THE TIME FAMINE:
AN UNINTENDED CONSEQUENCE OF THE WAY TIME IS USED AT WORK

by

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A.B. Princeton University
(1989)

Submitted to the Sloan School of Management
in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 1995

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ABSTRACT

Individuals in our society suffer from the symptoms of a time famine. Men and women, married and single, confront stress, exhaustion, even death. As a society, we accept that the time famine is an unavoidable consequence of maintaining a competitive position in the global market. We look at Japan, an economically dominant nation, and "see" that most Japanese work extremely long hours. We assume that their economic success is inextricably linked to the incredibly long hours they work and infer that we too must "put in the hours" if we want to succeed.

Few people consider that alternative ways of working might exist that actually facilitate achievement of an organization's goals while requiring fewer hours of work, not more. The assumption is that pressure to complete work rapidly and effectively necessarily implies that individuals work long hours. It seems preposterous to the individuals involved that alteration of the way they do their work could reduce the hours they must work while increasing the productivity of the groups to which they belong.

My purpose is to examine how time is currently used at work, to consider the implications of such time use for both individuals and the organization and to investigate the possibility of instituting new ways of using time that reduce hours worked and actually increase productivity. My three initial research questions are: 1) How is time used at work; 2) What effects does this time usage have on the organization; and 3) What effects does this time usage have on individuals' personal lives? After finding that the current way of working proves problematic for both the organization and individuals, I examine whether new ways of working could be created that would ameliorate these problems.

An integrated framework -- the "sociology of work time" -- is developed as a way to study the use of time at work and the implications of this use of time for individuals and the organization. The framework is composed of three parts: the temporal organization which is based on the "sociology of time"; the social organization which is based on the "sociology of work"; and the systemic use of time at work which has not been previously studied.

The analysis is based on a nine month field study of software engineers involved in a product development process. Engineers work under tight schedules and constantly confront crises. The intense pressure to be present at work renders it difficult for engineers to fulfill their responsibilities outside of work.

In Part I, I document the existence of the time famine. I then discuss both the framework and the particular site used to explore whether the time famine must be the consequence of the pressure to complete our work. In Part II, I describe how time is used by the software engineers I studied. I find a crisis mentality, an individualistic definition of success and a disruptive pattern of interacting: these elements perpetuate each other and produce a phenomenon I label the "vicious work time cycle."

In Part III, I challenge the assumption that the pressure to get products to market must result in a time famine. I question whether the vicious work time cycle itself is an inevitable result of high pressure work. Individual attempts to create change are shown to only reinforce the cycle. However, experiments indicate that collective change may indeed be possible, and such change could provide benefits both for individuals -- in terms of reduced stress at work and potentially more time to spend outside of work -- and the organization -- in terms of the efficiency and effectiveness of the work process.
The current use of time leaves engineers lacking sufficient time to accomplish their professional and personal responsibilities. However, if they as a group use time differently at work, the same amount of time might suffice to accomplish these responsibilities. These results provide new hope for eliminating the time famine. They further suggest that seemingly rigid work structures, in general, may be more flexible than commonly assumed. Change in these structures may indeed be possible, and provide benefits for both individuals and the organizations in which they work.

Thesis Supervisor: Lotte Bailyn
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# TABLE OF CONTENTS

List of Figures 5  
List of Tables 6  
Acknowledgments 7  

INTRODUCTION: Raising Some Questions 9  

PART I: Introducing the Time Famine 16  
Ch 1: Documenting the Time Famine 17  
Ch 2: Towards a Sociology of Work Time 24  
Ch 3: Software Engineering and the Sociology of Work Time 51  

PART II: Perpetuating the Time Famine 75  
Ch 4: Temporal Organization of Work: The Crisis Mentality 76  
Ch 5: Social Organization of Work: The Definition of Success 87  
Ch 6: Ways of Succeeding: The Cases of Max and Laura 95  
Ch 7: Ways Time is Used at Work: The Perpetuation of Interruptions 114  
Ch 8: Ways of Interacting: The Cases of Matthew and Sarah 135  
Ch 9: The Vicious Work-Time Cycle and the Time Famine 152  

PART III: Challenging the Existence of the Time Famine 168  
Ch 10: Creating Individual Change: The Cases of Chris and Kate 169  
Ch 11: Creating Collective Change: Experimenting with "Quiet Time" 185  

CONCLUSION: Reflecting On What Really Matters 214  

APPENDIX: Data Collection 224  

BIBLIOGRAPHY 234
LIST OF FIGURES

Figure 1: Distribution of Blocks of Uninterrupted Time 121
Figure 2: Average Day of Software Engineer 122
Figure 3: Helpfulness and Urgency of Interactions 125
Figure 4: The Vicious Work Time Cycle 153
Figure 5: General Productivity Phase 1 190
Figure 6: Productivity During Quiet Time Phase 1 191
Figure 7: General Reaction to Phase 1 192
Figure 8: General Productivity Phase 2 196
Figure 9: Productivity During Quiet Time Phase 2 197
Figure 10: General Reaction to Phase 2 198
Figure 11: General Productivity Phase 3 201
Figure 12: Productivity During Quiet Time Phase 3 202
Figure 13: General Reaction to Phase 3 203
Figure 14: General Productivity Phase 4 207
Figure 15: Productivity During Quiet Time Phase 4 208
Figure 16: General Reaction to Phase 4 209
Figure 17: Ways of Interacting 215
LIST OF TABLES

Table 1: Types of Interactions Engaged in by Software Engineers 115
Table 2: Helpfulness and Urgency of Interactions 124
Table 3: Time Allocation to Software Work Activities 130
Table 4: Whether Interactions are Urgent or Not 132
Table 5: Whether Interactions are Helpful or Not 133
Table 6: Work-Family Background of Software Engineers 158
ACKNOWLEDGMENTS

Five years ago I read the description of a Ph.D. in Organizational Behavior in the Harvard Graduate Student Announcement and thought I had found my dream career. Before jumping in head first, I decided to take a year to make sure I understood what the field really was about. I walked into two professors' offices and asked each of them if I might work for free as a research assistant. Both Lotte Bailyn and Nitin Nohria welcomed me with open arms and have provided me unwavering support from that day forth.

Lotte has encouraged me to strive towards my potential while providing me a wonderfully supportive environment in which to continually grow. She has critiqued every paper I have written while in graduate school. Her ideas profoundly influenced my thinking. Even when on leave in England during my final semester at MIT, Lotte managed to provide insightful feedback -- practically daily -- on the final drafts of my dissertation. (She also tried, unsuccessfully I am afraid, to teach me how to use the 'comma'.

Nitin has been my greatest source of inspiration and motivation throughout graduate school. He helped me gain both confidence and a sense of clarity as my thinking progressed. Without him continually pushing and reassuring me, I would never have finished in four years.

John Van Maanen pointed my energy and skepticism masterfully. He is the one who encouraged me from the beginning to "live with and like" the software engineers I was studying. He further taught me the valuable lesson that it is not an issue of being in the right place at the right time, but rather making the place you are in the right place. Once I was back from the field, John helped me craft thousands of pages of seemingly random field notes into a coherent tale. On the final drafts, John thoroughly read every page, providing both advice and editorial comments.

Deborah Kolb kept challenging me to think further about the theoretical aspects of my dissertation. She pushed me to "see" connections that enabled me to weave the pieces together into a more cogent whole. She kept me alert to the fact that writing a dissertation was not meant to be easy. She kept me struggling, all for my own good.

My research was conducted as part of a team project funded by the Ford Foundation. The team included Lotte Bailyn, Deborah Kolb, Susan Eaton, Joyce Fletcher, Maureen Harvey, Robin Johnson, and consultant Rhona Rapoport. Team meetings provided me a unique opportunity to develop my ideas about time, work-family and gender equity. Joyce Fletcher and Robin Johnson paved the way for me to write a dissertation as part of this team. Maureen Harvey showed endless willingness to accommodate to my need as a doctoral student to conduct independent research.

The software engineers who welcomed me into their lives and their homes could not have been more wonderful. They continuously shared stories with me and made me feel a real part of the group. I could not have asked for more friendly, supportive people to study.

Heather McPhee spent an untold number of hours editing. She became all too familiar with the stories of Sarah, Laura and Max herself. Without Heather's help this dissertation would be much more difficult to read. At the end, Mie-Yun Lee, Joseph Lu and Billy Pizer provided technical support to make the final draft presentable.
Jody Hoffer Gittell, Gil Preuss, Wendy Guild, Andy Hoffman, Amy Segal, Susan Eaton, and Kathy Marshall each made a unique and significant contribution to my life as a graduate student at MIT. Regardless of what happened, it was John Weeks who reminded me that we were going to make the best of it, and it would all work out in the end. He was right!

My friends outside of MIT have been most supportive by giving me an escape from my endless hours in front of the computer. Andrea Campbell faithfully had dinner with me every Tuesday night and reminded me why we wanted to be academics. Nancy Katz provided tireless emotional support without ever mentioning our work. (What do you study anyways?) Ari Zaiman sent flowers every time the going got tough. Stephanie Lewis introduced me to the wonders of the University of Michigan and the Society of Scholars. She gave me a reason to finish and get on with my career.

Most of all my family has provided boundless love and inspiration. My sister continually reminds me I work too hard and I am a better person when I put my books aside. My father read every draft of this dissertation and kept me from becoming a total academic. His role was to make sure I had something practical to say. But more than that he taught me how to play. He taught me that working hard is fine, but living life is better. Finally, my mother has supported me in everything I have done. She has followed the ups and downs of this dissertation in a way no one else would have cared to do. She has always been there when I needed her, whether to bring cheer to a gloomy day or to celebrate the little victories along the way. It is my family who has taught me that there is need for balance in our lives. If we work all the time we miss much of the joy of living.
INTRODUCTION:
Raising Some Questions

It is Monday evening. You just finished writing a draft of an article for submission to a journal. You are so pleased that you are almost done. Yet, you need a few citations in order to complete the reference section. What do you do? Naturally, you call your fellow academics and ask for the information, never thinking for a second that your colleagues would rather not hear from you on a Monday night. You could send an e-mail, write a letter or leave a voice message at work; after all, there is no urgency. If you send the article next week it may delay the editor's response, but that delay does not really matter given the fact that you will have to wait several months for a response. Yet, each of us has endless examples of when we have proceeded to do the next task on our "to do" list without thinking about the implications for those around us. Rather, we proceed like robots, fulfilling our own responsibilities when the time is most appropriate for us.

For all those examples that you can think of when you were guilty of such behavior, there are probably as many times when you have found yourself generously responding to the interruptions of others. All of those days that you went to work and tried to write, but found yourself bombarded by interruptions from students, other faculty and the constant ringing of the telephone epitomize the impact of the pervasive lack of awareness of others' temporal work needs. My own adviser has a clever way of separating the different parts of her job. When she wants to write, she does not come to school. Rather, she comes to school to teach, to meet with students and to attend faculty meetings. She writes at home, where she is temporarily protected from the constant interruptions of those around her.

The engineers I studied, however, do not have the option to work at home. Indeed, they do not even have the option of entering an office and closing the door when they are

---

1 This tale was relayed to me by one of my dissertation committee members who had just read a draft of my thesis and was feeling guilty, recognizing the implications of his own recent behavior.
busy and need to concentrate. They work in cubicles and in labs; consequently, they are subject to the constant interruptions of those around them, including peers, managers, technicians, meetings and social chatter.

As a result of the physical reality of the work situation, engineers often have trouble completing their work during normal business hours. Because there is immense pressure to get the products that they design to market as soon as possible, the engineers feel "obligated" to arrive early, to stay late and to work weekends. This intense work pattern continuously prevents them from fully partaking in the responsibilities at home. A drastic shortage of time, a "time famine," results from the schedules to which the engineers must adhere. The engineers suffer immensely. They have too much to do and not enough time to do it. The organization also suffers. My research suggests the way engineers use time at work causes the work to take longer to complete than it should; moreover, the quality of the work is adversely affected.

***

Individuals in our society suffer from the physical symptoms of coping with a time famine. Men and women, married and single, are stressed, exhausted and even dying as a result of frantic schedules. However, we tend to accept the assertion that a time famine is unavoidable, if we are going to compete as a nation in the global market. We look at the Japanese and "see" that they work incredibly long hours and assume that we too must "put in the hours" if we expect to succeed. An intense work style results that makes it difficult for individuals to manage responsibilities outside of work.

No one considers that alternative ways of working might exist that actually facilitate completion of the organization's goals while requiring fewer hours of work rather than more. The assumption is that pressure to get products to market means pressure to work long hours. It seems preposterous to the individuals involved that the way the work is done could be altered in a manner that reduced the hours required to complete the job while
increasing the group’s productivity. This assertion contradicts the commonly held assumption that the total time required for completion of a group’s work is directly based on the amount of time that each individual works.

A desire to determine whether longer hours at work provides the only way to be more competitive as a nation motivated my research. I wondered if alternative ways of working could exist that would enable market competitiveness, yet would avoid perpetuation of a time famine for our culture. To address this question required first studying how time is currently used at work and what the implications of existing time usage are for both the individuals and the organization. My three initial research questions were: 1) How is time used; 2) What effects does this time usage have on the organization; and 3) What effects does this time usage have on the individuals’ personal lives? After finding that the current way of working is problematic for the organization and for individuals, I then examined whether new ways of working could be implemented that would benefit both the organization and individuals. This inquiry constituted my fourth research question.

Adequately addressing these four questions required a more integrated approach to the study of the use of time at work than that which informs existing research. The current literature on the use of time is reviewed in Chapter 2. For now, one needs only to be aware that this literature documents how individuals use time at work without considering the context in which their work occurs or the implications of their time use for others involved at work, for the work process as a whole or for individuals’ lives outside of work.

The framework I propose considers both the context in which the work is done and the implications of how time is used by individuals for the individuals, for other people in the organization and for the organization as an entity striving to accomplish a goal. First, the framework integrates the temporal and the social organization of work into the study of the use of time. The framework therefore builds on research from both the "sociology of time" and the "sociology of work." I call this new framework the "sociology of work time" in order to emphasize the integration involved. The scope of the framework,
however, expands beyond either the "sociology of work" or the "sociology of time" or their simple integration. The framework considers how individual time use at work affects other individuals with whom an individual works. Capturing the effects of individuals' interactions on other individuals' time proves to be a critical part of my study. As I mentioned, the engineers often interrupt each other, making it extremely difficult for any of them to complete their work efficiently. This negative effect of the way engineers use time is only revealed when one considers what I define as "the systemic use of time" -- the way that individuals affect each other in the process of interacting. Finally, my framework not only focuses on the use of time in the context of the social and the temporal organization of work and on the effect individuals have on themselves and other individuals with whom they interact, but it also illuminates how this use of time affects the achievement of the project's goals and individuals' ability (or lack thereof) to establish balance in their lives.

I applied this integrated framework to the case of software engineering in order to answer my four research questions. The group of software engineers I studied were involved in creating the software component of a computer printer. I arrived on site shortly after the senior management committed funding to the product. I remained on site until the product was launched nine months later. I kept detailed records of what engineers do all day and how their uses of time affect the engineers themselves, the others with whom they interact and the completion of the project's goals.

Software engineers involved in a product development process provide an ideal group to study. They work under immense pressure to get products to market. They constantly feel that they must "hurry" or they will not succeed. No product is thought to be able to withstand market competition if it takes too long to reach the market. Within these tight deadlines, crises often emerge. The feeling among managers and their engineers is that crises must be handled without the group losing more time and ending up further behind schedule. For the engineers, that understanding translates into pressure to increase the number of hours that they work. Thus, engineers believe that they must put in long hours
in order to enable both the product’s development and the achievement of their individual success. Software engineering, therefore, provides a site where the time famine is thought to result from the unceasing pressure to get products to market.

Studying software engineering further provides an opportunity to investigate work that involves both an individual and an interactive component. Much of software engineering involves sitting in front of a computer writing programs. This type of work requires deep concentration. However, engineers are continually interrupted by spontaneous interactions. This makes it problematic for them to write programs. Yet, the interactions themselves constitute a critical part of the job. It is not possible for engineers to work in isolation and have a third party -- or even themselves -- "integrate" the parts into a uniform whole at the end of the project. Rather, individual parts are highly interrelated, and the work process requires continual interactions among the engineers. Studying a job that demands both individual and interactive work provides an opportunity to investigate the systemic effects of the temporal sequencing of these activities in terms of individuals' ability to complete their work and the group's capacity to complete the project in a timely fashion.

Currently, the sequencing of individual and interactive activities is disruptive for software engineers. Their managers, however, have the flexibility to alter the engineers' daily use of time. While the overall pressure is dictated by the need to launch the product as soon as possible, on a day-to-day basis the management team drives the dynamics of the schedule. The pressure to continually respond to the whims of the customer does not directly affect this type of work. Software engineering therefore provides a context where flexibility to change the daily use of time exists, if desired.

Ultimately, the time pressure involved in software engineering work, the sequencing of individual and interactive activities required to get work done and the daily flexibility in scheduling work combine to make software engineering an ideal site to investigate whether
pressure to be competitive as an organization must translate into the current way of using
time which in turn results in the "time famine."

In Part I of the dissertation, I document the existence of the time famine and describe
both the framework and the site used to examine whether the time famine is a necessary
consequence of the pressure to complete the work. In Part II, I describe how time is used
by the seventeen software engineers I studied. I find a crisis mentality, an individualistic
definition of success and a disruptive pattern of interacting which perpetuate each other in
what I label "the vicious work time cycle." In the "vicious work time cycle," the pressure
to get products to market turns all tasks into crises. When crises prevail, there exists
incentive to reward those individuals who work long hours and "heroically" solve
problems. This motivates engineers to focus on getting their own work done, as opposed
to thinking holistically about the work required to complete the product. In turn,
individuals perceive their own work as their top priority and feel justified interrupting
whomever they need whenever they feel it is necessary to make progress on their own
work. This approach makes it hard for individuals to complete their work because they are
constantly interrupted; this pervasive pattern of interruptions perpetuates the crisis
mentality. Thus, the vicious work time cycle keeps on spinning, reinforcing the
assumption that pressure to get products to market results in long hours of work, lack of
attention to others' work and perpetuation of a crisis mentality. This cycle leads to an
inefficient and ineffective way of working with severe consequences for both the product's
development and the individuals involved.

In Part II, it becomes apparent that the time famine is both a systemic and a collective
problem. It is a systemic problem resulting from the interaction patterns of individuals and
the consequences these patterns have on other individuals and the goals of the team as a
whole. Furthermore, it is a collective problem that results from the shared definition of
what type of effort is required to succeed.
In Part III, I show that individual change alone cannot address a problem that is both systemic and collective. Those individuals who try to create change on their own suffer negative consequences and only reinforce the assumption that no viable alternative exists. However, I further discuss a set of experiments which attempted to create collective change. I find that as a collective the group of software engineers can change their disruptive way of working and begin to break down the "vicious work time cycle." In the end, collective change exhibits potential benefits for both individuals -- in terms of reduced stress at work and more time to spend outside of work -- and the organization -- in terms of the efficiency and effectiveness of the work process.

The current use of time leaves engineers lacking sufficient time to get everything done. However, if, as a group, they use time differently, the same amount of time may suffice to accomplish their goals. The results of my research provide new hope for resolving the time famine. They further suggest that seemingly rigid work structures, in general, may be more flexible than they are initially perceived to be. Change in these structures may indeed be possible and provide benefits for both individuals and the organizations in which they work.
PART I:
Introducing the Time Famine
Chapter 1: 
Documenting the Time Famine

Certainly, our ancestors worked hard . . . . Grandma stoically stocked wood for the stove every morning and scrubbed the laundry on a washboard. Grandpa clocked in long, arduous hours on the railroad, or in the mines. But when he came home, there were no faxes waiting for him to answer, no cell phones or emails to interrupt his after-supper smoke. . . . Today there is no downtime, no escape -- from work or from other people. We have cell phones in the car and beepers in our pockets, and we carry them to Disneyland, to the beach, to the bathroom (Newsweek, March 6, 1995: 59).

Work pervades our lives. Pressure for longer hours of market work affects life both at the office and in the home. As women enter the work force, there is also more caring for the home and family that needs to be done before and after the normal work day. Many people feel that they lack adequate time to meet all of their responsibilities.

Michael Young refers to our culture's temporal crisis in his book the Metronomic Society as a "Time Famine":

The executive speeding in his Rolls-Royce to the next appointment has to seize a car telephone to clinch his deal lest he have no time for it when he gets there or lest the other party by then has left the car phone to which he too may have been momentarily attached (1991: 17).

Time, Fortune, Newsweek, "48 hours" on CBS, "Real Life with Jane Pauley" on NBC have all presented headline stories regarding the time shortage in our society.

Whether one refers to the troubling phenomenon as the "Time Famine" as Michael Young does, or the "Time Squeeze" as Juliet Schor names it in The Overworked American, or "Time as a scarce resource" as Lotte Bailyn describes it in Breaking the Mold, the underlying concern is the same: there is not enough time in our society to adequately meet the demands of work, family and the self.

According to Juliet Schor (1992), Americans work more hours than ever before. Between 1969 and 1987, Schor reports that the average annual hours spent on market and
household labor combined increased for employed persons 162 hours.² That increase reflects about three hours of additional labor a week, or the equivalent of an extra month a year. Analysis of this temporal phenomenon by gender reveals that men in the labor force have increased their annual market labor an average of 98 hours, while their contributions to household labor have increased an average of 68 hours (net increase equals 156 hours). In contrast, women in the labor force have increased their average annual hours of market work by 305 hours while their work at home decreased by 145 hours (net increase equals 160 hours). Schor's data further make it appear that overall men and women do comparable amounts of work, although men still do more market work and women still do more household labor.

<table>
<thead>
<tr>
<th></th>
<th>Average Hours of Work per Week in 1987* (Average hours of work per week in 1969)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Market Work</td>
</tr>
<tr>
<td>Men</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2152</td>
</tr>
<tr>
<td></td>
<td>(2054)</td>
</tr>
<tr>
<td>Women</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1711</td>
</tr>
<tr>
<td></td>
<td>(1406)</td>
</tr>
</tbody>
</table>

²Based on labor force participants.

A recent study by Roberts and Rupert of the Federal Reserve Bank of Cleveland (as cited in *Barrons* April 3, 1995: 32) reveals that when the data are broken out for married individuals and then categorized by whether or not the female spouse works, it turns out that women in dual income couples work significantly more than any other married individuals. Women in dual income couples work slightly less in the market than their

---

² Market labor is defined as paid labor. Household labor is defined as housework, child care and "other domestic labor."
husbands or men with wives at home. However, dual income women do significantly more domestic work. Compared to their husbands, women in dual income couples spend over twice as much time on "home work" each week.

<table>
<thead>
<tr>
<th></th>
<th>Market Work</th>
<th>Home Work</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men in Dual Income Couples</td>
<td>44.8 (44.0)</td>
<td>7.3 (6.0)</td>
<td>52.1 (50.0)</td>
</tr>
<tr>
<td>Women in Dual Income Couples</td>
<td>41.4 (39.2)</td>
<td>15.9 (20.2)</td>
<td>57.3 (59.4)</td>
</tr>
<tr>
<td>Men with Wives at Home</td>
<td>44.2 (44.6)</td>
<td>6.0 (4.4)</td>
<td>50.2 (49.0)</td>
</tr>
<tr>
<td>Women at Home</td>
<td>---</td>
<td>32.2 (34.0)</td>
<td>32.2 (34.0)</td>
</tr>
</tbody>
</table>


Roberts and Rupert entitled their report "The Myth of the Overworked American." Because hours of work have not changed much within any of the categories of married employees during the twelve year period between 1976 and 1988 they claim that American work culture has not significantly changed. They fail to analyze, however, the increasing number of dual income couples. The labor force participation of married women has increased from 44% in 1976 to 57% in 1988 (Schor, 1992: 25). As a result, the large number of women who entered the labor force between 1976 and 1988 worked an average of 32.2 hours per week in 1976, while by 1988 their total work hours had increased to an average of 57.3 hours a week (that is a net increase of 24.9 hours a week). It may not be the case that our society has overworked Americans, but it certainly seems to be the case that we have overworked dual income women. Moreover, the proportion of women in this position is on the rise (Schor, 1992).
When one further analyzes household labor by task, one finds that women spend more time than men at everything except "outdoor tasks" and "auto maintenance" (Shelton, 1992). These findings substantiate Hochschild's (1989) claim that the tasks that men assume responsibility for are often tasks that do not require day-to-day or immediate response. Women, on the other hand, assume responsibility for the domestic tasks that must be done daily and cannot easily be postponed or altered. These tasks constrain women's time, making it difficult for them to accommodate the demands for long and undefined hours of market work.

<table>
<thead>
<tr>
<th>Household task</th>
<th>Men</th>
<th>Women</th>
<th>Men as % of Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparing meals</td>
<td>3.1</td>
<td>8.9</td>
<td>34.8</td>
</tr>
<tr>
<td>Washing dishes</td>
<td>2.3</td>
<td>5.6</td>
<td>41.1</td>
</tr>
<tr>
<td>Cleaning house</td>
<td>2.2</td>
<td>7.2</td>
<td>30.6</td>
</tr>
<tr>
<td>Outdoor tasks</td>
<td>4.9</td>
<td>2.2</td>
<td>44.9* (W as % M)</td>
</tr>
<tr>
<td>Shopping</td>
<td>1.7</td>
<td>3.0</td>
<td>56.7</td>
</tr>
<tr>
<td>Washing/ironing</td>
<td>1.0</td>
<td>4.1</td>
<td>24.4</td>
</tr>
<tr>
<td>Paying bills</td>
<td>1.7</td>
<td>2.0</td>
<td>85.0</td>
</tr>
<tr>
<td>Auto maintenance</td>
<td>2.0</td>
<td>0.4</td>
<td>20.0* (W as % M)</td>
</tr>
<tr>
<td>Driving</td>
<td>1.2</td>
<td>1.7</td>
<td>70.6</td>
</tr>
</tbody>
</table>


*Manifestations of Time Famine in Individuals:*

In a disheartening study, Swiss and Walker (1993) set out to discover how women from Harvard's Business, Law and Medical schools confront their complex agendas of career, children, spouses and personal life satisfaction. Swiss and Walker (1993) found:

 Mothers afraid to take maternity leave for fear of long-term economic repercussions; women who delivered babies on Friday and returned to work on Monday, having been informed by male colleagues that these are the rules of the game; talented women forced out of a workplace that dictates 70-hour weeks or nothing... even women with the most solid credentials and the financial ability to arrange the best possible child care are finding it
difficult to merge their dual roles. . . . The desire to find time for family life crosses all economic groups and is a unifying theme for this generation of working women at all levels of the work place (p. 12).

Work-family conflict has developed into a major social issue in the United States. A 1989 Yankelovich Clancy Shulman poll found that 75% of employed women "very often" or "sometimes" "feel torn between the demands of their jobs and family" and 73% "very often" or "sometimes" "wish they could stay home and be a homemaker or mother." In a 1991 Gallup Poll, nearly two-thirds of working parents said they spend too little time with their children. Further, more than one-third (roughly 36.5%) of all workers reported experiencing "a great deal" or "quite a lot" of "conflict between the demands of work and family or personal relationships."

The demands of work and the resulting struggle to balance work and family, also engender both stress and exhaustion. According to Harris (1987), 89% of all Americans report stress; 59% report great stress at least once or twice a week; 30% report living with high stress daily. Harris (1987) further reports that stress means: seizures of anxiety, tension, nervousness, headaches, anger, irritability, fatigue, depression, muscle aches, stomach aches, increased heart beat, insomnia, rise in blood pressure, compulsive eating, loss of appetite and/ or a pervasive sense of upset.

According to a recent cover story in Newsweek (March 6, 1995: 56) "We're fried by work, frazzled by the lack of time. Technology has not made our lives better, just busier. No wonder one quarter of us say we're exhausted. We need to chill out before we hit the breaking point." Harris (1987) notes: 58% of the population sleep seven hours or less; 43% of Americans have trouble sleeping; 40% suffer from stress nearly every day and find that they can sleep no more than 6 hours a night. Those who get the least sleep fall into two categories: 1) emotionally disturbed; and 2) four year college graduates, baby boom generation, professional and top managerial types. Stress and exhaustion are the price paid for affluence and success. Close to twice as many high-income as low-income people report suffering from such tension (Harris, 1987).
**Manifestation of Time Famine for Market Work:**

Not only are excessive work hours affecting our families and our health, but they have an impact on the way we do our work. According to Moore Ede (1993:6):

> At the heart of the problem is a fundamental conflict between the demands of our man-made civilization and the very design of the human brain and body. . . . Our bodies were designed to hunt by day, sleep at night, and never travel more than a few dozen miles from sunrise to sunset. Now we work and play all hours, whisk off by jet to the far side of the globe, making life -or-death decisions . . . in the wee hours of the morning. . . . The pace of technological innovation is outstripping the ability of the human race to understand the consequences.

Moore Ede (1993) further reports that the Exxon Valdez, the Chernobyl disaster, and the explosion of the Challenger all resulted from human fatigue. He states:

> Fatigued people make errors. . . . Fatigued people also work more slowly and less effectively. They do things the long and routine way, and fail to see efficient shortcuts that could be used. They do not pay attention: vats boil over, tanks overfill, tools drop into machines, and goods drop off vehicles (Moore-Ede, 1993: 69).

There is a limit beyond which human beings cannot work effectively, and in some cases we have been pushed beyond that limit.

Full employment of our time capacity is perhaps a good thing, but there may also occur a form of overfull employment which is ineffective -- just as on the labor market overfull employment can lead to a less productive use of resources. At the personal level, this means a risk of stress. A fully packed schedule can lead to our jumping from one task to another and actually performing less than would otherwise be possible. In the worst case -- and this is no uncommon thing in a time famine -- people die an early death from overstrain and insufficient time instead of, as previously, from a shortage of goods. Deaths are now caused by high productivity, not low productivity (Linder, 1970: 25).

Employees suffer from work-family conflict, exhaustion, stress and even death. Mistakes at work result. At the same time, managers feel pressure to complete the work faster. Many believe that speed will be one of the major corporate battlegrounds of the future (Jones, 1993; Stalk and Hout, 1990; Tucker, 1991). For example, Stalk and Hout (1990) assert that getting products to market faster will: 1) enable 20-100% premiums to be charged until competitors catch up; 2) increase market share; and 3) decrease inventories required to insure immediate delivery. In the words of one management guru, the goal is to
create "zero based time" (Tucker, 1991). Tucker argues that customer waiting time should be completely eliminated; products and services should be delivered instantaneously.

**Implications:**

Managers face pressure to get their products to market faster and cheaper. Employees face pressure to work longer and more efficiently. Amidst professional chaos, someone must care for the home and family. People, however, can only work so hard and so much. The question is whether time based management and around the clock coverage must result in individuals working more. Currently, we accept that the answer is yes. However, could time based management enhance rather than destroy any hopes of work-family balance? Are there different ways to think about our use of time at work besides simply correlating demands for organizational speed with individual inputs?

In order to examine the deeply held assumption that time pressure faced by organizations necessarily implies a time famine for individuals, I consider how time is used at work and whether viable alternatives exist. I question whether the product development process could be made more efficient while employees would have more time, not less, with their families. One's initial response is, probably, "impossible." After all, the shared assumption is that time at work directly translates from individual input to organizational output. In this dissertation, however, I document how time pressure faced by at least one organization currently manifests itself in ineffective time use at work. I further show that opportunities for change *do* exist. In the next chapter, I review the existing literature on the use of time at work and the time famine. I propose a new framework to study the use of time at work.
Chapter 2:
Towards a Sociology of Work Time

The study of how individuals use time at work is not new. Indeed, some of the classic studies in organizational behavior address this topic. Henry Mintzberg’s (1973) study of what managers do analyzes how five CEOs spent their time at work. Scientific management devised by Frederick Taylor (1911) prescribes that management should fully plan the work of every man. The research by Mintzberg and Taylor characterizes two prominent streams of literature on time use. Mintzberg's approach describes the daily use of time while Taylor prescribes how individuals should use their time. Below I briefly review both types of analyses.

Descriptive Time Use

Time-budget studies examine the use that people make of their time. Traditional time budget studies analyze surveys based on daily activities registered from midnight to midnight; data are obtained either from diaries filled out by the persons in the sample or from interviews with the person (i.e. Andorka, 1987; Juster and Stafford, 1985; Robinson, 1977; Szalai, 1972). Three main indexes are calculated and used in the analysis: 1) average duration of each activity during the day; 2) percentage of all persons who participated in the given activity on the selected day; and 3) average duration of the activity for those who actively participated in it on the given day.

Given these indexes, investigators compare various demographic groups and social strata by different nations and cohorts. Researchers analyze the data to address the following questions: "Who does what (and what else simultaneously) during the day, for how long, how often, at what time, in what order, where and with whom?" (Szalai, 1972: 5). The different fields of utilization of time budget data include: mass media contact, demand for cultural and other leisure goods and services, urban planning, consumer
behavior, needs of elderly persons and of children, the sexual division of labor, the informal economy and household economics, social accounting, social indicators, quality of life, way of life and social structure (Andorka, 1987).

How individuals use time at work constitutes a sub category of time budget data. This sub-category, "market work," is further divided into normal work at main job, second job, non-work activities at work place before and after work, coffee and lunch breaks and travel to work (Hill, 1985). However, this literature does not break down and analyze activities that constitute individuals' "normal work at main job" nor does it address the effectiveness of time use in general. Rather, the research focuses on how people generally spend their time within the bounds of a working day, a weekend, a seven day week, or any other relevant period; these temporal segments are often further categorized by age, gender and/or country.

The work of Mintzberg, while similar to the literature discussed above in the way it provides a descriptive analysis of what people do all day based on extensive tracking data, provides a more detailed picture of how individuals actually spend their time at work. Mintzberg focused specifically on the use of time by five CEOs. Mintzberg examined six sets of characteristics regarding the CEOs' work: 1) quantity and pace of work; 2) patterns in activities; 3) relationship between action and reflection; 4) use of media; 5) relationship to a variety of contacts; and 6) interplay between rights and duties (p. 28). Mintzberg concludes that managers feel compelled to perform a large quantity of work at an unrelenting pace. Their work style is characterized by "brevity, variety and fragmentation" (p. 31). Mintzberg further found that managers prefer brevity and interruption and gravitate to the more active elements of their work -- the current, the specific, the well-defined, the non-routine activities.

One of Mintzberg's many followers, Chilingerian (others include Kurke and Aldrich, 1983; Sproull, 1984; Hannaway, 1989), focuses intensively on six hospital CEOs in order to gain a better understanding of how they use their work time. In particular, Chilingerian
develops a framework to explain "attention behavior"; he examines who and what are the subjects of CEOs' attention and what are the objects of their attention. He concludes that executive attention is influenced both by demands -- dimensions of the environment in which the hospital exists and the social structure of the hospital -- and constraints -- the size of the hospital, its physical location and the executive's length of tenure. He further finds that despite the presence of demands and constraints, executives also exercise choice regarding how they orient their attention.

Research by Mintzberg and his followers captures not only what people do at work, but what the expectations are that they will do. As Mintzberg notes, "Individual personality may affect how a role is performed, but not that it is performed. Thus, actors, managers, and others play roles that are predetermined" (p. 54). Mintzberg elaborates on the ten roles that managers play --figurehead, leader, liaison, monitor, disseminator, spokesman, entrepreneur, disturbance handler, resource allocator, and negotiator -- and the six basic purposes that these roles fulfill: 1) to ensure the efficient production of the organization's goods and services; 2) to design and maintain the stability of organizational operations; 3) to adapt the organization in a controlled way to its changing environment; 4) to ensure that the organization serves the ends of those persons who control it; 5) to serve as the key information link between the organization and its environment; and 6) to operate the organization's status system (p. 99).

Mintzberg, however, does not consider the implications of the managers' actions for other managers, the employees who report to the managers or the overall organization in which the managers work. For example, recall that according to Mintzberg, "brevity, variety and fragmentation" characterize the managers' way of working. Even if this approach is optimal for managers, as Mintzberg suggests, there is no consideration of the impact that these interruptions may have on the individuals who are the subjects of the interruptions. The negative effect on others' work processes may in fact outweigh the gains for the managers if one considers the best way for the group as a whole to
accomplish the job. Mintzberg and his followers pay close attention to what gets done at work, but they only consider the work in the context of the role the individual being studied plays and not the part that that role plays in the functioning of the larger organization.

In addition to neglecting the impact on others and the organization as a whole Mintzberg fails to consider the impact that the managers' work patterns have on the individuals themselves in terms of stress both at work and in their personal lives. It is important to consider all of the following implications of time use: for the individual, for colleagues, for the organization of which the individual is a member and for the individual's family. This has not been done in the existing literature.

Prescriptive Time Use

In contrast to the descriptive literature that considers how individuals allocate their time, a prescriptive body of literature exists that can be traced back to the work of Frederick Taylor. Taylor focuses on how to render individuals' use of work time more efficient. He assumes that individuals are general purpose mechanisms operated by management. The goal, therefore, is to determine the best way to use the rather inefficient human organism in the productive process. This is accomplished by specifying a detailed program of behavior that transforms a general purpose machine, such as a person, into a more efficient special purpose mechanism.

The emphasis on individual time management has been followed by a genre of literature that analyzes how individuals can use time at work more efficiently. Slightly different from scientific management, in which the emphasis is on managers dictating to employees how best to use their time, the time management literature attempts to raise employees' consciousness about the importance of increasing their own efficiency. Books targeted on helping employees maximize the use of their own time abound. A few titles include: Manage Your Time, Manage Your Money, Manage Yourself; Time Trap; Time is Money; and Time Management. These studies recognize that time is a scarce resource and
that choices must be made regarding its use. The underlying belief in these texts is that practical techniques can help individuals better manage the multiple tasks required by their jobs. The topics addressed by Mackenzie (1972) are among the most common: planning your work, getting organized, blocking interruptions, handling decisions, delegating, managing the time of subordinates and working with your secretary. Other favorite topics include making effective lists (Webber, 1980) and shortening meeting time (Jones, 1993).

The time management literature focuses on how to increase the efficiency of individuals in order to make them more likely to succeed at work. The operative idea is that for those individuals who have too much to do, time management may increase their ability to accomplish their tasks and decrease their work stress. A direct result of increased work efficiency should be that the job can be completed effectively in less time. If a job takes less time to complete, this means that the individual has the choice either to get more work done or to spend less time at work. Existing time management literature does not address the potential benefits derived from individuals increased efficiency at work for their lives outside of work. Indeed, the literature fails to recognize the motivational potential inherent in the personal benefits that could be derived from effective time management. Rather, the literature implies that individuals will reinvest any time saved back into their work.

**Critique**

Much literature on time use, with the exception of Mintzberg and his followers, focuses narrowly on how individuals use time, and does not consider the social or the temporal organization in which individuals exist. The patterning of the work activities and the definition of what it means to do the work successfully are not considered. Rather, existing time use research focuses only on what activities individuals do or how they can do those activities better. Time budget studies report data that are supposed to be generally relevant across not only occupations, but across whole nations. The time management studies prescribe techniques that are supposed to be equally generalizable. Time
management studies further indicate the need to make changes such as blocking interruptions and shortening meeting length but fail to consider the "root causes" of interruptions or meetings; indeed, the social and the temporal organization of work that leads to these problem-atic patterns is not challenged.

As I mentioned above, the work of Mintzberg and his followers is the only collection of research within the time use category that considers work within the context it is done. However, even Mintzberg and his followers neglect analysis of the interdependencies among individuals and how these relations affect the individuals, the organization and the families. The research on how individuals spend their time at work focuses on exactly that -- how individuals spend their time at work. The broader organizational and cultural implications of how individuals use their time at work missing from this literature constitute an important part of my analysis.

*Integrated Framework:*

I have suggested that the literature on the use of time fails to address two components. First, little of the literature describes how individuals actually use time at work or describes what individuals do at work in the context of both the temporal and the social organization of the work that they do. Second, the literature ignores the effects that individuals have on each other and the organization. To facilitate my study of the use of time at work, I propose a framework that captures not only what individuals do at work, but the context in which they do the work and the effects they have on others at work and at home.
The framework I propose differs in two ways from previous work: First, it assumes a systemic perspective. My framework has one look at the work group as a collection of individual members and focus on the interactions among the individuals that constitute the group; it has one examine how individuals influence each other and the collective of which they are a part. Second, the framework integrates existing streams of literature that have not previously been integrated: the time use literature, the literature on the temporal

3 The use of the term "systemic" needs to be clearly differentiated from the term "collective." Both the systemic and the collective refer to a whole that is socially constructed and perpetuated by the actions of the individuals. The systemic, however, refers to a whole as the sum of individual parts and focuses on the interactions among the parts that constitute the whole. On the other hand, the collective refers to a whole in which individuals are assumed to act in unison and the focus is on the whole that results. When I examine how individuals influence each other I will refer to the systemic. When I consider how the system as a whole is operating or affected I will refer to the collective; in that case I focus on an entity in and of itself.
organization of work and the literature on the social organization of work. Much can be learned not only from considering these components themselves, but also from analyzing how they interrelate.

In the remainder of this chapter I review the existing literature regarding both the temporal and the social organization of work (top of framework). I also consider the literature on what the outcome of certain modes of temporal and social organization are thought to be (bottom of framework). The chapter began with a review of the literature of individual time use at work (part of the middle of framework). I leave further analysis regarding how interactions affect the individuals, other individuals and the organization of which they are a part to the discussion of my own research in Part II.

Temporal Organization:

The temporal organization of work refers to the rhythm with which work is conducted. The "sociology of time" attempts to understand the "temporal organization" of work. In describing the temporal organization in a given setting, two dichotomies are considered: linear versus cyclic time and clock versus event based time. These two dichotomies do not describe all of the literature on the "sociology of time," but they provide the concepts necessary to understand the "temporal organization" of work as discussed in this literature.

Linear versus Cyclic Time

Views of time as linear postulate that time is a steady gradual movement towards one direction, whereas cyclical views of time postulate that time involves the repetition of a pattern of logic (Baert, 1992). Linear time has an inherent direction and uniqueness whereas cyclical time is non-directional and continually repeating itself (Gould, 1987). Linear time, therefore, slips away whereas cyclical time accumulates (Traweek, 1988). As Gould (1987) has noted, the essence of linear time -- "time's arrow" --
. . . lies in the irreversibility of history, and the unrepeatable uniqueness of each step in a sequence of events likened through time in physical connection -- ancestral ape to modern human, sediments of an old ocean basin to rocks of a later continent. Abstracted parts of any totality may record the predictable (and repeatable) operation of nature's laws but the details of an entire configuration are 'just history' in the sense that they cannot arise again, and that another set of antecedents would have yielded a different outcome (p. 194).

At the other end of the spectrum, cyclical time -- "time's cycle" -- captures those aspects of nature that are either stable or in simple repetition. In that case, time has no direction (Gould, 1987).

Clock versus Event Based Time

Ever since Sorokin and Merton's (1937) seminal paper, human time has been understood to include not only the fixed and infinitely divisible units of clock time, but also the experience, the content, and the social frame of reference of time. Clock time is divisible and quantifiable (Mumford, 1963; Moore, 1963.) It can be described in terms of its sequence, duration, temporal location, and rate (Zerubav, 1981). Building on Sorokin and Merton (1936), Sorokin (1943), and Gurvitch (1943), Clark (1985) argues that there are four main features of clock time:

1) It flows evenly and continuously.
2) It is free from contingent events and periodicities.
3) It is precise.
4) It is completely quantifiable and so can be added, subtracted, divided, used in a variety of heuristic calculations and in complex formulae (p.46-47).

However, in every society there is also the qualitative element, the experience of time (Sorokin, 1943). Event based time flows unevenly, discontinuously and contains varying levels of contingency and indeterminacy. The units are imprecise, although they may be relatively stable. At the core, this dichotomy between clock based and event based time captures how the passing of time is reckoned: Is time a continuous flow that is divisible, quantifiable, and measurable or is time a discontinuous flow made up of starts and stops, fuzzy boundaries and subjective experience?

-32-
Time and Work

When one applies these temporal concepts to the study of time at work, one possesses a new way of understanding the dynamics of work behavior. Temporal analysis reveals the rhythms of work. Below I provide two examples.

Probably the most famous study in the "sociology of time" in a work organization is "Banana Time" by Donald Roy. In this study Roy documents the different "times" that have been constructed by machine operators to make the work day pass more quickly. These "times" were not a part of the work but "physical interplay which momentarily halted work activity" (p. 170). In this environment the work was the same minute after minute, hour after hour. Different halts in the daily work routine created the pattern of the day. The pattern consisted of coffee time, peach time, banana time, window time, lunch time, fish time and Coke time. These "times" of the day did not occur at specific moments on the clock; they were based on the progression of the day's events. As Roy describes:

Banana time followed peach time by approximately an hour. . . . Ike would gulp it down by himself after surreptitiously extracting it from Sammy's lunch box, kept on a shelf behind Sammy's work station. Each morning, after making the snatch, Ike would call out, 'Banana time!' and proceed to down his prize while Sammy made futile protests and denunciations (p. 170).

After reading "Banana time" one understands a great deal about the temporal organization in which these machine shop operators worked. Roy captures both the monotony of the job and the "times" that break up the work. However, one derives little understanding of the work of the factory and how these individuals played a part in the larger process. Roy does not discuss the purpose of the work that the individuals perform or how their work affects the whole product. What would happen if none of the four primary operators in the room that Roy described went to work one day? Who else would be affected? How does this group fit into the larger organization?

In another important study in which the "sociology of time" has been applied to a work setting, Zerubaval considers the patterning of time in hospital life. Zerubaval notes, "Most of the activities and events in hospital life -- admissions, discharges, tests,
operations, the administration of medication, meals, rounds, conferences, clinic appointments, family visits, and so on -- are systematically regulated by fairly rigid schedules" (Zerubaval, 1981: 14). In particular, it is the calendar and the schedule that introduce such routine, orderliness and structure into life.

Zerubaval explains how even the non-routine becomes routine as a result of the schedule and the clock. He offers the example of admissions to the hospital. Admissions are more likely to be conducted during the day than during the night. There is an incentive among the hospital staff to minimize the number of admissions at night because of the amount of "leg work" involved in admitting a patient and the number of hospital staff that must be awake to do this. As a result, admission patterns follow the clock more closely than the natural demands for hospital care.

Zerubaval focuses on how the year, the rotation, the week, the day and the duty period introduce a rhythmic structure into hospital life by forcing both routine and non-routine events into regular temporal patterns. It is the resulting structure and not the impact on the individuals, the patients or other hospital staff that concerns Zerubaval. However, while not made explicit, the reader does get a sense that when admissions are made according to the time of the day, the needs of the patient may be negatively affected.

Both Zerubaval and Roy concentrate on the rhythms of life that exist and pay little attention to the individuals who experience these rhythms and how these rhythms affect those individuals, other individuals involved, the organization of which the individuals are a part or the individuals' families. Their focus remains on the resulting temporal structure imposed on the work. I however intend to highlight the impact that these ways of interacting have on the others involved as well as on the functioning of the organization as a whole.
Levels of Time

The literature on the temporal organization deals extensively with the rhythm of the day, the week, the month and the project life cycle. This focus is on the macro temporal organization. Lewis and Weigart (1981) further note that the temporal organization exists at various levels, both macro and micro. There are patterns that occur at the broad societal-cultural level, "cyclic time." There are also patterns that occur specific to bureaucracies and other formal organizations, "institutional time." Patterns further occur specific to informal group life, "interaction time." Finally, there are patterns to one's individual life, "self-time." Lewis and Weigart suggest that social acts are temporally fixed inside larger social acts and the "higher" social times take precedence over the lower (i.e. institutional time demands take precedence over interaction time, and interaction time demands take precedence over self-time). Lewis and Weigart provide the following example:

Two employees... would get into serious trouble with their supervisor if they habitually allowed their lunch-hour conversation (interaction-time) to extend beyond the time allotted for lunch (organizational-time) (p. 91).

While Lewis and Weigart draw attention to the lower types of time -- namely interaction and self time -- these types of time have not been captured in empirical studies of work. Both Roy and Zerubaval, for example, focus only on the documentation of "institutional time." However, in order to understand how individuals are creating patterns within the higher level rhythms -- which is critical to a study of individual time use at work -- one must examine interaction and self-time as well as institutional and cyclic time.

Furthermore, it is important to analyze the spontaneous as well as the routine part of the work process. Zerubaval (1979) admits that all social life is not rigidly temporally structured, but he says he has "deliberately ignored all non rational or irrational manifestations of the temporal organization of social life -- waiting, late coming, spontaneity" (p. xvi). While Zerubaval recognizes this limitation, he nonetheless defines temporal order as highly rational, in contrast to spontaneity which he considers to be non rational or irrational. I, however, believe that it is critical to incorporate the "waiting, late
coming and spontaneity" as part of the area of study. If the goal is understanding how individuals use time at work, it is crucial to examine all layers of patterned activity -- cyclic, institutional, interaction and self time-- and it is equally important to understand where these patterns break down.

Temporal Organization and the Time Famine

Most of the literature on the temporal organization focuses on the temporal organization as a theoretical concept. Some empirical studies however do exist and some even consider the temporal organization in the work context (top of integrated framework -- i.e. Roy and Zerubaval). Even studies of the temporal organization of work never make explicit individual time use and the impact of individuals on each other (middle of integrated framework). Some studies do however consider the implications of the temporal organization (bottom of integrated framework), at least for the individuals involved.

The research on the temporal organization as it exists in our society suggests that there is extreme polarization in terms of clock time reckoning (Bucciarelli, 1988; Hall, 1982; Hassard, 1990) and linear patterning (Gould, 1987; Thompson, 1989; Young, 1988). We confront an imbalance that accentuates the linearity and the clock based system and suppresses the cyclical and event based elements of the passage of time. The concern arises that the "beats" by which we live are arbitrary and imposed (Hall, 1982). Life is temporally structured in accordance with boundaries, quite independent of "the rhythms of man's organic impulses and needs" (Zerubaval, 1981: 11). Hall (1982) has labeled this structuring of time "monochronic." He describes this temporal organization of tasks, schedules and procedures as assuming a life of its own, without reference to logic or human needs. Young (1989) worries:

If we proceed to add yet more precision to the metronome and go on requiring people to conform to it even when it runs against their nature, always demanding that they turn about when the calendar tells them they have reached a certain age or the clock a certain time, and calling on them to divide the future into neat-looking parcels which they can imagine they are controlling, we will aggravate the hurry sickness (p. 260).
The implication follows that the clock and the calendar are at the source of the time
famine; they structure individuals' lives at the most minute levels, leaving individuals with
no "free time" to just "be." The argument emerges that the existence of the clock and the
calendar are not inherently problematic. Rather, the schedules they impose clash with our
"natural rhythms," and cause the problem. Young's thesis is that our rhythmic society has
been replaced by a metronomic one (p.19). The resulting rhythms, no matter how much
we assume that they are a "natural" part of our lives, are not inherent in our biological
rhythms. Rifkin (1987) has extended this argument and suggests that beyond the clock and
the calendar, the computer now controls our time as well. The units of time --
nanoseconds-- have become so small that they are too short to be experienced by humans.

Similar to Young's (1988) distinction between "natural" and "artificial" cycles, Rifkin
contrasts the "empathetic temporal orientation" and the "power temporal orientation:"4

The empathetic temporal orientation gives rise to an ecological, stewardship
vision of the future. Its advocates would like to establish a new partnership
with the rest of the living kingdom. At the heart of this new covenant vision
is a commitment to develop an economic and technological infrastructure
that is compatible with the sequences, durations, rhythms, and synergistic
relationships that punctuate the natural production and recycling activities of
the earth's ecosystems. . . . The power temporal orientation gives rise to a
high-technology simulated vision of the future. In this time world, an ever
more complex and sophisticated labyrinth of fabricated rhythms will
increasingly replace our long-standing reliance and dependency on the
slower rhythms of the natural environment (p. 199-200).

Both Young (1988) and Rifkin (1987) contrast the rhythms of the natural
environment with the rhythms that we have created through technological advances. They
argue that in our search for efficiency we create demands that destroy us. We impose
demands on ourselves that squeeze us harder and harder. Young (1988) believes that to
end the time famine we need to recover the "natural cycles" of our lives:

If we would let the sense of time refer to something besides being on the
dot, and always knowing where the dot is; if we would leave more room for

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4 These are all terms for the same temporal patterns: natural time and empathetic temporal orientation are
different ways to refer to event time and artificial time and power temporal orientation are different ways to
refer to clock time.
spontaneity; if more of us could let the future move into the present without grasping at it, with more presence of mind, the time famine could begin to abate (p. 260).

Rifkin also suggests that the ability to end the time famine resides in our hands. However, he recognizes that such a choice will have considerable consequences. His point is that the choice is ours to make, although there are serious tradeoffs involved in the decision:

   To will autonomy or to will community. To exercise power or to experience empathy. To control an artificial temporality or to rejoin the rhythmic world that is imprinted deep into the soul of our biological being. . . Two futures await us, each accompanied by its own temporal mandate. The will to power, the will to empathy. The choice is ours (p. 210).

Over a decade earlier, Linder discussed the tradeoffs between "natural" and "artificial" rhythms in a similar manner. He associated natural rhythms with the subsistence level of living and artificial rhythms with affluent living. Linder (1970) noted:

   We should not denigrate the great results of that economic growth which has lifted the now affluent countries from a subsistence level. Yet we may ask ourselves whether some day in the future an awareness of the consequences of an increasing scarcity of time caused by continued economic growth will not set up a new kind of revolution of rising expectations. . . . Perhaps being constantly chased by a scarcity of time will some day be recognized as an equally undignified way of life (p. 144).

These authors suggest that there is a choice to be made regarding the temporal organization in which we exist. The choice to construct the dynamics of the temporal organization belongs to us, but we must confront the consequences of our choices. Currently, we "choose" without conscious consideration of the fact that a choice exists.

Summary

The literature on the temporal organization of work emphasizes the rhythms of work. It further discusses the implications of these rhythms for the individuals involved. This literature, however, does not examine how individuals actually use time at work and the effects of this use of time on others. The concept of self-time has been suggested to capture individuals' temporal patterns. But individual patterns and the spontaneity
involved in the work process, and how this fits within (and contradicts) the higher levels of the temporal organization, remain to be studied empirically.

*Social Organization:*

The social organization of work constitutes the second element incorporated in the integrated framework I propose. This concept refers to the shared definition of the occupational members regarding their roles, their careers and their definitions of success in their organizational settings. The social organization of work is an important element of the study of the "sociology of work" from a micro perspective.

Both macro and micro sociologists of work exist. Macro sociologists follow in the tradition of Durkheim (structural functionalist) and Marx (conflict theorists). They believe that to understand work in any society, one must understand the nature of that society, how it allocates work, how structure differences between class and/or strata affect the society, and how the society and economy affect class and strata. Macro sociologists focus on large historical changes. Much of their research analyzes the "career of the occupation" and how occupations progress towards or away from being professions.

In contrast, micro sociologists concern themselves with the reality of everyday life and the subjective experience of work. They concern themselves more with the "career of man" than the "career of the occupation." As defined by Hughes, the "career of man" includes the process of selecting work, being socialized into its culture and passing through a series of successive statuses. The "career of man" consists of the task rituals, standards of proper and improper behavior and the grounds for respect both from members of the "occupational community" and the organization (Van Maanen and Barley, 1984).

It is the research by the micro sociologists on the reality of everyday life that addresses the social organization as I refer to it in the integrated framework; specifically it is

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5 The "career of man" does not exist entirely distinct from the "career of the occupation"; the status of the occupation affects the "career of man."
the work of Everett Hughes and his students that is relevant. Hughes (1972) defined work situations as "systems of interaction, as the setting of the role-drama of work, in which people of various occupational and lay capacities, involved in differing complex of Lebenschancen, interact in sets of relationships that are social as well as technical" (p.117). Hughes recognized the technological aspect of work, but only considered it in so far as it had recognizable social consequences. According to Solomon (1968), a student of Hughes, Hughes' perspective on occupations was based on three critical aspects of the work: 1) the nature of work -- "social drama of work" -- the process of interaction among participants; 2) the problems or tensions generated in work situations -- i.e. dirty work, mistakes, managing emergencies of others; and 3) the resulting social order -- the set of moral imperatives that tend to routinize interaction.

Braude (1975) further summarizes the work of Hughes and his students as follows:

The sociologist begins simply enough, by describing the occupation as it is. What name do the practitioners of the occupation give to their work? By what names do others in allied fields, or those not in the occupation at all, call the area being studied? Then, of course, one must ask what the people practicing the occupation do -- their craft, if you will -- as well (perhaps even more important) is what they think they do. What skills both technical and social are required to engage in the work? . . . . After description comes comparison. The sociologist assumes the posture of the historian for this purpose . . . . Who are conceived as the real or mythical founders, heroes, and villains of the occupation? . . . Finally, current trends, problems, and conflicts within the occupation are considered (p. 58-59).

When Hughes and his students studied work, they focused on the particularistic with an irreverent eye; they questioned even what those in the social system did not question. For example, studies by Hughes' students provide a sense of what it is like to be a public school teacher (Becker, 1952), an assembly line worker (Roy, 1952), a manager (Dalton, 1959) and a janitor (Gold, 1952). Each ethnography contributed piecemeal to a constellation of concepts. Hughes' work is more a framework than a theory in itself.
(Barley, 1989): occupation, role and career are among the key concepts that Hughes introduced into the sociology of work. 6

For Hughes and his students, individuals are defined as social beings; they are defined less by their uniqueness than by their membership in a category of actors that populate some setting (Goffman 1961: 127). Individuals experience careers, but the careers are not solely of the individuals' making. At the same time that the career makes the individual, the individual instantiates the social reality of the career and, by extension, the collective that underwrites its terms (Goffman 1961). Career links the private world of the individual -- one's hopes and dreams and the personal stance one takes toward oneself and one's world -- with the public world of norms, expectations, and statuses of other human beings (Goffman, 1961). As Barley (1989) has noted, inherent in the sociology of work -- as conducted by Hughes and his students -- is the duality between the objective and the subjective experience. The concepts that constitute the world of work -- i.e. occupations, role, and career -- are socially defined but individually experienced and enacted.

If we want to understand the social organization of work that affects (and is affected by) individuals' use of time at work, it requires exploration of how the work gets done as well as the individuals' experience of doing this work. In the case of my study, we must question what it means to software engineers to be software engineers; what is their career path; what are the stages in the succession; what is involved in succeeding; and how do they experience this progression? To answer these questions requires research in the tradition of Everett C. Hughes and his students.

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6 Hughes defined these concepts as follows: 1) "An occupation, in essence, is not some particular set of activities; it is part of an individual in any on going set of activities. The system may be large or small, simple or complex" (Hughes, 1965: 445); 2) a role provides the individual with some consistent conception of himself in relation to other people. "This conception, although identified with oneself as a unique being, is a social product" (Hughes, 1958: 57); and 3) a career consists, "objectively, of a series of statuses and clearly defined offices . . . subjectively, a career is the moving perspective in which the person sees his life as a whole and interprets the meaning of his various attributes, actions, and the things that happen to him" (Hughes, 1937: 413).
Unfortunately, Stinchcombe (1990) has pointed out that today little research of this type occurs:

There is now very little ethnography of any kind about social interaction at work. Our general inclination nowadays is to summarize all of a person's activity at work in an occupational name, sum up occupational names in four or five dimensions of social standing, work with things, people and data, or core versus periphery and so to miss the normative complexity that interaction at work involves (p. 114).

There are research throwbacks to the old tradition (i.e. Barley, 1984; Halle, 1984; Hochschild, 1983), but the tendency has been to move away from ethnographies of the workplace which make "social life at work juicy and interesting" (Stinchcombe, 1990: 115). To capture the social organization of work that affects the individual's use of time therefore requires sociologists return to the "long neglected path once blazed by their forefathers" (Barley, 1989: 41).

Social Organization and Systemic Effects

Understanding the social organization makes up only one part of the framework I propose. I suggest one must further address how the social organization of work affects the way individuals actually do their work and how this way of working further influences other individuals involved and the achievement of the organization's goals. In some cases, sociologists of work have already depicted the ways in which occupational groups interact at work and the impact interactions have on getting the job done. The most extensive study of the work flow and the interdependencies among different occupational groups is Whyte's research on the restaurant industry. Whyte (1949) notes "we see that the customer-waitress, waitress-supervisor, waitress-service-pantry-worker relationships are interdependent parts of a social system" (p.304). In a large restaurant Whyte explains, "The orders may go from waitress to pantry girl and then, as the pantry girl runs low in supplies, from pantry girl to pantry supplyman, from pantry supplyman to kitchen supplyman, and from kitchen supplyman to cook. And the food comes back along the same route in the opposite direction" (p. 305). Whyte then acknowledges, "We have here
a social system whose parts are interdependent in a highly sensitive manner. Thus the emotional tension experienced by waitresses is readily transmitted, link by link, all the way to the kitchen" (p.305). Whyte further suggests that status, sex relations, layout and equipment all have an effect on the relations among employees.

While Whyte does not explicitly acknowledge that how the interactions unfold has an effect on the work process, he does provide an example that puts in the foreground the centrality of the timing of interactions:

One bartender and one counterman not only enjoyed their work but were considered by waitresses to be highly efficient and pleasant to deal with. Both of them had independently worked out the same system of handling the job when the rush hour got under way. Instead of handling each order slip in turn as it was handed to them (thus responding to each individual waitress), they would collect several slips that came in at about the same time, lay them out on the counter before them, and fill the orders in whatever order seemed most efficient. For example, the bartender would go through the slips to see how many "Martinis," "Old fashions," and so on were required. Then he would make up all the "Martinis" at once before he went on to the next drink. When the work was done this way, the girl first in was not necessarily first out with her tray, but the system was so efficient that it speeded up the work on the average, and the girls were content to profit this way in the long run (p. 306-307).

Whyte provides a second example which further illustrates that how interactions unfold matters. In this example, however, the timing of interactions has a negative, rather than a positive, outcome for the system:

When the rush hour comes along, with customers pushing waitresses, waitresses pushing pantry girls, and pantry girls pushing supplymen, the supplyman is on the end of the line so far as face-to-face interaction is concerned, and he is likely to get nervous and excited. He may then put in a larger order than he will actually use or write "Rush" above many of his orders. If he over orders, the leftovers come back to the kitchen at the end of the meal, and the kitchen supplymen and cooks learn thus that the pantry supplymen did not really know how much he needed. They take this into account in interpreting his future orders. And, when everything is marked "Rush," the kitchen supplymen cannot tell the difference between the urgent and not so urgent ones. Thus the word becomes meaningless, and communication deteriorates. . . . In the heart of the rush hour, we have seen pantry supervisors running up and down stairs, trying to get orders, trying to find out what is holding up things in the kitchen. Since they have supervisor status, the kitchen workers do not resist them openly, but the invasion of an upstairs supervisor tends to disrupt relations in the kitchen. It adds to the pressures there, for it comes as an emergency that lets
everybody know that the organization is not functioning smoothly (p. 307-308).

Although Whyte does not make the point explicit, both of these examples illustrate not only how the interactions constitute part of the work flow, but also how the timing of the interactions affects achievement of the system's goal -- in this case providing good service to the patrons. In the first example, when the bartender decides not to respond immediately to the waitresses' requests but chooses to maximize his effectiveness at getting the whole job done, it turns out that even those waitresses who put their orders in first are satisfied because of the increase in overall productivity. However, in the second example, the pressure of rush hour causes individuals, in an attempt to get their work done, to reconfigure the system in a less effective way; such attempts disrupt the system and ultimately make accomplishment of the system's goal more difficult.

The second example suggests the type of pattern of interaction I found among the software engineers in my study. The software managers continuously label tasks as urgent and encourage engineers to get their own work done, at the cost of disrupting the system. Because everyone is under pressure to get one's own work done, individuals constantly interrupt each other, and no one can get work done. Moreover, engineers reach the point that they no longer can differentiate a true crisis from another "fire drill." The engineers, therefore, do not know when to make tradeoffs in favor of immediate results and when not to disrupt the system to get their own work done.

Whyte addresses two critical components of the work process: first, he makes explicit the role of social interaction in getting the work done. It is clear who interacts with whom as part of the work process. Second, it is obvious that who interacts with whom and how they interact affect the attainment of the goals of the system. But Whyte does not consider that alternative sequencing of the same interactions might enhance the possibility of attaining these goals.
In many ways the integrated framework I propose returns to the sociology of work carried out by Hughes and his students, particularly Whyte. The difference is my emphasis on the temporal dimension of work. Much of the existing sociology of work moves away from descriptions of how occupational members experience their occupation. Even the research that does focus on the work experience rarely mentions the temporal aspect of the work. Still, the integrated framework that I propose is not unique in form but in content. My research makes explicit those concepts on which others previously only touched.

**Social Organization and the Time Famine**

Some researchers suggest that the current temporal organization leads to the time famine (see above). Others suggest that the social organization creates the problem. Bailyn (1994), for example, explains the time famine as a consequence of each individual's attempt to succeed. According to Bailyn (1994), we as a society have come to view time as a sign of commitment, loyalty, competence, high potential and, in many cases, as an indicator of productive output. She asserts that as long as the amount of time spent at work is seen as a prime indicator of commitment and productivity, individuals will continue to work long hours (Bailyn, 1993). Because individuals aspire to succeed, they will put in the required time. Furthermore, given the culturally accepted correlation between long hours and individual success, individual deviation will have negative consequences. Individuals might be better off (and so might organizations) if everyone collectively agreed to reduce their work hours; however, unless everyone reduces their work time, anyone who does so will be judged against those who do not.

Landes, Rebitzer and Taylor (1994) refer to a specific case of this problem as the "long hours trap." They suggest that when professionals work in groups, teams or partnerships in which all members of the group share in the outcome of other group members there is an incentive to screen out new members based on hours. The norm
persists even when it does not serve the best interest of those already involved. They compare the "long hours trap" to the "arms race":

Rival superpowers devote 'too many' resources to their arsenals in the sense that equal security could be achieved at lower cost if the nations could simultaneously reduce the stock piles of weapons. Similarly, a long hours trap requires 'too many' hours in the sense that some would be made better off (and none worse off) by a coordinated reduction in work hours (p. 13).

The findings of both Bailyn (1994) and Landes, Rebitzer and Taylor (1994) suggest that the time famine is an unintended consequence of the determination of loyalty and commitment. Because organizations evaluate individuals' loyalty and commitment based on hours worked, individuals who want to succeed must "put in the time." Yet, these authors suggest that as a result the time required becomes unnecessarily high to get the actual work done.7

Schor (1992) argues that individuals work the long hours not necessarily because they want to succeed, but rather because they want to attain the status associated with consumption. As Schor puts it, we are caught in "the insidious cycle of work-and-spend" (p. 107). The more we have, the more we see as "must haves." As we work and spend more, we need more and therefore must work more in order to have more money to spend. The problem is not simply that it is more expensive to buy at the level we already had, but rather we develop a need to buy more.

Schor argues that there is a perpetual need to outdo our neighbor. Schor (1992) refers to it as the syndrome of "keeping up with the Joneses" (p. 122). She notes, "this competition is based on the fact that it is not the absolute level of consumption that matters,

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7 Giddens (1984) notes that it is possible that an outcome of action is everyone's doing and yet no one's doing. In other words, no one may intentionally cause the outcome, and yet the outcome results from everyone's continued actions. This phenomenon receives the most attention when the unintended consequence results in an undesirable outcome for everyone (Boudon, 1982). In such a case, since no one recognizes that the consequence is an outcome of their collective action, everyone continues to perpetuate the action, even though it creates an undesirable outcome for themselves as well as everyone else involved.

This is the case of the "tragedy of commons." In Post Roman England, the cattle grazed in a common pasture. Each farmer benefited from maximizing the number of cattle that he owned. Yet, when there were too many cattle, all of the grass was eaten and the pasture dried up. The land was destroyed for everyone and all the farmers suffered.
but how much one consumes relative to one's peers." Schor further notes, "over time, keeping up with the Joneses becomes a real trap -- because the Joneses also keep up with you" (p. 123). The more your neighbor consumes, the more you consume and, in turn, the more your neighbor must consume in order to outdo you in your attempt to outdo them.

Again, Schor's research suggests that the time famine is an unintended consequence of the social organization. She differs, however, regarding the aspect of the social organization that causes the problem. According to Schor the source of the problem is our consumption patterns not the definition of success; therefore, she offers a different analysis of what would alter this cycle. The implication of Bailyn's work is that reduction of the long hours worked would require alternative measures of commitment. Landes, Rebitzer and Taylor imply the need for a similar change. In both cases, the tradeoff for employees would clearly be positive if the definition of success were altered. The employees would simply have to work less in order to attain the same level of success at work. Schor, however, promotes more fundamental change in human nature. To alter the "cycle of work-and-spend" requires alteration of our desire to consume. We would have to consume less to outdo our neighbor, but we would also reduce our overall consumption in the process.

Before we can determine what must change in order to reduce the time famine, we need to better understand how the social organization, and the definition of success in particular, contribute to the perpetuation of the time famine. Is it purely the social organization that drives the time famine as these authors seem to imply, or is it a more complex integration of the temporal organization, the social organization and the way the work is done? It may not be the case that we need to alter fundamental values about consumption or individualism prevalent in our society. Rather, to reduce the time famine it may be enough to redefine individual success to incorporate the way individuals use time at work.
Conclusion:

In this chapter, I proposed an integrated framework to study the use of time at work. Using the framework will add to the existing literature on the use of time at work in four ways: 1) it will consider the temporal organization of work; 2) it will consider the social organization of work; 3) it will take into account not only individuals' use of time but the impact that individuals have on each other; and 4) it will consider the implications of this use of time for individuals, the organizations in which they work and their families. I label this framework the "sociology of work time" to emphasize the integration that occurs.

Studies exist in both the "sociology of time" and the "sociology of work" that capture many of the same elements. The differences are located in what various authors choose to make explicit. Both the research by Zerubaval (1979) on the patterning of life in hospitals and the research by Whyte (1949) on the social interaction in the restaurant industry could be reframed to fit under the heading "the sociology of work time."

In the case of Zerubaval's work, I return to the example of patient admissions which follows the clock based cycles of day and night shifts. Zerubaval's purpose is to demonstrate that admissions are structured by the clock. If one took the perspective of a sociologist of work time, rather than a sociologist of time, and analyzed this same phenomenon, one would focus on the temporal organization based on the clock as Zerubaval has done. However, one would also consider the social organization of the doctors who make the hospital admissions. One would describe the expectations for doctors in terms of both their occupational communities and also the hospitals in which they work. One would capture the distinct patterns of values, beliefs and interpretations for judging the appropriateness of the doctors' actions and reactions. Beyond the temporal and the social organization of work, one would further consider the actual work involved in admitting patients and the implications of doctors' decisions when to admit patients for other hospital staff and for the patients themselves. Finally, it would be important to
consider whether the doctors suffer from a scarcity of time and the implications for them and their families.

Similarly, Whyte's analysis of the restaurant industry could be reframed from the perspective of the sociology of work time, rather than the sociology of work. Again, this would result in a more extensive analysis of the situation. In the case of Whyte's example, he elaborates on the social organization and the interactions among individuals. He does not, however, consider the work of the different individuals and how this work actually gets done within the social organization he describes. Moreover, he does not consider the temporal organization. Whyte mentions that at rush hour certain things occur that do not otherwise occur. The reader, however, does not obtain a sense of how rush hour fits into the larger temporal organization of work in the restaurant industry. What is the rhythm of the restaurant? Whyte refers to peak times and quiet times, and one assumes that the occurrences of these periods relate to how the social organization functions both when it functions "properly" and when its patterns are disrupted, as in the case that Whyte describes with the kitchen supplymen. However, the issue of peak and quiet time occurrences needs further exploration. In addition, while Whyte mentions that rush hour disrupts the system, he does not explore the interrelationship between the temporal organization and the social organization that that assertion suggests.

By using the sociology of work time as a framework for analysis, one captures both the social and the temporal organization and then one can also examine their interrelatedness. Furthermore, the sociology of work time directs one to consider not just the individual's use of time but also the systemic effect of interactions. As I stated earlier, this approach means that one not only learns what interactions occur, but also how those interactions affect others involved.

The sociological literature to date has not addressed the difference between individual time and system time. Rather, the assumption persists that if something needs to be done in less time (less total system time), each individual must put in more time. The
possibility that the way individuals interact may affect the outcome has not been explored. This new framework however examines the ways individuals interact and therefore potentially highlights ways to decrease system time without increasing individual time.

In Part II of this dissertation I identify for the group of software engineers that I studied the three components of the integrated framework: 1) the temporal organization; 2) the social organization; and 3) the way time is used at work, paying close attention to both the individual and the systemic effects. Having identified these three components, I consider how these components interrelate and what the implications are for the individuals and the organization. In Part III, I explore possible ways to reduce individual time without altering system time. However, before turning to the analysis of my study of software engineers, the next chapter provides a more complete background on software engineering as an occupation, both in terms of the existing literature and in terms of the particular site I studied.
Chapter 3:
Software Engineering and the Sociology of Work Time

Research that examines the temporal organization of software engineering work and research that examines the social organization of software engineering work has been conducted. Additionally, a small body of research regarding the way software engineers use time at work exists. These three streams of literature partially address my research questions. In this chapter, I review the relevant literature on software engineering and then present a detailed description of the site I studied.

Temporal Organization of Software Engineering Work:

Software engineering, as I studied it, comprised part of a product development process. The product development process governs the temporal organization of the software engineer's work. A system of problem solving cycles forms the basis of the product development process. The four major cycles are concept generation, product planning, product engineering and production engineering (Clark, Chew, and Fujimoto, 1987). The length of the problem solving cycles, the number of iterations and the patterns of informational linkages among the cycles affect the length of the product development process (Clark and Fujimoto, 1989).

Problems frequently arise during each cycle. While there are many possible explanations for the numerous difficulties that emerge throughout the process, problems generally cannot be traced to lack of creative people, management desire, technical skills or market understanding. Rather, the problems tend to relate to "after-the-fact problem solving" (Wheelwright and Clark, 1992); that is, managers wait until a problem becomes a crisis before they address it. This management approach results in a culture dictated by crisis management rather than crisis prevention:
Managers fail to plan sufficiently in advance to provide the requisite skills and resources, to define the project and its purposes appropriately, to integrate the development project with other basic strategies. Rather, managers often seek to respond to problems as their importance becomes apparent; at that point they are unavoidable (Wheelwright and Clark, 1992: 32).

In software engineering "after-the-fact problem solving" has serious ramifications. When a project is behind schedule, management typically attempts to ameliorate the time pressure through the addition of manpower. However, Brooks (1982) documented that adding manpower may actually produce the reverse of the intended effect. Brooks found that when the task is not easily partitioned, the relationship between months and men is a U-shaped curve. In other words, beyond a certain number of "men" the number of months for product development increases rather than decreases with the addition of more "men." Therefore, once a project team falls behind schedule it is particularly difficult to find ways to "catch up."

The lack of up-front planning, the resulting slippages, and the limited opportunities to correct for slippages perpetuate a sense of urgency throughout the product development process. For example, a recent New York Times article (12/12/93) described the development work on the Newton by Apple Computers as follows:

The pressure to finish, exhilarating at first, eventually overwhelmed some of the young designers. After eighteen hour days, some engineers went home and cried. Some quit. One had a breakdown and ended up in jail. One took a pistol and killed himself.

In the Soul of a New Machine, Kidder (1981) describes a similar world of tight schedules, missed deadlines and sleepless nights, as a group of computer wizards envisioned the impossible and battled time, corporate intrigue and odds to bring their technological dream to fruition. Time in the world of computer development is inextricably linked to self-inflicted deadlines believed to be the key to market success and corporate profitability. It is a scheduling game based on determining "what is the earliest date by which you can't prove you won't be finished" (p. 113).
In order to achieve their goal, the engineers Kidder describes in heroic terms worked under immense pressure. Before these engineers were offered jobs, they were warned that "It's gonna be a real hard job with a lot of long hours" (p. 66). Once they were in the group, the engineers went through an initiation process, referred to as "signing up":

By signing up for the project you agreed to do whatever was necessary for success. You agreed to forsake, if necessary, family, hobbies and friends--if you had any of these left (and you might not if you had signed up too many times before) (p.63).

Group membership required that engineers do everything possible to facilitate successful product development; "everything" included working overtime for no extra pay and sacrificing family life.

Kidder vividly describes the time pressure that pervaded the engineers' lives.

Engineers were constantly racing against the clock:

You feel it, like a trickle of sweat down your back. I've got to hurry, you say to yourself. I've gotta get this reading done and write my code. This is just one little detail. There's a hundred of these. I better get this little piece of code done today.

Practically the next time you look up, it's midnight, but you've done what you set out to do.... When you wake up the next morning, however, FFAS (the code you are working on) is upon you. 'Oh my God! FFAS. They need that code next week. I better hurry (p. 115).

The time pressure seems no less severe for the engineers at Tech, the high technology organization that Kunda (1992) describes in his ethnography Engineering Culture. Kunda writes:

Work at Tech is experienced as making great demands on time and energy. Members describe heavy workloads, scheduling pressures, competition and the possibility of working at home, and they perceive these as factors that combine to blur the distinction between work and non work (p.163).

Kunda, like Kidder, stresses the potentially all-encompassing nature of the work. Kunda quotes one manager:

..... People are after you all the time. Before you know it, your calendar is full. . . . Most people I know are just married or divorced. It is incredible how many divorces there are. You can tell by looking at someone's calendar what the state of their marriage is (p. 165).
Engineers are constantly asked, how long will their portion of code take? When will they be done? Can they do it in less time? Preposterous deadlines are believed to be a corporate necessity, so everyone continues to push harder. It is a world where there is no time to look back. Time is conceptualized as linear and fleeting. It is a world where time is quantified, measured and continually broken down into smaller and smaller units.

The product development process and its different phases supposedly establish the temporal organization of the engineer's work. Chong (1995) considers the ways in which milestones, changes and external events dictate the product development process. However, the existing literature about the temporal organization of engineers' work lacks an analysis of how the time pressure affects the way engineers actually use time at work. To what extent is their time use dictated by the temporal organization set out up-front and to what extent is it determined by the pressure of the moment? Furthermore, how does the resulting way individuals use time affect others involved in the product development process? Brooks (1982) provides a telling analogy:

Observe that for the programmer, as for the chef, the urgency of the patron may govern the schedule completion of the task, but it cannot govern the actual completion. An omelet, promised in two minutes, may appear to be progressing nicely. But, when it has not set in two minutes, the customer has two choices -- wait or eat it raw. Software customers have the same choices. The cook has another choice; he can turn up the heat. The result is often an omelet nothing can save -- burned in one part, raw in another (p. 21).

This analogy highlights the critical question that needs exploration: To what extent does the pressure on software engineers result in uses of work time that ultimately negatively affect individuals' abilities to complete their work and therefore hinder the group's ability to create a quality product in a timely fashion? The literature specifies the temporal organization of software engineering specifies when the project engineer is to meet quality and manufacturability requirements (Clark, Chew and Fujimoto, 1987). The literature further describes the intense pressure that software engineers experience (Kidder, 1983; Kunda, 1992). The remaining question involves how the engineers actually use their time at work, given both the temporal organization specified up-front by project schedules and the
informal organization of crisis management that characterizes the actual process. I will investigate this question further in Part II.

Social Organization of Engineering Work:

When asked to describe their work, engineers distinguish between "real engineering" and the "rest of the job" (Perlow, 1994). They define "real engineering" as analytical thinking, mathematical modeling and conceptualizing solutions (Perlow, 1994). "Real engineering" is work requiring scientific principles and independent creativity. It uses the skills that engineers acquired in school. As one engineer summed it up, "real engineering is what I thought I was hired to do." However, "real engineering" does not comprise the whole job of the engineer. There are both the "necessary evils" of the job -- the meetings and paperwork -- and the "invisible work" -- the "behind the scenes" support work that provides the social glue that holds the product development team together.

Not only does the "whole job" of the engineer require a set of skills beyond "real engineering," but the career of the successful engineer, as defined by upward mobility via the organizational reward system, moves the engineer increasingly away from technical problem solving. As Hughes (1958) noted, "The engineer who, at forty, can still use a slide rule or logarithmic table, and make a true drawing, is a failure" (p. 137). The

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8 Zussman (1985) notes that engineers have both engineering and administrative responsibilities. Crawford (1989) further found that the activities performed by engineers include: technical-conceptualization, technical-execution, meetings, contracts with departments, technical writing, administration, relations with subordinates, relations with colleagues, and relations with supervisors. In the two organizations that Crawford studied, engineers in one spent 55% of their time, while engineers in the other spent 35% of their time, on work categorized as technical conceptualization and technical execution -- "real engineering." The rest of the time (45% and 65% respectively) was spent on activities not classified by engineers as "real engineering."

9 A colleague on my research team, Joyce Fletcher, has further elaborated in great detail on the types of invisible activities that are performed by engineers. According to Fletcher (1994, p.61), there are four main types of invisible activities: 1) activities associated with preserving the life and well being of the project; 2) activities related to empowering others to achieve and contribute to the project; 3) activities empowering one's self to achieve goals and contribute to the project; and 4) activities intended to create the social entity team.

-55-
successful engineering career is organizationally defined as movement into management (Katz, 1988; Von Glinow, 1988). Zussman (1985) describes the situation well:

The successful engineer leaves engineering for the higher pay and greater prestige of technical management or even general management, merging there with the successful accountant, purchasing agent, or sales representative to form the amorphous category of industrial manager. . . . Engineering may be a career starting point, but it is not, at least normatively, a career end point (p.223).

Occupationally, engineers are trained to perform and are supposedly valued for a specific set of technical skills -- "real engineering." Yet their organizational work and their organizational careers demand a wide range of skills. This tension between the occupational value system and the organizational reward system results in an "organizational occupational tension" (Raelin, 1985; Van Maanen and Barley, 1984).

The question has repeatedly been asked whether engineers' orientations are professionally or organizationally aligned (Raelin, 1985; Van Maanen and Barley, 1984; Watson and Meiksins, 1991). No uniformity of response to this question has been achieved. Much material has been written that argues that engineers are not "real" professionals (Perrucci and Gerstl, 1969; Ritti, 1971; Whalley, 1986; Zussman, 1985). Yet, it has also been argued that proletarianization does not accurately describe the engineer's role in post-industrial society (Whalley, 1986; Zussman, 1985). Whalley stresses the importance of the difference between the employment contract of engineers and wage earners: "One is designed to help the employer attract and maintain a trustworthy labor force who performs tasks strategic to the company's success. The other is designed to extract routine and easily monitored labor power with maximum efficiency" (p.205).

Recent literature affirms the assertion that engineers are neither professionals nor proletariats. For example, Whalley (1986, 1991) introduces a new classification of workers, labeling engineers as "trusted workers." Barley and Tolbert (1991) further suggest that engineers possess a set of specialized skills that serve as "the primary principle for organizing work" (1991: 5). Barley and Tolbert (1991) refer to this as the "occupationalization of organizations."
For the purpose of studying how time is used at work, the important point to be drawn from the literature on the social organization of engineering work is that an "occupational organizational tension" exists, and this tension likely affects both how engineers spend their time at work and how engineers experience the way they spend their time. If engineers are "occupationally aligned," their preference will be to perform "real engineering" at the expense of all else. If, on the other hand, they are "organizationally aligned," they may be more accepting of the interactive work that constitutes a critical part of the engineer's job but is not considered "real engineering." Examination of how engineers experience the social organization of their work is therefore crucial for understanding the use of time at work.10

Social Organization of Software Engineering Work

At the most general, descriptive level of what software engineers do, a transformation over the past 50 years from programming to software production has been documented (Kraft, 1979). During this time programming has experienced a steady process of fragmentation and routinization. Early programmers approached programming as a whole task. They started with a desired outcome and the same group of programmers (or even the same individual) carried out the approach, program design, instruction sequence, instruction entry, debugging and maintenance. Gradually, the field of programming has been subdivided into coding, programming and system analysis. The subdivision of programming has generated the emergence of a hierarchy of software engineers involved in the product development process (Kraft, 1979). The lowest level of engineers are coders; they generally have junior/community college level training. The more skilled programmers, who have typically been trained in traditional engineering colleges, work on

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10 There has been research conducted that suggests engineers vary in their preferences for daily work activities and longer term career choices (Bailyn, 1985; Bailyn and Lynch, 1982; Perlow and Bailyn, forthcoming; Watson and Meiksins, 1989; Zussman, 1985). These differences are not accounted for in the social organization of engineering work as described. The effect of the social organization on individual time use may therefore be mediated by individual preferences.
complete programs rather than on program fragments. Finally, system analysts, who
typically possess degrees from elite science institutions such as MIT, design whole
systems, languages or other large scale software.\textsuperscript{11}

Software engineering has evolved beyond the craft mode of production. Questions
loom, however, regarding how to best manage the software development process.
Cusumano (1990) specifically examines the effectiveness of managing software through a
factory process. He concludes:

Not only are more structured approaches possible to introduce, but, by not
pursuing process refinements, managers may be wasting human capital
resources as well as the opportunity to improve the competitive capabilities
of the firm (p. 443).

Beyond the literature that documents the general trends in software engineering and
explores how the process should be managed, the social organization of software
engineering, in particular, has not been isolated for study.

\textit{The Use of Time at Work:}

It has been suggested that we do not yet understand how software engineers use time
at work. Bucciarelli (1988) critiques both the existing literature and the engineering
education curriculum for focusing on the "object world" -- "the world of hardware, of
performance specifications, of scientific theory and law, of quantitative estimate, of
standard hex nut sizes, of budgets and milestone charts" (p. 96). Bucciarelli suggests that
the real world is "rife with uncertainty and ambiguity where boundaries on their
responsibilities are less well-defined, where individual initiative and competence still are
essential but now others must be dealt with, trusted, relied upon" (Bucciarelli and Kuhn,
forthcoming: 15). As a result, Bucciarelli claims the design process "is best seen as a
process of communication, negotiation, consensus building. No one person, no one

\textsuperscript{11} According to this classification, the engineers I studied at Ditto would be categorized as the middle level
--"more skilled programmers."
object-world, dictates the form of the design or even knows the design in its totality" (p 6).
Bucciarelli (1988) contrasts the work of the "object world" with that of the "process world"
-- "The world of dialogue and negotiation, of social exchange, laughter, gossip, banter --
all that which is ever present in design, but whose significance is generally discounted"
(p. 96-97). Bucciarelli asserts that the way software engineers use time at work is not
ddictated by the object world. Rather, he suggests that time use may be affected by the
object world, but it is determined in the process of doing the work. However, Bucciarelli
points out the process of engineers' daily work has not been considered in the literature.

The recent work by Perry, Staudenmeyer, and Votta (1993) focuses on developing
methods to collect data that capture how software engineers use time at work. Perry,
Staudenmeyer and Votta (1993) note that "...there has been surprisingly little research on
time related behavior at the individual level and on the connection between individual
actions and an organization's ability to act" (p.1). They recognize the importance of
considering the use of time for individuals and the project as a whole. To date, however,
they have only provided the methodology to carry out such a study.

In my research I use methods similar to those that Perry, Staudenmeyer, and Votta
develop in order to examine the individual use of time and the effects on other individuals
and the organization as a whole. I further explore the temporal and the social organization
of work and how these phenomena affect the engineers' use of time; without consideration
of these elements, an important component would be missing when trying to understand
why software engineers act in the way they have been observed to act. I also investigate
the implications of the observed ways of using time at work for the individuals, the other
individuals, the organization and their families. However, before discussing an analysis of
my field work, I describe the software engineers I studied and the product development
process of which they were a part.
THE SITE

Driving down Route 401 about twenty minutes from downtown, one could easily pass by and fail to notice the Ditto site.\textsuperscript{12} However, for those who know to exit and make a left under the underpass, a large complex awaits them. Ditto has 100,000 employees worldwide and 3,000 of them work at this site. This is Ditto's primary site for design and manufacturing.

From the outside, the complex looks like a cluster of long white warehouses. No structure is more than one story high. Most of the buildings have no windows. If one is not familiar with the complex, it is not an easy site to navigate. None of the buildings have distinguishing features. Indeed, the buildings have no names, only numbers. After passing three long warehouses and several parking lots, Building 113 is next on the left.

A bus route runs to the site, but almost everyone drives. There are parking lots on both ends of the building. The lots fill up early. By 7 AM it is hard to get a parking spot near the door. By 8:30 AM one will most certainly have to park at the very back of the lot. Back of the lot parking does not pose a problem on cool spring days; however, the five minute walk is a less than an appealing journey in the middle of winter when the temperature often falls below freezing.

Once inside the first set of doors, one encounters a security booth. The guards look up to see that you have a badge. If one is not a Ditto employee or a contractor,\textsuperscript{13} entry requires completion of a bright pink visitor's pass. Both a Ditto employee and the visitor must be present at the guard booth to fill out the form that serves as the visitor's guest pass. A visitor is supposed to be escorted at all times. However, once past the guard booth no one seems to care. Visitors wander freely.

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\textsuperscript{12} All names are pseudonyms. All route numbers are fictitious.

\textsuperscript{13} During my field stay I was given a contractor's badge that enabled me to enter without an escort. My badge was marked in big letters CONTRACTOR to make it readily apparent that I was not a "real" Ditto employee.
Guards do not easily grant strangers "visitor" status. One must be at Ditto on official business. Family members are not allowed to enter even if they are escorted by a Ditto employee. Three years ago there was a party in Building 113 to celebrate the launch of a product that the engineers had spent five years developing. The employees brought their families. Spouses and children still speak vividly of the one day they were allowed inside.

Beyond the guard booth is a second set of doors that leads to office space. As one walks through this set of doors, one leaves the outside world behind. The building is dimly lit and has no windows. Without returning to this entrance or the other entrance at the back end of Building 113, it is impossible to estimate the time of day or ascertain whether the sun is shining or a terrible winter storm has hit. Time is oddly suspended in the vacuum-like atmosphere of this building.

The interior of the building is divided into many large, open areas. Each area is subdivided by cubicles, sometimes as many as 50-100 in a "room." Engineers are assigned a cubicle. An engineer's grade level determines whether he or she must share a cubicle. Once an engineer reaches a sufficiently high grade (usually about eight years at Ditto or the equivalent level of experience), he or she is entitled to his or her own cubicle. Only managers have offices.

Much of Building 113 is filled with clusters of cubicles. There are also labs scattered throughout the building. Labs consist of open spaces without cubicles; they tend to be filled with computers, printers and other machines for testing purposes. The lab space frequently serves as unofficial storage space. Labs often evoke thoughts of a garage that desperately needs spring cleaning.

Like the external layout of the Ditto site, everything inside Building 113 looks the same. All of the cubicles look the same. All the office spaces are filled with rows of cubicles. All the labs are cluttered with computers, printers, paper and boxes.
The Product Team:

Two years ago Ditto reorganized. At that time, Jim became one of sixteen Division Vice Presidents. Previously, Chief Engineers managed engineering divisions. The Chief Engineer only had to be concerned with the design and manufacturing of products. The responsibility for a product's success on the market belonged to someone else. The corporate reorganization eliminated the position of Chief Engineer. After the reorganization, the Division Vice President assumed the responsibilities of the Chief Engineer as well as responsibility for the marketing and sales of the product.

The sixteen Division Vice Presidents report to six Business Unit Vice Presidents; Jim reports to Kent. Jim's Division is losing money. Both Kent and Jim are concerned about the Division's future. They are counting on the success of their next major product, a color printer they refer to as PEARL. Milton is the product manager. He has accrued his experience at Ditto selling products rather than designing them. Given the Division's new responsibility for sales and marketing, management believes that Milton's skills will be a great asset.

The future career success of Kent, Jim and Milton are all vested in the market success of PEARL. Consequently, anxiety pervades the working environment surrounding PEARL. Describing the importance of PEARL, one manager says: "if they don't do it the whole Division will fold. The pressure is really on them."

Two competitor products had already been launched when PEARL received official funding in September. Moreover, one of the competitors is expected to have an upgrade at the same time that PEARL is due to hit the market in June. There is no time to slip schedule. They are already behind in the "race."

PEARL is positioned to sell for $10,000. The goal is to install 4,630 units by year's end (six months after launch). PEARL's projected market is completely new for this Division. Prior to PEARL, the Division made much larger electronic machines that sold for closer to $100,000. It is hoped that PEARL will not only prove profitable, but also
position Ditto in this new market. There are plans to follow PEARL with a whole product family. If PEARL does not succeed, the rest of the plans will be worthless.

Given the widespread organizational importance of PEARL’s success, Milton, Jim and Kent all closely monitor the product’s development. If anything goes wrong, they demand an explanation. The engineers complain that they are forced to spend excessive time justifying why a problem occurs and explaining how they are going to address it; such "bureaucratic" requirements detract from the time they have to actually solve the problems. Therefore, the engineers avoid reporting problems if possible.

Engineers at Ditto typically develop products in three, four, sometimes five year periods. Most of the engineers who work on PEARL were most recently involved in RUBY, a product that took five years to design. Now, suddenly, they face the daunting task of developing a product that is supposed to launch in nine months.

Magnifying the challenge of PEARL’s time frame is the newness of the technology involved in its creation. The technology differs radically from the type with which many of the engineers are familiar, and the engineers involved lack many of the basic skills necessary to do their work. Limited time and money prevented the engineers from acquiring the initial training they needed. The engineers, therefore, are forced to learn on the job. Their daily confrontations with a steep learning curve slow their productivity.

To address the extremely tight product schedule, management purchased many of the parts from external vendors. For example, the product’s engine was purchased from Hitachi. Utilization of external vendors has significantly reduced the number of Ditto mechanical engineers that are involved in the product’s development. However, purchasing parts from external vendors requires the participation of additional managers to oversee the proper integration of the different parts.

The PEARL product team consists of 45 individuals internal to the company. The team includes: the product manager and his staff of eight managers, including a technical product manager (who has a hardware manager and 6 mechanical engineers), a software
manager (who has three project team leaders, an independent contributor and twelve software engineers), a launch manager (who has two direct reports), a marketing manager (who has two direct reports), a systems manager (who has seven systems engineers), a controller, a quality and business effectiveness manager (who serves as the product manager's right hand man), and a manufacturing manager (who has three direct reports).
Initially the software team did not comprise part of the product team. The software engineers reported to Carl, a senior software manager. Carl and Milton both report to Jim, and both men seem to want "star manager" status from Jim. They further behave in an adversarial manner towards each other and their hostile relationship causes problems for the engineers. Milton harbors the belief that Carl wanted to side track the software engineers so that PEARL would not launch on time. Carl assigned the engineers work that was not related to PEARL's development. Milton claimed that such managerial decisions were not in the best interest of the product or the Division. However, Carl claimed the work he assigned to the engineers temporarily took precedence over PEARL. From September to January, Milton and Carl battled over control of the software team. Finally, in February, Milton convinced Jim that the software engineers should report directly to him and not Carl.

Once the decision was made that the software engineers would report to Milton, he wanted to re-locate them in order to facilitate communication. When the engineers reported to Carl they sat in an area with other software engineers from other product teams within the Division who also reported to Carl. The software engineers had cubicles and labs in Building 113 located far away from the rest of the product team. They sat in a walled area in the middle of the manufacturing floor. A key pad lock guarded the software engineers' cluster of cubicles and offices. As one engineer remarked about cross-team communication, "The lock on the door hinders close relationships and communication, even though everyone knows the combination."

The software team was isolated from the rest of the program team not only physically, but also socially. They socialized only with each other or the software engineers on other products. Limited interactions occurred between the software engineers and the rest of the product team. Finally, in March, Milton succeeded in co-locating the software engineers with the rest of the product team. The move took two days out of the schedule, but the product management felt it was worth the time in order to facilitate better
communication. Milton's desire to physically move the engineers away from Carl possibly provided an underlying impetus for the move as well.

The software engineers did not view the move positively. They feared that after the move other team members would constantly make demands on their time. The software engineers claimed that they were the engineers everyone needed to talk to. Therefore, moving them closer to other team members would render them too accessible and hinder their ability to complete their work in a timely fashion. Furthermore, they preferred to sit with the other software engineers, many of whom were their friends. They moved as ordered, but very reluctantly. Six months into a nine month development cycle, Milton finally had official managerial control and had succeeded in physically locating the engineers where he wanted them.

*Software Team:*

I focused the majority of my field work on the seventeen software engineers who work on PEARL. It is a diverse group. There are four American Caucasian women, one African-American male, four first generation male immigrants (a Pakistani, a Vietnamese, an Indian and a Russian) and eight American Caucasian males.

Group members possess a great deal of education and experience. At the time of funding commit in September, no one had been employed by Ditto for less than three and one half years. All had engineering degrees: half the team had Masters in Computer Science or related fields and four were currently pursuing Masters degrees in Computer Science on a part-time basis. Most had earned their degrees from local schools. The engineers consider employment with Ditto to be one of the best jobs that they could have. Ditto has a very strong reputation as an employer of software engineers.

The software team is divided into three groups of four engineers, and each group reports to a project team leader. The three project team leaders in turn all report to one manager; this manager ultimately possesses responsibility for the software development.
There is also one individual contributor who is the fourth direct report to the software manager.

**Software Team Organization Chart**

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<thead>
<tr>
<th>Software Manager (Zeth)</th>
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<tr>
<td></td>
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<tr>
<td>Laura</td>
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<tr>
<td>Matthew</td>
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<tr>
<td>Chris</td>
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<tr>
<td>Sarah (joined in Oct.)</td>
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<tr>
<td>Jane</td>
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</tbody>
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*Names in bold indicate individuals whose cases are described in detail in the text.*

One project team leader describes his role in the following manner: "... to spend most of the time facilitating the work of the engineers, buffering interruptions in order to try to enable the engineers to get their work done." It is a job often described as "babysitting" or "policing" because the project team leader's primary role is "protection" of the engineers from the outside world. No sense of personal accomplishment immediately derives from the leader's role. Indeed, individuals who have recently been promoted from the engineering ranks, where they thrive on associating themselves with tangible output, often find the role of project team leader frustrating.

The software team is supporting two product launches of PEARL. They are working with two external vendors, one for each launch. The second product launch is planned as a lower cost upgrade to the initial product launch. It utilizes an operating system from a different vendor that is less expensive, but will take longer to implement. Because the vendors are competitors, the Ditto engineers who work with one vendor cannot share technical information with the Ditto engineers who work with the other vendor. Due to this
vendor situation, the engineers are divided up into two groups of four engineers. One group of four works with one vendor and is responsible for the first launch. This group reports to Allan, their project team leader. I will refer to them as "Allan's Group." A second group of four engineers is involved with the second launch and works with a second vendor. This group reports to Paul, and I will refer to them as "Paul's Group." Both Allan's Group and Paul's Group work to fill the same function but for sequential product launches.

For legal reasons, the members of Allan's Group and Paul's Group can have little interaction with each other. Allan's Group works with a vendor whose product has the market advantage. This vendor is very concerned that their confidential software not be shared with their competitors who are working with Paul's Group. In an attempt to ensure confidentiality, a special lab which requires key card access was created for Allan's group.\textsuperscript{14} This lab is a tiny room off in the middle of the manufacturing floor where there is no ventilation and the engineers are subject to the constant noise of motor carts and fork lifts. On cold winter days, these engineers often wear their winter coats to stay warm and in the heat of summer, they often pry the door open to obtain some cool air.

The remaining four engineers make up a third group which is responsible for a part that will interface with the work of Allan's Group in the first launch and the work of Paul's Group in the second launch. The third group, "Laura's Group," works closely with both Allan's Group and Paul's Group.

\textsuperscript{14} Although the vendor set strict guidelines as to who was to be allowed into this lab, the engineers are very lax about adhering to these guidelines. Any one who knocks on the door is admitted. I personally spent weeks sitting in this lab observing them work.
Work of Software Engineers:

Funding was committed to PEARL by the Business Unit Vice President on September 10th. The product was scheduled to launch a little over nine months later, on June 20th. The first four months from September through January were considered the design phase. The goal of the design phase is software development. The testing phase, in this case the period from February through June, focuses on solving problems in the software developed during the first phase.

<table>
<thead>
<tr>
<th>Product Development Schedule (as of September 10)</th>
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<tbody>
<tr>
<td>September 10</td>
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<tr>
<td>Funding Commit</td>
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<tr>
<td>Design</td>
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The software that these engineers develop renders the hardware bought from outside vendors (i.e. Hitachi) operable. Each software engineer has his or her own "deliverables," which is a list of functions/features that he or she must produce, or, in the language of the group, "implement." To "implement" a feature/function means writing the code to make that feature or function operable. Each deliverable, therefore, requires writing lines of code to make something happen; for example, one deliverable might prompt the user to enter his or her name at a specified time.

A "release date" marks the deadline when the engineers must give certain deliverables (lines of code) compiled on a disk, to the test groups and other designated groups on the product team. (Who receives a "release" varies depending on the deadline.)
During the design phase, release dates occur about once a month. During the testing phase, the software team makes a release once a week.

Because they are working so closely with external vendors, the PEARL software engineers view their work as adding code to a skeleton. One engineer compares his role to that of an author who must fill in the story where all the topic sentences already exist. Another engineer describes it as follows: "I see what is missing and plug it in." Building on work already produced by the vendor, rather than working from scratch, deprives the engineers of the degree of control to which many of them are accustomed. For these engineers, the particular work involved in the PEARL project lacks the originality and demand for creativity that they find stimulating. According to one product manager, "The engineers complain that their work is not challenging, but it is the work of the future. The engineers need to learn to excel at it. . . . They need to redefine what it means to do challenging work." He offered the following example, "How many times do you think a mechanical engineer has designed a screw lately? They don't! They integrate them into their projects."

The original schedule that the program team committed to on September 10th included a detailed "sub-schedule" that listed various features and functions and the dates when the items would be completed. Based on this list, management allocated responsibility for the various items among the engineers. Each engineer's deliverables for each release date was determined in September. All of the information regarding dates and responsibilities for various features and functions therefore constituted part of the up-front planning. However, the schedule is continually updated by both the project team leaders and the software manager as engineers find that certain items cannot be accomplished as originally planned.

In general, engineers have little control over the "due dates" for their deliverables. Senior managers determine the critical deadlines, compile a schedule and designate an engineer to serve as the project's Quality and Business Effectiveness Manager. This
engineer works within the temporal framework set by senior management and establishes incremental, "minor" deadlines. Only within all these predetermined deadlines do engineers have autonomy to plan how they produce their deliverables.

Estimation of how long completion of the software engineers' work will take proves difficult because the type of work is new for all involved. The potential difficulties inherent in writing this type of code are unknown. Moreover, even after completion of this type of work, evaluation of its quality is difficult beyond the simple knowledge of whether or not the function works. Because all the code is interdependent, one engineer's function may operate well but cause problems in someone else's code. However, the engineer may not be aware that his or her code exerts an adverse effect. The systemic effectiveness of each engineer's code is therefore difficult to ascertain prior to final integration. One engineer noted:

It is easy to recognize when things do not work because they blow up in your face, but it is more difficult to know when good work is occurring. Only in retrospect, if nothing blew up, can you recognize the work was good. But as it is going on, you cannot tell good work, only bad work.

This type of evaluative limitation frequently proves a problem in attempts to recognize and reward the software engineers because the quality of their independent work is difficult to evaluate objectively.

Fear of Layoffs:

Engineers are extremely concerned with perceptions of their individual work. In December, employees found out that Ditto was planning to lay off 10,000 people over the next two years. Many of them first heard the news on the radio as they drove to work. The information leaked to the press before management had informed the employees. It was not until the afternoon following the morning radio announcement that managers confirmed the rumors. Ditto would lay employees off starting in January. Little was known about who or how many employees would initially receive termination notification.
The common assessment of the situation was that one's job was safer if one was working on a project that had funding as PEARL had received in September.

From December through mid January, including Christmas vacation, engineers simply waited for further notification about the layoffs. Finally, on January 16th, workers were laid off in the downtown office signaling that layoffs would soon occur at the Ditto site I studied. Tuesday January 17th was a bleak day in Building 113. As employees arrived, some received pink slips indicating immediate termination of their employment. The other employees were expected to continue working as if nothing had occurred. Little work got done that day.

None of the members of the software team I studied were laid off, and only four members of the entire product team (out of the 45) were laid off, but the layoffs affected everyone's attitude. Engineers speak of their anger towards the company and their lack of desire to give to a company that will take jobs from their fellow employees even when the company is making a profit. At the same time, the engineers who kept their jobs speak of "feeling lucky" and "being privileged." Most fear that they might be "the next to go" and feel that, given the precarious employment situation, they need to work particularly hard to protect their jobs. If long hours were important before, now everyone feels immense pressure to be visible at work. Engineers employed at Ditto for many years and content to remain at their current job level suddenly worry that their lack of advancement will prove problematic. Individuals who never wanted to make work their first priority now feel pressure to give their all to the organization simply to retain their jobs. Engineers speak of how they had intended to remain at Ditto for the duration of their careers; now, they are compelled to reassess such plans. Even if they want to stay at Ditto on a long-term basis, they fear they may not have the option.
Work-Family Conflict:

According to Working Mother's 1994 Survey, Ditto is among the 100 best places in the country to work. The engineers express surprise when they hear that assessment of Ditto. They insist it is impossible to take advantage of flexible scheduling options without hindering one's career advancement. As one engineer said:

You really cannot leave for a few years and come back and expect to get to high levels. You have to be recommended for a manager's job. And so people look back at your record and see if you are committed, if you were willing to put the time in. And if not, well you don't go anywhere.

Another engineer simply stated: "It is like a train . . . if you get off, you can't get back on. It is a real problem."

At Ditto, one is subject to two major expectations: to complete one's work and to be visible in the work place. Ditto managers however do accommodate "ad hoc" needs. Engineers come and go each day as they choose. There are no official starting times, departure times or requisite numbers of working hours for a given week. "One-time crises" that occur outside of work can usually be accommodated without a struggle. A dentist appointment, a flat tire, or a sick child do not pose problems. Problems arise, however, if on a regular basis one is unwilling to put work above all else in one's life. Home scheduling needs are not expected to take precedence over work on a regular basis. Given the nature of the work, which is replete with crises and scheduling adjustments, boundary management between work and family is extremely difficult to achieve. One cannot expect to go home at a scheduled time each day and occasionally work late in order to cope with a work crisis. Rather, the expectation is reversed -- one must expect regularly to work late and occasionally to arrive home at a decent hour, usually due to a family crisis.

When anyone mentions the possibility of working fewer hours on a daily basis, the immediate response involves comparison with the excessive hours and extreme dedication of Japanese workers. Most of the Ditto managers, and many of the engineers, have visited Japan. Those who have made the trip to Japan tell stories about the long hours that the Japanese work and the excessive drinking that they engage in after work. The Ditto
employees discuss the fact that the Japanese engineers seemingly never go home. The comparative assessment of the two cultures leads the Ditto engineers to conclude that in order to beat the Japanese in the market place they have to adopt a similarly intense work style.

* * *

Ditto provides an excellent opportunity to study how engineers use time when they are under pressure to complete their work. A sense of urgency and crisis pervades the site. To ensure the most sound research program, I employed a portfolio of methods (Weick, 1979). I was on site full-time for nine months. My analysis derives from a combination of observations, interviews, daily tracking of activities, q Sorts and surveys conducted during my visit. For a detailed description of the data I collected refer to the Appendix.
PART II:
Perpetuating the Time Famine
Chapter 4:  
Temporal Organization of Work: The Crisis Mentality

For the software engineers, the project launch schedule dictated the daily dynamics of their work loads. On September 10th, when the product team committed to a product launch date of June 20th, a schedule was put in place that stipulated completion dates for each of the major hurdles in the product development cycle. This schedule provided a temporal framework for the product's development. However, continual crises marked most days, making it difficult to adhere to the originally established schedule. Indeed, the work necessary to meet each hurdle typically assumed crisis status before team members accomplished it.

*Development Cycle:*

The product first emerged as a concept two years prior to receiving funding. During August of that year, six individuals spent 10% of their time creating the architecture of PEARL. In December the team issued an interim report, and between January and March of that year the team members visited the Japanese vendors from whom they planned to purchase most of the parts. From April through June progress on PEARL temporarily ceased, as the corporation reorganized.

In July, the team completed PEARL's "market definition." The market definition documented the facts and figures integral to the product in terms of cost, quality and

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15 Of the forty five people on the program at launch (in June), only Sam, the Quality and Business Effectiveness Manager had been on PEARL since its beginning — the "architecture design." He was to become the manager in charge of scheduling and assuring synchronization of the work of the different subgroups. One afternoon, I sat down with Sam for several hours. He walked me through PEARL's history, based on the "A" -- or top level -- schedule, as it had unfolded during the two years before I began my study. I had been on site in this Division for these two years, and therefore had experienced the entire product's history in terms of the highs and lows of the Division, and of Ditto as an organization. However, I did not start to follow the starts and stops that characterized PEARL's history until October 5, just after funding was committed in September. The story of the product's existence for its first two years is reported as it was recounted by Sam. His story is consistent with all other accounts I have heard and all company documentation to which I have had access.
delivery. Senior management reviewed the market definition and assessed PEARL's market potential. It passed senior management's review, and work on the product continued. In December the team made further recommendations to the Business Unit Vice President regarding the engine and electronics that should be used to develop the product. The recommendations were rejected.

The following April, recommendations for the engine and the electronics were again to be reviewed by the Business Unit Vice President. Up until four days before the April review, the team worked under the assumption that management would approve a certain budget. However, the Business Unit Vice President suddenly denied the funding to the Division Vice President. Without sufficient funding, the plan was worthless. As a result of the denial of the funding, the April review was canceled.

Following the funding cut by the Business Unit Vice President, management had to consider whether or not to go ahead. Insufficient funding exacerbates the difficulties inherent in a rapid, effective product launch. Moreover, if the product did not reach the market quickly enough, substantial market share would be lost. At this point, it was April, and most of the staff had been assembled, except for the systems engineers and some of the support staff. The team spent the next three months drawing up a new budget which reflected substantial cuts in funding, especially for training.

In the midst of the turmoil surrounding the product's future, two competitor products were launched. The Ditto team knew about the development of one product, and therefore its market announcement did not surprise them; however, announcement of the second product, which was very similar to the product the Ditto team was developing, was unexpected. In response, the Ditto team took a week off in June to reconsider whether or not they should continue. They decided to continue and informed both the Division Vice President and the Business Unit Vice President of their decision. Neither person reversed the team's recommendation.
On September 10th, the product finally passed senior management's review, and the Business Unit Vice President gave the team official authorization to continue the project. From this point forward they were committed to a hard and fast schedule. The September authorization rendered the product development an officially approved, budget-backed project. Official approval transformed the atmosphere surrounding the project. Pressure mounted and work on the product intensified. Many of the engineers complained bitterly that the working environment surrounding the product had been unproductive thus far, and suddenly they were under immense pressure. The engineers explained, however, that this scenario was typical and blamed it on management's poor planning. They accused management of wasting time initiating products and questioned why, if product development is a race, does management waste so much time before they start "officially" running?

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Once the team received official approval, the only involvement of the Business Unit Vice President would occur several days prior to launch when he would determine whether the product was ready for launch. Except for his final approval, the Division determined when all the incremental hurdles were to be met during the product's development. The software engineers had the autonomy to create their own daily schedules, but individual schedules had to cohere with and support the tight product development schedule developed by the Division. The engineers complained that the overall product development schedule had not been constructed with an in-depth knowledge of the demands of the work. Engineers felt that the constraints were unrealistically tight. The incremental hurdles severely limited any scheduling flexibility possessed by the engineers and many felt that the scheduling constraints negatively affected their work. One software engineer summarized the feelings harbored by many of his colleagues:

The deadlines and schedules are unrealistic. The people at the bottom who are doing the work have no real input into them and nothing is delivered on time-- and if it is it has too many problems. Mileposts are set without understanding the details. They are set to meet the high ups' needs to be heroes . . . . The time schedule in the present project is very unrealistic. It is the first time Ditto is in this market segment. There are lots of parts we have never done before. The project has leaders who don't fully understand what they are delivering, how it comes together; it is all new and yet the schedule is tight and there is no contingency -- it is bad planning; there is no tolerance.

*Crisis Mentality:*

Tight constraints compel the engineers to constantly confront deadlines. Because the next deadline always seems imminent, it assumes crisis status. When a problem becomes a crisis it seemingly demands the engineers' undivided attention and prevents them from addressing non-crisis status work. Completion of non-crisis tasks are delayed until they assume crisis status. This perpetuates a crisis driven approach to work, and compels the engineers to work reactively rather than proactively.
For example, Jane, a software engineer in Laura's group, experienced difficulty obtaining the computer support she needed to do her work. Jane was supposed to work with a new software program, but the management refused to make the additional $5,000 investment to buy the support line that went with this software program. Consequently, Jane was forced to write code with a program with which she was unfamiliar and without the resources to facilitate learning how in a short amount of time. The issue of purchasing the help line had come up in August when Jane felt strongly that she needed the help line to accomplish her work. For four months, Jane asked for help. She continued to slip farther and farther behind schedule. Finally, her manager decided Jane should "track" (write documentation each day) her need for the next month and then they would be able to provide management with a compelling argument as to why they needed to invest $5,000. Jane was livid. She exclaimed, "We need it now. The amount of time I am wasting is worth more than the $5,000. A month from now, we will not need the help. It will be too late. We need it now."

Jane saw the problem growing worse. She knew that ultimately she would be to blame if she was not able to finish on time and subsequently delayed the product's launch. No one would remember that she had not been provided with the support she needed. They would only notice that she had not completed her work in a timely fashion. She felt helpless, and her frustration escalated.

In early November, Jane's manager found a way to get Jane access to a different help line. However, the new help line took days to generate a response. Jane explained, "The help line I have access to now takes forever. If you ask a question incorrectly, you automatically lose a whole day. We don't have that type of time to lose." Jane asked her first question on a Thursday. She did not receive a response until the following Tuesday. The initial answer Jane received was unhelpful. She had to rephrase the question and resubmit it. Finally, on Wednesday she obtained an answer that productively addressed her question. At this point, Jane's manager agreed that the situation was ridiculous. Two
weeks later, in early December, Jane finally got the specific help line she had originally asked for in August.

The relevant decision makers at Ditto could have spent $5,000 four months earlier and saved Jane trouble and wasted time. Instead, management delayed spending the money for the help line until Jane’s situation was desperate. As a result, when they finally purchased the help line, the return on the investment was minimal because, by December, Jane had spent a great deal of time figuring out most of the problems that the help line could have quickly solved. Jane’s case represents a familiar pattern for those I studied. Action is delayed until a situation becomes an emergency.

On September 10th, the development team committed to a variety of dates for different reviews and types of testing. While management erected these hurdles in order to ensure timely delivery of a quality product, when the deadlines approach there is rarely adequate time to complete the necessary work. The strategy therefore becomes how to circumvent the immediate hurdle. This approach often results in the creation of temporary "work arounds" to existing problems in the code, which ultimately either create more work in the end because "real" solutions are still needed, or even worse, supposedly temporary solutions become permanent parts of the final product by default.

Imagine a farmer with a wagon full of apples. He stops at the side of the road to ask how far it is to market. The farmer is told, "If you go slow it will take you an hour, but if you go fast it will take you all day." (If you go fast, you hit a bump, your apples fall out, and then you have to spend all day picking them up.) This anecdote describes the Ditto product development process. If each task did not become a crisis, their work would benefit. The engineers would have more time to effectively approach problems when they arose. Instead, everything is left until the last minute and, consequently, routine problems become crises. In the end, tasks take longer and are not completed as thoroughly as they might otherwise be.
The software manager has a reputation for being "focused on the short term" and therefore he perpetuates the group's crisis driven approach. One system engineer noted:

Zeth is very focused on short-term deliverables. He will not start worrying about the problem fixes until he feels that the right time has come. . . . He has done a good job; he has been very successful. He knows his stuff on electrical hardware. . . . But, he drives his people wild -- his operating style is that you do what he wants when he decides he wants it.

The system engineer continued:

Zeth's people do as they are told. . . . And I too accommodate him. If one doesn't accommodate him, Zeth will do it himself, or get someone else to do it. He has distinct ideas about how things are to be done, and he will have it that way, unless you make sure to get involved and argue for your own viewpoint. . . . For example, if Zeth wants a report formatted in a certain way, he will do everything he can to make sure it is that way. . . . He wants his hands in stuff and he wants it his way.

The software manager's attitude permeates the work style of the sixteen engineers who report to him. They all seem to agree that their manager wants things his way, and he has a tendency to create pressure in order to get what he wants when he wants it. Many people believe that Zeth sets unnecessarily short deadlines in order to build in some extra time to make any changes he feels are necessary. If something is due in two days, Zeth has a reputation for telling his engineers it is due in one, to ensure that the work will be completed the way he wants it. But, when every part of a project becomes a crisis, it is hard to distinguish the importance of any particular crisis. The engineers talk about how their managers have "cried wolf" too often. An extreme example occurred one afternoon in May when the Product Manager called an emergency meeting for his direct reports. Yet by the time the meeting occurred, he forgot why he had called it.

Because engineers constantly feel they are dealing with crises, they are unable to plan ahead to avoid future crises. Instead, the future is just like the present -- unplanned, unmediated, unstructured. According to one system engineer:

The attitude is we screwed up this time, now lets just get through it and do it right next time. . . . Unfortunately the problem is it does not happen right next time either, given the people. We keep on getting ourselves into the same binds, and then trying desperately, at all costs, to get ourselves out.
Work Time:

Ditto presents a work culture (at least in the Division I studied) formed more by crisis and spontaneity than routine. The crises become the routine. The typical pattern of an engineer's work day is a pattern of crisis confrontation; every day seems to require arriving early and staying late to respond to current crises. An odd night is one when an engineer arrives home early, rather than one when he or she works late. Only those who have what the employees call "hard stops" regularly leave at a set time. "Hard stops" are family and school obligations that are viewed by peers and managers as unbendable or non-negotiable. Otherwise, one leaves when the work is completed or it simply gets too late, and one is too tired to continue.

While engineers come in early and stay late, there is little internal patterning to the engineers' days. There are few planned meetings nor are there many planned interactions. Chapter 7 elaborates on how engineers actually spend their time at work. Chapter 9 explores the consequences of this work pattern on their lives outside of work.

Fuzzy Endings:

During each stage of the project, there is a sense that the engineers are behind schedule, and there is thus continual uncertainty about the possibility of an "on-time" launch. In October, the engineers were already nervous about adhering to the schedule. One of the engineers said, "The November deadline is our biggest release of the program. It is when everything must be up and running and all the bells and whistles must be in place." Yet, on October 12th, the same engineer stated, "I don't expect us to meet the November 22nd deadline -- I think it will be a few days late and even when it is released it

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16 One senior manager told what he considered a funny story about when he did arrive home early: "One night I arrived home at 5:30 PM. My wife was so surprised she did not know what to do with me. . . . She always tells me to come home earlier. . . . When I finally did she ended up sending me to watch TV. . . . She said she wasn't ready for me yet. She still had things to do . . . She still had to make dinner."
will be lacking some of what is promised for that date.” Still in March, no one was certain whether they would make the schedule. As one systems engineer expressed:

Yes with a big caveat.... We will launch close to June 20th but not with the quality we would have liked. .... I do not see this as so bad because the customers in this market do not demand the quality that we are used to. .... this market will not be sensitive to the potential problems that we are having. If we launch with a few bugs, we can fix them later. On a pragmatic side, they need the product out in the market and if they have some problems that will not be the end of the world.... Besides, the best way to find out if we have any problems is to put it in the market and let them complain. We can always do upgrades once the product is out there.... that is expensive and nasty but not the end of the world. It will irritate the customers who have to be upgraded, but everyone else will get the upgrade initially, and they will not know the difference.

Near the end, it was expected among system engineers and managers that the launch would occur on time. The software engineers, on the other hand, were not convinced. One engineer explained, "we might make it if we hit several home runs."

When I asked the software engineers why such a discrepancy in opinion existed between themselves and their managers, the software engineers explained that the managers lack the technical familiarity with the product to understand exactly what is involved in making launch at any particular point. The managers, on the other hand, explained that engineers strive for perfection, but to be "launch ready" a product does not require perfection.

According to the managers, products do not have to have zero defects to go to market. As one senior manager told me, "engineers aren't comfortable until every last problem is solved, but this is not necessary for us to launch."

It is apparently hard to declare the end of the program. As problems are solved, they are rolled into the software in preparation for what may be another release. It ultimately depends on a manager's decision as to when a product is "good enough."

Whether the problem fixes are included in the first launch or not, they are still necessary for the upgrade. Thus, the engineers keep making changes. Only in retrospect do the engineers know what was the final release (and what changes will go into the upgrade). Since everyone knows the products will be launched short of perfection, there will always be more work to be done. The operative question is when to launch a product.
After Allan's group made its first "final" release in May, there was no enthusiasm or celebration. Rather, there were only sighs informed by the realization that this might not be the final release. After the release was tested, they were sure there would be more problems to fix. They were right. One meeting during which the project team leaders reported their status to the software manager turned this phenomenon into a joke. First one project leader, then the next, and then the independent contributor reviewed their status and claimed that this was really the "final, final, final release." By the third time this happened, the individuals in the room broke out in laughter. Everyone knew that there could still be an "absolute final, final, final, final release." Only time would tell.

Before each deadline, the engineers feel that that crisis is the most important one of the project, and once that crisis has passed, the anxiety level will decrease. When I arrived in October, the engineers said November would be the worst month of the program, and after Thanksgiving the situation would improve. After Thanksgiving, they believed Christmas would bring relief, and after Christmas, they said the same about the end of January and so on throughout the entire development cycle. The pressure seemed to never let up until the product was launched. There was continual urgency, continual crises, continual fire fighting because another deadline was always around the corner. Even at the end of June, when the Product Manager was to take the team to New York City for the unveiling of the product, the Division Vice President said no at first, exclaiming "there is still more work to be done; they aren't done yet."

When endings are fuzzy and dates continually slip, personal schedules suffer. For example, planning vacations at "good" times becomes nearly impossible. Most engineers try to schedule their vacations closely following a major release date. This should be a relatively quiet time. However, release dates tend to be delayed and when the release is finally made, new crises surface. Engineers therefore end up having planned vacations at seemingly terrible times. As a result, many do not even bother to plan vacations, or if they do, they end up canceling or postponing them. Those who do go ahead and take planned
vacations often pay a stiff career price. Managers do not like to hear that the engineer they need is on vacation. Although there is usually a way to work around a problem, managers often retain a negative impression of the vacationing engineer's level of commitment. It is interesting to note that despite this negative impression, the work tends to get done with little problem. As one engineer remarked, "You think they (the project team) cannot live without you. They think the same. But when you are gone everyone realizes the work can go on."

**Conclusion:**

In the end, the product development team I studied launched the product on time. The forty five individuals worked day and night for nine months. They thought a timely launch was impossible, but they proved themselves wrong. As a result, they have set a new benchmark. They are convinced that they will be required to do even more work in less time for the next project. Next time the goal will not be to merely repeat it, but to beat it. From the engineers' viewpoint, there is constant pressure to accomplish work better, faster and cheaper. As one engineer voiced, "I think we made a mistake. We showed them that we could do it. Now they are going to expect even more from us next time. They are pushing us to the break point."

In this chapter, I have focused specifically on the temporal organization of the product development process. I have discussed the schedule and the process by which it is approved. Once the team receives official authorization to proceed, the pressure suddenly mounts. To some extent the schedule that is put in place structures the engineers' work patterns. However, a crisis mentality permeates the culture. In the end, it is not prior planning or even daily scheduling that actually dictates daily workloads. Rather, work is done in reaction to one crisis after another. The next chapter addresses the individualistic definition of success that is perceived as necessary to motivate the engineers to complete their work when everything is thought to be a crisis.
Chapter 5:
Social Organization of Work: The Definition of Success

Pending deadlines and rampant crises generate a sense of desperation. Managers are motivated to reward individuals who come in early, stay late and work weekends in order to get the job done. In this chapter, I examine the definition of success that seems to be perpetuated by (and seems to be, as I will show later, a perpetuator of) the crisis mentality. I will examine how engineers perceive and managers affirm the perception that rewards go to those who tackle the most daunting crises. It is those who put in the long hours and produce solutions at the last minute who are considered heroes. Engineers who solve their problems before the tasks become “crises” reduce their chances of being rewarded. Success is derived from crisis management, not crisis prevention.

*Individual Deliverables:*

Each engineer at Ditto has a list of individual deliverables for which he or she is responsible. Ultimately, the product’s development requires integration of the engineers’ individual deliverables. However, the engineers believe that individual recognition and reward depend specifically upon successful execution of their own individual deliverables and not upon facilitating the larger product’s development or the functioning of Ditto as an organization. One engineer explained:

I have three high priority items on my to do list. I know that one of them is the most pressing for the company, but the other two come from my boss. I will do those two first, because that is in my best interest. . . . Maybe if there was a way to have peer evaluation as well as manager evaluation we would be encouraged to act in the best interest of each other and not just do what our managers tell us to do. Maybe then we would make better decisions for the company as to how we prioritize our work. . . . But, currently, that is not the way it is.

Engineers think that what matters for their success is only their individual work. Faced with the choice of getting a product out of the proverbial door or making sure that their own deliverables are perfect, few engineers would opt for a timely product launch.
Trading off the quality of one's own deliverables in favor of a timely launch would likely hinder the engineer's reward and recognition. According to one engineer:

When the management launched RUBY (an earlier product), there was a bug in my code. They still made the decision to launch it. They felt it wasn't worth the time to fix the problem. . . . But, for me, I will always have to live with the tarnished image. I will always be identified with the flaw in that product. Since then, I try never to release my code without checking for all the bugs first, even if it holds them up.

The engineer quoted above would have preferred to delay the product launch date in order to fix her code. Her reputation depended on successful completion of her individual deliverables, not on the product's profitability. Management, however, decided that a delay would cost them dearly and chose to launch the product with its existing imperfections.

Visibility:

According to the engineers, it is not enough to achieve one's own individual deliverables. Completing "visible" work is critical for achieving individual success. Visibility in this context means senior managers consider one's work crucial to Ditto's success as a corporation and therefore pay attention to one's progress. In the process, the managers become familiar with the engineer's work and tend to recognize the engineer positively for stellar accomplishments but also negatively for failure to keep to the schedule. One engineer summed it up as follows: "I want visibility. Visibility is critical to move up in this company. . . . My work is not providing me an opportunity to shine. I don't want to be in the background any more."

Visibility is vital not just for recognition but also to ensure that one possesses the resources to accomplish the work. As one manager explained:

My team's work is less critical to the project, and therefore we get much less attention. This is good because it enables us to work along at our own pace, but we lack that extra push. . . . We can never get the resources we need. It makes it all the harder to succeed. . . . Management will pay attention if we succeed in the end. But, that makes it nearly impossible to shine. It is all or nothing. We have no visibility along the way. . . . And, we lack the support to make sure that we'll make it in the end.
Visibility increases the likelihood of individual success both because one is more likely to have the resources to get the job done and because managers are more likely to notice if one puts in the time and produces the desired output.

Visibility is self-fulfilling. It is more likely that one will succeed if one is in a visible position. Achieving a position where visible work can be performed, however, requires that one has succeeded before. One engineer displayed this shared understanding when he stated: "I expect to get another promotion this year. I don't know what the time in grade is to be promoted, but my perception is that they perceive me as a top performer in the group. . . . They keep putting me in very visible, high pressure positions."

*Accommodating Work:*

Beyond successfully performing visible work, there is a stance that goes with success. The stance conveys loyalty to the work itself. This is signaled by a willingness to do whatever it takes to complete a job. One engineer commented, "I never disagree, although sometimes I complain later on. But, when I am first told, I always agree. . . . I am the employee and I am supposed to agree."

"Accommodating work" requires a willingness to do whatever is asked, not just in terms of producing output, but also in terms of working whatever hours are necessary to get the job done. The work follows no predictable schedule. Demands often come up at the last minute. It might be "solving" a bug so a release can be made, or fixing a problem in the testing lab so the computer will operate again, or creating a "work-around" so a functioning product can be demonstrated.

One evening the software manager called one of his engineers at home. He wanted to know what time the engineer would be in the next morning. The engineer recounted:

I would not have gone in until probably close to 9 AM, but after Zeth called I made sure to be there by 7 AM. . . . What he said to me last night was: "I want to make sure we have our release ready for Sunrise in the morning," which is at eight-thirty, "because I want to be able to go in and say 'you're wrong we have our release ready,'". . . . Zeth always assumes that everything is going to go OK. And nothing ever goes perfectly smooth,
especially when you try to rush something and get it done really quick. Then you always f____ it up and have to do it again. I don’t think he realized that. So he just assumed that if I came in real early and gave the code to John, and he made the proms, and we plugged them into the machine, and then they would be ready to go, and he could go to Sunrise at eight-thirty and say, “Here’s the release.” But, it turns out that we didn’t have it working until when? . . . Eleven thirty or something like that. I knew it would never be ready by eight thirty -- that would have taken a miracle.

This engineer, however, never mentioned his well-founded doubts to his manager. Rather, he simply agreed to arrive early and give it his best. It is this willingness to be present and to work diligently, whether or not one thinks the task is feasible, that is a critical part of how one’s final output is evaluated.

"Accommodating work" is thought to be particularly crucial around key dates when software is supposed to be released. Taking the date seriously signifies commitment to the team. One day Sarah came to work quite sick. She was sitting staring at her computer screen unable to work. I asked her why she had come to work. She said, "because it is a major release date, and even though I know full well that the team will not be done, and nor will I ever finish, I wanted to be here to signify to Laura that I take this date seriously."

A willingness to "accommodate work" often involves giving up weekend and vacation plans. For example, a four hour meeting was announced by the product manager for one Saturday. In response, one of the engineers told me, "You feel like a wimp by telling people that you do not want to work Saturday or you do not want to stay late at night. It is just not something that you can do. You will always think twice before you say that around here." When the manager mentioned the Saturday meeting, he assumed all would attend and simply asked which four hours it should be -- morning or afternoon. One engineer spoke up saying that he would prefer the afternoon. His manager joked, "Oh, you have babysitting responsibilities in the morning." The engineer was uncomfortable. "That is true," he said, but then quickly added, "Don’t worry about my preference, I can easily hire a baby-sitter."
Even expressing a preference about what time the meeting should be, let alone whether or not you can attend at all, may be perceived by managers as problematic. There is a general sense among the engineers that one must always be available to work if necessary. Managers do not consider a meeting late afternoon on Saturday to be a serious infringement on engineers’ time. Unless one is going away, engineers rarely voice discontent with such a plan. One engineer explained, "You can only say 'no' so many times. You need to think carefully before you say the word 'no'. And when you do it had better be for a good reason."

Even planned trips (with non-refundable tickets) may not constitute an acceptable excuse for missing a meeting, especially if the meeting is one which management perceives as urgent, and most meetings are at least informally designated “urgent.” One engineer had planned a vacation several months earlier for the week following a major release. He had done this purposely to accommodate the organization. However, at the last minute, the schedule slipped. He went on vacation anyway. His peers suspected that his decision to go would be held against him for a long time. As one project team leader said about another:

Allan blew it today. He didn't cover for his engineer. He outright acknowledged that he was on vacation. Sure this is a long standing vacation, and it would have been well planned if the schedule had not slipped, but now his work is the object of concern, and he is not here. That doesn't look good. This will be in people's minds for a long time, and when promotions come around people will remember how he went on vacation before a major release.

Another engineer left on a long planned trip and flew back for two days in the midst of a one week vacation, deserting his wife and children, in order to solve some problems in his code. The expectation is that if one is needed at work, one will be there.

*Being Seen:*

The work of software engineers at Ditto demands long hours. Seemingly, there is always a crisis which needs to be confronted. However, beyond being present to deal with
the demands of work, being physically present is thought to be critical to one’s success.\textsuperscript{17} One day each week, Laura -- whose case will be described in the next chapter -- arrives at 2 AM and works straight through the day until 5:30 PM. Her manager was apparently impressed. Laura said:

\[\ldots (\text{He}) \text{ was really impressed when he ran into me at 2 AM one morning.} \]
\[\ldots \text{I used to just go to the kitchen table and use my PC, but after the reaction I got from my manager I decided it was important to do that early morning work in the office.} \ldots \text{ It is better to be seen here if you are going to work in the middle of the night.} \]

Even at the higher levels, there is an emphasis on being seen. One of the senior managers explained his own tricks for making sure that he is seen by his boss-- the Division Vice President. Carl said, "Jim leaves me a voice message very early most mornings, so I make a point to be here to pick up the phone when he calls. He is always impressed that I am in by 6 AM."

When an engineer has an extended presence, it is thought that management will consider him or her to be contributing a great deal to the team. This seems to be the case whether or not one is accomplishing what one sets out to do. Matthew, whose case will be described in Chapter 8, is the technical expert on the program team. He was having trouble completing some major deliverables. "If it weren't for the fact he was trying so hard," his manager said, "I think we would have lost faith in him a long time ago. But, he works so hard, you just have to assume he must be working on something really challenging."

The longer one works the more one is perceived as contributing. No one considers the possibility that a person who takes longer to do his or her work might actually be less

\textsuperscript{17} At the end of the calendar year the software engineers were ranked by their managers. This ranking determined who would receive what raises and what promotions for the year. A list was provided by the Senior Software Manager to the Human Resource representative. The names of each member of the software group -- including the software engineers I studied -- were listed followed by a comment explaining the ranking. Number one on the list was Max (who will be described in the next chapter). The comment read: "works 80-100 hours/week, top quality work." Similarly, the second on the list was noted for working 80-100 hours a week. Comments about others in the top included: "works days and nights" and "works 80 hours per week." In contrast, the comments about those at the bottom of the list included: "average contribution"; "light work load"; and "minimal contribution." My point here is to highlight the fact that managers notice the hours that people work and use that observation as a criterion in ranking them.
competent. Rather, long hours are seen as a sign of true contribution. The engineers share a deeply held assumption that the more hours they work, the more they are perceived by management to be contributing to the organization.

At the other extreme, not being seen may create a bad impression. With ten days to go on a major software release, two of Allan's engineers stayed late one night. Allan's own boss, Zeth, stayed late to help as well. Even Zeth's boss, Carl, stopped in as he was leaving work around 6:30 PM to check on the team's progress. Allan, however, left at 6:00 PM. His son was coming home from college and a family gathering was planned. Allan felt that it was unnecessary for him to stay at work: "There was nothing that I could do to help. I lacked the technical expertise that was necessary . . . so I left."

According to his colleagues, Allan's departure presented no problem to the team: "There is nothing that he could have done to help out. . . . His presence would have been more of a hindrance than anything." Even Allan's manager Zeth was seen by the group as unnecessary:

He should have gone home. It doesn't help us get the work done to have someone constantly standing over us. . . . We work best when we are left alone. . . . The managers just don't get it. They stand over us constantly asking how they can be of help. All they are doing is distracting us. They can help the most by not trying to help at all.

Nonetheless, despite the feelings of his colleagues, Allan was accosted the next morning by his manager's manager -- Carl. Allan was questioned why he had not stayed late the night before to support his engineers. Allan's response to the censure was not anger, or defensiveness, but rather guilt. He offered Carl an apology. He remarked to me, "I am such a smuck. I should have stayed around and done busy work. It is terrible that I left. It looks really bad. . . . If I had stayed, Carl would have seen me here."

To the engineers, "being seen" has little to do with performance or substantive output. All of the engineers felt there was no practical reason for Allan to have stayed. In fact, had Allan stayed, his presence might have slowed the team's progress. Still, from
Allan's perspective, leaving was a grave mistake. He feared that he would now have to live with an image of being uncommitted to the team -- "I left them in a time of crisis."

Conclusion:

To the engineers, success means producing one's own individual deliverables. However, producing individual deliverables -- visible individual deliverables -- is a necessary, but not sufficient, condition for organizational success. One also has to be willing to accommodate to all of the demands of the work, both in terms of what is asked and when one is expected to do it. Moreover, simply being seen at work somehow validates the contribution that one makes, and demonstrates one's commitment to the job.\(^{18}\)

This definition of success has profound implications both for organizational productivity, in terms of how the work is accomplished, and for engineers' personal lives, in terms of the lack of control that they have over establishing work-family boundaries. The next chapter describes two individuals who are succeeding at work. The chapter tries to illuminate the costs involved both in terms of organizational productivity and individual work-family issues.

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\(^{18}\) This is a highly individualistic definition of success and accords with the American culture of individualism. Americans grow up in a society built on hierarchy, specialization and individual contribution. From an early age, it seems that reward and recognition come to those who display an ability to "make it on their own." Bloom (1987), for example, has said: "Students these days are pleasant, friendly and, if not great-souled, at least not particularly mean-spirited. Their primary preoccupation is themselves, understood in the narrowest sense" (p. 83). He continues, "The petty personal interests of you -- 'making it,' finding a place for oneself -- persevere throughout life" (p. 85). In a description of American society, Sennett and Cobb (1972) further note:

If ability is a demonstration about you . . . then the more you have to act together with other people, the less chance you have to be rewarded for emerging from the mass -- which is the social definition of ability itself. While labor grows every day more interdependent, the dream of independent action remains strong because it seems the only way to show that you accomplish things (p. 246).

Believing that success derives from individual accomplishments, Americans seek opportunities in which they can display their individual competencies.
Both Max and Laura are software engineers in Zeth’s group. Max is a senior engineer who in his seven years at Ditto has been promoted four times and is considered to be one of the top performers in the group as well as in the Division. Laura, an engineer with five years experience at Ditto, is one grade level above Max and has received three promotions during her employment. She has recently taken on managerial responsibilities as a project team leader. She is accountable for her own individual deliverables, as well as for ensuring that her team’s deliverables are mutually compatible and delivered on time. Laura is also among the top performers in the Division.

Both are cases of individuals who have been successful at work according to the organization’s definition of success. Max represents the organizational Superstar. He privileges his individual deliverables above all else, both inside and outside of work. Laura’s approach to her professional and personal life represents a slight variation of the Superstar model because she balances her work responsibilities with those of a dual career relationship and three young children. Laura cannot commit the same amount of time to work as Max, and she cannot be as flexible in response to the demands of the work because of her responsibilities at home. However, she still exhibits unending loyalty to the organization and a willingness to go to the extreme, given her constraints. Laura does miss work when her children are sick, and she does leave earlier than many. However, she makes up the missed hours of work at other times of the day (and night).

Max is the consummate "computer hacker" (Levy, 1984). He seems thrilled by writing code, solving problems, and being perceived by others in the company as a technical expert. When confronted with a challenging problem he commits all his waking hours to finding its solution. He arrives at work early in the morning and stays until 10 or 11 PM at night. It is not unusual for him to work an 85 or 90 hour week.
Given the intensity of his work schedule, it is not surprising to discover that Max does not take good physical care of himself. He spends most of the winter perpetually battling sore throats and congestion, but never takes time off to recuperate. A container of aspirin and a bottle of Nyquil are permanent fixtures on his desk. The stash of food, candy and tea found throughout his office testify to his habit of sacrificing meals to enable extra periods of work.

When I first met Max in October, he told me that he would need some background to understand his approach to work. He explained, "for the eight months prior to June of last year, I was working 80 to 90 hour weeks continuously. I took July off, and now I am back, and onto my next assignment." However, Max went on to say, "I am still in lazy mode. I have proved myself. Management knows that they can count on me when they need me... currently my work is under control, and I intend to take it easy for a while. When there is work to be done, then I will do it. Now, there is not much." Max further explained that he is in school for the fall term and must leave every Tuesday and Thursday by 4:30 PM. He added, "I am not investing much energy in school either. I am in lazy mode at school too."

When I asked Max to elaborate on his notion of "lazy mode," he explained, "I am burned out." Nonetheless, Max said, "I will be back at it as soon as I have more to do. No one around here can afford to be lazy for too long. There is too little job security." Still Max, who is a star and knows it, points out, "even the best engineers have to worry in this environment." Max finds it particularly irritating when people complain about not getting paid overtime. He will always remind them that "at least they have a job."

Max drops anything that is going on in his personal life when focusing on his own deliverables. He says, "The work is crucial and I am willing to put in whatever hours the work demands." Max believes that everyone should be as willing as he to accommodate to work crises: "It is not the company's job to manage crises. It is the individual's
responsibility to accommodate." Max feels that to succeed, work has to be one's top priority.

A Day in the Life of Max:

One Thursday evening in mid November, with just over a week left before the
November 22nd release, I asked Max to track everything that he would do the next day,
from the time he woke up in the morning until going to bed at night. The following
Monday morning we discussed his day. He described:

6:14 AM  I woke up.
6:20-6:40  I got ready for work.
6:30  I left for work.
7:10  I arrived at work.
7:10-7:20  I went to my desk, took off my coat, checked my e-mail.
7:20-7:28  I headed to the lab, but I ran into my manager. We went together to get coffee. I statused him.
7:28-7:35  We went back to the lab. I finished statusing my manager. At the same time, I set up the printer.
7:35  My manager went to work at his computer (also in the lab). I began my own work.
7:35-8:30  I worked on my code.
8:30-8:43  I interrupted Andy and asked him a few questions about some common code. That reminded him that he had changed some other stuff about which he had forgotten to tell me. We discussed the changes.
8:43-9:00  I worked on my code.
9:00-9:03  Andy had a few questions about his code.
9:03-9:40  I worked on my code.
9:40-9:45  My manager needed more status information for the report he was filling out.
9:45-11:00  I worked on my code.
11:00-11:30  My computer went down. I went to find the system expert, who came to the lab and fixed the problem. I went back to work. But, now I had a different problem, and I did not know what the source was. (It was not until the afternoon that I found out that the system expert had introduced the new problem when he fixed my original problem).
11:30-12:30  The problem remained unsolved, but two engineers came by for lunch. We went to McDonalds.
12:30-1:00 PM  I came back to the lab. Now, another engineer was having the same problem. It was then that we realized that it was a system problem that had been introduced by the system expert earlier in the day. We went to find him.
1:00  Zeth stopped by to tell us that there was a 1 PM meeting on planning the integration among the software teams, and we should all be there.
1:10-1:45  I went to the meeting. It should have involved only the project team leaders. There was no reason for all the engineers to be there.
1:45-2:30  I worked on my code.
2:30-2:40  Ben was having a problem, and so I tried to show him how to do it.
2:40-4:00  I worked on my code.
4:00-6:30  I worked with Ben helping him to make his code integrate with mine. Ben is slow. I know a lot more than he does. It is quicker for me to just do it, rather than wait around for him to struggle through.
6:30-6:33  Another engineer stopped by to see if we wanted to go out for "happy hour." I didn't. But, we called it quits. I went home.
7:00  I arrived home. I was waiting for a phone call from my girlfriend.

-97-
According to Max this was not a typical day because there were fewer interruptions from both Zeth and Allan (his managers) than usual. Max said, "It was a much less active day than most of the days during the past few weeks. . . . It was a much more productive day than usual; that should tell you something." In terms of the time after work, Max said it was a typical Friday evening. When I asked if he would have liked to have left earlier because it was a Friday, he responded, "Not really, I don't have much to do at home at night."

The above log captures the basic temporal structure of the engineer's day. Engineers tend to arrive at work between 7 and 9 AM and leave between 5 and 7 PM, unless they must stay late to resolve a crisis. Some, not all, take lunch. There does not seem to be a direct relationship between the success of an engineer and a pattern of skipping lunch. If anything, the relationship is the reverse of what one might expect to find. If an individual skips lunch it often indicates that he or she is limited that day in terms of his or her work time and is saving time by not spending it at lunch. In general, however, an hour of visibility at the end of the day seems to be more valued than skipping lunch.

In broad terms, engineers typically have a meeting of some sort during the work day and spend the rest of the time working alone on their deliverables. Interruptions, however, are common. Long interruptions planned in advance are said by most to be preferable to lots of frequent, spontaneous interruptions. However, as Max's day exemplifies, interruptions are typically short, numerous and (more or less) spontaneous.

Max, like most of the successful male engineers, has few responsibilities outside of work. Max is single. Many successful male engineers do have a wife and children. However, all of the male engineers with children in my study have a wife who takes primary responsibility for the home and family.
In contrast, Laura has many responsibilities at home. She too succeeds at work (according to the organizational definition), but she struggles to balance the demands of being a mother of three young children and a wife of a manager at a level equivalent to her boss. Laura usually does not get to work until 8:30 AM after she has dropped the children off at day care. She must leave by 5:30 PM because the day care center where her three children are enrolled closes at 6 PM. Laura is often the last one to pick up her children. She says, "it is common for them to be shutting off the lights, and locking the doors as I come running in." Still, Laura manages to stay on top of her deliverables. She puts in the hours at different times of the day and night.

Once a week, Laura tries to be at the office by 2 AM in order to catch up on the work that she has not been able to do during normal business hours. Laura notes that it is not a problem for her to stay up all night and then work through the next day because: "During the core business hours you hardly have to function, just attend meetings." Laura describes her typical day as "completely unproductive... I spend from 8:30 AM to 5:30 PM supporting my team of four engineers."

As a new manager in a high profile position, she describes her job in the following way:

...[I am] a facilitator for my team which is pretty much unfulfilling... Not that I want to boss them around or anything but I... always take all the garbage work from them. I find myself saying, 'Oh, you are too busy to fill out a requirement, let me do it for you...' I'm the mom. I'm managing like a mom. I don't think it can last. Actually though, I manage my people much better than I manage my kids.

A Day in the Life of Laura:

As with Max, I asked Laura to track a randomly selected day. It turned out to be a Friday as well. This particular Friday was the Friday before the critical release on Monday, November 22nd. When we discussed her day the following Monday, she reported:

12:45 AM I woke up in my two year old's bed. I then went into my own bed.
3:30 My two year old crawled into our bed.
4:00 The alarm went off because my husband was going to work early.
4:00- 4:45 I was up while my husband got ready for work. (He turns on all the lights while he gets dressed and stuff.)
6:10 I woke up. (That is severely oversleeping. Usually I get up at 5:30 AM).
6:10-6:20 I showered.
6:20-7:00 I ate breakfast, made lunches, laid out clothes, got partially dressed. (I get ready in stages of 5-10 minutes.)
7:00 My mom left for work. (My mother has lived with us for the past two years.)
7:00 - 7:30 I got the baby and my 7 year old up and dressed, and fed them breakfast.
7:30 -7:50 I finished getting ready, straightened up the house, and did the dishes. (The two boys were watching TV.)
7:50- 8:05 I woke up my 2 year old, got him dressed and fed.
8:05-8:15 I got the kids’ coats on and got them into the car.
8:20 -8:35 I got to day care and spent a few minutes getting the kids settled, and talked to their teachers.
8:50 I arrived at work. (Very late.) Zeth and Andy saw me and grabbed me. I didn’t even get in the door before the first hallway conversation began.
8:50-9:00 I talked with Zeth and Andy in the hall. (It was good because I’ve had this piece of information in my head that I have not shared with anyone, so I got the chance to share it. I disliked the conversation though because I still hadn’t had a chance to take off my coat.)
9:00- 9:10 I delivered software to the applications lab. No one was there so I didn’t leave it. Instead, I wandered around looking for someone to give it to.
9:20 I gave it to Dan so I wouldn’t have to redeliver it.
9:20 I interrupted Jane and asked her how things were going.
9:30 I started to work on what was supposed to be my big task for the day -- my progress report -- which I thought I could get done in the morning. (In the afternoon I was planning to work on a presentation. I never got to the presentation, and I ended up finishing my progress report over the weekend.)
9:45 Zeth and Chip stopped by and we started talking about a demo for Monday. We decided to meet at 4:00 PM that afternoon to prepare. That changed my plans for the afternoon. Not only did I have to meet them at 4:00 PM, but I had to do some preparation first.
10:00 I went back to working on my progress report -- which is the weekly status report that is due on Wednesday, but I was late.
10:25 Chris came in and we talked about his status.
10:45 I went back to work on my progress report.
11:05 Roy stopped by to discuss the user interface.
11:18 I started work on my progress report again.
11:30 Paul stopped by to report on feedback from a meeting he had attended on my behalf.
11:50 I left Ditto and ran an errand during lunch. (I needed something to wear for Thanksgiving dinner, and I knew this was my only chance. It is rare for me to leave work during the day.)
1:00 PM I returned from the mall and talked to Jane and Chris about the demo plans for the 4 PM meeting. I planned to meet with Chris in the lab at 2:15.
1:30 I went back to work on my progress report.
2:18 I went to lab to work on the demo with Chris.
3:00 I reviewed my progress report with Zeth. (Zeth questioned it: He said, is this number right? Is that number right? Are you positive? He requested some changes because he wanted it to be a rosier picture than it was.)
3:10 I went back to work on my progress report.
3:18 Eric stopped by to talk about a non-disclosure agreement.
3:20 I went back to work on my progress report.
3:30 Jane stopped by with problems on the demo code.
3:40 I went back to work on my progress report.
4:00 I worked on the demo with John. Zeth stopped by in the middle to see how we were doing.
5:23 I left work. (NOTE: The demo wasn’t working when I left and it was scheduled for 8 to 10 AM on Monday morning. Chip told me on Monday that he was on the couch Sunday
night with his feet up watching football, when he felt so bad for Zeth and this demo, that he came to work at 4 AM on Monday. I came at 6 AM. We got the demo working for the 8 AM meeting.)

5:40  I picked up the kids at daycare
6:00  I returned home and ordered pizza. (Friday night is pizza night. Typically my husband picks up the kids and gets the pizza, but he wanted to go to "happy hour" with his friends from school, so I picked them up.)
6:45  After dinner, I gave the baby a bath. I took my son to a friend's to spend the night.
7:00-9:00  I played with the other two kids, and then put the baby to bed.
9:00  My husband came home and he watched our two year old, while I wallpapered until 11 PM.
11:10  I showered and went to bed.
12:10 AM  The phone rang. My son wasn't feeling well at the sleepover and wanted to come home. I went to get him.
12:30  I finally went to bed for the night.

After reviewing her day, Laura said:

The fact that it took me a whole day to get my progress report done is not right. I don't envision that as a big task. It is not a big task. What they're asking is very reasonable, which should only take a few minutes to put together. But, any task I would have tried to do on Friday would have taken an entire day because of all the interruptions.

She then added, "But all these interruptions are very typical."

There are two main differences between a typical day for Laura and a typical day for Max. First, because Laura is a first line manager and Max is a senior engineer, Laura has fewer deliverables to worry about than Max, but she has more work to do checking up on others than Max. Second, Max is able to easily accommodate to the demands of his work (and, not incidentally, believes that is the way it ought to be if any one is to succeed at work), whereas Laura has many responsibilities outside of work.

*Accommodating Work Demands:*

Perhaps, in order to minimize her guilt about not spending more time with her children, Laura has created a myth that she does not work overtime. It is apparently important for her to believe that she works only from 8:30 AM to 5:30 PM and spends the rest of the time with her family. In my first interview, Laura explained to me that, "As a rule, I never work overtime." As I got to know Laura better, I learned that what she said about her schedule often conflicted with what she did. Her words and deeds differed.
Laura typically does not come in early or stay late unless there is an extremely pressing issue or she is asked specifically to do so by her manager. As she says, she works regularly from 8:30 AM to 5:30 PM. Nonetheless, she usually puts in considerable extra time in other ways. As I already mentioned, Laura comes in at 2 AM one day a week. Two other examples follow.

One weekend in the Spring, Laura had to get some work done but she did not want to leave her husband at home with the children because he would be resentful. She played outdoors with the kids Saturday morning and afternoon, fed them dinner, bathed them, and put them to bed. Once the kids were asleep (and her husband sat happily in front of the TV watching a hockey game) Laura felt she could go to work. It was about 8 PM as she recalled. She worked throughout the night and said she felt good about the work since she had accomplished it without "sacrificing . . . the family."

During a two week period last year when her husband was away, Laura was assigned a short-term, high visibility project. The project demanded extra-ordinary hours. For two straight weeks, she would leave work every evening at 5:30 PM, pick up the kids from day care, feed them, play with them, and put them to bed. She said she would then take a short nap, and get up around 12 AM to start the next day's work. She worked at home until 5 AM and then would get the kids up, dressed, fed, and off to day care before coming into the office to work until 5:30 PM. She did this repeatedly for two weeks, never mentioning to her manager that her husband was away.

Maximizing Individual Deliverables:

Besides putting in the time, Laura rarely, if ever, questions her manager if he tells her what to do. I asked her why she would never resist her manager and she responded, "I work for him. He is my manager and I do what I am told to do. . . (I am) a real yes man.. . . My manager is that way, and he has encouraged me to be that way, as well" (emphasis added).
Unlike Laura, Max often questions what he is told to do. He does not immediately agree to follow instructions given to him; he demands an explanation for work plans. Managers however tolerate Max’s behavior because he is usually "pushing back" because he thinks that more, not less, should be done at a given time. For example, Max’s boss and his boss's boss decided that Max needed to create what they called a "work-around solution" for a system problem with the software. Max felt that creating a "work-around solution" would be a waste of time. He told me: "Such a work around would only be a temporary fix, and I would have to come back later and solve the problem." As a result, Max resisted. He was not complaining about having to do the work, but rather was complaining that he should be allowed to invest more time in order to permanently solve the problem. He reasoned: "I had to crack the problem at some point, so why not invest the time in the solution and not waste time on a work around." To his dismay Max discovered that his boss objected to his spending extra time to solve the problem. Therefore, Max did not ask again but simply did it on his own. Once he figured out the solution (as opposed to a "work around") he showed it to his boss, at which point his boss could only express pleasure and called Max's solution a "super achievement."

Max, unlike many of the engineers I studied, does not just do as he is told. He worries about his own time and apparently decides how to configure his work schedule on the basis of what makes sense to him. He seems to think on a longer term basis than many. Yet, his thought process focuses only on the use of his own time to complete his own deliverables.

Behaviorally, Max ignores everything that goes on around him. He wears headphones and blasts music into his ears, blocking out sounds from the office. When he is spoken to, he often will not respond. Even if someone is standing before him trying to get his attention, he often seems not to hear. When Max acknowledges another's presence but is busy, he has little difficulty telling them "I am busy now." Max admits: "My mode
of working can be troubling for others because I am so focused." This is an
understatement in the eyes of the rest of the group.

Max responds to others only when he feels he has the time. Even then, it is a limited
response. He helps them with their problems, but he will not work with them. Never did
I observe Max working jointly with another engineer. Some of the software engineers I
studied spent much of their time in groups of two, three, or even four people working
together to solve problems. Max, however, has no patience for group work.

At one point in the project, a Japanese vendor sent a representative to spend a week
working with Max. Max's response was: "I would be much more productive if they just
kept their representative at home and let me fax questions to him as they arise."

The general consensus of the engineers working with Max is that they would never
want to work for him. Several of them find it difficult to even work with him. He is
described by his peers as a "technical expert," but not a "team player," and certainly not a
"natural leader." Moreover, it seems that if Max does not believe a colleague to be his peer
in intelligence, speed, and commitment, he considers working with them a waste of his
time. He would rather do it himself. Few of Max's colleagues meet his exacting
standards.

When Max responds to a person requesting help, he "helps" by lecturing on how
something must be done or taking over the problem and solving it himself. Another
engineer in the lab once asked Max what he thought about his approach to a specific
problem. The engineer describes the results of his inquiry:

I got an hour lecture on why I was wrong and Max was right. Yet, after
spouting off for an hour, Max argued himself in a circle, ending up where I
had started. Still, Max did not acknowledge that I had been right initially.
He just kept on explaining why he was right and my approach was stupid...
. . I always forget until I ask Max a question why I should never bother.
He just likes to hear himself talk. . . . And, he always needs to be right.

If Max helps others, he draws attention to the fact that he is providing them support.
The person seeking help is often made to feel inadequate. Max does not provide the type of
"behind the scenes" help that will later be described. In Max's case, help is given only
when Max has completed his own work, and others are obviously (in the eyes of management) "lagging behind." One engineer said, "Max has a way of making me feel slow and inadequate, no matter what I do. He is always putting me down, criticizing my pace and questioning my attack of problems."

Max quickly loses patience with others. On his last project, he worked on a team with two other engineers. One was an intelligent, overly committed, workaholic whom Max respected. The other engineer, in Max's opinion, shared none of those qualities. She was willing to work "only" 50 or 60 hours a week. She did not put in the 85 or 90 hour weeks that Max and the other engineer worked. Finally, she became so demoralized, that she requested to leave the group. Max and his buddy were proud that their "intense work habits scared the woman off the project." Once the woman left, they could continue at their own pace. Moreover, when they finished the project, management considered them heroes because they had accomplished the task with less labor than originally allocated.

Even when help potentially benefits his own work, Max seems unwilling to focus on someone else's needs. One day Stan, who had been assigned to help Max on part of the project, wanted to spend some time reviewing with Max what each was working on to avoid duplication of effort. Max agreed to listen to Stan but insisted on simultaneously trying to solve a different problem on his computer. Because his concentration was elsewhere, Max took several minutes to respond to each of Stan's questions. Stan, consequently, had to stand around in the lab for over half an hour just to get Max to respond to five minutes worth of questions. Once Stan finally left the lab, Max said to me, "Stan is too slow. . . . He does not give me the information I need quickly enough." This assessment is not surprising given Max's unwillingness to even focus on the conversation with Stan.

Max's lack of concern for others, their work or the project as a whole renders him a threat to the technical success of a project. When attempting to solve a software problem, it is easy to accidentally create another problem in the process and not know about such a
problem until much later. Near the end of a program as the team is preparing to launch a product, a fear pervades the group that problems will not be caught until it is too late -- when the machine is already in the customers' hands. At this point in the project, Max is quite dangerous to the system. An engineer in the group summed up the group consensus about Max when he described him as: "an expert in solving problems, but a terror in the process." It is always a struggle for others -- mainly management -- to decide whether or not to assign Max to solve a particular problem. Max has a reputation for being a "loose cannon." He is among the most likely to find a solution but, he may cause troubling side effects in the process. He focuses only on his own work.

Reaping Rewards:

As a result of his seemingly unlimited commitment and his ability to produce valued output, Max receives copious rewards from management. This past year Max received the top raise in the group and additional financial bonuses for "outstanding" performance.\(^{19}\) Yet, when one analyzes how Max works, it is not clear that he is really a valuable asset to the team. Max values his own deliverables above all else. He is capable of solving the problems put to him but he often does so at the expense of the larger system. Max is not a "team player." Nonetheless, he is generously rewarded for long hours, apparent commitment and obvious technical capability.

Management at Ditto rewards individual, rather than collective, success. They encourage engineers to focus solely on their own deliverables rather than team output. The larger organization, however, may suffer as a consequence of this reward strategy. A constant pressure to produce output attributable to themselves encourages people like Max

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\(^{19}\) The top 10% of the engineers were awarded a 6% increase in salary. Max was in this category. He further was awarded several thousand dollars for his long hours and individual accomplishments during the Spring prior to my arrival when he was working 85-90 hour weeks. This was on top of a salary estimated to be in the mid $40,000's.
to continue to put their own work above all else, and this approach often comes (as I will later show) at the expense of the quality and timeliness of the final product.

Unlike Max, Laura's success at work depends less on her individualistic approach and more on her willingness to accommodate to work despite her family responsibilities. Managers hold up Laura as a "model female employee." More than once, I heard a Ditto manager turn to an employee and ask why she could not be more like Laura. "Look at Laura," a manager says, "she has a husband and three kids, and yet she still is able to do it all."

Laura can do things that men at her level cannot do. No one blinks when Laura leaves a meeting at 5:30 PM to pick up her children from day care. When a man does the same thing, however, eyebrows are raised and skeptical comments are heard. One day Laura mentioned to a male peer (who also had a young son) that she has privileges he does not. He responded, "I have recognized that." Laura then expressed concern, "It is not fair, I know, but what can I do?" Her colleague just shook his head and said, "I don't know, but someone has to pick up the kids. I just wish I could too."

Laura may receive special treatment because she is a woman. She may have high visibility and accelerated opportunities because she is a woman. However, she is a dedicated worker willing to do everything humanly possible to accommodate to the demands of her work. In the end, she always seems to get her work done. Her work is well-received, and this year she was awarded a lump sum bonus given to the top 10% of managers.20

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20 Due to the company layoffs, it was decided that managers would not receive a raise this year. However, the top 10% received a one time 10% lump sum award. My best estimate is that Laura, as a project leader, earns a salary about $50,000.
Work-Family Issues:

Both Max and Laura receive the highest level of individual reward, but also put in the most time at work. They work long hours largely to meet their own individual deliverables. Laura struggles over her decision each time she sacrifices family time to be at work. Max is less torn about how he spends his time. Because he is single and has few responsibilities outside of work, it is much easier for him to respond to the whims of the organization. For Max, the tradeoffs he makes are perhaps unconscious. However, whether consciously or not, one is compelled to put one's own deliverables above all else if one desires to succeed at Ditto.

While Max is committed to work and rewarded endlessly, he has no time to pursue a life outside of work and that exacerbates a vicious cycle. Because Max has no time to establish interests outside of work, he has limited interest in having time off and therefore is willing to work extraordinarily long hours. He does have a girlfriend and says he is very committed to making their relationship work: "I have invested so much in it, I cannot turn back now." However, he spoke to me only about financial commitment, not emotional commitment. In the middle of the year, Max bought his girlfriend an expensive gift. He told no one at work besides me because he said, "People around here will laugh." Max said, "It is things like this investment that have enabled me to win her over." Max continued, "I am in love with her, and so I do weird things sometimes. I didn't have the money to buy (the present)... so I had to borrow it."

At the same time that Max is trying to "buy" his relationship, he is also critical of his girlfriend. He complains:

She is very intelligent, but she does not know how to cook and clean. She is the baby in her family, and she does not know how to take care of herself, her family, or her home. She is used to everyone taking care of her... She must learn the role of the traditional woman before I can marry her. I need a wife to care for me, the home and the kids.

While Max is busy worrying about whether his girlfriend will ever be able to fulfill the "traditional female role," he is simultaneously concerned that she is not supportive of his
ambitions: "She says I am too ambitious. She thinks I should work less hard. . . . She doesn't understand me."

While Laura, like Max, is trying to succeed at work, she bears the brunt of the "second shift" at home. Laura is the one in her household who always makes lunch, who dresses the kids and who usually stays home if a child is sick. She says her husband will stay home, but he prefers not to and rarely offers. She gave an example of a recent work day when her son woke up with an ear infection. Her husband had been at work since 2 AM. (Like Laura he also works one early day a week.) She said:

The thought crossed my mind that since he had already worked a full day, from 2 until 8 AM, he might be willing to come home. But he never offered and I never mentioned it. . . . I don't really mind, because I have maternal feelings about wanting to be with my kids when they are sick. I want to make sure that I ask the doctor all the right questions. . . . whenever the kids are sick or hurt, they always come to me first. If they are well, they like their father as much. . . . My two year old wakes up in the middle of the night, and he always yells Mommy. Only if I wait long enough will he ever yell Daddy. And only then can I roll over in bed and make my husband go care for him.

It seems the only time Laura's husband helps out during the day is when he is accidentally thrust into the role. One day, Laura was so busy she did not check her answering machine all day. At 5:15 PM, she found that she had seven messages. The first one went back in the day to 11:20 AM, when the school nurse had called to tell her that her son was sick and needed to be picked up from school. The second message came at 12 PM. It was her husband saying that he had picked up their son but he had a meeting at 3 PM and she better come home. At 1 PM there was a third message saying the same thing and again at 2 PM. At 3 PM, there was another message from her husband saying he had taken their son to a neighbor's house and was now on his way to work. At 4 PM, her husband left a message saying that he needed her to help him pick up the car at the garage. At 5 PM there was a message from her husband saying: "Forget it, forget it, forget it all."

When Laura got home that night, she said: "My husband was livid. He thought that I had intentionally been ignoring him. I told him I would not do that. . . . In retrospect I am
glad I never heard those messages because my son was not sick anyway; he just wanted attention, and I had a ton of work to do."

Laura says her husband works longer hours than she does. If he does get involved in transporting the kids to day care, he prefers to drop them off in the morning so he has flexibility at night. He usually comes home between 6:30 PM and 7:00 PM, just as Laura is serving dinner. She says they quibble a lot about whose meetings are more important and who should have to skip out to care for the kids. However, her husband made it clear to me in an interview that, "if there is ever a real question, my work wins out because I'm higher up and my career matters more."

Laura says her husband is the one who oversees the details around the house. "He organizes the lawn service; he hires the maid; he pays the bills; he calls the dentist; he does the weekly shopping. He is the administrator." On the other hands, she says, "I take care of the children; I do the cleaning beyond the maid; I pick up; I cook; I do laundry, gardening, ironing and the shopping besides the weekly grocery shopping." Despite this breakdown of household responsibilities, Laura still describes her husband as a "50-50 guy." He is currently finishing up an MBA program and she admits that "because he is in school I cut him a lot of slack." She worries that he is used to the slack and that when he graduates from school he will no longer be as willing to help as he had been. She adds, "I'm afraid he's getting lazy in his old age."

Laura was particularly annoyed with her household responsibilities the week before they went on their spring vacation. Laura needed time at night to get everything ready. However, before she could even start preparing for the trip, she felt she had to do the evening chores. She wanted her husband to help. However, the help she needed was not help packing for the trip, it was help with the evening chores so that she would have more time to prepare for the trip. She said:

* I get most irritated late at night when I am still sorting laundry and stuff and he is lying on the bed reading a pleasure book. I just want to know why if he is always done before me can he not help me get a head start? Why can he not help with some of the responsibilities with the kids. . . . The
problem is not that he is a lazy sloth, but that we both think that different things are important.

As if Laura's responsibilities are not enough between her work, her three kids and her husband, her mother -- who has been divorced since Laura was a child -- has also lived with them for the past two years as she recovers from her most recent nervous breakdown. According to Laura, her mother is not much of a help around the house or with the children: "My mother hates to get the kids ready for school and drop them off, or pick them up and prepare dinner. She finds that all too stressful, and won't do it."

**Reflecting on Life:**

From a distance, Laura may appear to some to have it all. She is married to her high school sweetheart, also a very successful Ditto employee. They live in one of the most expensive homes I visited, in an upper middle class suburb some twenty minutes from the office. They can afford day care for all three children, to have their house cleaned once a week and to go on exotic Caribbean vacations once or twice a year. Moreover, managers are constantly pointing to Laura as a role model. From their perspective, she represents an example that women can "do it all" at the company. To Laura, however, life does not seem ideal. In fact, when I tell her that she portrays the image of being able to balance it all, she becomes visibly upset, takes me into an office and behind a closed door reminds me of how she is tormented by all the demands she tries to satisfy. Laura believes that it is only a manufactured image that things are "in control" in her life. She is very concerned that she is not able to do anything to the level she would like. She feels that she is not performing well enough at work and that her children would be better off if she did not work. Laura says: "I am not happy with my day-to-day life. I would like to be more organized at work and have more quantity time with the family, but the two are at the expense of each other."

Laura thinks that her children are deprived of parental attention. They lack what she refers to as "quantity time" and she feels that "quality time" is not enough. She believes that her kids need more actual time with her. She described one domestic scene to a group
of fellow software engineers: "My children are so naughty in the summer. The other day, I walked into the kitchen and my two year old yelled, 'Mommy, Mommy look what I am doing.' He was spitting juice through a straw all over the kitchen wall. Grape juice was dripping everywhere." In response, one of the female engineers listening pointed out, "Laura, that child is starved for attention." Laura muttered, "I just wonder what I am doing to my kids" and then fell silent.

Laura feels constant pressure to keep achieving. She says, "I know that I am a woman being set up for success. I am given lots of opportunities, but in return I must continually live up to their expectations." Her manager recently informed her that she has to do something next year, either go back to school or take a more visible position as the product manager's (her boss's boss) "right hand man." She must show progress and not settle into any role if her career is to continue upward in the hierarchy. Therefore, despite her desire to spend more time with her children, she has enrolled in an MBA program for the fall. She will take two master level courses per semester.

Laura is seemingly quite conflicted, if not confused. At one moment she tells me how her family is her first priority and the next she describes her ambitious career aspirations. At one point she says: "In the long term I want to be a Division Vice President. I want to continue succeeding, getting more promotions and more responsibility." The next moment she flips back to her family orientation and says, "But I know I cannot handle any more responsibility, especially if I start school this fall." Then she flips again:

I can never do the same job twice. That would be a sign of failure to me. It would not be continual movement upward like I am used to. I do not feel like I can cut back when I am in school. I cannot expect to finish school and instantly be handed some great job just because I have a degree. I have to continue to climb when I am in school.

Thus, the same woman who wants to take time off to be with her children will probably never do so because she is afraid that this would ruin her opportunities at Ditto. Instead, she adds more to her activities rather than cutting back.
Laura is caught in her own vicious cycle. She wants to be a star at work and a star at home. Yet, she worries that to be a star at work means she must not pull back professionally, even temporarily. In her mind, taking time for her family would ruin her future career. She cannot have the family now and career success later.

Max also feels that he is not achieving his "full potential" at work. Max often expresses uncertainty about staying at Ditto forever and progressing into management. He talks about starting his own entrepreneurial venture where he would be in control. Max explains that he has the "immigrant philosophy." According to Max:

I am interested in doing everything, and I will do whatever I do best. I believe that there is no limit to one's potential. . . . I will continue to take advantage of the opportunities at Ditto and if management is a path that is offered, I will certainly do it. But, I am not sure I want to spend my whole life here. . . . I am not satisfied with my life. I feel like I do not reach out for new opportunities. I just go along, never taking control over my life and my career. . . . Others would trade places with me. I have a college degree and a good job. . . . But I would trade places with you. You have taken the initiative to pursue a Ph.D. . . . Many people complain instead of just doing. I think that in order to make the world a better place, you have to do it yourself. You cannot count on anyone but yourself.

It is with this individualistic and determined approach to work that both Max and Laura manage to be successful at Ditto -- at least for now.
Chapter 7:  
Ways Time is Used at Work: The Perpetuation of Interruptions

Engineers at Ditto believe that the organization rewards those who promptly complete their individual deliverables. Whether one disrupts others in the process or is unwilling to help one's teammates seemingly does not affect management's evaluation. However, no one can successfully complete his or her own deliverables merely by sitting alone in front of a computer writing code. Engineers may be taught to solve technical problems individually in school (Bucciarelli and Kuhn, forthcoming), but the work of software engineers is becoming increasingly collective and complex (Cusumano, 1990).²¹

Each engineer has to write his own code, and yet each cannot successfully do this without interacting with other engineers, managers and support staff in order to create code that will integrate into the larger whole. The work of the software engineers therefore requires an individual component, but it also involves an interactive component. After tracking their daily activities, I categorized the different types of interactions that software engineers engage in, see Table 1.

Engineers must work together to integrate their code and to further develop code. When integrating, engineers share a collective set of deliverables. In this case, all of the engineers involved assume responsibility for the result. Various degrees of integration occur throughout the project, ranging from brief, intermittent interactions for the purpose of

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²¹ The organization's capacity to create products depends not on the competency of any one member of the group, but rather on the interaction of all group members. For example, studying a navigation team suffering from an engineering breakdown, Hutchins (1991) observed that the solution was a product of the interaction of the collective, and prior to its final configuration the solution was not represented or understood by any one of the participants. According to Hutchins, the final solution was as much a product of evolution through social interaction as it was a product of any one actor's design. Using Orr's ethnographic study of Xerox repairman as an example, Brown and Duguid (1990) further argue that organizations need to conceive of themselves as 'communities of interpretation.' It is the work of "communities of interpretation" rather than the work of any one individual that facilitates the accomplishment of the organization's task.
### TABLE 1: Types of Interactions Engaged in by S. ftware Engineers

<table>
<thead>
<tr>
<th>INTERACTION</th>
<th>DESCRIPTION</th>
<th>N (326)</th>
<th>Mir. (10,213*)</th>
<th>% of total time (20,523)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrating:</td>
<td>Working together towards a joint deliverable; intermittently assessing compatibility of individual parts</td>
<td>32</td>
<td>2,367</td>
<td>16%</td>
</tr>
<tr>
<td>Helping:</td>
<td></td>
<td>102</td>
<td>2,039</td>
<td>10%</td>
</tr>
<tr>
<td>Help seeking</td>
<td>Receiving help from another engineer</td>
<td>55</td>
<td>(980)</td>
<td></td>
</tr>
<tr>
<td>Help giving</td>
<td>Providing help to another engineer</td>
<td>47</td>
<td>(1,059)</td>
<td></td>
</tr>
<tr>
<td>Checking:</td>
<td></td>
<td>68</td>
<td>1,324</td>
<td>7%</td>
</tr>
<tr>
<td>Update engineer</td>
<td>Providing another engineer with an update on one's progress</td>
<td>25</td>
<td>(256)</td>
<td></td>
</tr>
<tr>
<td>Status manager</td>
<td>Providing a manager with an update on one's progress</td>
<td>40</td>
<td>(708)</td>
<td></td>
</tr>
<tr>
<td>Status team meeting</td>
<td>Small group of engineers reporting in turn to project team leader on their progress</td>
<td>3</td>
<td>(360)</td>
<td></td>
</tr>
<tr>
<td>Coordinating:</td>
<td>Engineers -- with or without project team leader -- deciding together how to proceed</td>
<td>24</td>
<td>754</td>
<td>4%</td>
</tr>
<tr>
<td>&quot;Social&quot; Gatherings:</td>
<td></td>
<td>66</td>
<td>2,077</td>
<td>10%</td>
</tr>
<tr>
<td>Hall convers./ coffee breaks</td>
<td></td>
<td>35</td>
<td>(482)</td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td>31</td>
<td>(1595)</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous:</td>
<td>Primarily includes quick questions asked both within and beyond software team, interactions with members on larger project team, and team meetings attended by larger project team</td>
<td>34</td>
<td>652</td>
<td>3%</td>
</tr>
</tbody>
</table>

* Over the course of 35 tracked days, 20,523 minutes were spent at work by the engineers, of which 10,213 minutes were spent interacting
assessing compatibility to continual, sustained interactions during which multiple engineers develop software while sitting together in front of the computer terminal.\textsuperscript{22}

In the process of designing, engineers often hit barriers that prevent them from proceeding with the design of their own code. When engineers confront barriers they must choose one of two options: They can attempt to overcome the issue by using manuals or calling software help lines, or they can turn to other engineers on site for help. \textit{Seeking help} from other engineers presents the risk of raising feelings of inequity and the danger of generating negative professional impressions of oneself in the eyes of one's colleagues (Goffman, 1967; Nadler, 1983; Pentland, 1991; Van Maanen, 1990). The costs associated with getting help from others must be assessed against the benefits derived from completing the task at hand.

"Help" is a dynamic concept; the inverse of receiving help is \textit{giving help}. There are two conditions under which engineers are asked for help by other engineers: either the help is required for work that will later be integrated with the work of the engineer whose assistance is sought or the aid does not immediately involve the helping engineer's work. The more directly related the work of the engineer asking for help is to the helping engineer's work, the more likely that the engineer being asked for help will provide it in a timely manner.

The organization generally fails to reward or even recognize the value of helping behavior. Helping another engineer solve a problem when the other engineer gets the credit for the completed line item offers no visibility to the helping engineer. There is a useful distinction between "helping" and "helping out." "Helping" is giving help to another so that they are better able to succeed. "Helping out" involves taking over for the other

\textsuperscript{22} It is common for engineers to engage in integration activities on a frequent basis; this was the case in two of the three groups of software engineers that I studied -- those in Allan's Group and those in Laura's Group. In the third group, Paul's, each of the engineers knew too little about what had to be done in order to make progress independently. In this group, almost all of the work was done collaboratively.
individual -- completing another's task and gaining visibility and reaping rewards at the other's expense.

Beyond integrating tasks and helping (or helping out) one another, engineers frequently inquire about each other's progress just as their managers check up on the engineers' work. By checking on each other, engineers gain a comparative sense of where they are in terms of their own deliverables. Much of this kind of information is gathered and exchanged in informal hallway conversations. Less frequently, the project leader will assemble the group and ask each member to report on his or her progress. The project team leaders also sporadically hold meetings in which the engineers decide collectively how to complete a task. Other times, the engineers get together without the project team leader for the same purpose: to coordinate their efforts and presumably move forward.23 Finally, some interaction is purely social; these interactions include lunch, coffee breaks and hallway conversations.24

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23 In addition to the interactive activities that occur internal to the software team -- integrating, helping, checking, coordinating -- there are several types of interactive activities that bring the software engineers in contact with other members of the Division. Software engineers must support the individuals in the testing labs. There are two types of testing groups with whom the engineers have regular interactions. First, there is a test group where the technicians try to stress the printers in as many ways as possible, to see where they strike problems, i.e. the messages that are posted to the user are incorrect, or the printer does not operate as planned, or even worse, the printer crashes. The employees in this test group are supposed to act as "dumb" users, testing the printer for operability. There is a second test group composed of system engineers who are much more technically competent; most occupy grade levels higher than the software engineers themselves. These engineers test the software for applicability in a wide range of situations. The software engineers must provide support for problems that emerge in both test groups.

There are also a variety of meetings that the software engineers attend. The Sunrise meeting occurs every morning at 8:30 AM. At this time the test lab provides feedback from the day before to all the project team leaders on the printer. Software engineers attend these meetings infrequently, either to stand in for their project team leader or to address a specific software problem on that day's agenda.

In the testing phase of the product development cycle, there is also a Sunset meeting every afternoon at 3:00 PM. This meeting focuses on providing feedback on the performance of the software from that day's test. Although this meeting is not mandatory, most software engineers attend.

The other type of meeting that occurs, but with less frequency, is the communication meeting. The Product Manager holds a communication meeting approximately every week. Usually it occurs about three times a month, depending on whether the Product Manager is in town and has something to "communicate." The Division Vice President also holds a communication meeting every few months to provide updates on the Division. The purpose of the "communication" meeting is exactly that -- to communicate to the group a bigger picture as to what is going on in the organization.

Because of the low frequency of these types of interactions that occur with members external to the software team, I have included them in the "miscellaneous" category on Table 1.

24 I have elaborated on only the visible interactive activities. These activities are a recognized, although not rewarded, part of the process of design engineering. A colleague of mine, Joyce Fletcher, studied
Data on Work Patterns:

Interactive work clearly constitutes an important part of the work process. To better understand how time is divided between individual work and interactive work, I coded each of the thirty five logs and analyzed the daily work patterns. For example, one Wednesday just after the November 22nd release, Andy was asked to write down everything he did from when he woke up in the morning until when he went to bed at night. He reported the following:

6:30AM  Woke to radio. Hit snooze.
6:50-7:35  Got up, showered, ate breakfast and left house.
8:00  Arrived at work.
8:00-8:10  Checked mail; got coffee.
8:10-8:20  Sat down to work.
8:20-8:30  Interrupted myself to inform Dan and Sam that they were working on the wrong code. This was not constructive for me but could potentially have saved them a lot of time. This could have been avoided if we received the proper code several days ago.
8:30-8:50  Worked on the computer.
8:50-9:00  Interrupted by Ben to talk about NAFTA debate on TV last night. Zeth joined the discussion.
9:00-9:45  Attended Milton’s communication meeting.
9:45-9:50  Social conversation as I returned to lab.
9:50-10:20  Got back to lab and was immediately interrupted by Sam. He needed to try to bring up the new ethernet card on the bobcat board. We got it running by 10:20 AM. Sam left.
10:20-10:30  I continued to play around with this.
10:30-11:10  Allan interrupted us to update us on the release plan. He then asked each of us for status. This was of some value to him and virtually no value to me. These status updates should be less frequent.
11:10-11:30  I actually got to work on debugging my code.
11:30-12:45  Lunch at my desk. Did some non-work related paper work. No interruptions.
12:45-1:35  Returned to lab. Immediately interrupted by Sam about ethernet card. We mucked around with it for about 45 minutes. In the end, we determined that one card is bad, the other was OK. This was pretty much a waste of my time, but Sam has no other working system to try it on.
1:35-2:00  Immediately upon Sam’s leaving, Fred showed up with some test patterns he needed to print. I spent 25 minutes helping him. This gave him some information he needed but was a waste of time for me.
2:00-2:15  Worked with Max integrating some changes we both made to some files. This was necessary interaction.
2:15-2:35  I interrupted Pat to talk about some requirement issues. This was useful for both of us.
2:35-3:00  Did my work.
3:00-3:05  Brief interruption by Roy who asked if we could meet to discuss color rendering issues. We set a time.

The thirty five logs come from the initial three days of tracking for each of the twelve engineers. In the case of one engineer, she did not join the team until after the first round of tracking data had been collected; hence the reason for data on thirty five rather than thirty six tracked days.
3:05-4:35 Sam shows up with a Macintosh to try the ethernet card again. This occupied the next one hour and a half. We determined that ethertalk does not work. The ESS rarely boots with the ethernet card attached. This was totally disruptive to what I had planned for the afternoon.

4:35-4:40 I took a break to make my draft pick for Fantasy Football.

4:40-4:50 Mark returned a call I left him regarding the ethernet problem but he was no help.

4:50-6:15 No interruptions. Actually got some work done.

6:15 Ran into trouble with Ben's code which Max compiled before he left for school. I decided to go home.

6:45 Arrived home. Made dinner. Watched TV.

9:00 Paid bills, balanced checks book.

10:30 Went to bed

In order to analyze this log, I further broke it down into blocks of uninterrupted time (UIT) and interaction time (I). I examined both the length of uninterrupted time and the urgency and helpfulness of the interactions. Analysis of Andy's day follows:

<table>
<thead>
<tr>
<th>Time</th>
<th>Type</th>
<th>Length</th>
<th>Helpful/Not</th>
<th>Urgent/Not</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:10</td>
<td>P</td>
<td>10</td>
<td></td>
<td>U</td>
</tr>
<tr>
<td>8:10-8:20</td>
<td>UIT</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:20-8:30</td>
<td>I (checking)</td>
<td>10</td>
<td>H</td>
<td>U</td>
</tr>
<tr>
<td>8:30-8:50</td>
<td>UIT</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:50-9:00</td>
<td>I (social)</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00-9:45</td>
<td>I (misc.)</td>
<td>45</td>
<td>H</td>
<td>NU</td>
</tr>
<tr>
<td>9:45-9:50</td>
<td>I (social)</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:50-10:20</td>
<td>I (helping)</td>
<td>30</td>
<td>H</td>
<td>NU</td>
</tr>
<tr>
<td>10:20-10:30</td>
<td>UIT</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30-11:10</td>
<td>I (checking)</td>
<td>40</td>
<td>H</td>
<td>NU</td>
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<tr>
<td>11:10-11:30</td>
<td>UIT</td>
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<td>P</td>
<td>75</td>
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<tr>
<td>12:45-1:35</td>
<td>I (helping)</td>
<td>50</td>
<td>H</td>
<td>NU</td>
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<tr>
<td>1:35-2:00</td>
<td>I (helping)</td>
<td>25</td>
<td>H</td>
<td>NU</td>
</tr>
<tr>
<td>2:00-2:15</td>
<td>I (integrating)</td>
<td>15</td>
<td>H</td>
<td>NU</td>
</tr>
<tr>
<td>2:15-2:35</td>
<td>I (misc.)</td>
<td>20</td>
<td>H</td>
<td>NU</td>
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<tr>
<td>2:35-3:00</td>
<td>UIT</td>
<td>25</td>
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</tr>
<tr>
<td>3:05-4:35</td>
<td>I (helping)</td>
<td>90</td>
<td>H</td>
<td>NU</td>
</tr>
<tr>
<td>4:35-4:40</td>
<td>I (social)</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:40-4:50</td>
<td>I (helping)</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:50-6:15</td>
<td>UIT</td>
<td>85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total time at work = 615 minutes
Interaction time (I) = 360 minutes =59% of time
Uninterrupted time (UIT) = 170 minutes = 28% of time
Personal time (P) = 85 minutes = 14% of time

In many ways Andy's day typifies that of many of the software engineers I studied.

Andy identified all but one of his interactions as helpful to either himself or someone else.

Furthermore, he considered only one of his interactions as urgent that day. In fact, Andy stated:
The work with Sam was critical, but we both would have been better off if it had waited. Not only was it inconvenient for me, but I would have been better prepared if I was further along in my own work first. We had two problems as it was... If I had done my work first, I could have solved one of them. Then it would have been easier for us to understand the problem that Sam was introducing into the system.

As a result of all the unplanned interruptions, Andy had little more than a quarter of his day to concentrate on his deliverables. He spent ten hours and fifteen minutes at work, of which two hours and fifty minutes (28%) were uninterrupted. Andy got only one block of uninterrupted time over an hour long (4:50-6:15 PM), where a block of time is defined as the number of consecutive minutes that an individual works on a given activity.

On average, engineers spend 48% of their time on individual work, which translates into 4 hours and 42 minutes a day spent working alone.26 The 4 hours and 42 minutes does not occur in one consecutive block of time however or even in a few large blocks of uninterrupted time. Rather, if the sequence of individual and interactive activities is examined, a large proportion of the uninterrupted time is found to be spent in very short blocks, sandwiched between interactive activities. Nearly 75% of the blocks of uninterrupted time are one hour or less in length (Refer to Figure 1).

Figure 2 shows the average day of a software engineer. Since most engineers believe that long, uninterrupted blocks of time are necessary for them to complete their deliverables, (and therefore to succeed at work), it is no surprise that engineers complain bitterly about not having time during the normal work day to get their work done. It turns out that on average only 28% of their time is in uninterrupted blocks over one hour long. Said a different way, on an average day engineers have only 1.1 blocks of uninterrupted time over one hour long. The aforementioned data substantiate the engineers' claim that they do not have substantial periods of time to themselves. Rather, their days are spent continually flipping back and forth from individual to interactive work.

---

26 These percentages are based on the thirty five tracked days of the twelve software engineers.
FIGURE 1: Distribution of Blocks of Uninterrupted Time

% Blocks Out of Total Blocks Uninterrupted Time

- Blocks ≤ 30 min
- 30 < Blocks ≤ 60 min
- 60 < Blocks ≤ 180 min
- Blocks > 180 min
FIGURE 2: Average Day of Software Engineer

-122-
Interactions fragment the engineer work day. The problem however is not the interactions but the fragmentation of uninterrupted time that the interactions cause. Indeed, engineers identify 97% of their interactions as helpful either to themselves or someone else. The problem is that 95% of the interactions occur spontaneously when only 24% of the interactions are judged by the engineers to be urgent. Therefore, 73% of the interactions, while perceived as helpful to someone, could be postponed (Refer to Table 2 and Figure 3).

Spontaneous interactions not only fragment the engineer's day, but leave the engineers with no control over their time. The problem is that engineers do not know when they will be interacting. During normal business hours, engineers rarely have a sense that they are in control of their schedules. Even if they are working uninterrupted, they do not know how long it will be before someone appears. As one engineer described "I am constantly looking over my shoulder, fearing that someone is about to throw something at me." Even long blocks of uninterrupted time are not recognized as opportunities for deep concentration. Only in retrospect do the engineers know that they just had an extended period of time to accomplish some substantive individual work. Spontaneous interactions therefore cause problems for engineers both because they fragment their day and because they render it impossible for engineers to settle down with any confidence that they will have significant time to devote to their "real work." The implication of the data is that no one would suffer, and some might benefit, if 73% of the interactions -- those that are helpful but not urgent -- were planned.

Drawing Some Distinctions Among Groups:

One of the three groups of software engineers that I studied had to work collaboratively. This group encountered a problem that no single individual in the group could solve. This group, Paul's group, provides a contrast to Allan's group. Both


TABLE 2: Helpfulness and Urgency of Interactions

<table>
<thead>
<tr>
<th>Activity</th>
<th>% Helpful</th>
<th>% Urgent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>97%</td>
<td>24%</td>
</tr>
<tr>
<td>N=226</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrating</td>
<td>100%</td>
<td>81%*</td>
</tr>
<tr>
<td>N=32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helping</td>
<td>95%</td>
<td>17%</td>
</tr>
<tr>
<td>N=102</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checking</td>
<td>97%</td>
<td>6%</td>
</tr>
<tr>
<td>N=68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinating</td>
<td>100%</td>
<td>30%</td>
</tr>
<tr>
<td>N=24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Paul's Group profoundly affects the information reflected in this table; they conducted 81% of the integrating activities. In Paul's Group, 96% of interactions were perceived as urgent; in contrast Allan's Group and Laura's Group perceived 33% and 0% of interactions as urgent.
FIGURE 3: Helpfulness and Urgency of Interactions

INTERACTIONS*
(N=226)

HELPFUL (97%)

NOT URGENT (73%)

URGENT (24%)

NOT HELPFUL (3%)

*The interactions included are from the 35 tracked days of the engineers, and include helping (102), checking (68), integrating (32), and coordinating (24).
groups were responsible for code to serve the same function on subsequent launches of the product.

The initial difference between the two groups was that Paul's Group was three months behind Allan's Group.\textsuperscript{27} The launch date was later because the operating system they were buying was cheaper than the one Allan's Group was buying, but it also required more work.\textsuperscript{28} However, what became apparent once the work began was that not only did the operating system need more work, but it actually was not functional at all. This set Paul's Group back even farther than originally anticipated through no fault of theirs.

Not having a functional operating system profoundly affected the work of the members of Paul's Group. In both groups the functions had been divided up and assigned, but in the case of Paul's Group, the work on individual deliverables could not begin. The project team leader explained:

> At this point the work is based on dynamic assignments, not hard set deliverables. Responsibility is determined on a continuous, not a fixed basis. Not only are deliverables collective, the actual work is . . . done together. . . . We are trying to get something working from the ground up. No one in the group has the expertise to do it on their own. We really need the expertise of each member of the team to get it working. . . . Once we have the base system working then they will have individual deliverables. Currently, no one person can get us where we need to be.

Consequently, the members of Paul's Group would sit together - two, three, four, sometimes all five, including their project team leader, trying to work through the bugs in their system.

Whether the engineers in Allan's Group would have chosen to approach their work in such a collaborative fashion if they were in the same situation is unclear. The engineers in Allan's Group certainly indicate that they would have chosen a considerably more

\textsuperscript{27} Because they had a later launch date, their work was less visible to management. As usual at Ditto, senior managers focused on the more immediate product. As mentioned earlier, visibility is critical for success; therefore, lower visibility decreased opportunities for the members of Paul's Group.

\textsuperscript{28} An operating system is the basic software to make the printer operate. A functioning operating system feeds a blank piece of paper through the printer. It is the Ditto engineers who add all the "extras" to make the printer actually print.
individualistic approach. They found the fact that the members of Paul's Group spent so much time together "odd" and "undesirable." One engineer said, "I would not like that style -- the way those guys work together. I do not know how they do it." Another engineer said:

I was once on a team that worked that way. I found too many cooks spoil the soup theory definitely holds true when you're trying to solve that type of problem. Everybody has a different style of how to go after a problem like that. And if you get too many people, everyone says "I'll type this," and then everybody else wants to type something else -- I mean you just don't get anywhere. . . . I am in no way convinced that having all those guys working together is good. . . . If Max and Ben and I worked together Ben would be left in the dust and it would be a race between Max and me and that would not be productive. That would result in wasted effort.

However, despite the skepticism of the engineers in Allan's Group, the engineers in Paul's Group seemed content.29 They described their work as a "joint endeavor" and saw no alternative way to complete their work. One member of Paul's Group said:

I think probably this project feels like more of a collaborative effort than others I've been on, in that during the others I could really be off by myself and . . . stream code out by myself, not worrying about everybody else's portion of the deliverables. . . . seems we're running into walls more frequently and when we run into walls, we all realize that the best thing to do is just grab everybody and put everybody's head together to try to overcome the obstacles. Perhaps that's the difference. We're just encountering so many problems we find it easier to grab the team together as a whole to work it out. . . . My general experience is that one plus one is definitely more than two.

As already described, software engineering at Ditto is largely an individually-centered, output-driven process. In general, engineers have a list of different functions for which they are responsible, and they go off alone to sit in front of their computer terminal and write the necessary code. Interactions such as "integrating," "helping," "checking," and "coordinating," no matter how necessary, are perceived as interruptions to the work process. Yet, the engineers in Paul's Group seem to feel differently about the role of these

---

29 I suspect that the fact that the engineers in Allan's Group are more individualistic in their approach to work than the members of Paul's Group has to do, at least in part, with the fact that the managers had chosen their best engineers for Allan's Group. As described in Chapter 5, being the best tends to be synonymous with being individualistic.
interactions. Members of Paul's Group treat interactions as part of their "real work." They view them as critical to the completion of their own deliverables.

It would have been useful to follow Paul's Group until its product launched and thus gain a better understanding of a different way of working and the effect of such a difference on accomplishing the work. Unfortunately, in January, it became apparent that Allan's Group lacked the technical support that they needed, and without additional help testing their software, the first product launch would be delayed. At this time, Paul's Group was still having trouble getting their operating system to function and the vendor had not provided the help to get the product up and running. Consequently, the contract with the second vendor was canceled and the individuals working in Paul's Group were reassigned to support the engineers in Allan's Group.

For the months between January and June, the members of Paul's Group played the role of testing support for Allan's Group. This role involved no opportunity to write their own code. It was considered by all to be boring work with even lower visibility than their previous assignment. "Testing support" carries little or no potential opportunity for recognition and reward. One engineer referred to this work as "chimp work.... There is no opportunity to learn or to be challenged."

As a result of the cancellation, it is impossible to compare and contrast the different ways of working in Allan's Group and Paul's Group. Nonetheless, my observations of Paul's Group raise an issue I think well worth pondering. It appears that when interactions are perceived as a fundamental part of getting one's own work done, they are not perceived as interruptions. Rather, Paul's Group appreciated the importance of their interactions and welcomed their occurrence.\footnote{When I would ask the members of Paul's Group about their interactions in the debrief interviews they would indicate repeatedly that the interactions were a critical part of the job they could not do without. In contrast, the members of Allan's Group and Laura's Group would indicate that the interactions while often necessary were highly problematic.}
Whatever advantages the work pattern of Paul's Group's produced, this pattern was not recognized nor encouraged by others in the organization. While I inquired about the differences in the groups and asked Paul (the project team leader of the group) what he was doing to encourage a collaborative spirit among his engineers, he emphasized that he did not consider this team orientation a positive occurrence. Rather, he attributed it to the demands of the work and expressed anxiety about having his engineers working so closely together. He said: "With no one taking ownership, the group lacks a sense of urgency, and it is harder to keep them motivated and to stop them from getting side tracked." It was Paul's belief that if each engineer did his part, the whole would follow. He feared that without such individual responsibility, the whole might never be completed because the team lacked focus and determination.

The story of Paul's Group illustrates how close, continual interaction is perceived as abnormal and potentially counter-productive at Ditto. Although I have compared Paul's Group and Allan's Group because of the similarity of their work, the way of working in Laura's Group was quite similar to that in Allan's Group. The members of both Allan's and Laura's Group interacted on an "as needed" basis; they never spent a whole day working as a group. Members of these two groups worked in ways considered "normal" at Ditto.

Given the distinction between groups, it is useful to break down the tracking data by group. First, to examine the data on uninterrupted time, refer to Table 3. Not surprisingly, Paul's Group had the smallest percentage of time at work that occurred in uninterrupted blocks. Most of their "real work" was done during interaction time. Accordingly, the members of Paul's Group spent a disproportionately large amount of time

---

31 All 35 tracked days occurred prior to the cancellation of the second launch. Therefore, when the engineers in Paul's Group were tracking they were still working together trying to get the operating system to function.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Overall</th>
<th>Allan's Group</th>
<th>Laura's Group</th>
<th>Paul's Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>20,523</td>
<td>6,905</td>
<td>6,443</td>
<td>7,175</td>
</tr>
<tr>
<td>Uninterrupted Time (UIT)</td>
<td>9,923</td>
<td>3,857</td>
<td>3,781</td>
<td>2,285</td>
</tr>
<tr>
<td></td>
<td>(48%)</td>
<td>(56%)</td>
<td>(59%)</td>
<td>(32%)</td>
</tr>
<tr>
<td>Integrating</td>
<td>3,367</td>
<td>315</td>
<td>78</td>
<td>2,974</td>
</tr>
<tr>
<td></td>
<td>(16%)</td>
<td>(5%)</td>
<td>(1%)</td>
<td>(41%)</td>
</tr>
<tr>
<td>Helping</td>
<td>2,039</td>
<td>762</td>
<td>1,010</td>
<td>267</td>
</tr>
<tr>
<td></td>
<td>(10%)</td>
<td>(11%)</td>
<td>(16%)</td>
<td>(4%)</td>
</tr>
<tr>
<td>Checking</td>
<td>1,324</td>
<td>732</td>
<td>405</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>(7%)</td>
<td>(11%)</td>
<td>(6%)</td>
<td>(3%)</td>
</tr>
<tr>
<td>Coordinating</td>
<td>754</td>
<td>128</td>
<td>131</td>
<td>495</td>
</tr>
<tr>
<td></td>
<td>(4%)</td>
<td>(2%)</td>
<td>(2%)</td>
<td>(7%)</td>
</tr>
<tr>
<td>Social</td>
<td>2,077</td>
<td>730</td>
<td>542</td>
<td>805</td>
</tr>
<tr>
<td></td>
<td>(10%)</td>
<td>(11%)</td>
<td>(8%)</td>
<td>(11%)</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>652</td>
<td>281</td>
<td>329</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>(3%)</td>
<td>(4%)</td>
<td>(5%)</td>
<td>(.6%)</td>
</tr>
<tr>
<td>Personal</td>
<td>387</td>
<td>100</td>
<td>167</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>(2%)</td>
<td>(1%)</td>
<td>(3%)</td>
<td>(2%)</td>
</tr>
</tbody>
</table>
engaged in what they called "integrating." For them, this was time spent working together trying to get the operating system to function.

Given the large percentage of time that members of Paul's Group spent working collaboratively, it is not surprising to find that the members of Paul's Group considered 53% of their interactions urgent. Members of Allan's Group and Laura's Group perceived 6% and 14% of their interactions respectively as urgent (Refer to Table 4). According to one member of Paul's Group: "If we don't interact then we will have no work to do. The interactions are our work."

Furthermore, in all three groups, 96% or more of the interactions were considered helpful to at least someone involved (Refer to Table 5). Yet, only in Paul's group did the individuals speak about their interactions as if they were vital to their work process. The members of both Allan's Group and Laura's Group indicated that interactions were interruptions to their "real work," despite their recognition of the helpfulness of these interactions.

**Drawing Some Conclusions:**

Two important points follow from these data. First, the data make clear that interactive work constitutes a critical part of the job of the engineer. Second, the data show that the timing of interactive work is often problematic for engineers. Viewed together, these two points suggest that members of my sample may not appropriately value interactions because of their often inconvenient timing. Software engineers believe that they need long, uninterrupted blocks of time to produce their individual work. Yet, they
<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Allan's Group</th>
<th>Laura's Group</th>
<th>Paul's Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall</strong></td>
<td>24%</td>
<td>6%</td>
<td>14%</td>
<td>53%</td>
</tr>
<tr>
<td>N=226</td>
<td>N=84</td>
<td>N=70</td>
<td>N=73</td>
<td></td>
</tr>
<tr>
<td><strong>Integrating</strong></td>
<td>81%</td>
<td>33%</td>
<td>0%</td>
<td>96%</td>
</tr>
<tr>
<td>N=32</td>
<td>N=3</td>
<td>N=3</td>
<td>N=26</td>
<td></td>
</tr>
<tr>
<td><strong>Helping</strong></td>
<td>17%</td>
<td>5%</td>
<td>13%</td>
<td>60%</td>
</tr>
<tr>
<td>N=102</td>
<td>N=39</td>
<td>N=48</td>
<td>N=15</td>
<td></td>
</tr>
<tr>
<td><strong>Checking</strong></td>
<td>6%</td>
<td>0%</td>
<td>24%</td>
<td>0%</td>
</tr>
<tr>
<td>N=68</td>
<td>N=35</td>
<td>N=17</td>
<td>N=16</td>
<td></td>
</tr>
<tr>
<td><strong>Coordinating</strong></td>
<td>29%</td>
<td>33%</td>
<td>0%</td>
<td>31%</td>
</tr>
<tr>
<td>N=24</td>
<td>N=6</td>
<td>N=2</td>
<td>N=16</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 5: Whether Interactions are Helpful or Not

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Allan's Group</th>
<th>Laura's Group</th>
<th>Paul's Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall</strong></td>
<td>97%</td>
<td>96%</td>
<td>96%</td>
<td>99%</td>
</tr>
<tr>
<td>N=226</td>
<td>N=84</td>
<td>N=70</td>
<td>N=73</td>
<td></td>
</tr>
<tr>
<td><strong>Integrating</strong></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>N=32</td>
<td>N=3</td>
<td>N=3</td>
<td>N=26</td>
<td></td>
</tr>
<tr>
<td><strong>Helping</strong></td>
<td>95%</td>
<td>95%</td>
<td>94%</td>
<td>100%</td>
</tr>
<tr>
<td>N=102</td>
<td>N=39</td>
<td>N=48</td>
<td>N=15</td>
<td></td>
</tr>
<tr>
<td><strong>Checking</strong></td>
<td>97%</td>
<td>97%</td>
<td>100%</td>
<td>94%</td>
</tr>
<tr>
<td>N=68</td>
<td>N=35</td>
<td>N=17</td>
<td>N=16</td>
<td></td>
</tr>
<tr>
<td><strong>Coordinating</strong></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>N=24</td>
<td>N=6</td>
<td>N=2</td>
<td>N=16</td>
<td></td>
</tr>
</tbody>
</table>
repeatedly find their days fragmented by spontaneous interactions. The problem, however, is not that the interactions are trivial; indeed on average 97% help at least one of the involved parties. Rather, it is the timing of interactions that seems to generate problems for the engineers.

---

32 The literature to date on the temporal ordering of work focuses either at the micro level of turn taking within an interaction (Goffman, 1967, 1983; Sacks, Schegloff, & Jefferson, 1974; Schegloff, 1992) or at the macro level on patterns of interaction (Zerubavel, 1979, 1981). Goffman devoted his career to documenting the norms governing face-to-face interactions. His emphasis was on turn taking within what I am labeling "an interaction." He did not concern himself with the sequencing of these interactions, but rather focused on what happened within "an interaction."

At the macro level, Zerubavel (1979, 1981) has documented the temporal regularity that characterizes the work place -- the "socio-temporal order" as he refers to it. In particular, Zerubavel finds that the calendar, the schedule, and the timetable introduce routine, orderliness, and structure into life. Including interactions and interruptions as opposed to just looking for patterns of interaction, I have studied what might be called an in between or the meso temporal ordering of work. I have examined both the temporal regularity of actions driven by the temporal order of calendars and schedules, but also the disorder, chaos and non routine elements of work that do not occur according to the clock. I have therefore taken both a clock based and an event based time reckoning perspective. It is at this meso level that it is possible to see how fragmentation and interruption (event based interaction), as well as continuity and patterned activity (clock based interaction) affect the work process.
"Helping," "checking," "integrating" and "coordinating" constitute critical parts of the engineering process. Planning and avoidance of repeated interruptions would further prove beneficial for the engineers' work process. Organizational standards for success however fail to address individuals' initiation of or response to interactive work.

The particular ways in which engineers interact with each other varies, both in terms of their willingness to support others and in terms of their conscientiousness of others' time. This chapter explores the particular cases of Matthew and Sarah. Matthew exhibits a natural tendency to always respond to others' needs. This behavior makes it difficult for him to complete his own work. He manages to produce his deliverables by working extraordinarily long hours. In contrast to Matthew, who is always willing to help others and asks very little in return, Sarah immediately interrupts others if she needs help. Sarah feels that she has no time to waste figuring things out for herself. She feels, as well, that she has no time to spare helping others.

A Day in the Life of Matthew:

One Thursday in late November just a few days before the November 22nd release, I asked Matthew to record what he did from when he woke up in the morning until going to bed that night. He reported the following:

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 AM</td>
<td>Woke up.</td>
</tr>
<tr>
<td>6:00-6:40</td>
<td>Showered. Got dressed. Ate breakfast.</td>
</tr>
<tr>
<td>6:40</td>
<td>Left home</td>
</tr>
<tr>
<td>7:00</td>
<td>Went to Marine Midland Bank to get money.</td>
</tr>
<tr>
<td>7:10</td>
<td>Arrived at work.</td>
</tr>
<tr>
<td>7:10-8:50</td>
<td>Worked uninterrupted.</td>
</tr>
<tr>
<td>8:50-9:00</td>
<td>Sam and Mike stopped by. They had a question about the server. I had already told them they had an account. This was an unnecessary interruption. They could have figured it out themselves.</td>
</tr>
<tr>
<td>9:00-9:23</td>
<td>Worked.</td>
</tr>
<tr>
<td>9:23-9:28</td>
<td>Roy called me to the front. He had forgotten his badge and needed to be signed into the building.</td>
</tr>
</tbody>
</table>
9:28 Back to work
9:30-9:54 Chris and Jane were debugging and hit a problem. They asked for suggestions.
9:54-10:06 While I was helping Chris and Jane, Sam and Mike came back. They had more questions.
10:06-10:10 Jane came by for some information on technical support. I gave her the form and told her how to fill it out.
10:10-10:30 Chris was having trouble with the printer in the lab. He did not know Jake, the technical assistant. I introduced them.
10:30-12:00 PM I developed software.
12:00-12:15 I read a technical article that I thought might help me figure out the code.
12:15-1:00 I took a break and ate my lunch.
1:00-1:45 I went back to developing software.
1:45-1:50 Sarah had a question about setting up the programming environment. I helped her out.
1:50-2:00 I went back to developing software.
2:00-2:10 Sarah came back with another question.
2:10-2:40 I went to see Sam. I wanted to know how things were working out. He told me something was not right. I helped him. Then we had a general discussion about networks.
2:40-2:45 Back to work.
2:45-2:50 Max came by. He needed some advice on something that was not working. I offered him a few suggestions.
2:50 I took a break to get some tea.
2:53-4:15 Back to work.
4:15-4:20 Sarah had a configuration question.
4:20-5:00 Back to work.
5:00 Tea time.
5:10-5:15 Sarah stopped by with more of the same.
5:15-5:20 I went to the lab to see how Max and Andy were doing.
5:20-8:00 I worked uninterrupted with my door closed.
8:00 I was getting ready to leave. My wife was waiting out front. I opened my office door and went to check something in the lab. I ran into Sarah. She was surprised to see that I was there even though my door had been closed. She asked for help. I helped her.
8:22 I left.
8:55-9:30 My wife and I arrived home. Dinner was ready. My wife had already eaten. I ate.
9:30-10:30 I paid the bills.
10:30 I went to bed.

For Matthew this was a typical day both in terms of the number of different times he was asked for help and in the way he stayed late to get his own work done. Matthew recounted the following story:

Last night, I called my wife at 6 PM and told her not to pick me up until 7 PM, but at 7 PM I changed my mind again and called to ask for 8 PM. We were supposed to meet outside the guard booth. Around five minutes to eight, I started to pack up my stuff. I wanted to check one thing in the lab before I left. When I got to the lab, Sarah was there. She seemed very pleased to see me. She was having problems with her code, and said, "I came to look for you, but I thought you were gone. I need some help."

Matthew continued:

I spent the next half an hour trying to help her understand her work so that she could continue without me... If she needs help, my first priority is to help her... When the conversation began to move away from helping her
to a more social conversation then I looked at my watch and said, "Oops, I
tbetter go, my wife is waiting for me."

When I asked Matthew why he had waited so long to tell Sarah that he needed to go, he
replied:

It was my first priority to make sure she could do her work. She needed
my help and I didn't want her to feel uncomfortable asking questions. If I
told her my wife was waiting, she would have stopped and I did not want
that. Once somebody starts the process flowing you do not want to
discourage them. . . . My wife can wait. . . . I do not know, it is hard for
me, because I say to myself, it is 15 or 30 minutes which I might as well
spend with her. I think it is harsh to say I have to go. . . . I could have
tripped and fallen walking down the hall and my wife would have had to
wait 15 minutes. . . . people have what they call "hard stops," but I
think you should be more flexible. . . . If you go out there and have a tire
punched, you still have 30 minutes you waste trying to change the tire. So
you cannot really be hard about that. . . . Why be hard when people need
help?

Matthew further described his attitude towards helping others:

I want to facilitate the learning process. . . . I want them to learn to do it by
themselves. . . . When I help, I try to just do enough to enable them to
learn to do it on their own . . . I push them away to make them try . . . . I
welcome them back if they need more direction.

Matthew talks about wanting to help people who in return are willing to help others,
thereby disseminating knowledge. Matthew says, "I don't like people to send others to see
me. I would rather that once I have helped them, that they in turn try to help the others
themselves."

A Day in the Life of Sarah:

As with Matthew, I asked Sarah to keep track of a random day from when she woke
up in the morning until going to bed at night. Sarah was asked to track on a Thursday in
early December. The November 22nd release had finally been delivered a few days late,
and now all attention was focused on the December 20th release, which was just over a
week a way. Describing her day, Sarah reported:

6:00 AM  The baby woke up crying.
6:00-6:30  I fed the baby.
6:30-8:15  My husband played with the baby. I went back to sleep.
8:15      My husband woke me up. He left for work.

-137-
8:15-9:00 I got myself and the baby ready.
9:15 Arrived at the baby sitter's. The baby was screaming and the baby sitter was busy.
9:15-9:30 I stayed to feed the baby.
9:30-10:00 Drove to work.
10:00 Arrived at work.
10:00-11:00 I initiated a conversation with Laura. Yesterday I had come across a big design flaw and I was very concerned about it. There is a requirement's problem. We decided we needed to meet with Pat in the afternoon. We set up a meeting for 3:00 PM.
11:00-12:00 PM I initiated a conversation with Chip. I needed some background information. He was available so I bugged him. I am a very interruptive person. I have no time to waste so I look for expertise.
12:00-12:30 I prepared slides for the 3 PM meeting.
12:30-12:45 I asked Matthew a couple of quick questions.
12:45-1:00 I finished my slides.
1:00-2:30 We had a team meeting to discuss our priorities. We are behind schedule but the group is pretending we will make it. There is a big sense of denial going on. I voiced the problem. Laura got angry and accused me of being flip. She won't admit that there is a big problem brewing.
2:30-3:00 The team sat around and bullshitted.
3:00-4:30 Laura and I met with Pat. I presented the problem and proposed my solution. I got their confirmation.
4:30-5:00 I stopped by to see Roy. He answered my question about supervisor rights. Then we chatted about sports.
5:00 I left for school.
6:30-9:30 Attended class.
10:30 Arrived home. My husband was already asleep.
10:30-1:00 AM I watched TV and vegetated.
1:00 AM I went to bed.

Sarah describes herself as a "very interruptive person." If she needs help she gets it. Indeed, she disturbs everyone she sees until she finds the answer. She recognizes that this may not be the best way to work, but she blames it on the schedule. She says: "I have no time to waste trying to figure something out that I do not understand. I need to go immediately to the expert and find out the answer." However, she admits, "if I did it myself, I might learn more such that next time I would be better prepared . . . but that type of long term investment is impossible given the schedule."

**Giving Help:**

Matthew promotes a system of learning and helping. Unlike a helper who merely responds to the question, and proceeds to address the issue for someone, Matthew attempts to consciously develop people's capacity to address the issues themselves. He says, "It takes longer in the short term, but it pays off in the end."
Because Matthew has a reputation for being willing to help, he invites interruptions. Whenever there is a problem in the lab, for example, Matthew is the first software engineer the test group looks for, not because it is necessarily his problem, but because they know that when they turn to him for help he will be receptive. As a result, Matthew spends much time working on problems that are not his own. This is a time consuming process.

One day when I was shadowing Matthew, one of the printers crashed in the testing lab. At first, Matthew thought it might be the cable and so he went to get a new cable, but that did not work. Then, he decided that maybe it was the type of computer, so he went to a different lab, put a computer on a cart and wheeled it into the testing lab. This did not rectify the situation either. At this point, Matthew still had no idea what was wrong. He did, however, have a good idea as to whom to refer the problem. As was typical for Matthew, before it was finished, he had spent over an hour addressing a problem that was not his.

Matthew recounted a similar event that generated a different outcome:

I was so busy that I had no choice but to say I couldn't deal with their problem this afternoon. By the time I was able to respond the next morning, it was too late, the problem had been solved. . . . If I had been available I would have ended up wasting all of yesterday afternoon on something that turned out not to be my problem. . . . This is a classic example of how I end up wasting time on things that have nothing to do with me. . . . But, someone has to investigate them, and that often ends up being me. Up front we just don't know whose problem it is.

While Matthew's generosity is useful to those seeking help, his helpfulness attracts problems. Matthew sums it up, "the problem with my work style is that responsiveness breeds more need for responsiveness, and I am so busy responding, I cannot get my own work done. Once I open myself up to doing something, I just cannot say no."

Matthew recognizes that others need support in order to work effectively. One day Sarah was very excited because she had just figured out the solution to the problem that had been impeding her progress. She went to Chris to show him, but he told her he was too busy and could not be bothered. Sarah undoubtedly felt dejected. Matthew explained:
Sometime you just need a pat on the back; you just need a boost. . . . I do not think that Chris meant anything bad when he said he was busy and did not want to check out her stuff. He probably was tied up in what he was doing. That is one thing about somebody like Chris, they can say no and then sit and do what they were doing without feeling bad. This way Chris can make optimal use of his time. I just cannot do this. I know that Sarah needed someone to go over and take an interest. Someone needed to give her a pat on the back so she would be motivated to keep on going. Sometimes you just need someone to recognize and value what you have done. Around here, people hardly take the time to recognize each other.

Unlike Matthew, Sarah feels she has no time to do anything but her own work. For example, she describes most meetings as a luxury she cannot afford. She skips communication meetings, status team meetings and Sunset meetings. Sarah only attends meetings when she feels she has the time. Her project team leader, Laura, has tried on several occasions to point out to her that if she would attend the meetings, she might better understand her own work. Laura feels strongly that Sarah should reconsider the importance of meetings; Laura believes that at least some meetings should be considered a necessity rather than a luxury. Sarah, however, feels too pressed for time to invest in such longer term potential gains.

One meeting that Sarah and her project team leader frequently discuss is the "Sunset" problem review meeting. The purpose of the meeting is to review all the software problems that come up in the test labs during the day and assign them to the appropriate engineers. The more software engineers present at the meeting, the better the understanding the group can get of the problems, and the more likely they are to assign the problems to the correct person. Sarah carries the belief that she does not need to be at these meetings. Apparently, she does not care to help figure out whose problems are whose nor does she worry about being assigned problems that are not hers. She says: "I have no trouble throwing it back over the wall to whomever I think should deal with it."

In terms of supporting the test group, Sarah says, "If they have a problem, they should write it down and tell me about it at a mutually convenient time." She explains, "I am careful not to establish a reputation for being helpful because the test group will come to
me all the time. I want them to think twice before they approach me." Sarah argues that she simply does not have time to take part in team focused activities.

**Getting Help:**

While Matthew is always willing to help and support others, he hesitates to ask for help. Matthew, for example, lacked the training necessary to complete one aspect of his deliverables. He was exhausted, had much work to do and did not have enough time to learn what he needed to know. Someone had to help. It turned out that Matthew had an acquaintance on a different program in a different division of the company who possessed the necessary skills. However, Matthew did not feel comfortable asking his acquaintance to take time away from his own work. Even after Matthew's manager approved the exchange between Matthew and his acquaintance with the acquaintance's manager, Matthew was still reluctant to take up too much of the man's time. Matthew explained: "I know what happens around here all too well. No matter what is said, John will not be recognized for helping me. For John, all that matters is his own work. Helping me will only hurt him." Matthew further described how he tried to minimize his imposition: "I saved up all my questions and only disrupted John on an infrequent basis, instead of approaching him for each question."

Matthew is particularly difficult to manage in a crisis because he does not want to disturb others by seeking their help. His managers argue, "Matthew needs to get help. We do not have time for him to figure it out on his own. We need him to get it done as soon as possible." When a crunch hits, Matthew's managers monitor him closely to ensure that, "he stays focused and does not waste any time trying to figure things out on his own... He needs to get help immediately if there is a problem."

In contrast to Matthew, who is very conscious of minimizing his interruptions, Sarah seeks others' help whenever she needs it. Sarah asserts: "The reason I have to be so disruptive is because there is not enough time allotted up front to sit down and design.
Now, they are designing on the fly and that creates crisis situations." Sarah further explains, "around here there is no problem prevention. Engineers think that engineering is just problem solving but you need to work smarter now and not just be fighting fires all the time. . . . If you plan ahead you will prevent fires later, but no one has time to do that."

About her own style Sarah says:

I'm one of those kind of people that will ask anybody. I do not care if they work in our group, if they want to help me, or if they do not want to help me. If I need to get something done, I'll find somebody to help me; that is just the way I am. . . . If I need to get something done, I'll just start putting the feelers out, looking for help. . . . If I do not know it, there is no sense in sitting there wasting my time. . . I just go look for expertise.

Sarah recognizes:

It's annoying to people like Matthew who has to come in at 12 PM and stay until 2 AM because people like me come in and bug him every five minutes, which is bad enough that I bother him, but it's even worse if everyone in the whole building bothers him. I try to be aware of doing that to him, because I know he has got his own work to do. . . . I try to bother other people if they can help me instead.

Sarah is comfortable asking for help from those whom she will likely never repay the favor. However, she does not like to help others who will not be able to repay her. Matthew assumes the opposite attitude toward helping others; he will help anyone, but he hesitates to ask for help. [33]

Checking:

Sarah is strong minded about the hours she works, about the meetings she chooses to attend and about the way she communicates. Sarah becomes visibly (and audibly) distressed when she feels that "the truth" is embellished or denied. She believes that when

[33] Matthew seems to think that it is a big deal to ask for help. That may be why he does it so rarely. That may also be why he finds it important to be receptive when anyone makes the effort to ask him for help. Recall the quote at the beginning of this chapter where Matthew explains why he stayed late to help Sarah even though his wife was waiting in the car. He said: "It was my first priority to make sure she could do her work. She needed my help and I did not want her to feel uncomfortable asking questions. If I told her may wife was waiting, she would have stopped and I did not want that. Once somebody starts the process flowing you do not want to discourage them."
others check on your progress, you should say precisely where you are, not where you want to be, not where you think you should be, not where you have fooled yourself into believing you are. For example, Sarah confronts her project team leader, Laura, when she thinks that Laura is misrepresenting the team’s status on a project to the senior project management. Sarah believes Laura does not question a situation, preferring to continue with the assumption that everything will work out in the end. Sarah does not appreciate this attitude and says she gets angry just thinking about it. At one point, Sarah told me "there is a big disaster brewing. The managers are clueless, the requirements suck, and we have no time." Sarah was apparently convinced that the managers on the project were in a state of denial. She believed that they would not admit that they were behind. However, Sarah said: "this is ridiculous. . . . They are afraid to say what really is because their managers do not want to hear it."

At the end of one team meeting (as noted in Sarah’s tracking at the beginning of this chapter), the members did a "process check" and listed all the positives and negatives derived from the meeting. Sarah said: "one of the biggest minuses is that this group is ignoring the fact that we are never going to make our schedule. We are pretending that we are going to make it, but we are not. . . . I think that we are in denial." Her manager responded that Sarah was "being a little flip." Sarah however said that she was "not being flip," rather:

When you know the schedule is insane, and there is no way in hell you are going to make it, it is really difficult to take it seriously. . . . although I understand that it’s very, very important to make the schedule. . . . It is very important to make it from a business standpoint, but I don’t know. . . . I don’t know how to look at it. I think the amount of work is just way too much for that schedule.

Sarah estimated that her work due on January 31st would not be completed until the end of March. Sarah was very close in her prediction. She completed her work in early April.

Sarah does not like to be asked about her progress. She thinks that simply answering the question creates trouble: "you tell it like it is, and they do not like what they hear, or you tell them what they want to hear, and you know deep down that you will never be able
to succeed in the end." Instead of perpetuating belief in a schedule that she feels is impossible to adhere to, Sarah expresses her doubts.

Sarah told a story in which her manager asked her how she was doing and she said, "okay, but I do not think there is any way that I will get this done." Her manager asked her what the problem was and she explained. Her manager then responded: "Well, Jane does not see any major problems." Sarah told me:

... that is not the impression that I got from Jane, so it's like, everyone was afraid to say the way it really is, ... that attitude carries all the way up and down, because Zeth does not want to hear the way it is. So I am like, hey, I cannot get this done and that's it... I think the whole software group, and maybe even the whole project team, has this big sense of denial.

Sarah said that by the end of the project she had learned not to report the truth regarding the status of her work. She said "all it does is make me look bad, so I try to gloss it a little bit and just keep on working as hard as humanly possible to get it done; hopefully, by the time my manager asks me again, I will have a little more done. I do not know what else to do."

While Sarah was considered blunt, Matthew was evasive. It is hard for managers to assess Matthew's progress on a project. Obtaining an accurate sense of the status of his work requires special maneuvering. For example, one day Laura and her manager Zeth called Matthew into a conference room; both were quite frustrated by their ignorance of Matthew's status. They asked Matthew to outline his status on the board. Afterwards, Laura commented, "I was impressed with Zeth's ability to help Matthew clarify where he was and what he needed to get done by next Wednesday... They came up with a plan of attack as to how he was going to get it all done in time... I feel I have a better understanding now of how he is doing."

*No Organizational Recognition for Interactive Work:*

Instead of recognizing the contribution Matthew makes to the team, Matthew's managers view his tendency to help others as problematic. They discourage his generous
work style and are bothered by his evasiveness. At one point, Matthew approached the
software manager and told him he was having a problem balancing all the demands for his
help and completing his own deliverables. According to Matthew, he was told: "Do your
own work first, and then if you want to help others that is your choice, but do it on your
own time." Matthew expressed dissatisfaction with that answer. He said, "I know I am
supposed to put my deliverables first, at the expense of all else, but that is very difficult
when so many people need help, and they get stuck if I do not take the time to share my
knowledge." The fact that Matthew refuses to say 'no' to others' requests for help
frustrates his manager. She says:

He needs to get his own deliverables done, and it is my responsibility to
shelter him from additional requests. . . . When others, especially Zeth,
approach Matthew, he will never say 'no.' . . . Nor does he make clear the
implications of doing the additional work he is given. . . . If he is to help
others, by default his own work will suffer. However, Matthew never
raises this issue. . . . He just accepts more work. . . . I have begged him to
insist that all requests come through me, because at least I can help to
prioritize how he spends his time. . . . Matthew needs to focus on his own
work. Otherwise, our group will never succeed.

No one disputes the importance of Matthew's technical knowledge, and Matthew
contributes to a successful product development in ways far beyond producing his own
deliverables. Nevertheless, his managers fail to recognize and reward his contributions; in
essence, those aspects of his work remain invisible. Unfortunately, Matthew's helpful
behavior is only recognized when it is perceived as hindering his ability to complete his
own work.

The difference between Matthew and an organizationally acknowledged superstar
like Max is not technical competency, nor hours worked, but how they choose to allocate
their time at work. Matthew spends as many hours at work as Max does, but much of his
time is spent "helping" as opposed to "helping out" or working on his own deliverables. In
the end, Matthew completes his deliverables, but lacks time to exceed the expectations of his managers.\textsuperscript{34}

In contrast to Matthew, who completed his deliverables and put in the long hours, Sarah completed her deliverables too, but her managers and peers perceived them as less technically demanding than Matthew's. She also did not work as long hours.\textsuperscript{35} The biggest difference between Sarah and Matthew, however, is not their output or their hours but their work styles. This is never mentioned by management.

\textit{Work-Family Issues:}

In the end, Matthew managed to complete all of his own work. However, Matthew's family life suffered the consequences of his intense work habits. He is married to a woman who has two teenage daughters from her previous marriage. His wife does not work outside the home. Matthew has few responsibilities at home that involves daily care of the home or the family. Often Matthew works so many hours that he says he goes several days without even seeing his wife.

Matthew compares his work environment to a war in which he must fight:

\begin{quote}
Right now at work, I need to be single-minded. . . . I must make whatever sacrifices are necessary. But, my wife doesn't understand. She does not understand that now I must dedicate my life to this battle, and only when it is over can I celebrate. . . . She doesn't understand the importance of what I am doing. . . . She does not understand the challenges I am facing.
\end{quote}

He continues:

\begin{quote}
Sometimes my wife is not happy that I stay late. But I think she will understand later on. . . . Sometimes she complains that I am hardly at home, but it is hard because I need to get this done and it is hard for her to believe the impact of this. I mean you could say it is good for my
\end{quote}

\textsuperscript{34} Last year Matthew received a 4 1/2\% raise compared to Max's 6\% raise. Matthew's salary is estimated to be slightly less than Max's -- probably in the low $40,000's. Matthew further did not receive any of the financial bonuses that Max did for outstanding performance. Still, Matthew's raise was above the company's average 3\%. This is apparently due to his technical capabilities and his willingness to work long hours. It is not related to the help he provides the rest of the team.

\textsuperscript{35} Sarah received a 3\% raise. She is one grade level lower than both Max and Matthew, and probably makes a salary in the high $30,000's.
professional growth, but also for the whole team. . . . The challenges we are facing are immense. . . . It is like a war . . . a battle . . . you have to sacrifice a lot of things in order to achieve the objective. And we are at that juncture now. . . . Most of the things we are doing are things on the edge. You have to put in extra time to do them.

Summing up his work style, Matthew notes:

I am a go-getter and you cannot stop me when I want to get something. . . . When I am in this mind set I don't allow anything to disturb me. Only when it is done, will I sit back and relax. But until then, I must keep my mind focused.

Matthew is one of two engineers who would not allow me to interview his spouse. He apparently never asked her about the interview. Matthew said: "I don't know what she will tell you. I know that she is very displeased with me and does not understand the hours that I am working. I am afraid to let her express herself."

At first I pushed Matthew to let me interview his wife. I was curious to meet this woman. Matthew wavered back and forth. He approached me several times and said I could interview her, but he always changed his mind. Other members of the team tried to convince Matthew that it was "a positive experience" to have their spouse interviewed. Nonetheless, he never felt comfortable with the idea. Finally, Matthew said "no."

The fact that Matthew refused to let me interview his wife provides information in itself. The implied message was: "I am doing what I know I must do, but my wife is not pleased." It became even more apparent to me that Matthew's wife was displeased when he reported the following exchange one Monday morning:

This weekend, a guy from down the hall, you probably do not know him, he approached me and said, "You are always here. Is your wife unhappy with you, too?" . . . I was relieved to find out that I was not the only one who is always in trouble for being at work.

Sarah works many fewer hours than Matthew. Yet, Sarah says her husband is also dissatisfied with her work schedule. Sarah works long hours when she feels it necessary. But, she also compensates following any major investment of time with time off. Engineers are no longer paid for overtime but they can take "comp time." Most choose not to utilize "comp time." They feel that they already have enough trouble manipulating their
schedules to allow them to use their "regular" vacation days. Sarah, however, believes that receiving no overtime pay means that the company is getting something for nothing. Therefore, she makes sure to compensate herself with days off.

When Sarah accompanied Matthew on a trip to California, they worked all weekend and took the red-eye home on Sunday. They then put in two long days on Monday and Tuesday. Sarah took off Wednesday and Thursday. Matthew, on the other hand, took off only a few hours on Wednesday morning to catch up on his sleep and then went back to work at his intense pace.

Despite Sarah's ability to set limits for when she will and will not work, she says she is unable to establish boundaries between work and family that satisfy either herself or her husband. Sarah often arrives at work late and then must stay late at night to finish her work. This pattern results in two undesirable consequences. First, Sarah does not arrive at home early enough in the evening to share the household and child care responsibilities with her husband. Second, she is often so exhausted at night that she cannot get up early the next morning. As a result, the cycle continues.

By all accounts, Sarah has a supportive husband. A Ditto engineer himself, Marshal does similar but less advanced software design. Marshal was a technician and Sarah was in between her junior and senior years in college when they first met. The following fall, Sarah returned to school and finished her bachelor's degree. She then signed on full time with Ditto. At that point, Marshal had not completed his bachelor's degree. After they were married he went back to school and took a course each semester until he finished his degree five years later.

Sarah says "It does not matter to me what level he is or how much money he earns." However, these issues do matter to Marshal. He admits feeling intimidated by Sarah's professional success. He says: "There are many times I could ask her for help but I am afraid to admit what I do not know." Thus they share little of their technical knowledge with each other.
Many nights this past winter, while Sarah tried to make up time at work, Marshal
cared for their one and a half year old daughter. Sarah talks about the sadness she feels as
a result of not spending evenings with her daughter. She has, however, created a way of
making up the lost time. She spends extra time with her daughter in the mornings before
work. Sarah does not recognize that this pattern may only perpetuate the problem of late
home arrival.

Marshal loves his daughter and appears to be a committed, caring father. Yet,
Marshal notes, "it gets hard having to be a single parent every night of the week." He
picks up their daughter from the baby-sitter, brings her home, makes dinner, feeds her,
bathes her, plays with her and puts her to bed. Marshal wishes that Sarah would be home
more to share the responsibility and the pleasure of watching their daughter grow up.
Marshal said to me: "Often we take (home) videos at night so Sarah will not miss out totally
on the experiences that Stephanie and I are sharing while she is at work."

Marshal does not inherently dislike the role of a quasi house husband. Indeed, he is
neater and a better cook than Sarah (and they both agree on this). Moreover, he says: "I
love Stephanie and spending time with her, but sometimes it just gets to be too much.
Sometimes I want some time to myself, time in the yard, time to finish all the projects that
I want to do." He adds sadly, "I have so many daily responsibilities that I have no time to
do anything but take care of the baby." "After that," he notes, "I am too exhausted to do
anything else."

Marshal admits that he has friends with wives who do not work and sometimes he
feels "cheated" that dinner is not on the table when he gets home. He says, "I don't really
understand what Sarah is doing but I always give her the benefit of the doubt. Still
sometimes I just think to myself, damn, this is getting old."

Thursday is Marshal's night to go bowling with the guys. Marshal told me that he
bowls not because he loves the activity but rather because it forces Sarah to be home at least
one night a week to care for their daughter. Marshal feels that the only way for him to set some boundaries on Sarah's work is through his own activities like bowling.

Instead of appreciating his domestic efforts, Sarah feels that sometimes Marshal's expectations are too high in terms of his goals for what he wants to get done around the house. She believes that much of the work Marshal wants to do is unnecessary. Sarah says, "it makes me feel guilty that I'm not helping as much as he would like, but when I'm home it is more important to me to be with the baby."

Sarah loves her husband very much, and she too wishes she could assume greater control of her time. She believes that she has put on weight because her stress level has become so high. When I went to Sarah's house, she showed me a picture of herself when she met her husband seven years earlier. She was a slender 21 year old. Sarah has not aged well. At 28, she has put on over 100 pounds. She no longer fits into normal sized clothes and rarely wears anything other than stretch pants and oversized t-shirts.

Sarah describes herself as caught in a vicious cycle. She eats when she is stressed. As she eats, she gains weight and then finds herself even more stressed. Yet she takes no time to cook or exercise. Sarah adds: "You'll probably find it gross, but I didn't even have time to shower today." She is overwhelmed by work: "I used to exercise every day but now I cannot ever get myself to exercise. But without exercise I have no energy, and without energy I cannot get myself to exercise. . . . as a result, I feel like I have been hit by a truck."

*Trying To Do Too Much:*

Because Sarah feels overwhelmed by work, she continually seeks help from others. Her immediate response when she has a problem with her code is to seek help. When she perceives a problem as critical she disrupts everyone and generates a ripple of crises. Work-related stress does not affect Matthew in the same way as it does Sarah. Matthew completes his work by maintaining a constant, intense pace over long periods of time. His
work style is less overtly disruptive for the organization than Sarah's style. Yet Matthew creates his own set of collective problems for the group. His work must get done in order to complete the project, but according to managers familiar with Matthew, his unwillingness to get help sometimes slows the work of those who depend on his deliverables. In sum, both Matthew and Sarah contribute to, and detract from, the system in "invisible" ways.36

36 John Van Maanen has suggested an explanation based on the "sociology of help" as to why Matthew seems relatively comfortable in the work place while Sarah does not. The "sociology of help" is a more or less deep set of culturally-shaped "rules" that specify who gives whom help, under what conditions and with what effects (Goffman, 1967; Pentland, 1991; Van Maanen, 1990). Briefly, the sociology of help suggests that the more help one gives, the more others are in debt, and therefore the easier it is to call on others for help. On the other hand, the more help one asks for, without giving help in return, the more debt one incurs. This would imply that Matthew has accumulated a great deal of credit while Sarah has incurred substantial debt. Matthew is secure socially, able to dip into a rather full reserve of previous 'helping deposits' if he is in need. Sarah is socially insecure, unable to fall back on 'helping reserves' which are growing thin with interest accumulating. Matthew is further surrounded by good will that comes from helping others who are not in social debt to him. Sarah, on the other hand, is surrounded by ill will that is spread by draining down her helping accounts and by her apparent inability (and unwillingness) to replenish them.
Chapter 9:  
The Vicious Work Time Cycle and the Time Famine

In this chapter I examine the interconnections among the temporal organization of work, the social organization of work and how time is used at work. I suggest that it is the particular way in which these three components intersect that explains the existence of what I am calling the time famine. Figure 4 outlines how the chapters in Part II fit together to generate this argument.37

As outlined in Chapter 4, perpetual crises characterize the temporal organization at Ditto. Members of the organization commonly hold that they -- as a group -- must race to get the product to market; moreover, they are always behind schedule. There is never time to prepare for deadlines. Each deadline is confronted only when it is around the corner. A sense of desperation therefore characterizes the work process. When an issue

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37 The recursiveness between the definition of success, the crisis mentality and individuals' ways of using time are noteworthy. Much work has been done recently on the recursiveness by which institutions jointly "constitute" and are "constituted by" the actions of individuals (Barley, 1986; Giddens, 1979, 1981; Orlikowski, 1992). Giddens developed the concept of recursiveness and further applied it to the study of time. Giddens views time as a constitutive feature of social systems, implicated in the most stable as well as the rapidly changing aspects of social life (Giddens, 1981, p. 30). In our society, we tend to think of time as measurable and separate from both the existence of objects and the occurrence of our own activities. However, structuration theory reconceptualizes time as part of both the existence of objects and the occurrence of daily activities.

Giddens outlines three forms of temporality (1984, p.34-35). At the level of daily activity there is what Giddens refers to as the duress of day-to-day life. This is the ordering of social activities via repetition from day to day. At every instant the duress of day to day life intersects with the duress of the life span of the individual. While day to day activities continually reproduce themselves on a daily basis, and are therefore experienced as cyclical, the human life span is finite and is experienced as irreversible. It is through this intersection of day-to-day and life span time that cyclical and linear time are inherently connected. Finally, the duress of day to day life and that of the life span of the individual, interweave with the duress of the institution. This third form of time institutionalizes the patterns of continuity and change which are carried on beyond the life span of any one particular generation of individuals.

In keeping with his theory of structuration, Giddens stresses that institutional time has the form it does only is so far as it is produced and reproduced in the setting of day-to-day life. And, at the same time, day-to-day conduct only has continuity through its involvement with institutionalized modes of activity (1987, p.145). Therefore, individual temporal strategies are not thought to exist in isolation. Rather, these strategies draw on the institutional duress in which the actors are situated. At the same time, individuals' temporal strategies are part of the reproduction or change of the institutional duress.

In both the definition of social organization and temporal organization, Giddens stresses the recursiveness between structure and individual action. I suggest that the vicious cycle that perpetuates the social organization, the temporal organization, and the way time is used at work can itself be described as a set of recursive relationships.
FIGURE 4: The Vicious Work Time Cycle

Pressure to be Competitive

Temporal Organization
(Crisis Mentality)
*Ch. 4*

Social Organization
(Definition of Success)
*Chs. 5 & 6*

Ways of Using Time at Work
*Chs. 7 & 8*

Time Famine
becomes urgent, resources, both monetary and human, are directed towards its resolution. Often, however, it is too late to solve the problem. Or, the cost of solving the crisis has become severe. One engineer summed up this situation when he said:

You cannot get nine women together and have a baby in one month. . . . And yet, that is how we operate around here. We never have the resources until the last minute. Once something becomes a crisis then we throw everything at it, but by then it is often too late.

When management waits until the last minute to meet deadlines, the product may suffer. "Work arounds" rather than well thought out, strategically implemented solutions are continually created.

As the engineers struggle to face the crisis of today, prevention for tomorrow is postponed. While engineers are busy addressing the most recent interruption, the work that they intended to do on any given day is delayed until it too is perceived as a crisis. Because engineers confront continuous interruptions, they have little time to invest in future work. Their ability to prevent future crises is negated. Each day brings a new set of crises.

In a world dictated by crisis, it is not surprising that individual output, a willingness to accommodate to the demands of the work and visibility at work are rewarded (Chapter 5). The perception is that everyone needs to get their part done, and no one should desert the effort. Consequently, those who stay around and solve the crises emerge as "heroes" and become role models. Engineers struggling to meet deadlines feel pressure to do whatever it takes to get the job done. In turn this leads to more interruptions, less time to accomplish "real work" and no appreciation for the positive contributions that helpful interactions make to the work process. Interactions continue to be perceived as interruptions which deter engineers from doing their "real work" (Chapter 7).

Managers do not calculate and compare costs and benefits of engineers' work styles. Rather, by rewarding individual output and presence they promote a way of using time which devalues helping and promotes interruptions. Since the assumptions that govern how time at work is used are never articulated or questioned, there are no incentives to be
more efficient (therefore less present) or to be more conscientious about others' time (therefore making it easier for everyone to get their work done). Engineers continue to interrupt each other and suffer from each other's tendency to act spontaneously. The definition of success is self-fulfilling because in a time of crisis, individual heroics are perceived as necessary to meet rapidly approaching deadlines.

The first five chapters of Part II have been devoted to documenting this cycle. Here I have attempted to show how these components constitute each other and result in the vicious work time cycle. In this chapter, I further will document how the cycle itself leads to the time famine. It seems apparent that the vicious work time cycle has profound consequences for both the organization -- in terms of when and how the work gets done -- and for the engineers -- in terms of hours they work and the stress they experience. At this point I move outside the walls of the corporation to explore the impact that the work time cycle has on the home lives of engineers and their families.

Work demands produce daily work schedules that involve long hours and little certainty. Individuals' work schedules are driven by the often unpredictable events of the workplace. Those who desire success arrive early and stay late in response to the demands of their work. However, an employee's life is not only composed of a work schedule but also a family schedule. While the organization follows certain patterns and expects employees to respond to the demands of work, the family also follows certain patterns. Children must be taken to and from day care, fed, bathed and put to bed within certain time intervals. The problem for employees is that time associated with the work schedule and the family schedule often conflict.38

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38 In the text I elaborate only on daily work and family schedules. My data are based on the nine month period I was on site. However, work and family demands tend to conflict not only within one's daily work and family schedules, but also across one's career and parenting cycles (Rapoport and Rapoport, 1975). Individuals' careers are assumed by their managers to be the primary concern of employees -- particularly professional and managerial employees. Employees are assumed to be first and foremost oriented towards work (Coser, 1974; Goode, 1960; Schein, 1978); after work they struggle to "navigate" among their many roles (Coser, 1974). As Rosenbaum (1984) suggests, the organizational career system is like a tournament: when you win, you win the right to go on to the next round; when you lose, you lose forever. The implication is that the game is everything to an employee and to stay in the game you must keep on playing and winning. Once you withdraw for any period of time you are out of the race forever. Engineers
Each of the engineers I studied had a schedule that could be broken down into three component parts: morning rituals, work and evening rituals. Their children have their own schedules, which can also be broken down into three component parts: morning care, day care and evening care. The engineer may be present during the morning care of their children, while the children get up, dressed and ready for day care. At the other end of the day, the engineer may be present for evening care of the children, while the children are fed, bathed, engaged in evening activities and put to bed. There is a spectrum of possibilities between being and not being present, where the engineer is present for some, but not all, of the hours of morning and/or evening care.

The role that the engineer's spouse plays determines the necessity for the engineer to take part in his or her family's care. Like the engineer, the spouse has a schedule that can be analyzed in the same three parts as the engineer: morning rituals, work and evening rituals. In the case of the spouse, it may be that the middle part of the day -- work -- is work in the labor force with an income producing job, or it may be that the work is to provide the day care for the children. For many of the female spouses that I studied, it is a speak of their struggle to decide whether or not to make the sacrifices in their family lives necessary to succeed at work. One female engineer said:

I will give 100% while I am here but I have decided work is not my main goal in life. Work is a means to other ends. So as a rule I work 10 1/2 or 11 hours a day and try not to come in on weekends except in emergencies. I used to work those long hours, then I just decided, this is not really how I want to spend my life. . . . I have just changed my personal goals. I have decided that kids will come before my career. Some people when they first arrive put in the hours, some of them continue, but others like me decide differently.

Another female engineer put it as follows:

I really like my job. I don't want to give it up but I will. I know other women who are doing the same thing, leaving the field, that is. I only know one woman who has taken another route. It seems strange to me but she has planned her pregnancies around programs so that her maternity leaves are during down times and she can be here when it is busy. This way she has been able to keep her career on track.

A problem for women is that key promotion stages at work tend to occur during childbearing years (Sirianni, 1991). Individuals who want to succeed feel that they cannot take time off when their children are young, and put extra time in later when their children are grown and they have fewer responsibilities at home. Rather, they must choose between being a successful employee as defined by the organization or being a successful parent as defined by spending time with their children when they are young. This results in "asynchronism" in regards to either one's career in relation to organizational norms, ones spouse's career in relation to the other spouse's career, and/or the family in relation to society (Sekaran and Hall, 1989). [Note: Sekaran and Hall define asynchronism as "a condition under which the person's or couple's experience is off schedule in relation to some sort of 'timetable' of development" (p.165).]
combination of both. The spouses work outside the home part time and provide day care for their children part time. At one extreme, spouses devote all of their work time to managing the home and child care. At the other extreme, spouses have full time careers that demand equal or more work hours and flexibility than the engineers to whom they are married. I define individuals with these extreme work arrangements as "traditional" spouses and "full-time" spouses, and the individuals in the middle as "part-time" spouses.

Of the seventeen software engineers that I studied, twelve are married and eleven of the twelve have at least one child under eighteen years of age. Of those eleven software engineers, four are women, all of whom are married to full-time working spouses. The remaining seven engineers are men, all married to women who work less than full-time; five are married to part-time spouses and two to traditional spouses (Refer to Table 6).

Male engineers and their spouses divide up the responsibilities of work and family by sphere. The men in these couples are the primary wage earners and the women are responsible for the home and family. Some of these women also work on a limited basis. By working at most part-time, the wives of the male software engineers ensure that "proper" attention is given to the household chores and parental care.

Many of the male engineers partially share responsibility at home, but none of them take primary domestic responsibility. What domestic responsibility amounts to is illustrated by Devault's (1992) research on feeding the family. She shows that there is far more involved in preparing a meal than simply cooking the food. Someone must orchestrate what gets made, how it gets made, when it is served, who will be present and what will happen as it is consumed. The meal is more than a time to satisfy one's physical needs for food. It is a family event with social implications. Managing a home requires feeding the family, augmented by all the additional responsibilities of caring for the children, ensuring that they are clean and dressed, loved and tended to, and transported where they need to be when they need to be there. It is the spouses of the male engineers who assume this responsibility for the home and family.
TABLE 6: Work-family Background of Software Engineers

<table>
<thead>
<tr>
<th>Gender</th>
<th>Marital Status</th>
<th>Number of Children</th>
<th>Whether Spouse Works</th>
<th>Own Satisfac. w/ W/F bal.</th>
<th>Spouse Satisfac. w/ W/F bal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female -- Full-time Spouse</td>
<td>Laura*</td>
<td>F</td>
<td>M</td>
<td>3</td>
<td>FT</td>
</tr>
<tr>
<td>Sarah</td>
<td>F</td>
<td>M</td>
<td>1</td>
<td>FT</td>
<td>DS</td>
</tr>
<tr>
<td>Kate</td>
<td>F</td>
<td>M</td>
<td>3</td>
<td>FT</td>
<td>DS</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>M</td>
<td>1</td>
<td>FT</td>
<td>DS</td>
</tr>
<tr>
<td>Male--Part-time Spouse</td>
<td>5*</td>
<td>M</td>
<td>M</td>
<td>3</td>
<td>PT</td>
</tr>
<tr>
<td>6*</td>
<td>M</td>
<td>M</td>
<td>4</td>
<td>PT</td>
<td>DS</td>
</tr>
<tr>
<td>7*</td>
<td>M</td>
<td>M</td>
<td>1</td>
<td>PT</td>
<td>DS</td>
</tr>
<tr>
<td>Chris</td>
<td>M</td>
<td>M</td>
<td>1</td>
<td>PT</td>
<td>S</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>M</td>
<td>1</td>
<td>PT</td>
<td>S</td>
</tr>
<tr>
<td>Male--Traditional Spouse</td>
<td>Matthew</td>
<td>M</td>
<td>M</td>
<td>3</td>
<td>TR</td>
</tr>
<tr>
<td>11</td>
<td>M</td>
<td>M</td>
<td>1</td>
<td>TR</td>
<td>DS</td>
</tr>
<tr>
<td>Male-- Full-time Spouse (no kids)</td>
<td>12</td>
<td>M</td>
<td>M</td>
<td>0</td>
<td>FT</td>
</tr>
<tr>
<td>Male--Single</td>
<td>Max</td>
<td>M</td>
<td>S</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>14</td>
<td>M</td>
<td>S</td>
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<td>--</td>
<td>S</td>
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<tr>
<td>17</td>
<td>M</td>
<td>S</td>
<td>--</td>
<td>--</td>
<td>S</td>
</tr>
</tbody>
</table>

* Managers
* Missing Data
Male Engineers with Traditional Spouses:

Of the eleven engineers who are married with children, two are married to traditional spouses. Both declined my request to visit their homes. These two male engineers may have declined because they know their wives are unhappy. As mentioned in the last chapter, Matthew told me: "I do not know what she will tell you. I know that she is very displeased with me, and does not understand the hours that I am working. . . . I am afraid of what will happen." The other male engineer married to a traditional spouse told me: "in my home we keep work and family separate. I do not mix what goes on in my work with my family." With that statement he politely declined my request to meet his wife and learn her story.

One can only infer that traditional spouses, who by definition are home all day with their children, have the greatest need of their husbands at night for adult interaction. Therefore, these women may harbor the most resentment when their husbands do not come home at a "reasonable" hour. The two male engineers I studied do not spend much time at home. Matthew is among the hardest working in the group I studied. He puts in extremely long hours at work. Furthermore, in order to maximize his uninterrupted work time, he often shifts his schedule so that he is at the office from noon until after midnight. By coming in at noon and going home after midnight, he minimizes the contact he has with his family. The second male engineer married to a traditional spouse does not work such long hours. Rather, he comes in early, by 6 AM, but he leaves by 4 PM. When he leaves, however, he reports that he has many engagements outside of work. These commitments seem to prevent him from having the time to help with family responsibilities. He is involved in his own business (outside Ditto) and he seems always engaged in home improvement projects. While much of this work, both on the outside business and on the house, is done at home, it is not time spent helping with the daily responsibilities of the house or child care.
It is also interesting to note that both of these men indicate that they are dissatisfied with their balance between work and family.\textsuperscript{39} At first glance, this may seem surprising. Both have wives at home full time who assume primary responsibility for the home and child care. However, the fact that both of these men work extremely long hours (one at Ditto and the other on projects outside Ditto), combined with the fact that their wives are apparently unhappy, may explain their own dissatisfaction with their work-family balance.

\textit{Male Engineers with Part-Time Working Spouses:}

The other five male engineers who are married and have children, have wives who work part time. In two of these couples, both the husband and the wife express satisfaction with the balance that the husband has established between his work and family.\textsuperscript{40} These men are extremely committed to their work and have a strong desire to succeed. Yet they also seem to feel that they can limit the time they spend at work. They take full advantage of the company's unspoken policy of "ad hoc flexibility." These two men make it a point to be at home to share "major events" in their family's lives. Their wives know that if they need their husbands, they will be there. Furthermore, these wives manage to combine work and child care in a way that enables them to get out of the house as well as spend substantial time with their children each day.

In contrast to the two couples in which both spouses are satisfied, both partners in one of the couples I studied expressed dissatisfaction with the male engineer's work-family balance. In this couple, the male engineer does not feel comfortable taking advantage of the "ad hoc flexibility" that the company offers. As a result, he misses many key events in his family's life. His wife says:

\textsuperscript{39} The measure of "satisfaction" is based on a survey where engineers were asked specifically to rate on a scale of 1 to 5 their satisfaction with their work-family balance.

\textsuperscript{40} The measure of "satisfaction" for the spouses is based on response to a question in the interview asking directly whether they are satisfied with the balance between work and family that their spouse has established.
He shows up in the third period of school open houses and at the end of basketball games, if he makes it at all. He missed both my MSW graduation and when Carla [his daughter] won the fourth grade role model contest. . . . It is always something, a vendor is visiting, a presentation to the vice president, or losing track of time, or something else. . . . There always seems to be something important, some reason why he cannot be home.

She further notes, "I used to try to force him to help around the house, but it would always result in an argument. . . . Now, I don't even try. . . . I fear that he is so stressed by work that he will not be able to handle anything else." She adds, half joking, "I would rather have a husband than a dead husband." In the end, she says, "I have decided it is just easier to do things myself rather than getting angry. I am too scared about his health to have a fight." This woman further recognizes that her husband is equally distressed by the lack of balance in his life. She explains:

I think that he would definitely accept a different lifestyle that required less work. I think he realizes that he has put himself over the edge. . . . He used to be a workaholic. He used to like being at Ditto. Now, he no longer feels that way. . . . He cannot sleep at night. Sometimes we get up in the middle of the night and work on resumes and cover letters. A while ago, he sent out dozens, but got no response. . . . I think he might be too old to find another job at his level. . . . But this work is destroying him. He cannot sleep. He works Saturday mornings. He takes off Saturday afternoon and Sunday morning. But, by Sunday mid afternoon he is already having anxiety attacks about returning to work on Monday morning.

Her husband describes his situation as:

. . . the worst year of my career. It is a combination of a new job, a tight schedule, and on top of that a schedule that continually gets pulled back. . . . I feel completely unempowered to do anything but what I am told . . . I feel completely out of control. . . . This is not my first job in project management, but it is far more out of control than what I have ever done before.

He describes the current pressure as "all consuming." He says, "I worry about work when I am not at work, at night and on weekends. I keep promising myself and my wife that it will get better soon, and yet each month I find myself promising that it will be better next month. But it never seems to get better." This man is apparently overwhelmed with his work and having his spouse take care of everything at home does not seem to alleviate his stress. For him, mere maintenance of his work schedule is problematic.
The partners in the remaining two couples express differing levels of satisfaction with current work-family dynamics. In one case, the engineer is satisfied with his balance, but his wife is not. In this case, the engineer sets limits at work saying he feels that his work is under control and he can leave when necessary. What he defines as a necessary reason to leave work, however, is not home related. Leaving work it seems is legitimate to him only if there is a crisis in one of the other two businesses he runs in addition to his job at Ditto. His wife receives no help at home. In fact, she said:

I once gave him a two page list of what he might do around the house and asked him to circle those tasks he would be responsible for... all he circled was taking out the trash... You better believe if all he is going to do is take out the trash, then I am never going to do it, even if it piles up all over... still I wait until he does it.

For the other couple, the discrepancy between the husband's and the wife's response to his work-family balance is flipped: the engineer is not satisfied with his work-family balance, but his wife is. In this case, the engineer makes it a point to take time off from work in order to attend major events in his children's lives. He works long hours, but his wife works part-time and feels it is her choice to spend time with the children. She is further satisfied that her husband makes an effort to be there when she needs him. In an interview, she told a story about one day several years ago when she was depressed after her mother had passed away: "All I did was call him and tell him I was having a bad day and he came home immediately." She further notes: "I never abuse his responsiveness, and he always comes when I need him." Her husband, however, no longer wants to climb to higher levels at work, and would prefer to spend the extra hours on either end of the work day at home with his family. He describes the problem as follows:

...layoffs are in the air, and just staying at my level is a very risky strategy. The next round of layoffs could hit any time, and I will be gone if I do not continue to aspire to new levels. They do not want guys like me getting old and standing still. They would prefer the young guys who are always eager to do more.

As a result, this engineer feels compelled to put more time into his work than he would like.
The seven male engineers in my study deal with issues of work and family by leaving responsibility for their home and children to their wives. Because their wives work part-time, if at all, these men do not have to worry about family and household maintenance on a daily basis. This arrangement, however, is not always satisfactory for the male engineers or their spouses. In cases where wives do not work, husbands do not feel in control of their work and/or husbands are not home even for "major events," dissatisfaction surfaces among one or both spouses. Both spouses are satisfied when the male is committed to his job but feels his work is under enough of his own control that he can be home when needed. This provides his wife the security of knowing that her husband, while not responsible for daily family care, at least will be present when necessary. The women in these couples also work part-time and therefore have a life beyond the family. Presumably, they are less dependent on their husbands for adult interaction than non-working wives yet still feel they have "sufficient" time to care for their families.

Female Engineers with Full-Time Working Spouses:

The four female engineers all have spouses who work full time. This is a problem for these female engineers. They do not have a "wife" at home to maintain their family's schedule. When spouses work part-time, the spouse is usually responsible for dropping off and picking up the children. For the dual career couples, there is an issue of not only who will care for the children and how everything will get done, but also who will transport the children to and from day care.

The degree to which it is problematic for a parent to have responsibility for picking up and dropping off the children depends on two factors: 1) the rigidity of the day care provider in terms of when day care begins and ends; and 2) the demands of one's work and whether the work schedule is defined by the clock, ensuring certainty regarding arrival and departure times, or by events which affords no such certainty.
The first factor -- the rigidity of the day care schedule -- is determined by the type of day care provider. For a day care center, there are likely to be set times for opening and closing. The times are strictly defined. In the case of an in-home day care provider, the times separating morning, day, and evening care may be somewhat flexible. The four female engineers in my study all use day care centers or day care providers outside of their home. They all therefore have limited flexibility.

The second factor -- the degree to which one's work schedule is clock-based versus event-based (Clark, 1985) -- is determined by the organization's definition of success. At Ditto, work schedules are event-based. To succeed, one is required to stay at work until the job is done. However, responding to an event-based schedule conflicts with clock-based demands. If the job is not done at 5:30 PM when the day care center closes, the person responsible for picking up the children must either suddenly arrange alternative accommodations or leave work, and suffer potentially negative consequences.

Managing the boundary between work and family is difficult for the female engineers, given their rigid day care providers and their own event-based work schedules. Three of the four female engineers however are married to husbands who have clock-based rather than event-based work schedules.41 These three men help their wives manage the children's transition between day and both morning and evening care. Despite the work schedules of these three men, however, none desire to take primary responsibility for the "second shift."

Of the four female engineers I studied, Laura is the only woman who is married to a man with higher career status than she has. (Her husband works at Ditto at the level of her manager.) Because her husband has equal or greater demands on his time at work, Laura not only has primary responsibility for child care and household tasks, but she bares most of the burden of picking up and dropping off the children. She is the only engineer I

41 Two of these men work at Ditto in lower grade level jobs than their wives. The third is a middle school teacher.
studied with this large a proportion of the child care responsibility. The fact that there is only one engineer out of seventeen in this situation suggests just how difficult it is to take on both work and family responsibilities simultaneously. Laura provides an example of some of the problems that the conflicting demands of work and family create. Laura complained bitterly about the sacrifices that she had to make both at home and at work. She described her priorities as:

... wishy washy ... I want both a successful career, and quantity time with my children. ... I worry that I am not spending enough time with my kids. I am with them after work, but the time is so pressured. I feel like I need more time, more time at home and more time at work.

Laura added:

If I truly thought we had enough money on one salary, I would quit working, at least for a few years. But I am afraid that I would never get the same opportunities again. I want to quit. I want more time with my kids. Family is my first priority. My heart is at home and as a result my work is suffering ... I wake up often and think to myself, it does not matter if you're a superstar; if you are not a premium employee. ... I want to be less stressed and more happy. I just want to be average.

But then she admitted:

I am too internally competitive for that. I cannot stand not being at the top. ... My heart is not currently in my work, but I need to keep trying. I need to buy some time, keep my job, so later when I am ready I can put myself back into it. I need to just make sure that I work hard enough to keep open the avenue for success. Otherwise, I will ruin my opportunity ever to be a superstar. People are judged based on age, and if I was older my opportunities would dwindle.

Laura experiences the greatest pressure to spend time both at work and with her family. Listening to her, the torment of her situation is obvious. If one tries to participate fully in both one's work and family life, one continually has to make painful tradeoffs.

In all four cases, the women are dissatisfied with their work-family situation. Of their husbands, two are dissatisfied and two are satisfied. The difference between the husbands who are dissatisfied and those who are not is the extent to which their wives "compensate" for the time they spend at work. The dissatisfaction arises when the husbands feel that they are asked to do more at home than they feel they should have to do. The problem, therefore, seems to be not so much whether the wives work, but rather the
wives' domestic expectations of their husbands. When "extra" requests are made of husbands by wives in terms of household and child care responsibilities, dissatisfaction seems to emerge from the husband.

**Conclusion:**

Considering the individuals' level of satisfaction across the different groups (refer back to Table 6), few of the spouses married to engineers are satisfied with their work-family balance. The dual career male spouses whose wives make few requests of them, but rather try to manage work and family by themselves (on top of their careers as engineers) are satisfied. The wives who work part time but whose husbands make it a point to be home for "major events" are satisfied. Otherwise, the spouses are dissatisfied.

Examining the lives of the engineers outside the work place substantiates the assertion that the work time cycle perpetuates a time famine not only for the organization and for the employees, but also for their families. Most of the engineers do not fulfill the demands of both work and family. Indeed, most do not even try. They are forced to make choices and few of them -- or their spouses -- express satisfaction with the outcome. In the end, the pressure to be competitive as an organization translates into not enough time for individuals to pursue a successful career and share the responsibilities at home.

In this chapter I have suggested that the work-family conflict is not just a conflict between an individual's work and family life but rather a conflict between collectively defined schedules -- the work schedule and the family schedule.\(^{42}\) I have further indicated

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\(^{42}\) The literature documenting the existence of the "work-family conflict" and suggesting possible solutions usually falls into one of two categories. Either the researcher studies the home lives of the individuals: how tasks are divided among spouses and what the implications are; or the researcher considers the work environment: how the work gets done, and what happens when an employee cannot accommodate the demands of work. Numerous surveys have further asked individuals about the impact of their work on their family and their family on their work. In this research, the work-family conflict is defined as conflict between an individual's work and family life. Solutions are designed (generally) to create change so that individuals are better able to cope with the current work practices.

The stream of literature that documents the responsibilities at home, who does them, and how much time is taken up, assumes that the demands of work are fixed, and the problem is how to make it more manageable for individuals to cope with the responsibilities at home. Since this research indicates that women bear the burden at home (Hochschild, 1989), the issue becomes how to create greater equity between
that a vicious work time cycle underlies individuals' work schedules. The implication of my research is that resolving the work-family conflict, and therefore the time famine, requires altering the work-time cycle itself. In the next chapter, I explore why individuals seem to fail when they try to resolve their work-family conflicts on their own. The failure of these individual attempts reinforces the assumption that pressure to be a globally competitive nation must lead to a time famine. In Chapter 11, I consider the possibility of collective change as a way to alter the work time cycle and therefore begin to ameliorate the time famine.

the spouses at home. A separate stream of literature coming out of psychology complicates this issue, however, suggesting that gender differences are a learned social reality (Gallos, 1982; Gilligan, 1982). Men are thought to focus on "doing" (Chodorow, 1989) and climbing to the top of hierarchies (Gilligan, 1982) while women are more satisfied "being" (Chodorow, 1989), surrounding themselves in a web of relationships (Gilligan, 1982). This research suggests that women tend to find the work at home more fulfilling and are therefore more willing to engage in it.

Women also seem to have a higher expectation regarding what needs to be done at home. They often find themselves with husbands unwilling to help at home because they think that much of the home work is unnecessary. For example, most men in my study seemed to have a much higher tolerance for dirty bathrooms. These men argue that if their wives felt that the bathroom was dirty, then they should clean it; otherwise it could wait. Encouraging men to participate more at home has not been very successful (Shelton, 1992).

The alternative stream of literature on the work-family conflict focuses on the work demands. This research indicates that the long hours and lack of flexibility expected of employees create problems for individuals who are also managing a family. The solution, according to many researchers, is to increase individuals' flexibility and reduce their hours of work. In response, work-family policies have been introduced at major corporations around the country that provide individuals the right to flexible work schedules, part time work, and job sharing in order to ease the burden for those who must balance work and family (Farber and O'Farrel, 1991; Kanter, 1977; Levitan and Conway, 1990; Schwartz, 1992). However, these policies have been found to create "band-aid" solutions, helping those desperate to balance work and family, but hindering their career potential (Perlow, forthcoming). Superimposing flexibility on existing assumptions about the need for presence at work means that those who take advantage of work-family polices cannot satisfy the organization's demand for extended hours at work (Bailyn, 1993). It is therefore no surprise that work-family policies such as flex-time, job sharing and part-time work hinder the career advancement of those who take advantage of them.
PART III:
Challenging the Existence of the Time Famine
Chapter 10
Creating Individual Change: The Cases of Chris and Kate

Ditto management recognizes that employees have lives outside of work and that crises emerge at home. "Ad-hoc flexibility," as mentioned in the last chapter, exists for those who wish to take advantage of it. However, problems arise if one needs more than temporary relief on an occasional basis.

For employees who need greater flexibility, Ditto managers try to make individual accommodations. These accommodations provide employees overwhelmed by their need to manage both the demands of their work and families an option to spend less time at work. However, employees who take advantage of these options suffer career consequences. The definition of the successful employee has not changed. Therefore, engineers who alter their work schedule risk being labeled "different" and "less able to perform."

Two stories follow of individuals who struggle to manage both work and family. They each found alternative ways of working that enabled them to complete their work and achieve more balance in their lives. Chris is one of the most junior engineers I studied. He has high career aspirations, but he also values sharing time with his family.\(^{43}\) Chris temporarily created an alternative work schedule. He worked Saturdays instead of Mondays. Kate shares both Chris's high career aspirations and a desire to be home with her family. She is several grade levels higher than Chris. Until last year, she was seen by her peers and her managers as a "rising star."\(^{44}\) Last year she arranged a more permanent change in her work schedule; she worked at home one day a week.

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\(^{43}\) Chris has been at Ditto for three and a half years. He is the lowest grade of the engineers in my study. (One other engineer is the same grade level.) I estimate that his salary is in the mid $30,000's.

\(^{44}\) Kate has also been at Ditto for three and a half years. She, however, has more prior work experience than Chris. She earns a salary in the high $40,000's.
The differences between the accommodations in their work schedules are twofold:
1) Chris articulated his need as temporary while Kate defined hers as more permanent; and
2) Chris positioned his alternative as a way to better enable him to meet the demands of his work, while Kate focused her request on her need to meet the demands of her family. In the end, requesting flexibility helped Chris accomplish his work without any apparent negative side effects. Kate also succeeded in completing her work. However, the following year she received no raise. Only the lowest ranked 20% of employees at Ditto did not receive a raise that year. The perception shared among many is that Kate's request to alter her work schedule resulted in her failure to receive a raise.

*The Case of Chris:*

Occasionally Chris adjusts his family schedule to accommodate work. However, he does not make the accommodations other ambitious employees make. He does not allow his work to dominate his family life. Chris's wife Heather expects him to be an "equalitarian" dad. She expects him home at night. If he is not paid for overtime, she insists, he should not work it. As Chris's manager said, "Chris's wife does not let him off the hook easily. He has strict hard stops everyday."

When Heather became pregnant with their first child, she quit her job bringing supplies to underprivileged women with children, and accepted a part time job (three evenings a week) at the neighborhood pizza parlor. Chris notes, "Heather works as a way to maintain her self-esteem." He describes her work history with sorrow and shame:

She had a job she loved when we lived in Rhode Island. . . . After I was laid off, the best job that I could find was at Ditto. We did not want to move so far from home, but we really had no choice. . . . We are not here to stay. . . . We want to get back to our families. We want to be closer to home. . . . It is hard being so far from home. . . . Our parents come visit, but it is very tough when they leave. . . . We have arrangements with other young families in the area, but it is not the same as having your parents around.

In her most recent job at the pizza parlor, Heather works from 5 PM to 9 PM, Tuesday, Wednesday and Friday nights. On those evenings, Chris leaves work by 4:30
PM. This seems to be Heather's way of assuring that Chris accepts his share of responsibility at home. Although both agree that her career is secondary, this attitude does not translate into Chris's work dominating their lives.

**Focusing on Individual Deliverables**

Chris achieves success by maximizing the time he devotes to his individual deliverables. He tries to minimize the help he provides his teammates and gets visibly angry when he has too many meetings to attend. At a team meeting in November, his project team leader suggested that Chris attend a meeting the following day with an outside vendor. Chris snapped, "Oh no, not another meeting. All I do these days is go to meetings. How am I supposed to get any work done around here?" Recall as well the example in Chapter 8 where Sarah wanted to show Chris her great breakthrough, but Chris could not be bothered. Matthew explained how Chris has an ability to act that way and not feel bad about it.

Sometimes despite his single-minded focus on his own work during normal business hours, Chris has trouble completing his individual deliverables. At these times, he does not use the typical Ditto approach of "throwing time at problems." He refuses to simply increase his total hours at work. Instead, he tries to find alternative ways of addressing the problem. For example, prior to the November 22nd release, Chris was having trouble keeping up with the schedule. Chris spoke to his manager. They both agreed that 8 AM to 5 PM, Monday through Friday, is not productive because of all the meetings and other interruptions that occur. Instead, they decided Chris would experiment with working Saturdays instead of Mondays.

Chris's wife approved of the plan. She said: "I feel lucky to have a husband on a day everyone else's husband is working... A lot is closed on Saturday that is open on Monday, and so we can do things we could not otherwise do." Heather also explained:

Chris has school on Mondays, so Mondays are a very long day for me to be alone with Mike (their baby). ... When Chris used to work Mondays, he
would go to work at 7 AM and then go straight to school, and he would not
get home before 7:30 PM.

Chris found working Saturdays to be more productive. "For example," Chris
described with pride:

Laura asked me to estimate how long a certain task would take. I thought at
least a week, and that was optimistic. Yet, I was able to do it all one
Saturday, the whole thing. Even now that I know what is involved, I still
think that during the week it would take 2 maybe 3 days, at best. . . . But I
only needed one day because I did it on a Saturday.

However, Chris did note:

I ran into some road blocks because it was Saturday, and I needed some
other people's input, but I knew that I would have to wait on those things
and so I just changed paths and it was no big deal. . . . I cannot believe
how much I can get done on Saturdays. I mean there is no one for me to
interrupt and no one to interrupt me. There is nowhere to go. It is an
incredible day. Saturdays are definitely worth at least two week days. . . . I
think Saturdays saved me. It makes a huge difference when you work
Saturdays.

Chris understands that if he wants to succeed, he must play by the established rules
and accept the work schedule as it exists. He presents his altered work schedule as
temporary, and he keeps the matter "low visibility." For example, during the week before
his wife had her second child, she was "very emotional" and wanted Chris to be around the
house to help her with their two year old. Chris received permission from his manager,
Laura, to take his computer home and work there as much as he needed. However, Chris
noted:

Laura is a nice manager. She is very flexible and understanding. But I
worry because I know that she is not the only one who evaluates me. The
rest of the management team have input, and they are less supportive of my
working at home part time, even if it is temporary. I fear that if they are
aware of what I'm doing, it will affect me negatively at work.

At one trying point on the program, Chris was so overwhelmed by work, he started
arriving at 5 AM to try to accomplish his tasks. Chris noted: "Heather is flustered because
I am not around in the morning to help, but at least we are spending evenings together."
Chris tries desperately to find ways to get his work done while also meeting his family's
needs. He says:
When I have lots of work work and school work to do, I try not to take time from Heather and Mike. I try instead to work late at night, or early in the morning. . . . For example, one night Heather was all excited because she had brought home a movie. I did not start working until after the movie, and after Heather had gone to bed. I try very hard to get my work done, but without taking time away from her.

The difference between Chris, who manages to innovate successfully, and someone who does not successfully reconfigure his or her work schedule (like Kate) seems to be a matter of degree. Chris innovates without challenging the underlying assumptions about how work must be done. Chris tries hard to adjust the system in a way that allows him to make subtle changes.

When the time for raises and promotions arrived last year Chris was well rewarded. He got a 4 1/2% raise (the same as Matthew), indicating that management thought that he produced high quality work. He also received a promotion. It is important to note that prior to this promotion Chris did technical work at the same level of difficulty as the rest of his teammates, all of whom were several grade levels higher. Laura, his project team leader, often sought out Chris when she needed to get something done. When Chris would question her choice, she would tell him: "I can count on you." Around the time that promotion decisions were made, Chris constantly reminded Laura, "If I am so dependable, I deserve to be recognized. I am a lower grade level and make significantly less money even from those in my grade level. It is not fair." Laura agreed and fought hard to obtain for Chris the recognition she felt he deserved.

The fact that Chris was dependable apparently profoundly affected Laura's perception of him. She supported both his desire to focus single-mindedly on his own deliverables at the exclusion of all else and his need to make minor accommodations in his work schedule. She approved of these ways of working because they clearly were meant to help him accomplish his individual deliverables, and as his project team leader that is what she perceived to matter most.
The Case of Kate:

Kate, like Chris, struggles to meet the demands of both her work and family. She, however, tried to effect a more permanent change in her work schedule. Last year, Kate attempted to work from home one day a week. This year Kate fell from a "premium employee" to a "below average employee." She attributes the drop to her attempt to create a flexible arrangement. Her managers, however, have a different account of their lowered perception of her work. They attribute her decline to a drop in the quality of her work.

After eight months working from home one day a week, Kate was assigned a new job working with confidential data which could not leave the lab. In her new job, Kate could no longer work from home one day a week. She said: "The problem with this new assignment is two fold: It is boring and unchallenging work and I don't see the value in it even once I am done. . . . If at least I saw the value, I would feel like it was less demoralizing."

The underlying question is why Kate was assigned this new job. Kate, as well as many of her peers (and even some of the Ditto managers), believe that she was assigned this position as punishment for trying to make accommodations in her work schedule for her family. The managers responsible for giving her the poor performance rating, however, claim this job assignment was important work she failed to complete adequately. Her managers take no responsibility for not clarifying the importance of the work, nor do they provide any explanation for why a premium employee would suddenly not be able to perform up to the organization's standards. The details follow.

From January until August (the year before I was studying the software engineers), Kate's managers viewed her as a "successful" project leader for a team of six engineers. Kate spoke with pride when she described her accomplishment: "I took what they considered to be a difficult group. . . . individuals who were notorious for not getting along. . . . and I created a self-managed work team. . . . I know it is an important skill to be able to empower a team like this."
Given that Kate had created a self-managed work team, she was able to work from home one day a week. This enabled her to save the two and one half hours of commuting time and increase the amount of uninterrupted time she had to accomplish her own deliverables. To accommodate her new arrangement she invented a rotating position which her engineers took turns filling. She said, "This provided them good exposure to what the role of a manager was like." Not only did Kate find working from home extremely productive (she said, "I could get more than two day's worth of work done in one, and still have time left over for educational advancement, reading manuals, etc.")., but her engineers experienced the role of manager early in their career. Kate’s six month review referred to it as the "best year of her career." Her peers considered her a "rising star."

**Forced to Give Up Her Flexibility**

When I met Kate (in October) she had recently been reassigned to a new group. She now worked as an independent contributor with confidential data. Kate's assignment was to evaluate the most recent software release of a vendor's product. However, it was Kate's opinion that "senior management had already made up their mind. They wanted to use the older, more established release. . . they were having me investigate the newer product just to reassure them that they had made the right decision."

According to Kate, she was in a "lose-lose situation." If she ultimately recommended use of the older version, the management’s response to her work would be "we told you so." On the other hand, if she asserted that they should use the upgraded version, she believed that they would not implement her recommendation. Kate was convinced that

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45 Kate’s husband is ten years older than she is and has spent his career as a middle school teacher in a public school system two and one half hours from Ditto. To change school districts would require him to give up his seniority. When Kate was looking for work three and one half years ago, the best job she could find was at Ditto. In an attempt to accommodate both of their careers, they live with their three children in a small village close to the midpoint. They wanted to live slightly closer to Ditto in a nicer area, but they could not afford it. Instead, they built a home overlooking a lake, in a small village consisting of only a post office. Kate commutes one hour and fifteen minutes each way, every day. When the weather is bad, it takes significantly longer.
management was beyond influence: "they have already made up their mind that they would
use the older software release, no matter what I do." She described herself as
"disempowered." She said, "I have no say in the final decision and I do not even have any
understanding of the financial implications of one release as opposed to the other. . . .
Without any of this information, it is impossible for me to be motivated to do work that I
think is worthless."

The software engineers who shared Kate's lab possessed similar perceptions of her
situation. They thought that Kate was a wasted resource. They wondered aloud, "Why
does the management keep Kate on a project that is so pointless when she is a technically
competent engineer and there is so much work to be done with the older software release?"
Because Kate and the other engineers in the lab believed that Kate's work was low
priority, it was not uncommon for them to ask for Kate's help or to borrow her computer
for lengthy periods of time -- hours, sometimes even days. This behavior was seen by her
peers as "facilitating the progress of the team." Kate said: "I let this happen because I agree
with them that their work is more critical than mine."

Looking for a New Job

For the first three months I knew Kate, she worked on this new assignment. She
was the only one investigating the more recent release, as opposed to working with the
older release. In November, Kate became so disgruntled that she tried to leave the group.
It is Ditto's policy that an employee can change jobs if management approves the change.
Kate found a desirable position on another project team in a different division. Although
she was offered the job, her management would not agree to let her leave.

Initially, her manager's manager, who would have to agree to the shift, promised
Kate that the situation within her current group would soon improve. He said that she was
being "targeted" to be a project team leader. Kate expressed doubts to me whether she
would even want such a job, but she recognized that it was an opportunity for visibility and
career growth. (It also indicated that they were satisfied with her performance.) For the time being, she had no choice because her manager would not agree to let her go.

By December, Kate was so frustrated with her job assignment that she decided to go above her manager with signature authority and try to get his manager to let her change jobs within the company. However, the week that she was finally ready to act, Ditto announced a 10% reduction in work force. The first round of layoffs was scheduled to begin in mid January, and one did not want to be caught in between jobs at that time. Kate suspended all action to leave the group.

Another Reassignment

Before the end of December, Kate was reassigned again, this time within her own project team to a different project team leader. She now found herself working for the project team leader whom she had been told several months earlier, she was being groomed to replace. Kate voiced concern to me, wondering "how do I handle this situation?"

The reason for Kate's sudden reassignment related to another engineer's disability leave and someone had to pick up the work. Kate evaluated the fact that she was the one reassigned to help (and her old work assignment dropped) as further indication that no one valued the assignment she had been given.

Again Kate accepted her new assignment and tried to make the best of it. Kate came up to speed quickly and contributed both individually, in terms of meeting her deliverables, and by supporting her new teammates. She eagerly helped her teammates and was often found sitting with them in front of their computer terminals, jointly solving problems. I never heard Kate say who was helping whom, but, when I pressed others for that information, it was always Kate who was seen as giving help.
**Everything Fell Apart**

When the raises for the year were announced, Kate was devastated. Kate, who had been told in writing on her mid year review that she had had the best six months of her career, and then had spent the last four months on a low priority, low visibility assignment was shocked to receive a zero. The raise was based on a twelve month period. Her six month review began by saying:

Kate had her most successful time at Ditto. . . . Kate and her team stayed on schedule for all tasks this year. . . . Kate has excellent software development skills. . . . Kate worked well with people outside the group. . . . Kate is good at the people side of management. . . . She successfully worked hard to build a team atmosphere. She helped mold the many diverse personalities of her group into a close team.

The only words of areas for improvement were " . . . She must improve her statusing skills. . . . Kate will benefit by improving her presentation skills."

Six months later, her end of the year review acknowledged that her assignment "had several built in barriers which Kate worked hard to overcome." It concluded:

Despite these barriers, Kate succeeded in integrating . . . this was a significant achievement. . . . She did not however complete the color compression task on time for a decision. Despite the obstacles mentioned above, this activity seemed to lack a clear direction and understanding of the barriers and the work-around to complete this task.

Kate received her review, but she refused to sign it. "To sign it," she explained to me, "would indicate that I accept it, and I do not." Kate was shocked. She had received no indication that her managers saw her performance as problematic. She had always been a top performer and she had no reason to think that things had changed. Kate said: "If the review process was working, I should have at least known that I was perceived as a problem. But I had no such indication."

Kate's initial reaction was to go into her office, close the door and sob. She notes, "I have never before cried at work." Once she was able to compose herself, she went to her manager and demanded an explanation. He attributed her zero to a bad year. "He told me that I was in the wrong place at the wrong time. He had no further explanation." Kate
said, "I could not help but feel bad for him, he is such a poor manager, and he had no idea how to handle this."

Kate next went to her manager's manager asking for an explanation. She received an unacceptable response. Kate said:

Zeth told me that I had not statused him appropriately. Zeth claimed that I did not let him know that I was having all the problems that I was having. . . . At that point I nearly lost it, but instead I joked with him that clearly, 'I was not communicating well.' So, I went back and pulled out all my weekly status reports from the four months I was on the project. I showed him how I was busy updating him regularly. I further showed him how I had noted over and over that I was facing problems and was getting no help, no sense of direction and no sense that what I was doing was important. . . . Beyond complaining about the lack of status, Zeth had no further explanation for why I would receive a zero.

Dissatisfied with the response of her manager's manager, Kate approached his manager, and even his manager's manager (two levels of management above her direct manager). She ultimately took her case to the Division Vice President -- four levels of management up -- and argued that she had not been given a fair evaluation. She said:

I argued that my first eight months were my best, and I had always been a premium employee, and my last four months were on an assignment of no value. . . . I am better than this and will not let them treat me this way. I know that I am marketable. . . . I will leave if that is what it takes. . . . It is not the money, but I will push for a salary increase because I am afraid that a zero will haunt my career for a long time. The issue is not $10 a week, but what other people will think of me. . . . And, especially in the case of another layoff, I have to worry that I will be out the door if I am not careful.

In response, management of all levels criticized her lack of commitment during the last four months and argued that the assignment had been a very important experience, a real opportunity for her to prove herself.

Her immediate manager, Allan, did admit to me:

I never communicated the importance of the task to Kate and the vendor certainly did not think that she was going to succeed. . . . the challenge was to demonstrate that it could be done. . . . It was a great opportunity to become the group expert. . . . It is not clear to me that the task could have been accomplished by anyone, but at least a star engineer would have gone down swinging. . . . I did treat it like a low priority task, we certainly were not going to jeopardize the older release for it, and Kate certainly had some major barriers to overcome. . . . when I was at her grade level, I would have killed for the assignment. It was a great opportunity to make a
contribution and acquire new skills. . . . I was disappointed with her attitude.

Zeth, her second level manager, made similar arguments:

The new software release would have reduced the printer cost by $300 and Kate failed. Now I have to find an alternative way to reduce cost. Her task was important. I would not have had her do it if I did not think so. We are short of resources so obviously it was necessary to use them as best we could. I felt that the new release really did offer a possible solution to the issue of cost reduction. . . . A superstar engineer would have succeeded. It was a challenging task, and the fact she failed does not mean that she is a bad engineer, only average. . . . The only reason I called off the effort and put Kate in to replace Jane was because Kate had provided insufficient data, and there was too great a risk to going ahead.

Even if Kate had succeeded, the issue of whether they would have used the new release remained. It was Kate's argument that no matter what she concluded about the new release, management would still have used the older release.

Kate had a great deal of trouble getting her managers to focus on her issues. At one point she noted, "around here, if a machine is down, that is a crisis that needs immediate attention, but when a person is down, there is no immediacy to the issue." Kate's case lasted several months, and by the end, she looked exhausted. Her eyes had huge circles under them, and she seemed to have no enthusiasm for her work. Kate said, "I am no longer able to sleep at night and during the day my attention is on battling for what I deserve, not on my deliverables." The incident left Kate bitter and the process that followed exacerbated her negative feelings. One Monday morning, in the midst of the situation, she said: "It is not fair. This is taking so much time. And I can think of nothing else. This past weekend, no matter what I was doing, I found myself thinking about how unfair this all is."

In the end, Milton, the Product Manager, conveyed to Kate the conclusion reached by her managers. According to Kate: "He said, 'your performance reviews do not have the superlatives in them that the others have.'" Kate's response was:

. . . that stuff is fluff. I never realized that I needed to make sure that there was enough fluff, but I will be sure to do that in the future. . . . In the meeting I was very hurt and I did all that I could to hold back tears. . . . When he asked me if I wanted to stay in the group I gave him a definitive no
and added that there are no career opportunities here. And he just said, 'okay.'"

At least now Kate was able to obtain a manager's signature to leave the group.

Although Milton delivered the outcome as Kate's new senior manager, he was not directly involved in the decision. Milton told me at one point, "I never understood why Carl (the old Senior Software Manager) would have been pushing for the new software release. It never seemed a feasible source of cost reduction to me. . . . I understand why Kate's heart was not in this work." Milton also said: "any employee who drops from premium to below average in a year that they successfully managed six people for eight months, deserves to be upset." He confided: "Kate asked to work at home one day per week. . . I suspect that is underlying her drop from a premium to a below average employee." Yet, despite all these comments, Milton did not overturn the decision (whether or not he could have is unclear).

In July, Kate officially joined the group that she had tried to join the previous November. Kate says: "This process has taken a toll. I will try the new group, but I am considering leaving the company." She describes herself as very cautious now. She says:

I am on the defensive. If nothing else, this experience taught me that I have to stand up at all times for myself. I have to think of myself and my work, above all else. . . . And I have to make sure I never get stuck on a bad assignment. . . . I learned never to get stuck on a side project. . . . One must always fight to be in the limelight. . . . And I think I better be very careful about working from home, even if it all seems like it is going well.

Making Sense of Innovation

Kate had constraints on her work time. She tried to devise a work schedule that would benefit herself and everyone else involved. She created a self-managed work team so that she could work from home, group members had an unusual opportunity to act as managers and the project did not suffer. Her six month performance review noted that the group was on schedule. Yet, management gave no recognition to her innovation. Instead, the common perception is that Kate was set up for failure. Management created a reason to
punish her. Kate's lack of commitment to her new job, not her work schedule innovation, supposedly lead to her failure. However, many engineers (and some of their managers) suggest that it was not a coincidence that her new job ended her opportunity to accommodate to her family's needs and provided her limited opportunity to succeed.

Kate's managers justified their treatment of Kate by pointing to her failure in her new job. However, a few comments about the importance she placed on her family did surface. One manager said, "home is stifling her career possibilities." An additional issue also emerged: Kate had declined management training -- a program that would have required her to be away from home for two weeks. The argument management made against her was that she does not make "sacrifices." Kate argues that management training was scheduled for the same week that she was moving into her new house, and after much discussion with her husband, she decided that it was not feasible at that time for her to leave her family. Thus she declined, but requested a future "opportunity."

Kate tried to fight her low performance rating. However, the harder Kate pushed her case, the more the management pushed back, creating even more elaborate reasons why she did not deserve a raise. In the end, the managers seemed relieved when she decided to leave the group. The loss the group suffered was not mentioned. When I asked the Quality and Business Effectiveness Manager his reaction to losing Kate, he responded: "She is leaving? Where is she going? I had no idea." He then added, "I guess that shows you how insignificant the team must think it is, if I have never even heard about it."

**Work-Family Stress**

Exacerbating Kate's stress and unhappiness was her father's death in the fall of this year and her mother's resulting financial troubles. Kate said several weeks after finding out that she had received a zero raise: "I have not been able to focus on my mother's problem, but I need to get involved. No one is handling it."
Kate also faced marital difficulties. As open and honest as Kate was with me about her work life, making sure that I knew every detail about what happened in terms of her raise and how everyone at work was responding, she did not want me to interview her spouse. At first Kate said, "I think it is a great idea, but in my case it will not be possible." For several months I said nothing. As I finished up the spouse interviews in April, Kate approached me and asked how they were going. She said, "I think it might be okay for you to visit my house, as well." She seemed timid. She put the responsibility on her husband saying he would not be pleased to be interviewed. When I did visit their home, I had not been there for more than five minutes when her husband told me that they were in "couple's therapy trying to save their marriage." During my extensive conversations with Kate, she had never mentioned problems at home. Her husband, however, was quite vocal about the stress he felt work was putting on her and the difficulties they were experiencing as they tried to cope.

A Poignant Comparison

Laura is now Kate's manager. One year ago they were professional equals. Both are women with three children and working husbands. Both were targeted as "rising stars." Last year, both were in their first managerial positions. The operative difference is that Laura seems to never resist higher management decisions. She accommodates to the demands of work, while Kate does not. Kate refuses work that does not cohere with the time she has. Kate's work-family boundary is rigid. Laura's is flexible. Laura tries to expand the time she has in order to avoid any refusals at work.

Kate created an innovative way to get her work done that benefited her work, her team members and her family. But Laura, not Kate is perceived as the dedicated worker. In a year that both Kate and Laura acted as project leaders for the first eight months, Laura was promoted and ranked in the top 10% of managers. Kate was not promoted and ranked in the bottom 20% of employees.
Conclusion:

The major differences between the work accommodations made by Chris and Kate were how the requested change was presented to management -- as temporary or permanent -- and how the request was framed -- as benefiting work or family. Chris's alternative slightly adjusted the system. Kate's alternative threw the entire system into question.

Conceptualizing the conflict between work and family as two opposing schedules, one recognizes that the solution to the work-family conflict requires finding a way to maintain both schedules simultaneously. The implication of my research is that work-family balance could be achieved if the work schedule was reconfigured. Kate tried to implement such change. She failed. Failures like hers reinforce the assumption that alternative ways of working that make it possible for employees to succeed at work and have greater work-family balance do not exist. It is not surprising however that individual attempts to create such change fail. These changes do not address the vicious work time cycle which underlies the problem. Unless the cycle itself is altered, engineers will continue to exist in a world dominated by a crisis mentality and an individualistic definition of success. Any attempts to create change will still be evaluated given the current standards. The final question is whether it is possible to alter the work time cycle itself. This will require changing the three components of the cycle -- the crisis mentality, the definition of success and the way time is used at work -- which will have to be done collectively. I explore the possibility of collective change in the next chapter.
Chapter 11:
Creating Collective Change: Experimenting with "Quiet Time"

Each engineer suffering from the time famine perceives the time shortage as his or her individual problem. As a result, the engineers make tradeoffs in an attempt to optimize their personal desires for organizational success and for family involvement. As described in the last chapter, however, individual accommodations in favor of family over work hinder one's organizational success and perpetuate the assumption that change is not possible.

Instead of accepting the time famine as an individual problem that requires individual accommodations, the collaborative project discussed in this chapter framed the time famine as a systemic or organizational problem and questioned whether the long hours are necessary to get the work done. The engineers and their managers assume that, given the extreme time pressure to be competitive as an organization, they as individuals have no choice but to "put in the time" if they are going to meet the work demands. The purpose of the experiments was to challenge this assumption and test whether existing work structures are as inflexible as the engineers perceive them to be. My hypothesis was that work could be rethought in ways that would better enable employees to get their job done and therefore begin to minimize the number of crises and the need for individual heroics. If a more positive cycle can be created where interactions are planned, crises are prevented and success is defined based on individuals' ways of working and not the number of hours that they work, the time famine should abate. My expectation was that altering the work time cycle would not only benefit the employees, but the product development process as well.

To alter the work time cycle all three components must be altered. The question is where to begin and this depends on who initiates the change. In my case, I was working collaboratively with the software engineers. The change therefore was being made from the "bottom-up." The most feasible point of entry in this case was the way time was used
at work. It would be more difficult for a group of software engineers -- on their own -- to create deep cultural change in either the definition of success or the crisis mentality that permeated the organization. They can, however, agree as a group to use time at work differently.

At the time the discussion of these experiments began, I had been on site for over four months and had collected extensive data on interaction patterns. I presented this information to the software team in a meeting. The problem identified was that no one could get their work done in a "reasonable" amount of time. This difficulty had direct consequences for the individuals who had responsibilities outside of work. It also affected the product development process, although these issues were not as apparent to the members of the organization. The intent of the experiments was engagement of the engineers in a collaborative process which further documented the problem and generated solutions.

At the first meeting, it was jointly decided that all would try to work together to address the time famine. After a week devoted to extensive conversations to obtain the input of each of the seventeen members of the team, another meeting was convened. Based on these conversations, I proposed to the seventeen individuals as well as the Project Manager and the Division Vice President, a collaborative experiment in which the software team would be left uninterrupted for blocks of time during the day that would be referred to as "quiet time."^46 The purpose was to try to establish alternative ways of working that would be less disruptive and therefore would enable people to accomplish more during the work day. At the time, the engineers came in early, stayed late and worked weekends in

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^46 It is important to highlight that the research team I was apart of were strong believers in the importance of interactions. The intention of these experiments was not to minimize interactions. On the contrary, the intent was to find ways that would optimize both individual time and interactive time. When interactions are scattered throughout the day they are perceived as interruptions. But, if they could have a time of their own, they might be perceived as a valued activity. In other words; underlying the attempt to provide individuals quiet time to get their own work done, was an interest in creating alternative times where interactions were seen as complementary and helpful to the work process. "Quiet time" was therefore created both as a way to provide individuals solid blocks of time to get their work done but also as a way to free up time so that individuals would have time for needed interactions.
order to have some "quiet time." The experiments were meant to place some of this precious "quiet time" within the normal work day so engineers would not have to work outside "normal" work hours.

As I worked with the group to refine the quiet time proposal, several concerns surfaced. The first involved the definition of a "legitimate violation." In response, one engineer told another: "We need to have an open mind in order to do this experiment, and only if the roof caves in should there be an interruption." He continued, "We need to do this to learn and be able to analyze the situation." Another engineer wondered, "What about walking down the hall, how do you deal with interruptions then?" In response, a peer suggested, "You tell them you are in quiet time. There is no way to have perfect quiet time, but let's give it a try." Eventually the group reached consensus that the decision rule would be as follows: "If the person you need was in a meeting and you feel your interruption is important enough that you would interrupt the meeting to find that person, then your interruption is important enough to cause a violation of quiet time."

The goal of the experiment was to achieve zero violations -- no interruptions during quiet time. It was agreed that violations could occur if defined as "absolutely necessary," but any interruption had to be reported to me so that I could further investigate its "root cause." If a team was working together (i.e. Paul's Group), team interaction was considered acceptable during quiet time, provided that it was work directly related to the advancement of the deliverables of everyone involved.47 No work was to be done during quiet time that was not directed at one's deliverables and the engineers were to disturb no one else.

47 Interactions were not completely excluded because, in the case of Paul's Group, interactions were often the way the group worked on their collective deliverables. If one recalls the earlier discussion, the members of Paul's Group did not have individual deliverables but were working together to get an operating system running. Because the members of Paul's Group represented a third of the engineers in my study, it was necessary to make an exception to the rule that there were to be no interactions during quiet time. We had no choice but to agree to this constraint. Paul's Group was working to meet strict deadlines and their work required continuous interactions. They would not (and really could not without completely altering the way the work was divided up) accept an alternative. Consequently, interactions that were directly related to the deliverables of everyone involved were considered legitimate, even during quiet time.
Another concern among the engineers and managers was that it was already the middle of January and, come the end of January, they would shift from the design phase to the testing phase. It was felt that in the testing phase it would be less possible to delay interaction and therefore quiet time would be more problematic. To handle this issue we agreed to limit Phase 1 of the experiment to two and one half weeks, which would keep it within the boundaries of the design phase. However, the experiments continued for several months into the testing phase, and this potential problem never came to fruition. Rather, in the end, the engineers and managers told us that they learned that interactions can wait, regardless of the phase.

A third concern related to the timing of quiet time. The software manager proposed that quiet time occur between 10 AM and 2 PM, as opposed to the morning or the afternoon exclusively. He expressed concern that after the morning Sunrise meeting he needed to be able to redirect the engineers so that they would be working on the high priority items for the day. He further wanted the opportunity to check in with them at night before they went home in order to get a sense of their progress. However, several of the engineers reminded their manager that the goal of the experiment was not to make everything critical. They argued that it was not in their best interest to have their manager shift their priorities every morning, especially because by the afternoon, the priorities would often shift back. The software manager resisted. He argued: "We must go along with the existing process or it won't work." But the engineers, with some support from the research team, kept challenging the software manager's assertions. Eventually he agreed to try quiet time in the morning.

The team established that during Phase 1 there would be quiet time three days a week until noon. Intentionally, no starting time was set. This avoided the explicit determination of when people should start working. The three days chosen were Tuesday, Thursday and Friday. The reason for this choice was that engineers felt that Monday tended to be a particularly busy morning which required responses to crises that emerged over the
weekend, especially in the testing lab. Since these crises tended to involve people beyond this study, the engineers felt that it would be best not to have quiet time on Monday mornings.

Initially, the software engineers were eager to have the uninterrupted time to complete their work; this seemed to explain why they were willing to experiment in the first place. Managers, however, expressed considerable concern that the work still needed to get done, and they did not want to be involved in experiments that might hinder the team's progress. A conditional rule was established: if anyone became distressed, the experiment would be halted.

With teamwide commitment at least to try for two and one half weeks, the experiment began. Late each evening before quiet time days (on Monday, Wednesday and Thursday evenings), I hung up signs around the office and on the lab doors. For example, on January 25th the sign read:

<table>
<thead>
<tr>
<th>TODAY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiet Time</td>
</tr>
<tr>
<td>until 12 PM</td>
</tr>
<tr>
<td>Tuesday 1/25</td>
</tr>
</tbody>
</table>

I also left a sign on each engineer's chair to remind him or her of quiet time and to give him or her a piece of paper to display in order to remind others.

After the first phase of quiet time ended, I asked the seventeen individuals involved to fill out a brief questionnaire that asked them to rate their productivity relative to their productivity prior to the experiments, both overall and during quiet time. I also asked their general reactions to the experiment. Analyzing the self-ratings, a little less than 60% of the engineers said that their general productivity in this phase of the experiment was "above average" (4 or 5 on a scale of 1-5). Refer to Figure 5. Slightly more (65%) said their own productivity during quiet time was "above average" (4 or 5 on a scale of 1-5). Refer to Figure 6. In terms of the engineers' general reactions to the first phase, 88% felt positive (4) or very positive (5). Refer to Figure 7.
FIGURE 5: General Productivity Phase 1

[Diagram showing productivity levels with categories 1 to 5, where 1 is below average and 5 is above average]
FIGURE 6: Productivity During Quiet Time Phase 1
FIGURE 7: General Reaction to Phase 1
In terms of the written comments on my questionnaire, two types of responses appeared. The first type were comments that indicated that quiet time provided the opportunity to address work that they would otherwise not have been able to complete. For example, one engineer wrote, "There was an expectation that I would have certain hours to complete an individual task -- I planned on it and it actually got done. I am not usually able to accomplish this when there is no quiet time." According to another engineer, "uninterrupted periods of time enable me to do some of the activities during the day which I would have normally deferred to late evening." The second type were comments indicating quiet time forced the participating engineers to change their behavior at times outside of quiet time. The engineers wrote that they now thought about interruptions and postponed them when possible, even when it was not quiet time. For example, one engineer wrote, "It helped me organize work in more productive ways. Helped my self-discipline in terms of forcing me to try to solve problems or find the answer before interrupting another engineer." According to a different engineer, "It generally made me think about making any interruption first, much more than before."

When the two and one half weeks had passed, the group met again. At this point, I suggested the group might try an alternative structure, making interaction time, not quiet time, the central focus. In the second phase, I proposed that there would be blocks of time set aside specifically for interactions. To flip the constraint and focus on interaction time as opposed to quiet time was of interest to both management and the research team, although for slightly different reasons. Managers were interested in improving communication among the engineers, especially across the full project team, not just within the software team. They were concerned that quiet time created an "island" for the software team. Interaction time might provide the members of the larger team a period when they could come to the software team and get responses to their questions. (In general, the software team had a reputation for not being helpful to the larger project team).
As a research team, we were also concerned about encouraging too much quiet time because interaction might be further diminished. The emphasis on quiet time did not challenge underlying assumptions about the importance of individual deliverables. Quiet time could be perceived as merely an opportunity for engineers to get their "real work" done. The purpose of focusing on interaction time was to facilitate better interactions. If there was to be a period when the engineers were encouraged to interact, the research team thought such a period might force them to rethink their interaction patterns and help them recognize the limited value they place on interactions.

The group agreed to try "interaction time" and a discussion followed regarding how to provide for such time. The software manager argued: "You promised to switch quiet time to the afternoon in the second phase." However, I suggested that we had only agreed to reconsider the timing of quiet time. In response, he stressed to his group: "Priorities are shifting daily, and there needs to be a means to communicate them early in the day."

However, when we voted, the engineers preferred to try interactive time in the middle of the day, keeping early mornings set aside for quiet time. Reluctantly, the software manager agreed.

Interaction time was set from 11 AM -3 PM. This set quiet time before 11 AM and after 3 PM. Furthermore, this schedule operated every day during the week, not just three days.\textsuperscript{48} Phase 2 of the experiment turned out to be troublesome. Almost from the moment it started, the engineers complained.\textsuperscript{49} Apparently, no one was following the parameters.

\textsuperscript{48} In retrospect, having interaction time five days a week was problematic. I should not have agreed to alter two variables at once. Interaction time should have been on the same three days as quiet time. However, the group was caught up in the excitement over their experience with quiet time and wanted to expand it to five days a week. The research team had a different agenda. We wanted to explore interaction time as opposed to quiet time. Since it was a collaborative project we agreed to do both which makes it difficult to decipher exactly what went on.

\textsuperscript{49} It is interesting to note that some engineers complained that there was "too much" quiet time. They rarely complained that there was too little interaction time. From the start, they focused on the quiet time surrounding interaction time as opposed to the interaction time itself. Interaction time is not consistent with their assumptions about how they do their work. The idea of encouraging interactions seems to have been uncomfortable for a group whose members strive to minimize their interactions.
As the first few individuals broke the rules, the remainder had incentive to follow their lead. The whole experiment began to quickly unravel. The new structure was only minimally adhered to during the two and a half weeks that it was operable in Phase 2.

Probably the fact that the sign was not changed everyday affected adherence to the structure. It may appear trivial, but in the first phase, every day there was quiet time there were new signs with new colors posted on the walls in slightly different locations. There were also signs sitting on each individual's chair in the morning as a reminder of the experiment. In the second phase, there were no special dates involved since every day was quiet time. A daily change of signs was therefore unnecessary. For the two and one half week period, the office walls displayed the same signs that read:

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Every day this week
Interaction time
11 AM- 3 PM
Quiet time
Before 11 AM and After 3 PM
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Because the signs remained in place every day, they no longer served as a continual reminder that the experiment was occurring.

At the end of the second phase, I again distributed a questionnaire asking engineers about their reactions. Examining the self-rating data, one quickly notices a decline in the reported productivity gains that were achieved during the first phase. In terms of general productivity, one engineer said that the experiment negatively affected his general productivity. Overall, 46% of the engineers still felt that the imposed structure enhanced their productivity (Refer to Figure 8). In terms of productivity during quiet time for Phase 2, 59% of the engineers felt that their productivity was above average (Refer to Figure 9). Finally, in terms of general reaction to the phase, 64% felt positive or very positive (Refer to Figure 10).
FIGURE 8: General Productivity Phase 2
FIGURE 9: Productivity During Quiet Time Phase 2

Phase 1

Phase 2

below average

average

above average
FIGURE 10: General Reaction to Phase 2
The engineers' written comments help explain why they felt the second phase was less successful than the first. One engineer wrote, "I did not obey quiet time as well as in Phase 1. Too much of it probably." Another engineer noted: "It was too restrictive. Everyone just gave up because of this. So there really was only a little quiet time in the morning." An additional comment that appeared indicated that the engineers prefer one longer block of quiet time as opposed to time that is interspersed throughout the day. There were several individuals who made comments indicating that "the time was too broken up causing more violations." It seems that too much structure may be problematic.

The attempt to encourage interactions themselves seems to have been overlooked by most respondents. One engineer noted that Phase 2 had the intended effect; "I don't find it was as productive as the original phase -- it is more or less business as usual. However, I did like the notion of interaction time as an opportunity to foster and build communication." In general, however, the engineers did not focus on improving the quality of their interactions.

The data substantiate the general sentiment that the second phase of the experiment was not as effective as the first. Still, it is important to note that a large percentage of the engineers found the imposed temporal structure to be constructive. Quite a few engineers mentioned general benefits that they felt derived from the structure imposed on their day. One engineer wrote: "It was enlightening to see how the process enabled me to plan my work, knowing that I would not be interrupted." Another engineer noted, "Quiet time has provided me more time to focus on my personal deliverables."

The greater success of Phase 1 over Phase 2 implies that it may be possible to eliminate interactions from certain parts of the day more easily than it is to constrain interactions to a certain part of the day. Despite continued interest, there was a clear decline in the effectiveness of the structure imposed in the second phase. This phenomenon posed several questions. Why was it that quiet time was sacred during Phase 1 but was not in Phase 2? Was there something about the second phase that made it less effective? Was it
simply easier for engineers to spend a block of time uninterrupted than it was for them to force all their interactions into a constrained block of time? Was it indeed the fact that there was too much quiet time or that the structure was too restrictive? Or was it just that the novelty of the experiment was wearing off and individuals were no longer motivated to participate?

In order to determine whether there was some "real" difference between Phase 1 and Phase 2, we repeated Phase 1 of the experiment as Phase 3. Again, for two and one half weeks, quiet time was imposed three days a week until noon. Again, I posted dated signs on the office walls and again I distributed signs the evening before to remind the engineers of the experiment first thing in the morning.

After two and one half weeks, the engineers again filled out a questionnaire. The enthusiasm about quiet time had returned. According to the self-reported questionnaire data, no one found that the imposed structure hurt their productivity, and 62% felt that it enhanced their productivity -- up from 47% in the second phase and even slightly up from the 59% in the first phase (Refer to Figure 11). The same trend appears in the individuals' responses to their productivity during quiet time. In Phase 3, 69% of the engineers described their productivity as above average during quiet time, compared to 59% in Phase 2 and 65% in Phase 1 (Refer to Figure 12). Furthermore, in terms of general reactions, 74% in Phase 3 as compared to 64% in Phase 2 and 88% in Phase 1 had a positive or very positive response to the experimental phase (Refer to Figure 13).

The fact that even more engineers said "quiet time" enhanced their productivity in Phase 3 than in Phase 1 may indicate that the experimental effects are cumulative. In the first phase, the engineers had not yet had the chance to practice planning ahead and postponing interruptions. During the first phase engineers spoke of their "struggles to prepare for quiet time." In particular, problems developed when they discovered they were not well prepared to work alone and needed help from a colleague to continue. Often what they needed was something that they could have easily prepared ahead of time, but they
FIGURE 11: General Productivity Phase 3
FIGURE 12: Productivity During Quiet Time Phase 3
FIGURE 13: General Reaction to Phase 3
were not used to thinking ahead. As effective as they found Phase 1, it was still new to them. However, by the third phase, they were accustomed to having uninterrupted time and therefore were able to prepare for such non-interactive periods.

Many comments on the survey further substantiated preference for Phase 3 over Phase 2. A major theme running throughout these comments was that Phase 3 was preferable because there was less quiet time in Phase 3 and thus people treated it as a "precious commodity" to be treasured and respected. One engineer explained: "Phase 3 was less restrictive, and it seemed like everyone took it more seriously because there was less time. Maybe Phase 2 was not taken as seriously because there was almost 'too much' quiet time." Another engineer suggested: "The non-quiet time (between 11 AM and 3 PM) conflicted with lunch. So, the interaction time was sometimes disrupted by the thought of going to lunch. That left little time for interaction and consequently the quiet time was violated." One engineer articulated the issue most directly, "Phase 3 is much better. It is a more focused, shorter time and less violations resulted."

Other engineers also indicated a preference for Phase 3. These engineers, however, stressed that it was not so much because there was less quiet time, but because it occurred in one continuous block. One engineer wrote: "I prefer Phase 3. It provides an uninterrupted block of time during the morning." Another engineer expressed a similar sentiment: "Phase 3 is better since it provides one continuous time interval for critical design/developing activity." A third engineer said: "Phase 3 seemed to work better since it did not split up the day into awkward time blocks."

Beyond noting that Phase 3 was preferable, several engineers expressed the benefits of quiet time overall. One engineer wrote: "I believe people have begun to respect others' work time. The focus has moved from themselves to the team. Interruptions still occur, but people take the time to think about what they are doing before interrupting. They are more prepared." Another engineer said:

It seems changes need to be mostly cultural. The idea that every problem has urgency must change. Not only does the immediate interruption of
others, because the problem needs attention right now, hurt the people that are interrupted but communication suffers because it is done so haphazardly. Now instead we are beginning to think problems through, decide who can help, and communicate to all that need to know.

The software manager, who, at the outset of the experiment, had been one of the greatest skeptics of quiet time particularly in the morning, proclaimed:

It does not matter when we have quiet time. I have come to realize interactions can wait. . . . Quiet time enables me to do work I used to have to do in the evening and now I am able to get it done at work. . . . quiet time has enabled me to get rid of a lot of unproductive things I used to do that were unnecessary.

After three phases, the enthusiasm was high among the software group. Many admitted that their initial skepticism was unfounded. Most wanted to continue. There was talk of rolling out quiet time to the rest of the program team who had heard about quiet time and were eager to try it. I agreed to provide other groups that were interested an initial presentation about quiet time and how they might implement it. Several of the groups took me up on this offer.

At the same time other groups were considering quiet time, the core group of software engineers that I had been working with decided to try to institutionalize quiet time on their own. There was no change in the reward structure -- just a collective agreement to continue quiet time on the part of the seventeen engineers with whom I worked. There was a discussion in the meeting at the end of the third phase regarding how many days a week they would continue quiet time. They agreed on a three day schedule, exactly as Phase 1 and 3 had been structured.

I was no longer involved on a daily basis in monitoring quiet time and debriefing the engineers as to what was happening. However, I was present for the next month, and I noted a distinct deterioration in adherence to quiet time. Many people spoke favorably of the experiment and what they had learned. Yet, quiet time as previously structured began to disintegrate.

A month after Phase 3 ended, I gave the engineers one final questionnaire. Self-managed quiet time (Phase 4) resulted in fewer individuals feeling that their general
productivity was above what it had been prior to the experiments. Still, 47% of the engineers indicated that their productivity was higher than average (Refer to Figure 14) and 53% of them still felt that quiet time was more productive than their normal work time (Refer to Figure 15). Additionally, 60% of the engineers still expressed a positive reaction to Phase 4 (Refer to Figure 16).

Looking to the comments on the survey, I found they supported my sense that the structure of quiet time was no longer being strictly followed. One engineer noted "quiet time has not been observed, it needs to be enforced." Another engineer said. "There still needs to be more done before quiet time will become institutionalized."

However, more generally, the software engineers were pleased with both the lessons they learned from the experiments and the impact the experience had on themselves and their colleagues. As one engineer explained, "We have not been adhering to any quiet time guidelines, but I believe the general level of productivity is up. People are much more sensitive to others' rights to have 'quiet-time' and there is definite change in behavior patterns. I think primarily due to quiet time." In terms of the improvements, one engineer said, "there are less interruptions now even though there is no official quiet time." Another engineer said, "interruptions occur when they need to, after preparation." Still another wrote: "People are more respectful of others' time, people plan to work together versus expecting an immediate response. Managers don't expect immediate attention either. People are more relaxed." Finally, one engineer summed it up in the following manner: "I think everyone is more considerate of other people's work loads and people are trying to plan around each other better. I think everyone is more considerate about interrupting. I think a lot of the rules concerning quiet time are more ingrained."

After the fourth phase was complete, we had one last meeting. We presented the data we collected over all four phases. In this meeting, we went around the room and each engineer shared with the group his or her experience. We heard the following comments.
FIGURE 14: General Productivity Phase 4

Legend:
- 1 below average
- 2
- 3 average
- 4
- 5 above average
FIGURE 15: Productivity During Quiet Time Phase 4

Legend:
- □ 1 below average
- □ 2
- ■ 3 average
- ★ 4
- □ 5 above average
FIGURE 16: General Reaction to Phase 4

The chart shows the distribution of reactions across Phases 1 to 4. The categories are very negative, negative, neutral, positive, and very positive.
The software manager said: "The value was that I learned to define a task and then just give the engineers time to do it without constantly inspecting. . . . It was a training in empowerment."

A few of the engineers mentioned that quiet time validates their choice to say "no" and focus on their own work. For example, one engineer said:

I really learned a lot from it. I used to be uncomfortable telling people to go away and now I feel OK, which enables me to really focus on what I am doing. I used to spend extra time late at night, but now I can get the work done during the day, and spend the extra time on additional work which makes it more worthwhile. . . . The sign gives me the right to tell people to come back when before I really never felt that was OK. . . . I am still uncomfortable but I believe that it is now within my rights.

Other engineers spoke about how quiet time not only provided them uninterrupted time, but forced them to realize the impact they have on others. For example, one engineer said:

I always used to worry about my own quiet time and I would reflect on how to get more of it, but this made me think about how I am impacting others. I realize now that it is not just a pursuit for my own quiet time but others' quiet time as well must be considered. . . . It has made me more aware of others' needs and not just my own.

Some engineers spoke of the difference they noticed in the supervisory style of their managers. Managers no longer constantly perform status checks and shift priorities. Apparently, the managers came to recognize the impact they have on the engineers. As one engineer explained, "I notice a difference in management style. I can be more relaxed now. I do not feel like I am constantly looking over my shoulder. Managers are not constantly standing over me pulling me to do other things."

The Division Vice President credited the experiments for the group's on time product launch, a first in the Division's history. He said: "I do not think we could have made the deadline without the Ford Foundation project. This is the new benchmark."

Despite the positive results that quiet time seemed to have for the product development process and individuals' abilities to get their work done, increases in available time created by the experiments were not used for family as it had been hoped. One engineer summed it up as follows: "I have not been affected in a positive way in terms of
my family life. That has not changed at all. Rather I push on the boundary at work until my husband is pissed."

Reflecting on the Experiments:

Initially, the software engineers were intrigued by the experiments and willingly suspended their normal ways of working in order to have "quiet time." I suspect they were willing to engage in such experiments because they recognized that continual interruptions made it difficult for them to complete their own work. For the most part, they were unaware of the reciprocal effect that they were having on others. Each engineer therefore engaged in the experiments for selfish reasons. Each was interested in increasing one's own uninterrupted time. However, the engineers learned from the experiments that their own work styles can have a negative impact on others -- they essentially do to others exactly what they do not like others doing to them. As individuals became more conscientious about their interactions, they interrupted others less, and, in turn, found themselves with more uninterrupted time. This began to create a more positive work time cycle.

Quiet time was a success, initially, and the perception that everything was a crisis began to diminish. However, because the definition of success had not changed, the additional time that was gained through an altered work structure was poured back into one's individual deliverables. The managers had no incentive to minimize the rewards for presence. From their perspective, it seemed to make great economic sense to have individuals work more efficiently for the same period of time and therefore accomplish even more work than before.

In the end, the question of whether work and family balance can be attained becomes one of what are management's priorities? Do managers want to help employees create more balance in their lives or do they care only about business goals? Are managers committed to long-term investment in their human resources? Or, are they concerned solely
about achieving short term output? If there is concern for their employees then managers may well be convinced to share the benefits of increased efficiency. If, however, managers focus on maximizing their short run output, then the incentive remains to extract all that they can from their employees.

It comes down to a value judgment.\textsuperscript{50} What is a fair day's work? How much work is too much to demand? At what point do people burn out?\textsuperscript{51} In other words, is there a point beyond which increased efficiency should not be put back into work, either through demands for presence or through demands for ever increasing output? If there is not such a "breaking point," process enhancing activities such as structuring interactions are simply another management tool to increase efficiency and offer no real benefits for employees in terms of their family lives.

\* \* \*

There are two implications to be drawn from the experiments with quiet time. First, the experiments highlight some of the boundary conditions in terms of imposing quiet time. Phase 1 and Phase 3 indicate that quiet time is possible and desirable. Phase 2 suggests that too much quiet time or too rigid a structure for imposing quiet time may in fact be counter-productive. It is important to stress that the three phases provide only a rough sketch as to what the desired ordering of work might be like in the future. The experiments should be perceived as no more than a first step in a much larger project that needs to be conducted in order to rethink how a more productive temporal ordering of work might be constructed.

\textsuperscript{50} Juliet Schor (1992) indicates that, left alone, management will have the incentive to perpetually increase demands for output. However, she argues that individuals "have a right to free time" (p. 141).

\textsuperscript{51} Moore Ede (1993) has studied the "twenty four hour society." He argues that as we approach the twenty first century, we are in the midst of a revolution in time, and he discusses how to take advantage of that revolution -- how to invest, how to modify one's life and how to avoid the side effects that can rob one of health and financial security, and cause fatigue and stress. He argues managers must make calculated decisions before they can decide that it is in their best interest to demand that the time be put back into the work. He emphasizes that there are repercussions that come with an overworked work force.
Second, the experiments successfully demonstrate that a collective change can result in a more positive -- as opposed to vicious -- work time cycle, even in a context where there is immense time pressure to get products to market. These results challenge the assumption that a time famine must result from the pressure to be a globally competitive organization. They show that work structures, when addressed collectively, are more flexible than often assumed. The change in the work time cycle did not sustain itself most likely because the definition of success did not change. The current definition of success gives individuals an incentive to violate the structure (and maximize their own deliverables) and therefore the new ways of working unraveled. But, I believe the definition of success could be changed permanently to recognize individuals' ways of using time at work and not just the number of hours that they work, in which case a positive work-time cycle might not only be created but sustained. This new cycle might well result in higher quality products and reduced development cycles for the organization, shorter hours and less stress for individuals at work, and more time for individuals to share family responsibilities.
CONCLUSION:
Reflecting On What Really Matters

In an era when there is so much emphasis on facilitating interactions by co-locating individuals, breaking down functional barriers in organizations and emphasizing accessibility at work, my results convey an important message. My research supports the critical role that interactions play in the work process, but it reveals that the timing of these interactions is a crucial factor enabling the attainment of both individual and organizational goals. The implication is that we need to think about when we interact.

Sociology of Work Time:

We know very little about the "ideal" way of using time in any given context or, indeed, if there even is an "ideal" way. The use of time among the engineers I studied can be characterized along two conceptually independent dimensions: 1) the extent to which interactions are planned or spontaneous; and 2) the degree to which interactions are defined by the individuals as interruptions to the work performed (discontinuities) or as part of this work (continuities). When interactions are considered "discontinuities," they are perceived as disturbances to one's "real work." When interactions are considered "continuities," they are defined as part of one's "real work." The case of Paul's Group exemplifies engineers who perceive their interactions to be part of their "real work." In contrast, members of Allen's Group and Laura's Group view interactions as interruptions that make it difficult for them to get their "real work" done.

Most of the engineers I studied follow an interaction pattern marked by discontinuity and spontaneity. This corresponds to Cell 1 in Figure 17. This pattern perpetuates what I have called a "vicious work time cycle." The "quiet time" experiments discussed in Chapter 11 show, however, that engineers can plan how they use their time and by so doing can create a better system for accomplishing their work. This moves them to Cell 2.
FIGURE 17: Ways of Interacting

Timing of Interaction

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<thead>
<tr>
<th></th>
<th>Spontaneous</th>
<th>Planned</th>
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<tr>
<td>Discontinuity</td>
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<tr>
<td>(Interruption to work flow)</td>
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<tr>
<td>Definition of Interaction</td>
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<td>Continuity</td>
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<tr>
<td>(Necessary to work flow)</td>
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1  2

3  4
The work of managers, as detailed by Henry Mintzberg in the 1970's, can further be categorized along these two dimensions. Mintzberg found the interactions of the managers he studied to be characterized by "brevity, variety, and fragmentation" (p.31). However, he further found that interactions of this sort are regarded by managers as "real work," not as disruptions to their "real work." Mintzberg notes:

Unlike other workers, the manager does not leave the telephone or the meeting to get back to work. Rather, these contacts are his work. The ordinary work of the organization -- producing a product, undertaking research, even conducting a study or writing a report -- is seldom undertaken by its manager. The manager's productive output can be measured primarily in terms of verbally transmitted information (p. 44).

Mintzberg's managers follow an interaction pattern characterized by continuity and spontaneity. They, therefore, fall into Cell 3 of Figure 17. For managers, this cell is seemingly appropriate. The fact that their interactions are spontaneous is apparently desirable to them. Mintzberg argues that this pattern is preferred:

The five chief executives of my study appeared to be properly protected by their secretaries, and there was no reason to believe that these men were inferior delegators. In fact, there was evidence that they chose not to free themselves of interruption or to give themselves much free time. To a large extent, it was the chief executives themselves who determined the durations of their activities (p. 34).

For Mintzberg's managers, Cell 3 seems ideal. Mintzberg, however, considers only the role that interactions play in facilitating the work of the five chief executives he studied. He neglects to consider the impact that these interactions may have on others.

Managers, like those Mintzberg studied, are the people who, perhaps, most often interrupt others, like the engineers I studied. If one considers the impact of the managers' interactions on those they manage, one might conclude that they have a negative impact. A manager's need to be "on top" of the situation may translate into constant disruptions for employees. The managers and the engineers as a group, therefore, might be better off if the way time is used at work is characterized by Cell 4 --planned interactions that are considered a part of "real work" as opposed to a disruption to it.
Figure 17 highlights both what my study has revealed about interactions and how much we still have to learn before we will be able to determine whether a certain way of interacting is desirable in a given context. As Winston Churchill once said:

Now this is not the end.
It is not even the beginning of the end.
But it is, perhaps, the end of the beginning.52

While my dissertation serves to establish a system of classification (Figure 17),53 it still remains unclear which cell is most desirable even for the engineers I studied. The implication is that we need further research that captures how time is used at work, what factors influence the use of time and what the ramifications of different types of time use are for both individuals and the organization. The purpose of further developing a sociology of work time would be to provide a better understanding of both the antecedents and the consequences of the way time is used at work.

_Time Famine Revisited:_

In the particular case I studied, it turns out that the way individuals use time at work both perpetuates and is perpetuated by a crisis mentality and an individualistic definition of success. My findings indicate that when individuals each consider their own work to be most important, everyone interrupts each other and no one completes work as efficiently or effectively as one might otherwise. The engineers and their managers are caught in a vicious work time cycle. As a result, engineers suffer from working long hours and enduring stress at work. Their families -- especially female spouses -- bear the burden of the responsibilities at home. At the same time, the tasks, and in the end the product, suffer because crises often result in short term "work arounds" rather than well planned out

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52 As quoted by Mintzberg (1973:165).

53 Underlying the two dimensions -- timing of interactions and definition of interactions -- are two of the main components of the integrated framework, the sociology of work time, I proposed in Chapter 2. The timing of interactions is a manifestation of the temporal organization of work. The definition of interactions is a manifestation of the social organization of work.
solutions. Both individuals and the organization, therefore, stand to benefit from change which alters the work time cycle.

Currently, however, we leave it to individuals to cope with the time famine on their own. Policies have recently been introduced at many corporations that try to ease individuals' struggles. Policies such as flex-time, flex-place, job-sharing and part-time work do increase employees' flexibility as to where and when they can do their work. These corporate policies, however, are no more than band aid solutions; they provide immediate relief to individuals in need, but individuals who take advantage of these policies suffer the organizational consequences. Since the criteria for success have not changed, those who choose to use flexible options are likely to be seen as less committed because of their seeming unwillingness to put in long hours and accommodate to the demands of the work.

My research therefore raises questions about our current way of addressing the time famine -- as an individual issue. It suggests, instead, that change must alter the work time cycle itself, and this requires collective change. The quiet time experiments further indicate that such change is possible. The engineers thought it preposterous that they could put in less time at work and get more done. Yet, the experiments successfully challenged their deeply held assumption that the pressure to get products to market had to result in ways of working that required engineers to arrive early, stay late and work weekends. When work time was structured to provide engineers "quiet time," they found that they had more control over their work day. The experiments not only helped engineers find time to do their "real work," but they also raised their consciousness about the impact that they have on others when they interrupt on an "as needed" basis. When individuals stopped continuously interrupting each other, it became possible to complete the work before it became a crisis. The crisis mentality began to subside. Better planning occurred and both the quality and the speed of the process seemed to improve. In the end, the product
launched on time, a first in the Division's history; the managers attributed this on time
launch to the experiments.

The experiments began to create a more positive work time cycle, therefore,
indicating that change in the work time cycle is possible. Such change, however, will have
to be collective change, and to be sustained will require change in all three components: the
crisis mentality, the definition of success and the way of using time at work. This is
change that will take a long time and will require individuals work together. There is
reason to hope that managers will take on the challenge of creating such change because not
only individuals but the organization itself stands to benefit. In this case, the time famine
could begin to abate.

*Life as a Game of Pinball:*

Change is possible, but we have to want to create this change. This requires that we
recognize and question the tradeoffs that we currently are making. In *The Soul of a New
Machine*, Tracy Kidder (1981) describes with awe the intensity with which software
engineers battle the impossible to bring their technological dreams to life. He captures the
excitement, dread and sense of self-importance that many engineers experience. Kidder
portrays the determination and willingness of engineers to give their whole selves to the
project as heroic. He acknowledges that the work requires sacrifices in their lives outside
of work, but fails to probe the negative effects of these work patterns. I have added to the
picture drawn by Kidder by investigating the whole lives of the product development
engineers, not just their work lives. My results question whether the way of working and
living depicted by Kidder should be idealized.

Kidder describes the crisis mentality as a source of incredible excitement. It may well
be true that such excitement is the inspiration for working extremely long hours.
Emergencies constantly arise. The engineers are needed. They feel important and they
stay at work to get the job done. The engineers' unwavering devotion to the project and their willingness to put in the long hours ensures that the product launches.

Like Kidder, I also find that a crisis mentality results in engineers working long hours. However, my findings indicate that the crisis mentality impedes business goals and hinders individuals' ability to establish a comfortable and satisfying home life. When crises emerge, managers know of no viable option other than throwing time at the problem. In a world pervaded by crises, individual heroics matter most to management. Consequently, engineers are led to concentrate on their own deliverables above all else. When engineers focus single-mindedly on their own output, they constantly interrupt each other; no one can get work done and all tasks become crises. Because everyone is responding to crises, no one has time to prevent future crises. Thus, new crises constantly arise. The vicious work time cycle keeps on spinning. No reduction in time to market occurs. Products tend to be based on "work arounds" rather than well thought out solutions. The time and effort required to get the work done are extremely high.

Engineers, particularly those who do not have the flexibility to devote infinite hours to work, are adversely affected. Even for the engineers who are single -- the Maxes of the world -- the process is draining. They continue to work in this manner because they have no choice if they desire to succeed. They are not content, however. When I returned for a brief visit six months after PEARL launched, Max said: "They keep pushing us to do it better and faster. The newness wears off. . . . We did it the first time. We set the benchmark. Now they just want more from us in less time. . . . Enough is enough."

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54 Another example in which a crisis mentality results in long hours that impede business goals and hinder work-family balance comes from a second company which is also being studied as part of the Ford Foundation project. At this second organization, it had been the habit of the sales team to work around the clock to complete proposals for prospective customers. In the morning, the employees were rewarded with cheers from their managers and co-workers, complimenting them on their commitment and willingness to stay and work until the job was done. One manager recognized, however, that this work behavior had a negative impact on people's ability to balance their personal lives and also reflected poor work habits. He began to comment to his team that he was not impressed with their behavior. He no longer viewed it as a sign of intense commitment to the organization, but rather as a demonstration of an inability to plan adequately. He was further concerned that it took days for these people to recover from these all-nighters and that they were less productive during this recovery time. This manager began to share his perception with other managers, and norms started to change as new work habits were recognized and rewarded. As at
Perhaps most revealing is the fact that six months after PEARL launched, the product manager himself was looking for a new job. He proved that he could manage an on-time launch, and now he wanted to move on to something more challenging. What goes unnoticed is the lack of investment he made in his people along the way. He pushed them beyond their limits and now he wanted to move on. He was leaving in his wake a demoralized and, in the phrase of the day, "burned out," group. As with everything else at Ditto, the product manager adopted a short term approach to his work. He got the most out of his people for that particular product cycle. He would be gone during the next product cycle. What happened at that time would not affect his career. In fact, if the team failed after he was gone, he would only look better. Some would think that he achieved what the next manager could not.

Ditto is a desirable corporation at which to work. The engineers who work there have struggled to get where they are professionally, and consider themselves lucky. They have obtained positions they consider "good jobs." Yet, their lives don't seem enviable. They continually strive to produce their best work merely to ensure that they will have the opportunity to do it all again. The most successful people are those chosen to be on the high visibility, crisis-ridden projects that require they totally immerse themselves in their work; the reward for hard work is a position that demands even more hard work, more stress and more sacrifices in their lives outside of work. Few, if any, have time to bask in the glory of the success of a product. By the time the product is successful, people are working on a new product and a new set of crises await them. Kidder (1981) captures this phenomenon well:

They didn't have to name the bigger game. Everyone who had been on the team for a while knew what it was called. It didn't involve stock options... many of the team had long since decided that they would never see more than token rewards of a material sort. The bigger game was "pinball."... "You win one game, you get to play another. You win with this machine,

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Ditto, the sales managers at this organization had viewed the long hours as a sign of commitment. However, what they realized was that this was not only adversely affecting the individuals' personal lives but it was impeding business goals.

-221-
you get to build the next." Pinball was what counted. It was the tacit promise that lay behind signing up, at least for some. Hoiberger felt that way. "I said, 'I will do this, I want to do it. I recognize from the beginning it's gonna be a tough job. I'll have to work hard, and if we do a good job, we get to do it again'" (p. 228).

In an attempt to be successful at this "game of pinball" engineers often let their careers dominate their lives, failing to realize until too late that they have missed out on, what, in retrospect, they regard as important aspects of their lives. In Breaking the Mold, Lotte Bailyn provides a vivid description of the regret felt by one such individual. According to this woman, Nancy Wright:

If I had it to do all over again, I think I would do things very differently... I think I probably would have taken off several years instead of choosing to go right back to work. I think with the benefit of hindsight, which of course is real easy for me to say given my position, the security of having achieved where I am, it's easy to look back and say, "that's how I would do it." I'm not sure I'd have the guts to do it that way, but my relationship with my son to this day is mediocre to poor and I think it's traceable back to [the fact that] I had an escape valve (p.61).

Nancy Wright further says:

No one's going to write on my tombstone "Nancy Wright, senior executive of [company]." Hopefully someone will write on my tombstone, "Loving wife and mother." No one will remember, hopefully, when I die at eighty-five, that I even worked here. But hopefully my children, who I haven't done a real terrific job raising, will get through whatever resentment they feel about that and we will have been able to establish a relationship where they will care to write on my tombstone, "She was a loving mother" (p.62).

When I told Laura about this senior executive's hope that her children would just write on her tombstone that "She was a loving mother," Laura said, "That is awful... I know I am making tradeoffs... I hope that I will never feel that way. I don't know what to do differently. I would spend more time with my family if I could. But if I do I will have to give up everything at Ditto." Six months after PEARL's launch, Laura is now the Quality and Business Effectiveness Manager reporting directly to the Division Vice President. She is also pursuing her MBA part time. This is the same woman who says family is her first priority.

It is as if many of the most successful engineers have lost touch with what they are really doing. Matthew said: "I must dedicate my life to this battle." Some engineers
recognize the absurdity of this mentality. One engineer noted: "You would think we
worked in an emergency room. We treat everything as if it is life and death." In the height
of the moment, the engineers get swept away by the pressure to get the work done, and
they seem to forget that they are just designing a color laser printer; a printer that is not even
groundbreaking, but rather just another color laser printer among several already available
in the market place. This product is hardly the same sort of technological breakthrough as
the "new machine" Kidder studied, and yet the Ditto engineers seemed to be every bit as
obsessed with playing the "pinball game."

There are certainly positive benefits that arise when individuals become so deeply
absorbed in their work. First and foremost, the organization benefits from the extreme
dedication of its employees. Engineers also benefit from having jobs that excite them
because time at work flies by and many experience a sense of self-fulfillment. However,
there is also a dark side of this way of working. The engineers must make tradeoffs that
affect them, their families and the organization at which they work. My findings indicate
that the downside of the current way of working may far exceed the benefits.

It is time for each of us to step back and consider the role of work in our lives. We
need to ponder whether this is how we want to live our lives. As Nancy Wright so aptly
noted: "No one's going to write on my tombstone 'Nancy Wright, senior executive of
(company).'" We must ask ourselves: what is it that we want people to write on our
tombstones? What matters most to us? Once we answer these questions we need to
further reflect on how we currently choose to spend our time. As my research progressed,
I asked many individuals about what matters most to them, and then I asked about how
they spend their time. Practically everyone squirmed as he or she tried to reconcile the
incongruence that this question revealed and that many of them have tried so hard to
suppress. It is time we confront the inconsistencies in the way we live our lives. Change
seems possible, but we will have to decide, first, that we want to make the effort to create
it.
APPENDIX:
Data Collection

Access for this project was negotiated two years prior to my study when a representative from the Ford Foundation and the principal investigators on my research team -- Lotte Bailyn and Deborah Kolb -- arranged for the team to work with members of Ditto. The Ford Foundation was interested in examining companies that enacted "leading-edge" work-family policies and programs. The former CEO of Ditto was on the Ford Foundation Board of Directors and contacted the current CEO, who agreed to the study.

How my research team actually ended up in the particular Division that we studied remains somewhat of a mystery to us. We had established an advisory board of Human Resource personnel from Ditto to oversee our project and it was through this advisory board that we were sent to the particular Product Development Division. At the time we started working with this Division, it was run by a Chief Engineer who expressed great interest in creative initiatives. However, within the first year of our study, the position of

55 This research was done as part of a study sponsored by the Ford Foundation and including three teams of researchers, nationwide, plus an advisory board and a consultant, Rhona Rapoport. I was one of the seven members on one of the three research teams. Our team was lead by two principal investigators -- Lotte Bailyn and Deborah Kolb. My teammates included Susan Eaton, Joyce Fletcher, Maureen Harvey, and Robin Johnson.

We had a grant to study gender equity and work-family balance in the work place. The project was born from the concern that current work-family policies and programs are undermining rather than enhancing gender equity and work-family balance, reinforcing rather than altering the underlying assumptions about commitment, work, and career. The goal of the project was therefore to explore these deeply held assumptions and engage the corporation in collaborative projects that would address such barriers to work-family balance and gender equity.

Although the team consisted of seven researchers, only four were actively involved at this research site. The four of us were all involved in the day to day data collection, feeding back information, and engaging the members of the site in collaborative change. Furthermore, one of the members of the team, Joyce Fletcher, wrote her dissertation based on a study of the relational work of six female engineers in the division.

As a member of this research team, I had been studying this division for two years prior to my dissertation research. During those two years I was on site about once per month for 2-3 days at a time. I was involved in interviewing, observing technical work and meetings, and shadowing engineers. I further did intensive analysis of the definition of engineering work. At the end of the first two years I wrote "The Myth of Real Work: A case study of engineers' preferences and their job requirements" in partial fulfillment of the requirements for a Ph.D.. It was in my third year from October until June that I carried out this research.
Chief Engineer was eliminated and the former Chief Engineer was promoted to a position that removed him from contact with us. A new position, Division Vice President, was created and its newly appointed occupant assumed the technical responsibilities of the former Chief Engineer, as well as the marketing and sales responsibilities for the Division. He also inherited our project.

Because the CEO initially enabled our access to Ditto, the managers and the engineers apparently felt obligated to facilitate completion of our project. This supportive, relatively open attitude provided us unique opportunities for both data collection and experimentation within the company. However, we repeatedly emphasized to those with whom we came in contact that we were not funded by the corporation, and we were not aligned with the management. We owed nothing specific to the management team. Rather, we were there to work with the employees. We also noted, however, that we had contact with those at the top of the organization, and our work might have positive (or negative) consequences for those who participated.

Initial Expectations:

When I first met the software engineers with whom I would later spend nine months, I was accompanied by two members of my research team -- Lotte Bailyn and Maureen Harvey. We met with the eleven software engineers (the twelfth did not join the team until about a month later), their three project team leaders, the two independent contributors (one of whom soon left the team), the software manager and his boss at the time - the senior software manager in this Division. At the initial meeting the Product Manager was not yet involved. The engineers we were studying were, at that time, only "indirect reports" to the Product Manager. Several months passed before the Product Manager became the boss of the software team.

At the initial meeting, we told everyone present that we were funded by the Ford Foundation and had received a grant to study "work-family" issues and, in particular, to
study the barriers in the work place that make it difficult to "create balance" in one's life. The engineers initially expressed skepticism. They were reluctant to get involved in another project that resembled the Quality Improvement Teams (QITs) that had previously been assembled by the company and had failed to effect any change. Nonetheless, the engineers agreed to allow us to spend a couple of weeks interviewing, observing and "shadowing" them as they conducted their daily work activities. We planned to reconvene the following month to discuss the research team's presence and review what we had discovered.

For the next few weeks, Maureen and I were actively involved in data collection. Following the next meeting, however, it became clear that this would be an ideal site for my dissertation research. At that point, Maureen withdrew from the site and became involved in one of our other research sites at Ditto. During the next eight months, I was the only member of the research team actively involved on a daily basis at this site. The only other team member who remained involved with the software engineers was Lotte Bailyn. She acted as my academic advisor and took part in the two hour meetings that were held every month or two with the software engineers, their project team leaders, their managers and the Division Vice President to discuss the research project. These meetings provided a forum in which to feed back some of our findings and to discuss further steps for the study. The majority of the meetings were used to work out a collaborative experiment and the iterations of the experiment that followed.

Data on Work:

On October 5th, I began my nine month study in the organization as a participant observer. I arrived shortly after the software project was funded and stayed through the product's launch. While on site, I was 350 miles away from my home in Cambridge, Massachusetts. I spent an average of four days a week at Ditto. My typical routine was to arrive at the site between 7 and 9 AM, depending on what type of activities I had planned
for that day. I usually remained at Ditto until at least 6 PM although I was often there until 8 or 9 PM. While I typically did not engage in planned research activities after 5 or 6 PM, I found that typing my field notes at work, rather than in my room, facilitated casual, but extremely revealing conversations with the engineers and the managers about the trials and tribulations they encountered during their days. Moreover, late night presence gave me an accurate sense of the actual hours individuals worked at different stages of the project.

For the first six months, I had my own office in the same area as the engineers I was studying. While I spent much of each day wandering around and observing, I would conduct formal interviews in my office. I also typed my field notes on a laptop computer in my office. While I carried a note pad with me, I tried to enter my notes into the computer as soon as possible. Even when typing notes, I never closed my office door. I sat facing the door, looking up whenever anyone walked by, always inviting conversation if the engineer or managers cared to enter. While this casual, "open door" methodology did not translate into the most efficient strategy for getting my field notes typed, because I was constantly interrupted, it did enable me to hear about recent events as related by passing engineers and managers.56

For the last three months of the study, I was not as well-situated in terms of office space. When the engineers were co-located with the rest of their project team, space was much more limited and there were no offices in the immediate area. At that time, I was given a cubicle in the open, like the engineers I was studying. While I did still have my office for private (and more or less formal) interviews, it no longer provided the same opportunities for spontaneous conversation because it was located in an area that the engineers no longer frequented. The new location put the engineers about a five minute walk from my office. I spent most of my time during the last three months of my study in my cubicle, where I was able to observe the work taking place, but lost the advantages of a

56 Although my work was obviously very different from the work of the software engineers, I experienced first hand the frustration of constant interruptions when trying to get some "real work" done.
private space and the confidentiality it signaled to the engineers. Now when they spoke to me it was out in the open, enabling anyone around to overhear our conversation.

In addition to being present and available to talk to the engineers, I conducted interviews and attended meetings. Initially, I engaged each of the seventeen members of the software team in one to two hour long interviews. These interviews provided background information about the engineers and provided me with an initial understanding of their perceptions about work and their work-family issues. Later, I shadowed each engineer -- some for part of a day while others for multiple days -- in order to obtain a sense of how they accomplished their work. Moreover, I sat for hours in each of the three software labs observing the engineers at work and the interactions that occurred in the labs.

I also conducted more systematic tracking to discover what these engineers do all day. On randomly selected days, I asked each of the seventeen team members to wear a digital watch that beeped on the hour; at each beep they wrote down everything that they had done in the previous hour. I encouraged them to write interactions down as they occurred and to use the beeps as an extra reminder to do so. Engineers were given the watch the night before, and asked to track their activities from when they woke up until they went to bed. This provided information not only on their patterns of interaction at work, but also on their lives and responsibilities outside of work.

I initially asked each engineer to track their activities on three different randomly selected days (two times for the project team leaders and the software manager) over the course of several months. Between three and four engineers were asked to track on any given day, and I would follow the tracking with a "debrief interview" the next day. I had all forty-five debrief interviews taped and transcribed. In each interview I began by asking the engineer to elaborate upon his or her log sheet, reviewing for me all interactions that he or she had had. For each interaction, I would ask him or her to identify with whom he or she had interacted; who initiated the interaction; what the purpose was; whether it was helpful or disruptive to him or her; whether he or she perceived that it was helpful or
disruptive to the other(s) involved; and finally, could the interaction have been done differently, later, or avoided? The debrief interviews lasted anywhere from half an hour to over two hours depending on the engineer's willingness to share his or her experiences from the day before. These debrief interviews also provided an opportunity to find out about engineers' perspectives on different events occurring at work. For example, on the day following the layoffs, the debrief interviews were very lengthy because, in addition to the standard questions, there was much conversation about the layoffs. The debrief interviews ultimately provided a wealth of information not only about the actual day-to-day sequencing of the work, but also about key events both at work and in the engineers' personal lives.

Almost all the debrief interviews were conducted the day immediately following the tracking (except Fridays which meant that the debrief interview occurred on Monday). Occasionally, an engineer would be too busy to engage in the debrief interview the following day and the interview would be delayed. The interview data were not as detailed after a day had passed. The engineers became easily confused as to what had happened the previous day and what had happened the day they had tracked. I strongly discouraged delaying the debrief interviews. I would come in early, stay late, and try to make whatever accommodations were necessary to ensure the debrief interviews occurred the next day.

After I had spent about four months in the field, it seemed clear to me that this work site had severe problems in terms of the sequencing of interactions and interruptions. At this point, I began working with the engineers to design experiments in which they had blocks of uninterrupted time. I discuss these experiments in Chapter 11. Here, I only want to mention that during this experimental phase I again asked each engineer to track three randomly assigned days and I again followed these trackings with debrief interviews.
Data on Performance:

In order to get a sense of how the engineers were formally evaluated, I requested copies of their annual performance reviews, which were distributed in February. At the end of each year, the project team leader writes a one page statement discussing an engineer's progress. The evaluation is signed first by the software manager and then his boss. Next, it is given to the engineer to review and sign. Because these documents cannot legally be released without the engineer's permission, I asked each engineer personally for a copy of this document. Of the fifteen individuals who report to the software manager (one of the engineers was on maternity leave at the time), fourteen of them agreed. The fifteenth said he would give it to me, but he had endless excuses for his procrastination so I finally let the request drop.

In addition to the official performance reviews that the engineers saw, I also had access to the software manager and his project leaders' ranking of the software engineers at the end of the calendar year. This ranking served as the basis for the engineers' raises and promotions.

Finally, the engineer, who fell from the ranking of "premium employee" to "below average employee" during the course of the year I was on site, gave me access to her entire personnel file (including all her past performance reviews and salary information). Her manager also provided me with the memos that circulated among the project team leaders and senior managers when they were forced to substantiate their decision to give her a zero raise. This case is discussed at length in Chapter 10.

Family Interviews:

As part of my research, I wished to get a better understanding of the engineers' lives outside of work. I therefore requested the opportunity to visit the homes of each of the
married engineers and interview his or her spouse. Most of the engineers met my request with enthusiasm. Of the twelve software engineers I studied, seven are married and five of the seven allowed me to interview their spouses. Further, all three project team leaders, the independent contributor, the software manager, the product manager and the Division Vice President are married and all welcomed me into their homes.

I made a total of twelve home visits. Each lasted from two to six hours. In the case of the male engineers, I visited all of their homes, except one, in the afternoon, and interviewed their wives before the engineers came home. In two of those cases, I joined the families for dinner after the interview. In the case of the four female engineers, all of their husbands worked full-time and I therefore went home with the women after work, took part in picking up the children from day care, preparing meals, and putting the children to bed. I interviewed their spouses while the engineers were home, but conducted the interview in another room. In the case of the six homes I visited where both spouses were home, we also engaged in three way discussions about the issues of work-family balance. This gave me (and them) an opportunity to hear and respond to each other’s opinions.

*Data From Social Events:*

While I made a distinct effort to draw a boundary between my role as "researcher" and the status of "friend," I did partake in many social events. I went to lunch with the engineers on a regular basis. Although several of the engineers (and all of the project team leaders) did not take time off for lunch, those who did tended to do one of three things: 1) eat in the main cafeteria in a building about a ten minute walk; 2) go to the lab and play chess with several other engineers; or 3) spend the time alone running errands or going to the library. I tended to join the first group of engineers. Occasionally, I observed the

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57 I requested to go to the homes of only the married engineers because it was unclear what I would do at the homes of the single engineers beyond "seeing" their homes. I already had the opportunity to interview them at work.
chess game. However, chess was an intense, timed event during which the players were not allowed to speak. Thus, although it was fascinating that the engineers chose to spend their lunch time in this way, there was not much more to be learned (except more about chess). Lunch conversations in the main cafeteria, on the other hand, were quite informative. The engineers spoke about their own lives and about the "events" occurring at Ditto. It is noteworthy that none of the women in the group regularly went to lunch. When I went to lunch in the main cafeteria it was almost always with three to ten male engineers.

In addition to these standard lunches in the cafeteria, about once a month an engineer would decide we should "go out for lunch." He would gather a group and we would head off (usually) to a local Chinese restaurant about a twenty minute drive from Ditto. A big group of engineers, including some of the "chess crowd" and even some of the women who did not typically take lunch, usually attended.

In addition to lunch time, I joined the engineers on several occasions at their "happy hour" on Friday nights. They would go drinking at one of the bars downtown. On these occasions, I was the only woman from the office present. Many of the men who attended were married, but their wives did not come, nor did any of the female engineers. The conversations tended to revolve around sports, women and Ditto management.

I also attended the official celebrations at the end of the project. There was a launch announcement party that was held off site at a picnic area one weekday afternoon in the Spring. I further accompanied the engineers and their spouses on a two day bus ride to New York City to take part in the unveiling of their product. Over seventy of us boarded the bus on a Monday morning at 7 AM, stopped for lunch and arrived in New York City by 4 PM. We spent the evening downtown in a sports arcade playing basketball, volleyball, putt-putt golf and video games. I spent the night at the same hotel as the engineers and joined them the next day at the Javits Center for the PC Exposition. That day was filled with pride and joy as the engineers showed customers their product, and checked out their competitors' products (which at this point felt like my competitors' products as well).
Finally, I attended the formal lunch for the press in New York City, where the Product Manager and the Marketing Manager "officially" introduced their new product.

Opportunities such as the New York trip gave me a chance to talk more freely with the engineers and get a sense of who they are and how they interact with each other socially. At lunch, at the bar, at the launch party and on the trip to New York City I put away my notebook and just listened and observed. The engineers were adamant that I take no notes in these situations. They joked that I was supposed to relax too. During times like these, I felt like more a part of the group than an outside researcher.
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