

Blurring Boundaries? Linking Technology Use, Spillover, Individual Distress, and Family Satisfaction

Information technology is entrenched in everyday life; yet, scholars have not firmly established whether this use blesses or vexes individuals and their families. This study analyzes longitudinal data (N = 1,367) from the Cornell Couples and Careers Study to assess whether increases in spillover explain changes in distress and family satisfaction associated with technology use. Structural equation models indicate that cell phone use over time (but not computer use) is associated with increases in negative forms of spillover (positive spillover is not significant) and is linked to increased distress and lower family satisfaction. Overall, the evidence suggests that technology use may be blurring work/family boundaries with negative consequences for working people.

Increasingly, scholars are interested in the implications of computer and communications technology use for individual well-being and family functioning (Hughes & Hans, 2001; Rakow & Navarro, 1993; Watt & White, 1999). Use of computing and communications technology by Americans is prevalent (Chesley, Moen, & Shore, 2003; Haythornwaite, 2001; U.S.

Census Bureau, 2000); however, the personal and family consequences of this use are not clear (Papadakis & Collins, 2001). In spite of interest in the implications of technology use for individuals and families, few studies examine the consequences of use for individual well-being or family life (Papadakis & Collins).

Some scholars argue that computing and communications technology use increases the permeability of work/family boundaries (e.g., Haddon & Silverstone, 2000; Lewis & Cooper, 1999; Valcour & Hunter, 2005) because these technologies provide additional ways to access individuals anytime, anywhere. For example, Lewis and Cooper (p. 389) suggested that more teleworkers means that work/family boundaries are “increasingly blurred.” These sentiments are echoed by Valcour and Hunter (p. 71), who argued that teleworking is “clearly associated with increased permeability of the boundary between work and nonwork domains” because of spatial, temporal, and psychological overlap of work and family roles. It is less common to speculate about how technology use is shaping nonwork activities in ways that may influence boundary permeability. Technology can be used, however, to bring home to work as well as work to home. In a review of the effects of computer adoption, Sproull (2000) showed that employees have historically used new technology at work to pursue personal interests (i.e., send personal e-mail, play games) as well as to meet work requirements. Further, Rakow and Navarro (1993) suggested that cellular phone

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use is one way women can remain available to their families, even as they work.

If the notion that the entrenchment of new technology is blurring boundaries is accepted, the consequences of these more permeable boundaries for individuals and families are hotly debated. In one camp are those who argue that blurred work/family boundaries are potentially bad for individuals and families because they promote overwork (Galinsky, Kim, & Bond, 2001; Weil & Rosen, 1997), individualism or isolation (Kraut et al., 1998; Sproull, 2000), an accelerated family life (Daly, 1996), and continual interruption (Ventura, 1995). Others argue that technology use has the potential to support work arrangements that enhance flexibility, thereby reducing conflicts between work and family (Hill, Hawkins, Ferris, & Weitzman, 2001; Valcour & Hunter, 2005). In spite of apparent interest in the role of new technology in shaping both work and family life, there is surprisingly little empirical research assessing the consequences of this use.

NEW TECHNOLOGY AND THE WORK/FAMILY INTERFACE

Theoretically, computers and communications devices are neutral with respect to promoting access to individuals across time and space. After all, e-mails can be filtered, calls can go to voice mail (or be unanswered), and all these devices can be turned off. In this sense, then, technology solidifies, rather than blurs, boundaries between work and home. Limited research evidence, however, indicates that new technology is generally used to increase access to individuals. For example, there is evidence to suggest that more fluid work/family boundaries are produced structurally as employers require computer and communications use outside the workplace (Chesley et al., 2003; Galinsky et al., 2001), or as social norms dictate that individuals use these technologies to always be accessible (see review in Rakow & Navarro, 1993; Ventura, 1995).

Theories that describe how social role transitions influence the construction of work/family boundaries provide a useful framework for organizing empirical claims linking technology use to a changing work/family interface. Drawing on boundary theory (e.g., Nippert-Eng, 1996), Ashforth, Kreiner, and Fugate (2000) described how particular characteristics of

social roles such as worker or family member influence the work/family interface. A role with flexible boundaries "can be enacted in various settings and at various times" (Ashforth et al., 2000, p. 474). Thus, a worker with a technologically mobile virtual office can work "wherever it makes sense," whereas workers in standard office settings cannot as easily fulfill their roles outside of these settings (Hill, Ferris, & Martinson, 2003, p. 222). Indeed, Hill et al. (p. 222), using a sample of IBM employees working from virtual, home-based, and traditional office settings, found that telecommuters do have more flexibility than traditional office workers to meet both work and family needs.

Role boundary permeability "is the degree that a role allows one to be physically located in the role's domain, but psychologically or behaviorally involved in another role" (Ashforth et al., 2000, p. 474). Technology use is often marketed to suggest that it promotes exactly this sort of role permeability. Thus, we see commercials in which a woman sits down to a work-related conference call at the beach while her children play happily nearby, implying that technology can help one simultaneously and successfully enact the roles of worker and mother. The hypothesis that technology use positively influences the boundary permeability of work and family roles, however, has not been adequately tested.

Moreover, it is not clear whether increased boundary permeability will promote positive or negative outcomes for workers and their families. Spillover theory, which proposes that the work microsystem and the family microsystem significantly influence one another through a permeable boundary (Zedeck, 1992), holds open the possibility that increased boundary permeability can let in both more negative and more positive behaviors and emotions (cf., Grzywacz & Marks, 2000). Empirical research demonstrates that spillover occurs in both directions (from home to work and work to home) and takes on both positive and negative forms (see reviews in Frone, 2003; Roehling, Moen, & Batt, 2003). Research also shows that negative forms of spillover are linked to problematic outcomes. For example, negative work-family spillover predicts family dissatisfaction, whereas negative family-work spillover predicts work dissatisfaction. Negative spillover in both directions is linked to higher distress (see review in Frone). We know very little about links between

positive forms of spillover and indicators of life quality, although the limited evidence to date suggests that positive spillover is positively correlated with several indicators of life quality and is related to age, education, and income (see Grzywacz & Marks; Grzywacz, Almeida, & McDonald, 2002).

Gender and Asymmetric Work-Family Boundaries

Pleck (1977) argued that gendered expectations about work and family life asymmetrically shape work/family boundaries. The practical result of this asymmetry, according to Pleck, is that men's work demands will tend to spill over into family life, whereas women's family demands will tend to spill over into the workplace. Empirical studies do not always produce findings consistent with Pleck's hypothesis (see reviews in Grzywacz & Marks, 2000; Roehling et al., 2003). There is contemporary evidence, however, that men continue to spend more time in paid work than women and that women continue to spend more time in household chores and caring for children than men, even when both spouses work (Padavic & Reskin, 2002), suggesting that the gendered role expectations that shape asymmetric work/family boundaries may still be intact.

There is also evidence that men and women have different levels of access to, and use of, new information and communication technology. Census data suggest that more women than men use a computer at work, whereas more men than women use a home computer (U.S. Census Bureau, 1999). Data also show that similar proportions of men and women access the Internet in nationally representative studies (Haythornwaite, 2001), although women do more personal and family e-mailing than men (Boneva, Kraut, & Frohlich, 2001). Furthermore, women have historically been heavier users of telephones (Fischer, 1992), although it is not clear whether this pattern will hold for cellular phones (Frissen, 1995).

This article uses longitudinal data collected from dual-earner couples at two time periods to examine linkages among technology use, spillover, and changes in individual distress and family satisfaction. The analysis builds on the previous literature by providing measures of technology use that are not connected exclusively to work or to telework arrangements. In

addition, work-family spillover is measured explicitly and linked to outcomes that can provide information about the potential consequences of technology use. Although many scholars have expressed concerns about the effects of technology use on family life and family relationships (cf., Kraut et al., 1998; Nie, 2001; Weil & Rosen, 1997), few studies examine the relationship between technology use and individual or family well-being (Papadakis & Collins, 2001). This study is intended to address a gap in existing knowledge about the mechanisms that may link technology use to indicators of individual and family life quality.

Four hypotheses are tested. The *blurred boundaries hypothesis* tests the claim that computer and communications technology use is linked to changes in individual distress and family satisfaction through increased levels of spillover (H1). The nature of changes in distress or family satisfaction (i.e., increases or decreases) will depend on whether technology use promotes negative or positive spillover experiences. Following previous research, increases in negative spillover (work-family or family-work) will be linked to increased distress levels, whereas increases in negative work-family spillover only will be linked to decreased family satisfaction (H2). Drawing on the meager literature examining associations between positive forms of spillover and life quality outcomes, increases in positive forms of spillover in either direction will be positively associated with family satisfaction and negatively associated with distress (H3). Finally, the *asymmetric boundary hypothesis* suggests that women will be more likely to experience positive or negative increases in family-work spillover, whereas men will be more likely to experience positive or negative increases in work-family spillover (H4). Models controlled for age, education, household income, and industry/organizational affiliation because all these characteristics appear to influence technology use (Chesley, in press; U.S. Census Bureau, 2000).

METHOD

Data

An analysis of the consequences of persistent technology use for individual well-being and family satisfaction is possible using longitudinal

data from the *Cornell Couples and Careers Study* (Careers Study; $N = 1,958$). Participating workers employed at one of seven organizations and their spouses or partners were interviewed during 1998–1999, with a follow-up interview in 2000–2001. The organizations were located in three upstate New York communities and represent a range of industries (manufacturing and utility, health care, higher education) and sizes (less than 2,000 employees to 10,000+ employees). In this study, the sample was restricted to include men and women who were working at both time periods and who remained partnered, resulting in a final sample of 1,367 individuals. These sample restrictions were necessary because spillover questions were asked only of the employed and family satisfaction questions were only asked of partnered people.

Careers Study respondents are, on average, 48 years old, and the majority are married (about 3% are cohabiting). Roughly three quarters have a bachelor's degree or better, with many (70%) working in professional or managerial occupations. Most respondents (95%) reported household incomes of \$50,000 or greater in 1998–1999. Although the respondents in this study do not represent the nation of technology users as a whole, they do fit the profile of people who were most likely to have access to new technology, particularly in the mid to late 1990s when the first survey was implemented (U.S. Census Bureau, 1999). Analyses that compare the dual-earner couples in the Careers Study to similar couples in the National Study of the Changing Workforce suggest that respondents in the Careers Study are slightly older, more educated, and have higher household incomes than a similar national sample (see Moen, 2003, pp. 350–352). Because computer and Internet use has been linked to higher household income and educational levels (U.S. Census Bureau, 2000), it is likely that respondents in this sample have higher rates of technology use than would be observed in a nationally representative sample.

Study attrition was 12.9%. Regression analyses (data not shown) indicate that Time 2 participants tend to be more highly educated and that cohabiters, women with children at home, and men with children of younger ages were less likely to remain in the study. Finally, men with higher job prestige scores or who reported higher workloads at Time 1 were less likely to participate at Time 2. In addition, 19% of women

and 14% of men changed employers between study waves. Further, whereas the distribution across organizations remained relatively stable, fewer men were employed by manufacturing firms and more men were self-employed by Time 2.

Procedures

Telephone surveys, which took about an hour, were collected from employees and their spouses separately. Most participating organizations expressed concerns about confidentiality, and as a consequence, employers distributed the initial recruitment materials to employees. The principal investigator of the Careers Study was not given any information about potential respondents, including the number of employees receiving recruitment documents. Thus, it is not possible to compute a true response rate because we do not know the size of the initial group of employees who were contacted. Interested participants returned response cards to the principal investigator. Of the employees who returned a response card, 75% completed a survey (see Moen, 2003). The percentage of cases missing on any one variable ranged from 1% to 3%. Missing values for numeric or scale variables were replaced with the sample mean because of the small number of missing cases (see Schafer & Graham, 2002). Twenty-six cases (1.3%) were lost because missing categorical data could not be reasonably imputed.

Several features of the Careers Study make it an ideal dataset for examining the consequences associated with technology use, as well as the mechanisms producing those consequences. First, the survey included questions that asked about frequency of use for a range of technologies. Most studies to date focus on use of one or two devices, typically computers and/or the Internet (Papadakis & Collins, 2001). Further, the study included diverse spillover measures and measures of individual well-being and family satisfaction at two points in time, allowing changes in these variables to be modeled. Correlations and descriptive statistics for the main study variables are listed in Table 1.

Measures

Technology use. In the current study, I distinguish between two types of technology use, computer-based use (e-mail and Internet) and

TABLE 1. PEARSON BIVARIATE CORRELATIONS AND DESCRIPTIVE STATISTICS FOR KEY MODEL VARIABLES (N = 1,367)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Computer use, T1	1.00															
2. Computer use, T2	.44**	1.00														
3. Communications use, T1	.15**	.17**	1.00													
4. Communications use, T2	.12**	.19**	.54**	1.00												
5. Negative W-F spillover, T1	.13**	.09**	.08**	.10**	1.00											
6. Negative F-W spillover, T1	.02	.06**	.02	.03	.30**	1.00										
7. Positive W-F spillover, T1	.05	.05	.01	-.01	-.12**	-.02	1.00									
8. Positive F-W spillover, T1	.03	.03	.05	.09**	.02	-.11**	.16**	1.00								
9. Negative W-F spillover, T2	.09**	.06*	.08**	.13**	.44**	.22**	-.06*	-.02	1.00							
10. Negative F-W spillover, T2	.04	.01	.07**	.09**	.18**	.42**	-.05	-.08**	.30**	1.00						
11. Positive W-F spillover, T2	.01	.00	.01	.02	-.10**	-.04	.46**	.18**	-.09**	.00	1.00					
12. Positive F-W spillover, T2	.04	.02	.04	.05	.03	-.05*	.15**	.55**	-.01	-.08**	.23**	1.00				
13. Negative affect, T1	.00	-.03	.04	.08**	.24**	.21**	-.08**	-.09**	.38**	.36**	-.09**	-.12	1.00			
14. Negative affect, T2	.00	-.04	.03	.08**	.20**	.17**	-.05	-.06*	.33**	.31**	-.04	-.08**	.96**	1.00		
15. Family satisfaction, T1	.03	.04	.05	.06*	-.13**	-.22**	.03	.48**	-.14**	-.16**	.08*	.41**	-.13**	1.00		
16. Family satisfaction, T2	.00	.00	.00	.00	-.10**	-.19**	.06*	.37**	-.17**	-.24**	.12**	.52**	-.26**	-.18**	1.00	
M	0.78	4.45	0.55	2.99	2.73	2.38	2.70	3.79	2.74	2.14	2.59	3.78	2.31	2.25	4.13	4.13
SD	0.42	1.05	0.50	1.58	0.62	0.63	0.78	0.72	0.96	0.87	0.99	0.97	0.40	0.48	0.55	0.69

Note: Source is Cornell Couples and Careers Study (T1 = Time 1, 1998/1999; T2 = Time 2, 2000/2001); W-F = work-family; F-W = family-work.

*p ≤ .05. **p ≤ .01. Two-tailed tests.

communications technology use (cell phones and pagers), so that the results of this study can be more easily compared to those of the previous research (i.e., Haythornwaite, 2001; Leung & Wei, 2000; U.S. Census Bureau, 2000). Frequencies of use were asked about at both surveys, but question wording was altered slightly from Time 1 to Time 2. At Time 1, respondents were asked about *regular* use of e-mail, the Internet, and so on, coded as 1, whereas a 0 codes use that is *not regular*. At Time 1, 78% of respondents reported regularly using computer technologies and 55% reported regular use of communications technologies. At Time 2, respondents were asked about use on a 1–5 (*never use to use a lot*) scale, with an average computer use of 4.45 and average communications use of 2.99. *Persistent technology use* is defined as use (i.e., regular use at Time 1 or a use frequency of 2–5 at Time 2) at both time periods.

Psychological distress. I use a negative affect measure, which captures the presence of symptoms frequently associated with depression, to tap psychological distress. The five-item scale (responses are averaged and reverse coded if necessary) asks respondents to rate how often in the past month they felt “in good spirits,” “sad,” “restless or fidgety,” “nervous,” or that “everything was an effort” ($\alpha = .70$). This scale is a shorter form of a six-item scale used in the Midlife in the United States Survey. The six-item scale ($\alpha = .87$) was developed by culling items from other well-known and valid instruments (see Mroczek & Kolarz, 1998, for details).

Family satisfaction. A five-item scale (responses are averaged) taps an individual’s satisfaction with family life (Smilkstein, 1978; Smilkstein, Ashwork, & Montano, 1982). Respondents were asked whether they believe they can turn to their family for help, about the level of family communication, satisfaction with the support they receive from family members, satisfaction with the level of family affection, and satisfaction with the way the family spends time together ($\alpha = .84$). This scale has been validated using a number of other samples and typically has alphas in the range of .80 to .86 (see Smilkstein et al. for details).

Spillover. Four separate measures tap four distinct forms of spillover (negative or positive spillover from work-family or family-work).

Each two-item measure (responses were averaged) is an abbreviated form of a similar three-item measure used in the National Survey of Midlife Development in the United States. In the Careers Study, negative work-family spillover measures the extent that one’s job leaves one feeling “too tired to do the things that need attention at home” or that “job worries or problems distract you when you are at home” ($r = .49$; $p < .01$). Positive work-family spillover captures whether work “helps make you a more interesting person at home” or “helps you deal with issues at home” ($r = .49$; $p < .01$). Negative family-work spillover measures the extent that “personal or family worries and problems distract you when you are at work” or “activities and chores at home prevent you from getting the amount of sleep you need to do your job well” ($r = .32$; $p < .01$). Positive family-work spillover measures the extent that “talking at home helps you deal with work” or whether love and respect at home help confidence at work ($r = .51$; $p < .01$). These two-item measures behave similarly to the three-item measures documented in Grzywacz et al. (2002).

Other measures. Models also include information about age (measured in years), education (measured categorically as high school only, some college, college degree, or master’s degree or better), the log of household income, and a series of binary variables that measure an individual’s industry affiliation (manufacturing, utility, health care, higher education, government/nonprofit, education k-12, self-employment, and other).

Analytic Approach

The central analyses of this study were conducted using Analysis of Moment Structures 4.0 (AMOS; Arbuckle & Wothke, 1999), a structural equations modeling program that facilitates assessment of the significance of causal pathways (Papp, Cummings, & Schermerhorn, 2004). To test the claim that different types of technology use (e.g., computer vs. communications use) are associated with changes in individual distress or family satisfaction that are explained by spillover increases (e.g., negative work-family, positive family-work), I use the mediation framework outlined by Barron and Kenny (1986). Briefly, this testing strategy requires establishing a link between persistent

computer or communications technology use and changes in negative affect or family satisfaction first, and then eliminating this association by adding a mediating variable (each of the four types of spillover, in this case) to the model. Because more recent practice suggests that mediation can occur even when an initial link between two variables is not established (via suppression or small effect sizes; see Shrout & Bolger, 2002), all possible mediation models were estimated, even if an initial link between technology use and an outcome was not established.

Each of the series of models is specified in two ways. First, I estimated a set of structural models where none of the key paths (Time 1 technology use to Time 2 technology use to a mediator or an outcome) was constrained to assess whether a specific model fits the data. Next, I estimated a series of models where all the key paths were constrained to check for significant differences in path coefficients between women and men (see Arbuckle & Wothke, 1999). All the models tested partial out effects of age, educational differences, household income, and current employer, although the effects of these covariates are not displayed to simplify the results. Further, Time 1 spillover and negative affect or family satisfaction is included to assess whether persistent technology use influences changes in these variables (see discussion in Finkel, 1995). Finally, because I had access to dyadic data, I estimated both individual- and couple-level versions of the models.

RESULTS

Results from the structural models suggest that persistent communications use rather than computer use is significantly linked to increased distress and decreased family satisfaction as well as increases in negative work-to-family or family-to-work spillover in individuals. Changes in positive spillover did not explain associations between persistent communications use and changes in either outcome. Further, these models fit the data well. For large samples such as this one, χ^2 goodness-of-fit tests may be significant even if deviations between observed and model-implied covariances are slight (Kline, 1998); thus, examination of a range of statistics is required to assess the plausibility of individual models. Dividing the χ^2 by degrees of

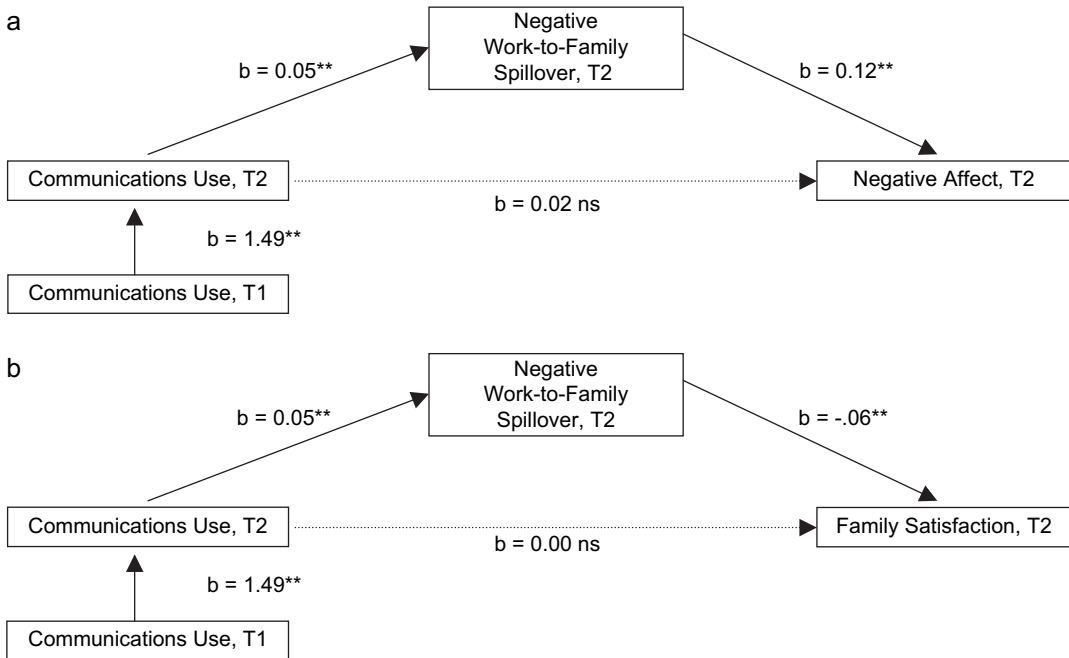
freedom is an additional way of assessing model fit; rules of thumb suggest that this ratio should be five or less (Arbuckle & Wothke, 1999). The root mean square error of approximation (RMSEA) is a fit measure that does not vary with sample size and penalizes more complex models. It is generally accepted that an RMSEA of less than .08 denotes an acceptable fit (McDonald & Ho, 2002). Finally, values greater than .90 for the normed fit index indicate a reasonable model fit (Arbuckle & Wothke). Couple-level models were examined and indicate that spousal technology use does not influence individual use, consistent with other analyses using these data (Chesley, in press).

Figure 1 illustrates the size of the component effects that make up a significant pathway linking persistent communications use to increases in negative affect and decreases in family satisfaction over the 2-year period. As the figure shows, these associations are fully explained by increases in negative work-family spillover over the same time period. Because the constrained models provide the best fit to the data, the significance of each of the pathways and the size of each of the component effects is the same for men and women.

Figure 2 illustrates the size of the component effects that make up a significant pathway linking persistent communications use to increases in negative affect and decreases in family satisfaction for women but not men. Again, these associations are fully explained by increases in negative family-work spillover over the same time period. Here, the constrained models do not provide the best fit. This suggests that there are differences in the size of path coefficients for women and men. Indeed, Figure 2 shows that the pathway connecting persistent communications use to increases in negative family-work spillover is significant only for women, suggesting that the full models hold for women, but not men.

Taken together, the results provide evidence that persistent communications use is associated with increased spillover (H1), although spillover increases appear to take on primarily negative forms; thus, Hypothesis 3 is not supported. Further, consistent with previous spillover research, I find that increases in negative work-family spillover associated with persistent communications use are linked to increased distress and decreased family satisfaction (H2). There is partial support for the asymmetric boundary

FIGURE 1. (A) PERSISTENT COMMUNICATIONS USE IS LINKED TO INCREASED DISTRESS AND NEGATIVE WORK-FAMILY SPILLOVER FOR WOMEN AND MEN ($N = 1,367$). $\chi^2 = 568.012^{**}$; $\chi^2/DF = 4.17$; NORMED FIT INDEX = 0.986; RMSEA = .048 (NS). (B) PERSISTENT COMMUNICATIONS USE IS LINKED TO DECREASED FAMILY SATISFACTION AND INCREASED NEGATIVE WORK-FAMILY SPILLOVER FOR WOMEN AND MEN ($N = 1,367$). $\chi^2 = 568.012^{**}$; $\chi^2/DF = 4.17$; NORMED FIT INDEX = 0.986; RMSEA = .048 (NS).



Note: Unstandardized (b) path coefficients are shown. Models controlled for age, education, household income (logged), employing organization, Time 1 spillover, and Time 1 negative affect and family satisfaction.

** $p \leq .01$.

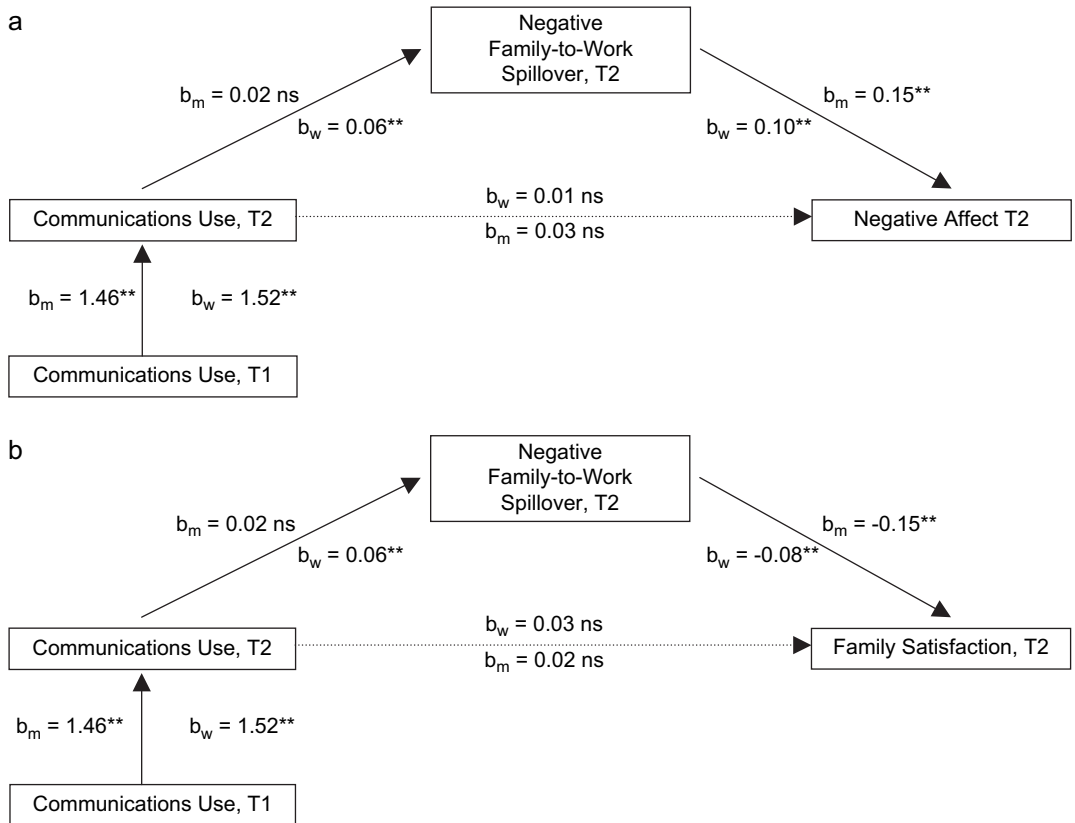
hypothesis (H4). The finding that persistent communications use is associated with increases in distress and decreases in family satisfaction that are mediated by increases in negative family-work spillover for women, but not men, is consistent with the idea that family worries and responsibilities are more likely to influence women's outcomes. The related claim that work responsibilities are more likely to influence men's outcomes was not supported. Instead, relationships among persistent communications use, distress, and family satisfaction were explained by negative work-family spillover increases for both men and women.

CONCLUSION

This study adds valuable information about linkages among computer and communications technology use and individual well-being and

family satisfaction, and tests the plausibility of a mechanism—increased spillover—to explain these associations. Is persistent technology use linked to greater work/family boundary permeability? The evidence from this study suggests the two are connected. Use of cell phones over a 2-year time period is associated with increases in negative work-family spillover for both men and women and with increases in negative family-work spillover for women only over the same time period. Consistent with previous research, these spillover increases are linked to higher distress and lower family satisfaction. The results also provide partial evidence that communications technology use is reinforcing gendered work/family boundaries because persistent communications use was linked with increases in negative family-work spillover for women, but not men. This use is also connected to increases in negative work-family spillover

FIGURE 2. (A) PERSISTENT COMMUNICATIONS USE IS LINKED TO INCREASED DISTRESS AND NEGATIVE FAMILY-WORK SPOILOVER FOR WOMEN ONLY ($N = 1,367$). $\chi^2 = 500.043^{**}$; $\chi^2/DF = 3.67$; NORMED FIT INDEX = 0.987; RMSEA = .044 (NS). (B) PERSISTENT COMMUNICATIONS USE IS LINKED TO DECREASED FAMILY SATISFACTION AND INCREASED NEGATIVE FAMILY-WORK SPOILOVER FOR WOMEN ONLY ($N = 1,367$). $\chi^2 = 444.742^{**}$; $\chi^2/DF = 3.27$; NORMED FIT INDEX = 0.989; RMSEA = .041 (NS).



Note: Unstandardized (b) path coefficients are shown. Subscript w=women, m=men. Models controlled for age, education, household income (logged), employing organization, Time 1 spillover, and Time 1 negative affect and family satisfaction.

** $p \leq .01$.

for both women and men, however, a finding that is inconsistent with the notion of gendered, asymmetric work/family boundaries.

The results also show that it is communications technology use rather than use of computer-based technologies that is linked to spillover increases. Why would this be? One possibility may lie in differences in the two types of technology. It may be that computers are more passive technologies relative to cell phones or pagers because users need to decide to sit down and turn them on before the access they facilitate can produce spillover. Another

possible explanation lies in the earlier entrenchment and adoption of computer technology relative to communications technology. Perhaps users of computer technology have learned how to exploit the positive benefits and avoid uses that promote negative outcomes because they have more experience with computers, e-mail, and the Internet than with cell phone or pager use (see discussion in Kraut et al., 2002).

The findings here underscore that more permeable boundaries, at least for working men and women such as these, appear to favor the transfer of negative, rather than positive,

spillover experiences, and are associated with negative consequences for working people. Grzywacz (2002) has suggested that boundary permeability is not the main issue in assessing the consequences associated with a shifting work/family interface. Rather, he argues that individual control over what passes through these boundaries shapes the consequences one experiences. Incorporating measures of individual control over how computer and communications technology is used may be a fruitful direction for future research.

These findings should be interpreted with a few design limitations in mind. First, this sample of workers is not a nationally representative sample. Therefore, the generalizability of the identified pathways is not clear. Even so, although this study may not speak to the national prevalence of the link between persistent technology use and more permeable work/family boundaries for working Americans, it does indicate that some workers are indeed experiencing this phenomenon, with negative consequences. The design also leaves some ambiguity about the direction of effects. The models tested assume that persistent technology use causes increased spillover, which, in turn, results in changes in individual well-being and family satisfaction. Although the longitudinal design and demonstrated mediation provide stronger evidence that this is the case, cause cannot be established without an experimental design.

Other data limitations may also affect interpretation of results. First, the technology measures are self-reported frequency measures. As with any self-report measure, the same use frequency may mean something different to different individuals, a situation that contributes to measurement error, although the direction of this error is unknown. Further, the response scale of the technology measures was changed between study time periods. Although a change in a measure across time periods is never ideal, I have included both Time 1 use and Time 2 use in the models to exploit the longitudinal data. Thus, we get some information about what happens when a respondent reports use at both time periods relative to those with inconsistent or no use, although changes in use cannot be modeled.

In many ways, studying technology use is like trying to hit a moving target. As new technologies become entrenched in the social land-

scape, they are used in different ways by different people, a reality most survey researchers (including this one) fail to address adequately in their measures and study designs. Further, there is some evidence of generational differences with respect to how these technologies are used. Anecdotal journalism indicates that teenagers expect to be connected "24/7," and tend to be avid and enthusiastic users of a broad range of computer and communications technologies (Begun, 2001). The question of "blurred boundaries" may become an irrelevant one for the next generation of workers, spouses, and parents because they cannot imagine life any other way. Even so, worries about the implications for technology users are not likely to disappear. Future studies can continue to build on previous work by focusing more directly on how a broad range of computing and communications technologies is used as well as how expectations about these tools (and control over them) structure any consequences associated with their use.

NOTE

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REFERENCES

- Arbuckle, J. L., & Wothke, W. (1999). *AMOS 4.0 users guide*. Chicago: SmallWaters Corporation.
- Ashforth, B. E., Kreiner, G. E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management Review*, 25, 472-491.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Begun, B. (2001, December 10). The click clique. *Newsweek*, 138, 64-66.
- Boneva, B., Kraut, R., & Frohlich, D. (2001). Using e-mail for personal relationships: The difference

- gender makes. *American Behavioral Scientist*, 45, 530–549.
- Chesley, N. (in press). Families in a high tech age: Technology usage patterns, work and family correlates, and gender. *Journal of Family Issues*.
- Chesley, N., Moen, P., & Shore, R. P. (2003). The new technology climate. In P. Moen (Ed.), *It's about time: Couples and careers* (pp. 220–241). Ithaca, NY: Cornell University Press.
- Daly, K. J. (1996). *Families & time: Keeping pace in a hurried culture*. Thousand Oaks, CA: Sage.
- Finkel, S. E. (1995). *Causal analysis with panel data*. Thousand Oaks, CA: Sage.
- Fischer, C. S. (1992). *America calling: A social history of the telephone to 1940*. Berkeley: University of California Press.
- Frissen, V. (1995). Gender is calling: Some reflections on past, present and future uses of the telephone. In K. Grint & R. Gill (Eds.), *The gender-technology relation: Contemporary theory and research* (pp. 79–94). London: Taylor & Francis.
- Frone, M. R. (2003). Work-family balance. In J. C. Quick & L. E. Tetrick (Eds.), *Handbook of occupational health psychology* (pp. 143–162). Washington, DC: American Psychological Association.
- Galinsky, E., Kim, S. S., & Bond, J. T. (2001). *Feeling overworked: When work becomes too much*. New York: Families and Work Institute.
- Grzywacz, J. G. (2002, November). *Toward a theory of work-family facilitation*. Paper presented at the 34th Annual Theory Construction and Research Methodology Workshop, Houston, TX.
- Grzywacz, J. G., Almeida, D. M., & McDonald, D. A. (2002). Work-family spillover and daily reports of work and family stress in the adult labor force. *Family Relations*, 51, 28–36.
- Grzywacz, J. G., & Marks, N. F. (2000). Reconceptualizing the work-family interface: An ecological perspective on the correlates of positive and negative spillover between work and family. *Journal of Occupational Health Psychology*, 5, 111–126.
- Haddon, L., & Silverstone, R. (2000). Information and communication technologies and everyday life: Individual and social dimensions. In K. Ducautel, J. Webster, & W. Herrmann (Eds.), *The information society in Europe: Work and life in an age of globalization* (pp. 233–257). Lanham, U.K.: Rowman & Littlefield.
- Haythornwaite, C. (2001). The Internet in everyday life. *American Behavioral Scientist*, 45, 363–382.
- Hill, E. J., Ferris, M., & Martinson, V. (2003). Does it matter where you work? A comparison of how three work venues (traditional office, virtual office, and home office) influence aspects of work and personal/family life. *Journal of Vocational Behavior*, 63, 220–241.
- Hill, J. E., Hawkins, A. J., Ferris, M., & Weitzman, M. (2001). Finding an extra day a week: The positive influence of perceived job flexibility on work and family balance. *Family Relations*, 50, 49–58.
- Hughes, R. J., & Hans, J. D. (2001). Computers, the Internet, and families: A review of the role new technology plays in family life. *Journal of Family Issues*, 22, 776–790.
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: Guilford Press.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, 58, 49–74.
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53, 1017–1031.
- Leung, L., & Wei, R. (2000). More than just talk on the move: Uses and gratifications of the cellular phone. *Journalism & Mass Communication Quarterly*, 77, 308–320.
- Lewis, S., & Cooper, C. L. (1999). The work-family research agenda in changing contexts. *Journal of Occupational Health Psychology*, 4, 382–393.
- McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7, 64–82.
- Moen, P. (Ed.). (2003). *It's about time: Couples and careers*. Ithaca, NY: Cornell University Press.
- Mroczek, D. K., & Kolarz, C. M. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. *Journal of Personality and Social Psychology*, 75, 1333–1349.
- Nie, N. H. (2001). Sociability, interpersonal relations, and the Internet. *American Behavioral Scientist*, 45, 420–435.
- Nippert-Eng, C. E. (1996). *Home and work: Negotiating boundaries through everyday life*. Chicago: University of Chicago Press.
- Padavic, I., & Reskin, B. (2002). *Women and men at work*. Thousand Oaks, CA: Pine Forge Press.
- Papadakis, M. C., & Collins, E. L. (2001). *The application and implications of information technologies in the home: Where are the data and what do they say?* (NSF 01–313). Arlington, VA: Division of Science Resources Studies, National Science Foundation.
- Papp, L. M., Cummings, E. M., & Schermerhorn, A. C. (2004). Pathways among marital distress,

- parental symptomatology, and child adjustment. *Journal of Marriage and Family*, 66, 368–384.
- Pleck, J. (1977). The work-family role system. *Social Problems*, 24, 417–427.
- Rakow, L. F., & Navarro, V. (1993). Remote mothering and the parallel shift: Women meet the cellular telephone. *Critical Studies in Mass Communication*, 10, 144–157.
- Rohling, P. V., Moen, P., & Batt, R. (2003). Spillover. In P. Moen (Ed.), *It's about time: Couples and careers* (pp. 101–121). Ithaca, NY: Cornell University Press.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7, 147–177.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, 7, 422–445.
- Smilkstein, G. (1978). The family APGAR: A proposal for a family function test and its use by physicians. *Journal of Family Practice*, 6, 1231–1239.
- Smilkstein, G., Ashwork, C., & Montano, D. (1982). Validity and reliability of the family APGAR as a test of family function. *Journal of Family Practice*, 15, 303–311.
- Sproull, L. S. (2000). Computers in U.S. households since 1977. In A. D. Chandler, Jr. & J. W. Cortada (Eds.), *A nation transformed by information* (pp. 257–280). London: Oxford University Press.
- U.S. Census Bureau. (1999). *Computer use in the United States: October 1997*. Retrieved March 1, 2005, from <http://www.census.gov/population/www/socdemo/computer.html>
- U.S. Census Bureau. (2000). *Home computers and Internet use in the United States: August 2000*. Retrieved March 1, 2005, from <http://www.census.gov/population/www/socdemo/computer.html>
- Valcour, P. M., & Hunter, L. W. (2005). Technology, organizations, and work-life integration. In E. E. Kossek & S. J. Lambert (Eds.), *Managing work-life integration in organizations: Future directions for research and practice* (pp. 61–84). Mahwah, NJ: Erlbaum.
- Ventura, M. (1995). The age of interruption. *Family Therapy Networker*, 19, 19–31.
- Watt, D., & White, J. M. (1999). Computers and family life: A family development perspective. *Journal of Comparative Family Studies*, 30, 1–15.
- Weil, M. M., & Rosen, L. D. (1997). *Technostress: Coping with technology @ work @ home @ play*. New York: Wiley.
- Zedeck, S. (1992). *Work, families, and organizations*. San Francisco: Jossey-Bass.