Final Report

EVALUATION OF THE PUGET SOUND TELECOMMUTING DEMONSTRATION: SURVEY RESULTS AND QUALITATIVE RESEARCH

by

Cy Ulberg
Research Associate Professor
Graduate School of Public Affairs
University of Washington

Andrew Gordon
Professor
Graduate School of Public Affairs
University of Washington

David Spain
Associate Professor
Department of Anthropology
University of Washington

Elizabeth Fortenbery
Research Assistant
Department of Anthropology
University of Washington

Bethany Whitaker
Research Assistant
Graduate School of Public Affairs
University of Washington

Steven Fireman
Research Assistant
School of Business
University of Washington

Washington State Transportation Center (TRAC)
University of Washington, JE-10
4507 University Way N.E.
Seattle, Washington 98195

Institute for Public Policy and Management
Graduate School of Public Affairs
University of Washington, DC-13
Seattle, Washington 98195

Prepared for

Washington State Energy Office
809 Legion Way S.E.
Olympia, Washington 98504-3165

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This project could not have been successfully completed without the contributions of many people other than the authors listed on the title page.

Ron Porter worked with the project from the beginning. He assisted in every phase of the research and contributed insights to the telecommuting phenomenon based on his observations and his own experience. Carol Zenker and Stuart Goldsmith worked during the first half of the project to help with the development, administration, and analysis of the first survey. Several people were involved in the data entry process. Their sticking to the effort under fire was admirable. The staff of the Washington State Transportation Center contributed word processing, editing, graphics, and moral support throughout the project.

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EXECUTIVE SUMMARY

The Puget Sound Telecommuting Demonstration involved 25 public and private organizations and several hundred telecommuters, supervisors, and co-workers, in an extensive study of the impact of telecommuting. Participating organizations were recruited by the Washington State Energy Office into a project which spanned two years, from mid 1990 to mid 1992. The project was one of the most multifaceted evaluations yet undertaken to understand many aspects of telecommuting, including impacts on the transportation and energy systems, on organizations, and on participants' work and their personal lives. This report covers several elements of that evaluation.

This project provides unique information about the experience of telecommuting. It spans a wide variety of organizations, large and small, public and private. They differed substantially in their degrees of bureaucratization and enthusiasm about telecommuting. The researchers collected data not only from telecommuters, but also from supervisors, co-workers, and a comparison group of other organization employees. Ethnographic data were collected in a variety of settings, and small groups of participants were interviewed periodically to gain additional insights into their experiences. Detailed observations were collected at a state-sponsored telework center, and special studies were conducted on productivity assessment and on the reasons why people stopped telecommuting during the project.

This report is divided into ten chapters and three appendices. The first chapter describes the research process. Each succeeding chapter focuses on a basic research question and includes a compilation of related evidence from surveys, observations, and interviews. The appendices provide more detail about the methodologies and a detailed summary of ethnographic data. The nine basic research questions and results described in this report are summarized in this section.

WHO ARE THE TELECOMMUTERS

The profile of research participants in all roles includes demographic data, job types, and basic attitudinal responses. The telecommuters are compared and contrasted with the co-workers and controls. The profiles lead to a conclusion which tempers our ability to generalize from this research:

The telecommuters differed initially in important ways from the other workers in the project.

One of the goals of the Washington State Energy Office's recruiting efforts was to enlist a wide variety of organizations to participate in the demonstration. Even though the organizations span a range of types, we know that they are an unrepresentative subset of all organizations in the Puget Sound. Our research clarifies relevant additional differences. For example, while telecommuters, co-workers and controls are similar to one another in basic demographics (e.g., gender, age, ethnicity) females are overrepresented in all three groups relative to the general working population. Our questionnaire also revealed important differences among the participant categories. Relevant examples include telecommuters' tendency to rate their job performance, stress, and autonomy higher before telecommuting than did the other participants. It is important to keep these differences in mind when interpreting the results of this study.

WHAT ARE THE ORGANIZATIONS LIKE?

It has been hypothesized that organizational characteristics are important determinants of telecommuting success. In this section, we profile the organizations in the Puget Sound Telecommuting Demonstration and discuss organizational characteristics associated with different degrees of success. We also describe impressions of management support for telecommuting and the relationship between management support and telecommuting success. The results differ, to some extent, from our expectations:

> **Organizations in the demonstration differ substantially from one another on a number of dimensions, and exhibit varying degrees of success with telecommuting. However, the variations in telecommuting success occurring among work groups and among people *within* organizations are as substantial as differences *between* organizations.**

Organizations in the project differed in ways which are important to projects such as this - for example, in the degree of centralization, in their organizational culture, and in their supervisory philosophy. Organizations with a high degree of upper management support for telecommuting, and which implement their programs in a coordinated fashion, tend to be somewhat more successful. For some telecommuters in our project, considerable organizational support is required. But it is also the case that some people's jobs and personalities are such that they can telecommute successfully in a wide range of organizational environments, and these individual differences are as important as differences among organizations.

WHAT ARE THE VARIETIES OF PRACTICES PEOPLE USE TO TELECOMMUTE?

Participants in this project employed a wide variety of telecommuting strategies. In this section, we describe some of them, including variations in the frequency and scheduling of their telecommuting, their home offices, technologies, and special locations, such as the telework center. We also discuss the relationship between supervisory style and telecommuting. Three important findings emerge in this discussion:

Most of the work done outside the office requires little on-line, electronic communication. Uninterrupted opportunities for quiet working time are far more important than the latest technology. Thus, advanced telecommunications equipment (other than telephones) was rarely crucial to successful telecommuting.

The vast majority of participants had no trouble finding space at home which they regarded as adequate for effective telecommuting.

Telecommuting thrives best when accompanied by a flexible supervisory style that accommodates limited direct communication between telecommuters and supervisors.

WHAT ARE THE CORRELATES OF SUCCESSFUL TELECOMMUTING?

In this section we outline data about the personal, job, and organizational correlates of successful telecommuting. In particular, the profiles of telecommuting "drop-outs" are examined to determine patterns of reasons for discontinuing telecommuting. We describe telecommuters' own perspectives on their success, and discuss the reactions of other project participants:

Job characteristics are more important to successful telecommuting than are personal or organizational characteristics.

Most of the people in this project have jobs which are multifaceted, dynamic, and fluid. Most workers perform many different tasks, some more suited to telecommuting than others. One can expect that the ability of individuals to tele-commute will vary as the details of their jobs vary.

Some combinations of job, personal, and organizational characteristics enhance the likelihood of successful telecommuting. If the job mix is such that

telecommuting is appropriate, then self-motivation and a supportive supervisor are especially important to success.

Both the fluidity of jobs and the likelihood that new people will start telecommuting continuously have implications at each stage of telecommuting. Telecommuter training, the start-up inertia one can anticipate from telecommuters, and the nature and intensity of ongoing organizational support for telecommuters and fellow workers are all influenced by job fluidity.

HOW HAS TELECOMMUTING AFFECTED PRODUCTIVITY?

One of the fundamental claims about telecommuting is that it will enhance worker productivity. At the same time, some workers (especially supervisors and co-workers) are concerned that people may be less inclined to work when they are out of the office. This section discusses findings concerning this critical issue. Telecommuter and supervisor responses to questionnaires provide perceptions of changes in telecommuter productivity. Supervisor interviews also focused on the impact of telecommuting on productivity measurement. Important results emerge from these analyses:

Telecommuters report substantial increases in their own productivity. Supervisors and co-workers tend to agree that telecommuters are more productive, but to a lesser degree.

Productivity gains for telecommuters seem primarily to be due to insulation from distractions in the office.

The concern that telecommuters will be unable to focus on work does not appear justified in our study. For the vast majority of participants, distractions in the work place were regarded as far more disruptive than distractions in the home.

Ratings of work group productivity did not change significantly during the demonstration. However, supervisors and co-workers reported problems with telecommuting that had the potential of diminishing productivity.

Telecommuting itself had no impact on the methods used for measuring productivity and worker performance during the course of this demonstration.

HAS TELECOMMUTING HAD AN EFFECT ON CO-WORKERS AND WORK GROUPS AS A WHOLE?

To capture the value of telecommuting to an organization, we should understand the impact of this phenomenon on all company employees. This project collected information on productivity, satisfaction, and communication strategies of the work groups and co-workers associated with telecommuers. Among the findings are these:

According to our survey data, the impact of telecommuting on work groups and other co-workers ranges from neutral to modestly negative. According to the qualitative data, some co-workers experienced serious problems as a result of working with telecommuters; a smaller number found that their productivity increased. The impact seems to depend on the working relationship between the co-worker and the telecommuter, on the specifics of the co-workers' job, and on the size of the work group.

Even though the negative impacts on communications and the organization of work were scattered, the problems were real and need to be taken into account in implementing telecommuting programs.

HAVE TELECOMMUTERS' LIVES CHANGED AS A RESULT OF TELECOMMUTING?

In addition to productivity enhancements, it has been hypothesized that telecommuting will improve telecommuters' job satisfaction, stress level, and home life, resulting in particular from the flexibility telecommuting can provide. A detailed analysis of survey responses and discussions and individual interviews is presented in this section. Findings include the following:

The anecdotal support for improvements in telecommuters' lives is considerable. However, there is very little quantitative evidence that these effects are widespread.

The impacts of telecommuting, positive and negative, differ substantially from person to person. It is important to attend to individual differences as well as to track aggregate changes which arise across groups of telecommuters.

HAS TELECOMMUTING AFFECTED TRANSPORTATION AND ENERGY USE?

This is a central question for the Puget Sound Telecommuting Demonstration. The primary sources of data for this analysis are the travel diaries collected before, during, and after the one-year demonstration and the case studies of office and home energy use, both of which are outside the scope of this report. However, some

questionnaire data are relevant to answering this question. Especially important is the impact of telecommuting on people's choices regarding the commute trip. Two findings stand out:

Long commute trips provide a strong motivation to begin and to continue telecommuting.

The expected reduction in commute travel was corroborated for telecommuters. While their work associates shifted somewhat toward transit use and carpooling during the demonstration, telecommuters were more likely to continue to commute as SOVs.

WHAT ARE WE TO MAKE OF ALL THIS?

Telecommuters in this project clearly report productivity increases, and there are some people, and some tasks, for which telecommuting is a highly attractive work option. The endorsements from telecommuters, and the claims from a few highly regarded workers that they would have left these organizations if telecommuting hadn't become available will be a sufficient reason for some organizations to adopt telecommuting. Because of problems of the representativeness of participating organizations and telecommuters, we cannot, on the basis of these data, say how widespread telecommuting is likely to become. At the same time, deci-sions regarding telecommuting are being made on other grounds, including public policy incentives and the rapid introduction of relevant technologies. Many of the other difficulties we note in this report are likely to be overcome.

The conclusion we reach based on our research is that with sufficient attention to the organizational and technological issues which are raised in this report, telecommuting can be a viable work strategy in many organizations.

CHAPTER 1
RESEARCH DESIGN, DATA COLLECTION, AND DATA ANALYSIS

The Puget Sound Telecommuting Demonstration had four major research goals:

1) research and evaluate the impacts of telecommuting on employees and their families;

2) research and evaluate the impacts of telecommuting on organizations;

3) research and evaluate the impacts of telecommuting on traffic congestion, the environment, and energy use in the Puget Sound region; and

4) assess the potential for telecommuting in the Puget Sound region and develop policy recommendations based on the findings of this study.

Since telecommuting is a complex phenomenon, involving organizational behavior, travel behavior, and individual attitudes, and since the demonstration involved a wide variety of people and organizations, multiple types of data collection were employed to gain an understanding of the impacts of telecommuting. None of the methods can stand alone, but each contributed to the design and interpretation of the others. The types of data collection fall into two general classes: quantitative and qualitative. A brief description of these classes of data collection are presented here to aid in the understanding of this report's contents and organization.

QUANTITATIVE DATA

The primary source of quantitative data for this study is a questionnaire that was administered near the beginning of the demonstration and one year later. Since organizations began telecommuting at different times, the administration of the questionnaire was spread out over time.

Roles

In order to assess the multiple effects of telecommuting, associates of the telecommuters were included in the research. For each telecommuter in the demonstration, a "co-worker," a "supervisor," and a "control" were identified. The research team attempted to use consistent criteria to identify the people in these roles. The "co-worker" was a person who worked closely with the telecommuter, but did not telecommute themselves. The "supervisor" was the immediate superior of the telecommuter. The "control" was a person in the organization (not in the same work

group, if possible) whose job was similar to the telecommuter's, but who did not telecommute herself. Similar questionnaires were given to telecommuters, co-workers, and controls. A separate supervisor questionnaire contained general work-related questions and a series of questions about the telecommuter.

Survey administration

Table 1 shows the numbers of people identified for each role and the numbers of people who returned questionnaires at the beginning and end of the demonstration. The response rates are indicated in parentheses. Two types of follow-ups were conducted for each administration of the questionnaire. In the first administration, the follow-up was done primarily through the telecommuting coordinator at each organization. The success of this approach was mixed. For the second administration, the research team conducted the follow-up directly with the project participants. A postcard reminder was sent shortly after the deadline date for the questionnaire's return. Then follow-up phone calls were made to each person. Because of the importance of the follow-up information from telecommuters, a short version of the final questionnaire was designed and sent to the telecommuters who had not responded to any of the follow-up attempts. Of the 190 second surveys returned by telecommuters, 56 were the short version.

Table 1. Survey Response Rate by Study Role

Study Role	Originally Identified	1st Survey Returned	2nd Survey Returned
Telecommuter	286	236 (83%)	190 (66%)
Control	163	111(69%)	48 (29%)
Co-worker	173	140 (81%)	98 (57%)
Supervisors	272	202 (74%)	142 (52%)

The content of the questionnaires was kept constant (to the extent possible) across time and across roles, so that good comparisons could be made. In the final administration of the questionnaire, special questions were designed for each role. The specific content of the questionnaires will be discussed in separate sections of the evaluation's report.

Presentation of data

The analysis of attitudinal responses in this report follows a typical format. The first survey asked participants their opinions before beginning to telecommute (or working with a telecommuter), and the second survey asked participants their opinions on the same questions after the year-long pilot study was completed. Each of the questions asked respondents to rate the statements on a 5-point

scale (strongly agree/agree/neutral/disagree/strongly disagree or always/frequently/sometimes/rarely/never). For the purpose of this analysis the 5-point scales were collapsed. For instance, in many cases, variables were presented according to percentage of "agree" responses. In cases where this comparison was not useful, other presentation options, which are obvious from the text, were employed.

In addition to the before and after responses, changes in responses are sometimes used to analyze the impact of telecommuting. Difference scores compare individual responses on the first questionnaire with the same individual's response to the same question on the second questionnaire. The differences are collapsed into three categories, less agreement or less frequency, no difference, and more agreement or more frequency. For instance, in the text, a group might be described as reporting "increasing agreement". Reporting increasing agreement could mean either that, for example, a particular telecommuter checked "disagree" in the first survey and "neutral" in the second survey, or that the individual checked "agree" in the first survey and "strongly agree" in the second survey. Comparing the percentage of people increasing agreement or frequency with those decreasing agreement or frequency shows how groups changed during the telecommuting demonstration.

Development of scales

Scales were developed to measure some global attitudinal factors related to telecommuting. Since those scales are used throughout the report, the development of the scales is summarized here and presented in detail in Appendix A.

There are numerous individual survey items that are discussed in this report. In describing the analysis, we found it useful to combine items to form scales. This set of scales is used throughout the report to describe the differences among telecommuters and to study the effect of telecommuting in changing job attitudes.

The nine scales represent nine independent dimensions of job attitudes and are computed as the sum of responses to items which are related to the scales. The scales are as follows:

JOBPERF — good job performance, indicated by self-ratings on overall performance, productivity, dependability and ability to work independently;

HISTRES — high job-related stress, including assessments of job-related stress on several dimensions, feeling that one's supervisor demands too much, thinking that

meetings take too much time and that office distractions make work hard;

GOODHOM having a good home life, indicated by a feeling that there is enough time to spend with family, friends and colleagues, that personal flexibility is high, and that home demands and job demands do not interfere with each other;

WKPRODH assessing work group productivity as being high;

LIKEWRK liking work, indicated by feeling a long term commitment to the organization and looking forward to going to work each day;

GOODPRO having good opportunities for promotion, supported by feeling that supervisors give enough feedback and that the office culture is positive;

GDINTSK having good interpersonal and communication skills;

SEPHOME being able to keep personal and professional life separate, supported by feeling that the family supports telecommuting and that work quality has improved; and

IDECIDE feeling autonomy in doing the job, including decisions on what projects to do and how to do them, also associated with being involved in neighborhood and community activities.

These nine scales can be organized into three types of job-related attitudes:

- **Job Performance** - JOBPERF is a general measure of job performance: GDINTSK represents a specific kind of personal job performance, and WKPRODH relates to work group performance.

- **Job Satisfaction** - LIKEWRK is a basic measurement of satisfaction with the job; while HISTRES, GOODPRO, and IDECIDE relate to satisfaction with specific aspects of the job.

- **Personal Satisfaction** - GOODHOM measures the extent to which the respondent is satisfied with aspects of life that

are not directly related to work; SEPHOME measures the extent to which home and work life are separated.

QUALITATIVE DATA

Several kinds of qualitative data were collected, including semi-structured interviews, informal discussions, and direct observation. Information from the qualitative data collection was compiled into notes and reports that were distributed among the research team. The results of these data collection efforts helped in the design of the quantitative data collection and in the interpretation of the results. In this report, examples from the qualitative data collection are used to illustrate various points.

Semi-structured interview

Two kinds of semi-structured interviews were conducted. One type of interview was conducted with people who dropped out of telecommuting. Each person who was no longer telecommuting was contacted by phone or in person. Minimally, the reason for discontinuing was determined. When possible, extensive discussions were held to learn all we could about the circumstances under which people felt they could not continue to telecommute.

Another type of semi-structured interview was conducted with supervisors. The primary intent of these interviews was to determine if supervisors had changed the way they conducted performance evaluations as a result of telecommuting. However, it soon became apparent that these interviews were crucial to a more in-depth understanding of the practice of telecommuting, especially in understanding how **supervision** changes when people are less often in the presence of their supervisor.

Informal contact

The research team engaged in numerous informal discussions with telecommuters and the people they worked with. All members of the research team were encouraged to participate in these discussions. The discussions ranged from informal contacts with people in the organizations during other types of research activities to organized lunches including certain project participants and members of the research team. Research team members were assigned a certain number of organizations at the beginning of the data collection. The initial purpose of this assignment was to facilitate the return of questionnaires. However, as relationships among the research team members, the telecommuting coordinators, and other people from the organizations developed, opportunities for informal interaction emerged, which led to rich sources of information.

Direct observation

Another source of qualitative information was direct observation. Two anthropologists were members of the research team. They

became involved in discussions with some of the organizations' members and in discussions at the telework center, which allowed them relatively close access to the progress of the project. This access included actually becoming one of the telecommuters at the telework center and being invited to attend regular staff meetings at one of the organizations. In addition, staff members of the Washington State Transportation Center, where the University's research team was based, were telecommuting, which allowed first-hand participation in the impacts of telecommuting.

SUMMARY

In designing and carrying out this research, the complexity of the telecommuting phenomenon was continually taken into account. The research team felt that it was important to consider each issue from a variety of perspectives and with a variety of methodologies. Quantitative data, by itself, can be misinterpreted because numbers only partially described complex human behavior and attitudes. Qualitative data, by itself, can be misleading, because it is based on a relatively small number of observations and is subject to bias. Both kinds of data together can be used to develop an accurate and comprehensive understanding of what happens.

CHAPTER 2
WHO ARE THE TELECOMMUTERS?

The telecommuters were volunteers recruited by the WSEO in conjunction with supervisors from organizations involved in the Puget Sound Telecommuting Demonstration. The controls were chosen to be as similar to the telecommuters as possible and still not be affected by the project. Co-workers chosen for the research were people who worked closely with the telecommuters, but did not necessarily share any characteristics with them. In order to compare telecommuters with the general population of employees, a systematic random sampling of organizational members would have been necessary; however, no such sampling was intended. Indeed, it would not have been consistent with the goal to use only volunteers in the demonstration.

It is important to understand what types of people the telecommuters are. Comparisons of their responses with controls and co-workers give some information about how they differ from the general population. Comparisons of their characteristics with those of controls, in particular, help us to control for outside effects when we assess the impact of telecommuting on the telecommuters.

DEMOGRAPHICS

Demographically, the three roles are very similar. Few of the differences are statistically significant. It is important, however, to understand the profile of the group of respondents as a whole.

Gender

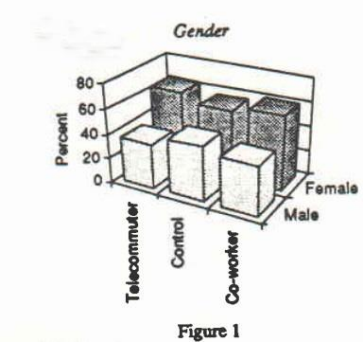


Figure 1

Figure 1 shows the distribution of respondents according to gender. As a whole about 62 percent of the respondents were females. Telecommuters were slightly (but non-significantly) more likely to be female than the other two roles. About 67 percent of the telecommuters were female. Since females account for only 45 percent of the workforce in the United States,[1] it should be recognized that the respondents in this study do not represent the workplace as a whole. There is no obvious explanation for the predominance of females among the telecommuters or in the study in general.

1 Statistical Abstract of the United States, 1991, p. 399.

Race

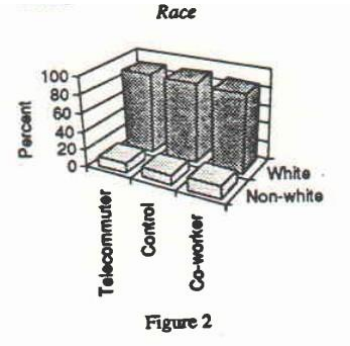


Figure 2

As illustrated in Figure 2, 12 percent of the respondents identified themselves as non-white, so the number of respondents in particular ethnic groups is too small to do a separate analysis by ethnic group. Relative to all the participants in the demonstration, there was a slightly higher percentage of whites among the telecommuters and a slightly higher percentage of minorities among the co-workers than would be expected by chance. The percentage of minorities among controls was about the same as the percentage for all workers in the demonstration.

Age

The median age of all respondents was 40. There was no significant difference in the median among the roles. However, as can be seen in Figure 3, there was a tendency for controls to be under-represented in the middle-age range (36-45), compared to both the telecommuters and the co-workers.

Household characteristics

For the analyses in this study, households were divided into the following six types:

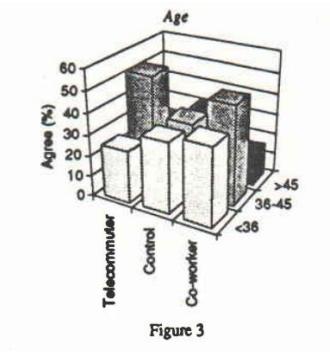


Figure 3

1) single - a single person, living alone

2) non-related adults - more than one adult living with others, none identified as "spouse" or "significant other"

3) couple - two people, one identified as "spouse" or "significant other"

4) single parent - one adult living with one or more children

5) couple with child(ren) (at least one under five)

6) couple with child(ren) (none under five)

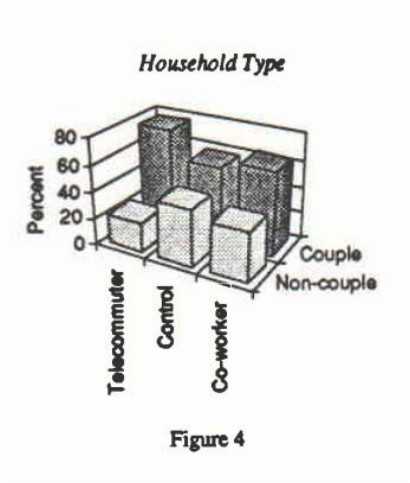


Figure 4

For all six categories, there are no significant differences among the roles in household type. However, as illustrated in Figure 4, when categories 3, 5, and 6 are combined to define people living together as a couple, and they are compared with the other categories combined, a significant difference among roles emerges. Telecommuters are significantly ($p<.05$) more likely to be living as part of a couple than the other two roles. Seventy-seven percent of the telecommuters are living as part of a couple, with 57 percent of controls and 63 percent of co-workers living as part of a couple.

Looking at the size of a household, the mode for all respondents is two people. Thirty-three percent of the households are composed of four or more persons. Telecommuters are no more likely to come from a large household than either of the other two roles. The roles also do not differ in the time period of residence in their current homes - the median time period of residence for all respondents is 3.5 years.

Income

The median monthly income for all respondents was $4,150. Although the telecommuters' median monthly income was highest at $4,470, compared to $3,980 for controls, and $3,920 for co-workers, the differences were not significant. It should be pointed out, however, the overall median monthly income was much higher than the regional median of $3,350.[2]

Summary

Although there were few statistically significant differences in demographic factors among the roles, there was a slight tendency for telecommuters to have higher paying jobs and to be living as part of a couple. These attributes coincide with being older, but the age differences among the roles were almost non-existent.

JOB PROFILES

The type of job and the specific tasks associated with the job type are fundamental factors to telecommuting. There has been considerable discussion about what kinds of jobs are most suitable for telecommuting. Jobs appropriate to telecommuting have generally been labeled "information" jobs. In this section, the types of jobs held by people in the demonstration and perceived appropriateness of jobs for telecommuting are discussed.

Tasks and telecommuting

No matter how one's job is formally defined, many employees engage in a variety of tasks during the work day. For some, the tasks may vary substantially and unexpectedly from day to day, for others, the proportions are more predictable. In most cases, we learned that participants' job titles lack the precision one needs to determine whether one's work is "telecommutable." However, we

[2] Puget Sound Council of Governments, 1992

did find that the range of one's tasks is an important determinant of the effectiveness of telecommuting.

Job titles were coded for this analysis. Respondents were divided into the following three general categories:

1) Administrative/managerial - (e. g. manager, administrator or supervisor)

2) Professional - (e. g. programmer, analyst, writer, illustrator, economist, mechanical engineer, librarian, architect)

3) Operations Support - (e. g. word processor, secretary, office assistant, clerk typist, administrative clerk, bookkeeper, transcriptionist)

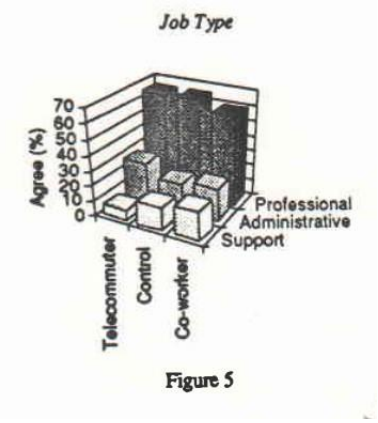


Figure 5

Figure 5 shows the distribution of job title types according to role. "Administrative/managerial" jobs accounted for 21 percent of the total and "operations support" comprised 10 percent. "Professionals" comprised 69 percent of the demonstration participants. There was no statistically significant difference in distribution of job types among the roles. However, there was a slight tendency for "operations support" people to be over-represented among the controls and co-workers. Seven percent of the telecommuters fell into the category of "operations support," while 11 percent of the controls and 15 percent of the co-workers were considered "operations support."

Suitability of jobs for telecommuting

From the perspective of policy, it is crucial to recognize that not only are some *people* more likely to telecommute successfully, but also that some *tasks* are more appropriate to telecommuting, and that this, too, is dynamic. Thus, in some phases of one's work, it is far more effective to work alone, while in other phases, interaction and

careful coordination with others is a prerequisite to success. The degree to which each of these classes of tasks can be carried out successfully away from the office will determine how often people in different jobs can work at home.

Respondents to our survey were asked to specify the kinds of work they typically engage in, and to describe the tasks that prove most amenable to telecommuting. The results are depicted in Table 2. Clearly, people feel that tasks requiring little interaction with others were preferred for telecommuting.

Table 2. Frequency of Doing Tasks (percent saying "often")

TASK	In general	On TC days	Diff.
Writing	74	70	-4
Word Pro.	74	70	-4
Reading	74	70	-4
Phoning	67	40	-27
Design	23	33	10
Programming	37	39	2
Analysis	60	52	-12
Training	16	5	-11
Record Keeping	45	32	-13
Meetings	41	2	-39
Prob. Solving	64	40	-24
Other Admin.	33	19	-14

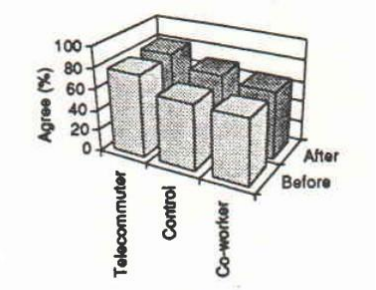


Figure 6

To learn what the participants themselves felt about the suitability of jobs, the researchers asked them whether or not they agreed with the statement, "*The reason people were chosen for telecommuting is that their jobs were well-suited for it.*" Figure 6 shows the results. In the first survey (71 percent) and in the second survey (72 percent) most respondents agreed with the statement. Not surprisingly, telecommuters (79 percent) were initially significantly ($p<.01$) more likely to agree that people were chosen for telecommuting because their jobs were well-suited for it than controls (65 percent) or co-workers (62 percent). All of the groups reported that they agreed with the statement at about the same rate in the second survey than they did in the first: telecommuters 80 percent, controls 71 percent, and co-workers 64 percent.

Supervisor comments

Supervisors have a unique perspective that allows them to assess the suitability of jobs for telecommuting. Because they were intimately involved in the selection of telecommuters and were close to them throughout the project, their comments about the suitability of jobs are especially important.

One supervisor, for example, said he wished in hindsight he had chosen someone whose job was better suited to telecommuting. While the person he chose to telecommute is highly competent and trustworthy, which is why he chose her, she has had so many job responsibilities continually added to her workload over the course of the year that most of the time she was unable to get out of the office to telecommute.

Another supervisor said that support from his manager was hard to achieve because the manager was worried about fairness to the other group he manages. That group cannot telecommute because the nature of their jobs requires them to be on-site. The supervisor thinks his manager is a little "over-worried" about fairness, especially considering that the telecommuting group, composed of programmers, are ideally suited to telecommuting.

One supervisor at a private organization, who commented on her second survey that an employee had to stop telecommuting because her job was not suited to it, elaborated in a phone conversation that the telecommuter, in fact, had a lot of tasks she could do at home. She said that the "real problem" was that people were not accustomed to her being off-site. Her co-workers simply could not get used to her working out of the office one day a week, and would not call her at home. It is not clear how much time the supervisor allowed for people to become accustomed to the telecommuter's absence.

Summary

People generally understand the importance of the suitability of jobs for telecommuting. It is also important to understand that it is the particular tasks being performed, rather than the job title or position that determines that suitability. Those tasks can change throughout the course of a month or a year and make any job more or less suitable to telecommuting depending on the circumstances.

Nevertheless, supervisors' comments illustrate some of the conflicting issues involved in assessing suitability. Even if the tasks are suitable to telecommuting, other people's expectations about where the tasks should be performed often impact assessments of job suitability.

INITIAL JOB ATTITUDES

Scales were developed from our questionnaire to assess the impact of telecommuting on how people feel about their jobs and their lives outside of their jobs. Elsewhere in this report, the impacts of telecommuting on attitudes, and the responses for particular items are reported. Here, we discuss initial differences among the roles.

As a first cut, the scales were used to compare telecommuters, controls and co-workers. Table 3 show the results. The entries in the table are scores on the scales at the first administration of the survey. The higher the average score, the more the people in the indicated role possessed each attitude. The data show that telecommuters differed initially from the controls and co-workers in some important ways. Telecommuters

1) tended to rate their job performance higher than others did,

2) rated themselves as significantly more stressed than the other two roles,

3) said they had more autonomy in their jobs, and

4) claimed that they were able to keep home and work separate more successfully than others did.

These findings raise questions about our ability to use the control group to account for differences occurring as a result of influences outside of telecommuting.

Table 3. Initial Scale Scores by Role

Scale	TCer	Ctrl	Co-worker	Sig.
Job Performance				
JOBPERF	14.79	14.44	13.98	.07
GDINTSK	6.17	5.91	6.02	.45
WKPRODH	5.46	5.93	5.51	.20
Job Satisfaction				
LIKEWRK	8.99	9.02	8.78	.62
HISTRES	9.61	7.88	8.95	.00
GOODPRO	7.77	8.28	7.39	.07
IDECIDE	5.41	4.77	4.29	.00
Personal Satisfaction				
GOODHOM	9.57	10.14	9.21	.35
SEPHOME	5.81	3.53	4.47	.00

As a result of these findings and the clear initial incomparability of the telecommuters to the other groups, many of the analyses in this report rely primarily on changes among telecommuters from the initial survey to the final one. The analysis of the survey compares answers before and after experience with telecommuting, and differences among groups. Where analyses of the differences among groups are included, one must remember that telecommuters describe themselves as more motivated, harder workers, and under greater stress than are controls and co-workers. The report will consider these differences where appropriate.

PREVIOUS EXPERIENCE WORKING AT HOME

Many telecommuters had previous experience working at home. Among telecommuters, 32 percent had worked at home at least once a month previous to the demonstration, compared with 12 percent of the controls and 18 percent of the co-workers.

In our interviews, some of those who had worked at home all the time, not just a few days a week, claimed it was easy for them to

adjust to working at home again. For example, one telecommuter who previously owned a business in another state moved her office into her home when she realized she was spending more than half of her time out of the office seeing clients, and thus wasting money by renting office space. She has been sold on working at home ever since. She says she has a strong work ethic: she never had a self-discipline problem in her own business, and she does not now. She and a number of other people said that their selection as telecommuters was partly due to their previous experience telecommuting. It made managers more comfortable knowing they knew what to expect.

We were interested to know if previous experience working at home correlated with success in telecommuting. The comments of some of the people we interviewed notwithstanding, we found no quantitative relationship between success in telecommuting and previous experience. People with previous experience working at home were slightly (but not significantly) more likely to drop out and less likely to say that their experience was either more successful than or as successful as they expected.

INITIAL ATTITUDES ABOUT TELECOMMUTING

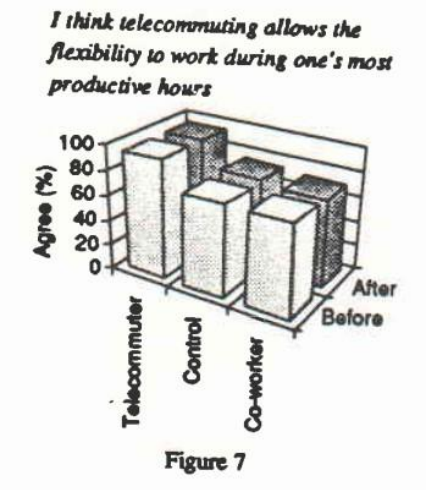


Figure 7

It is no surprise that telecommuters had strong positive attitudes about telecommuting before the project began. Since they were volunteers, they would be expected to have such attitudes. Comparisons of telecommuters' attitudes with others' attitudes about telecommuting confirm these expectations.

For instance, when asked if they agreed with the statement, "*I think telecommuting allows the flexibility to work during one's most productive hours,*" about two-thirds of the respondents in both surveys agreed. However, telecommuters were clearly the most likely to agree, and at an extremely high rate of 95 percent in the first survey. Controls (73 percent) and co-workers (73 percent) were significantly ($p<.01$) less likely to agree initially that telecommuting allows workers the flexibility to work during their most productive hours. Figure 7 shows the results.

As another example, respondents were asked whether or not they agreed with the statement, "*Telecommuting can improve my organization's ability to retain competent staff.*" Seventy-five percent of all respondents in the first survey agreed (see Figure 8). As anticipated, in the first survey telecommuters agreed at a

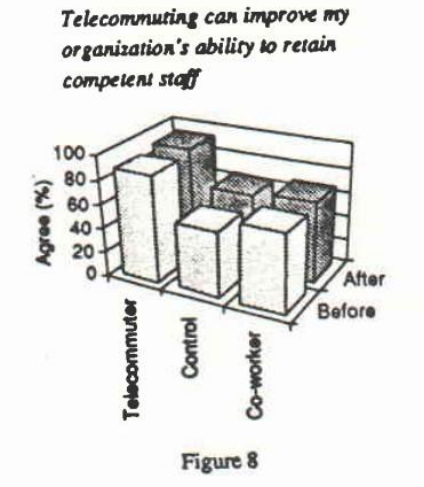


Figure 8

significantly ($p<.01$) higher percentage (88 percent) than either controls (56 percent) or co-workers (65 percent).

In another example, participants were asked the extent to which they agreed with the statement, "*I think most people would prefer to telecommute if they could.*" Forty-four percent of respondents in the first survey agreed with that statement. There was no significant difference among the roles. However, in the second survey, the percentage of telecommuters agreeing with this statement rose to 59 percent and the percentage of controls decreased to 40 percent, creating a significant ($p<.05$) difference between the roles (see Figure 9).

It is evident from all the data, both quantitative and qualitative, that telecommuters were very positive about telecommuting, compared with others. This is another important factor that should be taken into account when comparing the experience of telecommuters with others throughout this project.

SUMMARY

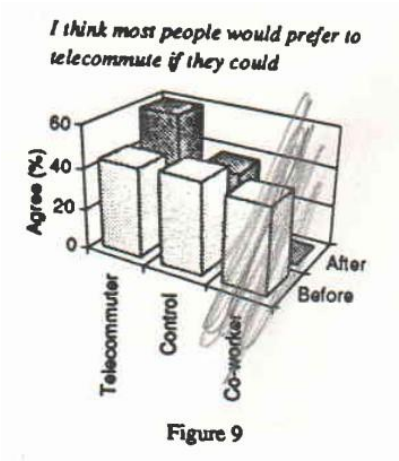


Figure 9

Telecommuters are demographically very similar to the research participants in the other roles. We were also successful in choosing controls whose jobs were similar to the telecommuters. However, it was very clear that telecommuters differed from both controls and co-workers in their initial job attitudes and their attitudes about telecommuting. It is important to continue to recognize that difference in the interpretation of the results of the demonstration.

CHAPTER 3
WHAT ARE THE ORGANIZATIONS LIKE?

One of the major opportunities this study affords is the ability to assess telecommuting as it manifests itself in a variety of organizations and job types. Our aim is to isolate the features that contribute to its perceived success. Much of the literature describes telecommuting as an activity that occurs without considering organizational context. In this chapter, we take a closer look at the contexts where telecommuting occurs.

While it is rarely precisely defined, telecommuting is often regarded as a "cutting edge" way to work - one which incorporates electronic communication and probably computers as central features. What we have found is that "telecommuting" is a rubric for a rich array of ways in which people and organizations struggle to redefine how they do their work, and how they coordinate their work with the rest of their lives. *We have discovered that the ways in which organizations responded to this research project tell us as much about how work is accomplished in contemporary America as it does about telecommuting itself.* This perspective helps us to speculate more productively about the future of telecommuting in American workplaces, and about where it might be most successful.

In this section we explore some of the different ways in which the participating organizations responded to and implemented telecommuting. We had hoped to be able to make some definitive statements about the kinds of organizational characteristics that either contribute to or detract from the telecommuting success of individuals. While we have found a number of factors to be important, we also have found that the differences among workgroups within the same organization are often as important as the differences between organizations.

CULTURE AND INNOVATION

The organizations in the Puget Sound Demonstration differ dramatically in a number of ways that were expected to impact the nature and degree of their participation in this project. Among the most important factors are the organization's size and purpose; whether they are public or private; the organizational culture, including the degree of centralization, supervisory philosophy, and commitment to orderly change; and the nature of their technologies.

Importance of organizational culture

How important are these factors likely to be to the experience of

telecommuting? As with so many central conclusions of our study, "it depends." Some people need very little in the way of moral or material support to work away from the office. But organizational culture is important to the ways in which telecommuting is implemented, and that, in turn, is important to how well less flexible people can work away from the office. Implementation strategies can mean the difference between official telecommuting programs, and individuals who just "disappear" to work at home whenever they need to. It is interesting that some of the people who have been "telecommuting" in some fashion for years begrudge formalizing it, and fear that making it official will take away the option of its flexibility. But if transportation and energy issues cause more people to consider telecommuting, organizations will want to be well-enough informed about it to avoid preventable miscommunications, scheduling problems, or personnel shortages.

Responses to innovation

"If there's any rule (here) it's that nothing will be the same tomorrow, and we have to be able to work effectively in that changing environment".
(Supervisor, private organization)

"There's nothing unique or innovative in how we do things (in this organization). We really can't get behind an innovation like this until the culture of the organization turns around... No one trusts anyone. The people at the top are against it."
(Supervisor, public organization)

Among the organizations volunteering to participate in this project, there are substantial differences in their experience with technical and organizational innovation. For some organizations, both public and private, change and experimentation is the norm, and this project was nearly indistinguishable from the ordinary course of organizational activity. For other organizations where organizational change along any dimension is slow and hesitant, this study was a unique push toward innovation.

At the extreme, some candidate organizations (more private than public) were so concerned about the implications of this change in the nature of work and supervision that they opted not to participate in the study. Thus, for some organizations, telecommuting via this project became the first attempt to experiment with long-standing supervisory styles. In others, we found work groups which were widely dispersed before the project began, with some participants already "supervising" people whom they rarely see in other states. A few work groups were already more "virtual" than "real," consisting of people who hardly ever met in one place.

The unit of analysis

In some ways, conceiving of organizations as single units for purposes of analysis is appropriate because policy is set "from the top" and this influences the ways in which individual employees responded to the study. But in other ways, the count of organizations is nearly arbitrary because of the array of job types within the organizations, for example, or the physical dispersion of the organization, or because of the autonomy granted to

individual managers or supervisors. Thus, within-organization variance was often as high as between-organization variance for valid reasons. We will address this point again in the discussion of individuals' job attitudes later in this section. For now, we turn our attention to the perspectives of the participating organizations - the views from the top.

MOTIVES FOR PARTICIPATING IN THE DEMONSTRATION

Organizations entered into the study for a variety of purposes. Their motives are worth exploring, as they have implications for the level of commitment they brought to their telecommuting programs. For some, it provided public evidence of responsible citizenship - a way to demonstrate their responsiveness to an identified community need. Some local government organizations, for example, felt it was important to participate in the study to provide an example of transportation innovation to the businesses in their jurisdictions. For them, the project emphasis on transportation and potential energy savings was attractive because it related to their mandate.

For others, telecommuting related to the nature of their business. Several companies, identified with the kinds of communications "services" that telecommuting might require, recognized the opportunity to learn more about this business niche.

Preparing for the future

One state organization had a commitment to realizing the effect telecommuting might have on air quality. Two other state organizations felt it was important to become familiar with telecommuting in the event they might be called upon to provide technical and administrative support for a future state program. Agencies whose mission did not bear on telecommuting itself seemed to be motivated by a desire to see if telecommuting might improve the functioning of their organizations through employee satisfaction and productivity.

Still other cooperating organizations are regarded as highly progressive, and have a history of experimenting with new work style options before they are generally adopted. One of our sites, for example, a branch of a national company that has long promoted flex time, "4/10s", and local day care, acknowledged the presence of a number of "guerrilla" telecommuters in their organization. Participants from this organization are among the handful who had already decided that telecommuting would work for them or would fit their style. They saw their participation in the study as a way to receive assistance in developing policies for their program, and to present a coherent argument to the corporate office stating the value of a telecommuting option.

Finally, there were a couple of organizations whose missions involved transportation demand management (TDM), and so they complied, but for other reasons the depth of their commitment was questionable. Recruiters at the beginning of the project perceived the participation of these organizations as politically motivated, and their commitment as only nominal.

Public versus private organizations in the demonstration

Profit-based organizations are less likely to commit to a project unless it has some benefit to the organization - either through savings, increased productivity, good publicity, or more long-term interests. Public organizations may be more apt to participate in a program solely for the reason that it may serve public needs, but they may also be concerned that the innovation not interfere with the proper functioning of the organization. There is an interesting and paradoxical point to be made here. While fewer private organizations were recruited for the study than public organizations, it may also be that those private organizations that chose to participate were better prepared and committed to implementing a program. Public organizations may have considered it their duty to participate in a program that may ultimately benefit the public, provided its implementation was not too disruptive; the private organizations were in it for their own reasons or they were not in it at all. As we will see, however, this did not result in complete unity and support for telecommuting in these organizations.

LIMITATIONS ON THE ABILITY TO GENERALIZE

It is important to remember that the organizations themselves are unrepresentative of organizations in the Puget Sound area in many ways, for some of the motivational reasons discussed above. The sample of participants included a high proportion of government organizations compared with private organizations. It was especially difficult to recruit organizations from the manufacturing and retail sectors. This may be have been due in large part to the perception that job types in these sectors do not lend themselves readily to telecommuting.

Time and sampling limitations

In addition, although this study was longer than most on this subject, one should remember that participating organizations were observed for less than two years, and these organizations were confronting other important issues at the same time that telecommuting was instituted. In a later section we will discuss the start up inertia that many telecommuters experienced, and the ways in which environmental factors inevitably impacted telecommuting.

It is hardly surprising that the cooperating organizations would be those for whom telecommuting may be particularly valuable, and

that organizations would choose employees who were the most interested and the most inclined to succeed at telecommuting. One must be aware that these facts may prohibit generalizing to all organizations when interpreting studies of telecommuting.

Many organizations were facing external pressures

In addition to the relatively long-term, "cultural" characteristics of these organizations, each faced a number of immediate concerns that influenced their participation. One, for example, was undergoing a public investigation, which meant that facets of their operation were being examined in minute detail. Others experienced shifts in upper management, which severely impacted their commitment to this project.

The staff has shrunk a lot in the last year, but the responsibilities (we are held accountable for) have not. That means (in our internal support group) that everyone has more support responsibilities, which requires their presence, and less opportunity for development work, which they can best do away (while telecommuting).

One characteristic that some of these organizations, whether public or private, progressive or cautious, had in common during this period was "downsizing," or responding to economic pressure by reducing their work force while attempting to retain the most competent workers and to squeeze as much productivity as possible out of those who remained. Thus, some organizations found themselves less able to implement telecommuting fully even though they viewed it as highly successful.

On the other hand, telecommuting was sometimes used as a valuable tool for recruiting or retaining competent workers. At least two organizations felt their ability to attract or retain a highly-valued employee by offering a telecommuting option was so significant that this single outcome more than demonstrated the worth of telecommuting. One Human Resources Director said that the level of detailed information we were seeking in the study was far beyond what they needed to justify the success of telecommuting. He said, *"We know this is working for us."* It is possible that this benefit to organizations would be less important in a different economic environment.

Organizations are always impacted in a variety of ways by the complex environment in which they operate. The salient point here is that when downsizing occurs, companies make vigorous attempts to retain the very best employees. This factor has had a substantial impact on how some organizations and individuals responded to this project and, as will be seen later, on what we were able to measure.

ORGANIZATIONAL SUPPORT FOR TELECOMMUTING

Organizational support has been considered critical for the successful implementation of telecommuting programs. However, the relative importance of different kinds of organizational support is unclear. Support can come from upper management, immediate supervisors, or simply be a part of the organizational "culture." In

this section, we discuss the extent and nature of organizational support among the participants in the Puget Sound Telecommuting Demonstration.

Survey data on upper management support

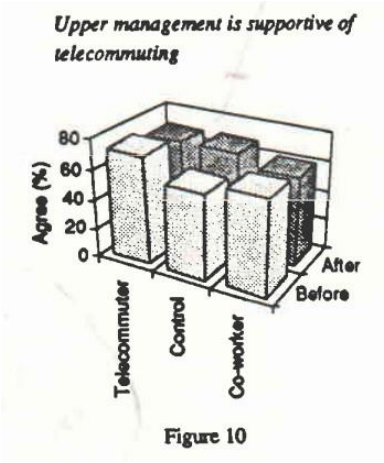


Figure 10

Since the ultimate decision to participate presumably rested with top management of the organization, we thought it would be reported that top management was at least somewhat supportive of the program. Participants' perceptions of upper management support, gathered from the initial surveys, confirm this assumption. Among telecommuters, the comparison group, and the co-workers, 67 percent of all respondents initially agreed with the statement *"Upper management is supportive of telecommuting."* At the end of the demonstration, 66 percent still agreed with the statement (see Figure 10). However, there was an interesting shift in opinions according to role. The percentage of telecommuters and co-workers who agreed with the statement fell slightly during the demonstration, but the percentage of controls agreeing with the statement increased. Supervisors agreed less with the statement at the end of the project. Initially, 82 percent of supervisors agreed with the statement. At the end, 73 percent agreed with it, a statistically significant reduction ($p<.05$). Even though most people still felt that their upper management was supportive of telecommuting at the end of the project, there was a tendency for those close to the project to agree less with the statement.

On the other hand, the controls shifted significantly ($p<.01$) from 57 percent agreeing to 70 percent agreeing. These results can be interpreted to mean that there was a tendency for upper management to voice support for telecommuting, but sometimes fail to provide the practical necessities to carry it out. Theoretically, controls were not as closely involved with telecommuting as the telecommuters and the co-workers, and so they might be more apt to take management's verbal support at face value. Telecommuters, co-workers, and supervisors may have expected more, and, failing to get more, may have concluded that management was not as supportive of telecommuting as it claimed. However, this tendency apparently applies only to a small portion of the sample. Even at the end of the project, the majority of all respondents agreed that their upper management was supportive of the concept.

Could the perceived support for telecommuting be related to perceptions about the organization's willingness to be innovative? Supervisors were asked whether or not they agreed with the statement "*My organization is reluctant to try out new things.*" There was a tendency for supervisors to disagree with this statement when they agreed that upper management supported

telecommuting. In the first administration of the questionnaire, the correlation between the two responses was -.33 ($p<.05$). In the second, it was -.25, in the right direction, but non-significant.

Differences among organization

Despite the overall perception of upper management support, the perceptions vary a great deal across organizations. Three organizations had too few participants for their frequencies to be meaningful. The remaining 18 can be categorized into four groups. Group A contains two organizations (one public, one private) whose percentages of agreement about upper management support are well above the average. Group B contains nine organizations (only one of them private) that cluster just above the average. Group C includes five organizations (three public, two private) which cluster just below the average. Group D contains two organizations (both public) that are well below the average.

Assuming that the participants' perceptions reflect something of reality, one thing is clear: the idea that private organizations may be more committed once they have decided to participate is not supported. Private organizations appear to be as divided as public ones. Otherwise, the general ranking of the organizations according to perceptions of upper management support coincides roughly with the initial assessments by WSEO recruiters of organizational support and commitment.

Recruiters' initial perceptions of organizational support

A few months into the project, the researchers asked the WSEO recruiters to recall their early impressions about the participant organizations. Their assessments of upper management support are fairly similar to the survey results, except in two cases (both private organizations, one in group B and one in group C). In these cases, the recruiters had considered top management quite enthusiastic and supportive, but participants rated top management much lower.

According to the WSEO recruiters' assessments, organizations had very different reasons for participating, and these reasons for participation reflected upper management support. One organization in group A is a local government organization whose motives for participating were to provide an example of transportation innovation, to get information about telecommuting, and to improve employee retention and morale. The other group A organization is a private company that saw the study as an opportunity to receive assistance in setting up a program. They also were easy to recruit and committed, and have relatively few levels of hierarchy, which made it easy to disseminate information about the program and to secure support.

In contrast, the two group D organizations are quite bureaucratic, and telecommuting was not well-promoted within the organizations. Both have missions that relate to the telecommuting demonstration, but seemed to have multiple and conflicting attitudes toward the project. For reasons related to their mission, they needed to be seen as contributing to the research; on the other hand, the organizations were generally conservative and not inclined toward innovation. Both were fairly difficult to recruit in the study, and their commitment was modest. In the estimation of the recruiters, both finally participated only because it was politically appropriate to do so. Judging from the survey responses about upper management support, employees of these organizations had the same perception.

IMPLEMENTATION OF TELECOMMUTING

Upper management support is a complex issue. In some organizations where upper management claimed to be very supportive, the support did not translate into a real effort to make telecommuting work. Interviews with participants uncovered many comments about the consequences of management's inability or unwillingness to follow through with practical support.

Distinguishing between nominal and practical support

For example, a co-worker at a large public organization said she thought upper management in the organization was, for the most part, supportive of telecommuting, but that their support did not translate into money for equipment. The co-worker's supervisor, a telecommuter herself, felt that a lack of overt support from her superiors had interfered with the success of the program in her group. She said that many of the people in her office who were good candidates for telecommuting were unable to telecommute for lack of money for additional phone lines. As a result, this group held some resentment against the few in the office who were able to telecommute. They were much less tolerant of miscommunications or increased workloads than they might otherwise have been. A couple of them even gradually concluded that telecommuting is a bad idea, even though in the beginning they wanted to do it. However, as discussed in Chapter 7, this did not seem to be a widespread phenomenon.

A woman who had signed up to telecommute but dropped out of the program before she started telecommuting summed up her reason not participating: "*Lack of support from management.... I was willing to purchase the equipment myself.... They weren't willing to work with me to make it work.*"

When asked whether she felt her organization was supportive of telecommuting, a telecommuter at another large public organization, replied with a resounding "sort of." She said there

was symbolic support from the chief executive, and that was important because it let everyone know that telecommuting was supported by official policy. But symbolic support failed to translate into practical support down through the ranks. "*It comes down to the individual division chief to make it happen. My manager supports it; there's no problem with trust. But that's not the case with the next level up. They want to be able to find you at your desk. At both levels, priorities are organized by urgent, emergency responses.*"

Another telecommuter said she knew upper management supported telecommuting and thought that her immediate supervisor did too. They went through the official training, and then the supervisor asked her to write a two-page summary of how she intended to go about telecommuting. "*A lot of the stuff we talked about in training... he really wanted in writing.*" Her supervisor then stalled doing anything about her proposal. She said it seemed that he felt telecommuting was a favor to her rather than a benefit to the organization. She dropped out of the program because she did not want to be constantly defending herself all year.

Another person who dropped out before the project began said, "*I think my bosses got cold feet at the last minute and just couldn't handle it, that I might not be at their beck and call every second.*"

Another telecommuter, who had been forced by increased schedule demands to cut back telecommuting and who did not expect to be able to continue, commented in his second survey on his organization's attitude: "*I am very disappointed that I am unable to work regularly at home where I feel I am more creative and more productive. I'm somewhat resentful of the lack of support for telecommuting.... I've often felt guilty when trying to reschedule meetings to allow me to telecommute.... We are not terribly supportive of innovation.*"

Many of the above statements attest to the need for more than just nominal support for telecommuting. Practical, active support is needed, whether it is money for equipment or just a willingness to reschedule meetings.

Internal education

Promotion is essential both to get people interested in telecommuting and also to educate people in the organization about what telecommuting is, and what the organization's policies are. This was more difficult in some organizations than in others. Good coordination and promotion of the program was especially important in more bureaucratic and hierarchical organizations. In a few small, not very hierarchical organizations, it was easy to

inform people about the program. The more people knew, the more they could discuss the option with supervisors and apply to the program if they had the support. Other organizations kept the program quiet - either deliberately, so they could limit the number of applicants, or simply because the structure of the organization made it extremely difficult to disseminate information. Sometimes in very large and diverse organizations, policy was not set from the top at all, and as a result there was a great deal of variability within the organization regarding how much people knew about the program since it depended on what specific department managers thought about telecommuting.

Participant selection and training

In organizations that deliberately tried to limit participation, many participants reported that other people resented not hearing about the program until it was underway. In one very large organization, the process of selecting participants was very slow and gradual, and three different training sessions were held. The decision was left up to individual managers to select participants. Several people said they had not heard about the program - even though some people were already telecommuting - until their supervisors asked them if they wanted to try it. Two of them called the research team to find out who the coordinator was so they could sign up for training. Later on, another telecommuter asked a researcher whether telecommuting would continue in that organization; the telecommuter was completely in the dark about her organization's policies and motives. In another public organization, more people applied than were allowed to telecommute. Staff members at that organization said this indicated a lack of upper management support, and caused some lasting resentment toward the program.

A different twist on the same problem occurred in other organizations. Sometimes, once upper management approved of telecommuting, anyone who wished to apply was permitted to as long as he had supervisor approval. In many cases, supervisor approval was not as informed as it could have been, which caused some communication problems later on. In other cases, supervisors and telecommuters went through training, agreed on some standards, and knew what to expect and what to be watchful of, while managers above the level of supervisor remained uninformed about telecommuting.

In one organization, a telecommuter commented on her second survey that her relationship with her supervisor's supervisor had worsened because he did not approve of telecommuting. She recommended that other levels of management, not just upper management, be included in the initial presentation and orientations, so they understand what the program is and what the

organization's policies are. It is possible that without such knowledge, some managers see the program as a threat to their authority, or to their ability to control what goes on under their supervision. We observed that this was less of a problem in low-hierarchy organizations, which could openly promote the program with much less chance that people in the middle would not know what was going on.

JOB ATTITUDES IN DIFFERENT ORGANIZATIONS

One of the unique opportunities in the Puget Sound Telecommuting Demonstration is the existence of comparable data across a large number of heterogeneous organizations. What influence do the factors we have discussed so far - motives for trying telecommuting, management support, quality of program implementation, and external factors like down-sizing - have on individual telecommuters' attitudes? It is instructive to assess the relative changes in workers' attitudes toward their jobs among organizations to see if some organizational characteristics influence the effectiveness of telecommuting in improving job attitudes.

Changes in telecommuter job attitudes

One-way analyses of variance was used to see if there were any significant differences among organizations. Changes in telecommuter responses to all nine scales were tested for significant organizational effects. For only one variable (IDECIDE, a measure of autonomy), was there a significant difference among organizations. For all of the other variables, the variations **within** organizations were larger than the variations **between** organizations.

Based on a significant difference in the employees' degree of autonomy in different organizations, respondents were divided into organizations where their autonomy had decreased and organizations in which it had increased. **All eight organizations in which telecommuters had experienced an increase in autonomy were public organizations**. Furthermore, in organizations where increased autonomy was reported, there was a significant tendency for respondents in all roles to **disagree** that upper management was supportive of telecommuting. There was a slight, but insignificant, tendency for people with higher feeling of autonomy to agree less that upper management was supportive of telecommuting. Of those respondents above the median on the IDECIDE (feeling autonomy in doing the job) scale, 61 percent agree that upper management was supportive, compared with 69 percent of those below the median (p=.18).

The likely explanation for these findings is that telecommuters who actually **experience** more autonomy when they work at home may make management personnel nervous. This effect could be especially strong in public organizations, where managers may feel a strong need to be accountable to the public for their employees' work habits. In interviews, some public agency managers expressed a fear of negative publicity related to allowing their employees to work at home.

Non-temporal differences in telecommuter job attitudes

Even though few differences in **changes** in job attitudes were found among organizations, there were differences in **absolute** measures of job attitudes. When all respondents were considered, there were significant differences in their ratings of job stress and opportunity for promotion. The highest stress organizations tended to be private, and the places with least opportunity for promotion tended to be public. These two variables had no significant interrelationship with supervisor or upper management support of telecommuting.

An organization's rating on opportunity for promotion was not found to relate significantly to any other job attitude variable. However, a statistically significant finding distinguished organizations that were rated low or high regarding stress. Not surprisingly, in low stress organizations, respondents reported significantly better satisfaction with home and social life than in organizations rated high in stress.

An important finding was that employees in organizations that were initially rated as high stress organizations tended to increase their stress ratings after one year to a greater extent than did the initially low stress organizations. That high stress organizations tended to be private might be explained in part by the down-sizing trend discussed earlier.

ORGANIZATIONAL SUPPORT AFTER THE DEMONSTRATION: WILL TELECOMMUTING CONTINUE ON AN OFFICIAL BASIS?

It will take some time to know for certain how the organizations themselves evaluated this experiment. The opinions of individual telecommuters, co-workers and supervisors tell us how well individuals in different roles responded to telecommuting. But information we have on whether organizations will decide to maintain the program varies according to whom one talks. According to a survey of telecommuting coordinators at each of the agencies conducted by the WSEO, about 90 percent of the organizations will continue telecommuting in some form. What the form is varies widely among organizations. We end this section with some of the opinions we heard from various organizational members, and comments about whether we find these outcomes surprising in the light of these organizations' earlier

responses to and implementation of telecommuting.

One large private organization apparently had some complaints from supervisors along the way about telecommuting, but the two project participants who revealed this said they suspected these complaints were about unofficial telecommuters. Many people jumped on the bandwagon after the program began, never went through the training, and perhaps were not as rigorous about communicating with their supervisors as those who had been trained. Nevertheless, the complaints have resulted in a more cautious attitude at the top. The organization will not recommend that telecommuting be a major part of their TDM strategy. This rumor is not too surprising. The organization is "cutting edge" in many ways, but fairly bureaucratic as well.

One large public organization, through close monitoring of their program, has managed to get a good idea of when telecommuting works for them and when it doesn't. Among the real gains attributed to telecommuting is that they have retained a highly valued employee who lives in another state. As a result, the local office may be able to convince the people at headquarters that it is a good program worth keeping. The coordinator said she was surprised when she heard that the agency was leaning toward accepting telecommuting, but she attributed the change of heart to the employee recommendations made during meetings with people from headquarters. This outcome is quite surprising, since halfway through the project the coordinator said, "*Something must be done to diminish managers' anxieties*" before telecommuting will really be accepted.

A large private organization is also working on strategies to convince their central office that telecommuting is a good idea. It is not an easy job, because as one supervisor said early on, *"we're a very conservative industry."* In fact, about midway through the project, the common feeling of supervisors at this and a similar private organization seemed to be that the best they could do was unofficial local endorsement of telecommuting.

One private organization has already succeeded in convincing its corporate headquarters that telecommuting is a good idea. They are retaining the policy they had clearly set out during the pilot, that no one could telecommute who had not been through training and signed a formal agreement. They have been fully committed from the beginning and implemented their program well.

One public organization has been very happy with the demonstration that was originally conducted in a few select

departments. It has decided to expand it to an organization-wide program.

Another public organization has had a very high drop out rate, and has a lot of resistance to telecommuting among management, but the coordinator is pushing hard to keep telecommuting a visible option, and an important part of its TDM strategy. The coordinator feels that having telecommuting as part of their trip reduction strategy will force them to work out the kinks in how telecommuting has been practiced in the organization.

Two state organizations, according to coordinators and supervisors, are taking a "wait-and-see" attitude toward telecommuting. They have not made any move to decide about the status of telecommuting since the end of the official project, and are supposedly waiting for the research results to decide whether or not telecommuting is a good idea for them. In the meantime, several of the telecommuters are continuing to telecommute on their own.

SUMMARY

A wide range of people, jobs and organizations are likely to participate in telecommuting, and many of these are represented in this project. It is apparent from our research that some people's jobs and personalities are such that they can telecommute successfully in almost any organizational environment. For other telecommuters in our sample, a considerable degree of organizational support is required. To increase the likelihood of success, this support must be evident in a commitment to detailed, practical implementation of a telecommuting program. Our observations suggest that organizations which have a high degree of upper management support for telecommuting, and which implement their programs in a coordinated fashion, tend to be more successful than those which evidence only partial or nominal support.

It appears that many different kinds of organizations are capable of providing effective support for telecommuting. The degree of telecommuting success was not correlated in any obvious way with organizational type in our project. Distinctions such as public versus private, and large versus small, for example, were not very important in predicting the overall success of participating organizations. Organizations often have many discrete units, and we found that variability within organizations was often as great as variability between organizations in our study.

It is also worth noting that despite the clear advantage to telecommuting when upper management is supportive, and when

innovation in general in encouraged, even these were not absolute requirements for success. In one very cautious organization, for example, upper management had little interest in telecommuting. In the absence of this support, participating work groups managed on their own to coordinate and implement a successful telecommuting pilot, and it worked well enough to gain the endorsement of upper management.

In summary, the more supportive management is of telecommuting at every stage, from training and initial implementation to on-going technical and supervisory assistance, the more successful a telecommuting project is likely to be. But "guerilla" telecommuters, who began before this project was undertaken, were evident in most organizations, and our experience suggests that if some individuals are determined enough to realize the advantages of telecommuting, even in a relatively unsupportive environment, telecommuting will sometimes succeed on its own.

CHAPTER 4
WHAT ARE THE VARIETIES OF PRACTICES PEOPLE USE TO TELECOMMUTE?

In the introduction to the final questionnaire, we included the following statement:

> You are now among the handful of people who have had significant experience telecommuting, and we are interested in learning all we can about important issues which have arisen during this project.

Questionnaire responses and interviews provided detailed information about specific things that workers did to make telecommuting work. The categories of experiences include issues about equipment and home offices, working at the telework center, frequency of telecommuting, and supervisory issues.

EQUIPMENT

Many people believe that the availability of high-powered equipment is prerequisite to telecommuting. Many project participants anticipated that operating a computer, modem, or particular type of software at home would be crucial to successful telecommuting. The data, however, dispute these ideas and minimize the importance of many of the concerns.

Examples of equipment use

There is a lot of variability among telecommuters in the ways they coped with equipment and equipment needs. One telecommuter represents an extreme example of our initial expectations. Her main office is in Olympia, she lives in another city, and she is working on a special project in a third city. She works at home on Mondays and Fridays to avoid the worst traffic. She has identical equipment in all three of her offices, uses an electronic mail system to let everyone know where she will be each day, has voice mail at both offices, and always makes sure to leave the number where she can be reached. Her office also uses teleconferencing to include her in meetings. Even with all this effort to be available, she expects there will be "crunch times" in the future when she will have to stop telecommuting and be in the office. Under current circumstances, however, she says it makes no difference to her Olympia co-workers whether she is at home or in her other office because the system she has devised suits everyone's needs.

Most of the people who talked to us neither had the funds nor felt the need to use high technology to such an extent. More common scenarios involved the question of whether to purchase a computer at all. One telecommuter's dilemma was not knowing whether

telecommuting would continue; she wanted to buy a computer for working at home. She said she did not really want to make the investment if she would not be allowed to continue telecommuting because she did not envision using a computer much except for work. Nevertheless, she felt she was wasting time doing things by hand at home and then entering them on the computer on the next day in the office. She was still more productive, but less than she could have been.

In another department of the same organization, two telecommuters said they were going out to shop for laptops after having lunch with the interviewer. Their department was setting aside the money for their telecommuters to have equipment they could check out if they needed it at home. As it turned out, one said in a later interview that she did not think she would continue to telecommute because the hassles of lugging the laptop home outweighed the convenience of telecommuting.

Data on obtaining and using equipment

Telecommuters, controls, co-workers, and supervisors were asked several questions in the surveys about equipment issues. In this section, we review their responses.

Employees

In the second survey, telecommuters were asked "*How was your equipment (computers, software, telephones) obtained?*" As shown in Figure 11, thirty percent of the telecommuters used equipment that was specially purchased by their companies for them. Thirty-nine percent used equipment they already owned, 38 percent used company equipment they identified as "surplus," and 13 percent did not use any special equipment at all. Percentages total more than 100 because respondents could give more than one answer. In another question, telecommuters were asked if they installed additional phone lines. Twenty-five percent of the sample said they did install additional phone lines. Ninety percent of those said that the cost of the additional phone lines was paid for by the employer.

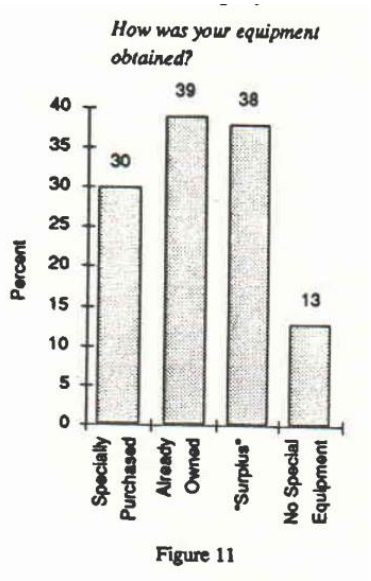


Figure 11

When asked "*In general, did you have any problems using the equipment?"* 86 percent of the telecommuters said no. Of the 16 people who reported problems using equipment, 3 said it was hard to get help when their equipment was not working, 3 said it was hard to get help with software, and 11 said there were other problems (see Figure 12). Most of the other problems were related to having equipment or software that was old or not compatible with that back at the office.

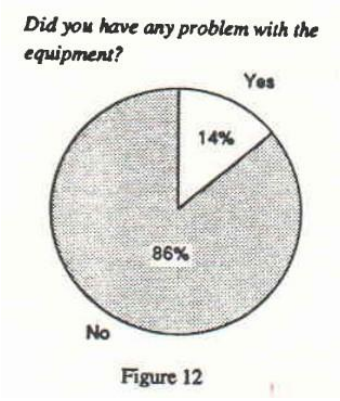


Figure 12

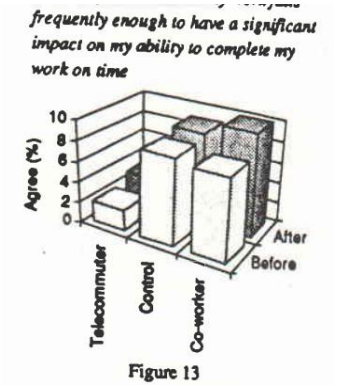


Figure 13

When asked whether or not they agreed with the statement "*The equipment I use in my work fails frequently enough to have a significant impact on my ability to complete my work on time.*" only a handful of respondents overall - 5 percent in the first survey, 6 percent in the second survey - agreed. However, as can be seen in Figure 13, the rate of disagreement is significantly ($p<.05$) higher for telecommuters (85 percent before, 87 percent after) than either controls (77 percent before, 68 percent after) or co-workers (71 percent before, 79 percent after). This difference appears in both public and private organizations, and suggests some interesting possibilities about the kinds of work telecommuters do or the kinds of equipment they have. It could be that, regardless of whether they work for public or private organizations, telecommuters are less frequent users of special equipment than others in their organizations. In fact, since there are more support jobs among controls and co-workers than among telecommuters, it could be that broken-down copiers are the culprits being referred to by those that have trouble with equipment. Unfortunately, the question on the survey did not ask specifically what kind of equipment was involved.

Supervisors tended to express more concern about equipment issues after a year's experience with telecommuting than their employees did. The shirts in agreement to the statements in Table 4 indicate that equipment issues hd been troublesome for them. However, they do not seem to worry that equipment problems affect their employee's ability to work.

Table 4. Supervisors' Attitudes about Telecommuting Equipment

Statement	Final % agreement			% Changing agreement		
	Agree	Neutral	Disagree	Incr.	Decr.	Signif.
"I'm worried about theft and damage to the organization's computer equipment in workers' homes"	3	19	78	34	12	$p<.01$
"Operating the equipment at home or at the telework center is difficult"	3	14	83	34	9	$p<.01$
"Equipment failures have a significant impact on my workers' ability to complete their work on time"	36	11	53	19	42	$p<.01$

Summary

Equipment issues were important to only a minority of the telecommuters in this demonstration. There was a wide variety of problems among this minority. For instance, one telecommuter

from a private organization explained, *"I didn't have a place to keep the equipment set up, so I had to do it every time I telecommuted, which was a hassle."* A small proportion (17 percent) of the dropouts explained their dropping out resulted from the inability to obtain proper equipment. A few other telecommuters relied heavily on various kinds of equipment to maintain good communications with their office. However, the majority of the people in the study either did not use any special equipment, or experienced no problems in obtaining it or using it.

SHARING WORKSPACE

One of the advantages of telecommuting is that in offices where space is in short supply, having one or more workers out of the office once a week enables other workers to use their workspace. It was unclear how receptive people would be to sharing workspace.

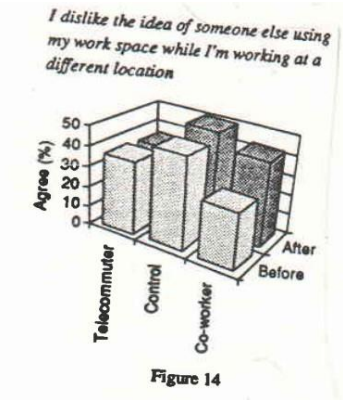


Figure 14

In order to measure workers' receptivity to the idea of sharing work spaces, respondents were asked whether or not they agreed with the statement "*I dislike the idea of someone else using my workspace while I'm working at a different location.*" As shown in Figure 14, overall, less than half (36 percent) of the respondents in the first survey reported that they disliked someone else using their workspace. About 40 percent of all the respondents in the second survey said that they disliked sharing their workspace. Analysis by role shows controls as the group most resistant to sharing their workspace (47 percent before and 50 percent after). Initially co-workers were less opposed to sharing workspace; 29 percent said that they disliked sharing space. However, the rate of agreement increased to 43 percent in the second survey. About one-third of the telecommuters (36 percent before, 34 percent after) in both sets of the surveys agreed that they disliked sharing their space.

It is interesting that telecommuters were the least opposed to having someone else use their workspace. This is important because they are the most likely to share their space. It was unclear the extent to which co-workers and controls shared their workspace with other workers. A possible explanation could be that telecommuters expected others to use their space and were more prepared to share and, therefore, did not mind it as much.

HOME OFFICES

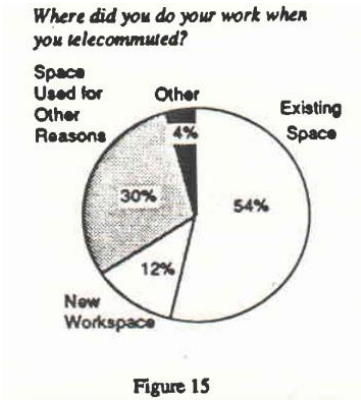


Figure 15

Setting up a good place to work at home is thought to be a very important part of successful telecommuting. It is important to note that the telecommuters in this project seemed to have little problem with arranging space to work at home. The second survey asked telecommuters "*Where did you do your work when you telecommuted?*" Results are shown in Figure 15. A majority of telecommuters (54 percent) reported that they used an existing workspace at home, and 12 percent said they had created a new workspace for working at home. A sizable number (30 percent) used space that was primarily used for other purposes. Finding space to work at home was seldom mentioned by telecommuters as an important barrier to telecommuting.

TELEWORK CENTER

Because at the time of the study there were only a few telework centers in operation anywhere in the country, and as far as we know, none in the Puget Sound area, it was felt that the general functioning of the WSEO demonstration telework center should be examined as closely as possible, given funding and other constraints. The main objective, therefore, was to provide a fairly detailed account of how and how well the telework center functioned.

Those using the telework center were asked to complete the same survey forms filled out by all others in the demonstration project. To the extent feasible, given the small size of the sample, their responses will be summarized and discussed elsewhere in this report. From the outset, however, it was expected that other methods should be used in the effort to understand how, and how well, this facility "worked."

The principal additional method utilized was "participant observation." This method, which yields far more qualitative than quantitative data, is widely used in the social sciences. Although relatively demanding in terms of field time, there are two reasons why data from participant observation studies are worth the effort. First, the data are derived from and pertain to relatively natural or "unguarded" events in the social context of interest (in this instance, the telework center). Second, the topical range of data gathered tends to be far less constrained by prior assumptions, as to what is relevant and important, than in questionnaire-based studies which, necessarily, must specify in advance the areas to be explored.

Since this facility in the overall demonstration project was so important, and since so little is known about such work centers, the

evaluation plan called for the allocation of relatively extensive efforts in gathering qualitative data on the telework center. Accordingly, on approximately 40 days between August 12, 1991, and January 24, 1992, and for a total of at least 174 hours (an average of about 4.3 hours per day), one researcher worked as a participant-observer at the telework center. A complete description of the ethnographic study at the telework center can be found in Appendix B.

Given the facts that we had a limited number of telework center users and that there was only one telework center, the conclusions based on our observations of the facility should be qualified. Of the limitations, the most significant one is that the study is based on the opinions and experiences of those who were able to use the telework center; the views of those unable to use the telework center are, for the most part, unavailable.

On the basis of the qualitative data available, however, the following 12 points can be noted:

1. Users of the WSEO telework center said they significantly reduced their commute time and distance. This was perhaps the most significant perceived benefit of using the telework center. The positive impact of this change on health, family relationships, and general outlook were strongly noted by all telework center users.

2. Users of the telework center felt, subjectively but with great conviction, that their productivity increased when they used the telework center. Most users said this increase was due to "fewer interruptions". This was perhaps the second most important benefit of using the telework center.

3. The availability of an expert technical support person was seen as vital by telework center users. They relied extensively on that person to get their computers up and running and then to keep them running.

4. Users of the telework center felt the workspaces at the telework center were, in several ways, better than those at their regular offices and that this contributed significantly to their satisfaction with the telework center.

5. The telework center functioned smoothly, on both technical and social, or interpersonal, levels.

6. Usage levels were very low by almost any measure; a few people used the telework center extensively, most used it irregularly. Some work spaces were almost never used.

7. Usage was most frequently disrupted by the need for users to attend meetings and otherwise be available at the user's regular workplace.

8. Although telework center users needed and often used the LAN, the fax machine, and other similar pieces of office equipment, the most vital items seemed to be the telephone and computer; few if any used modems.

9. Although telework center users did use the conference room and lunchroom once in awhile, these spaces were more significantly under-utilized than the individual work stations.

10. Security needs, apparently, were adequately handled. The problem of security was never raised by a telework center user during the study.

11. The modern building and spacious facilities were much appreciated by telework center users.

12. The location of the building may have been an impediment for at least some potential telework center users. It was not located conveniently to bus lines. Although it was near a major transit center, the walk from the center proved to be too arduous for people to use it regularly.

In general, the users of the telework center were very happy for the opportunity to work there. They did not, in general, feel that working at home was a good option for them. This supports the observation that it is important to offer a variety of settings for telecommuting. A telework center is one of those settings.

PATTERNS OF TELECOMMUTING

The aim in this demonstration was to study a variety of telecommuter types. We hoped that some of the telecommuters would be able to work at home most of the time and some considerably less. We were able to achieve such a variety; however, the majority of the telecommuters worked at home one day a week or less. We were also interested in the variability of telecommuting, and how telecommuting schedules interacted with other types of flexible job arrangements. This section covers these issues.

Telecommuting frequency

We asked telecommuters "*Throughout the telecommuting project, how often did you work at home rather than go to the main office?*" Table 5 shows the wide distribution of responses. The median response was once per week. However, some telecommuted virtually every day and some stayed at home less

than once per month.

Table 5. Frequency of Telecommuting

FREQUENCY	%
4-5 days/week	4
2-3 days/week	17
about once/week	48
less than once/week	16
once/month or less	12
varies	3

We were also interested in how regularly telecommuters were able to work at home. We asked two relevant questions: "*Did you have to cut back on the frequency of your telecommuting during the last year?*" and "*Did you have to stop telecommuting for more than a week during the year?*" More than half answered affirmatively to each of the questions. Fifty-two percent said they had to cut back on their telecommuting frequency during the year, and 71 percent said they had to stop telecommuting for more than a week during the year. It appears likely that many of this latter group were including vacations, so it is unknown how many had to stop for extended periods for other reasons.

Combining the results of the questions concerning frequency of telecommuting and whether or not the telecommuters had to cut back significantly during the year, we found that about half of the telecommuters were able to telecommute at least once a week without having to cut back significantly during the year. It is important to realize that only about half of the telecommuters were able to work at home on a fairly regular basis. It is also important to recognize that people who did not telecommute regularly were still very favorable toward telecommuting and wished that they could telecommute more.

In general, when people had to cut back on telecommuting frequency, it was because they were needed in the office or were perceived to be needed in the office. For instance, at one organization, two telecommuters found themselves in the position of "acting supervisor" as often as four days a week. These telecommuters did not seem resentful at losing their telecommute days when they performed this function.

In this study, we asked only general questions about telecommuting schedules. In future telecommuting research, it would be advisable to obtain more detailed information about

telecommuting schedules and what determines deviations from expectations.

Telecommuting schedules

Telecommuters tended to work on the same schedule each week. Only 22 percent said that their weekly schedule varied. The most frequent telecommuting days were Wednesday and Thursday, with Friday and Tuesday following closely behind. Significantly fewer worked at home on Monday. Only a few telecommuters said they worked at home on the weekends in place of office work.

We did not ask specific questions about the time of day that people worked at home. However, some anecdotal information was picked up in interviews and informal discussions. One woman said she works best right when she gets out of bed, so she would wake up at 5:30 or 6:00 and go straight across the hall to the spare bedroom where she works. Sometimes she would work for hours before getting around to morning rituals like eating breakfast, brushing teeth, and dressing.

Another telecommuter said she always had to have her coffee and shower first, so she started working at her normal time of 8:30. This woman has a baby, and says a lot of people assume the baby stays home with her on her telecommute day. *"That's not how it works. He goes to daycare like always."* Telecommuting helped her reduce her stress by allowing her one day where she does not have to get herself and her son *"out the door by 7:15."* Her husband takes the child to daycare on her telecommute day.

Both of these telecommuters said they gave their receptionists explicit instructions on what to tell people who call them on telecommute days -*"She's working out of the office today."* One says it is important to convince people in the office that she is working when she was at home, even though she supervises most of them. She sends E-mail early in the morning so they will know how early she starts working.

Getting started

Like many other telecommuters, both of these women mentioned that it took them a while to determine what they needed to bring home. Both started by taking much more than they needed, but have managed to trim down to bare essentials. One said if she needs something she does not have, she just calls the receptionist and asks for the information. The other says she got a modem hookup that allows her electronic access to all the information she used to have to haul home in a suitcase.

Conjunction with other flexible arrangements

For many organizations, telecommuting is just one of many flexible working arrangements. While we did not ask for

information about other types of flexible working arrangements specifically on the questionnaire, we have substantial anecdotal evidence that there were quite a number of people in the study who had fairly flexible job arrangements in their organizations. Many people were on 4-10s (4 days a week at 10 hours a day). At least two high level administrators worked only 32 hours a week. Several of the telecommuters were half-time employees. Some people who already had flexible arrangements were not allowed by their organization or supervisor to telecommute, but a number of others did telecommute. One telecommuter was in a half-time, job-share situation. Telecommuters who already had flexible situations may have experienced more resentment than usually experienced in some cases. Others seemed to experience less resentment because their co-workers already expected them to be away a lot.

Communicating with the office

Some telecommuters rely on electronic mail to remind people in their office that they will be telecommuting, and provide their home phone number to them. Many telecommuters also claim that they call in to get their phone messages, either to their voice mail system or to the receptionist, and that they try to return calls the same day. At least two organizations acquired a voice mail system during the course of the project. This acquisition was not due to telecommuting necessarily, but certainly helped solve communication problems between telecommuters and the office, in some cases. In at least three cases, the installation of voice mail helped ease tension between telecommuters and co-workers that was caused by co-workers having to take too many messages. At one luncheon, people were asked whether they felt this option of communicating by voice mail might cut down on informal contact and the accompanying social niceties. Might that, in turn, have a detrimental effect on the social cohesion of the office? Most thought not. One woman said she never tries to handle a delicate situation, such as asking for a favor, over the phone. All the things that require face-to-face communication are still done face-to-face.

SUPERVISION

There was a series of questions that asked respondents about their supervisors. The first survey assesses how workers interact and relate to their supervisors, in general. The second survey shows how the interaction between workers and their supervisors changed over the year, and provides insight into how telecommuting has been instrumental in those changes.

Supervisor feedback

Sixty-five percent of the respondents in the first survey, and 61 percent of the respondents in the second survey agreed with the

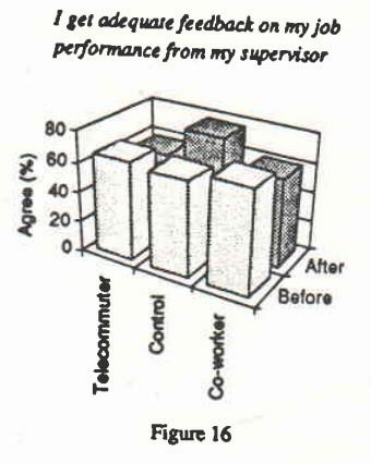


Figure 16

statement "*I get adequate feedback on my job performance from my supervisor.*" See Figure 16 for the breakdown by role. Telecommuters (65 percent), controls (62 percent), and co-workers (69 percent) in the first survey reported similar rates of agreement. Interestingly, while telecommuters (57 percent) and co-workers (60 percent) reported a decrease in agreement in the second survey, controls (76 percent) were more likely in the second survey to say that they got adequate feedback from their supervisors. Relative to controls, the telecommuters reported a decrease in agreement with this statement that approaches statistical significance (p=.09). There appears to be a slight tendency for fewer telecommuters and co-workers to feel they got adequate feedback from their supervisors at the year's end than in the beginning of the demonstration.

Supervisor demands

Respondents were also asked whether or not they agreed with the statement "*My supervisor demands too much of me.*" As shown in Figure 17, overall, there was very low agreement - 8 percent in the first survey and 10 percent in the second survey. The first survey revealed little difference among the groups - telecommuters (7 percent), controls (7 percent), and co-workers (10 percent). None of the changes over time were significant.

Supervisor support for telecommuting

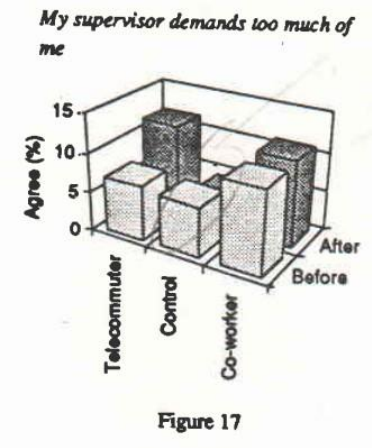


Figure 17

In both the first and the second survey, 77 percent of the respondents agreed with the statement "*My immediate supervisor is supportive of telecommuting.*" (see Figure 18) Each role reported only slight percentage differences between the first and second survey, with telecommuters being the most likely group to agree (89 percent before, 90 percent after), co-workers second (79 percent before, 75 percent after), and controls the least likely to agree (59 percent before, 61 percent after). The difference between telecommuters and controls is significant (p<.01) for both surveys.

Even though there were only small changes in the percentage of telecommuters who agreed that their supervisors were supportive of telecommuting, further analysis shows that more telecommuters reduced their agreement (30 percent) than increased it (16 percent). This difference is accounted for primarily by a shift from "strongly agree" to "agree." Even though the majority of the telecommuters anticipated and received support from their immediate supervisors, there is evidence that some telecommuters expected more support than they received.

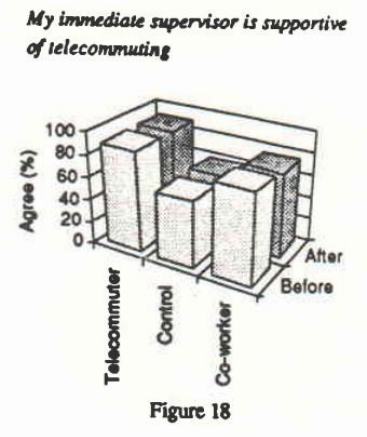


Figure 18

Supervisors themselves indicate support for telecommuting. However, the supervisors in the demonstration almost certainly differ from other supervisors in the organizations involved. An unwilling supervisor is unlikely to agree to supervise a telecommuter. For the most part, supervisors said they were able to choose who telecommuted. Seventy-four percent in the first survey, and 78 percent in the second survey agreed with the statement "*I had sufficient influence on who was chosen to telecommute.*" Only 11 percent in the first survey and 12 percent in the second survey disagreed with this statement.

The vast majority of supervisors were interested in seeing telecommuting continue after the year-long demonstration -- 55 percent said they were "very interested" and 29 percent said they were "interested." They endorsed statements that were positive about telecommuting or disagreed with ones that indicated problems, such as the following:

- *"Workers in our organization are more self-reliant because some are telecommuting"* (only 9 percent disagreed)
- *"I worry that telecommuters may leave the firm for a position elsewhere"* (88 percent disagreed)
- *"Telecommuters were never around when I needed them"* (66 percent disagreed, only 13 percent agreed)
- *"It took a lot of my time to supervise a telecommuter"* (86 percent disagreed)
- *"Telecommuting enhanced the job satisfaction of the telecommuters I supervised"* (89 percent agreed)

On the other hand, there were some worrisome responses that had to do with productivity and internal communication. We asked several questions only on the second survey. Consider the following results from those questions:

- Forty-one percent of the supervisors agreed that *"Non-telecommuters were envious of their co-workers who telecommuted."* Thirty-six percent disagreed.
- Forty-five percent disagreed with the statement that *"Non-telecommuters are able to work more efficiently because others are telecommuting."* Only 9 percent agreed.

- Only 33 percent agreed that *"Workers in our organization are more self-reliant because some are telecommuting."* Nine percent disagreed.

In addition, we asked questions on both surveys concerning supervisors' perceptions of support for telecommuting. As can be seen in Table 6, even though supervisors generally agreed that upper management and they themselves supported telecommuting, the strength of their agreement had declined over the course of the year.

Table 6. Supervisor Perception of Support for Telecommuting

	Final % agreement			% Changing agreement		
Statement	Agree	Neutral	Disagree	Incr.	Decr.	Signif.
Upper management is supportive of telecommuting"	74	22	4	15	36	p<.01
"I am supportive of my employees telecommuting"	88	11	1	11	33	p<.1

Communication with supervisor: frequency and type

The question of close supervision and worker autonomy were important for telecommuting because researchers expected that independence would be an important characteristic of a successful telecommuter. The survey asked participants a series of questions about initiating and completing their own work, as well as how closely their supervisor monitors their work. The issue of autonomy is important to both organizations and telecommuters. Telecommuting has raised many questions about worker autonomy and the potential emergence of more contract workers.

Comments by telecommuters and supervisors

Many telecommuters feel they work fairly independently of supervision, and a great many supervisors agree. One telecommuter said he does his job however he wants to because his supervisor trusts him. It is important to note the nature of the work of the telecommuters in the demonstration. One good example is provided by the supervisor of a group of programmers. On his first survey, this supervisor commented, "*Programmers could work at the bottom of a well as long as they had a terminal and a telephone. In fact, most would prefer it.*" When he was called later and asked whether his opinion had changed at all as a result of telecommuting, he chuckled at his earlier statement, but essentially agreed with it. "*Programmer analysts get their assignments and go away with them. They can concentrate better away from the office.*" He explained that he can tell whether a programmer is falling behind because weekly status reports can be compared to the timeline originally specified for the assignment. Falling behind

may not be the programmer's fault, he says, but it indicates other problems the manager may be able to solve.

"Programmer" is only one of many job titles represented in the sample of telecommuters. Many of the telecommuters' jobs are more difficult to characterize. Indeed, the subject of close supervision or independence came up most frequently in the context of discussions about productivity. In an early presentation at one organization before the project began, someone asked the presenter a question about how to measure the productivity of telecommuters. Later, someone else privately referred to this question and responded, "*How do you measure it anyway? You just assume these people are professionals, they're not goofing off.*" At a later training session for supervisors at the same organization, one person commented, "*the supervisors here tend to be working supervisors. We barely get our own work done, and do not have time to hover over employees trying to measure their productivity.*" It seems clear that this reflects a selection bias in favor of professionals to telecommute. Certainly, it reflects an idea that professionals require little supervision.

One telecommuter works in a branch office on the other side of the state from his supervisor and work group. He comes to see them in person once a month for a day or so, and once a year for a week or so. In between these times, they rely on the telephone and other forms of communication. His one day a week working at home has no impact on them since he is working remotely from them anyway. In another organization, remote supervision is also common, and not just of "white-collar" workers. This organization has four offices in four cities and blue collar workers scattered all over the state (these are not among the study's telecommuters). The strategy for dealing with remote workers is to have regularly-scheduled monthly meetings.

Many supervisors seemed to agree that productivity was difficult to measure, and hovering over the telecommuter did not help to measure anything. Several telecommuters and supervisors have referred to a supervisor's need to see people working as an "old-fashioned" management style. One supervisor referred sarcastically to the "butt-in-the-chair performance evaluation," as not a very useful way to assess an employee's performance. Interestingly, however, while several telecommuters described their supervisors or upper managers this way, supervisors never described themselves this way. Indeed, most supervisors who said anything on this subject claimed that they were not "look-over-the-shoulder" kinds of supervisors.

Survey data

Participants were asked the extent to which they agreed with the

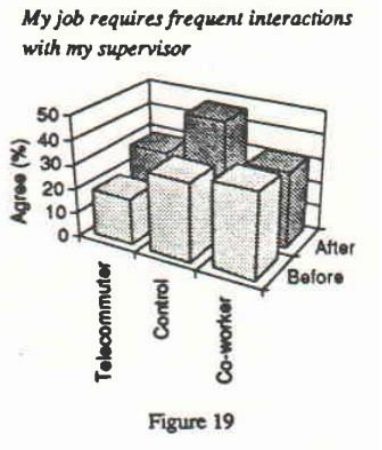


Figure 19

statement "*My job requires frequent interactions with my supervisor.*" (see Figure 19) In the first survey, 27 percent of the respondents agreed. In the second survey, 33 percent agreed. It was anticipated that telecommuters would require less frequent interactions with their supervisors because they would be spending one day a week away from their supervisor. Overall, telecommuters (19 percent before, 29 percent after) did report lower rates of agreement than controls (32 percent before, 47 percent after), or co-workers (35 percent before, 32 percent after). Telecommuters agreed significantly ($p<.05$) less with the statement than controls in both surveys. However, results from the second survey show an increase among controls and telecommuters.

The difference scores indicate that about 60 percent of telecommuters and controls changed their opinions over the course of the project. Telecommuters were more likely to change their opinion to agree more strongly (35 percent) than they were to change their opinion to agree less strongly (21 percent). Controls were equally likely to change their opinion in either direction. Telecommuters differed from the control group in that they initially reported fewer interactions with their supervisor than the controls did, and showed a decrease in that frequency over the course of the demonstration. This confirms that telecommuters tend to be relatively independent workers.

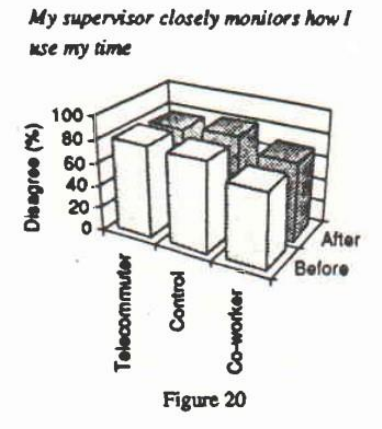


Figure 20

When asked if they agreed with the statement *"My supervisor closely monitors how I use my time.*" most participants disagreed. As shown in Figure 20, in the first survey, 77 percent of all of the respondents disagreed. In the second survey, 75 percent disagreed. In the first survey, telecommuters (81 percent) and controls (79 percent) reported similar rates of disagreement. Only 67 percent of the co-workers disagreed. Since co-workers were more likely to be in operational support positions, they are more likely to receive close direction from supervisors. In the second survey, similar

rates of disagreement were observed. Even with the addition of new forms and procedures used to track how telecommuters used their time on telecommuting days, and increased pressure on the work force, perceptions did not change much.

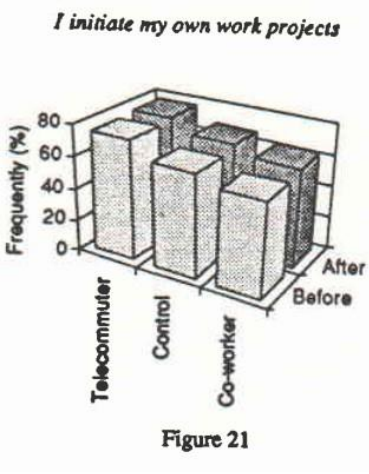


Figure 21

Participants were asked to indicate how often the following statement was true: "*I initiate my own work projects.*" Figure 21 shows the results. In the first survey, 68 percent of all respondents reported that this was always or frequently true. This figure rose slightly to 70 percent in the second survey. In the first survey, telecommuters (75 percent) were significantly ($p<.01$) more likely to agree that they initiate their own work projects than controls (65 percent), or co-workers (58 percent). These results were anticipated as telecommuters were expected to be more independent workers. In the second survey, each group had similar responses as in the first survey.

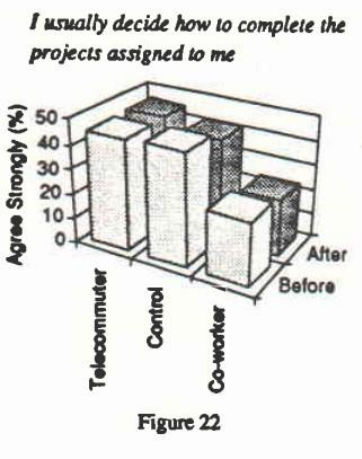


Figure 22

In a similar question, participants were asked whether or not they agreed with the statement "*I usually decide how to complete the projects assigned to me.*" Figure 22 shows the results. Overall, respondents reported high rates of agreement (92 percent before, 95 percent after). Not surprisingly, telecommuters (96 percent) were the most likely to agree that they usually decide how to complete their projects, compared with controls (90 percent) and co-workers (87 percent). This trend was also true for the second survey, where 98 percent of telecommuters agreed that they usually decide how to complete their jobs, compared with controls (90 percent), and co-workers (93 percent). Co-workers were significantly ($p<.01$) less likely to agree strongly (26 percent) with the statement than telecommuters or controls (both 45 percent). This reinforces the observation that co-workers are more likely to be in support positions. However, overall, telecommuting does not seem to have a major impact on any of the groups' perceptions of the amount of control they have over the projects assigned to them.

Summary

Telecommuters initially perceived their jobs to require less interaction with supervisors than did either controls or co-workers. However, there was a tendency over time for the telecommuters to perceive a greater need for that interaction. This is the only indication that there was some change in telecommuters perception of autonomy. For the most part, telecommuters and controls perceived their autonomy equally, and that perception did not change significantly over time.

SUMMARY

The telecommuting participants in the Puget Sound Telecommuting Demonstration used a remarkable variety of

practices in their work. Some relied heavily on electronic equipment and software to complete their jobs. Others were completely independent of it. Some people made extensive adjustments in their homes to accommodate their work there. Others simply used facilities that already existed. Some found that working at the telework center met their needs more successfully than working at home.

Some telecommuters worked at home virtually all the time and some worked only once a month at home, and most worked at home about once a week. Many experienced some disruptions to their telecommuting schedule, but continued to telecommute when they could. Others had to discontinue altogether. The time of day and day of week that people worked at home varied widely.

A supervisory style that accommodates telecommuting is clearly important to its success. However, we found that in most ways, telecommuters did not change their perception of their need for supervision differently over the course of the demonstration, nor did they differ significantly from controls in their perceptions.

After following telecommuters for the year of this demonstration, the variety of experiences is overwhelming. This variety points to the need for flexibility in the implementation of telecommuting in any organization.

CHAPTER 5
WHAT ARE THE CORRELATES OF SUCCESSFUL TELECOMMUTING?

The major aim of the Puget Sound Telecommuting Demonstration was to assess the success of telecommuting. However, as we understand more and more about the consequences of telecommuting, it becomes increasingly clear that there are multiple criteria of success. Some people consider telecommuting a success if a person continues to telecommute. Others look for increases in productivity, reduction in stress, or improvements in people's home life. In this section, we discuss these criteria. However, we pay special attention to "dropouts" because they can give clues about each of the measures of success.

HOW SUCCESSFUL WAS THE TELECOMMUTING EXPERIENCE?

When asked whether their telecommuting experience was more or less successful than they anticipated, 43 percent of the telecommuters said it was more successful, 41 percent said it was about as expected, and 15 percent said it was less successful. Most of those who said it was less successful commented that they had not been able to telecommute as much as they wanted.

We divided the telecommuters into three groups, 1) those who said their experience was more successful than expected, 2) those who said it was about the same as expected, and 3) those who said it was less successful than expected. We then compared the average scores on the nine attitudinal scales developed for this evaluation for each of the groups. For six of the scales, there were significant differences:

- GOODHOM - those who said the experience was less successful than expected felt significantly less than the other two groups that their social and home life were good.
- GOODPRO - there was a significantly positive relationship between feelings of success with the program and the respondent believing that they worked in a good atmosphere for promotion.
- HISTRES - those who thought the experience was less successful than expected felt significantly more stressed than those in the other two groups.
- LIKEWRK - those who thought the experience was more successful than expected indicated that they liked work more than the other two groups.

- SEPHOME - those who thought the experience was more successful than expected said that they were better able to keep home and work life separate than the other two groups.

- WKPRODH - those who thought the experience was less successful than expected also rated their work group productivity as significantly lower than the other two groups.

ANALYSIS OF DROPOUTS

In order to understand the dynamics of individual and organizational decisions regarding telecommuting, we decided to intensively study the dropouts from the project - those telecommuters who decided, for whatever reasons, that it was impossible for them to follow through on their initial intention to telecommute until the end of the project.

There were several reasons we thought this was a particularly important subpopulation. Among the most important was the fact that they have received little attention in previous studies. Since all the studies are comprised of unrepresentative organizations and participants, we thought that studying dropouts might shed particular light on more general problems with the telecommuting option. We also thought that the details of their decisions might help organizations plan for more effective recruiting, training, or support.

"If at some future date I can acquire the tools I need I would certainly be interested in telecommuting." (public agency dropout)

We spent considerable effort in locating as many dropouts as we could. At least three telephone calls were made to each telecommuter who had dropped out of the project. The effort was rewarded. We found the interviews to be most informative. For example, we found that nearly all these people continue to be highly supportive of the concept of telecommuting, and hope to be able to telecommute again in the future. We also found that most dropouts did not do so because of difficulties with telecommuting. As we will see in this section, the primary reasons had to do with other aspects of their jobs.

Reasons for dropping out

Approximately 33 percent of the individuals who were originally identified as telecommuters dropped out of the study in the course of the project. Of those who completed the second survey, 9 percent report that they will not continue telecommuting at the end of the pilot. Of those who were interviewed, many cited multiple reasons for stopping. Table 7 gives the distribution of reasons for dropping out.

Table 7. Reasons for Dropping out of Demonstration

REASON	%
Left organization	16
Job change	14
Lack of equipment	17
Office problems	15
Didn't like it	8
Personal absence	11
Non-participant in research	13
Miscellaneous	6

The most common reason given was a job change of some kind. Sixteen percent of those who dropped out left their organization for another job, and another 14 percent had to stop telecommuting because of a job change within their organization - either their job description changed, or they were promoted. This sort of turnover and job fluidity is comparable with that of most jobs. The average length of tenure for all positions in the United States is 6.6 years.[3] Since this figure includes non-information workers with very long tenures, such as farmers (21.1 years) and clergy (15.8 years), the average tenure for people in jobs such as those represented in the demonstration is likely to be less that 6.6 years.

Other reasons were also cited which give insight into some of the problems organizations may have had in implementing a telecommuting program. Seventeen percent of those who dropped out cited lack of equipment or other kinds of organizational support as a reason for not telecommuting. The majority of these people never even started to telecommute; others did start telecommuting, but were forced to stop because of circumstances at the office (15 percent). Most commonly, the problem was that the office was understaffed and could not function effectively in the telecommuter's absence. Most of these people only telecommuted a few times before they concluded it was impossible to continue. Usually the decision not to continue was made in consultation with the telecommuter's supervisor. It is possible that this reflects a lack of commitment and support of telecommuting by the supervisors; however, most of those who cited this reason regretted having to stop, but did not feel resentment toward their supervisors.

About 8 percent of those who dropped out said telecommuting was not for them: either they had difficulty working at home, felt guilty about it, had interferences at home, or simply felt isolated and

3 Statistical Abstract of the United States, 1991, p. 399.

didn't like working at home. Eleven percent stopped telecommuting because they were on personal absences from work: parental leave, medical leave, or retirement.

The interviews also suggested some minor difficulties in the coordination effort. A handful of people who had been selected to telecommute were then "deselected" because they did not meet policy requirements of the organization - home office set-up, child care requirements, and distance from work were some examples. Thirteen percent of those who dropped out decided not to get involved in the project because they did not want to participate in the research. Many of these individuals reportedly do telecommute, though are not part of this study.

Of those who dropped out, 40 percent did so because of reasons directly connected with telecommuting: lack of equipment, office problems, and because they simply did not like it. The first two of these are presumably resolvable and the last one accounted for only a handful of the dropouts.

Characteristics of dropouts

To further understand the criteria for successful telecommuting, we compared the initial responses of those who continued with those who dropped out during the year. This analysis does not suggest that there are definitive determinants of success, although some interesting contrasts emerged that will be explored further in the analysis of the data. The characteristics used in the analysis can be classified into three types: organizational, job, and personal.

Organizational characteristics

Telecommuters in some organizations were more likely to drop out than in others. There was no difference in dropout rates between public and private organizations. However, five of the 21 organizations, from which 30 percent of the original telecommuters were drawn, accounted for almost half (48 percent) of the dropouts. Organizational structure or dynamics which may have hindered telecommuters in continuing to telecommute throughout the year are discussed in other chapters.

Some organizations stood out because they accounted for a higher percentage of the total dropouts than they did of telecommuters. In one organization that started with 13 telecommuters, seven dropped out. Of these, three left the organization, and two others cited circumstances at work - their offices were understaffed because some people had left the organization. Whether such high turnover is commonplace for this organization, or representative of the rest of the organizations, is unknown. In another organization, the bulk of the dropouts had desired to telecommute, but did not want to participate in research. In another organization, half of the

dropouts had either changed jobs in the organization, or cited an understaffing situation. One person also mentioned a lack of management support. Finally, one organization had an astounding dropout rate of 73 percent, with no clearly dominant reason. Some reasons cited included job changes, understaffing, lack of management support, and difficulty working at home.

What is clear is that the discontinuation of telecommuting only occasionally had to do with telecommuting itself, and had more to do with employee turnover, insufficient staff for the workload, job fluidity within the organization, lack of materials and lack of moral support for the telecommuter. Turnover, staff shortages, and job changes may be status quo or may reflect a transition in an organization. Only the last reason, lack of support, clearly points to a lack of commitment on the part of the organization. Some organizations exhibited this more than others. Interestingly, the organizations where this is a common complaint are not among those with astounding dropout rates. Many of those who have made such complaints have continued to telecommute, in spite of the lack of support.

Job characteristics

Individuals who were unable to continue telecommuting tended to have jobs that required more frequent face-to-face contact and less independent work than those who continued telecommuting. People who supervised others were slightly more likely to drop out than those who did not supervise others. Among those who supervised

others, 34 percent dropped out versus 26 percent among those who did not supervise others. Continuing telecommuters were more likely than dropouts to say that writing and reading were a significant part of their job. Interestingly, they were also more likely than dropouts to say that "attending meetings" was a frequent part of their job. None of these differences were statistically significant. However, the pattern of responses is suggestive.

Many of the telecommuters dropped out because of changes in job responsibilities. Common reasons included changing organizations, changing positions within the organization, or changing job responsibilities. In a few cases, changes were attributed directly to telecommuting. For instance, one participant said that telecommuting made it clear that his long commute trip was unacceptable, and he found work with an organization nearer home.

We believe that most people's job changes were part of the normal course of events and had little to do with telecommuting. As can be seen in Table 8, when asked if their job description had changed in the last year for any reason, more telecommuters than controls said yes. This difference is not statistically significant and is about the same difference that was observed before the demonstration began. In addition, a significant proportion of the co-workers said that their jobs had changed in both surveys. It is possible that the people who became telecommuters are in more fluid jobs than the controls, but the experience of telecommuting did not change that likelihood. We do not have consistent information on the number of people who left the organizations completely, so it is not possible to analyze the impacts of telecommuting on that outcome.

Table 8. Percent of Respondents Whose Jobs Changed During the Year

ROLE	%
Telecommuter	37
Control	23
Co-worker	35

Individual characteristics

We found few strong personal predictors of telecommuting persistence. People who telecommuted for the whole year were not easily distinguished from those who dropped out. Their job attitudes and the demographics of the two groups were similar, with a slight (but insignificant) tendency for males to be more persistent than females (78 percent versus 68 percent).

If standard demographics were only marginally related to continuing to telecommute, personal motivation may have played a more significant role. Those who ultimately continued telecommuting for the whole year were significantly ($p<.05$) more likely to have initially reported that their job demands created stress at home than were those who ultimately discontinued telecommuting (42 percent versus 23 percent). While successful telecommuters and dropouts rated their commute trips as equally stressful, continuing telecommuters had significantly ($p<.05$) longer commutes (7 minutes more in the morning and 10 minutes more in the afternoon) than those who dropped out. The role played by personal motivation to telecommute is strong.

Summary

Dropouts from the demonstration were, for the most part, not very different from those who continued telecommuting for the whole year. They tended to drop out for reasons unrelated directly to telecommuting. Organizational factors did not seem very important. There was a slight tendency for telecommuters who

continued throughout the project to have jobs that required less interaction with others. There was also a tendency for continuing telecommuters to have strong personal motivations to telecommuting. On the whole, however, people dropped out because their job changed in some way that made it difficult for them to continue.

WHO MAKES A GOOD TELECOMMUTER?

When telecommuters were asked this question, almost all of them responded that self-motivation and supportive management were "very important" (97 percent and 91 percent, respectively). Other important characteristics identified by telecommuters are shown in Figure 23, in descending order of importance. While most people agreed that the right combination of personal characteristics and job characteristics are needed for successful telecommuting, there were a variety of opinions on their relative importance.

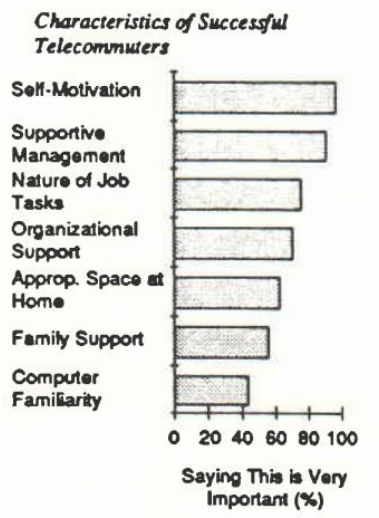


Figure 23

As further evidence of the relative lack of importance of personal characteristics to the success of telecommuting, we found that fewer than half of the people that had experience with telecommuting agreed with the statement that "*the right person could telecommute regardless of the job.*" Only 33 percent of the telecommuters and 36 percent of the supervisors agreed. A slightly higher proportion (45 percent) of co-workers agreed, perhaps because they were interested in telecommuting themselves.

SUMMARY

The correlates of success in telecommuting are not completely clear. People had very mixed opinions, probably reflecting their mixed experiences. However, there was a tendency for people to believe that personal characteristics were not as important as job characteristics. In addition, from the evidence we were able to gather from the organizations in this study, organizational factors were not very critical to success.

CHAPTER 6
HOW HAS TELECOMMUTING AFFECTED PRODUCTIVITY?

Of the many dimensions along which telecommuting is expected to have an impact on organizations and individuals, none may be more important to the future of telecommuting than productivity. It has been apparent from the beginning of this study that worker productivity would be a significant factor for gauging the effectiveness of telecommuting, and that concerns in this area were decisive and worrisome enough for some organizations to choose not to participate. The importance of productivity is evident in many ways. For example, while emphasis on *worker satisfaction* may seem like a separate dimension from productivity, it is in large measure a reflection of the emphasis on attracting and retaining the "right kind" of worker. Particularly in an era when many organizations are under pressure to reduce their work force or to demonstrate efficiency in a shrinking market of qualified personnel, finding and keeping the most productive workers is of paramount concern.

The expectations of telecommuters were clear from the onset. As the results of our first ("before") survey reveal, nearly every cooperating telecommuter anticipated an increase in personal productivity as a result of this new work strategy. As one typical respondent reported: *"I think I'll be able to work harder, with more focus on my tasks and fewer interruptions, when I'm telecommuting."* This chapter discusses our findings in this area.

WHAT IS PRODUCTIVITY?

Productivity estimates require some assessment of the relationship between results achieved and effort expended. It is often estimated numerically as a ratio of outputs to inputs, and can be used to characterize individuals, work groups, operating units, organizations, or entire economies. It is typical, and misleading, to regard conceptions and measures at vastly different levels of analysis as if they were interchangeable. In economic theory for example, productivity is often measured as a ratio of aggregate outputs to aggregate inputs. *Outputs* include the measures of goods and services produced, and *inputs* include labor, and the range of capital, material, financial, and technological resources employed. Often, aggregate measures of outputs (goods and services) are divided by the total number of full-time equivalent workers to obtain *average worker productivity* estimates. But note that inputs include many elements over which individual workers have little control. These average figures across vast numbers of workers in an organization or even in an industrial sector are often

interpreted as surrogates for the productivity of individuals. The wide use of these averages is in large part responsible for the common misconception that economic productivity is typically measured at the smallest unit, that of the individual worker.

When the workers and supervisors in this study express their opinions about productivity, what they have in mind is very different from the aggregate conception which drives most policy discussions. We do not have the firm-level estimates, nor sufficient numbers of participants in any organization to anticipate measurable impacts at the organizational level. Our primary focus is on before-after comparisons of participants' estimates of productivity. When interpreting these analyses, it should be recognized that individual interpretations of the meaning of "productivity" may vary widely.

It is important to remember that many participants thought that individual productivity among workers such as these is impossible to measure effectively. (See Appendix C for a discussion of performance measurement and an assessment of the impact of telecommuting on performance measurement.) One person in a training session said *"Going back to the productivity issue. I haven't a clue how I would measure productivity. Is that grounds for disqualification?"* There was general laughter in response. During the course of this project, we learned from respondent after respondent that hardly anyone "had a clue."

In fact, some workers and supervisors volunteered that the measures their organizations use are largely misleading. A supervisor in one organization that has a productivity specialist said that they have to settle for *"numbers which are easily gotten from the communication system"* and that even the specialist knows that *"half of those numbers are just grabbed out of thin air."* This supervisor chided a major competitor for recently instituting a more quantitative measurement scheme for assessing productivity. He said it was in response to the recession, but that it can only "get them into trouble."

PRODUCTIVITY AS A SELECTION CRITERION

In other sections of this report, we demonstrate not only that the organizations in this project are unrepresentative of Puget Sound organizations in ways which inveigh against ready generalization, but also that the controls are different from the telecommuters. Further evidence of these differences emerged in our interviews with supervisors of telecommuters. Even though they understood that for demonstration purposes telecommuters should be interchangeable with controls and co-workers where possible, supervisors acknowledged that employees about whom they had

any doubts regarding their working remotely were rarely chosen to telecommute. Some supervisors also admitted that they recommended employees for telecommuting as a reward for demonstrated excellence. Since these tendencies emerged in interviews rather than on the survey form, it is impossible for us to specify how often they occurred.

To regard these as "selection artifacts" is to view the process solely from the perspective of the researchers. Our "artifacts" are merely good policy to some supervisors who want to maximize overall effectiveness. Nevertheless, these acknowledged selection effects make it more difficult to generalize from the project sample to organizations as a whole (let alone to the entire Puget Sound).

TELECOMMUTER PRODUCTIVITY INCREASES

Our study of telecommuters, then, is of a selected subset from selected organizations, and assertions about their telecommuting productivity need to be interpreted with that in mind. *Nevertheless,* it is remarkable the extent to which telecommuters reported an increase in productivity, and how consistent their direct reports are with the indirect evidence we could adduce.

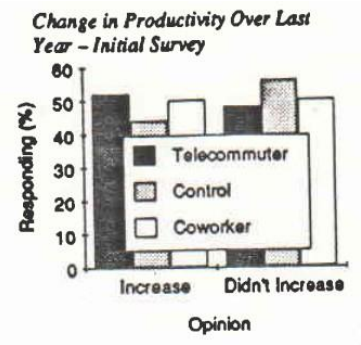
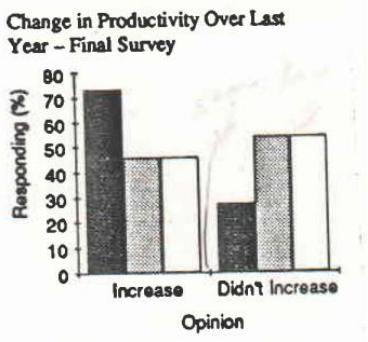


Figure 24 continued on the next page

Figure 24 summarizes participant ratings of their own productivity, by role. In the "before" measure, about half of *all* participants believed that their productivity increased in the last year, with no significant differences among the roles. In the "after" measure, the percentage of all participants saying their productivity had increased in the last year rose to 59 percent, with 73 percent of the *telecommuters* reporting an increase in the last year. This difference among the roles is highly significant ($p<.01$). The change scores,[4] summarized in the last part of Figure 24 show that only 11 percent of the telecommuters reported a decline in productivity assessment, compared with 16 percent of the controls and 31 percent of the co-workers. Clearly, telecommuters felt that the year of telecommuting had improved their productivity.

[4] It is important to remember that the "change score" refers to any relative change in reported productivity in the last year. For instance, respondents who said their productivity "increased substantially over the last year" in the first survey and said that it simply "increased over the last year" in the second survey would be recorded as "getting worse" in the third part of the figure. While these people would be reporting a lesser increase in productivity after the one year demonstration, it would not mean that they said their productivity got worse.



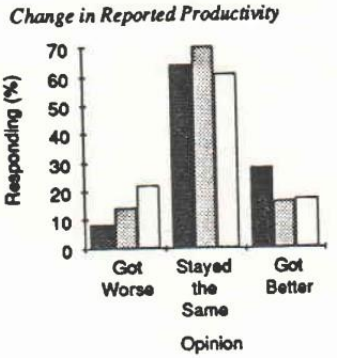


Figure 24

The consistency with which increased productivity was reported by telecommuters is noteworthy. Our ethnographers heard increases estimated from 30 percent to "ten times". Even when people were unable to continue with the project for various reasons (see below), they typically volunteered that their productivity had increased, often considerably. Increases were consistently reported by home workers and telework center telecommuters.

The difficulties with precise productivity measurement have been noted. As one telecommuter who does "intangible" work all the time said, "*They give me the ball and I run with it ...How can anyone know whether I'm more productive except if people complain that something isn't getting done?*"

But most indirect evidence supported the perception that productivity was up, and that telecommuters saw themselves as better off for the experience. For example, union officials we met with during the development of this project emphasized their concern about the potential of abuse of their employees, and thought that the consequences were very likely to be deleterious. In contrast, by the end of the study a previously "skeptical" professional staff employees' representative was collecting information that would allow telecommuting to be an option available to all workers.

Among other unanticipated indices of productivity increases are the following: in selecting organizations for participation, the Washington State Energy Office excluded those that set a higher work baseline (or target) for those who worked at home rather than in the office. However, during the course of this project we discovered that one participating organization with keystroke data entry telecommuters had accommodated to their enhanced performance by raising the baseline telecommuters had to achieve to be eligible for a bonus. Had they made this adjustment before the study began, this organization would have been ineligible to participate. Nevertheless, the keystroke telecommuters in this organization were pleased to continue telecommuting

.We consider reported interest in continuing to telecommute ("voting with one's feet") as an excellent indicator of telecommuter satisfaction. As reported elsewhere, more than 90% of the telecommuters in this study wanted to continue to telecommute. We performed a regression of interest in continuing against the array of work-related reasons why telecommuters might want to continue.

Self-reported increase in productivity was vastly more important than any other reported change in skill in its impact on whether telecommuters wished to continue.

Table 9 summarizes related results. Here, telecommuters were asked if their work skills had improved **as a result of telecommuting** in several different areas. This table shows the percentage who said each of the following skills had improved "greatly" or "somewhat." Once again, enhanced productivity stands out among achievements reported by telecommuters.

Table 9. Improvement in Skills as a Result of Telecommuting

Type of Skill	greatly	somewhat	no change	declined
productivity	37	51	12	1
personal time management	18	53	27	2
overall performance	16	54	30	0
project management	12	41	46	1
computer skills	12	36	52	0
work independently	13	33	54	0
communication skills	6	29	64	1
dependability	2	22	74	1
interpersonal skills	1	23	75	1
supervisory skills	2	10	86	2

It was much more successful than I anticipated. It was especially good for me because I'm high performance oriented. (private telecommuter)

The degree of telecommuters' reports of their own productivity occasionally startled the researchers. One woman, for example, said her productivity had increased to five times her normal in-office output, and added that she didn't feel she was exaggerating because she kept a crude log of her productivity. Reports such as this may be honest but misleading: telecommuters learn to take certain aspects of their work home on telecommuting days, and these tend to be tasks which require the uninterrupted time which is "never" available in the office. Thus, for that subset of a telecommuter's work, the productivity increase may indeed be phenomenal.

The more general point is that just as certain people apparently succeed at telecommuting, so do certain tasks lend themselves to productive telecommuting. Many people have a wide variety of tasks to complete, some of which lend themselves to out-of-office work. To enable organizations to plan for effective telecommuting, it is important to understand which tasks are best done while telecommuting, and which tasks are best done in the office. To plan for space allocation and group meetings, it is best to understand how predictable telecommuting is, and the extent to which schedule variations are required by the exigencies of collaborative work.

Telecommuters were very pleased with their experience on the whole. Many wished they could have telecommuted more frequently and more predictably. In an analysis targeted at those who expected to be less likely to continue to telecommute, few reported that the situation at home inhibited their successful telecommuting.

Instead, they reported that conditions **at work** were such that they were unable to continue. Because the state's telework center was closed, for example, one worker reported that she had no alternative but to return to the office. But she reported, "*Telecommuting is a great way to accommodate those who live greater distances from the office. You don't have to live nearby the office when work can be accomplished elsewhere.*"

Typically, workers who had to return to non-telecommuting office work did so because the schedule of responsibilities and the needs of other workers made continuation impossible. "*Personal problems of staff mean that I must assume their responsibilities when they are away,*" one reported.

REPORTS BY NON-TELECOMMUTERS

When we interviewed individual supervisors, we especially pressed those whose workers' jobs lent themselves to some metric (number of keystrokes, lines of code, *etc.*). Although they were reluctant to share the individual forms with us, in those cases where measurement was possible, supervisors assured us that productivity had indeed gone up.

Some co-workers also reported that they, too, felt that the productivity and job satisfaction of telecommuters increased. "*People can be more productive at home, and energy is saved,*" reported one. And several co-workers said they were more positive as a result of the project. One, who said she was very supportive to begin with, said she is "*now more supportive after seeing the benefit of reduced stress on the telecommuter*."

But while supervisors and other participants tended to agree that telecommuters increased their productivity, it was to a lesser extent than reported by telecommuters, and with important caveats. For example, supervisors were asked *"Do you feel that this person's productivity has changed in the last year?"* If they answered yes, they were asked if it "increased substantially," "increased," "decreased," or "decreased substantially." The proportion of supervisors who reported on the first survey that the individual's productivity went up in the last year was 44 percent. In the second survey, the equivalent figure rose slightly to 52 percent. However, this increase is not statistically significant, and it should also be pointed out that the proportion of supervisors who said productivity decreased went from one percent to six percent, another insignificant but countervailing finding. Over the course of the year, 24 percent of the supervisors lowered their assessment of their subordinates and 22 percent raised it. The remainder rated it the same. Overall, supervisors did not say that their subordinates' productivity went up substantially.

Non-telecommuting participants were more cautious and contingent in their assessments of telecommuter productivity than were telecommuters. One manager of several telecommuters, for example, said that how well people worked at home really depended on how well-organized they were the day before. "*When they plan before they leave here what they're going to do at home the next day, they're more productive than they would be here. But when they haven't planned, they just realize, 'Hey, I'm working at home tomorrow,' I'm not sure how much they get done.*"

In supervisor evaluations of their own telecommuters' productivity and job performance, they expressed only moderate support for the beneficial impact of telecommuting on their work. Consider their responses to the questions in Table 10. While supervisors are supportive of telecommuting in general, their responses reveal significant decreases in evaluations of their *own* telecommuting employee's productivity, quality of work, and motivation to work. Their concern about distractions tended to increase over the year.

Table 10. Supervisors' Perceptions of Individual Telecommuters' Performance

Statement	Final % agreement			% Changing agreement		
	Agree	Neutral	Disagree	Incr.	Decr.	Signif.
*"This worker's productivity has improved as a result of telecommuting"**	43	40	17	15	44	p<.01
"The quality of this employee's work has greatly improved in the last year"	18	56	26	12	28	p<.01
"This employee is highly motivated"	67	25	8	12	28	p<.01
*"When working at home, this worker was able to overcome distractions of other adults and children in the household"**	58	33	9	22	36	p<.1
"This employee is distracted by interruptions during work"	41	45	14	24	15	not sig.

* In the initial survey, these questions were worded as expectations

As reported in Chapter 4, supervisors' responses were mixed in assessing the impact of telecommuting on communication and integration in their work groups. Supervisors also responded to several questions about telecommuting and supervision. When asked their agreement to the statement, *"Telecommuting improves my organization's ability to retain competent staff,"* the vast majority (77 percent) initially agreed. However, there was a significant ($p<.05$) drop in agreement over time, with 33 percent decreasing their agreement compared with 16 percent increasing agreement between surveys. Supervisors were also significantly ($p<.05$) more likely to increase (38 percent) their agreement with the statement, *"It's difficult for telecommuters to supervise other people,"* than to decrease it (14 percent).

As seen in Table 11, supervisors generally felt that telecommuters could work well on their own and had made successful adjustments to working at home. However, there was a tendency for supervisors to say their supervision requirement went up and to say that it was more difficult than expected for telecommuters to make the transition to telecommuting.

Table 11. Supervisors' Perceptions of Working with a Telecommuter

Statement	Final % agreement Agree	Neutral	Disagree	% Changing agreement Incr.	Decr.	Signif.
"This worker's job requires frequent supervision by me"	7	13	80	24	13	p<.1
"I closely monitor how this worker uses his/her time"	1	10	89	16	18	not sig.
"This employee works best when there is a deadline"	32	42	26	27	31	not sig.
*"The transition to working away from the main office was easy for this worker"**	92	3	5	15	26	p<.1

* In the initial survey, this question was worded as an expectation

When it comes to rating telecommuters' performance, the changes in supervisor evaluations tend to express decreased enthusiasm over time for impact of telecommuting on their employees. Supervisors rated employees on six dimensions. Table 12 shows the dimensions, and the percentage of evaluations that went up and down, along with the statistical significance of the change.

Table 12. Supervisors' Ratings of Telecommuting Employees' Skills

Dimension	Higher	Same	Lower	Sig.
productivity	22	45	33	p<.05
interpersonal skills	20	63	17	ns
dependability	11	66	23	p<.05
communication skills	17	62	21	ns
work independently	12	64	24	p<.05
overall performance	9	73	18	p<.05

WORK GROUP PRODUCTIVITY

It should be clear by now that the vast majority of telecommuters in all organizations enjoyed their telecommuting experience and found it to have beneficial consequences. These findings are consistent with earlier studies of telecommuting. The responses of other participants regarding telecommuter productivity are milder but still relatively supportive. But the productivity of telecommuters, considered alone, tells only part of the story. From the perspective of the organization, it is important to understand how telecommuting may affect the productivity of *non-telecommuters* - of collaborators and support staff left back in the office, and of work groups considered as a whole.

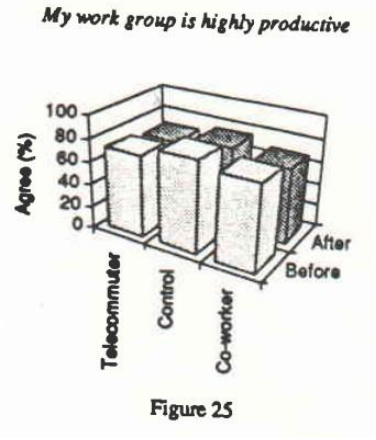


Figure 25

The extent to which even the elevated productivity of any individual worker contributes to the productivity of an organization may be quite complex, and outcomes from the perspective of other participants and the organization as a whole are also important. The success of telecommuting, or the lack of it, may hinge on one's unit of analysis. The answer may be very different from the perspective of the work group or the organization, than from the perspective of the individual telecommuter. In this study we asked a series of questions in an attempt to gauge the extent to which the elevated productivity of one (the telecommuter) might be at the expense of the productivity or efficiency of another (co-workers, perhaps, or supervisors). We also were interested in whether telecommuting makes it unacceptably difficult to coordinate work group efforts, to maintain the camaraderie which effective organizations may require over the long haul, or to facilitate those occasional moments when highly creative "breakthroughs" occur.

Survey responses

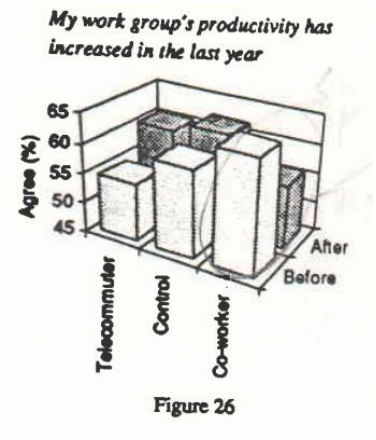


Figure 26

Survey respondents were asked to respond to two statements about work group productivity. Results are shown in Figures 25 and 26. One was *"My work group is highly productive,"* and the other was *"My work group's productivity has increased in last year."* Telecommuters, controls, and co-workers were equally likely to agree with each statement in both administrations of the survey. There was a marginally significant ($p<.1$) tendency for all respondents to agree less with the first statement in the second survey than in the first. The overall agreement went from 76 percent to 69 percent. In contrast to the strong tendency for telecommuters to report increases in their own productivity, these findings do not indicate an increase in work group productivity, and give some evidence of a possible decrease.

Supervisors responded to detailed questions regarding productivity in the first and second surveys. Table 13 shows changes in perceptions of productivity in general. On the second survey, supervisors indicated that they tend to worry more about telecommuters slacking off than they did before telecommuting started. There is also a tendency for them to say that their work groups are less productive.

Table 13. Supervisors' Perception of Employee Productivity

Statement	Final % agreement Agree	Neutral	Disagree	% Changing agreement Incr.	Decr.	Signif.
"My group's productivity has increased in the last year"	58	39	3	17	32	p<.05
"I think some people take advantage of telecommuting to slack off on their work"	20	20	60	33	15	p<.01
"My work group ranks right near the top in productivity at our company"	59	38	3	22	24	not sig.
"When working away from the main office my staff is able to concentrate more on work"	82	13	5	20	21	not sig.
"I think telecommuting allows people the flexibility to work during their most productive hours"	89	7	4	20	16	not sig.

Comments by co-workers and supervisors

Some co-workers also reported that the project had increased the burden on them and other co-workers. One public co-worker said "*I have become aware of the possible workload increases for people left behind.*" Another reported there was "*more work for me and other support staff.*" Some co-workers were suspicious of the telecommuters. One said, "*I don't exactly know what she does, and members of the work group have tried to call her at home, and she was not there. I suspect she is not really working.*"

Many noted that their own job was now somewhat more difficult. In some cases, however, they felt their increased burden was worth it. One woman, for example, reported that her job was harder, and there was more work for support staff, but nevertheless said, "*I was skeptical (about telecommuting), but now I think it's great*."

Co-workers' reactions may depend on the size of the work group from which the telecommuter came. As one reported, "*We have a very small group, and one less (person in the office) would be impactive.*"

Group productivity: To be effective, we have to get to the finish line at the same

Successful work strategies require appropriate coordination with other members of one's organization, and telecommuting complicates coordination in some instances. From the perspective

time. It's no good to be early or late. (Private sector supervisor)

of the organization, productivity may be determined, for example, not by how much an individual accomplishes, but by how effectively one's work intersects with one's fellow workers.

Supervision may require special skill when organizational productivity is thought of in this way, and may call for judicious combination of nurturing individual accomplishment, ensuring careful coordination with others, and maintaining the interpersonal environment which sustains these efforts over the long run.

The interpersonal elements may be among the most difficult to manage and, according to some participants, the most important. One volunteered that even in the office, teams are grouped together, and that "*if you don't sit physically inside the team, you don't get included. Even one (critical) day away can lead to your being left out.*"

A particularly sensitive supervisor in this organization said that he would change meetings to ensure that a worker was included and would call a worker with the results of a meeting they may have missed, but that, for the sake of the group as a whole, he would sometimes schedule a "party, not a meeting" for the times when they were all together.

Successful supervisors were sensitive to the particular circumstances of individual telecommuters. In one organization, a couple of telecommuters reserved special projects for their telecommute days. They were nevertheless expected to get their normal workload done on the four days in the office. One woman almost dropped out of the study because she found this impossible to do, but her supervisor helped out by redistributing some of her in-office tasks to other people.

There is little evidence from our project that supervisors fundamentally changed their management styles as a result of the telecommuting experience. Many progressive supervisors talk of old-fashioned, widget-counting supervisors, but never was a supervisor heard to describe him or herself as an old-fashioned type. The extent to which supervisors can be trained to supervise telecommuters effectively is unanswerable in our data. It may instead be the case that some already flexible supervisors were able to perceive the potential advantages of and accommodate to telecommuting, while others (underrepresented in our self-selected samples) would find it very difficult to accept telecommuting.

POTENTIAL REASONS FOR INCREASED TELECOMMUTER PRODUCTIVITY

Several of the questions on the survey addressed potential reasons for increased productivity among telecommuters. In this section, we consider these possible explanations.

Distractions in the office

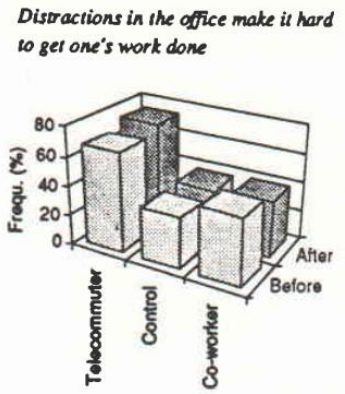


Figure 27

Ironically, workers often report that offices are extremely difficult places to get one's work done. Participants were asked how frequently "*Distractions in the office make it hard to get one's work done.*" Figure 27 shows the results. Fifty-four percent of all respondents in the first survey responded "always" or "frequently." In the second survey, the endorsement of those alternatives increased slightly (but non-significantly) to 58 percent . More importantly, telecommuters' endorsements were significantly ($p<.01$) higher than either co-workers or controls. Sixty-seven percent of the telecommuters thought distractions always or frequently made it hard to work, compared with 35 percent of the controls and 46 percent of the co-workers. Telecommuter endorsement of those answers increased in the second survey to 74 percent, while that of controls increased only slightly to 37 percent, and co-workers' agreement decreased to 38 percent. Thirty-five percent of the telecommuters felt distractions were greater in the second survey compared with 21 percent who thought it was less.

Clearly, distractions in the office were important to telecommuters and became increasingly important. One telecommuter, for example, testified that she got three times as much done working at home because of distractions in the office. While she felt very happy to be away from meetings, another telecommuter felt that working at home allowed her to get away from other office distractions, especially office politics.

Meetings taking up too much time

An early admonition we heard frequently was that telecommuters needed to partition an area of their home as "work space," and should consider putting up a sign at home declaring that "mommy" or "daddy" was working and was not to be interrupted. By the second year, telecommuters were talking almost as if they wished they could post a sign in their regular office which declared that they were "at work" so they wouldn't be interrupted as frequently.

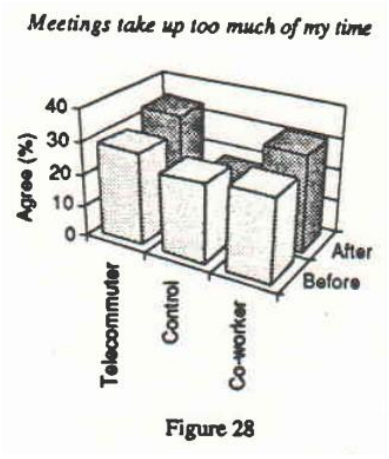


Figure 28

Worker complaints about spending too much time in meetings are commonplace, but when asked the extent to which they agreed that "*Meetings take up too much of my time,*" only about one quarter of the project participants agreed - 27 percent in the first survey and 30 percent in the second survey. (See Figure 28) There was no significant difference between telecommuters (29 percent), controls (26 percent), and co-workers (26 percent) in the first survey. In the second survey, the percentage of telecommuters agreeing with the statement increased to 33 percent, while agreement among controls decreased to 19 percent, and agreement among co-workers increased to 31 percent. These differences remained insignificant.

Productivity away from the office

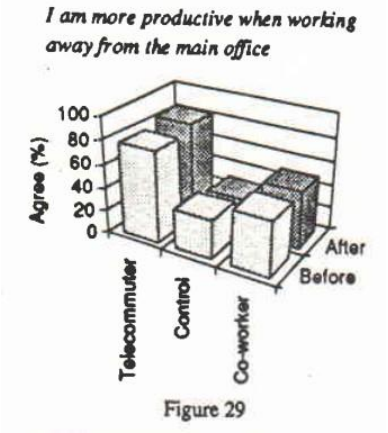


Figure 29

Participants were also asked if they agreed with the statement "*I am more productive when working away from the main office.*" The overall responses (shown in Figure 29) reflect little difference in agreement between the first survey (60 percent) and the second survey (56 percent). However, as expected, in both surveys telecommuters (77 percent before and 82 percent after) were significantly ($p<.01$) more likely to agree with this statement than either controls (35 percent before and 33 percent after) or co-workers (47 percent before and 48 percent after).

Ability to concentrate

Project management tasks are much easier to do in an uninterrupted environment -- working from home... (There is) more feeling of flexibility and trust from my employer. (Private sector telecommuter)

At the beginning of the study, researchers were concerned that workers may be distracted when they attempted to work at home. The survey asked telecommuters many questions about potential distractions at home - if they got non-work related phone calls at home, if neighbors frequently stopped by, and if they were distracted by other adults. However, after people began telecommuting it became apparent that there were many more distractions in the office than at home.

The quantitative data overwhelmingly support the idea that there are few distractions at home. When asked about non-work phone calls, neighbors stopping by, and other adults and children interfering with work, telecommuters did not say they were often distracted at home. They reported even fewer problems on the second administration of the questionnaire.

Flexibility

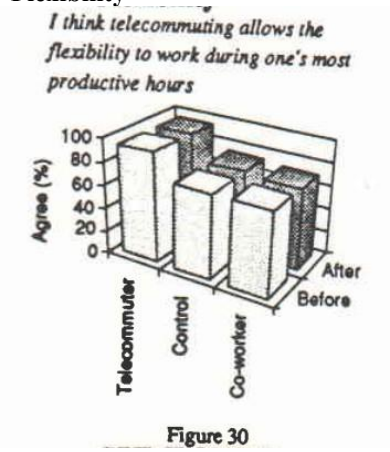


Figure 30

When asked if they agreed with the statement "*I think telecommuting allows the flexibility to work during one's most productive hours*," about 85 percent of the respondents in both surveys agreed. (See Figure 30) As described in a previous section of the report, telecommuters were the most likely to agree, and they agreed at an extremely high rate; 95 percent in the first survey, and 94 percent in the second survey. Controls (73 percent before, 75 percent after) and co-workers (73 percent before, 70 percent after) were somewhat less likely to agree that telecommuting allows workers the flexibility to work during their most productive hours, but their support for the statement did not fluctuate significantly over the course of the project.

SUMMARY

In interpreting the productivity results from this project, it is important to remember that the organizations in this study, and the telecommuters within those organizations, are unrepresentative in ways which may have substantial influence on the findings. Remember, too, that is difficult even for experts to describe or measure what it *means* for most workers to be productive. There are some tasks, to be sure, where productivity is relatively countable --- number of keystrokes, lines of code, etc. But most of the jobs in which people envision telecommuting don't lend themselves to these ready measures. The assessments in this study are based largely on the self reports of the participants. We have tried to overcome the measurement issues by seeking harder numbers where they were available, and by utilizing before-after estimates wherever possible.

The degree of concern regarding productivity measurement varied substantially among participating organizations. A representative of one of the more committed public organizations, when asked if everyone was satisfied with the level of productivity, said, "*You know, we don't even think about it. We just do our stuff.*"

Interestingly, what was often on participants' minds was the need for *defensible* measurement so that less desirable employees could be laid off without prolonged litigation. Supervisors were usually certain they knew who were their more productive employees --- the ones they wished to retain when forced to downsize, for example, --- whether or not they trusted the metric their companies use. They were less sure that their certainty about the lesser productivity of others would hold up in court. Without a "*solid system, you drop back to seniority, even though it hurts you and you know it,*" said one supervisor. This leads to schemes like

voluntary layoffs, and the hope that you can "*dissuade volunteers whom you want to keep.*"

It is clear from our data that telecommuters believe that their productivity has increased: this finding holds across measures, organizations, and job types. When telecommuting failed to live up to telecommuters' expectations with respect to productivity, it is because their expectations were very high, and because they were able to telecommute less frequently than anticipated.

Reports from supervisors and other participants were more reserved and contingent. While many thought that telecommuter productivity had increased, there were mixed responses and they were more concerned about the impact on co-workers and work groups.

At the same time, we are impressed by the extent to which the initial worries about telecommuters' ability to work away from the office have been muted. While some supervisors and co-workers worried about what telecommuters were doing when they weren't in the office, most thought that telecommuters got a lot of work done at home. Telecommuters sometimes went to extraordinary efforts (sending E-Mail early in the morning and late at night, for example), to demonstrate that they were working in their alternate work site.

As the project evolved, telecommuters came to value their time away from the office precisely because of the amount of work they could accomplish. In interviews, focus groups, and marginal comments on the questionnaires, participants described an at-home situation in which people could really "get their work done," while there were so many interruptions in the office that it was impossible to finish one's work.

While the general impression is that the productivity of telecommuters increased as a result of telecommuting, the impact on coworkers, and on work group productivity, is more complex issue and uncertain. Our evidence indicates that work group productivity failed to increase, and may even have decreased in some cases, even while telecommuter productivity was reportedly rising.

Some tasks are better accomplished at the telecommuting site than others, and it took most participants awhile to learn which work, and how much, to carry with them. Uninterrupted time seemed to be the particular advantage telecommuters reported about their alternative work site. Comments by telecommuters indicated that

supervisors who were flexible about telecommuting schedules, who didn't interrupt telecommuters unnecessarily, and who were attentive to the need to maintain a cohesive work group, were appreciated.

CHAPTER 7
HAS TELECOMMUTING HAD AN EFFECT ON CO-WORKERS AND WORK GROUPS AS A WHOLE?

The Puget Sound Telecommuting Demonstration paid special attention to the impacts of telecommuting on co-workers and the work group as a whole. Even if telecommuting is very successful for telecommuters, it is possible that adverse effects on others can outweigh the advantages to the telecommuters. We have already seen that the productivity of co-workers and the work groups as a whole was not clearly enhanced by telecommuting. In addition, we expected that telecommuting might introduce changes in the normal structures and procedures of participating workgroups. These might include changes in the workload within the group, changes in supervision requirements, changes in the integrity of the work group, and changes in office communication. We anticipated that some work groups might be more successful than others in coping with these changes. In order to understand both the problems and the coping mechanisms of workgroups, we tried to gain as much information as possible on co-workers and work groups as a whole.

As it happens, the survey data overall shows that telecommuting has only a modest impact in the areas mentioned above. Data from conversations and interviews provides a somewhat more negative picture. This section presents an overview of the perspectives of supervisors and co-workers on telecommuting, followed by assessments of changes in workload within groups, of impacts on supervision, of impacts on work group integrity, and of impacts on the quality of office communication.

COPING WITH TELECOMMUTING: AN OVERVIEW OF CO-WORKER AND SUPERVISOR PERSPECTIVES

Experiences of telecommuters and their co-workers varied widely. Many of the telecommuting employees were used to being relied on in their office for a variety of tasks, including troubleshooting, coordinating with others' work, and just being available as an extra hand when unanticipated demands arose. Some were readily able to adapt their work schedule to continue to meet these demands, or to find alternative ways to accomplish their goals. As a result, some co-workers scarcely noticed a change when telecommuters were out of the office. Some co-workers even volunteered that their *own* productivity was enhanced during *others'* telecommuting days since there were fewer meetings, or because it was quieter in the office. Other co-workers were pleased at their enhanced self-reliance and opportunity to learn new things when the telecommuters weren't available to lean on.

Some telecommuters were unable to adjust to the modified schedule and ended their participation, albeit reluctantly in most cases. Still others continued to telecommute despite not having found solutions to the problems caused by their absence, and created some hostility among co-workers.

It should be recognized that co-workers may have been predisposed to feel negatively about telecommuting. Few, if any, co-workers had much to say about whether telecommuting would be attempted in their work group or organization, and this may have caused some to feel that their needs or opinions were ignored. Co-workers at the same level as the telecommuters may have resented that they were not selected to telecommute. Co-workers who were support staff for telecommuters may have felt put upon, but not in a position to complain.

Supervisors, too, might be cautious of telecommuting, but generally those who were against it had the option to stop it. Consequently, the supervisors who ultimately participated were not likely to be as negative as co-workers might be. Indeed, as discussed in Chapter 4, supervisors of telecommuters expressed support for telecommuting in general. However, as also described in Chapter 4, supervisors had a tendency to express more concerns about telecommuting after the year's experience than they did in the beginning.

CHANGES IN WORK LOAD AND SKILLS

One possible cost of telecommuting was that non-telecommuters in a work group would be overworked when the telecommuter was out of the office. A possible added benefit of telecommuting was that the skills of co-workers might improve because of the need for self-reliance in the absence of the telecommuters. Work load shifts and changes in skills were reported in the survey data, but not with the frequency we might have expected.

To understand the dynamics of the work group relationship, researchers were interested in the way in which co-workers and telecommuters interacted, and how each perceived the efforts of the other. When asked how frequently it was true that "*I have to do work that my co-workers should be doing*" only about 14 percent of all respondents said it was "never," in both surveys. Figure 31 shows the results. In the initial survey, co-workers were significantly ($p<.05$) more likely than telecommuters to say the statement was <u>never</u> true (18 percent versus 9 percent). However, in the second survey, they were about equally likely to say it was never true (16 percent versus 14 percent). In the second survey 47 percent of the respondents said they rarely did their co-workers work, 33 percent said they did some of the time, and only 6 percent

said they did it frequently or always. There was no significant shift between the two surveys. This analysis does not give any quantitative support for the existence of an acute problem with co-workers having to pick up the slack when the telecommuters are not in the office.

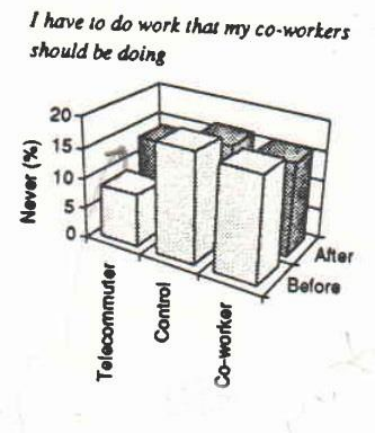


Figure 31

When telecommuters were asked on the second survey if there had been a change in work load of management, professional staff or support staff as a result of telecommuting, virtually none said the work load had changed for the first two categories. However, for the support staff, 16 percent said the work load had gone up and 6 percent said it had gone down. Co-workers responded to this question somewhat more strongly. Twenty-seven percent of the co-workers said that their work load had increased as a result of working with a telecommuter. Co-workers were also more likely to say that their job had become harder (21 percent) than that it had become easier (11 percent). Some also observed that the workloads of other support staff (21 percent), other professional staff (15 percent), and supervisors (9 percent) had increased. Though more emphatic than telecommuters' responses, the percentage of co-workers who noticed a shift in work load due to telecommuting is still fairly modest.

With regard to skill changes, co-workers were asked if their work skills had improved in any of several areas as a result of working with a telecommuter. These areas included productivity, inter-personal skills, dependability, communication skills, ability to work independently, overall performance, project management, personal time management, supervisory skills, and computer skills. The vast majority (between 77 and 90 percent) said that there had been no change in their performance in these areas. The percentage that said performance improved rather than declined was higher for all areas. The highest percentages in improved skills were in ability to work independently (20 percent), personal time management (20 percent), communication skills (17 percent), and productivity (16 percent).

Based on the survey data, the majority of work groups were not affected by telecommuting to any great degree in terms of work load shifting or skill changes. On the other hand, it is important to bear in mind that a fairly large number of co-workers did not respond to the second survey.

SUPERVISION ISSUES

Supervising remote workers

It was expected that supervisors would have concerns about their employees working away from the main office. Such an arrangement may require a different set of supervisory skills and a different relationship between supervisors and workers. We were

surprised at the fairly low rate of concern. When supervisors were asked whether or not they agreed that "*Having employees work in a remote location is troublesome for me,*" only 6 percent agreed in the first survey. In the second survey, the percentage of supervisors agreeing with the statement increased insignificantly to 11 percent. On the other hand, the change scores on this variable suggest that supervisors feel less certain than they did in the beginning about supervising remote workers. Supervisors were significantly ($p<.05$) more likely in the second survey to increase than to decrease their agreement with the statement, *"Having employees work in a remote location is troublesome for me,"* (27 percent increased their agreement and 14 percent decreased their agreement).

The qualitative data back up these findings. Some of the middle and upper managers reportedly expressed dissatisfaction with not being able to find telecommuters at their desks at all times, but most of the immediate supervisors who talked to us were more supportive, and were able to adjust to a different standard of communication and interaction. In a few cases, however, immediate supervisors who started out being very positive ended up agreeing that it was uncomfortable having workers in remote locations. In the cases we are aware of, this change of heart resulted because telecommuters were not communicating effectively or delivering work as planned. These supervisors felt out of control of the situation. One case in particular stands out because the supervisor had been extremely positive about telecommuting at the beginning and helped to write the policy for the organization. The telecommuter, however, worked away from the office almost every day and, according to the supervisor, was not doing his job well and was too far away for the supervisor to intervene effectively. This points to the importance of the distinction between telecommuting one day a week and being permanently "out-stationed," a distinction that will be further discussed below.

Telecommuters supervising others

Overall, thirty-two percent of the telecommuters supervised someone, and the percentage of controls and co-workers who supervised others was about the same. The question of telecommuters supervising others brings up a different supervisory concern. How does one manage to supervise from a remote location? It seems logical that the fewer people one supervises, and the more independent they are, the easier this task would be. Unfortunately, we do not have data that would allow us to compare the success of different telecommuting supervisors. However, a number of telecommuters dropped out of the project after they were promoted to supervisory positions, because they did not

believe it was possible to telecommute and supervise others.

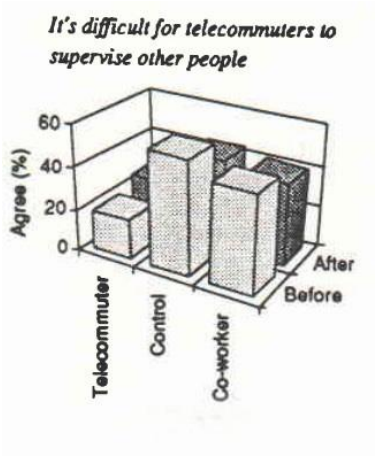


Figure 32

In the survey, participants were asked whether or not they agreed with the statement "*It's difficult for telecommuters to supervise other people.*" Figure 32 shows the results. About one third of the respondents overall in both the first and the second survey felt that it would be difficult for telecommuters to supervise other people. Not surprisingly, in the first survey telecommuters (19 percent) were significantly ($p<.01$) less likely to agree with this statement than either controls (54 percent) or co-workers (47 percent). It is interesting that after experience with telecommuting, telecommuters (25 percent) slightly increased their agreement that it is difficult for telecommuters to supervise other people, while controls (44 percent) and co-workers (40 percent) were slightly (but non-significantly) less likely to agree. This indicates that telecommuters may have been too optimistic about their ability to supervise others, and controls and co-workers may have been too pessimistic. Supervisors were also significantly ($p<.05$) more likely to increase (38 percent) their agreement with the statement, *"It's difficult for telecommuters to supervise other people,"* than to decrease it (14 percent).

Based on the assessments of participants in all the roles, telecommuting does require some shifts in supervisory practices and expectations, and may affect the work group as these shifts are undertaken. Though supervision did not pose major difficulties for most of the participants, the change between the first and second surveys indicates that the telecommuting experience made many people less sure about managing telecommuters or about telecommuters as supervisors.

WORK GROUP INTEGRITY

It was hypothesized that telecommuters might miss out on things that happen in the office and that they would feel isolated from the work group. This in turn might undermine the integrity and functioning of the group. Very few telecommuters in interviews, focus groups and conversations indicated that one day a week telecommuting was enough to cause isolation. On the other hand, nearly everyone who telecommuted several days a week mentioned some difficulties with feeling isolated. It is instructive to consider some of these comments. Though they represent the extreme of telecommuting, they nevertheless highlight some of the potential pitfalls involved in working away from the main office.

Multiple-day telecommuting

For anyone (not just telecommuters) who works away from the office more than once a week, feeling left out tends to be an important concern. One supervisor of out-stationed staff (not telecommuters, but people who work in a satellite office)

mentioned that it was difficult to keep them from feeling detached. In order to keep outstationed people connected to the main office, the supervisor must become their representative as well as their boss.

The few participants who telecommuted four or five days a week also mentioned problems. One said she had to make the effort to find out what was happening in the office because sometimes her supervisor didn't bother to inform her. This telecommuter felt her opinions were not considered when changes in office procedure were made. A woman who has telecommuted every day for several years complained once that her organization was somewhat insensitive to her needs when training sessions were arranged. Training sessions that lasted over three days were difficult for her to attend without making special accommodation arrangements because she lived so far away.

Three people who worked at home four days a week were asked whether they felt they had enough contact with their co-workers. Their jobs were such that they didn't really need to interact to get work done, so the issue was really whether they felt they had enough informal, social contact. One reported that she saw people as much as she needed to. Another said the same thing but added that she didn't know a lot of her co-workers anymore because so many new people had started since she had been telecommuting. She admitted she got some "cabin fever" sometimes, but did not see this as a big problem. Another woman who worked at home three days a week had a job that required that she be available by phone all day. She said she had enough contact with co-workers to get work done and that she's not really very social anyway. Her supervisor expressed mild concern that this telecommuter was somewhat less integrated into the work group because of the lack of informal contact with co-workers.

In one discussion with people who telecommute only one day a week, the telecommuters were hard-pressed to imagine being out of the office five days a week. They said it would be impossible to supervise others under such circumstances; there would be simply no way to stay on top of what other people were doing, no way to maintain the appropriate level of communication. These telecommuters suspected that people who telecommute so frequently do not expect or desire promotion, or they wouldn't do it. For them, telecommuting must be its own reward.

Staying informed

Twenty-five percent of co-workers felt that telecommuters missed out on important things when they were out of the office. Overall, telecommuters were somewhat less concerned that they were

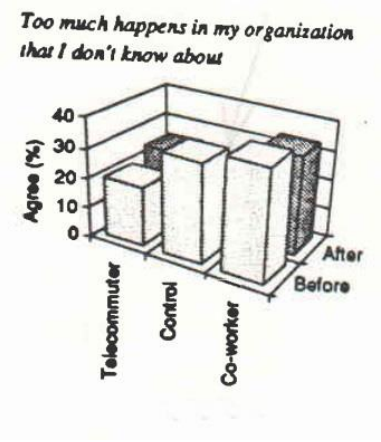


Figure 33

missing out (and this difference of opinion between telecommuters and co-workers by itself may reflect some lack of work group cohesion). One of the questions on the survey designed to investigate this concern about missing out asked participants if they agreed with the statement "*Too much happens in my organization that I don't know about.*" It was thought that since telecommuters worked outside of the office, they would be more likely to agree with this statement than their co-workers or the control group. As shown in Figure 33, overall, 28 percent of all respondents in the first survey and 26 percent in the second survey agreed with this statement. In the first survey, telecommuters (20 percent) were significantly ($p<.01$) less likely to agree with this statement than either controls (32 percent) or co-workers (38 percent). In the second survey, telecommuters increased agreement at 24 percent (an insignificant increase), and controls and co-workers decreased agreement to 21 percent and 32 percent. The difference among roles was insignificant in the second survey. The relative changes were also insignificant.

Thus, the anticipated result that telecommuters may be more likely to feel left out as a result of telecommuting was not confirmed. These results indicate that missing out on things at the office may not be the result of missing one day a week, but of other factors, like one's position in the organization or one's relationship with co-workers. Telecommuters' low rate of agreement compared with the other roles in the first survey underscores again the difference between telecommuters and controls to begin with. The telecommuters as a group are perhaps in positions where they are more frequently privy to information than others may be.

Analysis of public and private organizations further supports the notion that feeling left out may be more a function of the particular individual and organization than of telecommuting itself. Telecommuters in public organizations (24 percent before, and 26 percent after) were more likely in both surveys to say that too much happens that they don't know about than telecommuters in private organizations (13 percent before, and 18 percent after), and non-telecommuters in public organizations (39 percent before, and 31 percent after) were more likely in both surveys to say too much happens that they don't know about than non-telecommuters in private organizations (28 percent before, and 23 percent after).

Enjoying interaction with colleagues

The survey asked participants whether or not they agreed with the statement "*I enjoy social interaction with my colleagues.*" As shown in Figure 34, seventy-eight percent of all respondents in the

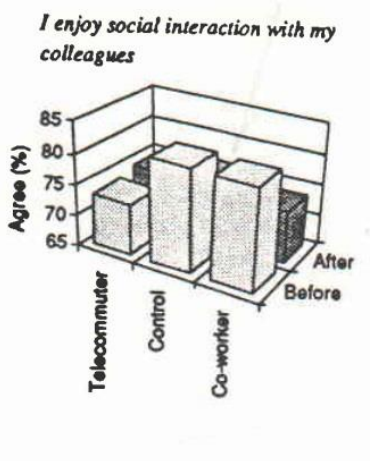


Figure 34

first survey and 74 percent in the second survey agreed. Telecommuters (73 percent) were less likely to agree than controls (82 percent) or co-workers (81 percent). The second survey shows telecommuters responding at approximately the same rate (75 percent). However, the other groups, controls 72 percent) and co-workers (74 percent) were slightly (but non-significantly) less likely to say that they enjoyed social interaction with colleagues.

Before dismissing this decrease, consider that twenty-one percent of the co-workers disagreed with the statement, *"Because my [telecommuting] co-worker telecommutes, our relationship has improved."* Only 10 percent agreed with the statement. These data indicate that telecommuting may have had a negative effect on the relationship between some telecommuters and co-workers, at least in the minds of those co-workers. Qualitative data backs this up. Several co-workers told us that telecommuters were either oblivious to the problems their telecommuting caused for their co-workers, or simply didn't care. The perception that telecommuters were unresponsive to the needs of their co-workers would explain why many co-workers feel negative about the relationship, even while telecommuters were neutral on the issue.

Commitment and team feeling

Supervisors were asked some questions about their employee's commitment to the organization. As shown in Table 14, when presented with two statements concerning telecommuter commitment, most agreed that their telecommuters were committed to the organization. However, there was a significant tendency for them to agree less with these statements over time.

Table 14. Supervisors' Perception of Commitment

	Final % agreement			% Changing agreement		
Statement	Agree	Neutral	Disagree	Incr.	Decr.	Signif.
"This worker feels a strong commitment towards this organization"	73	16	10	13	29	p<.01
"I expect this person to be working for this organization in two years"	71	14	15	10	30	p<.01

On the other hand, when presented with the general statement, *"My work group has a strong team feeling,"* they were equally likely to change their agreement up or down over the course of the demonstration. Telecommuting doesn't clearly affect team feeling

either way, according to these data. Perhaps supervisors dissociate individual loyalty from the overall assessment of team feeling.

None of the quantitative data related to work group integrity indicate that telecommuting has had a strongly positive or negative effect, but they do hint that telecommuting has caused some strain on the relationships in the work group. The qualitative data supports the idea that telecommuting sometimes strains the integrity of the work group.

Co-workers' desire to telecommute

Co-workers' desire to telecommute is one indication of how positively telecommuting is viewed among members of the work group. In the second survey, co-workers were asked if they agreed with the statement, *"I would like to have the opportunity to telecommute."* Sixty percent of the co-workers agreed with the statement. The same question was not asked in the first survey. However, in that survey, all respondents were asked if they had applied to telecommute. Among the co-workers, 11 of the 142 co-workers who answered the question said they had applied. Of those 11, 6 responded to the question about wanting to telecommute in the second survey. Only one did not want to do so. The qualitative observation (in Chapter 3) that some co-workers changed their mind about telecommuting does not seem to indicate a widespread phenomenon.

OFFICE COMMUNICATIONS

What effect did telecommuting have on the ability to communicate effectively to get work done? The qualitative data reflect very different opinions across roles. A number of supervisors and co-workers expressed the opinion in interviews that telecommuting had interfered with effective work group communication. Telecommuters tended to disagree. Survey data does not clearly show that telecommuting affected communication.

Telecommuter availability

Some problems have been reported regarding the telecommuters' availability. One supervisor said that he often found he didn't have as much access to telecommuters as he needed. Two telecommuters in different organizations have said that managers above their immediate supervisors complained that they couldn't find people when they needed them. Much of this may be because the managers have not adjusted to the system, and prefer face-to-face interaction. As one telecommuter said, "*they like to see live bodies.*" As another put it, "*They want to be able to find you at your desk.*"

Another problem reported by some co-workers is that telecommuters often do not stick to the same schedule, and sometimes do not let other people know where they are. This can

be a burden on co-workers who need something, and may also be a problem for customer service and for receptionist staff who have to deal with customer calls.

Many telecommuters, in focus groups and in interviews, have said that they are not always readily available and do not always manage to return all of their calls even on in-office days. People are not always at their desks. They may be in meetings or out in the field or any number of places, so those who drop by cannot be guaranteed to find them. In addition, "telephone lag" is common even in the absence of telecommuting. Some telecommuters claimed that co-workers' and management's complaints about their not being available were not related to telecommuting; they say they are just as hard to find when they are in the office.

Making contact with co-workers

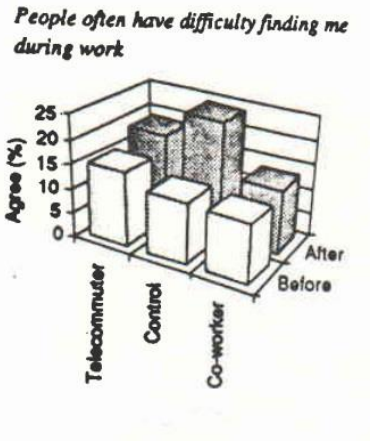


Figure 35

Judging from the survey data, however, not very many people thought they were hard to find at all. A small percentage of participants reported that they agreed with the statement, "*People often have difficulty finding me during work.*" Figure 35 shows the results. Each of the groups - telecommuters, controls, and co-workers responded with slightly (but non-significantly) stronger agreement in the second survey than in the first. Controls reported a change from 14 percent in the first survey to 23 percent in the second survey. The change between the first survey and the second was not as large for either telecommuters (15 percent before, 19 percent after) or co-workers (12 percent before, 14 percent after). There were no significant differences among the roles in response to this question. In general, only a small minority of workers felt it was difficult for other people to find them during work. For those people, it does not seem to be a result of telecommuting, but a result of other organizational factors.

Unexpected visits

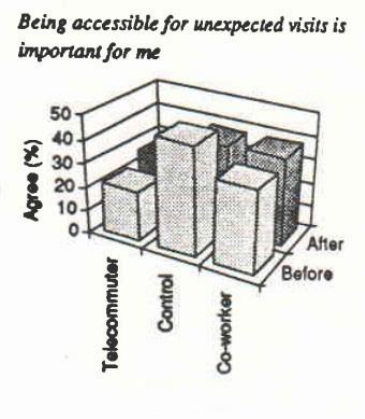


Figure 36

Another communication issue is the extent to which people feel they need to be available for unexpected visits. Researchers expected that telecommuters would say less frequently than other workers that being accessible for unexpected visits is important, because otherwise it would be difficult to telecommute. Participants in the demonstration project were asked to rate the extent to which they agreed with the statement "*Being accessible for unexpected visits is important for me.*" (see Figure 36) Thirty-one percent of the respondents in the first survey, and 32 percent of the respondents in the second survey agreed that being accessible for unexpected visits is important to them. The breakdown by group supported the researchers' expectation in the first survey. Telecommuters (22 percent) agreed at a significantly ($p<.01$) lower rate than either controls (45 percent) or co-workers (36 percent) that being accessible for unexpected visits is important. In the second survey, rates of agreement changed slightly (but non-significantly) to 26 percent for telecommuters, 40 percent for controls, and 37 percent for co-workers. The difference among roles in the second survey was not significant.

Missed phone calls

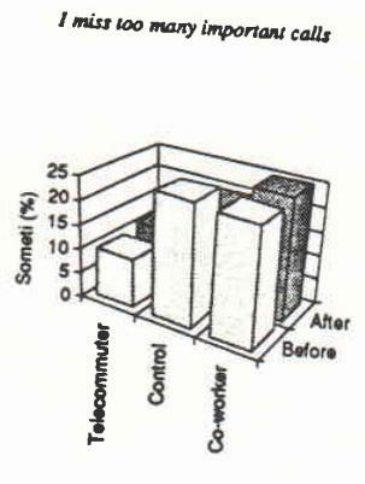


Figure 37

In the survey, participants were asked if they agreed with the statement "*I miss too many important calls.*" Results shown in Figure 37 indicate that missing important phone calls was not a serious problem for anyone - telecommuters or non-telecommuters. Virtually nobody said this was a frequent problem. Only 20 percent of the respondents in the first survey and 17 percent in the second survey said that it was sometimes true that they missed calls. Telecommuters were significantly ($p<.05$) less likely (16 percent in the first survey and 11 percent in the second survey) than people in the other two roles to say that this was sometimes true. Interestingly, the percentage of agreement that respondents missed phone calls was higher for people who had voice mail, for all roles. Perhaps this is because people who have voice mail are aware of what calls they have missed.

Despite the kinds of concerns expressed by co-workers and supervisors in the qualitative data, the surveys show no greater tendency for telecommuters than for anyone else to be unavailable. Telecommuting appears not to be an important factor affecting availability.

Getting timely information

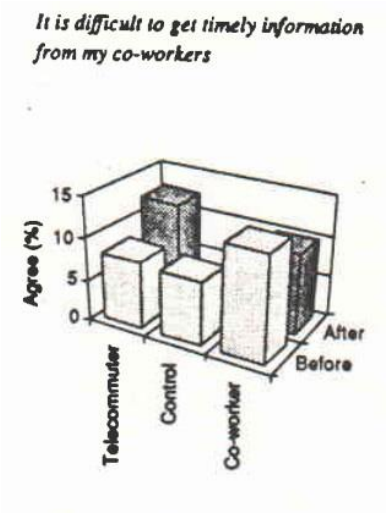


Figure 38

In addition to questions about finding people, the survey also asked participants about a work group's ability to exchange information. They asked participants how often the statement *"It is difficult to get timely information from my co-workers*" applied to them. Figure 38 shows the results. Ten percent of all participants in both surveys said it was frequently difficult. Controlling by role reveals that in the first survey, telecommuters (8 percent) and controls (7 percent) were less likely to say that it occurred frequently than co-workers (13 percent). In the second survey, more telecommuters (13 percent) reported that it was difficult to get timely information from co-workers, while controls (2 percent) and co-workers (10 percent) reduced their perception that the problem occurred frequently. the changes were not statistically significant. The survey results indicate that getting timely information from co-workers was not a serious problem for the majority of the project participants. In particular, the co-workers who did not telecommute actually reduced (though, not significantly) their perception that this was a frequent problem.

Meetings

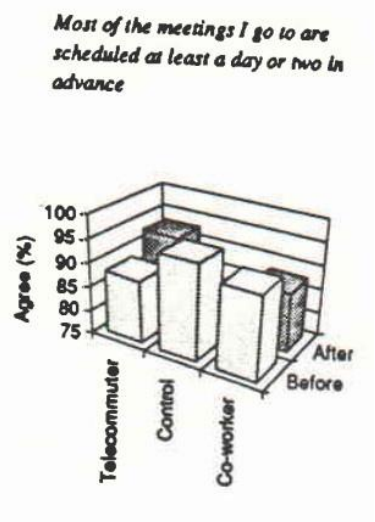


Figure 39

Telecommuting was expected to have an impact on meeting schedules also. Some speculated that telecommuters would miss impromptu meetings, or they would have to come in to the office on their telecommuting days to attend unanticipated meetings.

To measure whether telecommuters can reliably determine when meetings will be held, the survey asked respondents if they agreed with the statement "*Most of the meetings I go to are scheduled at least a day or two in advance.*" Almost all respondents agreed with this statement on both administrations (91 percent for the first and 93 percent for the second). As shown in Figure 39, however, the percentage that "strongly" agreed went down significantly ($p<.01$). Twenty-five percent of all respondents in the first survey and 16 percent of all respondents in the second survey strongly agreed. Comparison by role over time indicates a decrease in strong agreement by telecommuters (before 27 percent, after 18 percent), controls (down from 27 percent to 15 percent), and co-workers (down from 18 percent to 14 percent). Telecommuters did not differ significantly from controls, suggesting that factors other than telecommuting may have caused an increase in impromptu meetings.

On the other hand, when asked if the number of work-related meetings had changed in the past year, telecommuters and co-workers were significantly ($p<.01$) more likely to report that they had decreased than were the controls. Telecommuting did affect the total number of meetings. A reduction in meetings apparently

did not interfere with the communication necessary to get work done, as we show below.

Sufficient time with co-workers

Participants were asked if they agreed with the statement "*My colleagues and I usually have enough time to work together when we need to.*" Figure 40 shows the results. Respondents were just as likely in the second survey (73 percent) as in the first survey (71 percent) to say that they have enough time to work together with their colleagues. Telecommuters were slightly (but non-significantly) more likely than controls or co-workers to agree with this statement in the first survey, perhaps reflecting their more flexible attitude about when it is necessary to work together. Telecommuter agreement was about the same in the second survey (74 percent before, 72 percent after). Controls agreed at a rate of 69 percent in the first survey, and increased their rate of agreement insignificantly to 80 percent in the second survey. Co-workers did not change their responses over time (69 percent before, 70 percent after).

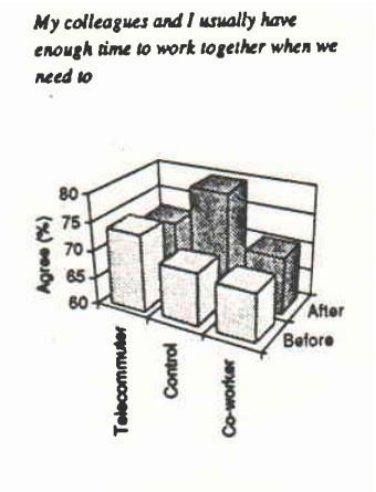


Figure 40

Participants were also asked how frequently it was true that "*My work schedule allows for enough informal contact with my co-workers.*" As shown in Figure 41, seventy-eight percent in the first survey and 81 percent in the second survey of the respondents said the statement was frequently true. Telecommuters reported similar answers in both surveys - 83 percent before, 82 percent after. On the other hand, both controls (74 percent before, 86 percent after) and co-workers (73 percent before, 78 percent after) reported slight increases.

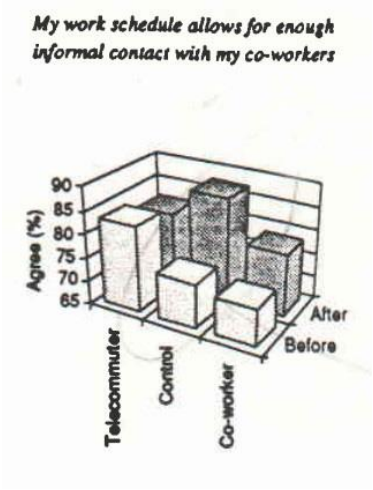
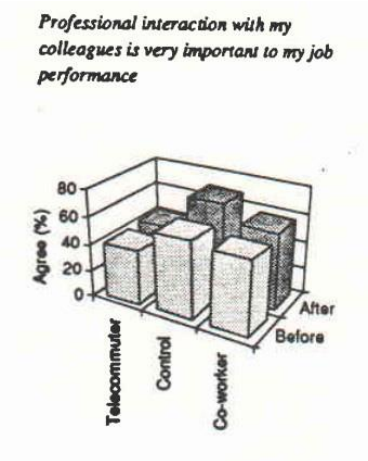


Figure 41

Importance of interaction with colleagues



Thus, people in all roles seemed to agree that they had enough contact with their co-workers to get the job done. Yet it is important to note that telecommuters were significantly (p<.01) less likely than those in other roles to endorse the statement *"Professional interaction with my colleagues is very important to my job performance."* (see Figure 42) Only 40 percent agreed with the statement in the initial survey, compared with 58 percent of the controls. The rate of agreement did not change significantly over time. This brings up a very important point: if telecommuters were less likely than others to feel that interaction was essential to their job performance, then they may have been less likely than others to report that they felt isolated or poorly integrated into the work group.

Figure 42

Supervisor assessments of work group communication

Supervisors too may have been less anxious about how well the telecommuters were integrated into the work group. Recall earlier in this section that the supervisors' concerns involved how telecommuting was affecting co-workers: the concern that co-workers were envious, the skepticism that telecommuting helped the
co-workers to work more efficiently, and so forth. Perhaps the supervisors are less concerned with communication in the work group than with the individual productivity of telecommuters and their co-workers. When presented with the statement *"Because of telecommuting, communications in my work group have become more difficult,"* they were marginally (p<.1) more likely to decrease their agreement (37 percent) than increase it (24 percent). When asked questions concerning communication with members of the work group, the answers were also generally favorable toward telecommuting (see Table 15).

Table 15. Supervisors' Perception of Communication Issues

	Final % agreement			% Changing agreement		
Statement	Agree	Neutral	Disagree	Incr.	Decr.	Signif.
"I'm concerned this employee was less integrated with their work group as a result oftelecommuting"	17	13	70	22	39	p<.1
"Professional interaction with colleagues is very important to this worker's job performance"	60*	40	0	18	39	p<.01

Statement	Final % agreement Agree	Neutral	Disagree	% Changing agreement Incr.	Decr.	Signif.
"Meetings take up too much of this employee's time"	14	32	54	24	20	not sig.
"This employee misses too many important calls"	6	29	65	14	10	not sig.
"This employee's work schedule allows for enough informal contact with co-workers"	82*	18	0	27	26	not sig.
"Being accessible for unexpected meetings is important for this worker's job performance"	27*	63	10	19	18	not sig.
"Telecommuters miss out on training opportunities"	4	8	88	22	10	p<.1
*"Telecommuting made work harder for this employee's co-workers"***	16	18	66	18	33	not sig.

* Categories are actually "always/frequently," "sometimes," and "never"

** In the initial survey, this question was worded as an expectation

Notice that the most significant of these findings ($p<.01$) is the one that shows that supervisors have decreased in their agreement that professional interaction is important to the telecommuters' job performance. According to these responses, there was a tendency for supervisors to feel that interactions with other members of the work group were of less consequence than they may have originally thought, and that communication problems were no worse or better than they anticipated.

SUMMARY

Different people have different perceptions about the impact of telecommuting on non-telecommuters, and some feel more strongly than others. In this section we have tried to determine the impact of telecommuting on the work group as a whole, from a number of different angles. We began by looking at the various attitudes toward and concerns about telecommuting among co-workers and supervisors. Here we argue that co-workers might tend to be more negative about telecommuting than were participants in other roles, because co-workers generally had less input about whether and how telecommuting would be implemented in their group. Supervisors were generally positive, but cautious. We then tried to assess whether telecommuting had resulted in any shifts in the work load of participating groups, whether telecommuting made supervision more difficult, whether telecommuting in any way undermined the integrity of the work group by promoting isolation, and whether telecommuting affected communication and interfered with getting work done. While we

have heard many stories that highlight the negative consequences of telecommuting for the work group, the survey data reveal a more modest impact.

In the chapter of this report concerned with the impact of telecommuting on people's lives, we noted that the highly positive assessments of telecommuting in our qualitative data are not clearly supported by the quantitative data. In this chapter, these data sources are at variance as well, but here it is the negative assessments which participants revealed in interviews and ethnographic observations which are less evident in the survey data. It appears that when participants are given the opportunity in person to express their enthusiasm for, or concerns about, telecommuting, they tend to amplify the impressions provided in the written surveys. In the qualitative data, telecommuters detailed enormous enthusiasm for telecommuting, and some co-workers and supervisors expressed considerable resentment of, and fear, about the possible impact of telecommuting. All these responses were muted in the survey data. Since some care was taken to select people for interviews, we do not think these differences are due to selection artifacts. We feel instead that all these data sources are legitimate expressions of people's feelings about telecommuting and should be taken seriously when deciding whether or not a telecommuting program is appropriate for particular individuals and organizations, and what form such a program should take.

CHAPTER 8
HAVE TELECOMMUTERS' LIVES CHANGED AS A RESULT OF TELECOMMUTING?

The possibility of increased productivity was only one of the reasons individuals and organizations were motivated to try telecommuting. Telecommuting was also expected to have a positive impact on the way telecommuters felt about their jobs and their lives in general. It was anticipated that workers who telecommuted would like their jobs more because they could do better work, and they could avoid some of the stressful aspects of their job, such as commuting. It was also felt that the flexibility offered by telecommuting would improve people's personal lives, and that stress caused by commuting would be reduced. These changes would benefit not only the individual telecommuter, but perhaps the organization as well.

The potential of telecommuting to improve worker morale may indeed have been a major reason for organizational interest in telecommuting. At the end of the project, for instance, one supervisor at a large public organization remained a bit skeptical about the benefits of telecommuting. He nevertheless acknowledged that most of the telecommuters liked it; they enjoyed having time to work away from the interferences at the office. Although he was a little frustrated that he couldn't always find people when he wanted them, and he was skeptical because there was really no way to measure the productivity of telecommuters under his supervision, he thought the morale improvement was significant. He said that this alone might be enough to justify the continuation of telecommuting. A supervisor at another public organization, referring to the lack of flexibility she had to reward employees for good performance, said of telecommuting, "*It's one of the things we can do to repay people... who put so much into their jobs.*"

How rewarding did telecommuting in fact turn out to be for the telecommuters? This section examines survey and interview data that relate to the issue of how telecommuting affects personal life and attitudes about the job. After looking at measures of job satisfaction and stress, workers' perceptions of flexibility and how they utilize it, and the relationship between work and home life, we note that the surveys and the qualitative data tell rather different stories. Qualitative data alone would yield the conclusion that telecommuters notice some improvements in their lives, and attribute some of these to telecommuting. The surveys, however,

show no significant changes on the relevant questions, leading to the conclusion that telecommuting has not greatly affected people's lives.

JOB SATISFACTION

Job satisfaction has numerous components, and the survey provided information on a number of these. One of the scales, LIKEWRK (liking work), developed for this project, combines several of the variables from the survey. An analysis of the changes in this scale

show little impact of telecommuting. Average scores across roles are not significantly different for either survey. In addition, the changes in scores do not differ significantly between roles. It should be noted, however, that all scores on the scales went down over the course of the demonstration, but the telecommuter average score went down less (not significantly so) than the other two roles. This is hardly overwhelming support for the contention that telecommuting improves morale and job satisfaction.

A further analysis comparing the changes in scores between roles revealed an important phenomenon: even though the average change in scores did not differ significantly among roles, the spread of scores often did. For instance, only 21 percent of the telecommuters had the same score on LIKEWRK (liking work) in the initial and final surveys. For the controls and co-workers, 42 and 32 percent, respectively, had the same scores. This difference between telecommuters and controls is statistically significant ($p<.05$). Telecommuters, then, were more apt to change their attitudes about their jobs than were members of the comparison group. This shows a telecommuting effect, but because people changed their attitudes in both positive and negative directions, the average comes out the same. The major point here is that telecommuters had disparate responses to the experience.

Relationship between job performance and job satisfaction

There is an extensive literature in organizational psychology that deals with the relationship between job performance and job satisfaction. The basic contention is that there is a relationship between the two, and that causation goes both ways.

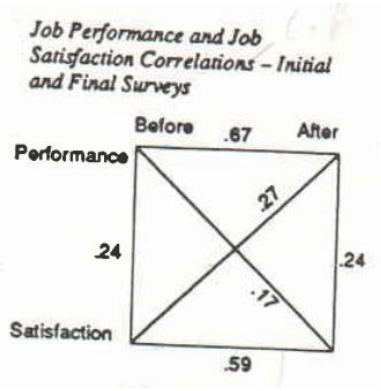


Figure 43

Since we have data over time, it is possible to estimate the directionality of this relationship with these data. Does improved job performance result in higher job satisfaction, or does higher satisfaction lead to better performance? Figure 43 shows the cross-lagged correlations between JOBPERF (good job performance) and LIKEWRK (liking work) in the first and second surveys for all respondents to both questionnaires. The numbers on the lines in the figure refer to the correlations between the items at each end of the lines. For instance, .27 is the correlation between the satisfaction measure on the first questionnaire and the performance measure on the second questionnaire, and .67 is the correlation between the first and second score on the job performance scale. All the correlations are significantly different from 0. The interpretation of this figure is as follows:

- the measures of job performance and job satisfaction remain somewhat stable over time (.67 and .59 are significantly different than 0),
- job performance and job satisfaction are significantly related to each other (.24 is significant for both administrations of the questionnaire), and
- using cross-lagged correlational analysis, there is a trend (nonsignificant) for higher job satisfaction to lead to better job performance than the other way around (.27 is greater than .17, but not significantly so).

The interpretation of the direction of causality based on the differences in correlations should be done cautiously because of the lack of statistical significance of the difference in the cross-lagged correlations. In addition, the one year lag (the time between the administrations of the questionnaire) may be inappropriate as the period during which causation occurs. If increased job satisfaction leads to better performance sooner than one year, the one year lag may fail to capture the effect.

The significant bi-directional relationship between satisfaction and performance in the survey data certainly underscores the idea that satisfaction and performance may both be affected by telecommuting. On the other hand, the survey data shows little evidence that telecommuting has affected satisfaction. Several measures of job satisfaction are discussed below.

Attitude about promotions

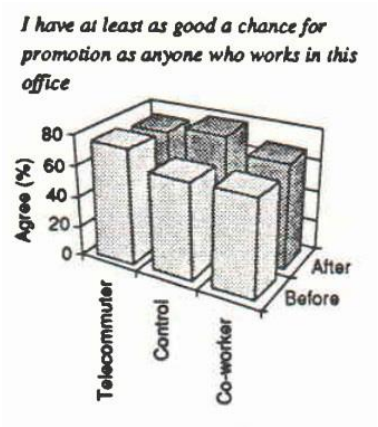


Figure 44

How people feel about their chances for promotion is one measure of job satisfaction. Participants were asked how strongly they agree or disagree that "*I have at least as good a chance for promotion as anyone who works in this office.*" Researchers were curious if being away from the office would make telecommuters feel as if they were less likely to be promoted. As shown in Figure 44, in the first survey, 69 percent of all respondents agreed that they had as good a chance for a promotion as anyone who works in their office. This percentage increased insignificantly to 72 percent in the second survey. Before the telecommuting project began, telecommuters were somewhat more confident (p=.08) about promotions than the other two roles, agreeing at a rate of 75 percent, compared with controls and co-workers, both at 63 percent. However, in the second survey this trend reversed. Controls (79 percent) became the group most likely to agree that they have as least a good chance for a promotion as anyone in their office. The telecommuters' agreement rate decreased slightly to 72 percent, while the co-workers' increased slightly to 68 percent. These differences are not large enough to infer a large impact of telecommuting on perceived promotability.

Training opportunities

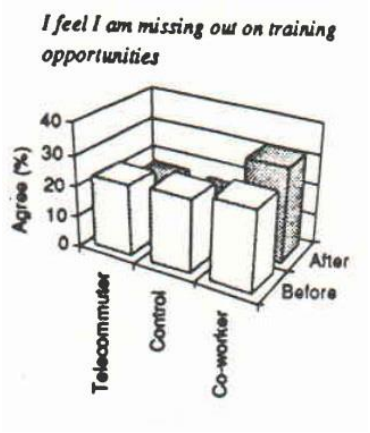


Figure 45

Another potential aspect of job satisfaction is the perceived ability to improve one's job performance. It was feared that telecommuters might feel less able to take advantage of training opportunities. Participants were asked whether or not they agreed with the statement "*I feel I am missing out on training opportunities*." The fears that telecommuters miss out on training opportunities were not borne out in the survey data. Twenty-four percent of all respondents in the first survey and 21 percent in the second survey agreed that they felt they were missing out on training opportunities (see Figure 45). In the first survey, there were only small discrepancies between groups: telecommuters - 23 percent, controls - 24 percent, and co-workers - 27 percent. In the second survey, agreement among telecommuters decreased (16 percent), and controls also decreased (17 percent), while co-workers agreed at a significantly higher (p<.01) rate (30 percent). Decreasing rates of agreement shows that groups do not feel they are missing out on

training opportunities. Thus, telecommuting does not appear to make telecommuters feel as if they are missing out on training opportunities. If anything, they are less fearful.

Commitment to the organization

It was expected that telecommuting would cause people to feel more committed to their organization. Indeed, many telecommuters commented in interviews and focus groups that the

option to telecommute made them feel more loyal to their organizations, because they felt their organizations were exhibiting a lot of trust in them. In a few of the cases where people telecommuted four or five days a week, people admitted to feeling somewhat detached from the organization, but the vast majority of telecommuters interviewed indicated a commitment to their organization.

The questionnaire inquired about commitment to the organization through two separate questions. One asked participants if they agreed with the statement "*I feel a strong commitment to my organization*", and the other asked if they agreed with the statement "*I expect to be working for this organization in two years.*"

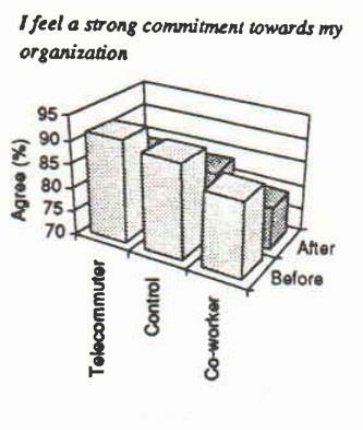


Figure 46

Regarding the first question (see Figure 46), in the first survey 89 percent of all respondents agreed that they felt a strong commitment towards their organization. In the second survey, this rate decreased to 82 percent. This trend was reflected in comparisons by role. In the first survey telecommuters agreed at a slightly (but non-significantly) higher rate (92 percent) than controls (90 percent), or co-workers (86 percent). All of the results are lower in the second survey, although telecommuters remain in the most committed group. Telecommuters reported agreement at 84 percent in the second survey. Controls agreed at a rate of 84 percent and co-workers at a rate of 79 percent.

Interestingly, even though the average change in responses to this question was the same for telecommuters and controls, adding the shifts in both directions shows that telecommuters were significantly ($p<.05$) more likely to shift (41 percent) agreement than controls (23 percent). This reinforces the notion that telecommuters had very different kinds of responses to their experience. They tended to either really like some aspect of telecommuting or dislike it greatly. These results also suggest that telecommuting may not be an overwhelming factor in making workers feel committed to an organization. Furthermore, in contrast to what the qualitative data might lead one to believe, analysis of the data shows that there is no correlation in the survey data between commitment to the organization and the frequency of telecommuting.

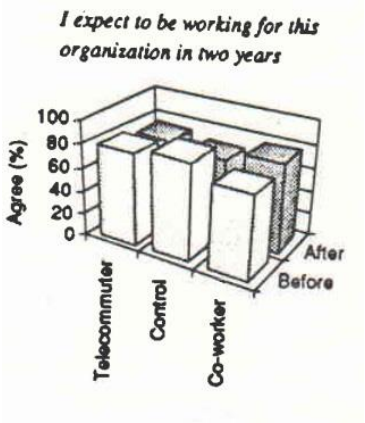


Figure 47

Regarding the second question, seventy-eight percent of the respondents in the first survey and 73 percent of the respondents in the second survey agreed that they expected to be working for their organization for the next two years. Figure 47 shows the results. In the first survey, controls (85 percent) agreed at a higher rate than either telecommuters (79 percent) or co-workers (71 percent). The results of the second survey revealed that co-workers were the most likely to agree (76 percent), followed by telecommuters (72 percent) and controls (69 percent). The significant ($p<.05$) drop in the percentage of controls agreeing is difficult to explain. The lack of increase among the telecommuters is unexpected because it was anticipated that telecommuting would be viewed as a privilege and lead telecommuting employees to feel more committed to an organization. According to these results, the option to telecommute does not obviously enhance commitment to remain at the organization. A possible explanation is that telecommuting leads workers to feel autonomous and more detached from their organization. Again, however, there was no significant difference in response to this statement related to frequency of telecommuting.

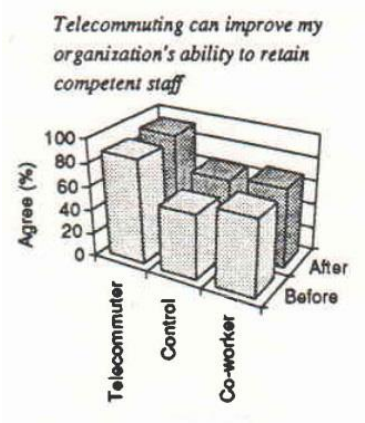


Figure 48

It is interesting to note that, although the ability to telecommute does not necessarily make employees more likely to expect to be working at their organization in two years, other data in the survey indicate that telecommuters do believe that the option to telecommute increases an organization's ability to retain good employees. Respondents were asked whether or not they agreed with the statement, "*Telecommuting can improve my organization's ability to retain competent staff.*" As reported in the section on initial attitudes toward telecommuting and as shown in Figure 48, 75 percent of all respondents in the first survey agreed. In the second survey, overall support increased to 79 percent. Telecommuters agreed to the statement at a significantly ($p<.01$) higher percentage (92 percent) than either controls (66 percent) or co-workers (67 percent). Changes over time were not significantly different across roles.

This illustrates an important point: that there is some discrepancy between people's belief or opinion that telecommuting enhances employee commitment, and their reports about their own commitment - which the survey results show to be virtually unaffected over time by telecommuting. Nevertheless, it must be remembered that telecommuters' commitment may have already increased by the time of the initial survey, because they already had the option to telecommute. It would have been more informative to be able to measure telecommuters' commitment

prior to their knowing they would be able to telecommute, and see if that commitment changed once they knew they had the option to telecommute. As already mentioned, several people commented in interviews on their increased loyalty to their organization as a result of having the option to telecommute, and at least one highly valued employee was coaxed into staying at his organization by the option to telecommute. It is important that telecommuters believe at a higher rate than other participants that telecommuting enhances an organization's ability to retain competent staff, even if the rate of agreement does not increase over time. Telecommuters may well be reporting their own experience, not just expressing an abstract belief in the value of telecommuting.

Liking work

Respondents were asked to what extent they agreed with the statement "*I look forward to starting work each day*." Researchers expected that if telecommuters were more satisfied with their job, they would be more likely to look forward to starting work each day. As shown in Figure 49, overall, about half of the respondents agreed. This was true for the first (55 percent) and the second (52 percent) administration of the survey. Telecommuters (59 percent) and controls (62 percent) were initially significantly ($p<.01$) more likely to agree with this statement than co-workers (42 percent). In the second survey, telecommuters and controls agreement was about the same as the first (55 percent and 57 percent, respectively). Co-worker agreement increased to 48 percent, making the differences among roles insignificant in the second survey. There is no evidence from this survey question's answers that job satisfaction is affected by telecommuting.

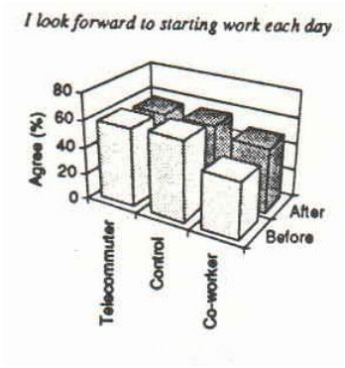


Figure 49

STRESS

Telecommuting was expected to have an impact on people's personal lives in a variety of ways. Working at home should give people relative freedom to design their own work day, for example, and it was anticipated that telecommuting would provide a good strategy for some women on maternity leave to "ease back" into the workplace. Telecommuting was expected to help to reduce stress, by shortening the commute trip if in no other way.

However, our data do not reveal any reduction in stress due to telecommuting. An analysis of our HISTRES (high job-related stress) scale, which measures general job stress levels, shows that telecommuters scored higher than either co-workers or controls in both the initial and final surveys. On average, stress levels increased for participants in all roles over the course of the study, and the **stress levels of telecommuters increased significantly more than stress levels of either co-workers or controls increased**. This finding is especially significant since

telecommuter stress levels were already relatively high in the beginning.

These findings cannot be explained from our quantitative results. However, the interviews and ethnographic data reveal that many features of organizational environments provoked stress among our participants, and that telecommuting was often one of their lesser concerns. Downsizing was evident in many of the organizations, for example, leading some participants to worry about whether their jobs themselves were in jeopardy. Against this background, the stress due to commuting often seemed relatively unimportant. High stress levels may have led some telecommuters to choose this work option, and for some of these their new relationship to their organization during these uncertain times may have served to enhance their stress.

FLEXIBILITY

One of the primary potential personal advantages for telecommuting is improved flexibility in schedules. Telecommuters are expected to be able to accommodate other needs in their life more flexibly when they have more control over when and where they work.

Do telecommuters exercise their option for flexibility?

Several people in the study who telecommute three or four days a week were asked in interviews whether their schedules at home differed from schedules at work. One woman had always been on a slightly different schedule than her co-workers, starting and finishing two to three hours earlier than others in the office. Her

situation allowed her to be on a different schedule because everyone in the office works independently of each other. She had to get up early to avoid the congested traffic, so she got to work by 5:30 a.m. On her days at home, she had the luxury of not starting until 6 a.m.!

Another woman said she could have a more varied schedule at home if she wanted to, but that she prefers to start at the same time and get her work done early. Another woman also keeps the same schedule at home as at work, largely to make things easier for her co-workers. She has a lot of calls during the day, and the receptionist knows she can just forward them to her home. If she does want to go out on an errand or something, she lets people know so they will take messages instead.

Many people apparently felt the need to stick fairly closely to their normal schedule, either to accommodate their co-workers or to help ensure their self-discipline. Nevertheless, several people expressed some relief at just knowing they could run an errand here or there if they needed to.

In terms of longer-term flexibility, a number of people found that telecommuting helped them to manage personal situations in their lives: personal illness, family illness, maternity leave, etc. People who would otherwise have had to be on extended leave were able to continue working. One woman who had taken maternity leave said that because of telecommuting, she was able to stretch her time away from the office from two to three months without falling further behind in her work. Another telecommuter appreciated being able to spend more time at home with his wife during her terminal illness. Others valued the increased flexibility in their work schedules.

Significantly, however, most of these people had jobs that did not require a great deal of contact with other people in their office or with clients. This suggests that people who telecommute were selected or applied, in part, because they had better than average flexibility to accommodate telecommuting into their schedules.

Perception of professional flexibility

The survey results support this observation, indicating that telecommuters claimed to have more flexibility than controls and co-workers to begin with. They also maintained this flexibility over time. Participants were asked if they agreed with the statement "*I have a great deal of flexibility in my professional life.*" As shown in Figure 50, in both surveys, 71 percent overall agreed. Telecommuter agreement was significantly ($p<.01$) higher than controls in the second survey. Among telecommuters, there was a slight (but insignificant) increase in agreement in the second survey (from 77 percent to 83 percent). In contrast, the percentage of controls who agreed that they have a lot of flexibility in their professional lives actually decreased in the second survey (66 percent before, 55 percent after). Co-workers, who agreed with the statement at the lowest rate (64 percent) in the first survey, reported very similar rates in the second survey (63 percent).

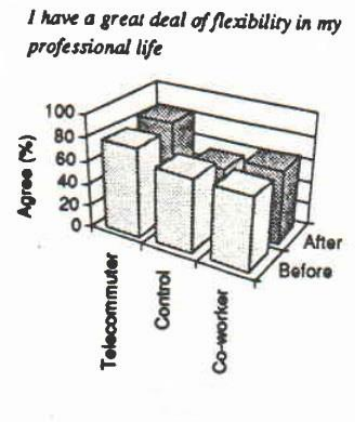


Figure 50

The results suggest that telecommuters were able to maintain this flexibility, while the controls indicated a reduction in flexibility (However, the lack of change among co-workers over time makes it difficult to support the contention that workers in general were losing flexibility). As with commitment to the organization, we are unable to tell whether or not telecommuters' perceptions of flexibility dramatically increased as a result of knowing they had the option to telecommute, because this would have occurred prior to the administration of the first questionnaire. It is important that telecommuters perceive more flexibility than do the other participants, even if their responses don't change over time. Unfortunately, we cannot know whether to interpret this as an aspect of selection bias (people selected to telecommute have more

flexibility to start with) or whether telecommuters' perceptions changed before we were able to administer the survey.

TELECOMMUTING AND THE RELATIONSHIP BETWEEN WORK AND HOME LIFE

Telecommuting potentially can have positive impacts on employees' personal lives. Since telecommuters have more control over their time and place of work, they have the opportunity to deal with demands of home life more easily. If they are happier in their work, that happiness would be expected to carry over into other parts of their lives.

Effect of work on home life

There was some evidence that the impact of work life on home life was a major motivation to telecommute. In the drop-out analysis, we found that those who ultimately continued telecommuting for the whole year were more likely to have reported initially that their job demands created stress at home than were those who ultimately discontinued telecommuting (42 percent versus 23 percent). A strong commitment to telecommuting was associated with an apparent desire to reduce stress at home. Anecdotal information supports the idea that telecommuting reduces stress for some people, and that satisfaction with work carries over into a happier home life. Survey data, on the other hand, provide no evidence that telecommuting helps reduce stress.

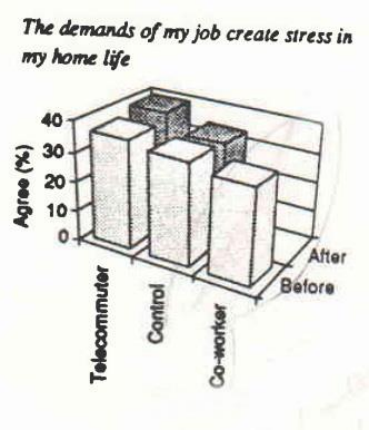


Figure 51

Project respondents were asked if they agreed with the statement "*The demands of my job create stress in my home life*." In the initial survey, 35 percent agreed. In the second one, 38 percent agreed. Figure 51 shows the results. The change is statistically insignificant, but is consistent with the observation (mentioned earlier) of increased stress in people's lives. Telecommuters were slightly (but insignificantly) more likely to agree with this statement than the participants in the other two roles. The responses to this question give no indication that telecommuting alleviates stress in home life caused by work demands.

Effect of home life on work quality

There was little evidence that home life had an adverse effect on the telecommuters' ability to maintain a telecommuting schedule, or on the quality of work performed at home. Participants were asked the extent to which "*The demands of my home life adversely influence the quality of my work.*" As shown in Figure 52, eighty percent of the respondents replied "rarely" or "never" on the first survey, and 76 percent replied similarly on the second survey. There were no significant differences among the roles in either survey. However, telecommuters were significantly ($p<.05$) more likely to change their response one way or the other than were controls. Fifty-one percent of the telecommuters changed, compared with 28 percent of controls.

Maintaining the boundary between work and home life

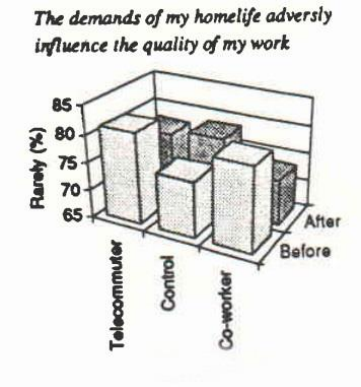


Figure 52

There were a number of comments in interviews and focus groups about how telecommuters manage the time and spatial boundaries between work and home life. Many interviewees said that they tend to work odd hours. Some volunteered that they get "carried away," and work more hours than they had expected to, though very few said they were workaholics at home. Parents continued to use day care for their children on telecommuting days. (One parent who had an excellent day care center near his office but far from home "commuted" twice on telecommuting days: once to deliver children, and once to pick them up!)

Comments in an early focus group were revealing about difficulties in juggling multiple roles while telecommuting. One woman made repeated references to meal-cooking and other family care tasks she continued to do while being an at-home employee. She commented that telecommuting has made some of these tasks easier and others harder to "juggle." Even though she was used to this juggling, the issue of multiple roles in the same space was tricky for her. Other attendees agreed with another woman when she said it was sometimes difficult when working at home to refrain from cleaning up the kids' messes.

The first woman even commented that she missed her commute on days when she worked at home because the commute time gave her the opportunity to shift roles mentally: "[Driving] *over bridges and things...I mean it's time-consuming, but it is not bad...I adjust from employee to mother then...I can be preparing myself for meeting my kids...whereas when I am [working] at home there isn't any transition...It still is kind of...a shock to my system."* This issue was rarely raised in the later stages of the project, suggesting either that telecommuters had solved the problem of boundary ambiguity, or had simply learned to live with it.

The survey data indicate that most telecommuters felt able to keep work and home life separate. In the introduction we describe two scales which are related to satisfaction with personal life. GOODHOM is a direct measure of how positively respondents perceive their social and home life to be, and SEPHOME, a mixed variable, appears to be strongly related to how effectively people think they can keep work and homes lives separate.

There were no significant differences among roles in the first and second administrations of GOODHOM, and any changes over time did not differ among the participant roles. But responses to SEPHOME revealed in both administrations of the survey that

telecommuters felt that they could keep their work and home life separate significantly better than other project participants. It is possible that telecommuters are simply more sensitive to this issue, and that initial survey responses were based on a desire to show that they could handle working at home. The fact that their perception held over time implies that they thought they were successful in doing so.

SUMMARY

There is support in the qualitative research for the contention that telecommuting creates improvements in some peoples' lives, but, in contrast to gains in productivity, there is very little quantitative support for this assertion. In terms of increased flexibility, the alleviation of stress, and improvement in home life, the survey data do not reveal the positive changes we were expecting between administrations. For some of these measures, internal analyses suggest that telecommuters may have anticipated such gains prior to administration of the first survey and that it was impossible statistically to separate this from actual changes in attitude. The fact that the survey failed to substantiate the results of the qualitative research may be due to inadequacies in the survey instrument's ability to produce reliable data for these issues. Taken together, the survey data show that telecommuting had mixed effects, with little evidence of general improvements in people's lives, while the qualitative data record strong and consistent endorsements from many of the telecommuters of the advantages telecommuting brings to one's personal life.

CHAPTER 9
HAS TELECOMMUTING AFFECTED TRANSPORTATION AND ENERGY USE?

One of the reasons for the growing policy interest in telecommuting is that it offers the potential for reducing vehicle trips, with concomitant reductions in energy use and environmental pollution. Thus far, the assumption has been that each time someone works at home or at a telework center significantly closer to home than the main office, vehicle miles traveled are reduced. Testing this assumption has been one of the primary purposes for the telecommuting evaluation project.

There are several possible ways that a potential reduction in vehicle miles could be overridden by unforeseen consequences of telecommuting. Conversely, telecommuting could enhance people's consciousness about energy efficiency and conservation. This section of the report discusses the reduction in commute trips as reported by participants, and explores some of the ways that those kinds of trip reductions may be offset by other increases in travel or home energy use, or augmented by other types of transportation efficiencies engendered by telecommuting. Before presenting the analysis of the trip reductions, we discuss the commute patterns and attitudes of telecommuters and the comparison group, in order to demonstrate the strong motivation within this particular sample of telecommuters to avoid the commute.

The data presented here are from questionnaires administered at the beginning of the project and again about one year later. Travel diary data were also collected, but are analyzed elsewhere. Some types of changes in travel behavior may occur over time regardless of telecommuting, so it is important to compare the experiences of telecommuters with a comparison group of people from the same environment who did not telecommute. In this section of the report, co-workers and controls are combined for comparison purposes. For some types of analysis (especially of organizational issues), it would be inappropriate to compare co-workers with telecommuters. However, in this section, we assume that the fact that someone is working directly with a telecommuter will have little effect on their travel behavior.

COMMUTE PATTERNS AND STRESS

Telecommuters differed from the comparison group in their commute times and distances. Table 16 shows the average number of minutes to commute to and from work for telecommuters and the comparison group before and after the study. Only those

respondents who supplied information on both surveys and whose commute changed by less than 100 minutes were included in this analysis. Three things are evident from these data: First, telecommuters have significantly longer commutes than the comparison group. The average commute times are from 12 to 19 minutes longer. Second, commute times decreased slightly (but not statistically significantly) over the year. The perception that traffic congestion is getting worse is not supported by these findings. The

third finding (consistent with other travel studies' findings) is that the afternoon commute takes longer than the morning commute. Traffic congestion is usually worse in the afternoon, primarily because there are more non-commute vehicles on the road in the afternoon than in the morning.

Table 16. Average Commute Times

	Telecommuter	Comp. Group
Before		
To	40.6	26.6
From	45.5	28.8
After		
To	39.5	23.5
From	44.1	27.6

*Telecommuting is a great way to accommodate those who live greater distances from the office. (*public telework center participant)

The average commute distance was 18 miles for telecommuters and 8 miles for the comparison group. This finding calls into question the appropriateness of the comparison groups, or the representativeness of the telecommuters. The length of commute undoubtedly was a factor influencing who applied, and perhaps even who was selected, to participate in the telecommuting project. In addition, though, differences in the distance from work may correlate with other demographic or lifestyle differences. Since, on the average, members of the comparison group live less than half the distance from work than the telecommuters, it could be that their lifestyles, attitudes, and choices about work and travel differ significantly from those of the telecommuters.

Participants were also asked a series of questions concerning their likelihood of changing commute times. The reasons they could have chosen included congestion, family schedules, personal preference, errands, work-related, and other reasons. The telecommuters differed from the comparison group on only one issue, how likely they would shift their commute start time because of congestion. Telecommuters were significantly more likely to

shift due to congestion than was the comparison group (47 percent versus 27 percent). One possible explanation for this difference is that telecommuters' jobs allow more freedom or flexibility in scheduling than do the jobs of the comparison group. Another possible explanation is that telecommuters might be more sensitive to the stress of negotiating heavy traffic, and that sensitivity is a large part of their motivation to telecommute.

Commute stress

Telecommuters were much more likely to report stress from their commute than were members of the comparison group. Table 17 shows the results from the first administration of the questionnaire. The results on the second administration were very similar.

Table 17. Commute Stress (before demonstration)

How stressful?	TCer	Comp. Group
very	10	4
somewhat	31	14
slightly	39	35
not at all	20	47

A strong correlation between length of commute and commute stress has been reported in other research.[5] The findings in this study corroborate that. Table 18 shows the percentages of people who report that their commuter trip is "very" or "somewhat stressful." The overall differences across commute length groups is highly significant. However, even when commute length is controlled for, one can see that telecommuters report more stress than the comparison group, at least for the long commute trip.

Table 18. Percent Saying Their Commute Trip is Very or Somewhat Stressful (before demonstration)

Commute dist.	all	TCer	comp.
0-5	10	7	11
6-10	14	17	13
11-20	37	40	34
>20	48	56	22

Another piece of evidence that stress is a motive for telecommuting is the fact that, among the people who initially telecommuted in this project, those who continued to telecommute

[5] See, for example, Stokols, et. al., "Traffic congestion, Type A behavior, and stress," Journal of Applied Psychology, 1978(Aug), Vol. 63(4),467-480.

had longer commute trips than those who stopped telecommuting. Avoiding a long and stressful commute was a strong incentive to continue.

COMMUTE TRIP REDUCTION

One of telecommuting's greatest potential environmental benefits is the reduction in the number of commute trips made. Even though commute trips constitute about 25 percent of all trips, they occur during the most congested times of the day, and any reduction will be environmentally beneficial. In this section, we present evidence of the impact of telecommuting on commute trip reduction.

Transportation mode definition

All respondents to the survey were asked how many days per week they used each of several modes of travel to and from work. The possible responses included the following modes:

- drive alone,
- walk to bus,
- drive to bus,
- drive to vanpool,
- carpool (2 person),
- carpool (3 or more persons),
- vanpool,
- motorcycle/moped,
- walk or run,
- bike,
- ferry,
- dropped off by someone else, and
- other.

Though the respondents were allowed to respond with more than one mode, responses were reduced to a predominate mode, defined as the one used most often during the week. When different modes were combined in the same day, the one using the longest distance was assumed to predominate. Since we did not have explicit information on the distance of each mode, we used a "most likely scenario" in the few cases which were ambiguous. For instance, if someone said they "drove alone" and "walked" to work five times per week, we assumed they drove further than they walked and coded them as "drive alone." For the purpose of analysis, the data were recoded into seven modes:

- drive alone,
- drive/bus,
- walk/bus,

- pool (carpool and vanpool),
- human powered (walk, run, or bike),
- drop-off, and
- other (motorcycle, moped, ferry, other).

Transportation mode shift

Table 19 shows the initial and final commute modes of telecommuters and the comparison group for people who responded to both surveys. None of the differences are statistically significant. The telecommuters do not differ significantly from the comparison group, and neither group changed significantly, on the average, over time.

Table 19. Usual Mode to Work

	Before		After	
Mode	TCer	Comp. Group	TCer	Comp. Group
SOV	60	68	60	64
Drive/bus	10	7	13	7
Walk/bus	8	7	3	11
Pool	18	13	21	15
Human-power	1	2	1	2
Drop off	1	2	1	1
Other	2	1	1	0

When one looks at the individual shifts in mode over time, similar results occur. For both the telecommuters and the comparison group, a little over one-fifth of the respondents shifted their usual mode over the course of the one year study. Table 20 shows the results. The shifts were classified as environmentally benign or detrimental. An example of an environmentally benign shift is from an SOV commute to a walk/bus commute. An environmentally detrimental shift would be in the opposite direction. The fact that over one-fifth of the respondents shifted usual mode to work is not extraordinary. Most panel surveys of mode choice result in similar findings.[6] There was a slight but non-significant tendency for telecommuters to shift away from environmentally benign modes more than did the comparison group.

6 See, for example, Ulberg, Cy, "Perceptions of Travel Modes and Measured Travel Behavior: Initial Findings from the Puget Sound Transportation Panel," Proceedings of the Sixth International Conference on Travel Behavior, May, 1991, Tome 1, pp. 366-382.

Table 20. Individual Mode Shifts

Environmental Direction	TCer	Comp. Group
Benign	8 (7%)	16 (13%)
Same	91 (81%)	98 (80%)
Detrimental	13 (12%)	8 (7%)

Trip reduction

To assess the reduction in commuting for telecommuters, the number of days that each mode was used at the end of the project was subtracted from the same figure at the beginning of the project. Table 21 shows the average change in the number of trips per week for each mode, for telecommuters and the comparison group. One can see that telecommuters made fewer SOV trips, as well as fewer transit and pool trips. The average reduction in weekly commute trips for telecommuters was .51. Some telecommuters who said they worked at home some of time also said that they usually went to the office five or more days per week. It is possible that some of the respondents misunderstood this question. For the comparison group, overall average trips per week decreased by .21.

Table 21. Change in Trips by Mode

Mode	TCer	Comp. Group
SOV	-.32	-.31
Drive/bus	.08	.00
Walk/bus	-.17	.14
Pool	-.17	.10
Human-power	.00	-.06
Drop off	.01	-.02
Other	.06	-.02
TOTAL	-.51	-.21

None of the changes in individual modes was statistically significant by itself, but the pattern of changes was suggestive. The reduction in overall trips by the comparison group consists of a reduction in SOV trips and an increase in transit and pool trips. *In fact, the reduction in SOV trips in the comparison group was almost the same as the reduction in the telecommuter group*. Whereas telecommuters simply reduced SOV trips, the comparison group reduced SOV trips by shifting to transit or ridesharing modes. The shift from SOV trips to forms of ridesharing in the comparison group is probably the result of the emphasis on TDM measures in the organizations in the study. In addition, some of

the comparison group members may have worked at home sometimes during the course of the study.

That the comparison group reduction can be partially explained by vigorous TDM programs in some organizations is supported by the fact that the comparison respondents in four of the organizations (38 people out of a total of 123 in the comparison group) had an average decrease of 1.21 SOV trips per week. These four organizations account for almost all of the reduction in SOV trips by the comparison group.

There are a number of possible reasons why the telecommuting group did not increase its use of transit and rideshare along with the comparison group. One explanation is that telecommuters already were making a choice that reduced commute trips. Another explanation is that telecommuters live or work where transit service is less available, timely or convenient (recall that they live a greater average distance from work than the comparison group). A third explanation is that telecommuting itself makes it harder to be part of a ridesharing situation because of scheduling (especially if people alter their telecommute schedules to fit changes in work demands), or makes it less economical to buy transit passes. It is important to find out whether telecommuting reduces people's ability or desire to participate in other strategies that reduce SOV trips, or whether it is simply that these particular telecommuters live or work where transit and rideshare services are less available or convenient. We do not have the data to make such a determination at this point.

Non-commute trip information is also important, to know whether the benefits of commute-trip reduction have been offset by increases elsewhere. Analysis of the travel diary data will provide more complete quantitative information on the impact of telecommuting on non-work trips. In the meantime, when telecommuters were asked in the final survey whether telecommuting had changed the frequency of non-work trips, 57 percent said they make fewer such trips. Several people have commented in interviews also that telecommuting had made them more conscious of how much they drove before, and they were making an effort to avoid unnecessary trips. The same might be true of the comparison group also, since many of those who consented to participate did so in the conviction that they were contributing to something good for the environment. They may be as conscious as the telecommuters of the amount of driving they do.

UNFORESEEN CONSEQUENCES OF TELECOMMUTING

If telecommuting leads to a shift toward less environmentally-benign transportation modes, automobile purchase, or a relocation of residence even further from the workplace, the transportation and energy benefits of telecommuting might be compromised. We have already seen that telecommuting did not lead to a significant shift toward less environmentally-benign transportation modes. Let us examine other possible ways that benefits of telecommuting may be mitigated.

Automobile purchase

Telecommuting may lead to changes in automobile purchase behavior. A decrease in the use of a car in the household may allow a reduction in the number of vehicles per household. On the other hand, if a mode shift toward SOV commuting occurs, an additional vehicle may be necessary. The survey asked several questions about auto purchase before and after the study.

Slightly over one-fifth of the telecommuters and the comparison group said they planned to purchase a new vehicle within a year in both administrations of the questionnaire. About the same number said they planned to sell their vehicles. However, there was a slightly higher (though non-significant) tendency for telecommuters to plan to divest themselves of a car after a year of telecommuting than there was for the comparison group. Table 22 shows the results.

Table 22. Planned Changes in Car Ownership (after the demonstration)

Change	TCer	Comp. Group
fewer	12 (10%)	4 (4%)
same	101 (80%)	86 (93%)
more	5 (4%)	3 (3%)

Most people buy new cars to replace old ones, rather than for a new use. In this survey, about 70 percent said the primary reason for buying or selling a car was to replace a vehicle. Job changes, residence changes, changes in commute needs, additional or fewer drivers, and other reasons account for the other 30 percent of the reasons. Auto purchase choices, then, are not greatly affected by telecommuting. Even among the 30% who indicated that a change in life circumstances was responsible for their auto purchases, changes at this percentage would occur in the normal course of events, regardless of telecommuting.

Residential location

Another way the travel reduction objective of telecommuting could be compromised is if telecommuters had a significant tendency to move further away from work. As we have already

seen, the telecommuters in this study already tended to live farther from work than their comparison group. The average commute trip in

the Puget Sound is about 10 miles,[7] compared with the 18 for the telecommuters. The question here is whether or not those telecommuters who live relatively close to work might decide to move further away as a result of telecommuting.

Overall, telecommuters initially were only slightly less likely to say they were planning to move from their current residences than were the members of the comparison group. Initially 18 percent of the telecommuters and 22 percent of the comparison group said they had plans to move. After the year-long project, the percentages changed to 13 and 20 percent, respectively. The differences between the groups and the changes over time were not significant. A separate analysis of moving plans was performed on telecommuters and members of the comparison group that lived within 10 miles of their main office. These results showed that telecommuters and comparison group members living close in were equally likely to plan to move as those living further out. In addition, the relationship between plans to move and commute stress was explored and found to be insignificant.

The qualitative data provide a somewhat different perspective into how people feel about where they live and work. The final survey contained some open-ended questions that allowed people to comment at more length on their telecommuting experience. One such question was, *"In what ways has telecommuting influenced your views about where you live?"* This sort of question is apt to get much different responses than the less-open question that asks whether the respondent has plans to move. The latter question, asked before and after, can measure whether a year of telecommuting has had an effect on plans to move. But asking how telecommuting influences feelings about residential location allows people to express some of the thoughts they might have before they reach the stage of deciding to move. In that sense the responses to this question may be more informative over the long run. The most common response was that they like where they live, even though they feel it's too far from work. Telecommuting has made them feel even better about where they live by allowing them to avoid commuting. Here is a sampling of those comments:

"*I don't feel so guilty about commuting so far.*"

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7 For all modes, it was 9.8 miles in 1987. (Household Travel Surveys, 1985-1988, Puget Sound Region, PSCOG, June 1990.)

"*It has made me less likely to consider moving closer to my work to reduce car mileage and driving stress.*"

"*Telecommuting enables me to live here - I like where I live. I feel it has made this home possible for me.*"

"*Makes me even happier that I moved out of the city.*"

"*I am certain now that despite the distance to get to the office, I wouldn't live any closer to town for anything.*"

Another common response was that telecommuting had made them more aware than ever that their commute was too long, and they were considering either moving closer to work or getting a job closer to where they live. A sample of these responses follows:

"*It's been good because I live far away from my job. I may think of moving closer to my job or getting a job closer to where I live.*"

"*I like living in the city even more. I'd prefer to work closer to home.*"

While no one expressed the sentiment that they would like to move further still from their work place, many people expressed greater satisfaction at the move already made. Further, it is hard to know what this sentiment might lead to a few years hence. It may begin to dawn on people that they could move a bit farther out, maybe telecommute an extra day, or even full-time. Still, the only people who expressed a desire to move now wanted to move closer to their jobs. Though the former outnumber the latter in our sample, it is still an interesting tension that deserves more exploration.

TRANSPORTATION SUMMARY

The data from the surveys are self reports. They can be distorted by people's perceptions of what the evaluation of a telecommuting demonstration should show. The travel diary analysis is less likely to contain these kinds of biases. Nevertheless, it is possible to discern a general picture of the kinds of people who telecommute, their motivations for doing so, and the effects of telecommuting from the survey data (at least for the first year of experience with it).

Telecommuters volunteer to work at home for a variety of reasons. Some of these reasons are tied to their commute and the way they handle it. In this study, people with long commutes were much more likely to want to telecommute than those with shorter commutes. In addition, telecommuters tend to be more sensitive to the commute than others. They are more likely to report that it is

stressful, independent of the distance. They are more likely to change commute patterns in response to congestion. For them, avoiding the commute trip is important. It is a strong motivator to begin and to continue telecommuting.

This study showed very little impact of telecommuting on people's travel behaviors outside of the reduction in commute trips. They reduced commute trips, as might be expected, however, they did not appear to change commute modes, their vehicle purchase plans, or their residential location plans. It should be noted, however, that these kinds of decisions may take a longer time to occur than the one year of the study. In addition, some of the participants in the study were not at all sure that they would be able to continue to telecommute after the first year. A longer follow-up regarding these decisions would be an important addition to our knowledge.

HOME ENERGY USE

The survey asked telecommuters and controls to respond to a series of questions regarding home energy use. If telecommuters were to be at home more often, then it seems reasonable to anticipate that

their more frequent presence might have an impact on home energy consumption. Thus, we included items in our survey in an attempt to gauge whether telecommuting would have an effect on indicators, such as turning down the thermostat, electricity consumption, or energy use in general. It should be noted that in the long run, increased energy use at home, if any, might be offset by decreased energy use in the office -- an effect we were not expecting during the course of this project.

What sort of fuel do they use

The participants were asked what sort of fuel they used to heat their homes. Table 23 shows the results. The relative shift of telecommuters' use of all fuels to natural gas was not statistically significant.

Table 23. Home Heating Fuel Use (percent using each type)

	Before		After	
Fuel Type	TCer	control	TCer	control
electricity	55	62	46	61
natural gas	38	31	45	29
wood	29	28	20	24
fuel oil	15	13	12	14

Increase of electric bills

Participants were asked if their monthly expenses for the use of electricity changed over the past year. They were given the choice to check "increased," "stayed the same," "decreased," or "not

applicable." In the first survey, 32 percent, and in the second survey 20 percent of all the participants said their expenses increased. Analyzed by role, controls in the first survey (37 percent) were somewhat (but non-significantly) more likely than telecommuters (31 percent) to say their electric bills increased in the past year. In the second survey as well, controls (22 percent) were equally likely as telecommuters (20 percent) to say their electric bills increased in the past year. There is no indication that telecommuters changed overall electricity use as a result of telecommuting.

Thermostat Setting

The participants were asked if they set their thermostat back during the winter months when no one is home. Eighty-four percent of the respondents in the first survey, and 90 percent of the respondents in the second survey reported that they did turn their thermostat down during the winter months. Telecommuters (85 percent before, 92 percent after) were only slightly (but non-significantly) more likely than controls (83 percent before, 85 percent after) to say that they turned their thermostat back during the winter months.

The majority of the participants turn back their thermostat manually. Telecommuters (74 percent before, 78 percent after) were slightly (but non-significantly) more likely than controls (70 percent before, 76 percent after) to turn back there thermostat manually.

Participants were asked at what temperature they set their thermostats during the winter months when they are home during the day. The mean temperatures reported for telecommuters (67.55) and controls (67.44) in the first survey were almost identical. In the second survey, the means are again almost identical: telecommuters (67.64), and controls (67.57). Thus it is fair to conclude that participants, whether telecommuters or controls, set their thermostats similarly, and didn't change their typical thermostat settings during the course of the project.

With telecommuters and controls so comparable in setting temperatures on days when they stayed home, it is interesting to compare their self reports about thermostat settings when not at home. While the first survey shows telecommuters (58.71) reporting only slightly (but non-significantly) lower temperatures than controls (59.86), in the second administration (after telecommuters had been working at home for several months), telecommuters reported a slightly (but non-significantly) higher mean temperature (59.27) than controls (59.00). However, over the 1-year test period telecommuters reported a significant ($p<.05$)

relative increase in the temperature they set their thermostat when away from home.

The potential influence of telecommuting on home fuel consumption is further illustrated by a question about the number of days per week that participants turn back their thermostat during the day. In the first survey, telecommuters reported that they turned down their thermostat an average of 4.78 days per week, significantly ($p<.05$) fewer than controls, who reported turning down their thermostat 5.16 days per week. In the second survey, telecommuters reported a decrease in the numbers of days they set back their thermostat (to 4.22), while controls reported an increase (to 5.41). The difference over time between telecommuters and controls is highly significant ($p<.01$), and reveals that telecommuters are substantially less likely to turn back their thermostats once they start telecommuting.

HOME ENERGY SUMMARY

With the additional burdens we placed on participants, we felt that we could hardly ask them to precisely measure all of the many sources of energy consumption at home, and we readily acknowledge the difficulty in answering and interpreting self-report data on issues such as these. But to the extent that our data pertain to energy use, our respondents report the (hardly surprising) result that telecommuters are more likely to keep their house warm on days they telecommute, and that they set their thermostats back on relatively fewer days than controls. The credibility of these responses from telecommuters is enhanced by the fact that high energy use is socially undesirable in our Northwest culture, where energy-savings efforts are popular. In summary, then, there is evidence in our study of increased home energy consumption among telecommuters. This must be considered when weighing the anticipated positive consequences of decreased energy use in the office. Home energy consumption should also be understood as an expense that is being *externalized* by the organizations and absorbed by the telecommuters.

CHAPTER 10
WHAT ARE WE TO MAKE OF ALL THIS?

Our study has focussed on the telecommuting-related experience of telecommuters, supervisors, co-workers and controls in a wide variety of public and private organizations in the Puget Sound region of Washington State. By asking questions and making observations before, during and after the state-sponsored demonstration project we have been able to explore the impact of telecommuting along several dimensions.

Without a doubt, telecommuters participating in our study perceived telecommuting as beneficial to them on nearly every dimension. By their own reports, work-related experiences improved in many ways, with few negative personal impacts. Many telecommuters reported an improvement in family relationships. More than ninety percent wanted to continue telecommuting after the pilot ended. Indeed, several telecommuters suggested that they might quit their jobs rather than having to return to a non-telecommuting position. Self-reported increases in individual productivity and personal time management were primary benefits, and many reported decreases in work- and travel-related stress as well. More telecommuters than co-workers or controls reported an improvement in the quality of their work during the study year. Over sixty of the telecommuters enjoyed their time *in the office* more now that they are telecommuting. While it was perhaps extreme for one worker to joke that *"I'll die"* if telecommuting doesn't continue, because of the balance of work and home life which it has afforded, her general sentiment is widely shared among telecommuters. Their responses were often critiques of conditions in their normal workplace as well as paeans to telecommuting, a theme to which we shall return.

One of the goals of telecommuting is to reduce commute trips. Though comprehensive analysis of the travel diaries is required for definitive conclusions, telecommuters reported reductions in their non-commute trips as well.

Even though telecommuters entered into the study with high expectations, three times as many telecommuters reported the experience as more successful than reported it as less successful than they anticipated. And "less successful" usually meant they were able to telecommute less often than they had wished!

Thus it is clear that there are many people for whom telecommuting works extremely well. At the very least we are able to conclude that telecommuting is an important addition to the work options available in private and public organizations. At its best, telecommuting may provide a work option with far ranging positive consequences for most workers and organizations.

Does our research merely detail the success of telecommuting for some workers, or does it allow us to anticipate beneficial outcomes for most workers who may want to telecommute in the future? Because of the nature of our sample of organizations and of the sample of telecommuters within organizations, and because of the less-than-positive responses from many non-telecommuters in our study, we remain cautious about generalizing from our conclusions.

SAMPLING BIAS

Participation was voluntary, and the organizations in this project were highly self-selected. Several of them take pride in being on the technological vanguard, or have a special interest in the success of telecommuting. Some of the private organizations expect to benefit from selling telecommuting products and services. One, for example, is helping to construct the state's first subdevelopment with a fiber optic link to each household, and another is piloting a device which combines computer and telephone technologies to deliver information services to individual homes. The mandate of several of the public participants includes promoting innovative approaches to transportation and energy problems. (Likewise, several organizations which were hesitant about telecommuting declined to participate in the study at all). We must be aware of the possible biases which this degree of selectivity may introduce.

It is also clear that telecommuters are a selected subset within participating organizations. Despite the urgings in WSEO training sessions and in subsequent communications that telecommuters should be as representative as possible, our before measures revealed that telecommuters were different from controls and co-workers on several salient dimensions. For example, telecommuters had more previous telecommuting experience, regarded professional interaction with colleagues as less important than did controls and telecommuters, required less access to equipment and people in the office, reported significantly higher ability to work independently, were more likely to have a telephone answering machine, and so on. Our conversations with others who have studied telecommuting suggests that similar issues are reflected in their results as well. For all these reasons, we suggest caution in generalizing from any individual study of telecommuting, including our own.

CONFLICTING PERCEPTIONS

Recognition of the value of the experience for *telecommuters* is widely shared. Participants in *all* roles in this study believe that telecommuters benefit from their telecommuting experience. While it is especially true that telecommuters report increases in their own productivity and overall performance, supervisors, co-workers and controls also record more muted assessments of the likely and experienced advantages for telecommuters.

While the expectation and experience of beneficial outcomes for telecommuters is undoubted, the benefits for others are less apparent. Whether or not one concludes that there is an overall benefit from telecommuting may depend on one's perspective and one's unit of analysis.

While the productivity of telecommuters was reported to increase, supervisors were more tentative about the productivity of the work groups in which telecommuters participated. There is a tendency for supervisors to report a decline in work group productivity. While supervisors continued to agree that telecommuters *in general* benefit from the experience, their support of their *own* employees' telecommuting declined during the study year. While support for their telecommuting employees remained fairly high, supervisors expressed more concern about the motivation, productivity, and quality of their telecommuters' work at the end of the study than at the beginning. They were also more likely to worry about their telecommuters' commitment to the organization, and about whether the telecommuters would remain with the organization.

CONCLUSIONS

People's experience with telecommuting varied dramatically. It is clear that some people had very successful experiences, while others' were not so successful. What can we learn from these varied experiences? Even among these organizations and individuals who wanted and expected telecommuting to work, there are lessons about what makes success more likely.

Find an advocate within the organization. Difficulties are inevitable. The steady hand of a well-positioned person who has a commitment to the success of the project, for whatever reason, can make all the difference.

Expect starting inertia. New telecommuters have to learn which kinds of work to bring home, and how much. Co-workers have to learn how to accommodate to the absence of the telecommuter. Even compatible software often hasn't been tested on the range of equipment which people use at alternate work sites, and so on.

Most workers required at least a month to adjust to telecommuting; others never fully adjusted.

Make sure equipment is compatible. Only a handful of the telecommuters utilized dedicated access to work-site computers, and many telecommuters rarely required computer resources on their telecommuting days. But those who did require computers often encountered major hardware and software incompatibilities between work sites. Voice mail and E-mail failed less frequently and proved to be of considerable value to many workers. When telecommuting begins, companies should dedicate a person or a committee to resolving the incompatibilities which will inevitable arise.

Provide a range of telecommuting options. There were people who worked at home who could not work in the telework center, and vice versa. There were people who could readily share their desk at the office (or give it up altogether) and others whose work required undisturbed desk space and access as predictable as if they were in the office full time.

Be flexible in supervising and scheduling telecommuting. The majority of our telecommuters had to vary their telecommuting schedule because of office emergencies, unanticipated meetings, etc. While some of these "interruptions" may subside over time, our feeling is that these "interruptions" are part of the flux and flow of office work, and should continue to be anticipated.

Remember that telecommuting is appropriate for some people, and for some tasks. Small work groups often can't absorb a telecommuter, or more than one, and one has to be attuned to any resentment among non-telecommuting co-workers. Successful supervisors often adjusted meeting and task schedules to accommodate telecommuters, and continued to be flexible when warranted and appropriate.

Try not to interrupt the telecommuter unnecessarily. For many people, telecommuting was highly valued because it gave them uninterrupted time to think a project thru, or to finish up a piece of work which required blocks of time which were unavailable to them in the office. If these people are being interrupted at home as readily as they are in the office, a major benefit of telecommuting is lost both to them and to the organization. This is in inevitable tension with the need to maintain telecommuters' accessibility, and thus requires savvy and judicious supervision.

One unanticipated consequence of this study was that we were able to learn about the work setting in general, and to find that it can be dysfunctional in many ways. Telecommuting can help to solve some of these work place problems, but it can lead to others. We believe that telecommuting can work well for many people, and can achieve some of the environmental goals associated with it. However, it is important to pay attention to the complications it can engender.

APPENDIX A
DEVELOPMENT OF JOB ATTITUDE SCALES

SELECTION OF SURVEY ITEMS

The first step was to select items appearing on both surveys that had to do with job attitudes. There were 35 such items, as shown in Table A-1. For the items to be included, they had to satisfy three criteria:

1) their content should have to do with general job attitudes (not specific to telecommuting),

2) they had to appear on both the initial and final survey in the same format, and

3) they had to be asked of telecommuters, controls and co-workers.

FACTOR ANALYSIS

A factor analysis was performed on these 35 items to see if there is a natural structure in the way the items go together. Including both the initial and final surveys, there were 546 people who returned questionnaires. Before conducting the factor analysis, the two administrations of the questionnaire were combined to give 1,092 cases with 35 variables.

The factor analysis resulted in nine factors. Table A-2 shows the items that loaded at least .4 on each factor. The items loading on each of the factors were relatively independent of items loading on other factors. As one can readily see, the meanings of the items that loaded on each of the factors were consistent with each other and with the factor titles indicated.

The factor analysis was also conducted with each of the survey administrations individually and results similar to the combined factor analysis were observed. These analyses give confidence to the meaningfulness of the factors in the combined analysis.

TABLE A-1

COLLEAGU	Enjoy social interaction w/ colleagues
COMMIT	I feel strong commitment to my org
COMMSKIL	Rate your communication skills
DEMANDS	Job demands create stress at home
DEPENDAB	Rate your dependability
DISTRACT	Office distractions make work hard
EXPECT	Expect to work for this org in 2 yrs
FAMSUPPO	Family supports partic in project
FEEDBACK	I get enough feedback from super
FRIENDS	Enuf time spend with family/friends
HOMELIFE	Home demands hurt work quality
INITPROJ	I initiate my own work projects
INVOLVED	Involved in neigh/community activities
JOBSECUR	Stressed by job security
LOOKFORW	I look forward to starting work daily
MEETIME	Meetings take too much of my time
OFFPOLIT	Stressed by office politics
OVERALL	Rate your overall job performance
PERPROF	Important keep personal/prof life separat
PERSFLEX	I have great deal personal flexibility
PERSKILL	Rate your interpersonal skills
PRODINCR	My work group productivity up last yr
PRODUCTV	Rate your productivity
PROFLEX	lots of flexibility in my professional life
PROJECTS	I decide how to complete assigned proj
PROJMGM	Stressed by managing mult proj
PROMOTIN	I have a good chance for promotion
QUALITY	Work quality greatly improved last yr
SATISFY	I'm satisfied with my job performance
SUPDEMAN	My super demands too much of me
WORKGROUP	My work group highly productive
WORKINDE	Rate your ability to work independently
WORKSCHE	Stressed by work scheduling
WORKTOGT	Colleagues & I have enuf together time
WORKVOLU	Stressed by volume of work

TABLE A-2

Factor 1	
OVERALL	Rate your overall job performance
PRODUCTV	Rate your productivity
DEPENDAB	Rate your dependability
SATISFY	I'm satisfied with my job performance
WORKINDE	Rate your ability to work independently
Factor 2	
WORKVOLU	Stressed by volume of work
PROJMGM	Stressed by managing mult proj
WORKSCHE	Stressed by work scheduling
SUPDEMAN	My super demands too much of me
MEETIME	Meetings take too much of my time
DISTRACT	Office distractions make work hard
JOBSECUR	Stressed by job security
Factor 3	
FRIENDS	Enuf time spend with family/friends
PERSFLEX	I have great deal personal flexibility
HOMELIFE	Home demands hurt work quality
DEMANDS	Job demands create stress at home
WORKTOGT	Colleagues & I have enuf together time
Factor 4	
PRODINCR	My work group productivity up last yr
WORKGROUP	My work group highly productive
Factor 5	
COMMIT	I feel strong commitment to my org
EXPECT	Expect to work for this org in 2 yrs
LOOKFORW	I look forward to starting work daily
Factor 6	
PROMOTIN	I have a good chance for promotion
FEEDBACK	I get enough feedback from super
OFFPOLIT	Stressed by office politics
COLLEAGU	Enjoy social interaction w/ colleagues
Factor 7	
COMMSKIL	Rate your communication skills
PERSKILL	Rate your interpersonal skills
Factor 8	
QUALITY	Work quality greatly improved last yr
PERPROF	Important keep personal/prof life separat
FAMSUPPO	Family supports partic in project

Factor 9	
PROJECTS	I decide how to complete assigned proj
INITPROJ	I initiate my own work projects
PROFLEX	lots of flexibility in my professional life
INVOLVED	Involved in neigh/community activities

SCALE CONSTRUCTION

It would have been possible to use the factor scores as scales for the different types of job definitions. However, a scale score can be computed for an individual only if they have responses for all 35 items that went into the factor analysis. If there is missing data for just one of the variables, no factor scores can be computed. Using scales composed of only a few items, the missing data problem is mitigated to some extent.

Since the factors were so well-defined, it was deemed possible to construct scales simply from a linear combination of the items that loaded over .4 on each of the factors. For the first cut, the weights assigned were plus or minus one, depending on the sign of the factor loadings for the items.

The resulting scales were correlated with the factor scores. The lowest correlation between the scales and the factor scores was .77, with an average value of .89. Because of these high correlations, the scales computed from the linear combination of the relevant items can be considered equivalent to the factor scores.

The scales were further adjusted so that all scores were positive and so that a higher number corresponds to a higher score on the scale. All of the scales are normally distributed with means approximately in the middle of the lowest and highest possible scores, with the exception of the scores for the job performance scale, which is somewhat skewed. (Table A-3 shows the means, standard deviations, skewness, actual maximum and minimums, and potential maximums and minimums.) Difference scores were then computed by subtracting the initial score from the final score. These scores represent the change over time, with a positive score indicating a movement in the direction of the description of the scale.

TABLE A-3

Factor 1		
OVERALL	+.80	Rate your overall job performance
PRODUCTV	+.78	Rate your productivity
DEPENDAB	+.75	Rate your dependability
SATISFY	+.69	I'm satisfied with my job performance
WORKINDE	+.03	Rate your ability to work independently
Factor 2		
WORKVOLU	+.81	Stressed by volume of work
PROJMGM	+.73	Stressed by managing mult proj
WORKSCHE	+.73	Stressed by work scheduling
SUPDEMAN	+.57	My super demands too much of me
MEETIME	+.56	Meetings take too much of my time
DISTRACT	+.50	Office distractions make work hard
JOBSECUR	+.38	Stressed by job security
Factor 3		
FRIENDS	+.80	Enuf time spend with family/friends
PERSFLEX	+.72	I have great deal personal flexibility
HOMELIFE	-.60	Home demands hurt work quality
DEMANDS	-.53	Job demands create stress at home
WORKTOGT	+.35	Colleagues & I have enuf together time
Factor 4		
PRODINCR	+.82	My work group productivity up last yr
WORKGROUP	+.80	My work group highly productive
Factor 5		
COMMIT	+.77	I feel strong commitment to my org
EXPECT	+.75	Expect to work for this org in 2 yrs
LOOKFORW	+.55	I look forward to starting work daily
Factor 6		
PROMOTIN	+.77	I have a good chance for promotion
FEEDBACK	+.61	I get enough feedback from super
OFFPOLIT	-.48	Stressed by office politics
COLLEAGU	+.37	Enjoy social interaction w/ colleagues
Factor 7		
COMMSKIL	+.73	Rate your communication skills
PERSKILL	+.66	Rate your interpersonal skills
Factor 8		
QUALITY	+.65	Work quality greatly improved last yr
PERPROF	+.03	Important keep personal/prof life separat
FAMSUPPO	+.52	Family supports partic in project

Factor 9		
PROJECTS	+.68	I decide how to complete assigned proj
INITPROJ	+.53	I initiate my own work projects
PROFLEX	+.49	lots of flexibility in my professional life
INVOLVED	-.45	Involved in neigh/community activities

APPENDIX B
FINAL REPORT OF
THE ETHNOGRAPHIC COMPONENT OF THE
WSEO TELECOMMUTING DEMONSTRATION PROJECT EVALUATION

INTRODUCTION

This final report on the ethnographic component of the WSEO telecommuting demonstration project evaluation, has three parts:

(1) a summary of materials about nine aspects of the telecommuting experience, gathered through informal and unstructured discussions with participants of all types,

(2) a relatively in-depth, comparative assessment of the place of telecommuting in two of the organizations participating in the project, and

(3) a narrative account of how the WSEO telework center functioned.

The remainder of this introduction includes some general comments about objectives and methods, including remarks about the limitations of this part of the evaluation, and an overview of the findings presented in the three parts of this report.

AIMS, METHODS AND STUDY LIMITATIONS

The basic aim of the so-called "ethnographic" component of the evaluation was to provide qualitative data that could amplify and supplement findings obtained by the quantitative analysis of the questionnaire data which, from the start, were expected to be the core of the project. The evaluation project as a whole was structured to generate qualitative data in various ways. There were focus groups, for example, and the questionnaire had open-ended questions as well as places for "comments." Even so, the ethnographic component was added because it was felt that valuable data could be obtained if researchers participated with and observed the day-to-day activities of telecommuters, their co-workers, and supervisors in their various work environments.

Initially, all sorts of *potential* data gathering efforts were envisioned, ranging from informal brown-bag luncheons with the various participants in the several participating organizations to comparatively long-term, close-up observations of teleworkers, co-workers, and supervisors at the office, the telework centers or, even, at home. Very quickly, however, various types of practical constraints placed significant limitations on the qualitative research that could be done. Three of these constraints deserve to be noted explicitly.

Before the project really got underway, the evaluation team was informed that the Energy Office had decided that in-home observations were too sensitive and, therefore, were out of the question. After the project got under way, it became evident fairly quickly that most of the participating organizations and individuals did not wish, and/or were not able, to accommodate the ethnographers sufficiently to make it possible to do observations in the workplace. The only exception was the telework center and, in this instance, the ethnographic role heavily emphasized participation, rather than direct observation and interviewing. It also became evident early in the evaluation effort that a significant portion of the time and personnel initially allocated for the qualitative research would have to be shifted to higher priority tasks (due, for example, to major unexpected complications in the distribution, collection and analysis of the questionnaires).

These resource limitations also had a bearing on another problem-the expressed reluctance of some individuals and organizations to let participant observation researchers into their work environments. In our judgement, this does not reflect a fundamental unwillingness to cooperate in such research, rather it is a product of two other facts: (1) it takes a great deal of time to gain the trust and understanding that are necessary prerequisites for getting permission to do ethnographic research, and (2) in this project, circumstances did not permit the ethnographers to build up this level of trust and understanding.

The qualitative data summarized in the remainder of this part of the report are, then, a compromise between what had been hoped for and what, under the circumstances, could be done. This is, of course, always the case in any research project of this kind, whether quantitative or qualitative. In this instance, however, this point needs to be made explicitly so

that it will not be presumed that the materials in this report constitute "an ethnography" or that they represent what an ethnographic report on telecommuting would look like under better circumstances. Instead, the ethnographic researchers were able to concentrate on three types of activities:

1. informal, relatively non-directed interviews with about 30 people at approximately a dozen researcher-organized meetings and "brown bag luncheons";

2. a relatively in-depth study of two organizations by means of repeated visits with individuals who had previously attended (i.e., non-researcher) scheduled events, such as meetings and lunches; and

3. in depth participant-observation at the WSEO-sponsored telework center.

These three efforts were, respectively, at the heart of the three subparts of this report that follow this introduction.

OVERVIEW OF FINDINGS

Even with the limits imposed and that emerged, the researchers learned a great deal from this ethnographic research. The findings, for the most part, reconfirm most of the more basic discoveries of the quantitative research and, most importantly, add greatly to our confidence in them. Thus, on the basis of the ethnographic research, it can be said with some confidence, but not without exception, that

- telecommuters felt, subjectively, that they were more productive on the days they worked away from their regular offices;

- productivity increases were attributed, overwhelmingly, to significant reductions in interruptions when telecommuters were away from the regular work environment;

- co-worker supplied data about the productivity of the work *group* (as opposed to the individual teleworker) may negate some of these gains in individual productivity;

- productivity measurements were seldom made in ways that could be called "precise" or that would readily permit one to assess objectively the impact of telecommuting on either the amount of change in productivity or the method of productivity assessment, whether at the individual or work-group level;

- telecommuters felt, subjectively, that they drove fewer miles when they were telecommuting;

- telecommuters liked driving less and being (or at least feeling) more productive;

- telecommuters felt, subjectively, that their co-workers had only moderate to very small adjustments to make when they were telecommuting and that, in general, their supervisors were supportive;

- more than a few co-workers felt that their work loads increased in ways they found undesirable when their work-groups included telecommuters;

- most telecommuters felt strongly that telecommuting should be an option after the conclusion of the demonstration project and that, by and large, their organizations were at least moderately supportive of their preferences in this regard;

- telecommuting had other important benefits that had not been envisioned, especially in the area of health and family life;

- unmet electronic equipment needs (special phone lines, computers, etc.) was the most significant impediment to getting started and one of the more important factors bearing on success of telecommuting;

- the factor that prevented most people from remaining in the demonstration project for the year were changes in job requirements and circumstances; and

- variations in the culture of an organization appear to have an important bearing on how telecommuting works, both for individuals and groups in those organizations.

PART 1: VIEWS ABOUT TELECOMMUTING BASED ON OPEN-ENDED, NON-DIRECTED, INFORMED INTERVIEWS

by David H. Spain and Liz Fortenbery

This portion of the report contains material from the ethnographic record pertaining to nine topics: (1) productivity, (2) co-workers, (3) supervisors, (4) equipment, (5) family, (6) organizations, (7) unions, (8) process, and (9) affect. Brief summary comments are provided at the conclusion of each topic.

1. PRODUCTIVITY

To the best of our knowledge, none of the telecommuters we interviewed reported a decline in their productivity while working at home. Indeed, we know of no comment to the effect that productivity remained the same. Although some did not comment on the matter, one can safely say that telecommuters think they are more productive when they are working at home or away from the office.

Although some claims on the matter seemed extreme (one person, for example, said "I feel I am one-tenth as effective at the office as compared to home. I hate, now, to go into the office."), most people clearly perceived the increase in productivity was due to the lack of interruptions. Said one: "In my work, isolation is vital for efficiency and productivity, and there is only one place to get it: out of the office!" And another: "I get a lot more done without the interruptions." This man did, however, complain that he gets a lot of phone calls at home.

Such claims about productivity increases may not be seen in the same way by all concerned. Our notes include the following account of some comments made on telecommuting and productivity during a training session by a man who subsequently was fired (in large part) for being unproductive:

> As it turned out, the male who was to be part of the project was already telecommuting; indeed, he apparently had been doing so for some time and, interestingly enough, for 2 days a week. He was a mature-looking man, perhaps in his late 40s or even 50s and, although I never did figure out quite what he did, it did not seem that his work was computer-based. He did refer, however, to

> routinely starting his day, when at home (telecommuting), by "cleaning my desk." In any case, he was obviously enthusiastic about telecommuting and noted: "I'm at least twice as productive at home. And I experienced no adjustment period. I was more productive right off." Much later in the meeting, he commented: "At home there is less busywork, so I can get bigger projects done."

Although telecommuters are, generally, confident that they are more productive, they do reveal, often in humorous "asides," some ambivalence on this obviously important matter. Prior to the start of a training session, for example, a person who, it was revealed later, knew a great deal about telecommuting and about the demonstration project and who was enthusiastic about telecommuting, said to a male friend: "So you want to work at home, do you? Well, you'll get a lot done with your daughter around," after which there was much laughter by both men.

Ambivalence conveyed by humor was associated with another aspect of productivity - how does one measure it? This question seems to be as true for those in the organizations participating in the study as for those doing the evaluation. At a training session, for example, a man said: "Going back to the productivity issue. I haven't a clue how I would measure productivity. Is that grounds for disqualification?" [Much laughter]. The trainer responded: "No, we just need to have some idea of a before-and-after comparison." At another similar session, a WSEO trainer mentioned that one of the research needs was to gather information about productivity and, at this, a telecommuting supervisor said: "I think you're gonna have a hard time measuring productivity. Nobody knows what I do. We don't make a product, and we don't make a profit." [Much laughter] She continues: "The supervisors here tend to be working supervisors. We barely get our own work done and hardly have time to hover over employees to measure their productivity."

An insightful comment about this was part of the ethnographer's summary of the session:

> This may not be simply a statement of fact. I think there is some pride in the nebulousness of "thinking" jobs. Her comments were combined with a sort of affirmation of the work ethic and, at the same time, she may be expressing the guiding ideology of the department with these remarks. She is saying, in a sense, that the ambiguity of work is freeing in a way, but also requires a defensive attitude about working. This ideology may be prevalent throughout much of the "information" workforce, but may be especially so in government agencies were profit is not an issue. Later on in the session, it became apparent that this

supervisor (who also telecommutes) may have overstated the ideology, since others exhibited some discomfort in the face of it.

Supervisors clearly were concerned about the impact of telecommuting on productivity. There were comments on this at most of the training sessions we observed and, most of the time, the WSEO trainers mentioned that some telecommuters tend to overwork either because equipment is available 24 hours a day or they start work earlier or they tend to be workaholics. In some instances, the trainers added that the increase in hours was not necessarily a good thing. Once, when asked if the productivity increase was due to an increase in hours, the answer was an equivocal "sorta" and, with this, a trainee said: "Presumably [this applies to] people without families or small kids" and the response was "That's a good issue." In a more definite but related vein, one man commented: "I find that time goes by faster [when I am working at home] and, as a result, I work more hours [and I am, therefore, more productive]."

There was one context in the study where productivity changes are measured with considerable precision. The medical transcriptionists in one organization indicated they are paid on a "piece work" basis in that their pay is tied directly to the amount they transcribe. Two transcriptionists at a luncheon reported, unequivocally, that their productivity went way up when they worked at home. When asked to estimate the amount of increase, they said "about 30%." When I asked if this meant more pay, they said that it did, but the amount was <u>not in direct</u> proportion to the increase in the amount produced. When asked to say why their productivity went up, the answer was immediate and emphatic: "no interruptions!"

The interviews we have done have yielded only one comment--and this an <u>indirect</u> one--pointing to a possible decrease in productivity. A man who has been telecommuting for a few months noted: "I have a tendency to doubt my memory and so, without all the records, this can slow things down on my telecommuting day."

<u>In summary</u>, most telecommuters are thoroughly convinced their productivity goes up; most supervisors and researchers worry about whether this is really the case and seem to know that it is not likely to be a question that will be answered very easily.

2. CO-WORKERS

Although comments about the matter in our records are not numerous, telecommuters do not think their relationships with co-workers are worse because of telecommuting. At one luncheon, two telecommuters discussed this issue briefly and noted that telecommuting did involve some "costs" vis a vis co-worker relations. Said one: "My personal relationships with my co-workers are not as strong as before." This was said in a most matter-of-fact way, as though the issue or the extent of the problem was anything but troubling to (or for) him.

One general reason for the concern about co-worker relationships was expressed well by a supervisor who said:

> I fear that the "incidental communication" (chance meetings in the hall, casual conversations, etc.) will decrease, thus eliminating much of the mutual support that exists in this kind of office. "That's why we took down the partitions," somebody else said, adding emphasis to the felt need to increase, not decrease incidental communication. This was linked also to a fear that "information sharing" will be affected.

In much the same vein, one telecommuter noted that he had been told explicitly by his supervisor that his many days away from the office were preventing him from fully absorbing and becoming a part of what was referred to, specifically, as "[Organization Name] Culture." Significantly, this organization eventually fired this individual (ostensibly for reasons having to do with productivity; see section 1, above).

Another concern was that those not picked for the demonstration project would be jealous of those who were picked. We did find one report of this. At a luncheon, one telecommuter noted:

> One of my co-workers, at first, didn't react too well. S/he had wanted to telecommute but wasn't picked. S/he went to our boss and asked "How do you know she's working?" She [also] wanted to know how I could be reached, so she could see if I was working.

But, these are not the predominant concerns expressed by the telecommuters. More often, we heard complaints from the telecommuters about interruptions from their co-workers. Complained one: "I get a lot of phone calls at home from co-workers." This then generated the

suggestion of keeping the [phone] number private but all involved in this discussion felt that wouldn't work out. As one noted: "Our telecommuting agreement says we have to be available by phone for four hours on our telecommuting days."

In another context but in a related vein, a woman telecommuter commented, in a cheery voice, that people still apologized to her for calling her at home on the day she telecommuted. The jokes about whether she was still in her bathrobe had, however, more-or-less stopped some time ago but it was obvious that her annoyance had not for she added in an insistent manner: "On my telecommuting day, I get up and get dressed and go to work just like I usually do" [except for the fact, obviously, that she does not leave the house].

Some other twists on the matter of phone calls are contained in these separate comments from telecommuters. Said one: "One drawback to telecommuting is that I now get business calls at home [from co-workers] on my non telecommuting days." Said another: "I do 'brain intensive' projects on my telecommuting days and so, when I get interrupted by a call from a colleague (or anybody), I can't talk in a coherent manner."

Interestingly enough, one co-worker noted, with obvious satisfaction, that the office is quieter when one or more workers telecommutes. As the ethnographer noted in his report of this conversation, "This reinforces the impression that the success of the bureaucracy (resulting from explosive growth) pushes too many people into a small area and then the impulse is to socialize if too many co-workers are in the immediate vicinity."

One of the most interesting co-worker relationships described was one involving a person telecommuting 4 days per week. Now, and because of this, on the one day each week (a Monday) when she is at work, she shares with a non-telecommuting co-worker the desk space she used to occupy exclusively.

Although we did not press for many details, this telecommuter assured us that this new arrangement worked fine. One drawer of the desk is hers. She tends to make up for the socializing she did not do during the days away from the office on the day she is in, so much so, in fact, that her productivity dropped way off on that day--something she was explicit in

indicating was not a problem, for her or her supervisor. Indeed, she said it was good to be able to do this "catching up."

In summary, co-worker-telecommuter relationships do not appear to be a source of problems after a short initial adjustment period.

3. SUPERVISORS

The relationship between supervisors and their supervisees who telecommute is a particularly sensitive one because supervisors worry that they cannot adequately assess the steadiness or pace of their supervisees' work and the supervisees worry that no matter how hard they work and how productive they are, their supervisors will still have doubts about their work when they are away from the office.

Although the data are not overwhelming, the training sessions appear to have helped quite a bit to reduce the impact of this potential problem. For example, during the "what did you do last week" exercise, one supervisor said to her supervisees: "Very interesting; we'd better discuss this." We took note of this seemingly quite banal statement because (quoting from our notes):

> it is my impression that both the supervisors and the supervisees were quite engaged by the exercise and, among other things, that the supervisees are beginning to have a clearer picture of the concerns and constraints faced by the supervisors (such things as how to evaluate people who were out of sight much of the time--e.g., the man who was and would continue to be telecommuting 2 days a week).
>
> Sometimes, however, the tensions on this matter were quite clearly in evidence. During one training session, for example, (interestingly enough, during the "what did you do last week" exercise), there were several joking remarks of interest, but the one I noted was this one by a supervisor. In an obviously humorous tone, but with all the double meanings so typical of humor, the supervisor said to one of the telecommuters (to a man, as I recall): "Oh, so you didn't do anything last week. Well, I'm sure you can do that at home" at which point there was much laughter all around.

At one luncheon meeting, it was obvious that one of the telecommuters had been feeling quite anxious about how her supervisor viewed her. According to our notes:

> We did not discuss this issue in any detail but my tentative impression is that [name] is not certain enough about her supervisor's general attitude toward her telecommuting. Specifically, she seems concerned that he may be wondering whether she is really working all the time.
>
> When this issue emerged, the coordinator chimed in saying that they (reference unclear) would continue to discuss this and that the supervisor would have to learn that it was important to assure her that she was trusted; that, indeed, it [that she could be trusted] was one of the reasons she had been picked to be a telecommuter. These comments struck a responsive cord in the other telecommuter at the luncheon who added some thoughts of his own about the matter of trust and working independently. He indicated that he had worked on his own (at an educational institution) for some years and so was used to being a self-starter and working alone.

The ethnographic data show two other more-or-less unexpected aspects of the relationship between supervisors and supervisees that emerged in the context of the demonstration project. First, there is evidence that the supervisees want evidence that the supervisors are supportive of telecommuting per se. For example, after a series of questions and answers that showed that the organization was hesitant about buying equipment for telecommuters, one supervisee exasperatedly asked the coordinator at a meeting: "Are the supervisors supportive or not?" The coordinator quickly answered that they were, but recognized that a problem did exist.

Second, one telecommuter noted that a co-worker had recently commented about his supervisor saying that he wanted to buy a home computer to "bend" [i.e., convince] the boss to become a telecommuter--a comment we took to be, as much as anything else, a humorous revelation of the co-worker's desire to have the boss out of his hair.

When all is said and done regarding supervisors, however, it may well be worth taking more seriously the following humorous exchange on the matter of supervisory "control." During a staff meeting in one organization, it was suggested that supervisory control may be an illusion under any circumstance. This came up when someone at the meeting noted that one of the hardest things is to get supervisors to support telecommuting. "It is difficult," someone else noted, "to get them not to worry about losing control when they never had control in the first

place." At this, another person laughed and replied: "[Yes, so] we'll have to [get them to] substitute a new set of illusions for an old one."

In summary, telecommuters and supervisors do worry some (but seemingly not excessively) about how they are perceived and the matter of control (respectively); the level of expressed anxiety is, however, higher among the telecommuters than the supervisors, at least in the ethnographic data.

4. EQUIPMENT

Equipment, it turns out, is one of the big stumbling blocks to telecommuting for this demonstration project. Much of the success of this project was contingent on getting the telecommuters in the various organizations "up-and-running" within the time frame laid out in the research design. Delays in getting the necessary equipment have, however, worked against this in many instances and, more importantly perhaps, have been the source of much frustration not only for the researchers but also for the telecommuters themselves.

Although there is (admittedly slim) evidence that somewhat bolsters the fear that telecommuters will merely look at telecommuting as a way to get a company to provide fancy computing equipment for use at home (e.g., at a meeting, somebody commented: "Since we are into telecommuting, we'll get a modem number, won't we?"), our general impression is that many telecommuters went to some lengths to arrange for or to provide their own equipment.

Mainly, however, we were struck by the number of times people reported having to delay the start of telecommuting or of having a difficult time with telecommuting due to equipment problems. For example, one telecommuter said that she hadn't yet started telecommuting primarily due to some misunderstanding and hold-up in getting access to the necessary software. From the beginning, in this instance, the telecommuters had understood that their employer [a public, non-profit business] would not supply equipment [an interesting fact in itself and part of the evidence that people in this project were willing to go to rather great lengths to telecommute] but they had agreed to supply the soft ware. A colleague of this telecommuter, however,

reported that he had gotten around the lack of software problem simply by bringing copies of it home. He felt that as long as he worked on it only one place at a time, he wasn't violating any copyright protections.

In a related vein, one telecommuter reported that he found it somewhat annoying to have to transfer things from hard-disk to floppies in order to be able to have material for use at home. And another complained that it took a lot more time than he had expected to get a computer and the other equipment needed and then to get it all up and running. Still another was puzzled about how best to arrange computer links. Should it be from PC to "Host," [don't know what that means], the mainframe or a terminal, he wondered. Somebody at the meeting suggested that he should try the "PC anywhere" software. Most surprising, however, were the frustrations of those who needed equipment that their own company was in the business of providing. Said one: "I find it ironic that we don't provide our own employees with our own equipment."

Perhaps most significant, however, were the often rather unsympathetic and, sometimes, openly hostile comments by management or supervisory people expressed, on several occasions, about the provision of equipment. For example, in one write-up of a meeting, the following was noted:

> Gesturing roughly as he voiced his opinion, this supervisor asked: "Where's the basis for the savings? The program began as an experiment to save energy expenses but are these savings offset by [the cost of] installing personal computers in the homes of everyone who telecommutes? Won't equipment expenses offset energy savings?"

In a related comment made at a training session, one person said: "The only issue for me is that there is no money to buy [the necessary] equipment. Telecommuting yields a need for twice the equipment." Although the trainer responded (in part): "Not all telecommuting requires a computer, and in some instances, where additional computers are needed, they can be obtained by donations," the questioner persisted: "But donations won't work here." Although the trainer countered with: "There are lots of other options," one wonders how convincing this would have been for such an individual.

Said another person at a training session: "The name [telecommuting] implies phone communications. What types are there and how are they provided? Modems tie up the phone. In the California study, did the companies pay for the extra phone line?" Again, the response was optimistic: "Call forwarding allows the office phone number to be used for incoming calls," but my impression is that trainer optimism alone can do precious little to put equipment into the hands of potential telecommuters.

And yet another person, this time a coordinator, made these rather discouraging comments about equipment at a training session for telecommuters at one organization (here, as summarized in my write-up):

> The coordinator also reported on equipment policies, an issue that (apparently) had been discussed with the supervisors, and the bottom line is this: equipment will not be purchased since this is only a demonstration project. Also, it is essential to distinguish between telecomputing and telecommuting. Not all telecommuting has to be supported by computers. She added, however, that "if push comes to shove, if your supervisor can show--by one week from today--that equipment is vital, then the 'no buy' policy will be reviewed." [Note: "reviewed," not reversed or revised.] This produced a question: "Can extra existing [unused] equipment be installed at our homes?" Her answer: "This will be decided by executive staff. It is a money matter [i.e., apparently, it depends on how much it would cost to do this]."
>
> This produced yet other questions which, for all intents and purposes, were not answered specifically. "Will [this urban public corporation] help employees buy needed equipment at their discount?" "Will they lease such equipment? Will they check for surplus equipment throughout the company? Can the company establish an equipment 'library'?"

After a string of non-answers to such questions, one telecommuter (mentioned above) exasperatedly asked: "Are the supervisors supportive or not?" and to this the coordinator said: "Yes, but the equipment issue does loom large [in their reaction]. I'm sure we'll get it all ironed out; telecommuting is exciting stuff."

But it is not so clear that these problems were always so well "ironed out." For example, in the write-up of one follow-up meeting, we noted that the telecommuters had reported

> many hardware problems. Lack of proper (or any) equipment had prevented some who had signed up to telecommute from actually starting. And it did not

> seem that this general problem was about to solved any time soon. Indeed, this was the only problem seen as significant by the telecommuters (who, in part, were speaking on behalf of others as well as in reference to their own equipment situations).

Under certain circumstances, however, the where-with-all for equipment was found, even in tight-budget situations. For example, after one meeting, we noted the following:

> The other problem mentioned had to with obtaining the needed equipment. These delays did not seem to have been extreme but did result in delays in the start-up of telecommuting. Because of the great and obvious pay-off of telecommuting to the transcription department, however, arrangements were made to provide very quickly the necessary equipment and to install separate phone lines (in short, the more the payoff, the quicker the difficulties will be surmounted).

In summary, one of the biggest problem in this study, both for the telecommuters and for the study itself, is the lack of or delay in obtaining necessary equipment.

5. FAMILY

The effects of telecommuting on the family life of telecommuters is significant but, for the most part, the negatives do not seem to be severe. It is clear that people anticipated some adverse impact, as indicated by (among other things) humorous comments made at some of the training sessions. For example, there was general laughter at one training session when somebody said: "Telecommuters often get the short end of the stick when it comes to cooking dinners."

Fears of this sort have not, however, materialized so far for those we have discussed telecommuting with. One interesting somewhat related development was reported by a woman who telecommutes 4 days per week, however. After having worked outside her home for several years, she noticed that, by Friday, she had "cabin fever" and was ready to go out but her husband felt like "crashing" at home. One man indicated that his wife couldn't get on the phone as often as she wanted to because his company hadn't been successful in getting a second phone line installed [for a modem].

One other problem reported by one person was that having such fine computer equipment at home meant that the kids needed to be given "time on the machine" since one could hardly

expect them not to use it, for example, on weekends. The kids in question apparently were older and were doing homework (papers and the like) on the machines and that this was not so much a problem as a fact to be reported.

One telecommuter said, "My kids are excited [about the fact that I will be telecommuting] because they think I'm going to be home" but her meaning is: I will be there, but not for them; their excitement is unwarranted.

And a few people actually reported that the impact of telecommuting on their family life was positive. In one instance, for example, a telecommuter indicated that he used to stay late at the office or go back to the office in the evenings and that had not been received very well at home. Now, he regularly goes home for dinner and resumes work after his children are in bed. It has improved things at home for him. Another man reported that he liked telecommuting because he was able to see his wife more.

And in other instances, some described situations that, while not seen as problems, could arguably become a problem in the future. For example, one individual who works on computers and, obviously, loves to do so, emphasized that he didn't "work" since to do what he does was, for him, more like play. His wife, he said (without a trace of concern), was a "computer widow." He works nights and weekends at the computer and, he said quite happily, "by telecommuting, I can do this even more."

In summary, the impact of telecommuting on family life does have some costs or downside implications, but these are not reported frequently and are not seen as serious.

6. ORGANIZATIONS

Telecommuting was viewed in rather different ways by the various participating organizations. Some did not seem too enthusiastic about it, so much so in one case that at least some telecommuters happy with the arrangement asked their supervisors if they wanted help in selling the idea to the company--a comment made when somebody asked what the end-of-the-year [of the demonstration project] aim of the company was.

Some telecommuters were suspicious of the motives of their companies. Several in one group commented about a lack of follow-through by upper management on the telecommuting demonstration. They felt their organization had participated in the demonstration for political reasons, to make the organization look progressive. There had been some questioning by board members about whether it should be allowed. Some thought that they had lost interest or motivation. The main evidence was in the lack of follow-through on providing software.

Some organizations, however, have very clear and significant gains in mind to justify their participation. At one organization, for example, the management sees telecommuting as an important way to demonstrate to the community that it is trying hard to find ways of undertaking necessary growth in staff without increasing the traffic flow to the main offices. If they are to expand, be it in number of staff or in the size of the facilities, they must be able to show, in their environmental impact statement, that other, less environmentally costly methods have been used. They view telecommuting as such a method and so they are glad to be able to try it. It really can reduce staff traffic flow to the office and it will help them maintain good relations with the community.

Another interesting comment about the motives for telecommuting in this situation came from the transcriptionists. They, it turns out, are a real instance of what one so often hears about from those who tout telecommuting but which probably isn't all that common (at least not in our study)--namely, the use of telecommuting as a way of getting around serious shortages of office space. One of the two transcriptionists, who not coincidentally has been at the organization for some years, telecommutes 4 days a week. Now, on the one day each week (a Monday) when she is at the main office, she shares with a non-telecommuting co-worker the desk space she used to occupy exclusively.

At another organization that stands to gain significantly from the sale of equipment that would support telecommuting if it were to be done on a broad scale, the coordinator gave a rousing pep-talk about telecommuting and the way it fit into corporate thinking and planning.

Since it is such a distinctive event in the record, we provide here a comparatively detailed summary of her remarks.

She began by talking enthusiastically about pending air quality legislation in the Washington legislature—a bill that would, she said, be of obvious relevance to telecommuting. It would require companies of 100+ employees to do something to reduce single occupancy vehicles. In view of this, she said, it is clear that "we are ahead of the pack by participating in this demonstration project." "This sort of information," she added, "can be given as an answer to the 'why are you telecommuting' questions you get." And then, a bit later: "This [the WSEO project] is a pilot project for transportation issues but it can be looked at in terms of corporate transportation policy in general."

"There are," the coordinator continued, "two market units [in the corporation] who have managers, product people that is, solely for products for people who work at home, so we can think about [the market potential] for what you [telecommuters] are doing vis a vis working at home, for people with businesses at home." With this comment, somebody asked: "Do you have the names of those product managers?" The coordinator answered: "Yes; is this whole issue something you all are interested in?" There was not much of a response.

The coordinator continued her pep talk. "At the SuperCom '91 trade show, there was some interest in the way developments in fiber-optics technology could be linked to both telecommuting and education." She added, however, that "a surprising 'con' to telecommuting was that, if done on a large scale, it would [negatively] impact auto manufacturing and pension funds." Seeing the puzzled looks after the last comment, she clarified: "Downtown buildings, which are often owned by pension funds, might become less attractive investments if telecommuting was done on a large scale."

Fully energized now, the coordinator rolled on. "I got into this project because our communications were like a highway problem" [apparently all jammed up; she didn't say; what is interesting is that she didn't seem to think it was necessary to say since it seemed obvious to her and, one supposes, to her audience]. And then, in what seemed like a revelation (at last) of

the real issue, she noted: "Our video-teleconferencing equipment could be used [in this general area]. So, you see, telecommuting is not just a wonderful, fluffy thing to do, but a very important thing for the company."

A bit later, somebody remarked that they had heard that the "T" County schools are promoting fiber links between the schools. Somebody else then asked: Is ["Brand X"] doing it for them? The answer: "No, it is the State's system." At this point, the coordinator added: "We didn't get a large part of the business but it still is exciting."

Still later, and still as part of what I am calling the "pep talk" (but which, the coordinator may have thought of as a routine "informational" component of the meeting), the coordinator noted that at the regional level, it was decided that there should be a position for a person to oversee flextime, telecommuting, and related matters. She then said: "When the opening was announced, they had 154 applicants." [This, obviously, was supposed to "wow" the audience and, in a sense it did, although it is not obvious what, precisely, it meant to them or what they thought the fact indicated vis a vis telecommuting. It seemed that the coordinator wanted them to see the large number of applicants as a measure of the extent to which WW Corp. was interested in telecommuting and related matters. It is hard, however, to see the numbers as indicative of anything more than that there are many ambitious people in that Corporation.]

7. UNIONS

Early in the project, there were numerous comments about what was recognized as being largely an "unknown"--namely, how unions would view telecommuting. Unions, it was thought, might fear that telecommuting could lead workers into exploitative situations and that they would, therefore, resist telecommuting. This possibility was worrisome because such resistance might end up being an impediment to the success of the demonstration.

Even now, at the end of the project, the reaction of--and to--unions to telecommuting is still largely an unknown. Our ethnographic data files contain virtually no data pertaining to "the union question." Early on, at a large staff meeting, one person asked: "What about labor unions

and the disabled vis a vis this project?" The answer given was simple and direct but also completely vague: "These are complex and will be discussed." To the best of our knowledge, they were not. At another organization, during a pre-training session, one person somewhat cryptically commented: "You are forcing us to really hang out there [= be vulnerable], especially in a union environment since people are defined as 'competent'."

During a training session at a government agency, someone asked: "How will the unions respond?" The answer (paraphrased):

> Fairness is the engineering union's concern. The agency's lawyers have said that bases must be covered regarding grievance or lawsuits. Communication to all employees seems to be important. Thirty people at the agency will be looking at the issues.

Obviously, the matter was of some concern to others besides those running the demonstration. Even so, the data about how management has responded to these concerns is virtually nonexistent.

Another dimension of the union issue is indicated by this fragment of a post-training conversation: "...the best question was about how to measure productivity; it was difficult to answer. How do you measure it anyway?" One person responds, "you just assume these people are professionals, [that] they're not goofing off." The observer made these comments about this scene when writing it up: "It seems to sum up the attitude of a lot of people involved in the project: that only professionals can telecommute effectively."

In summary, (1) there is anxiety about how unions will view and react to telecommuting and (2) the lack of data about how unions view telecommuting will compromise our ability to generalize the findings of this study to a larger population of telecommuters in the Puget Sound Region since such a population would almost surely include many union members.

8. PROCESS

Of all the topics raised with telecommuters, by far the easiest to discuss was how they made telecommuting work given their specific circumstances. The general pattern is that people

are rather flexible and adaptable; they have been creative in making the best of their circumstances and they have had quite a bit of support and cooperation from their employers and families in this endeavor (with the possible exception of equipment).

Because employers and co-workers were known to fear that telecommuters would work neither as many nor as regular hours as they should, we endeavored to find out something about the work habits of telecommuters. Did they, for example, have a different work schedule or take time off to run errands? Did they work in their bathrobes or gain weight from snacking from their all too handy refrigerators?

From the data available, the answer appears to be that most telecommuters do not vary their work hours or other habits very much. Although a few did report that they ran an errand or made the bed on "breaks" while telecommuting, nearly as many said they stuck to the same work schedule.

One telecommuter, for example, claimed that he did not vary his work schedule and that he took the same lunch hour the he did at the office. In fact, neither he nor the other telecommuter at our luncheon gave any indication that they ever did the laundry, mowed the grass, ran errands or did other things of this sort during the day. One does wonder, however, if the presence of the telecommuting coordinator had an inhibiting effect on their comments; they seemed awfully "PC" about "TC" throughout this discussion.

Others tended to be less rigid. Said one, with evident confidence and comfort: "One thing that is good about telecommuting is that I can schedule [and feasibly get to] a dentist or other appointment in my neighborhood during the day. I like the flexibility telecommuting allows in my personal life." Another at a non-profit organization reported that she had taken time off on her telecommuting days to do an errand or two in her home neighborhood since it is about 20 miles closer than if she did them starting out from her workplace. In much the same spirit, another woman noted that she enjoyed being at home because, when she needed to take a break, she could go and make the bed or do a quick errand, and she felt that her house was in better shape because she had an extra day at home.

Many telecommuters complained, but not too loudly, about the "logistics" problems of telecommuting. The problem is how to decide what one will need from the office when working at home and then how to simplify the task of lugging these materials back and forth. Said one: "I find it difficult to remember to take home the small stuff as well as some of the basic materials I will need. This makes my telecommuting day too much like [being at] work." And another remarked: "One drawback to telecommuting is having to carry a big backpack full of drawings and maps."

When another telecommuter reported being annoyed, sometimes, by the shear bulk of the material that had to be hauled back and forth from the office to home, another offered his solution to the problem. He, when faced with this problem, had taken to keeping certain materials (e.g., bulky and seldom-used software manuals) in his car. In this way, he didn't have to lug the things from home to office since, in either place, all he had to do was go to the car to get them. This was not seen, it must be emphasized, as a problem; rather, this was a solution. It did not seem to matter that his car was in the processs of becoming a filing cabinet on wheels.

One important and rather interesting aspect of the process of telecommuting that was discussed some by the telecommuters we interviewed has to do with telecommuting frequency. One person, who is telecommuting 1 day a week, said this is not enough [the implication being that by telecommuting more days the results, in terms of productivity and in getting things done in a timely manner would be all that much better].

And another noted that he had found it difficult to telecommute as often as he had planned (his once-a-week goal had become a twice-a-month reality) and he did not see any likelihood of a change--mainly because the other person in his office also was telecommuting and this fact, coupled with their meeting schedules simply made it very difficult for him to work at home as often as had been planned. The other telecommuter has been telecommuting for some months prior to the demonstration project and often telecommutes more than once a week. He thinks that, eventually, he can telecommute far more than twice a week.

A related matter was the impact on the telecommuting process of the pattern of one's work hours. Said one telecommuter: "When I worked 8-5, I couldn't be out of the office more than 2 days a week and so, now that I am on a 4-10 schedule, I can telecommute only 1 day per 5-day week [this plus his day off due to the 4-10 schedule gives him a net of 2 of 5 days away from the office]."

Although we did not interview a telecommuter who worked at home while his/her young children were there as well, we did learn from one single-mother telecommuter with school-age children that, when her kids came home from school, she generally had a snack with them right after they got home (at c. 2:30). She said she often began to cook supper after snack time but added, however, that after supper she and the kids did their "homework" together--i.e., she went back to work for a few hours in the evening.

In summary, the telecommuters we spoke with obviously have made an effort to make telecommuting work. Although they do not seem to face big problems (except perhaps with equipment, as noted previously) they also do not let smaller problems (e.g., with logistics) stand in their way. Also, while they are somewhat flexible as to when they put in their 8 hours on a given day, they are anything but lax in their efforts.

9. AFFECT

How do telecommuters feel about telecommuting? Do they like it? Do they feel anxious, guilty, stressed, more relaxed or what? In an effort to gain at least some perspective on this, we examined the record for specific comments about how telecommuters felt about telecommuting. We did not find all that many but the ones we did find were rather interesting (reflecting, in part, a bias toward recording the more unusual feelings).

That people expected to like telecommuting is indicated by this exchange at a training session. "What is a guerrilla telecommuter?" asks a trainee (on hearing the term used but not defined). The trainer answers and a few people nod. Someone then asks: "What about people who are reluctant to go back to the office at the end?" [Much laughter].

And there were many who felt that telecommuting was great. Said one, for example, "I am on a 4-10 schedule with Fridays off. Now I telecommute on Tuesdays. For 3 years, I have been waiting and hoping for this day to come. Telecommuting is great!" And another: "With telecommuting, my life is less stressful at work." And another reported less stress at home because he can do his overtime work there rather than have to go back to the office. Another telecommuter said he liked telecommuting because "when I get paged [on a pager] I can just ignore them unless urgent voice mail comes in."

But there were those who reported less than entirely positive feelings about telecommuting, or at least aspects of it. For example, one woman said: "I sometimes work in my home office in my robe and it feels strange. I actually feel guilty" (although, since this is guilt over a positive feeling, it may be debated whether this is really a negative aspect of telecommuting).

Another telecommuter commented with evident though subtle emphasis and, notably, in the presence of the coordinator, that she puts in a full 8 hours on her telecommuting day, even if the hours are not the standard "8-5." The write-up of this part of the conversation contains the following interpretive comment:

> it is tempting to hypothesize (and it is only an inference based, at this point, on very scanty evidence) that her expression of worry about her supervisor is less a product of his comments than her guilt over having taken time off for these errands [one errand mentioned, for example, was taking her car in for muffler repair--something done, she said (again with some emphasis) only because she could not easily do this if she had to drive to work daily at a location far from her repair shop].

At that same luncheon, another telecommuter appeared to be a bit resentful of the whole situation--i.e., that his telecommuting was preventing him from being more fully "in tune" with the "culture" of his organization. The coordinator was sympathetic with his plight, just as she had been with another telecommuter who had a problem. So, once again, she assured him, as he had her, that this was a matter that needed to and would be straightened out with those directly involved.

Another telecommuter said that telecommuting has had "a negative impact on my attitude about work. Now I bring it to my house which, before, was the non workplace." [The clear implication was that this was a cost, not a benefit of telecommuting.] And another person said that he was a bit unhappy because he gets less exercise when he telecommutes because he does not walk to his transportation departure point on his telecommuting day.

Finally, one man reported a situation that we think is significant, as much as anything else, because he did not see it as a particularly big problem and yet, it seems that it could, at least potentially, be a huge one. He indicated that he felt more like a "prisoner" of his telephone while working at home. If, while at the office, he was out of the office when the phone rang, he would not worry about it since he knew that others knew he was "at work." But, at home, he worried that people would think he was goofing off if he did not answer the phone so he made sure he was always near the phone on his telecommuting days.

In summary, telecommuters feel good about telecommuting; the feelings they have about it are generally positive. Even so, there are distinct negative feelings in the record, some recognized as such by those we talked with and others that are there but are either unrecognized as such or are denied.

PART 2: TELECOMMUTING AND ORGANIZATIONAL CULTURE: A CASE STUDY

by Liz Fortenbery

INTRODUCTION

It was anticipated that telecommuting would be perceived and, therefore , work differently in different organizations due to differences in their organization cultures. To explore this issue, one of the ethnographic researchers made an effort to identify some of the principal components of the culture of two organizations in the demonstration project and to see how these cultural factors were related, if at all, to the success (and other aspects) of the telecommuting experience. Part 2 of this report summarizes the results of this effort.

THE ORGANIZATIONS

Two organizations, and two work groups within these, were observed more closely than the others over the course of the project, and are compared here to illustrate some differences in the way telecommuting was perceived and implemented and practiced. Both organizations at the end of the project appear to be retaining telecommuting at least to an extent, and in both, upper management is perceived as supportive of telecommuting. As will be seen, organization A is clearly more unified on both points than organization B, and ranks higher in perception of upper management support, but neither has been completely without problems.

Organization A is a small public organization in which telecommuting has been officially underway for approximately two years. The organization began implementing its own pilot program 6-8 months prior to the start of the Puget Sound Telecommuting Demonstration, but did participate in the PSTD training and did cooperate with the research. Organization B is a much larger public organization in which telecommuting was not very well publicized, and participants trickled into the project for about six months. Though slower to get started, "B" had approximately the same number of telecommuters.

The process of observation at "A" spanned a period from late February 1991 to mid-November 1991, or approximately 8 months. During this time, I attended a "rap session" organized by the telecommuting coordinator, conducted lunch-time interviews and phone interviews, and attended staff meetings in one department of the organization. At "B," between April 1991 and January 1992, I conducted lunchtime interviews, phone interviews, and a short written survey. The amount of contact with people at "A" was about 30 hours, and with people at "B," about 15 hours.

While this short amount of time was certainly no immersion into the cultures of these organizations, I felt that I learned something of the way telecommuting was seen in each organization, and how people saw problems internal to the organizations. At "A," I also felt I had gained a clear sense of how the organization saw its place in the community and how telecommuting fit into that vision as a transportation and work option. I did not really get such a unified sense of mission at "B," probably because the organization is so large and diverse, and because most of the telecommuters were at a level somewhat removed from thinking about mission and how to achieve it.

Description of organizations' structure and attitude toward telecommuting

"A" is an organization whose structure and culture have allowed telecommuting to work in most cases. "A" has about 350 employees distributed through a number of departments, and has a fairly flat hierarchical structure (only about five levels). The size, structure, and attitude of the organization toward its employees and its role in the community made it easy to publicize telecommuting throughout the organization.

"A" has several motives behind its involvement in the program. The first contact with the WSEO was by a transportation planner, who expressed interest in telecommuting as a way for "A" to set an example as a responsible community citizen. Implementing such a program might be more persuasive than simply trying to regulate the transportation impacts of organizations within their jurisdiction, which they will eventually be doing in accord with state TDM

legislation. Another reason for involvement is personnel issues. According to the assessment of a WSEO recruiter, A has a positive attitude toward its employees, and telecommuting came to be seen also as a good way to recruit and retain people.

The director of the Human Resources department told me that they got serious about telecommuting after attending the governor's conference on telecommuting (1989). They worked up a telecommuting policy agreement early in 1990, and began their telecommuting pilot then with 5 telecommuters. When the PSTD program began, "A" expanded the number of telecommuters to 13, all participating in the research, and by February 1991 there were several more people telecommuting, but not participating in the research. By July of 1991, there were 22 telecommuters, only 10 of whom were in the demonstration project. Two very tradition-bound departments chose not to participate, but nearly all the others fielded some telecommuters. Closer observations of a work group were done in a division of the department that had the most telecommuters.

Over time, I got the impression that whatever problems may exist in the organization, it is still small enough that people at the top can maintain a sense of the organization's mission and keep their employees aware of this mission also. It is further my impression that overall, the organization has a progressive attitude toward employee welfare - an idea that what's good for the employees is good for the organization - in terms of morale and quality of work, and retention of quality employees. In the context of these commitments, telecommuting has been viewed positively from the beginning. Any problems become challenges to meet, not reasons to stop telecommuting.

"B" was receptive to participating in the project because it wanted to stay aware of alternative work options. The WSEO recruiter reported that upper management was mostly positive but divided on whether "B" should participate. A presentation in August 1990 to the heads of support departments seemed to show similar caution. Most telecommuters only learned about telecommuting when their supervisors nominated them, apparently because some managers feared that everyone would want to try it and would resent it when they couldn't.

Because publicity was poor, three separate trainings were required in order to train everyone who slowly trickled into the project.

In my own mind I grouped the telecommuters in the following fashion: 1) the "independents" - these were telecommuters at the first training and all were highly professional from different departments; 2) the "core" group - so-named because of their central location, three tc'ers were at second training, and three at third training. They work in different but closely related departments. They all seem to be valued and trusted employees, but they work within a fairly rigid hierarchical setting. One work group in this set became the focus of closer observation. 3) the group located at a remote site. They attended the second training. This group would have the most concrete measure of productivity changes, and would be telecommuting four days a week. It took a long time for them to get started because the budget did not permit the acquisition of equipment for use in their homes. All of these people were interviewed at one time or another, but the core group was the focus.

Most of the non-telecommuters encountered were either positive or neutral, but there was also some divisiveness about telecommuting. There was more talk of co-worker resentment than at "A." This resentment was talked about as though it was almost a matter of course. It seemed that in a structure where employees could not be rewarded for merit, and in which people may come to feel like interchangeable parts, flexible options like telecommuting are more than ever looked upon as a sign of management favor. It was not uncommon to hear telecommuters report that co-workers openly asked them, "why did you get picked to telecommute?" Co-worker resentment appears to be the biggest problem faced by "B," and one that supervisors have been very aware of from the beginning.

Given the structural obstacles to an innovative program - the almost inherent resentment from co-workers, the lack of a unified vision or unified upper management support for telecommuting - "B" has managed quite well to keep it going.

Before most people in "B" had even started, management in "A" had already decided it worked for them. At a rap session, an "A" supervisor was asking the HR director about

productivity and how to measure it, and about how much energy could really be saved by telecommuting. At the end of the meeting the HR director chuckled at these questions. He seemed to imply that the level of detail of these questions was far beyond what he felt he needed to know how to assess telecommuting. "We know telecommuting's working for us." He then told the story of one highly valued employee who stayed with the organization because of telecommuting. In the view of the HR director, retaining that person was worth any disadvantages anyone else could think up.

The rap session presented clear evidence to me of the attitude "A" holds toward telecommuting: the burden of proof is on the skeptic, not on the proponent, of telecommuting. Telecommuting is assumed to work, unless it is shown very clearly not to work - which had not happened to date.

Individuals Experiences at "A" and "B"

By and large, individual telecommuters in both organizations seemed to view telecommuting as a mostly trouble-free experience. Most people talk of a certain period of time to figure out how to do it, and some people have had to stop temporarily or permanently due to work situations in the office. One woman at "B" said she almost didn't make it through the first month because it took so much time to get organized the day before and so much time to catch up on her mail the day after that she was exhausted. When someone else took her mail duty, she was able to manage. Another woman at "B" decided she wasn't really interested in continuing to telecommute even though she had the full support of her supervisor. She got tired of lugging a laptop computer home on the bus before each telecommute day, and the benefits did not really outweigh the inconvenience. No one reported problems actually working at home.

At "A," such issues rarely came up in interviews. At "B," we talked about co-workers and supervisor support and all the other things that made telecommuting less than a sure thing. In one interview at "A," I was still trying to get some sense of how people's experiences might shape the organization's policy. I asked if everyone felt they were productive enough working at

home, and a telecommuter responded, "You know, we don't even think about it. We just do our work.... I'm afraid I'm not helping with your notes. We just do our thing. I don't know what you could write about us." At "B," a lot of people talked about how their supervisors were trying to get co-worker buy-in to the project. One supervisor told resentful co-workers that they needed to be supportive of telecommuters and show that it could work, or no one would be able to do it. Another supervisor offered a flex-time option to co-workers of telecommuters.

WORK GROUPS AT "A" AND "B"

During one discussion with a telecommuter at "B," it was suggested that if I really wanted to know how co-workers felt about telecommuting, I should talk to the work group's supervisor about setting up a group meeting to discuss it. Over the next six months I tried very hard to set this up, but to no avail. As the supervisor said, the office was really very busy and it was virtually impossible to get everyone together at the same time. In addition, though, the supervisor also felt that co-workers were expressing their resentment by not meeting to discuss telecommuting. "They say, 'I don't know anything about telecommuting because I don't telecommute. So I don't have anything to say.'" Nevertheless, through lunch interviews with the telecommuters and supervisor (who also telecommutes), and through a short written survey, I was able to learn something of the co-workers' opinions.

At "A," the HR director helped me arrange to sit in on the regular meetings of one work group. When I first spoke to the head of this division, she was concerned that I have an agenda so I did not waste their time. When I finally got it across that I just wanted to sit in on regular meetings and listen, she seemed most relieved. She did not seem nearly as concerned about the possibility of my hearing proprietary information as she was about my wasting their time. I began attending weekly meetings in the division in late August, and continued until late October 1991.

In the department as a whole, there are probably 25-50 people, and there are numerous divisions in the department (about 10). There are four people in this division, including J (the

division head and my primary consultant). J and another person are both telecommuters. All work fairly independently of each other during the week. The structure of the department seems to be that there are a number of projects underway, many of which require the expertise of a member of this division to work on particular aspects of it Meanwhile, J is engaged in scheduling and budgeting as well. So the weekly meetings are times when the members of the division get together and share information.

From what I could see, this division seemed to be very cooperative. I saw no obvious indication of interpersonal difficulties, no real "sub-texts." People in the division appeared to like and respect J, and she seemed concerned about their well-being and enabling them to do a good job. She seemed to have a sort of mentoring relationship with them, particularly with the full-time person -- offering council on the best ways to deal with certain people, or the best way to handle a situation, or the best way to present oneself, or the most appropriate language to use to define a situation and thereby maintain control over it. She also tried to keep them apprised of what was going on at the level above them, in order to prepare them for upcoming things, or to enable them to interpret communication from above or behavior in another division they might be working with.

The work group at "B" consists of eight people, three of them telecommuters, including the manager and the supervisor. The office is such that people are in frequent contact with each other, even if they are working on different things. This work group is part of a larger division in which a major innovative project is underway, a Quality Improvement initiative. Several of the telecommuters at "B" have been deeply involved in this process. During the course of the telecommuting project, a few people mentioned having to cut back on their telecommuting in order to attend all the meetings in connection with Q.I. One supervisor who has been somewhat skeptical of telecommuting said that because of Q.I., "This wasn't a controlled test environment in which to see whether telecommuting works or not."

Q.I., while looked upon as ultimately a good thing by everyone who spoke to me, nevertheless wreaked havoc with people's usual schedules, and also with normal office relations.

Many people reported increased tension in the office as meetings took up a lot of time, and sensitive issues were brought up in the interest of improving the quality of office functioning. A co-worker in the work group wanted me to understand that telecommuting was only a small part of a larger process. She described Q.I. as "a real painful process" in which people discuss changes that ought to be made, and dredge up all kinds of past resentments in the process. She estimated it might take four or five years before things actually got better as a result of Q.I. She said that because of the tension and unpleasant office politics, it would be difficult to introduce telecommuting and not add to the problems and resentments somewhat.

While the work groups at "A" and "B" are quite different in many ways, they share some important concerns. Although "A" is not in the midst of a revolutionizing quality improvement campaign, the department this work group belongs to has put two issues high on its list of priorities: improving internal communication (staff report circulation, etc.) and improving customer service. In the work group at "B," these issues are also critical. What is most interesting in comparing these two work groups is how they see telecommuting in relation to these issues. In "A," it is seldom talked about. In "B," these issues are the major justification co-workers have to call for an end to telecommuting. These different responses seem to be a reflection of the attitudes of top management in the two organizations.

Telecommuting issues for work groups

One telecommuter at "A" has mentioned that he feels the department is saturated with telecommuters, and that it has too often been the case that nobody knows where anybody else is. A receptionist in the department has expressed the same frustration. Both seem to feel that telecommuting without adequate communication of one's whereabouts makes for lousy public relations. Nevertheless, it has not apparently dawned on anyone to suggest that telecommuting should be curtailed. The receptionist was in fact quite uncomfortable about offering any criticism at all. Some solutions have been offered to the customer service problem. One is the installation of a voice mail system. In addition, a division head has been assigned to look into

ways of improving in-person service at the reception counter (the counter is not staffed solely by a receptionist but by a staff expert also, so that correct information can be given on the spot; the problem has been that sometimes there are scheduling mix ups so that no staff person shows up). Presumably, as long as other solutions are forthcoming, no one will pay much attention to telecommuting. I believe people in "A" come to interpret things through the filter of the organization, which has said that telecommuting is a good thing. Certainly there are cases where it has not worked, where individuals have stopped, but these are viewed - by the organization and by individuals themselves - as individual problems. They are not allowed to reflect badly on the concept of telecommuting as a whole.

The manager of the work group at "B" explains things this way: "We're doing what some people might consider unpleasant work, going after people delinquent in their payments. So people here are very concerned that they have the right information all the time." When I finally realized I would not be able to meet with co-workers, I sent them a short questionnaire. Four of the five co-workers in the work group sent in written responses, and all four felt that telecommuting was not working well in their work group. As one co-worker explained, currently people in the office are not cross-trained well enough to handle telecommuters' customers effectively when telecommuters are away. In addition, people in the office have other work to do as well, and so inheriting another person's customers diverts them from their tasks, causing them to be less productive. As one put it, "I believe telecommuting is a very good idea which could work in numerous settings. One such as ours, however, which has clients calling in and coming in to the office all day requires a more complete staff to share the load. With all the time spent on customer service, those of us here handling it are diverted from our other work and thus not as productive." In addition, co-workers were skeptical that the telecommuters' productivity had increased much, though one said she was sure the telecommuters themselves felt more productive. Other problems they cited were trying to schedule meetings when both Q.I. and telecommuting were happening, and greatly increased tension in the office.

Two of the co-workers who responded felt that telecommuting was a good idea, but not for their office at this time. The other two did not think it was a good idea at all. One was especially negative, in part perhaps because she felt that telecommuters were abusing the privilege, and that the input of co-workers was not being taken into account. This is interesting because early on the manager mentioned that discussion on the issue had been quite open, "fought without gloves." Nevertheless it seems apparent that solutions have not been offered to all the co-workers' concerns. One partial solution, offered by a co-worker, was cross-training - but this would take some time to implement. In spite of the negative feelings in the work group, telecommuting appears to be continuing for at least two people in the group. Both feel very positive about their productivity, and are apparently able to withstand the tension caused by their telecommuting.

Additional money from organization "B" might make it possible for the rest of the office to telecommute also. It would not solve the problem of office coverage, but at least everyone would feel they were sharing the burden equally. In addition, other improvements might come with the Q.I., such as cross-training. It is possible that the manager of this work group is trying to hold out and continue telecommuting until these improvements can be made.

CONCLUSION

This comparison illustrates the different ways that a phenomenon like telecommuting, which is perceived and handled basically the same way by individuals regardless of their organization (or at least with more variation within organizations than between them), can mean very different things to different work groups and organizations. This difference is a reflection not only of the different structures and cultures of organizations and work groups but also of extra factors (like Q.I.).

PART 3: QUALITATIVE RESEARCH AT THE WSEO TELEWORK CENTER

by David H. Spain

IMPORTANT FORMAT NOTE: KEY OBSERVATIONS, FINDINGS, AND RECOMMENDATIONS ARE INDENTED AND IN BOLD FACE. READERS WHO WISH TO DO SO MAY GAIN A REASONABLY GOOD SENSE OF THE HIGHLIGHTS OF THE OVERALL REPORT BY READING ONLY THOSE PASSAGES.

1. INTRODUCTION AND OVERVIEW

Including this "introduction and overview," this part of the final report has 6 sections. The objectives, methods and limitations of the study are presented in section 2. The primary aim of the study was to find out how the Telework Center (hereafter, TWC) functioned; the basic data-gathering method was participant-observation.

Because a random sampling procedure was not used to determine when observations would be made, it cannot be said with assurance that the conclusions can be generalized to the entire time span during which the TWC was in operation. A general description of life in a TWC is presented in Section 3.

The data are presented in the form of a "synthetic" narrative. In such a narrative, the specific elements in the account are factual but their chronological arrangement may not always be. The account is based on the personal and, for the most part, subjective views and/or observations of the principal researcher. Throughout, names have been changed and, where feasible, other non-essential details have been left out or changed so specific individuals can not be identified.

The principal findings presented in this part of the report indicate that, on the whole, the TWC functioned very well and was a success, at least from the perspective of those who were using the TWC during the time of the study.

Additional positive and negative comments about telecommuting and the TWC are presented in sections 4 and 5, respectively. The principal positive aspects of using the TWC

were that (a) it was easier to get to work because the commute distance was significantly reduced and (b) there were significant (but self-reported) increases in productivity because the work environment was better than at the regular offices of the TWC users. Although by no means the only problems, the principal negative aspects were that the TWC was often rather noisy and difficult to get to.

In section 6, some general conclusions are outlined. It is noted there that the TWC was viewed as a great "success" by those who used it regularly. Also noted, however, is the fact that the significance of this finding is mitigated by the lack of data from those who, for one reason or another, were unable to use the TWC regularly or at all. Consequently,

> those developing TWCs in the future should develop ways to ensure that the available space is used as effectively and efficiently as possible.

2. OBJECTIVES, METHODS AND LIMITATIONS OF THE STUDY

Because, at the time of the study, there were only a few TWCs in operation anywhere in the country and, so far as we know, none elsewhere in the Puget Sound area, it was felt that the general functioning of the WSEO demonstration TWC should be examined as closely as possible given funding and other constraints.

> The main objective, therefore, was to provide a fairly detailed account of how, and how well, the TWC worked.

Those using the TWC were asked to complete the same survey forms filled out by all others in the demonstration project. To the extent feasible given the small size of the sample, their responses will be summarized and discussed elsewhere in the overall report. From the outset, however, it was expected that other methods should be used in the effort to understand how, and how well, this facility "worked."

The principal additional method utilized was "participant observation." This method, which yields far more qualitative than quantitative data, is widely used in the social sciences. Although relatively demanding in terms of field time, there are two reasons why data from

participant observation studies are worth the effort. First, the data are derived from and pertain to relatively natural or "unguarded" events in the social context of interest (in this instance, the TWC). Second, the topical range of data gathered tends to be far less constrained by prior assumptions as to what is relevant and important than in questionnaire-based studies which, necessarily, must specify in advance the areas to be explored.

Since this facility, in the overall Demonstration Project, was so important and since so little is known about such work centers,

> the evaluation plan called for the allocation of relatively extensive efforts to the gathering of qualitative data on the TWC. Accordingly, on approximately 40 days between 12 August 1991 and 24 January 1992, and for a total of at least 174 hours (an average of about 4.3 hours per day), I worked as a participant-observer at the TWC.

During that time, I did not give equal attention to both aspects of this role; rather, I tended to emphasize being a participant. I did so for three reasons. First, I knew that, in this context and given my general familiarity with the ambient culture, participating was not only more feasible than would usually be the case in unfamiliar situations but also would be far less obtrusive and threatening than observing; this latter reason was important because passive "observation" tends to be more threatening to people and, since I would not be at the TWC for very long, I felt I should be as unobtrusive and unthreatening as possible. Second, I had work I needed to do; and third, I wanted to find out how the TWC worked by actually using it in more-or-less the way the "natives" did--i.e., as a place to go, on a somewhat irregular basis, to do concentrated work on large projects.

As a consequence, I became, in effect, one of the subjects of my own research--something that is not at all unprecedented; indeed, in the view of some, it is an essential part of good participant-observation research. I also did not do some things I would have done had I emphasized the "observer" role more. For example, I did not routinely wander around, systematically watching people at work nor did I regularly seek out those working at the TWC to "interview" them. For this and other reasons that need not be developed here, I took very few

notes and I did not record in a systematic way who was at the TWC when I happened to be there (I did not, in other words, "take attendance").

I did, however, chat with people in a normal, social manner and, as normally happens in such circumstances, I developed far closer relationships with some of the TWC users than with others. I shared coffee with various people, took "gab breaks" with people who happened to come by my work station and, on more than a few occasions, went to lunch with various users of the TWC. At those lunches, we often did not talk about the TWC or TCing at all. Indeed, I suspect most of the participants would say, were they to be asked, that these lunches were purely social events. And, to an extent, they were, especially for them. For me, however, they were part of my effort to become like a "native" and, not coincidentally, to be liked by them.

I emphasize "like" because of a simple and inescapable fact: my telecommuting role was not the same as that of the typical "native" user of the TWC; at most, it was similar to theirs (i.e., "like" it). For example, unlike those who typically used the TWC, I did not have designated days that I should be there; neither I did have a supervisor who might choose to monitor whether I was there or not. Similarly, I did not have to think about whether I was working hard enough to convince a supervisor that I should be "allowed" to continue working there. Also, it was not novel for me to use of an out-of-office work station; I have worked at home at least one day per week for over 20 years.

Even so, I did try to be seen by the natives as being "like" them, at least as much as was possible under the circumstances. Consequently, I worked hard like they did; ate lunches at my desk most of the time, like they did; complained about the annoying noise of the unanswered phones like they did; shared food that I brought to work; went out to lunch with "the regulars" and otherwise attempted to "blend in." I think these efforts were successful. Indeed, some of the "natives" said things that made it clear to me they were wondering whether I was "working"--i.e., doing evaluation research "on" them--at all.

> My participant-observation periods were not selected in a manner that could permit one to say they were representative

of either (a) the period from 12 August 1991 to 24 January 1992 when I did the research or (b) the year when the TWC was operating. The times selected were not a random sample of days and hours during either of these periods. Rather, I went there when other events in my schedule "permitted" me to.

Thus, there is a slight bias toward being at the TWC in the afternoons. Although the trend was not strong, I know that I found it easier to be at the TWC on Tuesdays, Wednesdays and Thursdays rather than on Mondays and Fridays; even so, I was there at least several times on every week day and on at least 4 Saturdays, and at every hour of the day, including several days when I stayed well past 5 PM. Indeed, except for a few for whom the TWC was their regular workplace, I was one of the heavier users of the TWC during the August-September period.

I would like to have gone to the TWC more often--not only because my participant-observation sample could have been bigger, if not better as well, but also because I am sure I could have gotten more work done had I been able to get away from other demands that prevented me from going to the TWC. This may be, I think,

> one of the principal findings of my work at the TWC: it was hard to go to the TWC as often as I wanted to and this was true as well for many of the users with assigned space there.

Insofar as my experience is representative (and there are, of course good reasons for thinking it may not have been), one can predict that most telecommuters end up actually telecommuting less than they want or expect (plan) to. All of this does mean, however, that

> it would be somewhat risky to make direct extrapolations from my findings in an attempt to say what the TWC was "really" like throughout the period when it was open.

The TWC was open for nearly a year but I did my work during a period of only about 5 months--extensively in August (a period when some TWC users may have been away on vacations, although my data from other times do not lend any support to this potential bias) and September, not at all in November and on only a few scattered days in October, December and

January. Moreover, I did not begin my work at the TWC until it had been open for some time--a fact that means I did not observe, first-hand, typical start-up problems (though I heard a bit about some of them). The timing of my research does mean, however, that

> I was in a position to get a good feel for what a well-functioning TWC is like since, by August, when I got there, the center had been open for more than 6 months.

3. WORKING AT THE WSEO TELEWORK CENTER: A PERSONAL ACCOUNT

Dead End

Late in the afternoon of Friday January 24th, I went to the WSEO Telework Center for a last look around. The official closing ceremonies had been held the day before, complete with strong coffee, enthusiastic speeches by the major players in the project, and certificates of appreciation handed out to those who had used the center during the year it was open. At that event, several of the telecommuters I had gotten to know, in the course of my work there as a member of the project evaluation team, told me they would be there on Friday, packing out the last of their belongings. Their comments had only reinforced my decision of a few days before: the TWC, which had become like an old friend of mine, was dying and I wanted to be there, right at the very end.

Standing before the door to the TWC, which was located at the end of the hall on the fifth floor of a modern building near a well-known shopping center, I zipped my key card through the slot in the electronic lock, glanced at the number I had taped to the card (because I never did manage to memorize it), tapped in the code and, hearing the click of the lock as it opened, gave the door a gentle push and stepped inside.

It was quiet. Very quiet. "Hello!" I softly shouted (something I would never have done at the TWC on any other day). There was no response. Somehow, I was not surprised. Who, I thought, would want to hang around this place, a place that was so doomed, on a gloomy Friday afternoon. Just to be sure, however, I made a circuit around the hallway between the half-walled

non-hexagonal cells of what normally was anything but a beehive of activity. All thirteen of the work stations were empty of people and, except for the computers (which had not been supplied by their users anyway), most showed few signs of ever having been inhabited. In a few, there were some small neatly packed boxes and some trash and, in one, a little note attached to a cluster of things said: "Don't throw this stuff away. I'll be here on Monday to get it." But, in general, it was obvious I had not arrived in time; the TWC was already quite dead.

Under the circumstances, I felt a bit foolish being there when there was so obviously nothing going on and so, as if I were the one being watched, I made a lame effort to look like I had come to the TWC with a specific purpose in mind. I went to my work station and made a last check of the storage areas. They were as empty as the center as a whole. Finding nothing, I sat quietly at my desk.

The silence was so eerie, I began to think about it. Soon, it hit me: the "tower of power" (my idiosyncratic name for the LAN, the equipment that powered and hooked together all the computers) apparently had been turned off. As a consequence, there was no hum from either the computers or that wonderful HP Laserjet III printer that I had used so often. That mystery solved, I leaned back and propped my feet up on "my" desk and began to reflect on what had been, for me, a rather unusual field project--one not carried out in an African village (where previously and on several occasions I did participant-observation research as an anthropologist), but the one I had done right here, in this ultra-modern but now all too deadly quiet telework center.

First Contact

My first day at the TWC was during the second week of August, 1991. At about 10 AM, I approached the door of the TWC, key card in hand. I tried to open the door but, not having the exact directions for using the card, my first few attempts were unsuccessful. As I stood there wondering what to do next, I found myself recalling how often, as a student, I had heard of the

many difficulties anthropologists had in getting into their field sites. Nobody had ever warned me about problems of the sort I was having at that moment, however.

Eventually, after several more tries and an unsuccessful attempt to get assistance from a secretary in a nearby office (who looked at me as though I were crazy), I heard what I took to be an appropriate "click." I pushed on the door and it flew open. The space before me appeared to be some sort of reception or waiting room. WSEO literature about the telecommuting demonstration project was prominently displayed. I walked through the room, stepped through a doorway, looked around and listened. In Africa, at night, when one stops and listens, one often hears the pulsating sound of drums. Here, during the day, there also were rhythmic sounds--not the dum, dum, dum of villagers at ease but the tap, tap tap of white collar work being done. The large room I had walked into was alive with the clack, clack, clack of computer keyboards.

After a minute, and with a sense of having gotten my bearings, I did just what someone had told me I should do. I went immediately to one specific and rather centrally-located work station where it was said I would find Ron Brash (as I'll call him here). He was, I would soon learn, the local equivalent of the African village chief I had lived with during fieldwork I had done in Nigeria many years ago. Like his African counterpart, he did not have a lot of power, but he was quite hospitable. He also was the person who knew the most about what was going on in the TWC. Although he was not the main subject of my study, this man, like the village chief, eventually became one of the keys to the success of my efforts.

Unlike the village chief, Ron was a computer expert and, just as I had been told by reliable sources, a ball of energy. And unlike "my" African village, the TWC was cool and comfortable. Outside it was a typically hot August day. Inside, the central air-conditioning made it seem like Spring--a fact that brought to mind thoughts about how stiflingly hot it usually was in my home office this time of year.

I found Ron sitting amid what seemed like a veritable computer jungle He was a pleasant looking man about my age with a jovial glint in his eyes. I said hello, explained who I was and, after the usual pleasantries, he offered enthusiastically to show me all around the center. With

equal interest, I accepted the offer. Where there were people, he introduced me, mentioning, usefully, that I was part of the WSEO evaluation team; usually he also added that I was there to "spy" on everybody.

Typically, that brought a wan smile to the face of the person hearing overtly what many undoubtedly think but haven't the nerve to say is happening when they are the "subjects" of participant observation research. On the heels of their nervous laughter, I used the "joke" as an invitation to ease anxieties by explaining the purpose of my work and letting people know that I would not be doing much straight "observing" (although I am not sure this is what they equate with "spying") but, instead, would mostly be participating right along with them—i.e., that I would be trying to get some projects of my own finished while I was learning how the TWC worked. I also indicated that they could ask questions about the project at any time.

After making the rounds, Ron said he would show me a work station where I could set up shop "because," he said with a laugh, "nobody from the agency assigned to it ever shows up." As with most humor, that remark only half-hid a rather serious matter—one that ended up being

> one of my most basic findings: the TWC was seriously underutilized during the times I was there. Indeed, during my study, there was never a time when more than half of the work stations were in use at once.

People seemed to be quite sensitive about this issue. Once, when I was there on a Saturday, two people came in. From comments they made, apparently only one of them was a TWC user. After I had identified myself and asked who they were, she/he indicated, I thought somewhat nervously, that his/her regular telecommuting schedule was, as s/he put it, "to be here 1 or 2 days per week," but, s/he continued, "I have had some trouble being able to come in." That struck me as something of an understatement since I had not seen him/her in the 28 days of observation that I had done up to that point.

We passed several vacant work stations. Eventually, when we came to one that was not only empty but also showed no signs of ever having been occupied, Ron said "This is it" and added, "step in and I'll help you get set up."

Those words were music to my ears because, compared to people like Ron, I am computer illiterate. I know how to turn computers on and how to use one ancient and quite simple word processing program, but that's about it. For me, just formatting floppy disks is a major undertaking ("How was your day, David?" "Oh, great, Honey. Believe it or not, I formatted 10 floppy disks today without a hitch.").

As I sat, for the first time, in my (very comfortable) chair in front of the computer, Ron began talking about the equipment available to those using the TWC. What he said seemed like Greek; every other word sounded foreign: if it wasn't LAN this or mega that, it was micro something else. In the midst of it all, I was virtually certain I heard him say "Turn it on" and also that I saw him nod in the direction of the familiar rectangular box in front of me. So I reached for the computer's on-off switch. "Don't turn that on yet," Ron blurted abruptly. "Always turn on your monitor first; it is much safer." ("How was your day, David?" "Oh, not so good, Honey. I found out I didn't even know the right way to turn on my computer.")

"What software do you need?" Ron asked. "We have..." and he proceeded to reel off the names of several big-time programs, most of which I had heard of but hadn't a clue as to how to use. Hopeful that I wouldn't have to use one of them, I told him the name of my word processing software. "Huh?" he said dubiously. "Do you have it with you?" I showed it to him and, although he continued to express some skepticism ("I can teach you how to use Word Perfect in a few hours"), he had it loaded, booted up and running in just a few minutes. To me, it seemed nothing less than miraculous and I said as much. Ron, however, insisted it was all quite routine; "just a part of the job."

And, indeed, as I was to witness on several other occasions and as I would be told by several of those who used the TWC, Ron always managed to make the electronic parts of the TWC work and, as a consequence, made a major contribution to the success of the center. Although I did not fully appreciate it on this first occasion,

> this event would be the foundation for the first of one of the more important conclusions I would reach about how the TWC worked. It worked, and worked

> well, because there was someone there (Ron) who knew how to deal with the many and various problems that inevitably develop with the electronic (mainly computer) equipment telecommuters depend upon.

A few minutes later, I was ready to print a "document" (one of the few "technical" words of the computer world that I can use with ease). I pushed the familiar keys but nothing happened. I tried it again. Still nothing. So I went down to the village chief's hut, 'er a, Ron's work station. "Uh, Ron.... I can't get my document to print." "Show me what you did," says Ron in what I would learn was his almost always upbeat style. I took him to my booth, showed him the steps for printing and, thank goodness, nothing happened ("What's the matter with your car, Dave?" "Well, I don't know but when I start it like this, it makes this terrible clanking noise" ... and then there is the hum of a what seems to be a beautifully tuned engine). For once, Ron didn't say too much. Apparently, this was not a problem that could be solved in a minute. He took the manual, suggested that I should start on my next document and said, "I'll see what I can do; I'll be back in a little while."

I wondered: had he looked grim? He had reason to, or so it seemed to me. In the first place, he wasn't familiar with my software. In the second place, since it was nearly 10 years old, it was an antique by industry standards. And third, I used it at home to drive a Model T (an ancient Okidata dot matrix printer) whereas here, at the TWC, I had the audacity to hope that I could use it to race around in what was, by comparison, the printing equivalent of at least a Porsche if not a Ferrari. Before I had even finished the next letter I was writing, Ron came back and said, "Save that and let me try something."

He sat at the machine and tapped a bunch of keys. A screen full of what looked like gibberish appeared. "File names," Ron said cheerfully in answer to my pathetically elementary question. He called up one and said: "I'm going to make a few changes... here, ...here and ...there." He's going to screw up the whole thing, I thought; "OK," I said.

"Now let's try it." So I tapped the familiar keys and we went down the corridor to the room with the printer. Nothing. See!, I thought. "Now what!?" I said. "Ah," says Ron, "let's try

one more thing." And so we go back to the computer. "Try doing the print commands and then exit your software program after the text comes back on the screen." That's crazy, I thought and also a pain in the neck. "OK," I said again. I tried it and we headed toward the printer again. By the time we got there, the document was waiting for us, beautifully printed.

Ron beamed. I beamed. And I printed many documents that day. Ron tried, several times, to get my software to print without having to exit the main menu. But he never succeeded and so I had to learn to accept this inconvenience. It was, however, an easy trade-off given the other many technical advantages to working at the TWC compared with my set-up at home or at the University. Once again, I eventually came to appreciate something else that could be called

> another of my basic findings: although several others at the TWC had had to make various minor trade-offs with equipment or software or work environment, there were few if any among the regular users who complained; they knew the trade had been a good bargain.

As I packed up my briefcase and prepared to go home at the end of that first day, I found myself thinking ahead, imagining how great it would be to work at the TWC. For one thing, it seemed I had gotten more work done than usual that day. And, for another, the physical features of my work space were so superior to those available to me at the other places I worked (at home and at the University). Moreover, the people I met were pleasant and it seemed to me it would be interesting to get to know them. Once again, although I did not know it at the time, these tentative thoughts were the start of what would become another of my

> general and basic conclusions about the TWC: people who worked there regularly reported that they felt their productivity went up when at the TWC, that the facilities there were better than others available to them and that the social, interpersonal aspects of life at the TWC were excellent.

In sum, that first day was virtually a microcosm of my whole project at the TWC.

Getting Acquainted

For several reasons, I went to the TWC quite regularly at first. In the first place, I had lots of work to do. Second, I knew from experience elsewhere (e.g., in Africa) that the more I

was around, the more the impact of my presence on the behavior of the "natives" (in this case, the TWC users) would diminish. Most importantly, however, I wanted to be there a lot because this seemed like the best way to find out how much the center was used and how hard people worked when they were there. This goal was important so much had been made, through anecdotes and negative stereotypes, of telecommuters being lazy when they were away from the office and out of sight of a supervisor.

It was especially startling one day, therefore, to round the corner by Ron's cubicle and find him lying on the floor apparently asleep! For all the world, it looked like the worst-case scenario was being played out right in front of my eyes and after I had spent only a few days at the TWC. "Bad back," he said, in response to what surely must have been a rather puzzled look on my face. We chatted a bit and I learned that he had been on the verge of not coming in that day but had forced himself to come in. "Had to," he said; "too much work to do." This was generally the attitude I saw at the TWC--not that people were always dragging themselves in even when they were injured or ill but, rather, that those using the TWC regularly really wanted to do their job. Indeed, this was

> one of the more powerful themes I encountered--in both the actions and from the statements of regular TWC users: they liked the TWC because, they felt, when they worked there, there were fewer interruptions and so, as a direct consequence, they could actually get their job done, something that was anything but assured when they were at their regular workplace.

In short, regular TWC users were hard working and dedicated. People did take time to be sociable but mostly it was work, work, work. As I soon learned, even lunch hours often were skipped.

I discovered this during my first week at the TWC. I took a lunch with me to the TWC for the first few days. I did so for two reasons. First, the TWC had a pleasant (but windowless) lunchroom, complete with microwave oven, large refrigerator, coffee machine and a good-sized table with about 6 comfortable chairs. Second, I was sure the lunchroom would be a good place to meet people, that it would be, in other words, a place not unlike the well in the village in

Africa where I had done research--i.e., a place to hang around to catch up on news and to meet people "by chance."

On one of those first days, at about noon, I left my cubicle and, intentionally making a bit of noise with my lunch sack in order to be noticed, headed for the lunch room. A few minutes later, Ron came in and took his lunch from the refrigerator and put it into the microwave. He sat down and we began chatting. Although the topic was nothing that related to telecommuting in particular, it was obvious to me that I could easily have directed the conversation that way. "This is going to be great," I thought; "shortly this place will be filled with people and I'll learn all sorts of things!"

After 15 minutes or so, however, we were still the only ones in the room. "Where is everybody?" I wondered. Periodically, I looked toward the doorway, hoping to see one of the "real" telecommuters coming to join us. Amazingly (at least to me), no one ever did, not even once and not even when I invited the few people I saw eating their obviously home-made lunches at their work stations to bring their food to the lunchroom "someday."

> This pattern turned out to be just one aspect of what I consider to be
>
> one of the more puzzling findings from my work at the TWC, viz: except for the obviously vital, work-related room containing the printer, copier and fax machines, almost nobody ever used the non work-station facilities (the conference room, lunchroom and waiting room).

One user of the TWC did report that he used the conference room "once in awhile" and I did see him use it once. I also used it once--for an interview with a new TWC user. Otherwise, I saw the conference room used only twice, once for the awarding of certificates at the time the TWC was being closed and once by a real estate agent who was trying to find a new tenant for the space. I also had a report that one TWC user, on one occasion, brought his/her child to the TWC and let it play unattended (for the most part) in the conference room (which had glass walls to the ceiling, thus allowing the child to be seen but not heard).

As for the waiting room, it was never used when I was there except to walk through and as a place for the mail carrier to deposit mail. Although I should and wish I would have, I didn't think to ask people why they didn't use these facilities. My impression is that the work demands and characteristics of the particular set of users at the TWC when I was there simply did not produce the need (in the case of the conference room) nor the desire (in the case of the lunchroom) to use these facilities. In any case, after a few days of solitary brown-bag lunches (even Ron did not always use the lunchroom), I took to doing what most of the "natives" did: I went out alone for lunch when I got hungry (which wasn't always at noon) or I ate alone at my desk in my work station. From time to time, I also arranged small lunch groups.

I intended to go to the TWC every day that first week but I ended up missing Thursday altogether because something came up that made it impossible to go in. Retrospectively, this event also can be seen as the start of what ended up being a trend--missing days at the TWC due to unexpected meetings and other obligations elsewhere.

> Many who used the TWC reported to me, with more than a little annoyance in their voices, that they frequently did not come to the TWC because they had to accommodate the need for a meeting with others in Olympia or other places too far from the TWC to make it practical to return to the TWC that same day.

One does not learn about a place like the TWC only by getting to know people or watching what is going on. One also learns by making what can be called "informative mistakes." One of the clearest examples occurred late one day as I was about to leave. As I passed Ron's work station, I stopped to tell him where I had hidden the key to one of the lockable storage bins in my work area. I felt I should let somebody know just in case there was a need to get into it when I wasn't around.

He looked at me with a very puzzled expression and said, "Why did you do that? I never lock anything and as far as I know nobody else does either." I said "OK" and sheepishly went back to my cubicle to unlock the cabinet which, by the way, had only a few books and some

floppy disks in it. I am not sure of all the motives behind my initial decision to lock the cabinet. I am, however, aware of one that is pertinent to this project.

During the various training sessions for telecommuters and others, much was made of security, especially for people from different organizations who were working in the same place (as is typically the case in a TWC). It had been reported rather regularly that "security" was an issue in such situations. In retrospect, it may seem obvious that the "security" issue in question pertained to data stored in computers not in cupboards. Even so, and even though I never did go around (on weekends, for example) to check to see for myself whether others had locked their cupboards,

> I am convinced the people I got to know at the WSEO TWC were not very concerned about "security."

From casual inspection, it appeared that most of the lockable cupboards still had the keys in them and I frequently saw rather large amounts of paper lying out on the desks of people who had not come in that day. Moreover, and although I do not recall asking directly about security, I can say with certainty that it never came up spontaneously in a conversation with me while I was at the TWC. It was not overtly a "worry."

I, of course, was not the only one who needed to make friends and otherwise get acquainted with people at the TWC. By the time I got there, most of the regular users seemed to know each other rather well; and, for various reasons, I eventually got to know them fairly well, too. There were, however, a few people who began working at the TWC after I did and I am not sure that Ron or anybody else made a conscious effort to introduce these new arrivals to the other "old-timers." It may be, of course, that the introductions were made on a day or at a time when I was not at the TWC. In any case, it did seem that the newcomers had relatively little contact with the old-timers. Although this may have been the result of newcomer preferences, it does seem that

> in future/other TWCs, there should be a method established for helping newcomers to meet and get to know those who have already gotten established in the TWC.

Usage Levels

During my first 6 weeks at the TWC, I worked there on 25 of the 29 days it was open (1 of the 30 weekdays in this 6 week period was a legal holiday), plus 4 Saturdays. I can say with some confidence, therefore, that I was, for that period and except for Ron and perhaps two other persons, the heaviest user of the TWC. During that time, the combination of TWC users was virtually never the same two days in a row or, for that matter, from one week to the next and seldom if ever were more than half the work spaces being used (although this must be considered only an "impression" since, as I've indicated, I never "took attendance").

There were 13 work stations at the TWC. Although it would be correct to say that seven of these were in fairly regular use, two of these were used by individuals closely associated with the WSEO project, I used one of them and one was used by a person who helped TWC users keep their equipment up and running). Thus it would be more accurate to say that

> during the time of my study, only 5 of the work stations were used on a "regular" basis--i.e., at least once per week--by people not connected with the administration of the WSEO project.

Of these four, two were used on more than two and as many as four days per week; each of these work stations was used by only one person. One of the remaining stations was used by only one person but, according to the user, typically for less than two days per week. The fourth of these regularly used work stations was used primarily by one person but sometimes by others; these users arrived toward the end of September.

Of the six stations not in "regular" use, three were used on what I would call an "irregular" basis--i.e., about 1 day every two weeks. Because I knew it was possible that some of these stations were used when I was not around, I asked the regular users about the use levels of

those cubicles. Their responses confirmed my impressions; thus, I do not think the views summarized here are a product of poor sampling on my part.

One of the remaining three work stations was used regularly for the first two weeks of my observation period but, shortly after I began my work at the TWC, the person using it took a new job (in part in order to avoid a long commute after the demonstration project ended). When this person left, there were several others who indicated (verbally to me and by a posted name sign) that there would be several people using the cubicle on a fairly regular basis. In my experience, however, their actual use levels were much lower than they had expected them to be.

I saw each of the remaining two stations used only once during the 40 days of my observations. In one case, the use was for about 15 minutes on a Saturday morning when a man and woman came in, made a few phone calls, used the copy machine for a few minutes and then left. I had never seen these individuals before and I never saw them again. In the other case, the user came in on the last day the TWC was to be in use and, on the basis of several apparently independent sources, I believe it is in fact the case that this was completely coincidental; i.e., the person did not know the TWC was closing on that day. The person also seemed almost completely indifferent to this fact. Thus, besides showing no overt interest in what was happening to the TWC, s/he did his/her work without expressing any interest in the closing ceremonies.

In general, those who used their work stations on a regular basis (i.e., at least on a weekly basis) personalized their work stations with family photos, special items of equipment and in various other ways. It seemed obvious to me, therefore, that

> from the point of view of those users, these work stations were "their territory." These territories were not totally "off limits," however.

Indeed, one person made a point of showing me his/her stash of candy and said I should help myself whenever I wanted a piece. By the same token, I figured I had pretty much become "one of the bunch" when, one day, I noticed that my supply of chocolate cookies (which were inside a

cupboard but which I had been known to eat openly) was quite a bit smaller ("I can't resist a good chocolate cookie and so I helped myself," said a semi-regular user in a nearby work station with whom I had a friendly relationship).

The matter of "territory" was made particularly evident to me one day, after I had been working at the TWC for several months--but also and significantly after I had been unable to come to the TWC for two weeks. In that context, I came in and found somebody I did not know working at "my" work station. I was startled, to say the least. She was in "my territory" (which, by the way, I had not personalized in any way). I found this so unsettling, I did not immediately know what I should do, so I walked past the cubicle casually as though nothing was the matter and collected my thoughts.

Ultimately, I decided to go back and introduce myself to the woman. She was quite polite but seemed rather indifferent to my situation, especially by comparison to what I presumed she must have known was my wish. She explained that she and her workmate both needed to be at the TWC that day and that her workmate (who I knew was by far the more common user of their station) was in a nearby cubicle. Having said this, she then made what I thought was a rather lame offer to move. In view of the many piles of paper spread out on "my" desk as well as the fact that she was obviously in the midst of using the computer on a day when I did not have a great need for one, I offered to use another booth. She did not object and so I went to one that I knew was rarely if ever used and sat down. I could not, however, get into a proper working mood in that space (one that had, by the way, been personalized somewhat) and so I packed my things and left the TWC for the day. I never saw that person at the TWC again (although it must be said that I was there only infrequently after that).

Parting Shots

The day the TWC closed was a day of considerable ambivalence for nearly everyone involved. On the one hand, there were proud speeches and fervent testimonials about lots of hard work--by those in government and industry who had made the TWC possible and by the

telecommuters who had been fortunate enough to use the facility that had thus been created. On the other hand, plaintive comments and tired refrains were sometimes heard when people discussed the really significant topic of the day, indeed, of the month: "What'll you do now?"

Although worries about the future were in evidence, the TWC users I talked with did try hard to give a positive spin to the situation and there was, all in all, less "gloom and doom" talk than I had expected, at least overtly. Instead, I often found that people were in an almost defiant mood at times. Tacitly, anyway, the position seemed to be: "We will not be stopped." And all those I talked with seemed agreed on two things: the TWC would be greatly missed and they would do virtually anything within their power to avoid returning to their old workplaces.

Although the reasons for this goal were as numerous and varied as the people who used the TWC,

> the MAIN attraction of the TWC was that it enabled the users to avoid the long, painful and UNHEALTHY commute from their Seattle-area homes to Olympia. From this perspective, the productivity and ecological benefits were entirely secondary reasons for being at the TWC.

This finding, which began to emerge early in my participation at the TWC, was confirmed in the strongest terms after it was announced that the TWC would be closing at the end of January. Without exception, the regulars who planned to continue working for the state indicated that they had found a work site in a regular government office in the Seattle area. In short, when faced with the closing of the TWC,

> people did not seek to arrange to work at home where, it could be argued, they would drive less and be interrupted less and, in this sense, have a work environment that was perhaps even better, in at least some respects, than the one they had gotten used to at the TWC. Rather, they mainly sought a place to work other than Olympia.

This is, I believe, an important finding for the project as a whole. A principal aim of the project was to show that travel would be reduced through telecommuting. Insofar as these cases can be used to discuss the matter, it is quite clear that people will do a great deal to avoid 100

mile round-trip commutes. In the small sample I came to know at the TWC, I know of one person who moved closer to Olympia in order to avoid the commute and another person who changed jobs (leaving government service) to avoid it. By comparison, telecommuting is a very easy way to achieve the same goal and the TWC was appreciated very much for this fact by its users.

To put it another way, the main horror (and that seems quite the appropriate word here) of the prospect of closing the TWC, in the opinions of most of the regular users of the TWC, was being faced with the prospect of having to go back to the long commute to Olympia. The fear of this prospect was so great, they all found a way to avoid it. And, perhaps most significantly of all, the desire to avoid the commute had virtually nothing to do with trying to reduce air pollution or gasoline consumption or wear and tear on the family car or expenses associated with the commute (all of which were acknowledged to be areas of benefit that came with avoiding the commute). Rather, the principal reason for wanting to avoid the long commute was that a short one brought an immediate improvement in the general quality of their lives, and especially of their personal, interpersonal and intra-familial relationships. This was, as far as I could tell, a simple matter of time. Some of the users of the TWC lived well north of Seattle and, prior to the TWC, had been driving to the southern part of Olympia. Being able to drive the few miles to the TWC (in the northern part of Seattle) meant their work days were cut by a *minimum* of three hours and, typically, four or more.

More than time is involved, however. The stress of the commute is often extreme. Sometimes, according to my TWC co-workers, the stress persists throughout the commute, from start to finish, and it always is there for a least portions of the trip. The toll of this on their health and mood, and of these factors on their professional, personal and family lives was said to be enormous. Indeed, one TWC user had a serious heart attack during the study and, at one point afterward, made a moving plea to me (and others) to be sure to emphasize the way

> telework centers may actually lead to COST SAVINGS for employers due to reduced expenses for medical benefits.

I think this particular ramification of telecommuting should be studied far more thoroughly because it may well turn out to be one of the biggest of all. Lives may well literally be saved by an increase in telecommuting, through a reduction in miles travelled (which, by itself, must yield a reduction in highway deaths) and, perhaps most importantly, through a reduction of adverse medical effects of the stress of rush-hour commuter driving. In addition, and although it will require well-designed epidemiologic studies to be sure, it may be hypothesized that an increase in telecommuting should lead to reductions in stress-induced physical and emotional health problems generally, both during the commute itself and in the period at home and at work afterwards.

One could also predict that large reductions in commute distances would improve what may be referred to, for now, as the general "psychological health" of not only the individual telecommuters but also of their family members. Insofar as the stress experienced by workers with very long commutes lead to social and psychological problems at home, then it can be expected that, among other benefits, reducing the commute by telecommuting could lead to reductions in divorce and better school performance by children of telecommuters. These are, it must be stressed, conjectural comments made in light of an extremely small and unrepresentative sample. They are, however, plausible enough to warrant further study (assuming, of course, that such studies have not already been done).

> It may be that WSEO may wish to join forces with DSHS to sponsor research along these lines.

4. POSITIVE REACTIONS TO THE TWC

Except for rare events like finding somebody I didn't know in my work station or finding my desk covered with grit from some ceiling repair work, I really liked working at the TWC. As a workplace, the TWC met and, for the most part, exceeded user expectations. From numerous conversations in which the subject came up, I know that virtually everybody else at the TWC felt much the same way. There were several reasons for this. The main one, however, is that

> TWC users felt productivity increased significantly when they were working at the TWC.

I know that I felt this way, quite strongly. This was true, for me and others, largely for one simple reason: there were far, far fewer distractions and interruptions. This is, of course, one of the great cliches of the telecommuting subculture. But, cliche or not, it feels quite true.

Another reason I liked the TWC is that, in several respects, the work space I had was superior to any other I have access to. The desk-top work spaces were quite large by the standards I am used to, the position of the computer keyboard was ergonomically ideal (and adjustable), the lighting was good (but could have been better), and the carpet was thick enough to significantly reduce noise (and added a touch of class that was appreciated--after the smell of the new carpet went away). All of these features were noted by the natives as well.

> Without exception, those I talked with about the matter emphasized that the work spaces at the TWC were far larger and more suitable for the work they did than were the spaces they "regularly" worked in, and they all felt that this made a great deal of difference to them, both as to their feelings about the TWC generally and to their subjective sense of its (positive) impact on their productivity specifically.

In a related vein, the work stations were ideal in another respect: only limited work materials were there. There were no "tempting" distractions at my work station because I took to the TWC only those materials I needed to work on what I went there to work on. This is not a new discovery. It has long been known that workers will use various delaying tactics when faced with a big task--a favorite being to take care of all sorts of small tasks that are visible in the typical office (stacks of stuff in an "in box" or a "to do" file). If these are out of sight (i.e., in another office), they are "out of mind" and that means that one's effort can be devoted to what really matters--a development with obvious implications for one's subjective sense, at least, of productivity.

As simple (and ancient) as it is, *the significance of this point should not be underestimated*.

> Telecommuters I talked with constantly mentioned the advantages of fewer interruptions.

What needs to be but is all too infrequently included in this is an assessment of the impact of "self-interruptions"--deflections from the task at hand that are not initiated by other people but, instead, by the person faced with the task. Such deflections are brought on for all sorts of reasons (everything from boredom to anxiety) and the more "temptations" there are (and most offices are full of them), the more they will occur. At the TWC, at least for those like myself who did not work there regularly, there were few materials around that would distract attention from the task at hand.

> These experiences lead me to what I consider to be another major (though admittedly not particularly new) finding of my work: it appears that productivity can very likely be increased significantly simply by identifying the causes of self-interruptions and then eliminating these by, for example, making arrangements for workers to move, periodically, to less distracting work environments.

From the perspective of those trying to "sell" telecommuting, however, this observation can be seen in a less positive light. Thus,

> productivity increases that appear to be due to a person telecommuting may be a spurious correlation; it may be that productivity can be significantly increased without telecommuting simply by recognizing the role of interruptions (self and otherwise) and making arrangements enabling workers periodically to move (on foot within the regular workplace) to less distracting work environments.

In other words, it is one thing to say that productivity probably will not go down and may go up when people telecommute; it is another thing to say or imply that people should be encouraged to telecommute because it is "the" way to reduce interruptions and, thereby, increase productivity. There are lots of ways to prevent interruptions (self-induced and otherwise) besides getting workers to telecommute.

Although some who used the TWC 3 and 4 days per week may well have accumulated distracting files of "to do" projects, my comments here should not be construed to mean that I, or others I talked with about these general issues of the work environment, liked the TWC so much

more than their "regular" office that they would not want to return to it. People noted, for example, that they felt uneasy at times being away from the regular office because they were out of the "gossip loop." They missed seeing and working regularly with some of their longtime associates.

> The main fact remains, however: the physical environment of the TWC was (a) important, (b) very good, all in all and (c) was thought to have had a large, direct and positive impact on productivity.

Another set of physical features of the TWC that made it a very good place to work was the availability of good supporting office equipment--fax machine, photocopier and a top quality printer, and such vital allied "equipment" as a refrigerator, microwave, coffee maker and hot water dispenser. It was never hard to use these machines; no lines, no mechanical breakdowns and always a good supply of paper (at least in my experience and I heard no complaints about these facilities).

5. NEGATIVE REACTIONS TO THE TWC

This is not to say there were no problems with the physical features of the TWC. One problem, whose scope, measured in terms of the number of people influenced negatively, is hard to measure, concerned one of the most basic features of the TWC: its location. In at least one instance known to the evaluation team, a potential TWC user finally decided it was more of a hassle to drive across-town from his East side residence to the North-end TWC than it was to drive to Olympia. Also, others complained that the building was not right on a bus line and, in at least one instance, a potential user gave up on the TWC because of this difficulty. Obviously, then, future TWC sites must be easy to get to by bus and other methods of transportation.

As noted above, users of this TWC were very satisfied with the computer equipment available. Even so, it must be acknowledged that those who, for one reason or another, could not use the equipment provided were not really a part of this study. Their views, therefore, are simply not available to us. It is known, however, that at least a few potential users did not use

the TWC because it was equipped only for PC users. "Mac-users" simply could not be accommodated. Hence, it may be suggested that future TWC sites must be equipped to handle a variety of computer systems.

One of the most common, if not most significant complaints, was that phones sometimes rang for a very long time before they were answered and, because of the half-wall structures the overall space was divided into, the sounds carried easily and became annoying. I too noticed this problem and soon found myself doing what the natives did when the phone rang in an unoccupied booth: I unplugged the damned things. Fortunately, this is something that can be done and undone quite easily. This solution was especially valuable for the TWC since there were often many booths that were not occupied on a given day--a fact that outsiders making the calls could not easily know.

There were other phone problems. I found, for example, that I got quite a few calls from people who had, for some reason or another, been given the number of the phone in my booth but who were not trying to reach me. One day in particular, I had 3 or 4 such calls in less than an hour. I also found that it was sometimes quite annoying when a person in a nearby booth talked on the phone for lengthy periods (in a few cases, these conversations went on for more than an hour). In fairness, however, it should be emphasized that this latter distraction is not unique to a telework center; it would be common in any office with such physical features. The particular significance of it in the TWC environment is that I and many people there are seeking an especially favorable work environment in order to achieve high levels of productivity so, as a result, these lengthy phone conversations were *relatively* more annoying than they would have been at a regular office.

6. CONCLUSIONS

Given the limitations of the study (see section 2, above), only tentative conclusions can be offered here. Of the limitations, the most significant one is that the study is based on the

opinions and experiences of those who were able to use the TWC; the views of those unable to use the TWC are, for the most part, unavailable.

On the basis of the qualitative data available, however, the following 11 points can be noted:

1. users of the WSEO TWC said they significantly reduced their commute time and distance; this was perhaps the most significant perceived benefit of using the TWC; the positive impact of this change on health, family relationships and general outlook were noted strongly by all TWC users;

2. users of the TWC felt, subjectively but with great conviction, that their productivity increased when they used the TWC; most users said this increase was due to "fewer interruptions"; this was perhaps the second most important benefit of using the TWC;

3. the availability of an expert technical support person was seen as vital by TWC users; they relied extensively on him in getting their computers up and running and then in keeping them running;

4. users of the TWC felt the work spaces at the TWC were, in various important ways, better than those at their regular offices and that this contributed significantly to their satisfaction with the TWC;

5. the TWC functioned smoothly, on both technical and social or interpersonal levels;

6. usage levels were very low by almost any measure; a few people used the TWC extensively; most used it irregularly; some work spaces were almost never used

7. usage was most frequently disrupted by the need to attend meetings and otherwise be available at the user's regular workplace;

8. although TWC users needed and often used the LAN, the Fax machine and other similar pieces of office equipment, the most vital items seemed to be the telephone and computer; few if any made use of modems;

9. although TWC users did use the conference room and lunchroom once in awhile, these spaces were even more significantly under-utilized than the individual work stations;

10. security needs, apparently, were adequately handled; the problem of security was never raised by a TWC user during the study; and

11. the modern building and spacious facilities were much appreciated by TWC users; the location of the building (e.g., not on bus lines) may have been, however, a significant impediment to use for at least some potential TWC users.

APPENDIX C
PRODUCTIVITY ANALYSIS STUDY

A major concern of at least some participants in all organizations in this project, emerging as a theme even in the earliest meetings about a potential demonstration, was the impact of telecommuting on productivity. For some, the concern about the possible onerous consequences was so prominent that the organizations decided not to participate at all. For most others, the concern seemed to concentrate on how to gauge the productivity of workers who weren't within one's line of sight.

Analyzing the impact of telecommuting on productivity became a focus of our study. However, as we discovered, the measurement of productivity of information workers was a difficult problem that was not solved during the course of this demonstration. Before discussing the results of our research, an introductory section on the definition of productivity will help to illustrate the complexities involved.

WHAT IS PRODUCTIVITY?

Considerable relevant literature suggests that the connection between technological innovation and productivity, especially for the information workers who make up most of our study, may be far more complex than anticipated. Economist Stephen Roach, for example, has analyzed the relationship between American productivity and information-technology investments and finds that the productivity of the average information technology worker has just stayed even with productivity in the 1960s, despite a six-fold increase in the proportion of fixed capital devoted to office equipment and computers (from 3 percent to 18 percent).[1]

Juliet B. Schor, in a number of insightful recent pieces, compares the ways in which the United States and its competitors perceive the relationship between productivity and the use of

[1]Cited in Computer User, May, 1992.

leisure time, and speculates that with current ways of thinking U.S. industries may not wisely implement whatever time is made available through advancing technologies.[2]

In economic theory, and in large scale empirical studies such as Roach's above,[3] productivity is ideally measured as a ratio of aggregate outputs to aggregate inputs. In the case of our telecommuters, neither the nature of their jobs nor of the data available to us parallel this conception of productivity. The extent to which this aggregate concept of productivity is relevant when assessing the productivity of individual workers is problematic:

> Although units of output may be an appropriate measure to determine productivity in one organization, the measurement of each employee's performance against past efforts may be more appropriate in another. Whatever criterion is used, it must be (1) measurable in some way (e.g., by units of output, by valid performance appraisal results, by quality of output, or by comparisons of actual costs versus budgeted costs); (2) related to the goals of the organization (e.g., units and quality of output for a manufacturing firm and actual costs versus budgeted costs for a governmental agency); and (3) relevant to each job (e.g., units of output for a production worker and performance appraisal results for a white-collar knowledge worker).[4]

This "unit of analysis" issue is important to understand in general, and in particular for its relevance in assessing the productivity of our participants. It is easy to get the *impression* that productivity is being measured at the *individual worker level* in studies where the economic conclusion is that American workers are less productive than foreign counterparts. Even in the rare cases where this is true, individual labor still represents *only one component* of input as some proportional overhead figure to be included in a denominator that would capture the portion of the capital, material, financial, and technological resources for a given worker.

Typically, productivity measures exist only for larger conglomerations of workers {industries, total organizations, operating units, and (only rarely) work groups.} By dividing these larger unit measures by the number of full-time equivalent workers, an *average worker*

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[2]See, for example, Technology Review, November/December, 1991.
[3]See also R. S. Schuler and V. L. Huber, Personnel and Human Resource Management 4th ed (St. Paul: West, 1990)
[4]Schuler & Huber, page 406

productivity figure (usually based on key indicators) is obtained. Note the wide use of such average figures is in large part responsible for the *common misconception* that economic productivity is typically measured at the smallest unit, that of the individual worker. Such figures can be used to "blame" workers for lagging productivity by ignoring the role that management decisions play in determining the other elements that impact productivity. Without careful consideration, for example, a management decision to make do with an outmoded facility might be misconstrued as a problem of individual worker performance.

For our present purposes, it is most important to note that the problems of measuring and interpreting *productivity* as a ratio of outputs (goods and services) to inputs (labor, capital, material, financial, and technological resources) are generally most difficult at the individual level and less so as the aggregate level increases from group to organization levels.

Typically, when *individual* productivity is assessed, the input is restricted to measures of time, and the output is restricted to the number of products produced. In the Hawthorne study (of factory workers in an electric utility plant), where variations in lighting were designed as the primary independent variable, increasing output was partially a result of increasing hours of input. As telecommuting is supposed to reduce the amount of unproductive time spent travelling to the main office, an increase in output would be expected from the *additional* time spent on job tasks. Therefore, even at the most rudimentary level, any measure of individual productivity would need to control for time. But Schor reminds us of the inherent flaw in using time as our metric. In the Kellogg company's "historic switch" to a 6-hour work day in 1930, in response to unemployment due to the Depression, for example, W.K. Kellogg was surprised to learn that workers were happy with a "quicker pace but shorter hours" and that the unit cost of production went down so dramatically that "*we can afford to pay as much for six hours as for eight.*"[5]

[5]Schor, 1991, page 28.

We will see later that productivity is quite a different issue when seen from the perspective of the telecommuter, who is the immediate beneficiary of this change in workplace, than as seen from the perspective of a co-worker. But "productivity at what cost" is an issue which reasserts itself at every level of analysis. What, for example, is to be done with the extra hours saved if more can be accomplished with fewer workers? Dennis Chamot of the AFL-CIO Department of Professional Employees, for example, reminds us that while declines in work time "*helped to absorb the large productivity gains generated by new technology*" in the past, this is hardly the attitude, of contemporary companies - "*running lean and mean becomes the operating philosophy of U.S. industry and individual work loads grow while companies 'downsize.'* "[6]

Understanding the productivity of individuals was complex even during the era of "scientific management" where time and motion studies, coupled with relatively discrete and measurable outputs and inputs, allowed managers to think about setting rates of production based on particular elements of the tasks to be performed. In contrast, the "outputs" of few of the jobs in the telecommuting project are the uniform, discrete products (or identical services) that lend themselves to ready measurement. What matters in the long run, Schor says in summarizing our experience and that of the Japanese, is "*not how many hours one works but how productively one works them.*"[7]

Just as a relevant constellation of interpretation difficulties plagues the Hawthorne study, it has been pointed out that greater care in the *selection* of participants in the production plant environment of the Topeka experiment may have been partially credited with some of the increases in outputs that were initially credited to participative organizational changes alone.[8] Though the choices made by our participants are readily understood as reasonable in the context of their organizational needs, selection artifacts of far greater magnitude impact our study.

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[6]Dennis Chamot, "Technology and time." Technology Review, November/December, 1990.
[7]Ibid, page 26.
[8]See Donald T. Campbell, "Reforms as Experiments," American Psychologist, April, 1969.

In previous sections of this report, we demonstrated not only that the organizations are unrepresentative of Puget Sound organizations in ways which inveigh against ready generalization, but also that the controls are different from the telecommuters in significant dimensions, such as commute trip length, type of job, and some demographic factors. In our interviews with supervisors of telecommuters, they revealed that their choices for telecommuters were hardly random. Even though they understood from the training sessions that the telecommuters should be interchangeable with controls and co-workers where possible, supervisors acknowledged that employees about whom supervisors had doubts regarding their working remotely would not be chosen for the project. Some supervisors also indicated that they saw recommending an employee for participation in the telecommuting project as a reward for the best employees.

To see this as a "selection artifact" is to view the process solely from the perspective of the researchers, whereas supervisors and managers were more cognizant of the need of an effective workplace, in the long run and the short run. This "artifact" is policy among many effective companies. Recent research about the success of the Japanese auto makers in this country, for example, indicates that part of their success is due to the thorough and intense screening and *pre-employment training evaluation* that the Japanese rely on to assure that selected employees are compatible with a highly participative work environment. Nevertheless, this selection effect makes it more difficult to generalize from the project sample to the individual organizations (let alone the entire Puget Sound organizational population).

The Topeka focus was on *work group and plant productivity*. There was a recognition that participation and cooperation could result in group and plant productivity gains that individually set rates could not. It should be noted that the precise measurement of individual productivity for jobs without uniform, easily countable outputs, or where the process is an interdependent one, is not reality. Thus, cooperation and interdependencies were areas of exploration in both the written surveys and the in-person follow-up interviews performed as part of the project.

IMPACT OF TELECOMMUTING ON PRODUCTIVITY

The researchers decided to do a separate study of the impact of telecommuting on the measurement of worker productivity, based on as much information as we could glean from in-depth interviews with a subset of supervisors once they had had experience overseeing telecommuters. We had an initial interest in exploring the measurement of productivity in general. In conversations with experts in productivity measurement and supervisors of workers like the ones in our study, we soon learned that measuring productivity among the "knowledge workers" who typified the vast majority of our study is elusive at best. There was general agreement that our substudy was unlikely to bring any general clarity to the complex and confusing literature on productivity measurement, but several informants thought that detailed conversations with a number of experienced supervisors might help to clarify how their measurement strategies are affected by their confronting a new kind of worker - the telecommuter. Thus, we decided to concentrate instead in assessing *changes* in productivity measurement as a result of telecommuting.

We hoped to compare the individual performance reports on participants with their prior performance reports, and with reports about co-workers, but we learned immediately that the sensitivity of material we were asking for would preclude any such study of individuals. Even among organizations who were enthusiastic participants in the larger study, we found very few who would willingly supply formal performance appraisals on individual project participants - let alone on comparable "non-participants" --- too few, in fact, for any such effort to be meaningful.

We decided to abandon that tack altogether, and instead to request copies of blank appraisal forms from sampled organizations, and to conduct interviews with supervisors where we would talk generally about performance appraisal, rather than specifically about the performance of individual workers as recorded of formal appraisal forms. As long as we promised to protect even these blank forms, some organizations were willing to participate (In

fact, supervisors were typically willing to talk about individuals when interviews were conducted, so long as it the conversation was not part of their formal appraisal process).

Once we had decided on the focus of our substudy, letters were sent to the telecommuting coordinators in all participating organizations describing what we were looking for and requesting their cooperation. (Sample letter attached) Next, the individual research liaisons from the University of Washington project team contacted the telecommuting coordinators in each organization to establish the likelihood of gaining access to the participating supervisors. Based on the organizations' responses to this request, the characteristics deemed most important in distinguishing the available organizations (in particular organizational size, climate, public/private, job types) were used to choose seven organizations for in-depth interviews of their participating supervisors.

The blank forms used for performance appraisal/evaluation in each of these organizations, together with the questionnaire material previously received from the supervisors and their telecommuters, were reviewed before the interviews.

Interviews were conducted individually with each supervisor. Where possible, the interviews were in person and on site, typically in a conference room supplied by the organization.

Many of the major findings regarding productivity, as discussed in the body of the project report above, came from the following protocol which guided each interview:

INTRODUCTION

Based on the cautions we had learned in our preliminary inquiries, the interviewer set the stage in opening comments by reminding respondents of the following:

- The focus is on telecommuting, and in particular on changes in productivity assessment.
- Maintenance of confidentiality is assured
- No access to individual records will be required

- Any additional blank forms or any general written material on performance evaluation would be appreciated

- We will use both formal and informal methods (we have a protocol, but will depart from it as warranted)

- We recognize the difficulty in measuring performance in most jobs, and that approaches vary with type of job

PRODUCTIVITY MEASUREMENT

- How does your organization measure productivity at different levels (e.g. work group, division or department, or entire company)?

- How are productivity goals defined and set? (Specifically, for you and your work group)

- What specific indicators are used to judge progress toward these goals?

- Are these indicators completely under your control, or do they depend on outside influences such as other work groups' performance or general market trends?

- How are these indicators communicated to you, your subordinates or other parts of the organization? How often?

- Are these indicators used to foster individual or work group competition? How?

- Are productivity goals used to foster cooperation? How?

- Is performance by other companies or groups of companies used as a standard of comparison in productivity goals? How?

INDIVIDUAL PERFORMANCE EVALUATION

- What factors are used in individual performance evaluations? (May we have a copy of rating forms you use?)

- Are factors combined into an overall rating? How is the overall rating determined?

- Does the performance evaluation process allow for employees to challenge any part of the procedure? If so, how?

- What are the most important tasks that the telecommuter(s) you supervise perform?

- Do(es) the telecommuter(s) you supervise perform tasks that are largely independent of others?

- Has coordination between telecommuters and others in your work group affected individual performance or work group productivity? How?

- Have changes been implemented in the formal process for performance evaluation? If so, was it as a result of telecommuting?

- Have changes been implemented in the informal process for performance evaluation? If so, was it as a result of telecommuting?

REWARD SYSTEM

- Are specific performance objectives set for you or for your employees? If so, how well-defined, difficult, achievable do you think they are? How are they determined?

- Are rewards (pay, benefits, promotions) tied directly to achievement of performance objectives?

- How is progress toward, or achievement of, performance objectives communicated within the organization?

- Has the reward structure changed? If so, was that a result of telecommuting?

SPECIFIC TELECOMMUTING ISSUES

- Has telecommuting led to a re-examination of any part of the productivity assessment process?

- Has telecommuting led to any changes in the structure of the organization?

- Are there any changes in these areas that you think should occur to accommodate telecommuting?

Individual, in-person interviews were completed with twenty supervisors in four organizations, and with the only supervisor of transaction-based telecommuters in a fifth organization. Despite repeated attempts to schedule interviews with supervisors in the two smallest of the sampled organizations, it was never possible. We ultimately attributed this problem to the sensitivity of any formal *ex parte* interviews about the productivity of individuals, and to the likely impression that in organizations of this size it would be impossible to guarantee the confidentiality of information about individual telecommuters or supervisors.

The interviews at the supervisor's work site were scheduled to run approximately 30 minutes, but several interviews in fact ran an hour or more. When given the opportunity, supervisors seemed more than willing to talk to people who had some sympathy with the difficulty in formally assessing individual productivity, even when supervisors felt "certain" about the competence of individuals whom they supervised. We also learned a good deal about the reasons why these appraisals are regarded as so confidential.

Where supervisors chose not to be interviewed in person, as much information as possible was requested during a phone interview. Due to dynamic changes in these organizations, largely independent of telecommuting (as noted elsewhere in this report), most of the supervisors who resisted in-person conversations felt they had little to tell our interviewers: many reported that they had only supervised a telecommuter for a short time (due to job changes, or because the telecommuters were no longer with the organization, etc.) Ultimately, these phone calls resulted in approximately 20 relevant conversations.

FORMAL APPRAISAL SYSTEMS

The formal performance evaluation forms which we received from participating organizations typically called for supervisors to rate employees on four or five elements within four to six categories. As we said, we promised not to share even blank versions of the forms which we were given, some of which are viewed as so valuable that they provide a competitive edge for the organization. We have little else to compare the data to except the forms we received as part of this study, but our impression is that the State of Washington's form S.F. 9128, used by public agencies in Washington and available to the public, is in fact quite representative: The categories in that form are:

- Accomplishment of Job Requirements
    - Quantity of work
    - Completion of work on time
    - Quality and accuracy of work completed
    - Initiative in accepting responsibility

- Job Knowledge and Competence

  - Knowledge of work unit purposes, goals and duties
  - Command of skills needed for employee's position
  - Commitment to improving services to the public
  - Adaptability to new developments in the job
  - Other elements (to be defined by employee and/or supervisor)

- Job Reliability

  - Dependability and reliability regarding work instructions
  - Pursuit of efficiency and economy in the use of state resources
  - Degree of need for supervision
  - Efficiency in the use of work time
  - Other elements (to be defined by employee and/or supervisor)

- Personal Relations

  - Ability to get along with others in the work unit
  - Contributes to the promotion of morale
  - Accepts appropriate direction from superiors
  - Contributes to the productivity of the work unit
  - Other elements (to be defined by employee and/or supervisor)

- Communications Skills

  - Comprehension of oral and written directions
  - Ability to communicate orally and in writing
  - Ability to listen and absorb new forms of information
  - Knowledge and use of correct means and channels for the communication of notices. Complaints, etc.
  - Other elements (to be defined by employee and/or supervisor)

- Performance as Supervisor (for Supervisor's use only)

  - Plans, organizes and monitors work unit activities for efficient operation
  - Directs and provides guidance to subordinates
  - Conducts effective performance appraisals and promotes employee development
  - Sets personal example of high performance for the work unit
  - Other elements (to be defined by employee and/or supervisor)

There are five overall rating categories which are provided on this State for summarizing each performance dimension:

far exceeds (5), exceeds (4) and meets (3) normal requirements, and meets (2) and fails to meet (1) minimum requirements.

We learned that these categorizing schemes are regularly in flux in all the organizations we focussed on, which is consonant with the general sense that the strategy each is now using is deemed insufficient.

Ironically, if the organizations are in fact concerned about the effectiveness of their formal performance assessment mechanisms, their responses are almost as if they are rearranging deck chairs on the Titanic: while some organizations were switching from four category ratings to five, others were doing the reverse; while some were implementing forced distributions of the numbers of employees within a given rating, others had abolished such a requirement. If there was any pattern, it was that organizations seemed to displayed cycles of change which seemed to correspond with reorganization.

One conclusion we can reach with certainty is that *none of the changes in the measurement of productivity were due to the introduction of telecommuting into the organization*. Every respondent answered in the negative to questions related to this, and to whether telecommuting per se should provoke changes in the appraisal process. Supervisors typically seemed surprised that we might expect such changes, and as their comments captured in the body of this report reveal, they believe that much larger forces were at work in nearly every aspect of organizational change. Of these contending forces, budgetary crises, competition, and the pressure to downsize while preserving the best employees were far more important than telecommuting, but even these had little to do with performance measurement instruments *per se*. They had far more to do with the ways in which people filled out the forms they were given.