveys next to one another.

We ran the Cronbach’s alpha on responses from our ISCS pre-survey. Descriptive statistics were performed on each variable. Frequencies and percentages were calculated for the categorical variables of gender, age, registered nurse status, nursing education, telework status, and length of telework.

A paired t-test was calculated to identify the differences in the total mean ISCS score, and the bonding and bridging subscores between the pre-and post-ISCS survey (hypothesis 1). Independent t-tests were calculated to determine differences in the total mean ISCS pre-survey scores by routine versus situational teleworker (hypothesis 2) and by those who teleworked at the
organization for two years or more compared to less than years (hypothesis 3). Total pre-post ISCS change scores between routine versus situational teleworkers (hypothesis 4) and total pre-post ISCS change scores between those who teleworked at the organization for two years or more compared to less than two years (hypothesis 5) were calculated using an independent t-test. All p-values were calculated with a significance level set at 0.05.

**Ethical Considerations**

The study, including the pre-and post-surveys, was approved as an expedited review by the George Washington University’s Institutional Review Board. Study participation was voluntary. The first page of the pre- and post-surveys contained a Consent Statement and identified that clicking the “Continue” button indicated the subject’s consent to taking part in the study. The online, anonymous survey did not request personally identifying information.

The PsychData web collection platform used encrypted 256-bit Secure Socket Layer Technology for transmission over the internet. Data were stored on a PsychData server and held in an isolated database only accessed with the correct username and password. We had full control over the data, and it was backed up each time it was saved. The raw data were saved to an external hard drive. Throughout, and at the end of, the study the student investigator stored data on an external hard drive, which we held in a fire-proof locked box. Data will be kept for three years as required. We permanently deleted the data from PsychData at the end of the study.

We kept the external hard drive under a double lock when not being used. We were the only ones who used the external hard drive. Nurses anonymously participated in our surveys and, therefore, we did not have any means to determine which individual responded with which answers. The only possible way that we may have had an idea who took the surveys was based
on the email addresses used to request electronic Starbucks certificates. If the email addresses did not have names in them, we did not know who asked for an electronic Starbucks certificate. Requesting an electronic Starbucks certificate was not linked to completing the survey so anyone contacted could request a certificate whether they participated or not. Furthermore, the email account set up for the study was only accessed for study purposes and deleted upon study completion.

**Results**

**ISCS Reliability**

The ISCS and subscales demonstrated good reliability in our study. The pre-survey ISCS Cronbach’s alpha, taken by 44 participants, was 0.81, bonding 0.57, and bridging 0.89.

**Demographic Characteristic of the Respondents**

We received eighty total responses from both the pre- and post-surveys. Both surveys had double the average internal survey response rate with 44 of 55 (80%) completing the pre-survey and 36 of 44 (82%) completing the post-survey (Gorsht, 2013). Nurses taking the post-survey acknowledged listening to the educational webinar. The educational session was open to all members of the office including non-nurses, and 103 attended. Seventy-eight attended the live presentation, and 25 listened to the recording. Pre- and post- ISCS surveys were linked, however, to only 28 pairs.

Of the 44 pre-survey respondents, all were nurses (n=44). Most were female (n=40, 90.1%), Baby Boomers (n=26, 59.1%), earned a graduate degree in nursing (n=24, 54.5%), utilized routine telework (n=34, 79.1%) and had teleworked at the organization for less than two years (n=24, 54.5%; Table 2). The 28 paired study participants were representative of the population studied. All were nurses (n=28, 100%), most were female (n=24, 85.7%), earned a graduate degree
in nursing \( (n=17, 60.7\%) \), utilized routine telework \( (n=24, 85.7\%) \), and had teleworked at the agency for less than two years \( (n=24, 85.7\%; \text{Table 2}) \). Half were Baby Boomers \( (n=14, 50.0\%) \).

**Study Results**

We checked the distribution of the variables. All variables appeared normally distributed as the skewness to standard error and kurtosis to standard error ratios were less than 2.0. The normality assumptions were not violated. We first evaluated hypothesis 1 for the difference in the ISCS total mean score and the bonding and bridging subscale scores before and after the intervention using paired t-tests. The ISCS total mean score for the pre-survey was 3.26 \( (SD=0.50) \), which indicated the nurses were neutral about their feelings of bonding and bridging in the workplace. The total mean post-survey ISCS was 3.44 \( (SD=0.35) \), which indicated a higher level of bonding and bridging one month after the intervention. The difference in total mean ISCS scores between the pre- and post-surveys was statistically significant \( (t=2.83, p=.009; \text{Table 3}) \), which indicated that nurses perceived significantly higher levels of bonding and bridging after the intervention than before.

The bonding subscale mean scores for the pre-survey was 3.08 \( (SD=0.68) \) and 3.24 \( (SD=0.61) \) for the post-survey. The difference in the bonding subscore between the pre- and post-surveys was not significant. However, the bridging subscale mean score for the pre-survey was 3.43 \( (SD=0.63) \) and 3.83 \( (SD=0.50) \) for the post. The difference in the bridging subscale mean score between the pre- and post-surveys was significantly different \( (t-test=2.55; p=0.02) \), which indicated that nurses perceived significantly higher levels of bridging after the intervention compared to before the intervention (Table 3).

Next, we evaluated hypotheses 2 and 3 with the pre-survey sample \( (n=44) \) to assess if there were differences in the total mean ISCS pre-survey scores between types of telework and
length of telework. The ISCS pre-survey means for routine versus situational teleworkers were 3.29 (SD=0.58) and 3.39 (SD=0.52) respectively. The ISCS pre-survey mean for those who teleworked less than two years at the organization was 3.32 (SD=0.62) versus the pre-survey mean of 3.35 (SD=0.52) for those who teleworked for two years or more. There were no significant differences in the mean scores by type or length of telework.

Lastly, we evaluated hypotheses 4 and 5 for the 28-paired surveys to determine if there were differences in total mean ISCS pre- and post-survey change scores between those who were routine versus situational teleworkers and those who had teleworked at the current organization for two years or more versus those who had teleworked for less than two years. Routine teleworkers had a mean pre- and post-ISCS change score of 0.29 (SD=0.52). Situational teleworkers had a mean pre- and post-ISCS change score of 0.21 (SD=0.63). The mean pre-post ISCS change score for those who teleworked less than two years at the organization was 0.26 (SD=0.59). The same score for those who teleworked two years or more at the organization was 0.31 (SD=0.44). There were no significant differences in the mean pre-post-survey change scores by type or length of telework.

**Discussion**

The reliability of the total ISCS score and the bonding and bridging subscales scores in our study demonstrated high internal consistency of the items and was similar to the findings of others. Using the scale in 765 subjects, Williams (2006) reported high reliability (bonding $\alpha=0.896$, bridging $\alpha=0.841$) (p. 621). Stefanone, Kwan, and Lackaff (2012) used the ISCS to identify bonding and bridging among 49 Facebook users, and the Cronbach’s alpha for bonding was 0.88 and 0.85 for bridging (p. 457). Guo, Li, and Ito (2014) determined the ISCS reliable
for both bridging ($a=0.85$), and bonding ($a=0.63$) among social networking sites participants in Japan (p. 56).

To our knowledge, our study is the first to assess the effects of a bonding and bridging intervention among federal nurse teleworkers. We found a significant increase in nurse perceptions on the total ISCS and bridging subscale scores among a small sample (hypothesis 1). The webinar the student researcher developed and delivered enabled nurses to increase their perceptions about the relationships they developed among their small teams (bonding) and across the organization (bridging). We speculate that the tools and information provided during the educational intervention, coupled with a new awareness about the positive impact of online relationship building, were associated with the increased perceptions of bonding and bridging.

Our intervention stressed the importance of team building, clear online communication, working toward a common goal, and recognition (Appendix). Henttonen et al. (2014) wrote that managers need to focus on team building and social networks when looking to optimize performance through bonding and bridging. There should be a clear articulation of how team members contribute work toward achieving the mission and vision of the organization through constant, clear communication (Lembke and Wilson, 1998). Brown et al. (2016) and Henttonen et al. (2014) argued that explicit and repeated clarification of team boundaries and roles are integral to increasing social capital.

Tyler and Blader (2003) realized that groups must be engaged in multiple levels of decision-making to increase their organizational commitment and sense of identity – teams want to feel that they are involved in decisions. Authors have observed that bonding and bridging are improved when using award recognition for behavior alignment of team members (Lembke & Wilson, 1998). The educational intervention offered several ways to reward staff in the
teleworking environment such as the use of online thank you cards, official award nominations, and the use of electronic gift cards. Additionally, the intervention discussed concrete activities that focused on the importance of social events such as social gatherings, everyday intergroup activities to increase bridging and break down silos, and the use of social media as concrete strategies that foster bonding and bridging (Appendix) (Henttonen et al., 2014).

The significant increase in the bridging subscale mean scores between the pre- and post-survey was not unexpected. Grottke, Hacker, and Durst (2018), in their study of 888 subjects using the ISCS found that bridging tended to be higher in older participants – 50% of our paired sample was composed of Baby Boomers. Sharma, Menon, and Marimuthu (2017) utilized the ISCS to assess the difference in bridging and bonding among 93 subjects who had high internet use, as our teleworkers did. Those with high online usage had increased bridging with others, but no change in their development of close relationships, or bonding, as our results indicated (Sharma, Menon, & Marimuthu, 2017).

Wong, Ching, Whitfield, and Duncan (2016) used the ISCS to determine the bonding and bridging levels of deaf students in Australia who used social media and the internet. A total of 29 students completed the ISCS questionnaire (bonding $a=0.92$; bridging $a=0.88$) (Wong et al., 2016, p. 109). Over 59% of the students spent five hours a day, or more, on the internet interacting with peers (Wong et al., 2016, p. 107). Students who spent more than four hours a day on the internet had higher levels of online bridging when compared to those who spent less time; however, there was no statistically significant difference seen in bonding between the two groups (Wong et al., 2016, p. 110). Our participants generally spent 40 hours a week using the internet.
The absence of a significant difference in the pre-post bonding subscale scores may have been related to the fact that half of the paired subjects in our study were Baby Boomers and that older internet users were found to have less favorable online bonding experiences (Burke, Marlow, & Lento, 2010). However, in our study, most respondents were females, who tend to bond more than men (Burke et al., 2010). Grottke et al. (2018) found that if the internet is used to connect new people, bonding tends to be lower (p. 6). The respondents used the internet daily to connect with other staff, which may help explain why we did not find a difference in the bonding subscale scores.

We found no significant differences in the total mean ISCS pre-survey scores or total mean ISCS pre- and post-survey change scores between telework type or length. Perhaps we did not find a statistically significant difference in any of the groups because most participants routinely teleworked at the organization for less than two years. One possible reason for no difference in the total mean ISCS pre-survey scores or total mean ISCS pre- and post-survey change scores between telework type or length is that the nurses may have all received the same guidance on telework expectation when starting in their current roles.

**Study Limitations**

We identified four limitations to our study. One, we conducted our study within one federal government office among nurses who self-selected to answer the surveys which may have led to selection bias. The nurses in our study were office workers. Our findings are not generalizable to nurses who are actively providing clinical care.

Two, we believe there are a couple of reasons we did not reach our goal of 31 paired samples for our pre/post study. Falling short of our goal increased the risk of a false negative result. We used the rigorous two-tailed test which means our results were less likely to show
statistical significance then if we had used a one-tailed test. We wanted to determine if there was a difference in either direction at the expense of having a higher statistical power.

Third, the pre- and post- intervention study design required participants to remain engaged at three different points in time. Fourth, the participants also had to remember their linking code. We had 44 participants in the pre-survey and 36 participants in the post-survey. We were only able to match 28 pairs. We believe that several respondents forgot the linking identification number (house or apartment number) they used on the pre-survey. This could have occurred because respondents made up a number and did not save it in a place they could easily remember or retrieve.

**Implications/Recommendations for Policy, Practice, and Research**

Our study findings demonstrated that an educational intervention was effective to improve nurses’ perceptions of bonding and bridging in the telework arena. The intervention could also be used by other federal offices, the health insurance and pharmaceutical industries, and nursing institutions of higher learning. We recommend that organizations increase and sustain bonding and bridging through policy change, practice, education, and research. The increased perceptions of closer relationships may lead to a happier team and decreased turnover.

Through the broad dissemination of our research, we could impact health policy. The student investigator will disseminate our results to members of the federal Senior Executive Services within two executive departments that oversee national health care policy. The student investigator will also present our data at a national conference targeting executive healthcare leaders who set healthcare systems strategies. Lastly, the student investigator will disseminate our results at an international nursing conference targeting key nursing leaders and providing information that will better allow them to impact national and local policy. A change to an
organization’s local policy may mean that all teleworking nurses are required to participate in a bonding and bridging educational session.

Our data have implications for future research. We recommend the study be replicated with a larger sample size. Researchers might also want to measure the long-term effects of the intervention to assess if there is a sustained change in bonding and bridging perceptions over six months or a year. We also recommend that the same research be conducted with nurses who telework 100% of the time in the healthcare insurance and pharmaceutical industries and then evaluate whether there is an increase in nurse retention and productivity related to increases in bonding and bridging.

An educational session has the power to impact practice change. Leaders who are interested in increasing nurse’s perceptions on the strength of their work relationships should develop an education program, with actionable, concrete strategies to build teleworking relationships.

**Sustainability**

Practice change and sustainability do not happen overnight. We recommend the development, implementation, and evaluation of a practice change program that could increase the perception of bonding and bridging in organizations. The program would be named according to the needs of the organization.

The newly developed program would require the support of leadership and the buy-in of early nurse adopters. We envision an ongoing two-year program with several facets tailored to the teleworking environment, which includes the delivery of evidence-based relationship building workshops, utilization of concrete remote team building activities and discussions, and individual and team recognition. Specifically, the implemented workshops could include
educational presentations and interactive case study discussions targeted toward the adult learner focusing on maintaining a positive work environment, providing interactive tools, and encouraging self-reflection (Grottke, Hacker, & Durst, 2018).

The team building activities could vary depending on the group personality but could include taking and discussing assessment tool results; developing a common mission, vision, and set of specific team values; conducting team meetings via video at least monthly; and holding weekly video and chat team lunches. Staff recognition for accomplishments and important events could be individual and provided through a short, thoughtful email; a mailed card; an occasional gift card; a certificate; or verbalization of the good old-fashioned “thank you.” Teams could be recognized in public through verbal recognition; team t-shirts and mugs; monetary awards; and time off.

We believe the two-year program should be continually evaluated to identify its successes and opportunities. Two months after each educational seminar, the ICSC survey should be sent to all participating staff to see if there is a change in bonding and bridging perceptions over time. The program should be continually evaluated and improved to ensure the content and delivery are well received by the intended audience. Adjustments should be made to the seminars throughout the process and used to deploy an improved version of the program in subsequent cycles.

**Conclusions**

An educational webinar provided to federal nurse teleworkers working at a desk job significantly increased their perceptions of bonding and bridging relationships measured by the total ISCS and bridging subscale. No statistically significant differences in ISCS scores were identified between routine or situational teleworkers or those who had teleworked at the
organization for less than two years, or two years and longer. We recommend that our research be replicated with nurses who telework 100% of the time and be taken a step further to evaluate whether there is an increase in nurse retention and productivity related to increases in bonding and bridging. Lastly, we recommend that other federal offices, the health insurance, and pharmaceutical industries, and nursing institutions of higher learning develop, implement, and evaluate an educational bonding and bridging practice change program.
References


Table 1

Definition of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Theoretical</th>
<th>Operational</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational seminar</td>
<td>A learning opportunity for teleworking nurses to learn about bridging and bonding best practices.</td>
<td>45-minute live, synchronous, and asynchronous training.</td>
<td>Participants taking the post-survey will affirm they attended the educational seminar.</td>
</tr>
<tr>
<td><strong>Dependent</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre and post ISCS mean scores</td>
<td>Difference between the mean of ISCS pre-test and post-test scores.</td>
<td>The minimum score is 20 and the maximum is 100. (Williams, 2006).</td>
<td>Scale 1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree</td>
</tr>
<tr>
<td>ISCS total mean score</td>
<td>Mean scores calculated from the 20-item ISCS.</td>
<td>Mean scores generated by the sum of each subject after completion of the total ISCS score which includes both</td>
<td>Scale 1=Strongly disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree</td>
</tr>
</tbody>
</table>
BONDING AND BRIDGING AMONG NURSE TELEWORKERS

<table>
<thead>
<tr>
<th>Bonding subscale mean scores</th>
<th>Individual question mean scores calculated from the 10-item ISCS bonding subscale.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonding subscale scores generated by each subject after completion of the bonding subscale. The ten items include: problem solving, advice, personal problems, loneliness, emergency loan, reputation, sharing, importance, and injustice.</td>
<td>Scale</td>
</tr>
<tr>
<td>1=Strongly disagree</td>
<td></td>
</tr>
<tr>
<td>2=Disagree</td>
<td></td>
</tr>
<tr>
<td>3=Neutral</td>
<td></td>
</tr>
<tr>
<td>4=Agree</td>
<td>5=Strongly Agree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bridging subscale mean scores</th>
<th>Individual question mean scores calculated from the 10-item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridging subscale scores generated by each subject after completion of the</td>
<td>Scale</td>
</tr>
<tr>
<td>1=Strongly disagree</td>
<td></td>
</tr>
<tr>
<td>2=Disagree</td>
<td></td>
</tr>
</tbody>
</table>
ISCS bridging subscale. The ten items include interested in things, new things, thinking, curiosity, big picture, bigger picture, world connection, community, talk, and contact.

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>“The behavioral, cultural, or psychological traits associated with one sex” (Merriam-Webster, n.d.)</td>
<td>Male or female (Transgender not included due to small sample)</td>
<td>Nominal 1=Male 2=Female</td>
</tr>
<tr>
<td>Nurse Education</td>
<td>The degree level a nurse has achieved.</td>
<td>An Associate Degree in Nursing is a two year</td>
<td>Nominal 1=Associate Degree</td>
</tr>
</tbody>
</table>
A nursing degree based upon a registered nursing curriculum. A Bachelor of Science in Nursing degree is a four-year degree in nursing. A graduate degree in nursing is a Master or Doctorate degree focused on the discipline of nursing.

<table>
<thead>
<tr>
<th>Telework type</th>
<th>“A work arrangement that allows an employee to perform work, during any part of regular, paid hours, at an approved alternative worksite” (OPM, n.d., para. 2).</th>
<th>“Routine telework is three or more days per two-week pay period...situational use of telework is two or less days per pay period” (OPM, 2017a, p. 5).</th>
<th>Nominal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1=Routine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2=Situational</td>
</tr>
</tbody>
</table>
| Length of telework experience | Length of time a nurse has been teleworking at the agency. | Two years or more equals 730 calendar days or more. Two years or less in 729 calendar days or below. | Nominal  
1=Fewer than two years  
2=Two years or greater |
Table 2

Demographic characteristics of the sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Survey Respondents</th>
<th>Paired Pre-Post Survey Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td></td>
<td>44 (100)</td>
<td>28 (100)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4 (9.1)</td>
<td>4 (14.3)</td>
</tr>
<tr>
<td>Female</td>
<td>40 (90.1)</td>
<td>24 (85.7)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby Boomer</td>
<td>26 (59.1)</td>
<td>14 (50.0)</td>
</tr>
<tr>
<td>Generation X</td>
<td>18 (40.9)</td>
<td>14 (50.0)</td>
</tr>
<tr>
<td>Nursing Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADN</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>BSN</td>
<td>20 (45.5)</td>
<td>11 (39.3)</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>24 (54.5)</td>
<td>17 (60.7)</td>
</tr>
<tr>
<td>Telework Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine</td>
<td>34 (79.1)</td>
<td>24 (85.7)</td>
</tr>
<tr>
<td>Situational</td>
<td>9 (20.9)</td>
<td>4 (14.3)</td>
</tr>
<tr>
<td>Time Teleworking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two years or less</td>
<td>24 (54.5)</td>
<td>24 (85.7)</td>
</tr>
<tr>
<td>Greater than two years</td>
<td>20 (45.5)</td>
<td>4 (14.3)</td>
</tr>
</tbody>
</table>
Table 3

Differences in total mean ISCS scores and bonding and bridging subscores before and after the education session

<table>
<thead>
<tr>
<th></th>
<th>Before education</th>
<th>After education</th>
<th>Paired t-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total mean ISCS scores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>Paired t-test</td>
<td>p-value</td>
</tr>
<tr>
<td>Total mean</td>
<td>3.26 (0.50)</td>
<td>3.44 (0.35)</td>
<td>2.83</td>
<td>0.009</td>
</tr>
<tr>
<td><strong>Bonding Subscores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>Paired t-test</td>
<td>p-value</td>
</tr>
<tr>
<td>Bonding</td>
<td>3.08 (0.68)</td>
<td>3.24 (0.61)</td>
<td>1.25</td>
<td>0.22</td>
</tr>
<tr>
<td><strong>Bridging Subscores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>Paired t-test</td>
<td>p-value</td>
</tr>
<tr>
<td>Bridging</td>
<td>3.43 (0.63)</td>
<td>3.83 (0.50)</td>
<td>2.55</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Figure 1. Human Capital Theory applied to study.
Appendix

Teleworking and Team Engagement Presentation Outline

I. Overview

II. Definitions
   a. Telework
   b. Social Capital
   c. Bonding
   d. Bridging

III. Telework
   a. History of telework
   b. Telework cost savings
   c. Telework in the federal government

IV. Actions to increase social capital
   a. Organizational structure
   b. Leadership buy-in
   c. General ways to increase goodwill
      i. Bonding
         1. Shared activities
            a. Virtual lunch
            b. Fitness goals
            c. Electronic picture album
            d. Team problem solving
            e. Virtual open mic
BONDING AND BRIDGING AMONG NURSE TELEWORKERS

f. Sharing assessment tool results

g. Holiday party

2. Common goals

a. Organization mission and vision

b. Project team values

c. Project deadlines

d. Genuine interest in ideas and values of colleagues

3. Enhanced communication and transparency

a. Weekly team meeting

b. Routine “touch base” with staff through Skype

c. Monthly organization meetings for all staff

d. Newsletter

4. Transparency

ii. Bridging

1. Employee engagement

a. Reinforced goals and values

b. Committees composed of the right people

c. Advisory committee

d. Employee engagement survey

2. Supporting one another for mutual gain

a. Assist one another

b. Recognize staff

c. Share “best practices”
3. Build and maintain formal and informal networks
   a. Chit chat
   b. Ice breaker questions
   c. Online games
   d. Virtual team builders
   e. Video calls
   f. GIF and meme’s
   g. Intentional celebratory spaces

V. Online team building resources

VI. References