The Impact of Professional Isolation on Teleworker Job Performance and Turnover Intentions: Does Time Spent Teleworking, Interacting Face-to-Face, or Having Access to Communication-Enhancing Technology Matter?

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Although the teleworking literature continues to raise concerns regarding the adverse consequences of professional isolation, researchers have not examined its impact on work outcomes. Consequently, the authors first examine professional isolation's direct impact on job performance and turnover intentions among teleworkers and then investigate the contingent role of 3 salient work-mode-related factors. Survey data from a matched sample of 261 professional-level teleworkers and their managers revealed that professional isolation negatively impacts job performance and, contrary to expectations, reduces turnover intentions. Moreover, professional isolation's impact on these work outcomes is increased by the amount of time spent teleworking, whereas more face-to-face interactions and access to communication-enhancing technology tend to decrease its impact. On the basis of these findings, an agenda for future research on professional isolation is offered that takes into account telework's growing popularity as a work modality.

Keywords: telework, virtual work, professional isolation, performance, turnover

Recent advances in information technology have untethered many employees from the workplace, enabling them to perform work assignments away from the traditional office setting. Telework, practiced worldwide (Korte & Wynne, 1996), is growing by over 11% per year (Office of National Statistics, 2005; Society for Human Resource Management Foundation, 2001). Although initially this work mode was restricted to clerical or home-based workers, today it is commonplace for professionnal-level employees to telework, with major corporations institutionalizing companywide programs in which at least a portion of every workweek is spent working in this mode (Baruch, 2000; Cummings, 2005). Despite some proponents contending that telework enhances job performance and reduces turnover (Bailey & Kurland, 2002; Igbaria & Guimaraes, 1999; Staples, Hulland, & Higgins, 1999), others suggest that professional isolation may leave teleworkers feeling out of the loop in office interactions (Baruch & Nicholson, 1997; Vega & Brennan, 2000), thereby creating a major obstacle to telework's continued adoption (Cascio, 2000; Venkatesh & Speier, 2000). To date, however, much of the extant evidence as to the nature and impact of professional isolation among teleworkers has been essentially anecdotal (e.g., Shellenbarger, 2006).

Although professional isolation has not been widely researched, more generalized notions have been studied and are rooted in a wide variety of disciplines, including economics (Edwards, 1979), sociology (Seeman, 1975), psychology (Rousseau, 1995), manage-

ment (Drucker, 1970), religion (Fromm, 1941), communication science (Sproull & Kiesler, 1991), and engineering technology (Taha & Caldwell, 1993). As noted by a variety of scholars, isolation is fundamentally the feeling that one is "cut off from others" (Diekema, 1992, p. 484), and it "occurs when the desire for support, understanding, and other social and emotional aspects of interaction are not met" (Taha & Caldwell, 1993, p. 277). Although professional isolation has been recognized in the telework literature as a potential obstacle to the effectiveness of this work mode (Cooper & Kurland, 2002; Kurland & Egan, 1999), research has not focused on its impact on job outcomes.

Given that the existing literature is composed of only a few qualitative studies (Cooper & Kurland, 2002; Kurland & Cooper, 2002), we initially focus on hypothesizing links between professional isolation and two fundamental job outcomes among teleworkers, namely performance and turnover intentions. Then, we hypothesize three salient factors that may play contingent roles as teleworkers cope with being routinely absent from the social milieu of their office. Specifically, we investigate the moderating roles of time spent teleworking, face-to-face interactions, and access to communication-enhancing technology. We test these hypotheses using matched survey data from 261 professional-level teleworkers and their managers.

Theory and Hypotheses

Professional isolation is a state of mind or belief that one is out of touch with others in the workplace (Diekema, 1992). In effect, one's inherent striving and desire to feel socially connected in the workplace (Baumeister & Leary, 1995) has been thwarted. Consistent with the isolation literature (e.g. Smith & Calasanti, 2005; Taha & Caldwell, 1993), physical separation or solitude per se is not implicit to such feelings (Diekema, 1992; Vega & Brennan,

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2000), although either may play a contingent role in impacting work outcomes. Consequently, just as some individuals can feel professionally isolated despite working side by side with coworkers (Miller, 1975; Rokach, 1997; Smith, 1998), others are able to sustain feelings of connectedness even though they are regularly absent from the workplace (Diekema, 1992; Duxbury & Neufeld, 1999; Vega & Brennan, 2000; Venkatesh & Speier, 2000). Essentially, then, professional isolation reflects the belief that one lacks sufficient connection to "critical networks of influence and social contact" (Miller, 1975, p. 261), without regard to the individual's extent of contact with coworkers. Moreover, given that such beliefs generally comingle feelings of professional, as well as social, connectedness, like others, we view professional isolation as encompassing beliefs about the sufficiency of both professional and social contacts (Cooper & Kurland, 2002).

Teleworker Professional Isolation and Job Performance

Although not all teleworkers report feeling professionally isolated, interview data suggest that they often lack "social barometers" that they can use to compare themselves with others, making it difficult to determine how they should behave or react to work events (Mann, Varey, & Button, 2000; Vega, 2003). Given such feelings, professionally isolated teleworkers are less apt to be confident in their abilities and knowledge, which can put them at a distinct disadvantage in performing their jobs. For example, they are less able to effectively manage interpersonal relationships and interactions with others to coordinate complex and ambiguous tasks and enhance the level of understanding derived from the sharing and refining of tacit knowledge (Krauss & Fussell, 1990). In part, work relationships provide crucial knowledge containing contextual information about events; detailed understandings necessary for working with complex information; or the nuances of personalities of coworkers, managers, or clients—all of which may be essential to performing the job well (R. A. Baron, 1996; Duffy, Ganster, & Pagon, 2002). In effect, because their relationships and interactions are more apt to suffer, professionally isolated teleworkers are less able to perform their jobs.

Professionally isolated teleworkers also effectively put at risk their own knowledge base essential for job performance. Specifically, given their belief that they need and yet lack relevant information, they are more apt to display a lack of confidence in their ability to inform interactive discussion for fear of being criticized or exposed. As suggested by social learning theory (Bandura, 1977, 1986), workers lacking sufficient in-depth interactions operate at a disadvantage and are forced, instead, to carry out work activities with limited insights, information, and feedback. Consequently, professionally isolated teleworkers are more likely to take frequent corrective actions due to suboptimal decision making and, therefore, experience increased anxiety (Baumeister & Tice, 1990), loneliness (Jones, 1990), and, in more extreme cases, diminished psychological or even physical health (DeWall & Baumeister, 2006; Schneider, Hitlan, & Radhakrishnan, 2000), which further detracts from their job performance. In sum, professionally isolated teleworkers are less likely and able to receive, accurately interpret, or use important information, adversely affecting their performance of assignments (Rook, 1984), the interpretation of events in the social and political structure

(Kurland & Egan, 1999), and their ability to launch valued job initiatives (Mann et al., 2000).

> *Hypothesis 1:* Professional isolation is negatively related to job performance.

Teleworker Professional Isolation and Turnover Intentions

Professional isolation is also likely to be associated with a teleworker's desire to leave the organization. Specifically, teleworkers who experience greater professional isolation are likely to feel less fulfilled in their basic human need to belong (Baumeister & Leary, 1995), and, without inclusion, they are more apt to dislike colleagues (Pepitone & Wilpizeski, 1960). In addition, they may also experience greater disinterest or even rejection from coworkers (Golden, 2006, 2007; Leary, Springer, Negel, Ansell, & Evans, 1998), resulting in less of a desire to remain in the organization. With a reduced sense of belonging and the increased frustration that comes with greater professional isolation (Lewandowski, 2003), they are also likely to feel less ownership and organizational commitment (Bandura, 1977; Duffy et al., 2002). Indeed, prolonged periods of professional isolation are likely to increase job burnout and dissatisfaction (Baumeister & Leary, 1995), further precipitating the likelihood of departure (Arches, 1991). By hindering their "ability to establish or maintain positive interpersonal relationships, work-related success, or favorable reputation within one's place of work" (Hitlan, Cliffton, & DeSoto, 2006, p. 217), professionally isolated teleworkers feel less esprit de corps and less bound to the organization (Ashforth & Humphrey, 1995; Mann et al., 2000).

> *Hypothesis 2:* Professional isolation is positively related to turnover intentions.

Contingent Factors

To date, extant telework literature has identified three salient factors that are likely to influence the relationship between professional isolation and work outcomes: the amount of time spent teleworking (Bailey & Kurland, 2002), the extent of face-to-face interactions (Kurland & Cooper, 2002), and the extent of access to communication-enhancing technology (Venkatesh & Speier, 2000). Given that these factors are generally posited as playing a contingent role, we now consider to what extent they moderate professional isolation's impact on job performance and turnover intentions.

Time spent teleworking. Time spent teleworking, or the extent to which individuals work virtually, away from others in the office, has been noted as an "instrumental" contingency in the understanding of this work modality (Bailey & Kurland, 2002, p. 391). Essentially, the more extensively professionally isolated teleworkers are absent from the workplace, the greater professional isolation's detrimental impact on work outcomes are likely to be (Caldwell, 1997). In particular, as the amount of time teleworking increases, interactions are more likely to take place through electronic media (Wiesenfeld, Raghuram, & Garud, 1999), which are less rich and less capable of effectively transferring the full range of contextual indicators for interpreting interactions (Daft & Lengel, 1986; Sproull & Kiesler, 1986). Moreover, even if media

and time available permit greater sharing of contextual information, it is less likely to occur because of difficulties in timing or loss of information due to asynchronous exchanges (Crampton, 2002). Therefore, with greater time spent teleworking, those who feel professionally isolated are more likely to experience even greater uncertainty and ambiguity (Vega, 2003), which further degrades their ability to fully interpret critical information and complex understandings that aid performance (Cooper & Kurland, 2002). Consequently, the more time spent teleworking increases, the greater the negative impact of professional isolation on job performance.

Similarly, the more time spent teleworking increases, the less coworkers and supervisors will appear accessible (Napier & Ferris, 1993) and the more difficult identification with the organization will become due to a lack of tangible cues (Wiesenfeld, Raghuram, & Garud, 2001). Absent the office milieu, and with increased barriers to interactions that prevent proximal encounters known to increase interpersonal communication (Oldham, Cummings, & Zhou, 1995), individuals who telework extensively are likely to have fewer casual interactions (Sarbaugh-Thompson & Feldman, 1998) and feel less psychological inclusion (Allen & Renn, 2003). Consequently, because of reduced access and increased barriers to interactions with coworkers and supervisors, as well as less of a sense of inclusion and belonging, when professionally isolated individuals spend more time teleworking, their intentions to leave are likely to be even more pronounced. Therefore, the more time spent teleworking increases, the greater the positive impact of professional isolation on turnover intentions.

> *Hypothesis 3a:* The extent of time spent teleworking moderates the relationship between professional isolation and job performance, such that the more time individuals spend teleworking, the stronger the negative impact of professional isolation on performance.

> *Hypothesis 3b:* The extent of time spent teleworking moderates the relationship between professional isolation and turnover intentions, such that the more time individuals spend teleworking, the stronger the positive impact of professional isolation on turnover intentions.

Face-to-face interactions. The literature suggests that when teleworkers devote more time to face-to-face interactions, they are better able to reduce a number of communication and interpersonal obstacles associated with being physically absent from the office milieu. Although it is possible for teleworkers and other forms of virtual workers to never meet face to face, nearly all do so on a regular basis (Kirkman, Rosen, Tesluk, & Gibson, 2004; Maznevski & Chudoba, 2000), which provides an opportunity to create a foundation for future successful collaboration (Kiesler & Cummings, 2002; Mortensen & Hinds, 2001). Face-to-face interactions may involve lunches, impromptu water-cooler conversations, or periodic meetings, resulting in interpersonal contact that can reinforce connectedness and trust (Burtha & Connaughton, 2004; Kiesler & Cummings, 2002) and partially compensate for the anxiety and frustration stemming from professional isolation (Cooper & Kurland, 2002; Crampton, 2002).

Studies have shown that even with significant use of electronic mail, face-to-face conversations are necessary for common frames of reference to be established and maintained (Sarbaugh-Thompson & Feldman, 1998; Zack, 1993). Face-to-face interaction enables a full array of contextual indicators to be exchanged, such as head nods, gestures, and expressions, which facilitate quicker and more complete comprehension (Daft & Lengel, 1986). More frequent interaction can reduce misunderstandings and enhance exchanges, such that teleworkers who engage in more face-to-face interactions are better able to develop shared interpretations (Crampton, 2001, 2002) and assign meaning to information, which can enhance their ability to interpret the communications of others during periods of teleworking (Montoya-Weiss, Massey, & Song, 2001). Hence, when teleworkers engage in greater face-to-face interaction, the negative impact of professional isolation on job performance decreases as communication obstacles are reduced and collaboration and shared interpretive contexts with coworkers and supervisors are enhanced. In addition, because of enhanced connectedness and trust afforded by greater face-to-face interaction, when teleworkers engage in more face-to-face interaction, the positive impact of professional isolation on turnover intentions is reduced.

> *Hypothesis 4a:* The extent of face-to-face interaction moderates the relationship between professional isolation and job performance, such that the more individuals interact face to face, the weaker the negative impact of professional isolation on performance.

> *Hypothesis 4b:* The extent of face-to-face interaction moderates the relationship between professional isolation and turnover intentions, such that the more individuals interact face to face, the weaker the positive impact of professional isolation on turnover intentions.

Access to communication-enhancing technology. To varying degrees, teleworkers have access to advanced communication technologies with which to connect and interact with others, which researchers have noted as the most significant work-mode factor in teleworking effectiveness (Venkatesh & Speier, 2000, p. 993). Examples of such technology include high-speed Internet, audio/video conferencing, and blended e-mail/Web meeting software (Rhoads & Silver, 2005). Although some technologies approach the richness of face-to-face communication, they are not equal to, nor do they replace, face-to-face interactions (Straus & Olivera, 2000).

Compared with teleworkers with little or no access to advanced communication technologies, those with extensive access are better able to anticipate the needs of others (Kirkman & Mathieu, 2005), more fully and easily interpret otherwise ambiguous messages (Hinds & Mortensen, 2005), and experience greater transparency in interactions more typical of those who are colocated (Hertel, Geister, & Konradt, 2005). Rather than being frustrated because of slow downloading or less responsive but secure access to corporate databases (Caldwell, 1997; Vega & Brennan, 2000), those with greater access are better able to operate seamlessly (Cooper & Kurland, 2002). In addition, with greater access, individuals are not only more likely to perform their jobs effectively but also to experience more meaningfulness, purpose, and connectedness, as well as perceived work-based social support (Finholt & Sproull, 1990; Wiesenfeld et al., 2001). Therefore, because

of greater richness of information and an enhanced ability to do their jobs seamlessly, when teleworkers have greater access to communication-enhancing technology, the negative impact of professional isolation on job performance will be reduced. Moreover, with greater access, the positive impact of professional isolation on turnover intentions will be reduced because of more transparency in interpersonal interactions and a greater sense of connectedness and social support.

> *Hypothesis 5a:* Access to communication-enhancing technology moderates the relationship between professional isolation and job performance, such that the negative impact of professional isolation on job performance is reduced when individuals have greater access.

> *Hypothesis 5b:* Access to communication-enhancing technology moderates the relationship between professional isolation and turnover intentions, such that the positive impact of professional isolation on turnover intentions is reduced when individuals have greater access.

Method

Sample and Procedure

To control for differences in telework policies and practices, in our study, we focused on a large high-tech corporation, with 80,000 employees and an active telework program. A senior executive endorsed and solicited responses to our Web survey via an e-mail sent to 2,000 mid-level managers. Managers were asked to think of a direct report who teleworked and then answer a series of questions. On completion, managers e-mailed this person to request his or her voluntary participation. As explained to all participants, responses were anonymously linked via a tracking code supplied by the supervisor. We had refined and verified this protocol earlier in a small pilot study, during which we had resolved several ambiguities in instructions and software incompatibility. Using the refined protocol, 522 supervisors (26% of all supervisors contacted) and 261 direct reports (50% of those contacted) participated. This response rate appears reasonable, given the potential difficulties of having to gather data from two sources and considering many managers did not supervise teleworkers, with only 16% of the company's overall workforce engaged in telework. Seventy percent of the managers were male; they averaged 43 years of age and teleworked, on average, 37% of their workweek. Sixty-four percent of direct reports were male; on average, they were 39 years old, teleworked 60% of their workweek, and had been teleworking 40 months.

Measures

Professional isolation. Given the lack of a previously established measure of professional isolation in the workplace, on the basis of prior qualitative research on teleworker professional isolation (Cooper & Kurland, 2002; Kurland & Cooper, 2002; Vega & Brennan, 2000), we developed questions to guide semistructured interviews with 9 professional-level employees (cf. Glaser & Strauss, 1967). We then developed an eight-item measure to assess the extent of professional isolation experienced and pilot tested the instrument with 86 employees. Exploratory factor analysis re-

vealed a single construct composed of seven items: (a) "I feel left out on activities and meetings that could enhance my career," (b) "I miss out on opportunities to be mentored," (c) "I feel out of the loop," (d) "I miss face-to-face contact with coworkers," (e) "I feel isolated," (f) "I miss the emotional support of coworkers," and (g) "I miss informal interaction with others." The eighth item loaded poorly and was dropped.

We took two further steps. To assess convergent validity, we correlated our measure with the well-established UCLA Loneliness Scale (Version 3; Russell, 1996). As expected, our measure evidenced a significant positive relationship ($r = .74, p < .01$). We assessed content validity through a panel of 15 informed judges who were provided a definition of professional isolation and then asked to independently categorize items, as well as to indicate the extent to which they had confidence in each categorization ($1 =$ *not at all confident* to $5 =$ *totally confident*). Each item was consistently categorized with an average agreement level of 90% and an average confidence rating of 4.0, further increasing our confidence in the measure.

In the final measure ($\alpha = .89$), respondents assessed the frequency with which they experienced professional isolation ($1 =$ *rarely* to $5 =$ *most of the time*). Factor analysis revealed seven items constituting a single factor accounting for 60% of the variance in responses, with each item having a factor loading above .68. Results from confirmatory factor analysis were consistent as well, $\chi^2(14, N = 261) = 106.6, p < .000$, comparative fit index = .90, incremental fit index = .90, Tucker–Lewis index = .80, normed fit index = .89.

Job performance. We used a four-item measure developed by Wayne and Liden (1995) and used by Bolino and Turnley (2003) to assess job performance ($\alpha = .87$). Supervisors rated their direct reports on a 5-point scale ($1 =$ *strongly disagree* to $5 =$ *strongly agree*).

Turnover intentions. We used the three-item scale by Schaubroeck, Cotton, and Jennings (1989) to assess turnover intentions. This measure has acceptable psychometric properties ($\alpha = .70 – .89$; Clugston, 2000; Schaubroeck et al., 1989). Items were averaged ($\alpha = .91$).

Time spent teleworking. On the basis of prior work (Golden & Veiga, 2005; Wiesenfeld et al., 2001), time spent teleworking was assessed by asking direct reports the proportion of an average workweek spent working remotely, away from the office. As a check, supervisors were also asked for an estimate ($r = .68, p < .01$), demonstrating a relatively high degree of convergence.

Face-to-face interactions. Building on prior research (Kirkman et al., 2004), we asked individuals to assess the amount of time in a typical workweek they spent in face-to-face interactions with their supervisor and coworkers and the average amount of time they worked per week. These were then used to calculate the proportion of the week spent in face-to-face interactions.

Access to communication-enhancing technology. On the basis of previous approaches to assessing available technology (Belanger, Collins, & Cheney, 2001; Prezza, Pacilli, & Dinelli, 2003; Raghuram, 1996), we asked teleworkers whether they had specific communication-enhancing technologies available. The firm we studied identified four technologies provided to teleworkers on an as-needed basis: (a) high-speed Internet access, (b) audio conference bridge, (c) dedicated telephone line, and (d) video conferencing and whiteboard collaborative software. Technologies available

were scored either 0 (not available) or 1 (available), with resulting values ranging from 0 to 4.

Control variables. On the basis of prior research, we controlled gender (1 = male, 2 = female) and tenure with manager (in months; Bailey & Kurland, 2002; Guimaraes & Dallow, 1999).

Results

Table 1 presents means, standard deviations, and correlations. Hypothesis 1 predicted a negative relationship between professional isolation and job performance and, as shown in Table 2, was supported ($\beta = -.13$, $p < .05$; $\Delta R^2 = .02$, $p < .05$), suggesting that greater isolation is associated with lower performance. Hypothesis 2 predicted a positive relationship between professional isolation and turnover intentions, and, although our finding was significant ($\beta = -.27$, $p < .001$; $\Delta R^2 = .07$, $p < .001$), it was in the opposite direction to what we hypothesized. Essentially, the most professionally isolated respondents expressed the lowest intention to turn over.

To assess our moderating hypotheses, we centered variables prior to constructing interaction terms (Cohen, Cohen, West, & Aiken, 2003) and entered them into the regressions simultaneously (Kohler & Mathieu, 1993) following procedures outlined by R. M. Baron and Kenny (1986). Hypothesis 3a, which predicted that time spent teleworking would moderate the relationship between professional isolation and performance, was supported ($\beta = -.16$, $p < .05$; $\Delta R^2 = .04$, $p < .05$). To interpret the interaction effect, we followed Cohen et al.'s (2003) procedure, and, as shown in Figure 1, isolated individuals who spent extensive time teleworking exhibited the lowest performance. However, for those who spent limited time teleworking, the impact on performance was negligible. Hypothesis 3b, which predicted time spent teleworking would moderate the relationship between professional isolation and turnover intentions, revealed a significant interaction ($\beta = -.34$, $p < .001$; $\Delta R^2 = .07$, $p < .001$). However, as shown in Figure 2, contrary to expectations, professionally isolated individuals who spent extensive amounts of time teleworking reported the lowest turnover intentions. For those who spent limited time teleworking, professional isolation's impact on turnover intentions was negligible.

Hypothesis 4a, which predicted that face-to-face interactions would moderate the professional isolation–performance relationship, was supported ($\beta = .21$, $p < .01$; $\Delta R^2 = .04$, $p < .01$). As shown in Figure 3, the performance of teleworkers experiencing

professional isolation suffers the most when they have limited face-to-face interactions. Conversely, when engaged in extensive face-to-face interactions, they are able to offset the negative affects of isolation on performance. That said, it would also appear that extensive face-to-face interaction detracts from performance for those who experience limited isolation, perhaps because such interactions are not essential to job performance. In addition, our findings suggest that Hypothesis 4b, which predicted face-to-face interactions would moderate the impact of isolation on turnover intentions, was not supported.

Hypothesis 5a, which predicted access to communication-enhancing technologies would moderate the impact of professional isolation on performance, was not supported. However, Hypothesis 5b, which predicted access would moderate the relationship between professional isolation and turnover intentions, was supported ($\beta = .22$, $p < .001$; $\Delta R^2 = .07$, $p < .001$). As shown in Figure 4, extensive access significantly offsets the impact of professional isolation on turnover intentions, whereas, contrary to expectations, those with limited access report the lowest turnover intentions.

Discussion

Although scholars in a variety of disciplines have alluded to the deleterious consequences of professional isolation, few have articulated a theoretical rationale, particularly in the workplace. Given mounting concerns about professional isolation among teleworkers (Cooper & Kurland, 2002; Kurland & Cooper, 2002), we developed a measure of professional isolation, proposed a theoretical rationale for its impact on teleworker job performance and turnover intentions, and empirically tested these relationships. In addition, we examined the moderating effects of time spent teleworking, the extent of face-to-face interaction, and access to communication-enhancing technology to account for some of the more salient contingencies associated with this work mode.

In particular, we found that professional isolation among teleworkers was negatively associated with job performance. Although some have suggested that teleworking affords the opportunity for individuals to be more productive (Bailey & Kurland, 2002; Gejendran & Harrison, 2007), our findings offer a caveat—such benefits may not accrue to those who feel professionally isolated. Clearly, more research is needed to fully understand how professional isolation detracts from job performance, as well as the myriad other ways it might negatively impact additional work and

Table 1
Means, Standard Deviations, and Correlations Among Variables

Variable	M	SD	1	2	3	4	5	6	7	8
1. Gender (1 = male, 2 = female)	1.46	1.05	—							
2. Tenure (in months)	25.83	21.84	−.04	—						
3. Professional isolation	4.24	0.69	.00	.02	—					
4. Job performance	4.09	0.67	−.04	.18**	−.13*	—				
5. Turnover intentions	1.99	0.94	−.05	−.15*	−.28**	.04	—			
6. Time spent teleworking	.60	.32	−.09	.06	.04	−.05	−.11	—		
7. Extent of face-to-face interactions	.11	.06	−.06	.08	.15*	−.01	−.11	.39**	—	
8. Access to communication enhancing technology	2.21	1.12	−.06	.03	.02	.04	−.08	.46**	.09	—

Note. N = 261.
* $p < .05$.   ** $p < .01$.

Table 2
Hierarchical Regression Analysis for Job Performance and Turnover Intentions

Variable and statistic	Job performance				Turnover intentions			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Step 1: Control variables								
Gender	−.03	−.03	−.03	−.03	−.06	−.06	−.07	−.06
Tenure	.18**	.18**	.18**	.18**	−.15*	−.14*	−.14*	−.16**
Step 2								
Professional isolation (PI)		−.13*	−.13*	−.09		−.27***	−.26***	−.25***
Step 3								
Time spent teleworking (TST)			−.11	−.10			−.06	−.07
Extent of face-to-face interaction (FTFI)			.03	.01			−.04	−.05
Access to communication-enhancing technology (ACET)			.09	.09			−.05	−.04
Step 4								
PI × TST				−.16*				−.34***
PI × FTFI				.21**				.11
PI × ACET				−.04				.22***
Change in R^2	.03**	.02*	.01	.04**	.03*	.07***	.01	.07***
R^2	.03	.05	.06	.10	.03	.10	.11	.18
Adjusted R^2	.02	.04	.04	.07	.02	.09	.09	.15
F	4.41**	4.43**	2.64*	3.03**	3.49*	9.31***	5.20***	6.06***
df	2, 258	3, 257	6, 254	9, 251	2, 258	3, 257	6, 254	9, 251

Note. $N = 261$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

career outcomes. For example, we encourage further research to examine social learning theory (Bandura, 1977, 1986) more explicitly. Specifically, research should focus on the mediating role played by the nature and quality of work relationships that are impacted by professional isolation and that, in turn, influence job performance.

Our findings also suggest that the negative impact of professional isolation on job performance is greater for those who spend extensive amounts of time teleworking and for those who engage in limited face-to-face interaction. Although it might be that extensive teleworking effectively serves to limit face-to-face opportunities in the office (Wiesenfeld et al., 1999), our post hoc analysis does not support this conclusion. As a test, we examined the three-way interaction between

professional isolation, time teleworking, and face-to-face interactions on performance and found no significant interaction. Moreover, the positive correlation between time spent teleworking and face-to-face interactions ($r = .39$, $p < .01$) suggests that those who extensively telework may actually be more inclined to seek out face-to-face contacts, as they "make conscious efforts to communicate" (Thatcher & Zhu, 2006, p. 1080). Further research is needed to determine if this is simply a useful coping mechanism or more a function of specific job-related attributes. Given the lack of a significant interaction between professional isolation and access to communication-enhancing technology on job performance, we also explored the possibility of a
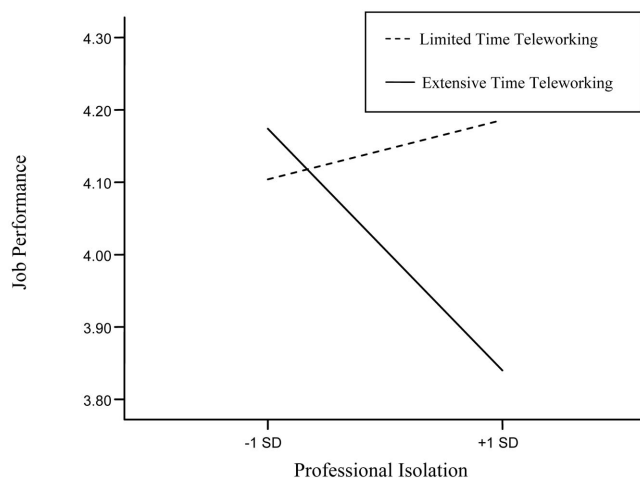

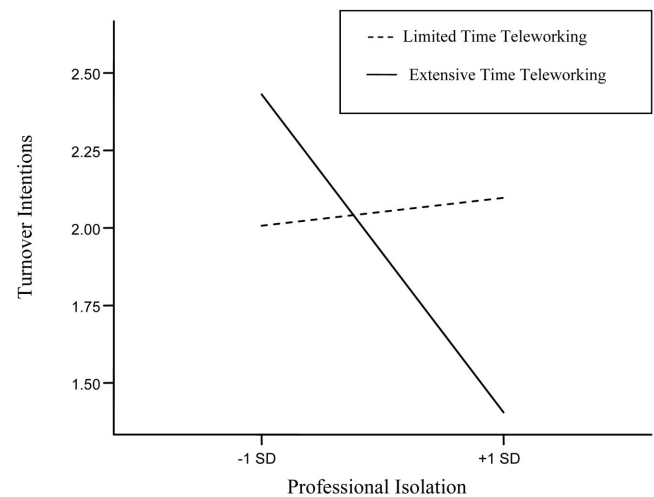*Figure 1.* Moderating effect of time spent teleworking on job performance.

Figure 2. Moderating effect of time spent teleworking on turnover intentions.
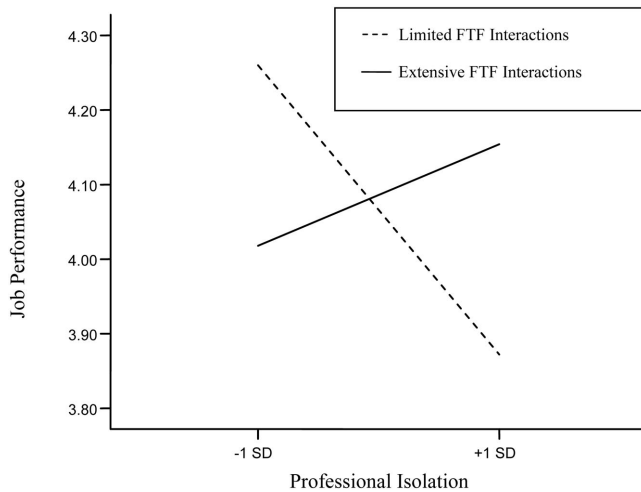
Figure 3. Moderating effect of face-to-face (FTF) interactions on job performance.

significant three-way interaction between professional isolation, access to technology, and face-to-face interactions. Here too, consistent with media richness theory (Daft & Lengel, 1986), we found no significant interaction, suggesting that technology may never be able to fully substitute for the richness of interacting face-to-face (Straus & Olivera, 2000). Although the jury is still out on this issue, perhaps advances in handheld electronic devices, inexpensive virtual meeting software supported by super-high bandwidth, or widely accessible mobile networks may eventually serve to alleviate the impact of professional isolation on performance (Rhoads & Silver, 2005).

With respect to the impact of professional isolation on turnover intentions, we found that teleworkers who experienced greater professional isolation expressed less of a desire to leave the organization, which was contrary to expectations. We had argued, as have others, that increased professional isolation would negatively impact a teleworker's organizational commitment, sense of belonging, and interpersonal relationships, all of which have been shown to increase turnover intentions. What, then, can explain these counterintuitive yet intriguing findings? Perhaps, as a consequence of greater professional isolation, teleworkers simply begin to lose faith in their skills and knowledge and in their ability to find alternative employment? Alternatively, it may be that teleworkers maintain a high level of continuance commitment, rather than affective commitment, stemming from "trailing spouse" or other dual-career or family constraints (Brett, Stroh, & Reilly, 1993), in which a spouse engages in telework as a way of maintaining a job. In essence, the flexibility in work and family domains derived from teleworking (Golden, Veiga, & Simsek, 2006) may simply outweigh any downside, such that teleworkers who experience professional isolation are less desirous of leaving. Indeed, we found that this inclination was even more pronounced for those who telework extensively or have limited access to communication-enhancing technology, whereas face-to-face interaction had no influence. Perhaps those who spend the most time teleworking enjoy its benefits more fully, so that despite professional isolation, their desire to seek employment elsewhere is mitigated. It could also be that these individuals have less confi-

dence, because they lack the advantages of communication tools that enhance networking essential to making a move (Lankau & Scandura, 2002). Moreover, if future researchers discover that continuance commitment is a primary driver of reduced turnover intentions among teleworkers who experience professional isolation, we may also find that face-to-face contact, essential to affective commitment, is simply not important to these individuals.

With respect to our study's limitations, because the study was correlational rather than involving the manipulation of variables, causality cannot be inferred. For example, our research design does not allow us to conclude that professional isolation causes a decline in job performance, only that professional isolation is significantly associated with performance. We also cannot rule out the possibility of reverse or reciprocal causality between professional isolation and job performance, such that low performance results in individuals being isolated from others. Moreover, because we controlled for many aspects of the organizational context in which teleworking occurs by focusing on one company, we cannot generalize our findings to all organizations. Hence, for example, it would be useful to compare companies in which teleworking is actively encouraged (as in our study) with companies in which it is not. It would also be useful, given that the average level of professional isolation reported by teleworkers appears to be quite high ($M = 4.24$), to gather comparative data from nonteleworkers, to examine the role of work mode differences, as well as to determine to what extent isolation may be endemic to teleworkers. To explore this possibility, we compared professional isolation scores between those who telework extensively and those who engaged in limited amounts of telework and found no significant differences. Moreover, we analyzed data obtained in our protocol pilot study from 56 nonteleworkers (M age = 44 years; 61% male) and found nonteleworkers scored significantly lower on professional isolation ($M = 3.51$, $p < .01$) than did their teleworking counterparts. Although difficult to conduct, clearly an experimental or quasi-experimental research design using a matched sample of teleworkers and nonteleworkers could offer valuable insights.
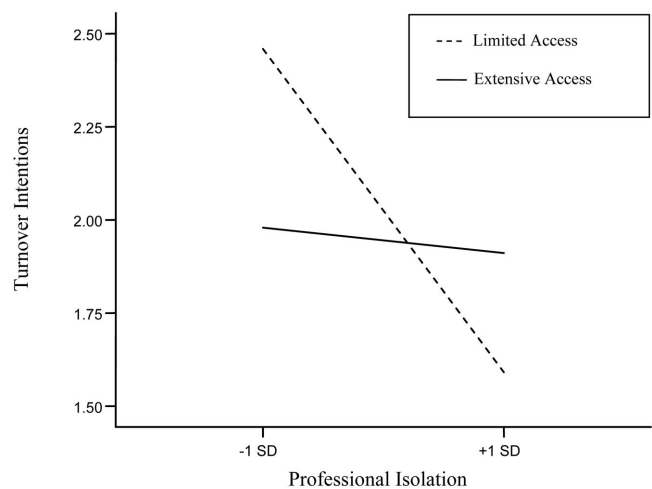

Figure 4. Moderating effect of access to communication-enhancing technology on turnover intentions.

Although the practitioner literature has raised the possibility that contextual elements such as time spent teleworking, access to communication-enhancing technology, and face-to-face interactions may have a direct effect on professional isolation (Kugelmass, 1995), such possibilities are not well supported by our data. Specifically, time spent teleworking is not significantly correlated with professional isolation ($r = .04$), suggesting that the practitioner literature may be equating physical separation from coworkers with professional isolation. Although separation can exacerbate professional isolation's effects, as the isolation literature suggests and our findings support, it is not implicit to such feelings (Diekema, 1992; Vega & Brennan, 2000). Similarly, as our data show, although access to communication-enhancing technology tends to dampen professional isolation's effects on job outcomes, it does not have a direct effect on professional isolation ($r = .02$). However, we would encourage researchers to go beyond the availability of technology per se and begin to examine more detailed comparisons of its usage patterns (Wiesenfeld et al., 1999). Last, our data indicate greater face-to-face interactions are associated with increased professional isolation ($r = .15$), suggesting a less straightforward relationship. Perhaps in seeking extensive face-to-face interactions, some teleworkers may actually be perceived as overly intrusive during their limited time in the office, inadvertently dampening their coworkers' willingness to meaningfully dialogue and thus exacerbating feelings of isolation. Assessing the quality of interactions, rather than the extent as done here, may therefore uncover important aspects of such exchanges.

Finally, what can organizations do to reduce professional isolation? Whereas initiatives such as training programs on how to cope with professional isolation could be useful, fundamentally, managers need to be more proactive. This may include structuring activities between coworkers to ensure sufficient levels of both task and affective exchanges occur, so as to build and strengthen interpersonal connections during the course of achieving work objectives (Golden, 2007). Performance appraisals may also need to include assessments of focused sessions in which employees share knowledge of common topics important for professional development, as well as informal interoffice activities that build cohesion and reinforce professional respect. Additionally, human resource professionals and managers may need to devote greater attention toward changing job designs and providing developmental assignments whereby employees feel more integrally involved in core organizational functions. With these and similar initiatives augmented by the further research suggested here, we hope the multifaceted role of professional isolation in both new and traditional work modes can be more fully understood and managed.

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