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PSYCHOLOGICAL FACTORS AND SUSTAINABLE TELECOMMUTING: THE IMPORTANCE OF NEED FOR CONTROL

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Abstract

Technological, social, economic, and organisational factors are converging to facilitate remote or distributed work trends. Telecommuting ---working at home or at some other remote location and using communication technologies in lieu of the requirement to travel to the office--- is the best known of the distributed work options. Although telecommuting is on the increase, insufficient empirical data exists in relation to this work phenomenon.

Accordingly, this paper reports on the results of a recent applied study in telecommuting (Meyers, 1999). The core premise---drawing on the principles of control as a core psychological construct, in particular, Bandura's (1986, 1997) self-efficacy theory---is that individuals differ in levels of confidence in their abilities to exercise control over important aspects of their work and personal environments. Translated to the world of telecommuting, 'control', as indicated in the present study, therefore offers useful as well as empirically-validated perspectives concerning the experiences of 155 Australian and United States 'corporate' telecommuters.

Findings are that the Importance of Control as a person-centred factor is a predictor of all three proxy indicators of telecommuting sustainability: telecommuter productivity, telecommuter job satisfaction, and telecommuter lifestyle satisfaction. As well, Task Mediation via Others, as a self-efficacy construct, is an additional predictor of telecommuter productivity. . However, predictor factors as empirically identified in this paper are suggested as the key influences on sustainable telecommuting, in contrast to the many intuitively appealing factors frequently suggested in the telecommuting literature.

A final benefit of the study was that it serves as an inventory of personal, work, organisational, and domestic factors that telecommuters themselves indicate as important to their work efficacy. Accordingly, the study has importance for IT and HRM managers; it should also assist policy-makers and planners keen to implement telecommuting in their respective organisations.

Introduction

Telecommuters, or in the broader context teleworkers,¹ are full-time or part-time corporate employees who working at home or at some other remote location, using communications technologies in lieu of travel to work (for useful overviews of these trends, see Gray et al. 1993; Hill, 1995; Jackson and Van Der Wielen, 1998; Kugelmass, 1995; Nilles, 1998; Switzer, 1997). Although earlier predictions on take-up rates were over-enthusiastic, telecommuting in Australia and other advanced 'information' societies is now steadily on the increase (as overviewed in Meyers and Hearn, 2000). In the United States, Apgar (1998) estimates that the number of telecommuters may be as high as 15 million. Broadly speaking, telecommuting has been touted as a means to save on energy consumption (Mokhtarian, 1997), reduce office space and other costly overheads, increase worker productivity, reconcile

¹The competing definitions of 'telecommuting' and 'telework' have been noted and are often used interchangeably, even by Jack Nilles who coined the term 'telecommuting' (e.g., see Nilles, 1998).

conflicts between “work” and “home,” retain valued employees, and make organizations more competitive (Kugelmass, 1995; Nilles, 1998).

During recent years the concept of control has been increasingly recognised as a topic of major importance in the context of research into human behaviour and it has clear relevance for the study of telecommuting. In general, control research has focused on the centrality of control beliefs as an essential aspect of human motivation (readings in Weary et al. 1993); to general control expectancies across several personal and interpersonal spheres (Paulhus, 1983; Phares, 1976; Rotter, 1966); to control expectancies across several work domains (Greenberger and Strasser, 1986, Greenberger et al., 1989; O’Brien, 1986; Spector, 1986); and to actual motivations for control over events in one’s life as opposed to whether or not one generally feels in control (Burger, 1992).

Perceived control-in the light of these broad research traditions-can be broadly defined as ‘the ability to intentionally influence environmental, psychological, or behavioural events’ (Morling and Fiske, 1994, p. 719).

Moreover, to fully understand control as a psychological construct, it is useful to refer to the principles of social cognitive theory (Bandura, 1977, 1986, 1997). A core principle of Bandura’s social cognitive theory is self-efficacy theory. As applied in the present study, self-efficacy refers to ‘the beliefs in one’s capabilities to mobilise the motivation, cognitive resources, and courses of action needed to meet given situational demands’ (Wood and Bandura, 1989, p. 408).

Self-efficacy theory applies to ‘triadic causation’ (ie the opportunities that people see in their telecommuting environments, as well as confidence in their abilities to perform appropriate behaviours to achieve the outcomes they are seeking. In short-as opposed to general expectancies about control---self-efficacy theory is a domain-specific assessment of individuals’ coping behaviours *to exercise control*. Figure 1 describes the triadic causation for the telecommuter.

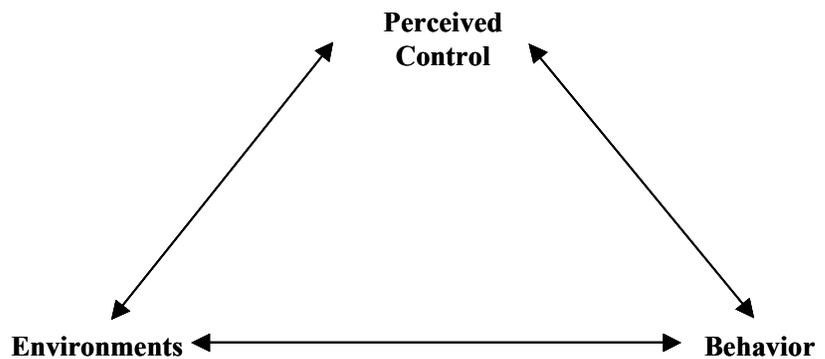


Figure 1. Teleworker Choices - Schematisation of the Relations Between the Three Classes of Determinants of Telecommuter Behaviours (Adapted from Bandura, 1977)

As shown in Figure 2, it can be speculated that telecommuters who report that they have adequate levels of control over such environments will also report high or reasonably high levels of satisfaction with telecommuting as well as being able to exercise control (ie via self-efficacy) in these domains.

Thus, at this stage of the analysis, beliefs in personal control can potentially be seen as major independent variables of sustainable telecommuting (the outcome variable).

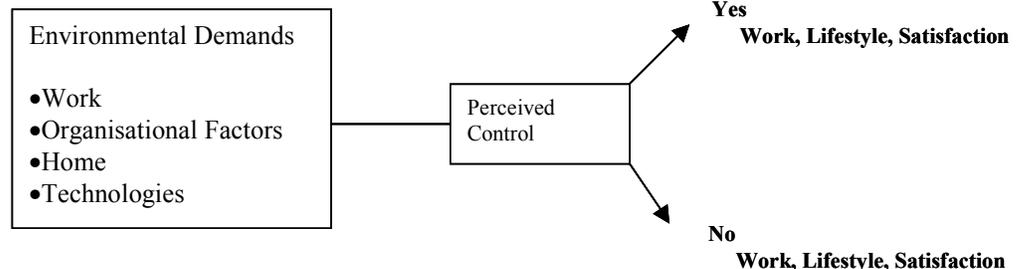


Figure 2. Telecommuter Specific Control Model (Myers, 1999)

Self-efficacy theory can be operationalised as telecommuters’ confidence in their ability to perform appropriate behaviours to achieve desired work and lifestyle outcomes. Central

to this notion is the telecommuter’s ability to actually exercise control over his or her work-home domains, as well as confidence in their abilities to overcome stressors and obstacles, in order to achieve the job and lifestyle outcomes they seek. Therefore, the survey aimed to take a comprehensive approach to the assessment of the telecommuter’s ‘mindscape’.

In particular, a questionnaire (a copy is available from the authors) was designed to collect appropriate data and so determine the extent to which demographic, personal, work, organisational, and domestic-lifestyle factors, as well as self-efficacy beliefs, interacted and respectively contributed to telecommuter *productivity*, telecommuter job *satisfaction*, and telecommuter *lifestyle satisfaction*. As outlined in the telecommuting literature (e.g., Kuglemass, 1995), these outcome variables-in turn-are regarded as the major indicators of sustainable telecommuting.

Accordingly, the study was underpinned by three research questions linked to the identifiable 'proxy' indicators of sustainable telecommuting (i.e., telecommuter productivity, telecommuter job satisfaction, and telecommuter lifestyle satisfaction):

- Question 1 What are the contributions of demographic, personal, work, organisational, and domestic factors, as well as self-efficacy beliefs, to **telecommuter productivity**?
- Question 2 What are the contributions of demographic, personal, work, organisational, and domestic factors, as well as self-efficacy beliefs, to **telecommuter job satisfaction**?
- Question 3 What are the contributions of demographic, personal, work, organisational, and domestic factors as well as self-efficacy beliefs, to **telecommuter lifestyle satisfaction**.

Methodology

Earlier research (see Meyers and Hearn, 2000), allowed control domains relevant to the telecommuter's experience to be chosen (e.g., extrapolating from this earlier research, the telecommuter's need for control to combine childcare with work, save on commuting time, save on work-related costs, have flexibility in hours for personal or family needs, and work free - satisfy needs for autonomy).

Work factors included fourteen questionnaire items relevant to the telecommuter's environment (among them, access to administrative support, access to technical support, volume of work expected, timely access to work -related information, and so on).

Organisational factors such as overall support for telecommuting as well as organizational communication factors, in particular, the extent to which telecommuters might be required to achieve task mediation through others (Meyers and Hearn, 2000) were also included.

Personal and lifestyle factors included assessments regarding adequacy of the telecommuter's physical work environment and the ability to control work interruptions at home, levels of support from partner (or others in household) for telecommuting, opportunities to fulfill family responsibilities while telecommuting, pressures in ensuring other domestic factors do not interfere with telecommuting, and the avoidance of role conflict.

Measures of control behaviours as adopted in the present study are derived from self-efficacy theory (Bandura, 1977, 1986, 1997). Drawing on Bandurian principles, Telecommuter Self-Efficacy would be assessed according to the individual telecommuter's beliefs in his or her capabilities 'to mobilise the motivation, cognitive resources, and courses of action needed to exercise control over given events' (Ozer and Bandura, 1990, p. 472; see also Bandura, 1977, 1986, 1997).

In actual assessment of self-efficacy beliefs, well-established protocols have been developed (Bandura, 1986, 1997). In the present study, following Bandurian principles, Likert-type scales were used, and the telecommuter asked how confident he or she was with respect to performance of appropriate behaviours in each of their personal, work, organizational, and domestic-lifestyle domains. Issues relating to a balance between task-specific competencies and more generic attributes affecting recording of the telecommuter's experience were also addressed (Meyers, 1999). Self-regulatory aspects were also assessed by eight items concerning the telecommuter's confidence level in setting realistic goals, self-monitoring work progress, setting own work priorities, staying work-focused despite distractions, and other attributes.

Findings

The Study Sample

One hundred and eighty-one telecommuters responded to the survey (N=150 usable responses).. Respondents were drawn from 31 different organisations and were self-selecting. Issues relating to the self-selecting nature of the sample have been previously addressed (Meyers, 1999).

The 150 respondents to the Study 2 survey met the criteria for 'information workers' in that a considerable part of their work could be deemed relatively location-independent, involved the manipulation of information and other symbols, and comprised work in the following job categories.

Table 1. Telecommuters - Employee Categories (Meyers, 1999)

Manager	Professional/ technical	Sales marketing	Clerical	Public relations	Other (misc)
20	100	11	1	8	10

A relatively equal number of males (51%) and females (49%) responded. The average age of respondents was in the range 30-39 years. Total number of family members potentially affected by the telecommuting arrangement in each household averaged three persons. The majority of respondents (65%) had spent between 0 and 5 years telecommuting, while the rest of the sample had spent various additional periods as telecommuters (mean = 3.79 years). Moreover, 48.3% of respondents had also worked between 3-10 years for their present employer. The majority of respondents (N= 34, 23%) telecommuted one full day a week from home, while a further 33 (22%) telecommuted only part of a day from home.

In addition, almost 26% telecommuted between two and three, and roughly 15% either four or five, days from home. A small number of respondents (N= 12, 8%) did not work at all from home. However, 50% of respondents also reported that they spent varying periods during the week also working at other remote sites. The present survey is not atypical: extensive documentation of United States telecommuting patterns (e.g., United States Department of Transportation, 1994) confirms 'the average telecommute is a one day per week person' (p. 36).

Telecommuters' relative job status was as shown in Table 2.

Table 2. Telecommuters - Employment Status (Meyers, 1999)

Full-time employee	Part-time employee	Contract employee	Status unknown
75.33% (N=113)	8% (N=12)	16% (N=24)	0.0067% (N=1)

In summary, these respondents were predominantly full-time 'volunteer' versus 'mandatory' telecommuters. As well respondents gave (Table 3) the following preferences and durations of telecommuting.

Table 3. Preferred Duration of Telecommuting (Meyers, 1999)

Desired	Another 2-5 years	Permanently	Stop right now	Intermittently	Other
Respondents	12%	70%	1%	10%	7%

Overall, respondents reported they had considerable control over task factors including proportion of work suitable for telecommuting, levels of flexibility in being able to choose when, where, and how to work, and in actual work scheduling.

Findings: Data Reduction

In order to allow consideration of data within a more parsimonious set of constructs, data reduction procedures, including principal component analysis, were followed according to Tabachnick and Fidell (1996). Following standard statistical procedures well accepted in the field (Tabachnick and Fidell, 1996; and Harris, 1985) the number of factors to be extracted were determined by inspection of eigenvalues. The decision rule applied was that eigenvalues needed to be greater than 1.

Oblique rotation was used because it makes no assumptions regarding correlation between the factors. The resulting factors were named by inspection of the factor loadings using the following decision rule: Items with loadings greater than .5 were included on the factor for interpretation provided they did not load above .3 on any other factor. All items that loaded on more than one factor were eliminated according to established principles (Tabachnick and Fidell, 1996, p. 642). In addition coefficient alphas were calculated for all factors and any factors with coefficients less than .5 were deemed unreliable and eliminated. Factor scores for use in the predictive models were calculated using weighted combinations of all variables (Tabachnick and Fidell, 1989).

This procedure was adopted for personal, work, organisational and domestic domains for both 'importance' and 'satisfaction' ratings. It was also conducted for the self-efficacy items. The factors that resulted from this data reduction process, proved to be a parsimonious set that had strong face validity. They are reported in Table 4 along with their reliabilities. Factor loadings, and variances accounted for, have been extensively reported elsewhere (Meyers, 1999).

Table 4. Factors Resulting from Factor Analyses and Reliabilities (Meyers, 1999)

Domain	Factors	Coefficient Alpha
Personal	Importance of control	0.5467
	Importance of work convenience	0.5292
	Satisfaction with work control	0.6663
	Satisfaction with work convenience	0.6957
Work	Importance of clarity of work role	0.7026
	Importance of work support	0.605
	Importance of communication technologies	0.5651
	Satisfaction with technical support	0.7024
	Satisfaction with access	0.6697
	Satisfaction with communication technologies	0.5992
	Satisfaction with task parameters	0.5434
Organisational Factors	Importance of organisational support	0.8017
	Importance of communication social and career influence	0.6318
	Satisfaction with communication social and career influence	0.6249
	Satisfaction with manager-supervisor-co-worker support	0.7048
Domestic Factors	Dissatisfaction with informal communication	0.665
	Importance of having work-supportive environment at home	0.8118
	Importance of family-partner support	0.5216
Self-efficacy	Satisfaction with domestic environment	0.8627
	Self-regulatory behaviours	0.8567
	Coping with organisational factors	0.5889
	Moderation of domain conflicts	0.8704
	Problem-solving efficacy	0.787
	Managing information	0.7284
	Managing communication with supervisor	0.7126
Task mediation via others	0.6812	

Job satisfaction and lifestyle satisfaction were measured as predictions of future job satisfaction and lifestyle satisfaction anticipated from telecommuting.

Demographic Factors and Sustainable Telecommuting: Lack of Predictive Power

The relationship between demographic factors and both job and lifestyle satisfaction was tested using linear regression and did not prove statistically significant. Similarly, demographic factors failed to predict telecommuter productivity via discriminant analysis of high versus low productives. Overall, no demographic factors were predictive of telecommuting sustainability and thus were excluded from all further analyses.

Telecommuter Productivity: Predictive Factors

Altogether, 73% of respondents reported that they are more productive when they telecommute (while 25% reported 'no change' or 'uncertain' and 1% indicated 'less productive'). Stepwise discriminant analysis was used to determine which factors discriminated between these two groups. The resulting discriminant function was significant (Wilks Lambda = .860, chi-square = 22.565, $p < .000$). The only two factors which discriminated between high and low productive groups of telecommuters were Importance of Control and Task Mediation via Others, as expressed in Table 5.

Table 5. Factors Predicting Telecommuter Productivity (Meyers, 1999)

Factor	Discriminant Coefficient
Importance of control	0.806
Task mediation via others	-0.585

Telecommuter job satisfaction: Predictive factors

Linear regression was used to build a predictive model of job satisfaction. All factors derived from data reduction (as reported in Table 6) were included as predictor variables. The dependent variable was job satisfaction as measured in section 11 of the questionnaire. A significant R-squared of .308 was obtained (F= 2.228, p= .002). Only the *Importance of Control* factor had a significant beta weight (Beta = .290, t= 3.093, p= .002).

Telecommuter Domestic-Lifestyle Satisfaction: Predictive Factors

Linear regression was used to build a predictive model of lifestyle satisfaction. All factors derived from data reduction (Table 6.9) were included. A significant R squared of .275 was obtained (F= 1.914, p= .009). Only the importance of control factor had a significant beta weight (Beta = .257, t= 2.692, p= .008).

Telecommuting Sustainability: A Predictive Model

In summary, the following factors have been identified as determinants of sustainable telecommuting:

Table 6. Factors as Determinants of Sustainable Telecommuting (Meyers, 1999)

Demographics	Personal	Work	Organisational	Domestic	Self-efficacy	Sustainability indicators
Nil	Importance of Control	Nil	Nil	Nil	Confidence in task mediation through others	Productivity
Nil	Importance of Control	Nil	Nil	Nil	Nil	Job satisfaction
Nil	Importance of Control	Nil	Nil	Nil	Nil	Domestic-lifestyle satisfactions

Summary

This section has summarised key findings arising from the data. A brief discussion follows.

Discussion of Findings

This section provides both an interpretation and---given word length limitations, brief--- discussion of these results and their further implications for a clearer understanding of what makes telecommuting `sustainable`. As indicated via discriminant and regression analysis, the *Importance of Need for Control* across all `proxy` indicators of sustainable telecommuting sustainability---telecommuter productivity, telecommuter job satisfaction, and telecommuter lifestyle satisfaction ---is discussed. As well, the extent to which the single self-efficacy item *Task Mediation via Others* becomes an important predictor of telecommuting sustainability, is also examined.

Introduction: Overall Importance of Person-centred Needs for Control

Respondents indicated---as revealed via factor analysis---that telecommuting significantly met their person-centred needs according to the need :

Satisfy needs for autonomy (work free) – almost 71% of 150 respondents rated this as important in their choice to telework. Other research confirms the importance of this construct in telework situations (as representatively reported in Bernardino, 1996; Huws et al., 1990; Korte et al., 1988; Olson, 1989)

Achieve more control of work outcomes – A high degree of control over work has similarly been reported as achievable through telework (almost a third of respondents in Meyers, 1999 rating this as ‘very important’ and another 50% as ‘moderately important’). This is a consistent finding in the telecommuting literature (as empirically found in Bernardino, 1996; Huws et al., 1990; Kraut, 1989; Mannering and Mokhtarian, 1995; Reymers, 1996).

Save on commuting time and costs – Altogether 70% of respondents (Meyers, 1999 reported this aspect (including cost savings) as important, while other researchers (e.g., Kraut, 1989; Kugelmass, 1995) have observed similar preferences.

Have flexibility of hours to meet personal lifestyle or family demands – As recently confirmed (Meyers, 1999), 77% of teleworkers rate this as ‘important’ to ‘very important’ compared with 91% of teleworkers (as reported by Huws et al., 1990). Interestingly, statistical cross tabulations did lend support for gender differences, given the often-expressed viewpoint that the promise of teleworking to offer greater flexibility appeals more specifically to women than to men (e.g., see Mokhtarian, et al., 1998).

In terms of other personal factors, a full inventory of coping behaviours earlier empirically validated (Meyers, 1999) extends beyond the confines of the present paper given its somewhat limited focus on the three ‘proxy’ indicators of sustainable telecommuting. However, in the present study however telecommuters identified, as revealed by frequency analysis, twelve core coping behaviours in order to successfully self-regulate their behaviours, achieve work outcomes, effectively interact with co-workers “back in the office”, and successfully maintain boundaries between “work” and “home” (Meyers, 1999).

Telecommuter productivity predictors : Importance of need for control and self-efficacy

As already identified, respondents had certain person-centred needs pertaining to productivity that they expect to be achieved via telecommuting. To be specific, over 80% of telecommuters view better control of work outcomes as important. Further, this motivation for improved control of work was reportedly achieved (82.7% of respondents expressing satisfaction with improved work control via telecommuting). To the extent that these employees were achieving improved work outcomes (i.e. increased productivity), these employees can be seen as ‘in control’. Thus, in one important domain, telecommuting (as also indicated via telecommuters’ assessed predicted outcomes via future telecommuting) will continue to satisfy their need for control.

However, such control outcomes—following Bandura (1977, 1986, 1997; see also Figures 1 and 2)—cannot be seen in isolation. Rather, these control outcomes are the result of interactive effects. For example, telecommuters have benign work environments (almost 70% reporting that a high proportion of their work is suitable for telecommuting). Apart from such work ‘telecommutability’, 74.5% say they have a ‘great deal of flexibility’ or ‘complete flexibility’ in their work environments, enjoy similar degrees of choice in work location (57%), and exercise considerable choice in task selection (70%) as elsewhere reported (Meyers, 1999).

In terms of personal factors—in terms of Bandura’s triadic model—two additional key aspects can be briefly stated: firstly, these respondents had been telecommuting for a considerable period (mean=3.79 years), allowing time for individual adjustments to work demands. Moreover, self-efficacy, an important predictive factor, i.e. *Task Mediation via Others*, has been linked to telecommuter productivity (Meyers, 1999). This was a strongly loading factor (.82111), doing double duty as an indicator of telecommuter coping efficacy and as a predictive factor that differentiates between productive and non-productive telecommuters. Briefly stated, *Task Mediation via Others* (in essence, seeking cooperation of others to meet work goals) can be viewed as an essential condition of organisational life. But telecommuters face unique demands: lacking immediacy of access to their task environments, they must rely on a form of ‘proxy’ control via others (see also Bandura, 1997). Accordingly, confidence in one’s ability to enlist the support of others ‘back in the office’, interact effectively with in-office staff, participate in meetings, secure task-related information, among other factors, all emerged as key determinants of telecommuter productivity (Meyers, 1999).

Telecommuter job satisfaction : Importance of need for control

As already indicated, it was found, via regression analysis, that only *Importance in Need for Control* emerged as a predictive factor. The study included, however, strong indicators of telecommuter job satisfaction. Telecommuters were overwhelmingly favourable (m=4.58, SD=1.75) in their endorsement of telecommuting. As well, 70% of respondents reported that they wanted to continue to telecommute “indefinitely”. Such levels of satisfaction can conceivably be linked to telecommuting as a work option that allows respondents to meet their already-stated person-centred needs for control (i.e. satisfy needs for autonomy, have improved control of work outcomes, and so on). To cite just two examples, 83% of telecommuters reported reasonably high to high levels of satisfaction with work outcomes. They similarly reported “satisfied” with levels of autonomy as well as

needs for work flexibility. Consequently, it can be reasonably concluded that telecommuters' reported satisfactions in all these person-centred domains are likely to be important influences on their satisfactions with telecommuting – the instrumental means for the fulfillment of such needs.

Telecommuter domestic-lifestyle satisfaction : Importance of need for control

Again, via regression analysis, *Importance in Need for Control* emerged as a predictor. To provide context here, telecommuters (using a 10-point scale) were specifically asked about the likelihood of telecommuting being a means to achieve increased lifestyle satisfactions. Respondents (N=92%) reported 'moderately' to 'highly' likely on the present achievement of these lifestyle outcomes ($m=7.65$, $SD=2.27$). A similarly high proportion (N=86%) also reported that telecommuting was likely to continue to allow them a better balance of work and family needs ($m=6.89$, $SD=2.86$). Flexibility of hours, linked to quality of life aspects, is a growing need for many workers in Western economies. Moreover, it is likely that fulfillment of the person-centred needs that have already been discussed may also impact on lifestyle satisfaction, highlighting the interplay between personal and work factors – allowing the home to do double duty as a work site.

However, 'control' can be linked to more tangible aspects. In the present study, empirically-validated were such related key factors as *Having a Work Supportive Environment at Home* and the *Importance of Having Family-partner-household Support*. Therefore, telecommuting for these respondents appears to have a positive influence on balancing work-family-personal needs, thereby underpinning the telecommuter's need for improved control of life style arrangements (as also confirmed by Hill, 1995). Present findings in this crucial domain contradict those of Hartman et al. (1991) who reported increased family disruption as result of telecommuting. In the case of the present study, however, the longevity factor of the telecommuter's experience ($m=3.79$ years) may again have allowed time for adjustments across work-personal domains. For example, 91% of respondents reported that they were 'moderately' to 'totally' confident they could stay work-focused, despite distractions at home (or other remote locations).

Conclusion

Overall, this study paints a generally positive picture of telecommuting. The 'triadic framework' (Bandura, 1977, 1986, 1977) has allowed almost a full inventory of personal-work-organisational-and domestic lifestyle factors, as well as highlighted core predictive factors. Limitations to the study are readily acknowledged: practically all the respondents were volunteers when, increasingly, organizations are turning to 'mandatory' forms of telecommuting where individual choice and preferences may be secondary to organisational needs for costs savings in overheads and improved client contact 'in the field' (Apgar, 1998). Manager ratings of the telecommuter respondents would also have been useful (albeit potentially altering respondents' motivations in responding to the survey). A more diversified sample, involving more clerical telecommuters, as opposed to the current focus on mainly professional telecommuters, would also have been useful. Nonetheless, the study offers a useful inventory on what makes telecommuting 'sustainable'.

Recommendations to managers are that such an inventory, highlighting as it does both personal and environmental factors as well as telecommuter outcomes (productivity, job satisfaction, and lifestyle satisfaction), can be usefully adopted for planning the introduction of new telecommuting programs. Elements of the present study may also serve to 'benchmark' aspects of existing telecommuting programs.

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