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Work-Family Integration in Biotechnology: Implications for Firms and Employees

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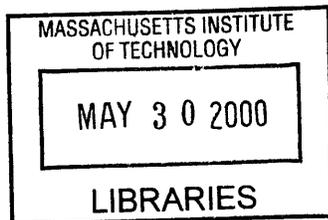
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ABSTRACT

This dissertation addresses the problems and synergies of integrating paid work with other meaningful parts of life, and avoiding pernicious choices between work and family. To do so, I examine the very structure of work organization for professional and technical employees in small and medium-sized companies in a new, knowledge-based sector of the US economy. The research questions are: What dynamics at work, related to time, boundaries, and control of schedules and work process, influence satisfaction at work and home, commitment to the work organization, well-being and gender equity? Under what conditions are supportive “work-family” practices by firms, as experienced in a day-to-day context, associated with positive outcomes at home and work?

The dissertation builds on relevant aspects of industrial relations, human resources, and work process research, and scholarship concerning families, gender, and work-family boundaries. Work scholarship is incomplete without a lens that incorporates the holistic lives and concerns of the people doing the work, and family scholarship is incomplete without serious consideration of the work structures that shape family schedules, resources, conflicts, and availability for caregiving.

This dissertation uses both qualitative data from 80 interviews to get an in-depth picture of respondents’ lives, and a broader quantitative analysis based on an original survey with 463 professional scientists and managers. These were gathered from biopharmaceutical employees in Massachusetts during 1996-99.

From the interviews I find that flexibility at work, support at home, and control at work are the key factors that contribute to satisfaction outcomes given similar levels of demands. But these are not distributed evenly by gender, company, or level of job. The survey data show that it is not only the presence of workplace policies on work-family, but the employee's day-to-day experience of whether she is free to use the policies, that contributes to positive outcomes. I introduce a concept of "perceived usability" and use multivariate regression analysis to show it is linked to control of time, pace, and place of work, to organizational commitment and “integrated satisfaction.” I find that gender is the strongest stress predictor in this sample. I find that biotechnology offers unusual opportunities for gender equity at work, but a combination of traditional managerial attitudes and inequity at home erects barriers to realizing this potential. In conclusion, I argue that we cannot effectively understand organizational life and work design without considering mutually interactive effects of home and family concerns.

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TABLE OF CONTENTS

	<u>Page</u>
CHAPTER 1 CONTEXT AND MOTIVATION	10
Introduction.....	10
Context for the Dissertation.....	12
The Social Context	15
Changes in Families.....	15
Changes in Work	17
Research Context	18
Work-Family and Gender Studies	18
Organizational Commitment, the Employment Contract, and the Psychological Contract	20
Family-Friendly Policies and Their Value to Business.....	23
Research Questions	24
What This Dissertation Contributes	24
Key Ideas of the Dissertation.....	25
Motivation.....	31
Organization of the Dissertation	33
CHAPTER 2 THE ENVIRONMENT IN BIOTECHNOLOGY: THE INDUSTRY, FIRMS, AND PEOPLE.....	35
Choosing an Industry: The New American Workplace	35
The U.S. Industry	38
A Profile of the Biotechnology Industry	40
The Biotech Workforce.....	42
Organizational Culture in Biotech Firms	48
Industry Development and Hard Times	49
Summary: The Biotech Industry.....	49
Biotech Firms in Massachusetts	51
Initial Evidence From Biotech: A Family-Friendly Place.....	54
Conclusion	56
CHAPTER 3 A MULTI-LEVEL RESEARCH METHOD.....	58
Research Methods	58
The Case Study Firms.....	59
The Case Study Site Profiles.....	61
Additional Firms Participating in the Survey Research.....	63
Data Collection Methods.....	66
Workplace interviews	67
Interview Strategies	69
Interview Protocol, Employee Selection, and Interview Procedures	70
Contextual Interviews	72

Survey Methods and Procedures.....	77
Survey Distribution.....	78
Characteristics of Survey Participants	84
Summary and Conclusion.....	85

CHAPTER 4 A TALE OF TWO COMPANIES: INTEGRATED SATISFACTION REQUIRES FLEXIBILITY, SUPPORT AT HOME, AND CONTROL AT WORK..... 86

The Organizational Settings.....	90
Organizational Culture: Rigid and Flexible Firms	94
Boundary Management: Stories from the Companies	99
Analyzing Employees' Work and Home Demands	107
High Work Demands	107
High Home Demands.....	112
Analyzing Satisfaction at Work and Home	115
Satisfaction with Work	116
Satisfaction with Family	118
Findings: Using Satisfaction as a Bellwether	119
Responding to Demands	122
Mixed Outcomes in the Dual "High Demands" Setting	124
Integrated Satisfaction Within a Context	125
Summary and Conclusions	129

CHAPTER 5 FLEXIBILITY AND CONTROL AT WORK: RELATIONSHIP TO COMMITMENT, SATISFACTION, AND WELL-BEING 132

Chapter Outline.....	133
The Study Variables	135
Research Framework.....	139
Hypotheses Concerning Commitment, Satisfaction, and Well-being	141
Variation in Firm Practices	147
Other Factors Influencing Employee Outcomes.....	151
My Study	152
Measuring the Independent Variables: Formal, Informal, and Usable Policies.....	152
Measuring the Dependent Variables: Organizational Commitment, Satisfaction, and Well-being	156
Commitment and Job Satisfaction: Their Relationship	168
Control Variables.....	168
Potential Moderating Variable: Control.....	174
Additional Considerations: Household Status.....	179
Findings: Predicting Commitment, Satisfaction, and Well being.....	182
Findings: Work-Family Policies and Organizational Commitment.....	182
Findings: Integrated Satisfaction and Work-Family Policies	186
Findings: Well-being and Work-Family Policies	189
Findings: Perceived Usability, Parental and Marital Status, and Commitment, Satisfaction and Well-being.....	191

Conclusions.....	194
Note on Gender: A Bridge to the Next Chapter.....	195
CHAPTER 6 EVALUATING GENDER EQUITY AT WORK: OPPORTUNITIES AND CONSTRAINTS IN BIOTECHNOLOGY FIRMS	198
Introduction.....	198
How Scholars Have Framed Gender Equity	201
Women in Science	206
Methodology and Data Used in This Chapter	207
Characteristics of Survey and Interview Respondents.....	209
A Gender Analysis: Commitment, Satisfaction, and Well-being	213
Commitment and Well-Being.....	213
Satisfaction	215
Time	216
Gender Equity Opportunities in Biotechnology.....	219
Gender Equity Opportunity 1: Difficulty of Academia	220
Gender Equity Opportunity 2: Work Cycles and Autonomous Interdependence	225
Gender Equity Opportunity 3: A Scale Effect.....	230
Summary of Opportunities for Gender Equity	233
Barriers to Gender Equity in Biotechnology	234
Restrictions on Opportunity	234
Gender Equity Barrier 1: Particularity, Individualism, and Negotiation.....	236
Gender Equity Barrier 2: Degrees, Previous Jobs, and Promotions	244
Gender Equity Barrier 3: Specificity in Work Structures.....	248
Conclusions.....	251
CHAPTER 7 CONCLUSION AND IMPLICATIONS.....	253
Review of Arguments and Findings.....	253
Contributions to Theory.....	262
Flexibility in Work Arrangements.....	262
“Social Contracts” in Employment.....	264
Gender Inequities at Home and at Work.....	265
New Measure of “Perceived Usability”	265
Implications for Public Policy and Practices	266
Limits of the Study.....	268
Concluding Notes.....	270
References	271
Appendix 1 The Survey and Cover Letter.....	289
Appendix 2 Interview Guide	303

List of Exhibits

		<u>Page</u>
Exhibit 1-1	Career as Life Path	30
Exhibit 2-1	U.S. Biotechnology Firms: Years Companies Were Founded	45
Exhibit 2-2	An Example of the Role of Individual Key Scientists	47
Exhibit 3-1	Characteristics of Biotechnology Employees Interviewed	75
Exhibit 3-2	Characteristics of Biotechnology Employees Surveyed	81
Exhibit 3-3	Formal Work-Family Policies	83
Exhibit 4-1	Framework for Analysis	89
Exhibit 4-2	Characteristics of Professional Employees Interviewed at BioCo and ImmuCo	92
Exhibit 4-3	Structural Conditions at Work and Home	114
Exhibit 4-4	Satisfaction at Work and Home	120
Exhibit 5-1	Research Framework	140
Exhibit 5-2	Companies' Formal Flexibility Practices	148
Exhibit 5-3	Why Work-Family Policies/Options Not Used	150
Exhibit 5-4	Mean Scores of Companies on Work-Family Policies	156
Exhibit 5-5	Organization Commitment Scale	159
Exhibit 5-6	Measuring Integrated Satisfaction	162
Exhibit 5-7	Stress Index Symptoms	165
Exhibit 5-8	Well-Being Index by Company	166
Exhibit 5-9	Dependent and Independent Variables and Their Correlations	167
Exhibit 5-10	Means of Family Groups	171
Exhibit 5-11	Correlations Between Control Variables	173
Exhibit 5-12	Measures of Control and Moderating Variables	176
Exhibit 5-13	Descriptive Information on Control/Moderating Variables	177
Exhibit 5-14	Key Variables and Correlations with Moderating Variable	178
Exhibit 5-15	Means of Family Groups for Key Variables by Gender	181
Exhibit 5-16	Effect of W-F Policies on Organizational Commitment	183
Exhibit 5-17	Work-Family Policies and Integrated Satisfaction	187
Exhibit 5-18	Work-Family Policies and Well-Being	190
Exhibit 5-19	Correlations: USABLE with Family Status	193
Exhibit 6-1	Characteristics of Professional and Technical Employees Interviewed	210
Exhibit 6-2	Characteristics of Biotechnology Employees Surveyed	211

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Cambridge Massachusetts
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Context and Motivation

*“When you’re a knowledge worker, where do you work?
As long as you have your brain with you, you’re working....”*
– Ragnild Sohlberg, Vice-President, Norsk Hydro¹

INTRODUCTION

One story circulating among friends of my generation is an updated version of Tolstoy’s *Ivan Ilyich*. It is about coming to the end of life, confronting death, and wondering what you spent your life doing and whether you made the right choices. We tell each other that no one ever wishes on her deathbed that she spent more time at work. Yet many of us might wish we had devoted more time to our parents, our children, our families of choice, or our communities. This ambivalence results in part from the gender revolution, at least for women. Unlike the majority of American women in previous generations, many women now have a chance to make a serious commitment to paid work, and to find meaning, dignity, and importance in it as well as in the home sphere. However, I suspect few see such work as the most meaningful thing in their lives. Many men and women, even the most privileged, feel

¹ Sohlberg is a VP of Norsk Hydro, External Relations and Special Projects, age 63. In: C. Fishman, “The Way to Enough: Norsk Hydro”, *Fast Company*, July-August 1999, p .166.

forced to make unacceptable choices between serious, rewarding work and a committed family life.

This dissertation is concerned with the challenge of combining work with other meaningful commitments in life, and of avoiding pernicious choices such as those “between” work and family. While I believe difficult choices are necessary in life, it seems strange that relatively prosperous Americans are hard-pressed to achieve an “integrated” life.² By this I mean a life satisfying in both its work and non-work aspects, a life rewarding materially, intellectually and spiritually, and enriched by human connections in community and family as well as in the workplace. It sounds simple, yet in research studies as well as personal and professional life, I find relatively few people manage to lead this “integrated life,” at least over any extended period of time.

Why is this such a problem today? In the household of the 1950s and earlier, integration was often achieved by men and women dividing the work and home spheres—at a family level, rather than at an individual one.³ I argue that today’s lack of integration occurs partly because of the way paid work is organized and conceptualized, which often does not support different possibilities for blending multiple spheres of commitment. I locate one source of the problem in continuing gendered traditions of dividing “public” and “private” labor, even though those patterns do not reflect reality for most families any more (Bailyn 1993; Fletcher 1999).

² It is also important, of course, how less prosperous and fortunate Americans deal with the dual spheres issue, and I address this issue in previous research concerning union leaders and nursing home workers. This dissertation concerns a relatively privileged group in U.S. society and in the world; I argue that if this group cannot address this challenge, it is likely to be much harder for others.

³ Of course U.S. working class and many racial and ethnic minority women have always worked for pay (if not as slaves), but earlier in the 20th century they represented 22-35% of women, an important portion. Here I am speaking of the majority of U.S. women. See J. Williams (2000), Chapter 1.

What I contribute in this dissertation relies on a synthesis of industrial relations, human resources, and work process approaches with current scholarship concerning work-family boundaries and gender equity. Through various cuts at my original data, I show that for men and women in multiple work settings, common key factors shape their levels of satisfaction at work and home, their commitment to work, and their well-being. These factors include available flexibility, support at work and home, and control at work. I address the debate about firm-level “family-friendly policies” by showing that employees’ experience of their work environment is the only reliable predictor of positive outcomes, not the presence or absence of policies. Finally, I show how one cutting-edge industry provides opportunities for innovation and creativity in work process and work-family integration, but too often managers and outdated traditions prevent the realization of this potential.

CONTEXT FOR THE DISSERTATION

Both work organization and current approaches to work-family integration should be reconceptualized, I argue, in light of dramatic changes during the last three decades in employment patterns, family demographics, and work-family boundaries. By work organization I mean the way that jobs in the U.S., especially knowledge jobs, are structured, managed, and evaluated as to their productivity. By work-family integration, I mean a flexible modification of the traditional separation of “work” realms and “family” realms, so that employees are free to act as whole human beings, without artificially or unnecessarily

separating these key concerns, to achieve a work schedule and workload that allows them to attend to obligations in both work and family spheres⁴ (Bailyn 1993).

In this dissertation, I show how the specifics of work organization affect work-family boundaries, and work and employee outcomes in a new, growing, knowledge-based sector of the economy. I argue that opportunities for innovation and for producing simultaneously positive work and family outcomes for employees are fortuitously ambiguous. In other words, potential exists for synergy as well as for conflict—and how the interface is managed is critical to whether these opportunities are realized. They arise partly from the structure and demands of work itself (in this case, scientific research, discovery, development, and production of biologically based pharmaceutical products), and also from ways employers and employees control and structure daily time. These opportunities are subject to conscious decisions and change. However, the opportunities or barriers for integration also arise from the mental models held consciously and unconsciously by managers and employees (Senge 1990). These models are often based on outdated assumptions about work, about workers, about families and about ways that work is best organized and evaluated. The models are often gender-biased and profoundly conservative. Frequently these mental models do not permit experimentation and innovation in ways of working, even in an industry like biotechnology, founded on innovation as a *modus operandi*. Managerial mental models can be translated through training and direct experience into individual managerial practices that

⁴ One concrete example of this integration might be that many employees appear to be making crucial work and career decisions not primarily on the basis of salary or promotion opportunity, but on the basis of the community where they choose to live and send their children to school, or because their partner has an excellent job in the current location (Eaton and Bailyn 2000). If this is true, it calls into question older models of the “rational actor” individual who takes primarily his or her own economic well-being into account when making choices about careers (G. Becker 1964). It also means that employers cannot continue to conceptualize the “ideal worker” (Bailyn 1993; Williams 2000) as an individual (usually male) with a homemaking spouse, who is always available for work and has no other responsibilities or interests.

inhibit creative ways to work. I find this true even in an industry that employs primarily science professionals who require high levels of creativity, intrinsic motivation, stimulation, interdependence, and autonomy to do quality work (Pelz and Andrews 1976).

This dissertation has implications for public policy. Should state or federal governments determine what is required for family life? After nearly 100 years of workplace regulation, Congress recently determined that *some* parents should not be penalized by firing for taking up to three months off without pay for the birth or adoption of a child or the care of an ill dependent. The Family and Medical Leave Act (FMLA) was passed in 1993; only about half the workforce is included, and “essential” employees in every enterprise are excluded. Some employers already offered this right and more, including sick leave, vacation, or paid parental leave. But those who did not, mostly small businesses, objected strenuously to such a requirement and most were exempted. However, an important norm had clearly changed. Even in the biotech companies studied here that were exempt from the legal requirements of Family and Medical Leave Act because they had less than 50 employees, the FMLA standard was cited in making company policy. If not government, should employers be responsible for providing ample opportunity to care for children, elders, and other non-paid members of the national community? Which employer will volunteer first? Or is it up to each family?

We in the U.S. have a problem. Do we value families enough to make changes in our workplaces to accommodate them—or do older models of a single-worker family and privatized responsibility for raising the next generation keep us from reducing the stress and increasing the satisfaction of today’s generations? Will individual firm incentives (such as increased commitment and retention, potentially) be enough to solve this problem? I address policy in the conclusion, but these questions underlie the dissertation throughout.

THE SOCIAL CONTEXT

Changes in Families

Families have changed dramatically in the last thirty years, with increased female workforce participation, smaller families, and fewer intact marriages. Women make up more than 47% of the total paid labor force, and most have significant family responsibilities, as do most men. Nearly four out of every five mothers of children ages 6 to 17 are in the labor force (U.S. Bureau of the Census, 1998). Compare this 80% to the 60% of mothers of children 6 to 17 who worked for pay in 1978 and the far smaller proportion (19%) in 1960. For single mothers, paid work is even more prevalent—77% are in the labor force (BLS 1998). From the employer perspective, 40% of all women in the labor force are mothers of children under 18. Ninety percent will marry and 85% will have children during their working lives. At the same time, more than a third of women work part-time at some point in their careers, often to address family needs (*Catalyst* 1997). Overall, 90% of women now support themselves economically at some point during their lives, and many do so for most of their lives.

In general, those who study families and those who study work fail to incorporate the strong influence of the other domain on their primary area of research. I integrate relevant aspects of these scholarships in this study. I argue, with Jurczyk (1998), that a different “logic of time” prevails in each domain, and that the failure to acknowledge these different logics generates dissonance and stress. Literature on family well-being addresses psychological health, children’s welfare, gender roles, and other issues internal to families—but these also affect society and community. A newer literature measures “spillover” from work to home and vice versa, and concludes that employees’ bad days at work impact families harder at

home than the other way around (e.g., Barnett and Rivers 1996). Despite a few public calls for women to work only in lower-responsibility or less-pressured jobs (the so-called “mommy track”), most research shows that having multiple roles improves the health of both men and women (*Ibid.*). Few medical practitioners could argue that work and family experiences are unrelated to a person’s overall health, yet many scholars still treat them as separate domains in different fields. My dissertation does not.⁵

We know some important sources of people’s work-family attitudes. They include personal characteristics, parents’ roles, gender, age, and the situation in which people live and work on a day-to-day basis, including their family obligations, their type of work, their partner’s attitudes, and their actual tasks (Sanders 1998). Yet, we do not have a good theoretical basis for understanding what combinations of policies, practices, culture, and individual responsiveness work best for people in a given workplace. While some companies earn high marks in public and in studies for having “family-friendly” workplaces, a closer inspection reveals that few successful technicians or salespersons, let alone managers, have been able to take advantage of these positive and friendly policies for their families. The policies are not integrated into the culture of succeeding in the company (see Bailyn *et al.* 1996; Fletcher 1996; Perlow 1997, for detailed accounts of the barriers in one company to employees’ full use of family-friendly policies which increased gender equity and also promoted the company’s business goals).

⁵ In this effort, I am far from alone. The work of Rapoport (1965) and R. Kanter (1977) as well as many studies by Bailyn, E. Galinsky & D. Friedman, R. Barnett, K. Gerson, K. Newman, D. Ellwood & M.J. Bane, and others in the 1970s, 1980s, and 1990s make important original contributions to the insights on work and family, and I draw on that strong background of work here. See Barnett (1997) for a review of work-family literature, especially the psychological literature, over the last 20-plus years. See also the Boston College Center for Work and Family Website for more information on their collection of reference materials (www.bc.edu).

Whatever future patterns emerge, the U.S. constellation of families and workers has changed permanently. It has become far more heterogeneous and unsuited to traditional 1950s assumptions about either work or family. Most people are simultaneously employees with paid work commitments, and family members with substantial commitments and obligations outside work.

Changes in Work

Work life, like family life, has changed dramatically in the U.S. during the last three decades. New forms of work organization, globalization, heightened competitiveness, international influences on workplace practices, the digital revolution, decline in manufacturing industries, and a dramatic increase in the service sector, are all part of a revolution in workplace dynamics (Kochan and Osterman 1994; Appelbaum and Batt 1994). Some research on new work systems treats workers as disembodied, more like factors of production than like complex human beings, even when authors are concerned with employees' experiences in work teams, total quality management, etc. Psychologists of work account for individual differences that employees bring to work, but not often for family circumstances. Most economics literature analyzing workplace dynamics assumes that workers are principally individual preference-maximizing agents, and does not treat them as embedded actors who are closely interdependent with other non-workplace actors, including their spouses, children and parents, neighbors, and children's teachers.⁶

⁶ In defense of economists, they would probably say that these embedded interdependencies would reveal themselves in the workers' preferences that they evaluate through their actions. But I am more interested in the complex mechanisms underlying such "preferences," and how those preferences change with specific life stages and workplace dynamics, something economists might see as too micro-analytic and too psychological for their interests.

These interdependencies (Bailyn 1993) are critical to a worker's well-being, just as a family's well-being is related to the successful employment of its wage earners. While "spillover" is usually measured at the individual level, the effects of many people experiencing spillover in their own domains has a group, organizational, and arguably even a societal-level impact. These issues require measurement, analysis, and solutions at multiple levels, including personal, group, organizational, and institutional. What I do here is to piece together experiences at work and at home to find patterns that lead to success and failure.

RESEARCH CONTEXT

Work-Family and Gender Studies

In the past 25 years, scholars have begun to address shortcomings in the literature, particularly as women moved more often into the workplace and their careers looked more like men's—with some significant exceptions. A new field has emerged in sociology and organization behavior and it is also becoming part of industrial relations (see Rapoport and Rapoport 1965, for one of the earliest efforts to integrate the work of family and organizational sociologists and social psychologists; see also Kanter 1977; Bailyn 1993; Osterman 1995; Pitt-Catsouphes and Googins 1999). It is broadly termed "work-family" (or "work-life" in some corporate settings, as an effort to include those employees with no nuclear family⁷). Those who conduct research in this area have academic and practitioner backgrounds in many disciplines (i.e., sociology, economics, organization behavior, social psychology, industrial relations, social policy, urban studies and anthropology). However, all

⁷ I do not call the study of the integration of work for pay and non-work for pay modes "work life" since that suggests that work is not part of life—and a central thesis of this dissertation is that work is part of nearly everyone's life, and work for pay is becoming nearly universal among women and men throughout life.

such researchers are concerned with the interdependencies and mutual interactive effects of work and family on each other (where family is broadly defined to include the non-work commitments of every employee, not just those with young children).

Recent research in this area has raised questions about the rigidity of perceptual and intellectual barriers that separate work from home life (Bailyn 1993; Pitt-Catsouphes and Googins 1999), and notes the origin of these barriers in the conception of “separate spheres.” These notions themselves are carried over from a more sex-segregated society and public ideology grounded in the post-agricultural, Industrial Revolution-enforced separation of workplace and home (Fletcher 1997, 1998; Rosaldo and Lamphere 1974; Rapoport and Rapoport 1965).

This emerging work-family literature is integrally related to a growing literature based on gender analysis, or using a “gender lens,” and the relationship of gender to work and organizational structure⁸ (Kolb, *et al.* 1998; Bailyn *et al.* 1996; Fletcher 1998; Acker 1990; Reskin 1978; Baron and Bielby 1980). This literature documents discriminatory aspects of the labor market, many tied to women’s family roles. Occupational segregation in the U.S. is very high, above 90% in most occupations at the level of the job (Bielby and Baron 1986a and 1986b; Baron and Bielby 1980).⁹ The connections of women’s domestic roles with their most

⁸ Many scholars have contributed to this emerging literature on using a “gender lens.” I first encountered it in a Ford Foundation project, an account of which is referenced here as Bailyn *et al.* 1996. I first saw it in use in action research with Prof. Deborah Kolb, Director of the Center for Gender and Organizations at Simmons College, Boston. Kolb, Bailyn, Fletcher, and their colleagues are among the most innovative users of this lens, but far from the only ones. Others include L. Smircich, M. Calas, J. Acker, S. L. Bem, R. Jacques, and others. See www.simmons.edu/gsm/cgo.

⁹ At the level of jobs in U.S. workplaces, the index of segregation approaches 0.96, meaning 96% of all men or women would have to change jobs to achieve a workplace where specific jobs have an equal gender distribution (Baron and Bielby 1985; Bielby and Baron 1986). This makes biotech firms unusual indeed, since women are 50% of most occupational classifications, but perhaps looking more as future firms will look. See Chang 2000 for an updated analysis of occupational sex segregation across countries. There are important distinctions between “gendered” workplaces and occupationally segregated workplaces, but what I focus on is a workplace where the potential for gender equity is high because of low occupational segregation.

common workplace roles (particularly in health care, education, social work, and services) are one cause of this phenomenon. This is true even before considering “statistical discrimination” and whether employers view all women as less committed to the workforce than men because of family roles they may have (G. Becker 1964; Arrow 1971; Bielby and Baron 1986a,b). Some scholars focus on the experiences of men in families, and study the possibilities for men to more fully realize their roles in the “private sphere” (e.g. Drago *et al.* 2000; Pleck 1993; Thompson and Pleck 1995; Pleck 1997; Levine and Todd 1998; Gerson 1993).

Organizational Commitment, the Employment Contract, and the Psychological Contract

The second research context for this dissertation is current industrial relations, labor economics, and organizational behavior research.

In this dissertation, I analyze employees’ self-reported satisfaction with their work lives and their family lives and ways in which they can integrate the two. Employees care about these issues a great deal. While managers and firms may care about employee satisfaction as an outcome in its own right, the evidence tying satisfaction to performance is mixed and inconclusive—some suggest that strong performance seems to lead to increased satisfaction rather than the other way around. Since performance and productivity in this industry, as in many knowledge-based industries, are difficult to measure directly, I focus on organizational commitment as a firm-level outcome tied to individuals.

The evidence that organizational commitment is tied to performance (at least in the affective and normative forms studied here; see Meyer and Allen 1997) is strong. (This is not to suggest that satisfaction is not an important outcome in its own right.) Further, companies

often want to tie employees to their firms, as firm-specific knowledge is not only valuable but also sometimes irreplaceable. Professional employees are likely to feel more committed to their careers and their occupation/profession than to the firm (Abbott 1988; Larson 1977), so the issue arises particularly in the case of professional workers.

While employment has changed dramatically under globalization and new technology, the relationship between employers and employees has also come under considerable strain. The old image of an “implicit contract”, which provided for continued employment as long as an employee was doing a “good job” and the company was solvent, may be exaggerated as an ideal (Kochan 1997; Heckscher 1995). Nonetheless, many Americans believed in long-term employment through the 1970s and into the 1980s, and many thought that they might work for one employer all their lives. This was probably true of more men than women. In 1995, a national survey conducted by the Families and Work Institute showed that 50% of people still thought that it was reasonable to expect employers to provide lifetime jobs (Bond, Galinsky and Swanberg 1998; Kochan 2000).

Among younger workers and those with higher levels of education, we might expect that figure to be considerably lower, and indeed it is: in my sample of 463 employees from seven biotechnology companies, only about 20% think employers can be expected to provide lifetime jobs in today’s climate. But 50% of them (and their average age is only 36) started their work lives believing that they would work for one company all their lives. So even in my relatively small sample of educated employees (90% have some college education), we see a disconnect between people’s expectations and their real experience in the world of paid work.

In these days of apparent reduced length of stay at one employer, it is still essential, from employers’ perspectives, to retain the workers they want to retain. Evidence is mixed on the empirical prevalence of frequent turnover, but many employers seem to find it a real

concern (Swinnerton and Wial 1995; Herzberg *et al.* 1999). This is where “organizational commitment” comes in. This concept was developed in the 1960s (Mowday, Porter and Steers 1982) and refined in studies in the 1980s comparing the U.S. and Japan (Lincoln and Kalleberg 1990). Organizational commitment (OC) includes at least affective, continuance, and normative types (Meyer and Allen 1997). OC as a whole helps measure how loyal and connected employees are to their firm. Increased OC is associated with increased intention to stay working with an organization, with willingness to exert extra effort on the employer’s behalf, also with lower turnover and absenteeism, and higher organizational citizenship behaviors and productivity.¹⁰

Why is organizational commitment important today? Losing a valued employee is expensive, estimated at between two and four times the cost of annual salary in the business literature. The negative effect of unwanted turnover is particularly significant in knowledge work; professional employees have been found to identify more with their professional identity than their company ties (Abbott 1993; Larson 1977). However, despite the importance of professional training and qualifications of scientists and technicians in this example, my data show that firm-specific, product-specific, or project-specific skills are also essential for smoothly functioning work. One scientist is simply not replaceable with another who can do technically the same thing. A great deal of tacit knowledge and important co-worker relationships are embedded in a well-performing incumbent of a job. A new person has to learn all the implicit and explicit information, as well as forge new bonds with co-workers, if someone leaves a firm. This makes organizational commitment an outcome of interest.

¹⁰ Marsden, Kalleberg and Cook (1993) recently investigated gender effects on organizational commitment and found none once job characteristics are controlled.

FAMILY-FRIENDLY POLICIES AND THEIR VALUE TO BUSINESS

Many media outlets have accepted the idea that family-friendly policies are correlated with better organizational outcomes, sometimes with specific productivity measures and sometimes with a positive corporate image (Martinez 1997; Edelman 1996). A number of journals (best known are *Working Woman* and *Business Week*) name the “100 Best Corporations on Work-Family” and “100 Best Corporations for Women” in which the work-family policies of the company are singled out. In addition, influential columnists such as Sue Shellenbarger of *The Wall Street Journal*, Amy Gage of the *St. Paul Pioneer Press*, and others have documented case after case of employees deciding to take or keep a job with a family-friendly employer because of the flexibility and support the employer offered in meeting their family commitments. The *Harvard Business Review* and other managerial journals have carried articles making the business case for work-family policies (Friedman *et al.* 1998). Several journals have shown that men as well as women benefit from these policies, although most public relations is directed toward women and “diversity” initiatives of large corporations (Parasuraman 1997; Catalyst 1989). The Sloan and Ford Foundations have created major programs to support research and dissemination of work-family-related organizational findings. All this attention merits more intensive, careful, and reproducible research studies about the real impacts associated with family-friendly policies, not only for the business bottom line, but for employees and their families as well. This study seeks to contribute such research to this field.

Research Questions

I address the following major research questions in this dissertation:

- What dynamics at work, particularly those related to time, boundaries, and control of schedules and work process, influence satisfaction at work and home, commitment to the company, well-being, and gender equity?
- Under what conditions are formal and informal “family-friendly” practices by firms, as they are actually experienced in a day-to-day context by employees, associated with positive outcomes at home, at work, for the firm, and for the employees?

What This Dissertation Contributes

I focus on the boundaries between work and non-work—in part because these issues have always been relevant to professionals, particularly to women. Yet rarely are such boundaries incorporated into theories of performance, motivation, or commitment. (For more on the relevance of boundaries, see Nippert-Eng 1996; Zerubavel 1996.) I am not yet able definitively to tie innovation in these boundary areas to measurably improved productivity, partly because “productivity” is so ill-defined in knowledge work. *However, data I present show positive outcomes, including higher levels of organizational commitment and satisfaction at work and home, in places where employees feel free to use flexible schedules to cross boundaries.* These outcomes occur at firms that initiate and sustain experiments and creativity in ways of working, managing time, and integrating lives.

In this dissertation, I pry open the “black box” of small and medium-sized cutting-edge organizations to see what mechanisms create a truly “family-friendly” workplace, and what its impact might be on employees, their families, and firms. I argue that gender equity in the

workplace, as measured by promotions, career paths, and income as well as workplace climate, cannot be achieved even in a relatively young, gender-integrated workforce, unless typical work-family practices at the level of the firm, and perhaps also at home, change. This is necessary so that men and women have more equal structures of opportunity as well as constraint (Rapoport and Bailyn *et al*, 1996).

KEY IDEAS OF THIS DISSERTATION

I advance and present evidence to support four key ideas in this thesis.

- All employees have families and communities, and these influence their work profoundly.
- Our understandings about organizational commitment and implicit employment contracts require revision to reflect the realities of today's workplaces and families.
- Old assumptions about the ideal worker, the separation of work and home, and what constitutes "real work" hamper businesses and their ability to address employees' concerns, including more flexible work-family boundaries.
- How work is "gendered" affects both women and men, and this needs to be incorporated into workplaces of the future to ensure gender equity at work and outside work.

First, all employees have families and communities. One cannot think accurately or creatively about employment relations without incorporating this reality. The requirements of acting effectively in those spheres are quite different: the "logic of time" at work, sometimes called "masculine time" (Jurczyk 1998), where one may at times finish a project, have uninterrupted time, and feel productive, is quite separate from the "logic of time" at home,

sometimes called “feminine time.” In time at home, a caretaker is continually on call, performs repetitive tasks that are necessary for the family’s well-being, exists on a cyclical and entirely differently paced time schedule than at work, and rarely has a sense of finishing anything. Community time is different still, and requires seasonally changing relationships with neighbors, public officials, schools, religious organizations, and others that may be hard to fit in around the demands of the rigid regular workday and the constantly changing time demands of families.

So, my argument about employees involves the notion of time, and how even a finite amount of it can be innovatively structured, controlled, and made more flexible, in certain circumstances, so that work and family can be better integrated. In Chapter 4, I compare a rigid firm and a flexible firm that are otherwise similar—but where managers and employees treat time very differently.

This first key idea is not obvious. The research literatures on “work” and “family” continue to be very distinct. Careers are studied as if they are separate from employees’ private lives and commitments, even though we know that a spouse’s reaction often determines a relocation decision. Work reorganizations and scheduling decisions are discussed and implemented, often without reference to obligations and commitments employees have outside work (whether continuing education classes, school hours and day care center deadlines, or elder care). Only recently have work-family consultants, scholars, and managers attuned to these issues, tried to address them in a more complex and interdependent way—but this work is still in its infancy. This thesis contributes to the development of data and hypotheses about these interdependencies.

The second key idea is that our understandings about organizational commitment and implicit employment contracts require revision to reflect the realities of today’s workplaces

and families. Ideas about the contract between employees and employers have changed, along with workplace realities (Kochan 2000; Eaton and Bailyn 2000). The “psychological contract” (Rousseau 1990, 1995) for employees has been affected, including feelings of obligation and loyalty. Another expectation that seems unrealized today is that good jobs will be “family wage” jobs that pay a living wage and provide benefits sufficient to raise a family, including a mother at home to raise children. In a related development, unions have declined significantly in their workforce coverage and are not raising wage and benefit levels as much in bargaining as they did in the past.

In my research, 46% of survey respondents say they are “not sure” when asked how long they intend to stay with their current employer. I argue this does not necessarily mean that they are uncommitted to their firms. A large percentage of the “not sure” respondents express strong loyalty, satisfaction with their jobs, agreement with company values, etc. However, this finding suggests that the whole concept of “contracting” should be reconceptualized. Employers have urged that employees focus on “employability”—but it is not clear that employers are pleased to see valued employees leave for new jobs before the employers are ready to lose them.

So, conflicting and contradictory messages, feelings, and realities exist today, both for employees and employers. My dissertation suggests a changing concept of organization commitment. In turn, this revised concept will help researchers think about new questions, such as: “Does your community matter to you enough that you would turn down a better job that had a longer commute or that required you to move?”

My third key idea is that old assumptions about the ideal worker, the separation of work and home, and what constitutes “real work” hamper businesses and their ability to address employees’ concerns, including more flexible work-family boundaries. While this is

not original to me (see Bailyn 1993), the argument is still contested. The evidence I provide here supports it in firms that represent workplace types likely to be more common of the future (RPPI 1999). One example is the issue of part-time work for professionals. One company's blanket refusal to consider such a proposal even if it would be more efficient led to dissatisfaction even in those who did not wish to work part-time. It was seen as an arbitrary rule limiting flexibility. The same is true of a supervisor's refusal to implement a compressed workweek for an employee who can demonstrate improved productivity with a different schedule. The data I present show that how daily work is organized, whether with creativity and responsiveness, or with rigidity, is directly related to work motivation, autonomy, and control, which are important for effective professional work, worker morale, and commitment (Hackman and Oldham 1980).

The fourth key idea is that how work is "gendered" affects both women and men.¹¹ Scientific work in biotechnology firms is gendered and continues to inhibit women from realizing their full potential at work, even in young firms like those where women are 50% of the employees in nearly every classification, and we might most expect to see gender equity. These gendered work structures also seem to inhibit men from realizing their full potential with family, although that is less clear. A woman employee embedded in a family and community structure and working full-time often has different experiences than a similar man.

¹¹ I use here the distinction between sex, which is biological in reference, and gender, which is socially constructed, varying according to culture, times, and environments. When I discuss "gendered work" I mean the construction of work norms according to ideas about members of which biological group will be performing the work, whether or not women and men actually share such work roles. In fact, the same occupation can be filled by either men or women, but often in different job titles or establishment types, meaning that the work is "gendered".

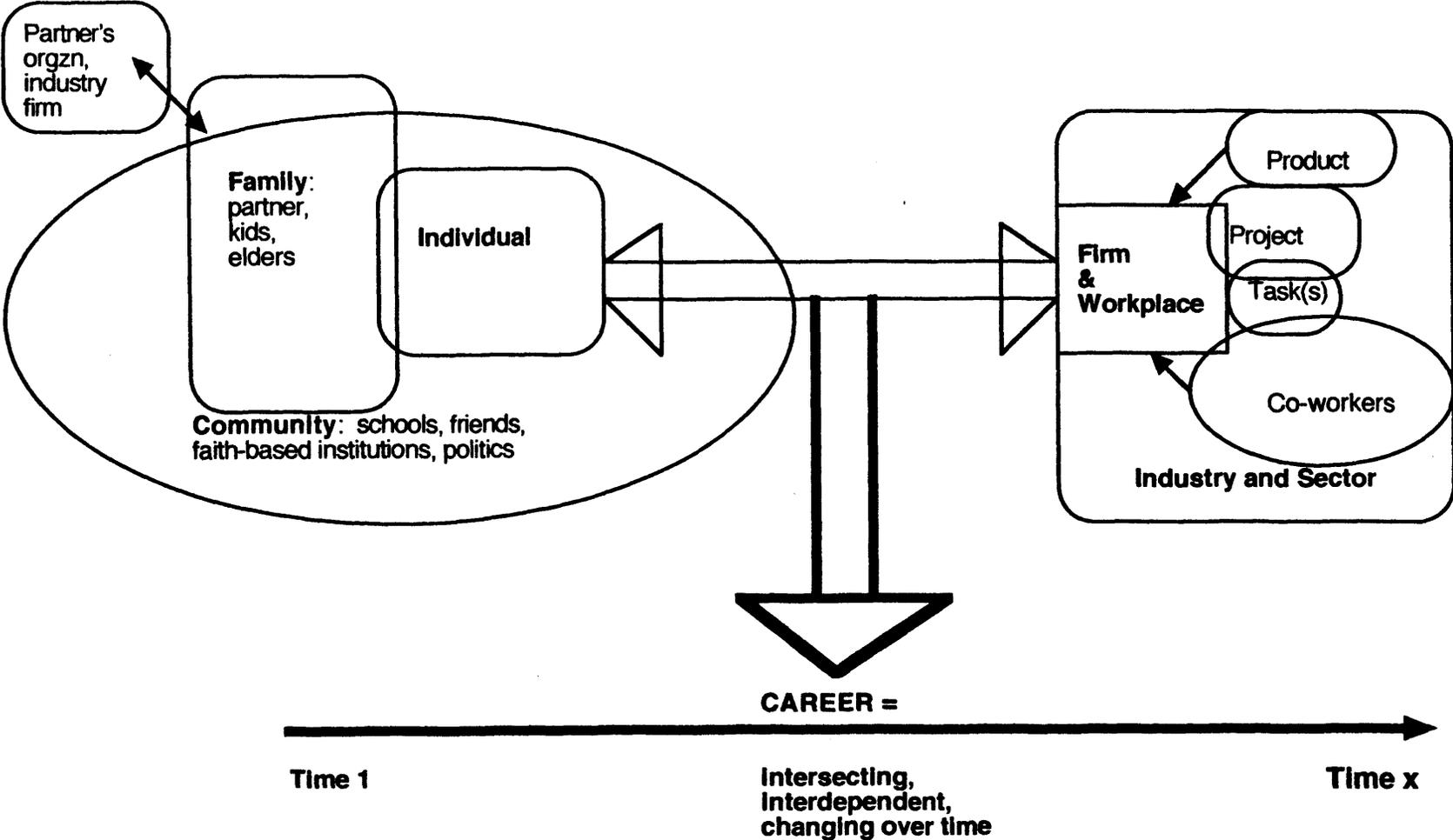
Studies with a “gender-neutral” lens, in which gender is assumed not to matter, would miss this reality.¹² In biotechnology, I find that women are particularly attracted to interdependent and interdisciplinary work structures, which are essential to make the complex science work: by definition, biology, chemistry, and human physiology intersect in new biology-based drugs. “Some people would be happy working in a cardboard box,” said one female Ph.D. scientist, referring to one of her male science colleagues. “I’m not one of them: I need other people to interact with and to share ideas with.” After starting as a bench scientist, she splits her time between marketing and working with scientific teams on product development.

Changes in workplace organization, in workforce demography, and family obligations in the larger economic context, interact so that work and family are intertwined in daily life today. This thesis addresses how we understand the employment relationship, including careers, employment understandings, satisfaction, commitment, and work design. It examines employee outcomes of well-being and integrated satisfaction, and work outcomes of gender equity and organizational commitment and productivity. To better understand all of these, we need to take gender and families into account. We may even need to design new scales for established constructs like “organizational commitment” and “satisfaction.” I conclude with a question about whether one can accurately measure job and family satisfaction separately in a useful sense.

A simple model of the influences I propose is shown in Exhibit 1-1.

¹² See Fletcher 1997 for examples from software engineering. One thing made visible with a “gender lens” is “relational practice”, meaning the ways in which relationship-oriented behaviors commonly associated with women help get the work done. This concept of relational practice is developed by Fletcher in her recent book (1999), and has its origin in a therapeutic context, developed by a group of creative women psychologists and psychiatrists at the Stone Center at Wellesley College (see, for example, Miller 1976; Jordan et al. 1991, 1998; Miller and Stiver 1998). Fletcher and colleagues Lotte Bailyn, Deborah Kolb, Maureen Harvey, Laura Woodburn, this author, Chris Robb, Maureen Walker, Irene Stiver, Jean Baker Miller, and Judith Jordan have developed the construct further, in an organizational sense, with others at the Centers for Research on Women at Wellesley College.

Exhibit 1-1: Career as Life Path



30

Source : *Eaton and Bailyn 2000, p. 193.*

MOTIVATION

The motivation for this dissertation is both professional and personal. As a professional, I study work organization and its role in the development of human and productive potential.¹³ I also conduct research and teach about gender roles in organizations and society, including leadership, management, and equity issues. I study and value employee voice and agency, whether via organized labor unions or other forms of voluntary association.¹⁴ I target my research at the meso-level, at the intersection of individual and group action and organizational dynamics, without neglecting the macro-effects of social policy, economic institutions, and political context. Questions about work-family practices and their role in employee and firm outcomes provide a perfect opportunity to combine research into many of my deepest professional concerns.

On the personal side, I came of age in the 1960s when gender roles were changing dramatically. Like many young women of my generation, I assumed that I would work full-time my entire life. This assumption was drastically different than my mother's had been. Soon after completing college in 1951, she married my newspaper reporter father, traveled to two Army postings, then moved with him from the Midwest to Washington D.C. in 1955. She found a public sector job doing research and worked for pay until my birth in 1957. She became a full-time unpaid homemaker, community volunteer, and mother (of me, and my sister born two years later). She went back to work at a paraprofessional job in 1971 when I was entering high school. Later, she returned to school and then began to work as a lawyer

¹³ See Hackman and Oldham (1980) and Hackman (1990) for a definition of effective work I adopt here: it simultaneously develops the capacities of individuals involved and the competency of the group performing it, and also meets or exceeds the expectations of the managers or clients for whom it is completed.

¹⁴ Both in my academic research and as a negotiator in the U.S. labor movement for twelve years, I sought to address employees' problems in ways that involved them directly in creating solutions while also meeting business and social goals.

and administrative judge for twenty years until her retirement at age 69. Though I now believe my mother would have preferred building a career for those first 14 years, she did not feel she should do so, if my father could support the family, until my sister and I could take care of ourselves.

In contrast, I started working for pay at the age of 10, worked at the city library daily in high school. I have worked or attended school full-time ever since, and expect to do so until well into my 70s, if I am able. My parents divorced in 1978, after my sister finished high school; my father, as men more frequently do, later remarried, while my mother remained single.¹⁵ My sister married at 22, and is raising two children who are now 10 and 14. She also worked full-time except for short maternity leaves. In her case, it was not because she preferred to work for pay as a library and kindergarten aide and later as town clerk in a town of 10,000. Rather, she and her schoolteacher husband found they could not give their children a college education unless they both worked.¹⁶ For my part, after ten years of 70-hour weeks working in the labor movement, I married at age 32, to a talented union and political organizer who was 46 then. We both work full time and have no children.

I tell my own story not because it is in some way “typical”—I was unusually fortunate to have a college-educated mother stay home to raise me and my sister—but because it reflects some evolving generational cross-currents in the United States. Most married men now have wives working for pay: fewer than 12% of U.S. families consist of a male breadwinner and a female homemaker with children under 18, compared to 60% in 1950 and 52% in 1960 (Gerson 1993). Many families have dissolved and re-formed, with half to two-

¹⁵ This is especially true with divorces when the parties are older; for all divorces, three-quarters of men remarry, as do two-thirds of women—but most of these divorces are from shorter marriages (Cherlin 1992).

thirds of all new marriages today ending in divorce, and 40% of all children experiencing parents' marital disruption by the time they turn 16 (Cherlin 1992). One-third of all children are born out of wedlock, and half of all children born in the 1980s will reside in a single-parent family before they reach age 16, for an average of six years (Bianchi 1995). So the issues of how to combine paid work with a meaningful family and community life speak to me personally as well as professionally.

ORGANIZATION OF THE DISSERTATION

This dissertation relies on data collected from the biopharmaceuticals sector of the biotech industry in Massachusetts from 1996-99. The industry exemplifies many changes described above: its workforce is half women, 20% are foreign born, nearly all are knowledge workers laboring in insecure firms, small work sites, and relatively new organizations. In Chapter Two, I show why biotechnology is a good setting to study my research questions, and describe the industry nationally and in Massachusetts. I summarize what we know about the workforce generally and the family-friendliness of these workplaces.

In Chapter Three I present my multi-method research design. This dissertation uses both qualitative data from 80 interviews, to get an in-depth picture of actual lives, and a broader quantitative analysis based on an original survey with 463 respondents, mostly professional scientists and managers. I collected data at both the individual and the firm level.

In Chapter Four I show that flexibility at work, support at home, and control at work are the key factors contributing to varying satisfaction outcomes in both work and family

¹⁶ This is not uncommon; men's incomes in the 1980s were no longer enough to maintain a middle-class lifestyle since real wages for men continued to decline through this period. By the mid-1980s a majority of families in the upper half of the income distribution were two-earner families (Cherlin 1992).

realms, given similar levels of demands. But these are not distributed evenly by gender or level of job.

In Chapter Five I report that survey data show it is not the mere presence of “family-friendly” workplace policies, but the employee's day-to-day experience of whether she is free to use the policies, that contributes to positive outcomes. I introduce a concept of “perceived usability” and use multivariate regression analysis to show it is linked positively to control of time, pace, and place of work, to organizational commitment, and to “integrated satisfaction”.

Chapter Six reexamines biotechnology firms with a “gender lens.” I outline opportunities for gender equity created by the nature of work in the industry and show structural and ideological bases for the many barriers that still exist. Chapter Six argues that career theory should be expanded to include familial influences, or to “cross the last boundary” (see Fletcher and Bailyn 1997, Arthur and Rousseau 1996, Eaton and Bailyn 2000).

In Chapter Seven I summarize the learnings and contributions of this work, note limitations of the study, and discuss implications of my research for public policy and employment research and practice.

The Environment in Biotechnology: The Industry, Firms, and People

In this chapter I explain why biotechnology is a good industry in which to conduct research on my questions. Next I profile the U.S. and Massachusetts biotechnology industry, to provide the empirical basis for the dissertation. I summarize what is known about the workforce in this sector and about family-friendliness of firm policies. My goal is to portray accurately the environment and context in which the men and women I studied conduct their work.

CHOOSING AN INDUSTRY: THE NEW AMERICAN WORKPLACE

Why choose the small industry of biotechnology to study? After all, it employs only 130,000 people at present, and the industry itself is barely twenty years old. It is concentrated in two or three states and regions, although it is growing in many more. It is constantly changing its technology and workforce requirements as knowledge advances in universities and research labs. Firms in this industry are not stable but are constantly being formed, going public, making new alliances, issuing new stock, revaluing their old stock options, being acquired, taking on new shapes and purposes. The average age of the biotech workforce falls in the thirties, with only some top managers in their fifties, and a few star scientists and

founders in their sixties. While pay is high (and most of the workforce is college-educated at least), turnover is common, approaching 25 % in the industry as a whole, and more in some places. Being laid off is not a cause of stigma because it has happened to many scientists.

Professors often start biotech firms in addition to fulfilling their university teaching and research roles, and public funds support them in part, along with venture capital. Public opinion is mixed about the value and ethics of the complex genetic re-engineering work being done (see Rifkin, 1998 #816, and recent alarms about bioengineered food in Europe.) Clearly, the industry has neither stabilized nor institutionalized. What can we learn in these shifting sands, especially about social phenomena as disparate as work and family trends?

Biotechnology is a good choice for a research site exactly for these reasons-- as well as because of the remarkably even gender mix of employees, the high percentage of knowledge workers and young workers, and the relative job insecurity and newness of the sector itself. In a sense, firm and employee performance and satisfaction outcomes in this industry are not “overdetermined” but are being determined today, during (and in an ongoing fashion, continuing after) this study.

Unlike steel, automobiles, or even the public sector and telecommunications, biotechnology has not yet taken on an institutionalized character which makes change and adaptation difficult. Quite the opposite! During the two and a half years I participated in fieldwork in twelve biotechnology firms, I saw workforces change, and companies merge, expand, contract, and fold. Even feedback that MIT Professor Lotte Bailyn and I gave to one firm about work-family issues among its employees was quickly incorporated in revised human resource practices.¹

Most written sources of data about the industry itself are Internet-based and interactive, or sent via daily fax or e-mail, rather than published in books or even articles.²

¹ Lotte Bailyn is a dissertation co-chair and was a Study Director for the social-psychological portion of the RPPI study (1999); she and I gave feedback to one study firm together. The company adapted its policies to promote more consistency after we pointed out some inconsistencies.

² I monitored BioPharm's Website, the Massachusetts Biotech Council Website, The Scientist Website, etc. For the pharmaceutical industry organization's website, see <http://www.phrma.org>.

The data from firms and individuals herein come from my own research and research by others in the field, particularly the Radcliffe Public Policy Institute industry research directed by Françoise Carré.

What about the larger economy? Forecasts suggest that small, entrepreneurial firms are more likely to typify future U.S. workplaces than will large, older industrial corporations. Despite the popular image of large corporations dominating the American economy, many people labor in workplaces that are small: 54.8% of private sector U.S. employees work in establishments employing fewer than 100 persons (U.S. Bureau of the Census 1998). And more than 87% of U.S. establishments have fewer than 500 workers (*Ibid.*). Many newer, successful U.S. firms employ a high percentage of “knowledge workers” rather than a majority of production, maintenance, and service personnel (McCullough 1995). This study is based on firms that exemplify the networked, collaborative, small, and less secure environments where many U.S. employees will work in the future.

Despite the changing face of the American workplace, most organizational research on work and family has been conducted in large firms and often in large manufacturing firms. A well-known Ford Foundation-sponsored study focused on several *Fortune* 500 companies, for example (Bailyn *et al.* 1996). Most magazines that identify “family-friendly” firms focus only on the largest, most prominent firms. Arlie Hochschild’s controversial new book, *The Time Bind*, is based on a *Fortune* 100 industrial firm (Hochschild 1997). Some argue that only large firms can afford the slack that is required in order to offer certain work-family benefits such as childcare or benefit from the favorable publicity that may result.³

Yet some researchers have found that small firms can provide a more supportive work environment which might be more amenable to efforts to integrate work and family concerns (MacDermid and Williams 1997; MacDermid *et al.* 1994). Most research on spillover and time pressures also has used large survey (or time diary) data sets of individuals or families,

³ In Paul Osterman’s survey of national establishments and their work practices, for instance, larger establishments are over-sampled because of his research objectives. Most establishments responding to his survey had at least 100 employees. See Osterman 1995.

and has not sought to examine the experiences of employees within particular firms (Schor, 1991; Barnett and Rivers 1996; Robinson and Godbey 1997; an exception is Drago *et al.*'s 2000 study of teachers in school districts). In contrast, this dissertation study of professionals working in biotechnology sheds light on work and life integration strategies within small, entrepreneurial, knowledge-based firms.

Thus the context for this research project is the workplace of the late 1990s, looking ahead to the new millennium to envision what work and non-work lives might be like for knowledge employees in the early 21st century. As outlined in this chapter, biotechnology firms represent a potential type of “firm of the future” in the sense that they are small, networked, highly dependent on global markets and on large capital investments, with well-educated, highly skilled employees—and thus somewhat unstable. In these complex, fast-moving labor markets, firm-specific skills and knowledge, not least the ability to work creatively with scientists and researchers from other disciplines, are very important to the organizations I studied. One of their manager's interest in my research outcomes was to learn what factors were important in professional employees' decisions to stay with the firms, and particularly what role work-family policies might play in their choices.

THE U.S. INDUSTRY

This section and the next contain background information on the biotechnology sector, both nationally and in Massachusetts, where I conducted this study. Biotechnology is defined as “the industrial use of rDNA, cell fusion, and novel bioprocessing techniques” (Office of Technology Assessment 1991). The most salient characteristic of the industry is uncertainty, combined with a very long product development cycle (10 to 12 years) that creates multiple points for possible failure on the road to a successfully marketed drug. Most biotech firms are small, unstable, financially uncertain, and generally stressed. At the same time, they are often

exciting places to work, and the employees of a given company see great potential in most cases. Yet in the end, less than one in ten firms or drug discoveries succeeds (Hewitt 1997). Elliott Goldstein, CEO of British Biotechnology, confirms that “For every 10 compounds that enter the clinic, only one will make it to the market” (quoted in Ward 1999). Put another way, seven million compounds must be screened to produce even one marketable drug, according to a Pfizer executive (Hernandez 1998).

Biotech firms go through multiple cycles related to their funding and the stage of their science projects, which I discuss in the cases I studied. Generally, a startup firm is small and privately held, while a firm that survives fifteen or twenty years is usually reasonably large and public, or has gone through at least one major reorganization. Few companies actually take their own products through the pre-clinical and four possible stages of human clinical trials that are required in order to receive U.S. Food and Drug Administration (FDA) approval. But they strive to get as close as possible to this goal because much of the value of their discoveries is realized in the last stages. A product can fail at any stage, from discovery through purification and testing, all the way through extensive trials and the regulatory process. Even “scaling up” the manufacture of biologically based drugs is a huge challenge. At each step, failure becomes more expensive and potentially devastating to the firm.

In writing this chapter, I relied on information from interviews with industry experts and company professionals, prior industry research, documentary and Web research, the Radcliffe Public Policy Institute industry study (Radcliffe 1999),⁴ and my own first-hand field

⁴ Much of the industry research in this chapter draws on the reports and materials prepared by Sandra Resnick, Françoise Carré, and Wendy Jade Hernandez for the Radcliffe Public Policy Institute study. Other research assistants involved in this work were Ming Hsu, Pamela Joshi, Alina Martinez, and Parul Singh. I am grateful for their willingness to allow me to examine their files, memos, and industry source interviews in addition to using my own.

observations. I attended three annual meetings of the Massachusetts Biotechnology Council, and several sub-group meetings of the Human Resources Committee. I read publications aimed at biotech professionals (*Science, Genetic Engineering News, The Scientist, BioPharm,* and others), and for more than two years I received a daily e-mail that compiled and summarized updates on the industry.

PROFILE OF THE BIOTECHNOLOGY INDUSTRY

Biotechnology is a rapidly growing industry in the U.S. and around the industrialized world, although the U.S. has created more firms than the rest of the world combined, and accounts for 63% of biotechnology drugs under development (Radcliffe 1999). Biotech, as it is often called, includes companies that engage in the research, development, production, and commercialization of products using ribonuclear DNA (or rDNA), cell fusion, and novel bioprocessing techniques (OTA 1991). All of these have some basis in biology and the life sciences, as opposed to chemistry, the basis for many other drugs and the traditional pharmaceutical industry. But efforts to identify and develop gene-related products include 5,000 to 10,000 targets, compared with 500 for conventional drug therapies (Radcliffe 1999).

The subset of firms that deals with human therapies constitutes 42% of the industry, and is called biopharmaceuticals (BIO 1997). For the most part, the companies I studied fall into this area. Other areas within the industry include agriculture, vaccines, human diagnostics, supplies, and chemical and environmental products.

The basic technology was born from genetic engineering breakthroughs in the early 1970s. Scientists learned how to “cut and paste” and “amplify” genes in order to make

synthetic drugs based on biological elements. The first commercially successful drugs were marketed by Genentech, Amgen, and Biogen, with products such as synthetic human insulin for diabetics and drugs for hemophilia. Today the most popular drug quests are in areas where there is a large insured market, including Alzheimer's Disease, AIDS, cardiovascular disease, and autoimmune diseases like rheumatoid arthritis, lupus, etc. (Radcliffe 1991).

However, biotech as an industry has been through tremendous market cycles, both boom and bust. Some biotech stocks have just begun to rise again after two prolonged slumps in 1992-93 and 1996-98. Investors are more risk-averse and less willing to wait long periods for their returns. Biotech firms can no longer raise as much money from venture capital or from Initial Public Offerings (IPOs) or stock reissues. In fact, nearly half the firms (46%) were operating in 1998 with less than two years' capital on hand, a point when employees typically start looking elsewhere for work (Ernst and Young 1999, quoted in Radcliffe 1999).

These firms rely on a combination of venture capital, IPOs, and alliances or contracts to provide working capital for many years. Publicly held companies were 26% of the total in 1998 and 30% in January 1999. The total of funds invested in the industry in 1998 was \$97 billion (Radcliffe 1991). On average, a new drug requires fifteen years and more than \$304 million in 1996 dollars to be brought from conception to market (Hewitt 1997; DiMasi *et al.* 1991). Pharmaceutical researchers estimate that only three of ten drugs introduced from 1980 to 1984 had returns higher than their after-tax R&D cost, and newer research, while not complete, suggests similar ratios (DiMasi *et al.* 1991). At the time of this writing, the FDA in its history has approved about 30 biotech-based drugs, and 150 more are awaiting approval or are in the last stages of clinical trials.

Most biotech firms are networked in one form or another via partnerships, alliances, formal and informal collaborations and agreements, etc. (Powell *et al.* 1996). These ties are constantly changing as competitors make new arrangements, as clinical trials succeed or fail, as companies buy and sell other companies, and as newly discovered science and technology (such as the high-throughput computerized screening equipment now becoming available) change the nature of competition and the shape of the industry. Uncertainty is the watchword of the industry. “Job insecurity goes with the business,” one scientist said. “There is no such thing as a secure job.”

The Biotech Workforce

Demographics

Overall demographic data for the industry is scarce because federal records and surveys do not separate biotech products from other pharmaceutical, veterinary, or agricultural products made with traditional methods.⁵ I collected data from industry sources and external surveys, but it is not completely reliable, although there are no better sources at this time to my knowledge.

The industry’s research-intensive nature means that it employs a high percentage of knowledge workers, particularly science professionals from various fields, in the research and development phases. In addition, biotech firms employ technical and professional employees in manufacturing and scaling up, both to create the appropriate processes and to provide materials for research, and eventually, if the product succeeds, to produce it for the market.

⁵ Biotech activities are classified along with traditional pharmaceutical companies’ work as part of the following SIC codes: 2833 Medicinals and botanicals; 2834 Pharmaceuticals preparations; 2835 Diagnostic substances; 2836 Biological products, excluding diagnostic; 5122 Drugs and toiletries wholesale; 8731 Commercial physical research (Radcliffe 1999).

In this study I included firms at several stages of this process, and the demographics of the workforce shift predictably depending on the focus at the time. For example, the three smaller biotech firms I study, with between 40 and 65 people on their payrolls, employ at least 50% science professionals, including PhDs, MAs, and college graduates with scientific training or experience. Two additional firms that are actually producing drugs or therapeutic tissue substitutes for surgical repairs and illness, have a smaller scientific research force as a percentage of the workforce, but have many more production and technical employees. (The case study companies are described in Chapter 3.)

The biotech industry is among the largest employers of life-science professionals. The workforce has grown from 100,300 employees in 1995 to approximately 153,000 in 1998 (Ernst and Young 1998). Professional occupations make up most employment in the industry, including scientists with postgraduate degrees as well as college degrees. Administrative staff is generally small, but includes information systems employees, development personnel, and a few clerical workers. Most companies past the first stage of research employ professionals in clinical and regulatory affairs as well. Production technicians, quality control and quality assurance, and training staff make up a significant portion of payroll for companies that are in the production stage. A 1998 *BioPharm* survey of 720 readers reported that respondents included research scientists 36%, research directors 19%, research associates 8%, staff scientists 8% (these are often different names for research scientists, though perhaps at a lower level on the pay scale), professors and instructors 7%, and laboratory managers 6% (Radcliffe 1999).

Gender of biotech employees is harder to document, though many industry observers noted that women are roughly half of biotech employees at all levels except in administrative jobs (more female) and the higher-level management/director/CEO jobs (less female) (Borque 1996). A San Diego area study showed that women comprised 49% of employees in biotech firms in that highly successful biotech region as of 1996. But women held only 10% of executive positions while outnumbering men by 24% in the lowest, non-management positions

(DeHaan 1997). Women seem to be better represented among clinical development heads and heads of operations, as well as in regulatory, quality assurance/quality control, communications, and human resource roles (Radcliffe 1999).

Ethnicity was equally difficult to document. My 1999 survey of 461 respondents in seven Massachusetts firms found that 20% of biotech employees were born outside the U.S., while fewer than 10% were non-white and these were mostly Asian or Asian-American (7%).

The biotech workforce in general is fairly young, partly because the technologies are relatively new and continually changing, and also because the firms themselves are relatively young. The industry in its present definition did not exist before the 1970s, and only a few of the firms founded in the 1970s still survive today. While an average employee age has not been measured for the industry as a whole, many biotech employees are in their mid- to late twenties, thirties, and earlier forties. In my survey of 461 biotech professionals the average age of respondents was 36.6 years, with men a little older on average than women (37.7 for men, 35.6 for women). The interview sample was a little older, perhaps because I interviewed more senior managers; the average age for both men and women was 39 years.

Types of Firms in Which Biotechnology Employees Work

The number of biotechnology firms in the U.S. was 1,283 in 1998, and they employed approximately 153,000 people, not including support sectors (i.e., legal, supply, and clinical research) (Radcliffe 1999). Most biotechnology firms are small, with 58% employing fewer than 50 employees, and 88% of firms employing less than 500 people. A biotech firm of 50 to 150 employees is considered a medium-sized firm in the industry (*Ibid.*) Most firms are less than 15 years old (see Exhibit 2-1 below), and many face difficult challenges getting products to market in a tightly regulated environment. A few large firms exist nationwide, and perhaps five to seven large national firms employ a significant fraction of the biotech workforce

But as William Adler noted, small size is not just because of high financial requirements. "The size of a biotech company in terms of workforce is an interesting

problem. There are very few projects that can actually accommodate a large workforce. [Biotech] is pretty much a cottage industry” (Adler 1999). So, even in the larger firms, work is organized in smaller projects, except for production work—and even that is often very individualized, as in growing cells for a specific person. This aspect of work structure turns out to be important in the research questions I ask in the next chapters.

The industry continues to change rapidly as new companies emerge, less new companies fail or merge, and pharmaceutical companies make alliances, license discoveries, and buy out biotech companies, in some cases. The latest developments marry silicon computer chips and genetic information, and are called “bioinformatics.” Soon this platform will be standard for biotech, which will raise the capital requirements for these firms yet again.

Exhibit 2-1 : U.S. Biotechnology Firms: Years Companies were Founded

YEAR FORMED:

1990s	391 (26.3%)
1980s	600 (40.3%)
1970s	224 (15.1%)
1960s	83 (5.6%)
1950s	51 (3.4%)
1940s	36 (2.4%)
1930s	24 (1.6%)
Before 1930	79 (5.3%)

Note on U.S. biotech industry employment and company size: This chart includes companies that were labeled as biotechnology (those dealing with fermentation and other biological reactions in agriculture and drugs) even prior to the 1971 startup of the modern biotech era. But note also that the largest portion of companies was founded in the 1980s and the second largest in the 1990s, so many of the companies are relatively young.

Source: CorpTech, 1999

Comparisons with Academia and the Business-Science Tension

Biotech provides opportunities for creative, innovative, entrepreneurial, or simply non-conforming scientists to work in a new environment which seems in some ways less constrained than academia, and where they have at least a chance to make significant amounts of money if their ideas produce a useable drug. But "more alluring than the money," according to Genentech scientist Alex Ullrich who played a significant role in discovering HER-2 (a specialized breast cancer treatment), was the early CEO's "willingness to allow the top scientists to carry out their own research virtually unfettered by the traditional standards of the drug industry and other profit-making corporations that sponsor research" (Bazel 1998). New Genentech scientists were assured they would have *almost* the same freedom as those in universities to pursue whatever ideas they chose. Corporate scientists, often working in secret, carried out applied science—directed toward the goal of creating a product. But, says Ullrich, "We just convinced Bob Swanson that he had to allow us to publish and publish and publish fast and be in contact with the academic scientific community. And that became the basis of this completely new way of doing science," an approach that would prove productive both for basic science and for drug discovery (*Ibid.*). However, as I explain later in the dissertation, the business-science tension does not always work out in such a favorable way for either the scientists or the business. I find it is a major factor in scientists' satisfaction at work, their motivation, and the willingness of business to invest large amounts of capital on an uncertain project.

Dealing with Turnover and Retention in Biotech

It is interesting that success in biotech seems to depend on a variety of factors, not all of which are within the control of the people involved. Everyone in the business tells researchers that an extraordinary amount of serendipity must combine with excellent, rigorous, creative science to produce the kinds of drugs that biotech firms typically seek. In Bazel's discussion of the discovery of the oncogene HER-2 to cure a certain type of breast

cancer, he quotes one of the discovering scientists, Alex Ullrich, as reflecting that he and his colleague “enjoyed an amazing amount of luck” (Bazel 1998; see also Exhibit 2-2 below).

Exhibit 2-2: An example of the role of individual key scientists

Both individuals and serendipity seem to play strong roles in the success of a given drug and/or company, at least in stories which have been told so far (and this accords with my observations as well). Consider *HER-2*, the story of the discovery of a revolutionary drug for treating metastatic breast cancer (Bazel 1998). The lesson of this book seems to be, in part, how arbitrary scientific success is. He points out that "elegant biology often seems obvious after the fact." And "during its early life, the HER-2 project was ridiculed, close to impossible to fund, and nearly abandoned more than once. . . . Although these [two key] scientists [Dennis Slamon and Alex Ullrich] were personally committed to the project, it encountered labyrinthine vicissitudes at the hands of a corporate culture that was concerned with the firm's sheer survival" (p.xii).

The drug that finally emerged will benefit perhaps 50,000 breast-cancer patients a year, most of whom had little hope for a cure before this discovery. Yet, it saw the light of day in no small part because of two individuals. First, Bill Young, a vice president for manufacturing at Genentech who was a doubter about pursuing the research, had experience with his mother developing metastatic breast cancer-- and realized how few treatments existed for this form of the disease. Despite the “fiction that research decisions are based on sound business and scientific decisions, Young’s passionate advocacy of continued research for Her-2” was crucial in the decision to continue funding (p.52).

Second, Bob Erwin, himself a biotechnology scientist, was married to a physician, Marti Nelson, who died at the age of 40 from metastatic breast cancer before she could be treated. He subsequently focused on bringing Genentech management and breast-cancer advocates into a working alliance as a kind of tribute to her (pp. xiii and 110).

For a third unpredictable factor in this case, a "chance encounter with a single patient opened a floodgate of money for ... research efforts from the Revlon Corporation."(p.xix) Genentech spent an estimated \$200 million and an enormous amount of time on Herceptin-- but it might easily not have done so, had not these two individuals and one encounter occurred. (Bazel 1998)

Despite luck, the role of the individual scientist is crucial in biotechnology-- which makes the question of how to attract, select, recruit, and retain the best scientists even more important than in larger organizations or less discovery-dependent industries. As Bazel describes,

As so often happens in science, the research that led to an important innovation in cancer treatment began not with hundreds of scientists working toward a

stated goal, but with a lone researcher who happened onto the trail by accident. In the case of the first gene-based cancer treatment, that person worked not for the government, academia, or a giant pharmaceutical company, the three traditional loci of medical research, but for that infant phenomenon of the late 1970s and early 1980s: the biotechnology industry. (p. 29)

Biotech firms overall have an 18 to 25% annual turnover rate, according to one HR director I interviewed, and this is considered too high, but unavoidable at the moment. When firms need scientists, they have to look in a national job market to find them, as jobs are typically quite specialized. Some research on innovation has shown that as long as companies have less than 200 people (as are 75% of biotech companies in the U.S.), “knowledge is largely accumulated in ‘individuals’ which determine the firm’s productivity” (Clarysee 1996). As they grow larger, the return on investment in a broader knowledge base pays off more. In this case, productivity is defined as the number of patents received by the firm.

Organizational Culture in Biotech Firms

Biotech companies differ significantly in their organizational culture from other research, discovery, and pharmaceutical organizations. In part because they are young and experimental, as well as small (at least at first), they tend to be less formally organized and encourage an informal culture. Few employ Personnel or Human Resource management (HRM) staff until they reach a critical threshold—somewhere between 50 and 100 people. In several small firms, the person I interviewed about HRM policies on work-family was also the Chief Financial Officer (CFO), or even the Chief Executive Officer (CEO), because there was no one else! Sometimes the HR managers double as investment relations people, assistants to an officer, or fill other jobs as well.

High-level employees at Genzyme boast that CEO Henri Termeer “will not permit rules,” because of his concern that regulation will stifle creativity. This has become more of an issue, especially for HRM people and managers, as Genzyme approaches the 3000+ employee size. In this setting, issues of equity and disparate treatment as a result of “not

having policies” begin to emerge, as well as issues of legal compliance with an increasing number of labor market regulations, including the Family and Medical Leave Act.

Bazel describes Genentech in the early days as “a huge college campus. Casual dress is *de rigueur*. Ties [*sic: for men presumably*] are nowhere to be seen, and big Friday-afternoon beer bashes were a crucial part of the company’s culture” (Bazel 1998:44). Of the 15 biotech firms I visited in Massachusetts, nearly all of them hold a “payday party” or “Friday lunch on the company” at least every other week, and sometimes weekly. Most scientists dress casually, as does everyone but company officers and the financial managers. Bazel compares this “lean and mean” culture with the stereotypical “big pharma,” or large pharmaceutical companies which “employ huge bureaucracies and execute research and development based on incomprehensible flowcharts,” in contrast with the Genentech decisions, which often followed “gut instinct and hunches” (*Ibid.*).

Another contrast between biotech and pharmaceutical companies is that “big pharma” companies were reputed rarely to have carried out experiments without a clear goal, tending to leave pure research to universities and government labs. Rather, they concentrated on the repetitious steps required either to find a drug in random trials, or to convert basic research discoveries from other realms into useful medications (Bazel 1998). The initial idea of biotech was that these same top scientists could carry out basic research, become “instantly” aware of its potential for drug development, and bring it to market

Two distinct approaches distinguish biotech firms from each other. Some fall into the “drug discovery” realm, in which they work with biological materials either discovered by accident or by plan (many stories are told of bringing back rocks and soil from exotic vacations, only to find important compounds embedded in them), and screen them against known diseases and receptors to see what interactions are promising. This is based on a deep knowledge both of biology and chemistry, of course, but the process is still one of knowledge-based discovery. One description of a key early variant of this process is found in *Making PCR* (Rabinow 1996).

The second and smaller group of firms works with “drug design.” Their scientists are likely to use computer-based modeling, X-ray crystallography, or magnetic resonance imaging to simulate the molecular interaction of a drug and receptor (Clarysee 1996). Mathematicians and computer experts, as well as biologists and chemists and physicists, are needed to carry out this second strategy. This process in a Massachusetts-based firm named Vertex, which does this kind of drug design, is described in some detail in *Billion Dollar Molecule* (Werth 1994). The firms where I conducted interviews and surveys for my study were primarily of the first type, but I did include two firms (neither of which is Vertex) of the second type.

Industry Development and Hard Times

But biotechnology does not always produce world-changing discoveries, like those that investors and observers noted with amazement in the late 1970s and early 1980s when Amgen, Biogen, Genentech, and others experienced skyrocketing stock prices over a single new product. The realities of drug discovery and development in biotech firms, Bazel reminds us, is quite different from that of high-technology information systems. “If a high-tech start-up invents a revolutionary new chip, it can almost sell it the next morning. But no matter how promising a drug appears in the laboratory or even in animals, it must undergo years of staggeringly expensive clinical trials before anyone really knows whether it works” (Bazel 1998:45). This means that a mistake at any stage, especially when deciding which drugs to send to clinical trials, can be potentially fatal for companies, causing them to go off track for years and lose millions of dollars if they are wrong.

Summary: The U.S. Biotechnology Industry

While there is much more that can be said about the U.S. biotechnology industry, for now this brief overview provides a context for explaining the basic financial, organizational, and market context for biotechnology firms. Biopharmaceutical firms are the largest subset of these, and they are where I focused my study. Human therapeutics presents the greatest

challenge for development, as well as the providing the largest number of jobs and firms engaged in the discovery, development, production, and approval process.

BIOTECH FIRMS IN MASSACHUSETTS

Innovation research, both in economics and management, has often emphasized the importance of location for firms seeking to create and market new products (Griliches 1991; Saxenian 1994). Jaffe *et al.* (1993) found that knowledge spillovers in such industries are often geographically localized, as in Silicon Valley, or Massachusetts Route 128 (Clarysee 1996; Gunz *et al.* 2000). Biotechnology shares this same characteristic of high-tech “clustering” — a large number of firms located in a relatively small area, often close to major research universities where their scientists can find collaborators and stay abreast of breaking developments.

Massachusetts boasts the second-largest concentration of biotechnology firms in the United States, trailing only California. Approximately 130 biotech and related firms existed in Massachusetts at the time this study began, although some have gone out of business and some new ones started during the 2-1/2 year research process. The industry is represented in the state by a self-funded industry organization, the Massachusetts Biotechnology Council (MBC), which convenes committees, holds an annual conference, gives awards, provides information to legislators about industry concerns, and completes an annual membership survey. Many firms are clustered in the Boston-Cambridge area so they are close to the major research universities, some are in Framingham, some are scattered around Route 128 (see Saxenian 1994 for a description of high-tech firms in the same geographic area), and others are in Worcester, which built a biotech park in hopes of attracting more firms to that location.

In 1995-96, a biotech industry survey conducted by the MBC reported results based on responses from 57 of the 103 Massachusetts biotechnology member companies. Only two

companies were founded in 1995, down from 9 in 1992. A larger percentage were public (44%) than in the national industry, where the figure is closer to 33%. Two-thirds of the companies focused on biopharmaceuticals, 10% on diagnostics, and 8% on medical devices. The MBC reported six major drug approvals by the FDA in 1996, including Septrafilm, Allegra, and Redux. There were also 34 therapeutic products in late-stage development, usually meaning the Phase 3 clinical trials, or awaiting approval. The industry claimed \$1.2 billion in total revenues, of which one-third was investment revenues and two-thirds product-driven, but noted that only five firms accounted for 96% of product-driven revenues. This highlights the fact that 52 of 57 companies reported few or no revenues as a result of their products, and were most likely in a net “burn” mode with resources.

Market capitalization of Massachusetts biotech firms had more than doubled, from \$5.1 billion to \$10.7 billion, between the end of 1994 and 1995. The biotech firms responding (about half) employed 6,912 people in Massachusetts in 1995, and projected a 28% increase in 1996. The industry was small, but highly visible and a major employer of knowledge workers and science professionals.

Most companies in Massachusetts were nowhere near a Phase 3 or 4 (the final stage before FDA submission and approval) clinical trial during my 30-month research study. Many were barely at Phase 1, which is conducted with only a small number (say 25) of healthy patients to ensure there are no negative side effects. Phase 2 was also common, where a slightly larger number of patients with the targeted illness or condition would engage in a voluntary, double-blind trial to see if the drug caused any side effects in the ill patients. Phase 3 is where most companies appeared to stumble, since for this phase perhaps 10 or 20 times as many patients (up to 2000, or as many as are required to prove a statistically significant effect in a large sample) are needed. Very often even drugs which had sailed through Phases 1 and 2 trials with strong effects seemed to show “no difference” when compared to a placebo in Phase 3.

Relatively little was known about HR practices or the workforce in particular in Massachusetts biotech firms before Radcliffe Public Policy Institute's Research Director Françoise Carré in 1997 surveyed HR departments in 113 companies primarily involved in biopharmaceuticals who were members of the MBC. A total of 33 surveys were returned, for a 29.2% response rate. Because the surveys were confidential, no conclusions can be drawn about the representativeness of the sample, although the response rate is similar to most other MBC surveys (1996 was an exception, apparently).

HR professionals in responding Massachusetts firms described a highly educated workforce, with 85% of employees holding a bachelor's degree or higher, including 26% with PhDs, 4% with MDs, and 16% with Masters' degrees. The workforce was reported to be 54% male and 46% female, although men in the responding companies held a higher proportion of R&D jobs (61%) than women did. Approximately half the workforce had children living at home, and 46% of those children were under age 5. In this sample, 45% of employees worked for companies with 50 employees or less, who would therefore be ineligible for the Family and Medical Leave Act benefits, for example. Another 30% worked for companies with 51 to 150 employee. Fully 49% of employees were in research positions, 19% in administration, and 12% in manufacturing.

Nearly everyone, more than 95% of employees, worked full-time in the industry. More than one-third, 36%, worked more than 40 hours per week, with 55% working 40 hours, according to the HR managers. (Note: I found a different result when asking individuals directly, that more like half worked more than 40 hours a week, as I report below.) Managers worked an average of 47 hours a week, at least in research and administration, where most are concentrated. More than three-quarters were likely to work more than official hours, according to the HR informants. And average length of service was just under 3 years (Radcliffe 1998). Approximately one-quarter of the 33 firms in the RPPI survey experienced layoffs in the 1995-97 period. Three of the twelve firms I studied also experienced layoffs during the study.

Company representatives reported that most Massachusetts companies allowed for flexibility, with 40% giving their firm a 7 out of possible 7, and another 52% reporting a 5 or 6 out of 7. Nearly 60% saw uncertainty in business outcomes, including fear of layoffs, as a major source of morale problems, while only one-third saw work and family issues as a source of such problems. But two-thirds of HR professionals reported that benefits such as childcare, including care for sick children (40%), were major issues facing employees. Nearly 90% of the companies reported giving leave for childbirth or adoption, and personal sick days. But other work-family related benefits were less common: for example, 75% permitted leave to care for a sick relative, 71% reported flexible scheduling, 66% claimed to allow part-time work, and only 53% said employees could use sick leave to care for an ill child. Working at home was available at 39% of these companies, compressed work weeks at 16%, and elder care resource and referral at 19%. Nineteen of the 33 companies reported having an employee assistance plan, all of which were outsourced. Most indicated in open-ended responses that such innovative scheduling options as part-time and job-sharing were not common, and were negotiated on a case-by-case basis, at management's discretion. Finally, 17 of the 27 companies that responded said morale problems are handled on an individual basis, compared to company-wide. HR professionals wanted to see more innovative policies and practices, such as sabbaticals, telecommuting, etc., but they also noted problems of small size, available resources, and lack of formal career paths for employees.

INITIAL EVIDENCE FROM BIOTECH: A FAMILY-FRIENDLY PLACE?

I was not sure what to expect from biotech firms in their human resource management, for a variety of reasons. Very few studies of the internal workings of biotech firms have been published, although some scholars have examined their network alliances (Powell *et al.* 1996), their university affiliations (Zucker 1994, 1995) and their practices related to compensation

via stock options (Leibeskind 1997). Others have looked at funding sources and strategic decisions about marketing (Cohen 1998). To my knowledge, few studies of work organization, family issues, or gender existed prior to the RPPI study in 1997 (see March *et al.* 1999) on the surprisingly high representation of women in innovative and less bureaucratic firms in California).

We might expect that like other industries that are also new and rely on high-tech knowledge workers, that biotech would be free of the bureaucracy and rigid workplace rules associated with older industries. However, high tech, at least in Silicon Valley and other vaunted locations, has become primarily male, although women started out in prominent roles in some of the firms. Also, while people come and go from Silicon Valley firms, most of them do not have to uproot their families in order to make a job change, at least in certain regional areas (Saxenian 1994).

We might also expect that because biotech firms are small firms, they have less “slack” which might allow them to offer flexibility as a benefit to employees. Someone who requires family leave, for instance, might not be replaced or easily covered in their work in a smaller firm. In general, wages and benefits in smaller firms will be less generous (Kalleberg 1996).

In fact, little has been written specifically about the biotech industry, in part because it is so new as sectors go. (The first biotech firm, Cetus, was created in California in 1971). However, several interesting accounts of key discoveries in the field lend insight into the day-to-day lives of scientists (in these books, they are mostly male) and their families. For instance, in *Making PCR*, Rabinow describes scientists who stay in their labs for 24 hours at a time, shedding family obligations as they go. He implies that good science cannot occur without this kind of dedication, but never addresses this issue directly (Rabinow, 1996).

In *The Billion Dollar Molecule*, Werth describes days at a time when key scientists and the CEO don't go home, don't shower, and eat only pizza or yogurt in their labs (Werth 1994). This is not a family-friendly lifestyle, to say the least. The firm Werth is describing is a discovery-based start-up in Cambridge, Massachusetts. It is called Vertex. In Werth's

account at least, a race to the finish with a Harvard scientist publishing comparable findings is crucial. This partially explains the urgency of the deadlines described in his account.

More recently, in *HER-2*, Bazel describes a lead scientist, Dennis Slamon, as someone who “admits he seldom saw his children during the first decade of their lives” (Bazel 1998). Given the description of the man and his research, the reader does not find this a likely exaggeration.

Women scientists are virtually invisible in these few heroic accounts of pioneering biotech success stories, however. This dissertation helps to amend the collection of accounts by showing what a normal day-to-day life in biotech firms is like, both with and without extraordinary deadline pressure.

CONCLUSION

Biotechnology is a rapidly changing and still-growing industrial and R&D sector of the U.S. economy. Certain of its characteristics are unique: the high levels of education and expertise among its workforce, the large number of small and unprofitable firms, the collaborations with universities and other non-profit research institutions, and its clustering in relatively few geographic locations around the U.S. In addition, as I emphasize in future chapters, the nature of the work processes, not discussed in detail here, are quite unusual. Employees participate in market-oriented research, yet they also are encouraged to conduct experiments that might lead to unexpected results. In fact, at least a few of the major discoveries described here came about through a combination of luck, skill, and opportunity. Individual contributors are extremely important, not just because of the specific knowledge they bring, but also for their networking relationships inside and outside the firm, and for their contribution to the reputation of the firm (particularly with star scientists who have or will

have patents to their credit). The life cycles of companies are volatile and unpredictable so far, and the industry itself is rather young, with a relatively young workforce. HR practices are not standardized through the industry (although wages are frequently based on adjustments to a national survey that virtually every biotech company subscribes to), but HR managers are likely to claim that their companies allow employees a good deal of flexibility.

In the next chapter I explain my research design.

A Multi-Method Research Design

In this chapter I explain the multi-method research design I used to explore my major research questions, and why I chose it. I explained in Chapter 2 why I chose the biotechnology industry as a site for study. Here I explain my reasons for choosing twelve specific firms and work settings, including the three case study sites and nine others where I conducted interviews and/or surveys. Next, I describe my interview sample of 70. I conducted additional interviews at nine firms to recruit more companies to participate in the survey, to learn about variation in practices and work structures, and to get a better idea whether what I had seen in the case study firms was typical. I also interviewed several employees who had recently left one of the case study firms when they began working in their new firms. Finally, I explain the survey I designed, distributed, and collected at seven biotech firms in Massachusetts. The firms where employees were surveyed included the three case study firms referenced earlier, and four others, ranging from a tiny startup to a large, successful, and established firm. I wanted to observe a range of types of companies while holding local environment constant.

My goals in designing the study were to engage the research questions with both depth and breadth, to learn intensively from qualitative interview data about how employees manage time, work, and family commitments; about how they view the employment relationship today; and about how and whether their work, families, and organizations are gendered. For

a broader group of employees in seven companies, I designed, distributed, and analyzed an original survey with measures of commitment, satisfaction, time management, flexibility, and assessment of work-family integration strategies and the practical formal and informal tools available to them in different firms. I distributed 1,055 surveys and 463 were returned completed, for a 44% overall response rate. These data help reveal the influence of firm policies and practices in the lives of a larger number of employees, and across more firms than I could study intensively on my own.

This chapter outlines how and why I collected these data as I did, including the semi-structured interviews, case studies, surveys, site visits, observation, and industry research.

RESEARCH METHODS

For this dissertation I use both qualitative and quantitative techniques of data collection and analysis to develop hypotheses in a small group of informants and then test some of the hypotheses in a larger sample. Of course the actual research process was more iterative; the interviews informed the survey design, but the literature on which the survey was based also informed the interview outline, for example. I explain the method in detail below. Here I explain why I combined case studies, close observation, interviews, and surveys to get a multi-faceted perspective on the internal workings of a number of small to medium-size firms.

The Case Study Firms

My study is based in part on intensive case studies of three firms in Massachusetts, a state that is home to approximately 10% of the U.S. population of biotechnology firms. These firms are described below. Further, I interviewed approximately 20 industry experts and scientists in other firms and universities for context and background on the industry and professional workforce.

Each case study site currently employs between 35 and 250 employees, of whom 10-30% are Ph.D. scientists and 50-80% are directly involved in research activities (broadly defined).¹ Professionals with college degrees or higher educational credentials comprise more than 65% of the workforce. Two sites also employ technicians and manufacturing managers. At all levels below the top managerial jobs, excluding administrative and secretarial, half the employees are men and half women; this represents unusual gender integration at the job level, but is typical of biotechnology workforces generally.²

Although these sites do not cover the universe of company types, they are well within the range of typical biotech companies. Each is an independent, publicly traded company, at a middle stage of development. The largest firm has two products on the market, and one smaller firm has one product.

For this analysis, I combined interviews and observations from all companies. The data offered here stem from focused interviews, observations, and group discussions. Data were gathered over a period of twenty months (in 1997-98), so some longitudinal data were obtained, as new children arrived, childcare situations changed, marriages ended, companies moved or merged, etc.

¹ The sites were chosen by a process of elimination in which consideration was given to size, distance from the research headquarters in Cambridge, stage of development, type of production, presence of research scientists, and willingness to participate in the study. Lotte Bailyn, Paula Rayman, and Constance Perin conducted the access negotiations to these three sites, with assistance from Françoise Carré and Sandra Resnick. I gained access to the other firms independently after having participated in fieldwork at these three sites for the Radcliffe project. I also negotiated the survey distribution and collection separately with the three case study sites.

² We know that at the level of jobs, in U.S. workplaces, the index of segregation approaches 0.96, meaning 96% of all men or women would have to change jobs to achieve a gender-integrated workplace (Baron and Bielby 1985; Bielby and Baron 1986). This makes biotech firms unusual indeed, but perhaps more like future firms will be, as men's and women's education levels equalize.

Case Study Site Profiles³

To ensure confidentiality, I have disguised the names of the actual case study sites, referring to them as BioCo, ImmuCo, and GeneCo. Below are brief descriptions of each site.

BioCo

BioCo was founded in the first wave of biotech companies. Like many other early biotech companies, it began with a business strategy that focused on becoming a large, if not fully integrated, biopharmaceutical company. To this end, BioCo built a respectable “product pipeline,” achieved some success, and grew to a medium-size company. It did not, however, develop a solid revenue base and, thus, restructured in the mid-1990s. These changes included one large layoff, and attrition took several other employees. The company is now at less than half of its peak size.

Since restructuring, BioCo’s business strategy has concentrated its resources on R&D and on building alliances. It relies on these alliances for the manufacture and sale of its products and also for licensing revenues. Top management reflects the greater R&D focus. The CEO is a scientist with extensive management experience in both pharmaceuticals and biotechnology.

BioCo has been in a somewhat precarious business position because of its reliance on financing from partners. This is a situation faced by many biotech companies. BioCo’s situation, however, improved recently when it entered into a multi-million dollar alliance with a large company. BioCo is still in the unsettled stage of the ‘uncertainty spiral,’ however, and at this we could observe the effects of serious uncertainty on employees and managers.

During the study period, BioCo merged with another firm that had complementary technology, patents, and scientific and managerial expertise. At first the merged company had

³ These profiles are intentionally general in nature to protect the confidentiality of the firms that were included in the study. Each case study firm has seen its own profile and has approved the language used for it. Developments during and after the time period of the study have changed some of the particulars, but this was accurate as of the time of study initiation. I added brief updates to each company’s profile reflecting changes in the company’s situation since the study began.

many more employees than either of the older ones, but after a restructuring and some natural attrition (the sites were merged over a six-month period after shareholder approval), the newly merged company had just twelve more employees than BioCo had at the beginning of the study. I conducted the survey with the entire population of the merged BioCo, but all interviews were with initial BioCo employees.

ImmuCo

ImmuCo was founded in the early 1980s and also began with the vision of becoming a fully integrated company. It has had some success, having already received government approval of its first product (a product for a national market) and it maintains a production facility on-site. ImmuCo has also licensed its proprietary technology products to several corporate partners and also continues to develop products for itself. The company actively seeks collaborations with academic institutions and industry. These activities have created a modest income stream that, while not offsetting the company's losses, creates internal and external optimism about longer-term chances of success. This optimism is buoyed by confidence in the management team headed by a CEO who has extensive scientific and managerial experience in various biotechnology companies.

ImmuCo has been somewhat successful, having brought its first product to market, but also has suffered major setbacks and restructuring. Its ultimate success will be determined by its second set of products, those in the "pipeline," because a company usually needs more than one product to be successful. At ImmuCo, we witnessed the job and morale insecurity that exists in a company with a medium level of uncertainty. During the last six months of my study, in 1999, a number of employees voluntarily left ImmuCo, in part because of a geographic move the company made during the study period, and in part because the company was still having difficulty getting its production capacity on line. Also, ImmuCo hired new employees during this period. When I ended the research it was smaller than when the study began, but approximately the same size as the merged BioCo. The value of the

technology ImmuCo has developed, however, seems clear in the market, and it is possible the firm will consider partnerships or becoming acquired in the future, according to industry experts and internal sources.

GeneCo

GeneCo is in a more commercially positive situation than the other two sites, although it is the youngest organization. Founded in the late 1980s as a small company that developed cutting-edge technology in medical therapeutics, GeneCo became a subsidiary of a large, financially secure company in the 1990s. This position provides it with steady access to significant financial and intellectual resources. Since its acquisition, GeneCo's lead product has received government approval and is receiving increasing acceptance from insurers. The site is now focused on increasing its manufacturing and sales capabilities. It expanded its workforce at times during the study, but also experienced a small layoff. GeneCo's R&D group functions as part of the scientific division of the parent company, while its manufacturing, sales, marketing, and administrative activities are together in their own unit.

At GeneCo, we see employees in a growing company that is in the least uncertain stage, but has not yet achieved reliable success: employees know it is still losing money, despite being at full production at the moment. This is a situation we may see occurring more often in the near future as the biotechnology industry approaches the 25-year mark and more than 200 products industry-wide move ahead to late-stage clinical trials. During the thirty-month research period, GeneCo continued to improve on all its metrics but did not move into profitability.

Additional Firms Participating in the Survey Research

The three firms profiled above were sites of intensive case study where I conducted many interviews and observations over time (including science meetings, company meetings,

and management meetings). These firms were generous with their time, as were their employees.

In addition, I sought a broader range of companies and employees to be represented in the survey which I developed after most interviews were complete. A copy of the survey is attached as Appendix 1. Four additional firms that agreed to participate in the survey phase of this study are briefly profiled below. I wanted to find companies that represented different aspects of employment situations in which biotech professionals might find themselves. One is a “virtual company” startup, one is a privately held small company that is six years old, one is a larger company that had recently downsized at the time of the survey after a failed clinical trial, and one is a very large and successful company. I called these additional firms Quattro, Pente, Octo, and Nente.

Altogether I asked six additional companies to participate in the survey. Four accepted and two declined. Of those that declined, one was a large firm similar to Quattro, and another was a smaller firm similar to Octo. The larger firm’s HR director said that the company had “too many things on its plate already,” and it was in the midst of a fast-growth stage. Also, unlike any other biotech company I visited, that company surveyed its employees internally on an annual basis, and did not want to add an external survey. The smaller company’s CFO and HR manager wrote a letter in which he stated that although the survey topic was of interest, that the management “is not confident enough to ask employees these types of questions.” Shortly after I received the letter, he resigned from the company, and because a new manager was not appointed immediately, I dropped my effort to conduct the survey there, although I did interview three employees, two women and one man, from that company.

Here are brief descriptions of the additional survey sites.

Quattro

This is the only medium to large firm in this study. It employs about 3,500 employees worldwide, including 3,000 in one state. This firm is a public company that was founded in the early 1980s and still has its first permanent CEO. It manufactures, among other things, a critical drug for a rare condition for which it has exclusive rights (this is called an “orphan drug”), and it has purchased six or eight other companies in the last two years. Quattro has several companies that serve as “divisions” with their own tracking stock but which are wholly owned by the parent organization. The company has few written policies related to work-family issues, aside from a policy on maternity and other family-related leave which complies with the FMLA, and which provides short-term disability coverage after two weeks out of work, for up to 24 weeks. HRM professionals say that there are many instances of flexibility “out there,” but in part because the firm is so large, systematic data were not collected.

Pente

When I began my study, this neurologically focused biotech company had about 120 employees and, with a colleague, I interviewed the HRM director. By the time I gained agreement to administer the survey, from a part-time businessperson who left shortly after she provided me with names and job titles, employment was down to 21 people including two contract employees. The HRM director was working in another industry. A crucial clinical trial had failed unexpectedly, and the company lost its private financial backing and was forced to lay off nearly all its staff. The remaining staff was mainly working to try to arrange for a licensing or other disposal of the intellectual property assets.

Not surprisingly, perhaps, the survey response rate here was below the median. These employees had many other things on their minds—mostly, what their next job would be. But I did not want to omit the company from the study. What had happened was not unusual in biotech, and could have happened to almost any one of the other firms, so I wanted to capture that experience even though the numbers are extremely small.

Octo

This is a small company with about 35 employees, located away from a nearby major metropolitan area, in a biotech park. It was founded six years ago and has yet to produce any revenues, although it also is working on a diagnostics tool to raise cash (this is a common short-term strategy in biotech; usually the firms eventually divest the diagnostic capacity). Just before the survey was distributed, the firm laid off two people, and the HR director, among others, was working two jobs. This company is typical of younger companies which are beyond the start-up phase but which have not yet stabilized. The survey was administered to the 18 people who volunteered to take it after an e-mail approach by the HR professional. They were all managerial and professional employees.

Nente

This is a startup “virtual company” which at the time of the survey administration had only 10 employees, 5 of whom responded to the survey. At the time of writing, one year later, it has 25 employees and is still growing rapidly. Access to this company was gained through Wendy Jade Hernandez’s efforts, and all the returned surveys were answered via the Internet. The company is too small to hire an HR officer, and managers report that few or none of its policies are in writing, or at least this was true at the time of the survey follow-up in 1999.

DATA COLLECTION METHODS

For this study I conducted 70 interviews with biotech professionals, mostly scientists and researchers. Fifty of these were held at one of three case study firms. In addition, I interviewed selected professionals and managers at 10 additional firms in the same state. I also interviewed industry experts and industry association employees. I used workplace interviews, workplace observations, and follow ups with former employees to collect data.

Workplace Interviews

Between January 1997 and July 1999 I held interviews with 70 professional, technical, administrative, production, and managerial employees in twelve U.S. biotech companies and two universities. Three-quarters of these employees either were presently working or had worked recently in one of the three case study firms described above. During the thirty-month field research period, I was able to re-interview approximately ten individuals to see what changes had occurred in their lives over the time of my research.

At BioCo, a total of 23 individuals were interviewed in a total of 30 sessions: 10 PhD scientists, 5 Master's level scientists and administrators, 6 Bachelor's level scientific employees, and two administrative support staff.⁴ (Note: while the distinctions between degree levels are important for job titles, job content, and compensation, in this summary and unless it matters to the analysis, I refer to all individuals performing scientific work as "scientists".)

At ImmuCo, 6 Ph.D scientists, 4 Master's level scientists and administrators, and 8 Bachelor's level employees performing scientific work were interviewed.

At GeneCo, one Ph.D scientist, one B.S. manufacturing manager, one B.S. and one M.S. production supervisor, 3 quality assurance or quality control scientific managers with B.S. or M.S. degrees and 2 manufacturing technicians (with high school plus certificate credentials or associate degrees) were interviewed. This totaled 50 individuals. Since some individuals were interviewed more than once, the total number of interviews at case study sites was 60. In addition, 20 individual scientists and managers were interviewed at ten other biotech firms and in two academic settings, to learn about various firm practices and choices of those who were not in the intensively studied firms. The academic settings included one

⁴ I conducted all but two of these primary interviews myself, although four with executives were shared with other members of the research team. Two interviews were conducted by Sandra Resnick, research associate, and taped and transcribed. I later held brief interviews with these individuals to validate and update the information in Resnick's interviews. All but four of the primary interviews were held in person, the others (all with employees who had left the case study firms) were held on the telephone, and occasionally follow-up interviews were also conducted on the telephone.

research university and one university teaching hospital complex. Several professionals formerly employed in biotechnology firms, now working in consulting and electronics, were also interviewed, as part of a follow-up sample from individuals who had left case study firms, and to gain perspective on other types of biotechnology employment.

Women are rare in upper management at any of the studied firms, though some have succeeded in becoming officers. Hours were similar to those in the case study firms, though some appear consistently to press their scientists harder, apparently because they are under more financial pressure or because they are younger firms. Only one firm, not a case study site, had developed human resource plans and strategies, and it also had a culture of working its science people extremely hard. By reputation, according to one informant in HR, this firm hires young people with few family commitments in part so they will work long hours, as well as for their current scientific expertise. This firm's HR representative expressed concern that because the company was hiring "more mature" scientists to get their more extensive scientific knowledge as it developed into new stages of research, that these "work-family" issues would become more pressing.

To summarize, employees to be interviewed were selected to represent a range of occupations, ages, family status, and lengths of service. I selected individuals based on a series of criteria, including in one firm those individuals who volunteered or who were identified by HR managers as representing classifications or family situations not yet represented in the sample. At BioCo, 50% of the professional staff were interviewed. At ImmuCo, I interviewed nearly 40% of employees, and more were involved in focus groups. The interviewed subjects do not differ in substantial ways from those not interviewed, with the exception that in GeneCo, a group of production employees who are younger and single were under-sampled. No one refused an interview, although some interviews were rescheduled three or four times, sometimes at the last minute, because of conflicts at work. This in itself permits insight into the pressures on the professionals and technical employees in biotech.

Interview Strategies

First I developed an interview guide which I amended and expanded as I learned more about the industry and relevant issues to these employees. The final interview guide, showing amendments, is attached as Appendix 2.

I began the field research by interviewing top managers, including the CEO in two firms, the HR managers in all firms, and the chief scientific officers in two companies. My Radcliffe colleagues and I held group introductory meetings with some of these individuals, and followed up with individual interviews. In one firm I interviewed the training director several times. She also designs and implements work process changes. In another case I interviewed the chief financial officer. In total, I interviewed ten top-level administrative and scientific staff during the first six months of the study. In some cases these interviews were conducted with multiple researchers from the Radcliffe study team so that we could make the most of these individuals' time and ask questions from multiple perspectives. In addition, I shadowed the CEO of one firm for one 12-hour day, and interviewed that person twice about typical activities, strategic outlook, and work-family issues. From these individuals I received recommendations of employees and other industry experts to interview.

To gain a broader set of experiences below the managerial level, I focused mainly on workplace interviews with scientists at various levels and lower-level managers such as project directors. I also arranged for follow-up interviews with five of BioCo's former employees and two former ImmuCo employees, to learn about their next jobs or unemployment experiences and their reasons for leaving. I attended five all-professional staff science meetings and two management luncheons at BioCo, and observed interactions between work groups and project teams, as well as conducting interviews and observation in several lab settings. I interviewed the key contacts, often HR personnel or training managers, multiple times to obtain detailed information about the workforce as a whole and to identify appropriate interviewees. In 1998, BioCo laid off 30% of its workforce after merging with

another firm earlier that year, and I returned to the company to conduct additional interviews to learn about the implementation and effects of the reduction in force.

At ImmuCo, in addition to scientist interviews, I conducted a focus group in 1998 with my colleague Ann Bookman, which involved eight professionals not previously interviewed. The group discussion centered around the anticipated move of ImmuCo's lab, manufacturing facility, and offices, which posed serious complications in work-family integration for most of the attendees. The firm moved to a new site during the study, and I completed several follow-up interviews along with a survey of all employees there in January 1999.

The field research at GeneCo included interviews with two individuals before a major schedule change in 1997, and then I re-interviewed them and additional individuals after implementation of the new schedule for many employees.⁵ Interviews were also conducted with process development staff, training staff, and quality control and assurance staff. I attended a "cGMP" or Current Good Manufacturing Practices training session for manufacturing technicians (required by the FDA) in Fall 1998, in addition to re-interviewing the training manager several times over the eighteen-month period of field work. GeneCo also implemented a layoff of seven employees in 1998, which had noticeable impact on the individuals remaining in the firm. In this layoff, for the first time, laid-off employees were not able to find employment in GeneCo's parent company.

Interview Protocol, Employee Selection, and Interview Procedures

The semi-structured interview protocol used in all workplace interviews is, as referenced earlier, Appendix 2 of this dissertation. As the interviews progressed, I added questions on community and family life. I asked the professionals to describe a "typical day" including their home and work segments of time. When I heard employees voice concerns

⁵ The compressed schedule for all production employees and managers involved four ten-hour days instead of five eight-hour ones, each shift including either a Saturday or Sunday.

about retirement and mobility, I added new questions. I asked individuals about personal support, and borrowed an interview question from RPPI study director, Constance Perin, asking about a work-personal life tradeoff in the last six months. The interview questionnaire became a living document, adapting both to new learnings for the researcher and to changes in the companies' business environments.

I also asked managers how they managed the work-family boundary for their employees, and collected examples. To better place the scientific employees in the context of the industry and the changing workforce as a whole, I asked about their membership in professional associations and about their experience with business-science tensions, if any. Because several interviews were follow-up interviews, I also adapted the questions to build on what had been shared earlier. Obviously, for individuals who had left the firms, I asked about their reasons for leaving and their subsequent work and family experiences and satisfaction.

Five interviews and the focus group discussion were tape-recorded and transcribed. Four of the follow-up interviews were conducted by telephone.

I scheduled the interviews by calling employees directly, usually reaching their voice mail and exchanging messages to set up times. Most interviews lasted between 60 and 90 minutes, although at GeneCo, nearly all were held during non-work time and off the premises while at BioCo and ImmuCo they were held during work time and at the work site. This partly reflects the different nature of the production process at the three sites (GeneCo has a manufacturing component that makes talking in offices more difficult, since fewer employees have offices. Also its officers are more concerned, as is typical in a production operation, with employee time.)

All interviews, except four follow-up interviews, were conducted in person, using a personal shorthand which enabled me to make near-verbatim transcripts of the interviews. I wrote up extensive notes afterward which were shared with the work-family sub-group of the Sloan project team. Five interviews were taped and used for reference for quotes and to

verify notes. In sum, I sought individuals from a variety of job levels who had dependent care issues, but also interviewed single and childless employees.

Follow-up With Former Employees

To minimize selection bias which would occur if I spoke only with employees who had decided to stay at the firm, I sent out letters to employees who had left two case study firms asking if they would volunteer to be interviewed about their next steps and decisions. One firm declined to provide such information formally, although I was able to interview people about the decisions of those who had left. Five employees (of a total of eight) who left BioCo during the first year of the study volunteered to talk about their choices. All of the BioCo employees were happy that they had left. Of the five, two men stayed in biotech and improved their career prospects, one man left the industry, and the two women left the industry, both principally for family reasons.

Three women who left ImmuCo after the move volunteered to be interviewed after I reached them at new jobs or at home. One scientist resigned after being denied the opportunity to work part-time so she could attend school, while another scientist decided she could not make the additional one-hour commute each day and still have a life with her family. One administrative employee was denied the opportunity to work a slightly non-standard schedule after the birth of her child (7:30 to 4:15, which would have permitted her to use her family daycare provider of choice), so she left the firm.

Contextual Interviews

In addition to conducting the site-based interviews, I went with members of the RPPI research team to interview several other industry experts, including an HR manager who left a biotech company (and the industry) to shorten his commute and spend more time with his family. Another helpful source was a business development manager who commuted to the

West Coast for a number of years and then began an individual consulting business; she has now taken a job with a firm which requires another commute.

I also attended a meeting of the Human Resources Committee of the Massachusetts Biotechnology Council (MBC) focusing on work-family resources, and two of the MBC annual scientific conventions.

Additional Biotechnology Employees Interviewed

All the additional interviews I conducted were intended to provide a larger context for the work than the case study research permitted. These 20 interviews in five additional firms and two universities proved helpful in identifying characteristics common to a larger subset of firms and for showing variation in firm practices. At least one of these firms, for instance, forbids part-time work altogether, while another allows it only in exceptional cases. A third has a policy against part-time work but it is allowed informally by individual negotiation. This is consistent with the distribution of flexibility in the three case-study firms.

For the most part, I identified either HR professionals at an MBC meeting or a sub-committee session, including the one I spoke at, and sometimes scientists would refer me to other scientists who were their friends at other firms. Beginning with one reference (originally through a colleague of mine in a Harvard fellowship program 7 years ago, via his wife who was an academic biochemist), I interviewed a female scientist, her husband (an MD/Ph.D researcher), a manager in another firm, and an additional person in her firm. So one interview led to several others, similar to a snowball sample. When I talked with friends, I asked for a reference to someone who might have a different perspective in each case. I was referred to a scientist in one firm by someone I met at a conference on gender and organizations who had formerly worked with the scientist in an academic setting.

Many of these networks that I tapped into existed between women, but often men were involved (the colleague, the husband, the HR officer and Chief Operating Office of another company, for example). So my additional interview sample was not a random sample,

but a purposeful one without an explicit bias except to seek people who represented a diverse group of family situations, firms, and age and job types within the biotech industry.

Interviewee Demographics

The basic descriptive statistics for the 70 interview respondents are attached as Exhibit 3-1. In this interviewed employee group as a whole, 73% or 51 of the 70 employees have children, and 96% of these parents are either in two-career families or are single parents. But important gender differences exist in the potential impact of family status on these scientists. While 4 women are single mothers, no men are single fathers. Also, the men are much more likely to have more family support from their partners. Two men have a non-working spouse, and 9 men are married to women who work part-time. Only one of the 41 women has such support. Nearly half of the men with children (44%) either have a partner working part-time for pay and part-time at home, or a partner at home who is not working for pay at all. In contrast, 21 women are married with children and have partners working full-time, compared to 14 men. All but one of the 26 women with children either have no partners or have partners working full time.

In this sample, issues of work and family (including dependent care) are likely to be highly salient to this group, but not equally by gender. The women are almost twice as likely as the men to be in the high-stress situation of being either single parents, or a parent with a full-time working partner.

Exhibit 3-1

Characteristics of Biotech Employees Interviewed

(n= 70)

Sex

		% Female
Male	29	41%
Female	41	59%

Highest Degree Obtained

	Female	Male	Totals	% Female
PhD or equiv	15	10	25	60%
Master's	8	10	18	44%
BA/BS	18	8	26	69%
Less than BS	0	1	1	0%

Position in Co

	Female	Male	Totals	% Female
Manager (sci)	8	8	16	50%
Scientist*	22	16	38	58%
Administrative	7	6	13	54%
Production	2	1	3	67%

* Note that many scientists have at least one employee to manage; all managers listed here are also scientists but manage full-time

Full or Part Time Status

	Female	Male	Totals	% Female
Full time	38	29	67	57%
Part time	3	0	3	100%

Length of Service

	Female	Male	Totals
Mean	6.4	4	5.4
Shortest	1	1	1
Longest	21	14	14

Age (est)

	Female	Male	Totals
Oldest	57	54	57
Youngest	26	25	28
Median	39	38	38.4

Family Status

		Female	Male	Totals	% Female
Single - no children		4	2	6	67%
Single - w/children		4	0	4	100%
Spouse home	Married - w/children	0	2	2	0%
PT wk. partner	Married - w/children	1	9	10	10%
2 FT job/career	Partner- no children	2	3	5	40%
2 FT job/career	Married - no children	2	5	7	29%
2 FT job/career	Married- w/children	21	14	35	60%

Note on table: All figures as of time of last interview.

Feedback to Case Study Firms

Along with MIT Professor Lotte Bailyn, I gave formal feedback to one company in a lunch meeting with managers and scientists which drew about 10 people. The feedback to other firms went to HR contact people and directly to scientists and a training manager who was the main contact in one firm. Feedback on the survey included a summary distributed to employees who had requested it and meetings with management. No firm identities were revealed to other firms.

Although Professor Bailyn and I found some resistance among management to the suggestion that work could be structured any differently (for instance, more writing might be done at home in situations where that works for the employee and the firm), the managers also found it useful to speculate on these ideas. The notion that individualized “negotiation” might have inequitable consequences overall was problematic for the company where we raised this issue, as the CEO did not see any other way to handle these issues than through individual supervisors; we learned later from the HR manager that general consciousness of potentially inequitable consequences increased as a result of our feedback.

I gave a survey summary presentation to GeneCo managers, and distributed a written report of findings to them and their employees. I met with Quattro HR managers and also gave them a written report of findings for their organizational use. Other companies’ managers received feedback on the study through Radcliffe and through individual meetings and conferences with managers. Employees who requested summary survey results received them through a distribution at work.

Turnover in Case Study Firms

Turnover at the smallest two firms was moderately high, on the order of 20-25% annually, with 5 of 27 total scientific employees leaving from ImmuCo in the first nine months of the study, and 3 scientific employees and one receptionist departing BioCo. At BioCo, no new science employees were hired before the merger, although several temporary and

consulting employees were employed. At ImmuCo, several new scientists were hired, but the workforce shrank significantly (from 60 to 48) after the company moved from its former site. While one or two individuals were “encouraged” to leave because their skills no longer matched the company’s needs, most chose to leave, either because they wanted more job security or for family reasons.

At GeneCo, turnover is more common in the production jobs, although full training in even a portion of the procedures required takes nearly five months. Two of the three firms experienced layoffs in the year prior to the beginning of the study, and two more implemented reductions in force during the period of the study. These experiences were still fresh for employees we interviewed (see Rayman and Cintron’s analysis, in Radcliffe 1999:39-50).

SURVEY METHODS AND PROCEDURES

I developed and administered an original survey of 212 items, on 12 pages, with 226 variables. The survey instrument is Appendix 1 of the dissertation. A cover letter was attached, unique to each company, which explained the voluntary nature of the study, what would be done with the data, and how to reach the researcher. The purpose of the survey was to learn about the experience of a broader cross-section of employees than had been possible to develop in the interview portion of the study. The survey was designed to learn about the employees’ work histories, their current hours of work, their preferences regarding work-family boundaries and issues, their knowledge of both formal and informal work-family policies and practices in their firm, whether they felt free to use policies even when they existed, and of course, their basic demographic profiles including their family situations. I also included questions designed to measure workplace organizational commitment, their feelings about lifetime employment, their satisfaction at work, at home, and in their personal lives, their happiness with their partner’s work schedule, their childcare arrangements, and their self-reported productivity at the time of the survey. I asked two open-ended questions, to which I

received about a 20% response. About half of the survey items used previously tested measures from other surveys, and half of the questions were original and specific to my study.

Survey Distribution

The survey was administered in the seven companies over a six-month period but never for longer than four weeks in a single company. Only 29 respondents (6.3%) used the Internet version of the survey, and their responses were integrated with the other data produced by handwritten responses.⁶ Those who responded were not significantly different from the total workforce in important demographic characteristics, although a higher proportion of managers and professionals than are actually in the workforce responded at GeneCo, where the most manufacturing employees worked. So some production workers may be underrepresented, but they were not the main target of this survey or study.

In consultation with the HR and managerial staff from each firm, I prepared paper surveys for all but one of the firms (Nente). I handed them out to individuals myself wherever possible, by visiting the site at least once, and often twice (once two weeks after the initial handout), and by collecting surveys in person immediately where possible. I brought snack food and fruit to lunch rooms, and sometimes walked through the workplaces.

Surveys were individually coded with a unique ID number so that I could assess the returns in terms of their representativeness. While this undoubtedly reduced the response rate, as employees knew they could be identified by the researcher, it was valuable to gain a better sense of the responding population.

⁶ I offered the Internet version of the survey to 900 of the employees who received a written copy, by giving them the information about the Website location in the cover letter. Very few accepted the invitation, only 29 of the 900, and their responses did not differ significantly from their co-workers' responses on the written survey. In one company, a small start-up of only 10 employees, the manager only wanted to distribute the survey on the Internet, as virtually everything they do is via electronic communication. Five of those employees responded, and I have no basis of comparison for them with a written survey of their coworkers. Most employees preferred the written version. The questions were the same, with one difference in the order of a section of questions, but I do not believe this significantly changed anyone's answers. Missing data were less likely in the Internet responses, but the sample is too small to tell if this is statistically significant.

Participants were given a postage-paid envelope to return the surveys, if they did not return them immediately. In two firms, GeneCo and Quattro, employees were given an option to fill out an identical survey on the Web in their cover letter. In a third firm, Nente, at the company's request to a colleague, all employees were given the option only to fill out the survey on the Web.⁷ In GeneCo virtually all responses were by paper survey; in Quattro approximately 20 came in over the Web, and in Nente all 5 responses came in over the Web. In addition, approximately 4 other individuals accessed the survey via the Internet. Where I could not give someone a survey in person, I put it in their mail folder or box, with permission from the company.

The dates and numbers of surveys I distributed by hand are as follows:

1/8/99	ImmuCo	51 surveys
1/21/99	Pente	20 surveys
1/28/99	BioCo	62 surveys
2/3/99	GeneCo	80 surveys
2/5/99	GeneCo	27 surveys
4/1/99	Nente	10 surveys (distributed by Web only)
5/20/99	Quattro	762 surveys distributed in 3 sites between 5/17/99 to 5/24/99
6/5/99	Octo	18 surveys
		Total n= 1030 surveys distributed

This accounts for all the numbered and pre-packaged survey packets I distributed. In addition, I distributed 25 additional surveys to employees who asked for them on site, usually in the lunch room, but who did not have a prepared labeled package. Most of these (18) were manufacturing employees in Quattro and 7 were science employees at GeneCo and ImmuCo. So the total number of surveys distributed in all was 1055.

I included in the survey packet a cover letter addressed to employees of the company as a whole, explaining the research and that their participation was voluntary, but offering to

⁷ Thanks to Wendy Hernandez for her vital assistance in enlisting and surveying Nente.

provide them with results of the survey if they requested them. I also offered to sign up anyone who worked directly in the life sciences for a free subscription to either *The Scientist* or *Genetic Engineering News*, and more than 200 employees accepted this incentive offer by mailing back a pre-paid postcard directly to me. I then signed them up for the periodical of their choice.

The surveys were returned by postage-paid envelope directly to a data processing firm, where they were processed and entered in an ASCII format and translated into an SPSS database with double-entry verification. The time limit for each survey was originally two weeks, but I extended it an additional two weeks in each case except Octo, to allow more people to participate.

In the case study worksites (BioCo, ImmuCo, and GeneCo), I revisited the workplace lunchroom two weeks after the initial survey distribution, giving employees initial feedback on the response rate and providing duplicate surveys if theirs had been lost (with the same ID number so no one could submit two surveys). Finally, I offered the employees of the firm with the highest response rate a drawing for a \$50 gift certificate; ImmuCo won with a 71% response rate.

At Quattro, I distributed paper surveys to all 762 professional employees in the Research and Development and the Operations divisions in three separate locations, and gave them the option of participating in an Internet-based survey (about 20 did that while 289 responded by hand, for an overall response ratio of 42.5%). Also, about 20 people asked to fill out surveys who were not in the initial group; these were a combination of high-level professionals and lower-paid manufacturing employees. I report their results in the totals.

Total usable responses to the survey were 463. The overall survey response rate was 44%, ranging from a low of 30% in the smallest company to a range of 60 to 71% in the mid-sized companies. The respondents were 56% female, and included 37% scientists, 27% other professionals, and 18% managers, with average age 37 and average tenure 4.7 years.

Summary statistics for the 461 survey respondents are given in Exhibit 3-2.

Exhibit 3-2

Characteristics of Biotechnology Employees Surveyed

(n= 461)*

Sex	no.	%
Male	200	44
Female	253	56

Highest Degree Obtained	Female	Male	Totals	%
PhD or equiv	30	42	72	16%
Master's	56	34	90	20%
BA/BS	118	88	209	46%
Less than BS	48	34	82	18%

Position in Co	Female	Male	Totals
Manager (sci)	38	47	85
Scientist*	101	68	169
Administrativ	29	9	38
Professionals	63	61	124
Manufacturing	20	15	35

* Note that many scientists have at least one employee to manage

Full or Part Time Status	Female	Male	Totals
Full time	235	197	432
Part time	14	0	14

Length of Service	Female	Male	Totals
Median	4.6	4.76	4.7
Shortest	0	0	0
Longest	14	16	16

Age (est. in years)	Female	Male	Totals
Oldest	59	68	68
Youngest	22	19	19
Median	35.6	37.7	36.5

Family Status	Female	Male	Totals	% women
Single - no children	83	41	124	67%
Single - w/children	15	1	16	94%
At home spouse	0	19	19	0%
PT partner	7	42	49	14%
2 FT job/career	81	43	124	65%
2 FT job/career	88	47	135	65%

* not every employee answered every question; therefore, the totals are not all 461.

Survey response rates by company, including percentage of female respondents in each company and percentage of surveys returned by women, as well as similar data for managers and scientists, are attached as Exhibit 3-3.

In general, the response rates for women, scientists, and managers were reasonably close to the firm population. There are a few exceptions. Overall, firms identified 47% of their employees as scientists, while only 37% of respondents identified themselves as scientists. I attribute this in part to a difference in terminology. Since respondents could choose between “scientist” and “other professional,” some of them whose job title was not literally “scientist” did in fact call themselves “other professional—an “associate scientist,” for example, described himself on the survey as an “other professional.” Only in ImmuCo and Octo are scientists more underrepresented than I might expect for this reason, and I believe it is because Octo’s sample was self-selected in advance, by e-mail, and included fewer scientists and more managers than its entire workforce. In the case of ImmuCo, it is probably because I interviewed a number of non-scientists there and they were motivated to fill out the survey; plus ImmuCo has a higher percentage of science managers than most, and they were classified as managers. While Nente has an overrepresentation of scientists, it is a tiny company of 10 people and those were the most interested participants, probably because of a personal relationship with my colleague Wendy Hernandez, who introduced the survey to them.

The only other significant concern about response rate bias would be in the slightly higher percentage of female respondents (56%) than are in the workforces (49%). This is probably attributable to a higher level of interest in work-family topics because of women’s greater responsibility in general for family caretaking, and it does not seem to be so extensive as to invalidate the results.

In GeneCo, managers are overrepresented (33% respondents compared to 20% employees). That company has a higher percentage of manufacturing workers than any other, and the survey was not specifically directed at their concerns. There also may have been some literacy or language issues in that workforce, which is overall the most diverse educationally,

**Table 3-3
Formal Work-Family Policies**

Formal/Written Work-Family Policies							
Company	BioCo	ImmuCo	GeneCo	Quattro	Pente	Octo	Nente
Policy							
Flextime	Yes	No	yes, limited	no	no	no	yes
Job sharing	No	no	no	no	no	no	no
Flex place	no	limited	limited	no	no	no	yes
Compressed work week	no	no	yes, required	no	no	no	no
Parental Lve. Beyond FMLA	no	no	no	no	no	no	no
Use sick days for kids	yes	yes	yes	yes	yes	no	no
Empl. Assistance Prog	Yes	yes	yes	yes	no	no	no
Elder care resources	eap	eap	yes	eap	no	no	no
Child care resources	eap	pretax	yes	yes	no	pretax	no
Long hours expected	mixed	no	yes, non hrly	yes	yes	yes	yes
Part time available	mixed	no	no	no	yes	no	no

and the most diverse in national origin and native language of any of the companies. In general, I feel the job distribution, gender distribution, and managerial levels in the survey responses were acceptable, with the caveats I have mentioned.⁸

Characteristics of the Survey Participants

Nearly three-quarters of the employees who responded to the survey (73%) are either married or living with partners, and 94% of these (n = 308) have spouses who work either full or part-time for pay. Fully 62% of partnered employees and 11% of single employees have children, most of whom are living at home. And 75% of all employees either do have now (13%), or say they definitely will or might have eldercare responsibilities within the next five years. Thus for this age group in particular, work-family issues have a valence and importance that managers can recognize in day-to-day interactions with employees.

Differences in support at home also emerge among the larger surveyed population across seven firms and multiple locations and occupations (see Exhibit 3-2 above). Approximately two-thirds of women have a full-time working partner, while only 45% of men do. Fifty-seven percent of men with children have a part-time or non-working partner, while only seven percent of women with children do. So men with children are eight times as likely as women with children in this sample to have a part-time or non-working partner. Also, a higher percentage of women (55%) than men (45%) have no children, though the women are only two years younger on average than the men, confirming a possible relationship for some women between having a career and having to choose not to raise a family. HR personnel in the case study firms confirmed that this pattern was generally true among their employee populations, especially at the higher-paid professional and managerial levels.

⁸ Complete data on age, length of service, and marital or parental status was not available from all companies, or in fact from any in sufficient detail to compare with survey responses. The responses varied by company in a number of respects. For instance, while 67% of respondents overall said they were married, the figure was higher in some companies with older average ages, such as ImmuCo at 80% and lower at newer and younger companies. Only 54% of those at GeneCo and 60% of those at Quattro were married, for example. Therefore, where relevant, I tried to account for company effects in the analysis in subsequent chapters.

Note also that men are 50% more likely to be managers than women, even though their length of service is the same. Men are more likely than women to have a Ph.D. degree, in this sample as nationally.

SUMMARY AND CONCLUSION

This chapter described the universe of interview, survey, case study, and observation data from which I draw the specific data samples for analysis in the forthcoming chapters. The data are in-depth in the three case study firms, and more diverse when considering the ten additional firms and two university sites where I interviewed and surveyed people. While I made every attempt to include a variety of professional, technical, and managerial employees in the study, I was unable to draw on a random sample of biotechnology employees, as few or no researchers could at this point in time. Therefore I am limited in the extent to which I can generalize from these findings, although I feel confident that both my industry and employee sources have considerable face validity and can be considered externally reliable. Also, though I was unable to conduct a true longitudinal panel study, I did succeed in interviewing a small number of employees over time, and in observing the case study firms over a 30-month period, and I have incorporated those findings into the analysis in the upcoming chapters.

A Tale of Two Companies: Comparing Flexibility, Support and Control

"At this time it is hard to tell [if I can be fully engaged in both work and family]... With the move to [City X], my commute time has increased. As my children get older, they become involved in more activities that I want to be involved with. My position in the company allows me to work any hours (relatively speaking) I need to get the job done. Usually I can get in early if I have to leave for a child's function. My wife and I are very involved in the community and with our children's education and extracurricular activities. In the past, working here has enabled me to enjoy my children's sports, activities..."

"At what cost to my career advancement, I do not know... I am very dedicated to my job and at times I can find myself totally involved with work so that I almost exclude everything else. Being involved in coaching my kids' teams and the Scouts almost forces me to keep a perspective on my relationship to job responsibilities and home. In this day and age we all want to give our kids the best life we can. In the last year I have been able to do this with the flexibility I am allotted at work. Whether this continues to be the case in the future will remain to be seen. If it costs career advancement, so be it."

- A male supervisor in a flexible workplace

In this chapter I address two questions:

- How do professional and managerial employees in biotechnology firms manage the boundary between work and home?
- Under what workplace conditions can employees effectively fulfill their work and non-work responsibilities, a goal I call achieving "integrated satisfaction?"

Workplace conditions set the context for individual choices and for patterns of choices made by employees in one work group, occupation, or firm compared to another. In this chapter I illuminate the daily choices that professional biotechnology employees make about jobs, partners, children, and community activities. To understand these, I analyze the structural conditions of their work organization, firm, and family that effectively shape the choices available to them, and the support that their work and family environments offer.

I first review the context for these research questions. I explain the organizational setting for this study: a paired comparison of two firms, one relatively flexible and one relatively rigid. Several employees' explanations of their boundary management strategies set in a real context my analysis of both work and home demands. I divided employees into groups based on whether they had high work demands, high home demands, both, or neither. I measured their satisfaction at work and at home through detailed analysis of their interviews.

Then I bring the analyses together, showing why professionals with similar work and home demands have different levels of satisfaction. I conclude that integrated satisfaction occurs only where at least three key factors co-exist: flexibility at work, support at home (which I found to be highly gender-specific), and control of one's own work and sometimes the work of others.

Individual and family decisions about how to care for self, spouse or partner, and children or relatives are made in complex interaction with managerial decisions intended to produce effective work outcomes. Virtually all employees have significant commitments outside work. These decisions are not a simple tradeoff between being "work-focused" and "family-focused" (Gerson 1985, 1993). They are better understood as negotiated and changing over the life course (Kossek *et al.* 1999; Bailyn 1993; Moen 1996; Han and Moen 1999) — sometimes even over a single year. Yet, few researchers have combined an analysis of individual choices while simultaneously comparing actual organizations to see what patterns, synergies, or conflicts emerge. That is my goal in this chapter.

Although personality is certainly a factor in outcomes, my interest is to distinguish the structural conditions at work and home that, in conjunction with personality, enable or constrain "integrated satisfaction". By this phrase, I mean a combination of work and outside-work satisfaction. Although many workplace studies assume "time at work" as a given, increasingly both work and non-work concerns are attended to during traditional working hours. More people than in past decades, especially professional and technical employees, now work at home before or after traditional work hours.¹

Some companies have won awards for making this kind of integration easier for employees, through flex-time or telecommuting policies, for example (Nippert-Eng 1996; Elchardus and Glorieux 1994; Kingston and Nock 1987). The *Working Mother* "100 Best Companies for Women" list is only one of several lists with which corporations seek to be identified. But researchers have shown that these policies can be more rhetoric than reality (Rapoport *et al.* 1998; Hochschild 1997; Osterman 1995).

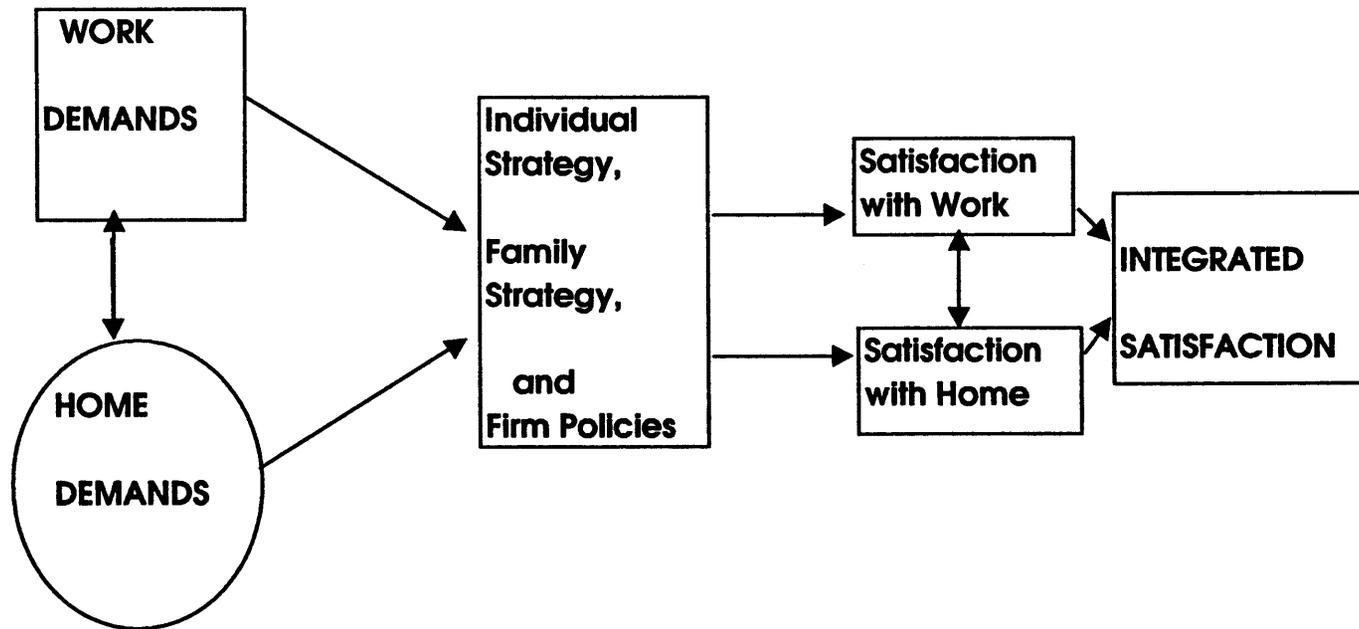
My data for this chapter are drawn from ethnographic interviews² in two companies. I call these biotech firms BioCo and ImmuCo, and they form the basis for this paired comparison. These two firms are quite similar except that one offers significantly more flexibility and autonomy to its employees than the other, an important *a priori* condition that could influence integrated satisfaction. Exhibit 4-1 is a diagram that shows the relationship I propose: both work and home demands, combined with an individual's strategy for boundary management, a family strategy for boundary management, and firm policies and practices, lead to satisfaction with work and satisfaction with home, separate but interrelated measures that combine to create "integrated satisfaction."

In-depth interviews and observation during 18 months enabled me to understand how 42 people in these two settings experienced their work-family choices. I tried to see the world from their points of view, and to generate ideas to be tested with larger samples in the future.

¹ I define traditional work hours as between 8:00 AM and 5:30 PM weekdays.

² See Geertz 1973; Weick 1993; and Glaser and Strauss 1967 on the relationship of ethnography to generating "grounded theory."

**Exhibit 4-1:
Framework for Analysis**



I conclude this chapter with a series of hypotheses about how practices related to time, flexibility, support at home, and control at work affect employees' ability to achieve life goals and satisfaction in work and non-work realms.

My emphasis is on employees as actors, and the structures in their lives that shape the ways their actions and choices are constrained or enabled. By analyzing individual interviews in detail, I seek to shed light on the effect of critical strategic choices that managers make (Kochan 1984 *et al.*; Kochan, Katz and McKersie 1986; Dutton and Duncan 1987). These might include restructuring work requirements if a job can be done productively in a new way, providing scheduling options for groups, or promoting individual flexibility. It is in this context that I investigate the choices individuals made about work and basic life choices such as when and whether to have children.

THE ORGANIZATIONAL SETTINGS

The data in this chapter are drawn from 42 interviews with scientists and managers in the paired biotech firms.³ While the firms are similar in size, age, and general mission, they differ in their organizational cultures and leadership. One firm, called "BioCo", offers the most flexible workplace environment of the twelve firms I studied; the other, called "ImmuCo," sets the most rigid rules. The workforces in the two firms are similar in composition. Neither firm now manufactures or produces drugs, except in small amounts

³ See previous chapter for a detailed description of interview and data gathering and methodology. In three of the 42 cases, I rely on taped transcribed interviews conducted by Sandra Resnick, a research associate for the RPPI project. In one case, I rely partially on a transcript of an interview conducted by Paula Rayman, executive director of the Radcliffe Public Policy Center. Some data were derived from a focus group organized by researcher Ann Bookman that I attended. It was taped and transcribed. I am grateful to my colleagues for sharing their field data.

needed for research and clinical trials. They are located in the same metropolitan area. The chief executive officers (CEOs) know one another, and meet at industry gatherings, but are not friends; neither are the two firms direct competitors. For this study, the matching seems sufficiently close to compare the firm settings in terms of basic employment patterns, yet different enough on the crucial variable of interest (work-family boundary flexibility for employees) to make this contrast valuable.

The 42 individuals interviewed for this analysis included the main officers of each firm (research and development directors, and administrative officers), roughly half the project directors or assistant managers, more than half the Ph.D. and half the Master's and Bachelor's degree scientists, and a few supporting research associates and administrators. Over the 18-month period of the interviews, I interviewed men and women with a broad range of experience, and individuals in each firm with similar family and work circumstances. The employees I interviewed typify the overall sex, job, and family type distribution of employees of the two firms.⁴ Specifics about the job type, marital and parenthood status, age, sex and level of support at home for these 42 employees are listed in Exhibit 4-2.

Twelve women and twelve men were interviewed from BioCo, nine women and nine men from ImmuCo.⁵ Of the 21 women interviewed, eight had no children (4 at each company, although one woman at each company was pregnant at the time of the interview). They were younger than 30, single or recently married, and in three cases they did not plan to raise a family. A total of 12 women professionals had children at home, many with at least one child under the age of 6, and only one with more than two children. Two women were

⁴ There is one exception only in terms of job types: I interviewed more managers than their population in the firms, to increase my understanding of how they approached work-family issues for those who reported to them. While managers comprised 20% of the workforce, they were 28% of interviewees. Also at GeneCo I interviewed more science professionals than manufacturing workers, because of the study's focus.

⁵ Those interviewed at BioCo totaled one-half the workforce at one time during the study, while those interviewed at ImmuCo totaled about 40%. During the study, ImmuCo underwent a downsizing through attrition, so fewer people were interviewed there in total.

Exhibit 4-2

Characteristics of Professional Employees Interviewed at BioCo and ImmuCo

(n= 42)

Sex

Male	21
Female	21

**Highest Degree
Obtained**

	Female	Male	Totals
PhD or equiv	7	9	16
Master's	4	3	7
BA/BS	10	9	19
Less than BS	0	0	0

Position in Co

	Female	Male	Totals
Manager (sci)	5	5	10
Scientist*	14	14	28
Administrative	2	2	4

* Note that many scientists have at least one employee to manage

**Full or Part
Time Status**

	Female	Male	Totals
Full time	19	21	40
Part time	2	0	2

**Length of
Service**

	Female	Male	Totals
Median	7.5	5.75	7
Shortest	1	2	1
Longest	11	13	13

Age (est)

	Female	Male	Totals
Oldest	57	54	57
Youngest	26	28	26
Median	40	37	38.8

Family Status

		Female	Male	Totals	% women
	Single - no children	3	3	6	50%
	Single - w/children	2	0	2	100%
At home spouse	Married - w/children	0	1	1	0%
PT working ptr	Married - w/children	0	7	7	0%
2 FT job/career	Married/Ptnrd- no children	5	3	8	62%
2 FT job/career	Married/Ptnrd- w/children	11	7	18	61%

mothers of grown children. All the women in couples had partners or spouses who worked full time, usually in equally or more demanding jobs. Of the 21 men, six did not have children. Of these, four were single (one of them was engaged), and two were married to women scientists whose jobs made it difficult for them to have children. The remaining 15 men all had children, and eight of their wives worked part-time or not at all; these wives took care of family matters at least part-time. Of the seven fathers whose wives had full-time work commitments, all the women had jobs that allowed some flexibility. Two were students, one was a secretary, one worked 36 hours weekly, and one ran a small business where she could take her child to work. The other two wives were teachers who were able to be home during some afternoons with the children.

I analyzed the data through an iterative method of reviewing and coding the interview transcripts. I carefully reviewed all 42 interview transcripts as well as my field notes, observations, and transcripts of telephone conversations and meetings that supplemented the direct interviews. I worked with the help of a colleague, Kate Kellogg, who coded separately and against whose analysis I matched my own. We coded and re-coded the interview transcripts to find emergent categories that related to my questions about boundary management and satisfaction at work and home, and the conditions which enabled or constrained these. I looked at patterns for BioCo and ImmuCo, for men and women, for people at different life stages and with different work and home demands. This helped me see that people with similar family circumstances did have very different results in their lives, depending on how much control, flexibility, and support they had, both at home and at work.

In this chapter, I describe how several employees manage the boundary between work and home, focusing on differences between men and women, and BioCo and ImmuCo employees. I show how the contrasting company practices affect employees' satisfaction even when they have similar demands.

The patterns of integrated satisfaction I find reveal that the most satisfied people are those with the most control at work and support at home, particularly a partner who can be at

least sometimes at home to care for family members. The other key factor in satisfaction for employees is having flexibility in how they integrate or separate the two, so they can choose what works best for them. Flexibility gives more control at work, so BioCo employees have more of both. I found no "one best way" to predict satisfaction, though adjusting work demands is generally easier for employees than adjusting home demands, at least in the short term. Yet company policies, even in firms that require similar work, can prevent people from adjusting their work demands, or support them in doing so.

The next section contrasts the cultures of the two firms.

Organizational Culture: Rigid and Flexible Firms

I define a rigid firm as one where managers view work itself, work hours, work organization, and the separation between work and home in a very traditional segmented way. Rigid firms, based on past research, feature a management culture that assumes that workers have no other major commitments outside the job. This leads managers to visualize an "ideal worker" (Bailyn 1993; Fletcher 1999; Williams 2000) as someone who is always available for work. This concept effectively penalizes any worker with substantial family or community time commitments. Many of these employees are women who have primary care-taking responsibility for children or elders.

Another managerial belief found in rigid firms is that workers must be "seen" to be working. So, longer hours, or what is called "face time," are used as a basis for assessment, more than the actual output or productivity of work (Perin 1991). It also means that managers resist setting up work arrangements where they cannot literally monitor the worker minute by minute (e.g., see Perlow 1998 on the "social ordering" of work through boundary control). Managers can actually interfere with the work through excessive monitoring.

In my comparison study of all twelve biotech firms, one of them (ImmuCo) emerged as the most rigid, based on practices, symbols, and policies of the top officers. While the HR manager recognized the problems of such rigidity, he was relatively powerless to change the formal work culture. He occasionally made policy exceptions, and he made individuals' lives less stressful by agreeing to specific short-term requests, if he could keep these "under the radar." One irony is that he requested a researcher not to talk to anyone at the firm about these examples so that they would not be seen as widespread. Simultaneously, he told me of actions that showed his genuine concern for employees. One science director also explained that she deliberately did not tell the CEO of flexible hours arrangements in her department, because she knew they would be terminated. Such secrecy demonstrated how counter-cultural these particular individuals felt in ImmuCo. The general climate was so rigid that nearly complete secrecy was required to give anyone any flexibility. So the company culture dictated non-flexibility, but a few sympathetic managers allowed it, on a case-by-case basis.

Some examples of ImmuCo's rigid practices include the following:

-- Requirements that all employees be present for the same eight or nine hours per day, without regard to commuting or traffic issues, weather, or personal life events. An example was an often-discussed incident: employees were required to come to work on a snow emergency day when almost all workplaces, roads and schools were closed --and the officers who made the decision did not come in;

-- Refusal to grant a number of employee requests for temporary or extended part-time work, small changes in hours of work to accommodate child care or other needs, or other non-standard working schedules;

-- Inconsistent treatment of high-level and other employees. Top officers of the firm could work remotely or on non-standard schedules, while prohibiting the same privilege to others. Citing this example, one employee complained that there were "two sets of rules at our company-- one for management, another for underlings;"

-- Denial of alternative schedules or work organization proposals because the "reason" is considered insufficiently important. For example, one employee asked for a 32-hour work week so she could attend to personal and community concerns, and she was told that she did

not have children, so her request could not even be considered as she did not have a "valid" reason;

-- A refusal by a top officer to permit earned accrued vacation time to be carried over a few weeks in the case of an upcoming maternity leave, so the employee actually lost her entitled accrued paid leave. The HR rep told her she could carry it over for this purpose, and this was countermanded too late for her to take it.

All in all, ImmuCo was the most inflexible of the 12 biotech companies I studied, both in its formal written policies (none on flexibility) and in its informal practices. Yet the CEO and other top officers believed themselves to be quite flexible, in part because they permitted themselves to arrive late or leave early, justifying this by the long hours they felt they put in, or the high level of responsibility they felt they had. They said that these "alternative arrangements" would not work for the science or production departments where the vast majority of employees worked. Although two women told me they left the firm because of its inflexibility, the officers of the firm did not see this as evidence of their rigidity, but as inability of the individuals to adapt to their requirements.

In contrast, BioCo is an example of a relatively "flexible" firm. The company had formal written policies permitting and regulating some non-standard hours and schedules. Having such policies often does more for the reputation of a company than for employees if the policies are not accompanied by a culture that supports work-family flexibility including utilization of the policies (see Kossek *et al.* 1999; Bailyn 1993). So I measured both formal and informal work-family policies, and asked employees whether they felt free to make use of them. The characteristics of BioCo that made it a "flexible firm" include the following:

-- a Chief Executive who openly supported family-friendly policies, who cared most about output, who did not reward "face time" for its own sake, and who instructed managers to implement flexible policies;

-- one or two high-profile employees working non-traditional hours, part-time, or on different days or shifts. These women, who worked in core science jobs, were spoken of as performing well and treated as fully valued members of the workforce;

-- one or two high-profile managers or officers who made it known that they worked non-standard hours at times, or work from home, or changed their way of working, for family or personal reasons, and who also worked to minimize any concerns their non-standard hours created for others, while supporting the right and ability of others to take similar measures;⁶

-- support for experiments in new ways of working, rather than disapproval of employee proposals for fear that others might want to participate in such experiments (Bailyn *et al.* 1997), although the degree of this varied by supervisor;

-- written personnel policies permitting flexible working hours and scheduling, use of employee sick leave for dependents, and even tele-working or telecommuting, without imposing a "job level" requirement; equally important, an absence of policies that penalized employees for inevitable occasional absences;

-- regular forums for employee feedback and input into work scheduling and work organization;⁷

-- software or other equipment that assisted employees to work remotely, particularly on weekends or holidays to monitor experiments;

-- rotation or an agreed upon equitable system for distributing occasional required long hours to meet deadlines, weekend or holiday care for animals, or other non-standard work requirements;

A written 1997 BioCo personnel policy on flextime shows both strengths and limits of such formal policies:

Flextime is available, with the agreement of the supervisor, the department supervisor, and the human resources manager, only for 40-hour employees. Flextime employees must work the "core times" of 9:30 A.M. to 4:00 P.M., and may observe their flexible hours between 7:30 and 9:30 A.M., and 4:00 to 6:00 P.M. Requests for flextime must be in writing, and must meet the requirements of business interests, convenience, and necessity. Once flextime has been negotiated and approved, the hours are considered fixed, and a minimum of six months must elapse before any change will be considered. All requests must be in writing (emphasis added).

This interesting policy formally permits flextime, but under very limited conditions (only for full-time employees, a small window of time to "flex," and very limited ability to

⁶ Interestingly, this is a kind of "reverse modeling" compared to that described in Perlow's work (1998), in which managers modeled working long hours. But the concept here is the same: managers model flexible hours and act as if they believe they are appropriate for others besides themselves, unlike in ImmuCo.

⁷ See Eaton (2000) for accounts of how turning scheduling over to front-line employees improved attendance and reduced tardiness in the nursing home sector, for instance.

change the flexible schedule). Despite serious flaws, this is an example of a relatively flexible policy in the biotech industry. The real test is in the employees' experience of the actual application of such policies—were written requests truly required? Must every small change occur with six months' notice? In BioCo's case, I found this formal written policy not precisely adhered to when it came to these specific issues in practice, though the *de facto* right to more flexible hours had not generated less restrictive language. The company protected its right to control hours, while offering some potential options for change on a case-by-case basis.

Large companies are more likely to offer formal work-family benefits and programs than small ones (MacDermid *et al.* 1999). So even finding this formal policy in a smaller firm is somewhat unusual. Having a written policy does not guarantee its usability, if employees do not perceive it to be truly available without negative consequences for their careers or daily work lives. But in the case of BioCo, this policy proved to be the actual basis for several flexible work arrangements during the period of the study, and all parties involved approved them. That alone makes BioCo a very different firm than ImmuCo.

Summary of Company Differences

The differences between BioCo and ImmuCo reflect the differences in management styles and values among the CEOs and other officers. In BioCo, the CEO said,

We have a philosophy, a value, which is not just blowing smoke, that the company is the people. The greatest asset we have is the people. Look at [Project X], where because of our success, the work is going away. We don't work on that any more. We have used those people in new projects. We made a change, but we took immunologists and found other ways to build the business around their skills... we have shrunk workers, but the projects grow out of their skills.

Speaking specifically of retaining valued employees, the CEO said, *"It's the skills, flexibility, and attitude— the spirit is so important. It's worth it to make a concession to their personal situation, to keep them."* This is a direct statement of the relationship between loyalty, retention and flexibility, as well as a wish for reciprocal flexibility from employees.

In contrast, the CEO of ImmuCo said that it had been *"tough to hold together"* employee relations at the firm, especially through hard times for the company. The CEO felt that generally, the employees who were still there were *"very positive, and dedicated, on the whole."* However, the employees did not feel equally positive about the CEO. The CEO believed strongly in uniform policies for lower-level employees. While the HR director tried to *"bend the policies around the individual"*, the CEO tended to micro-manage and change decisions made at a lower level. One employee said in an interview, *"You should know this is a stress-riddled organization. Lately it has been incredible. There should be a sign on [the CEO], saying 'Stress Producer!'"*

Another company difference is evident in the policy on work at home. One Ph.D. scientist at ImmuCo, a new father, said, *"I would love to work at home, but that is not encouraged. [My boss] does not like us to take the notebooks home. I can't even do paperwork at home, because I need the notebooks to write a report."* An HR rep said *"only the top eight people"* could work from home at ImmuCo; others were apparently not trusted. At BioCo, people felt more comfortable working from home if it was necessary and possible in their jobs, though it was not a widespread practice.

The two companies operated very differently on a day-to-day basis, in part based on the two different models set by the top officers. When I analyze the patterns of work and home demands for employees in both companies, I find that company cultures matter profoundly to those working in them.

Boundary Management: Stories from the Two Companies

To understand how biotech employees actually negotiate the boundary between work and home, I asked people about their approach to everyday life. I sought clues of "segregation" or "integration" (see Andrews and Bailyn 1993; Nippert-Eng 1996) to see if employees' work and family lives were synergistic, in conflict or some combination of the two.

I also examined employees' specific job demands, and the company cultures in which they worked, to see how much control and choice they had about these day to day decisions.

I found that most employees experienced some significant overlap between their work and home roles, including defining their hours of work by childcare commitments, taking personal calls at work, and working at home on evenings and weekends. Workers with children often organized boundaries around limiting their hours at work and spending evening hours with family when their children were awake. A few people liked to separate their home and work lives completely, but not many were able or wanted to do this. I found company and job-level support for choices to be very important in determining what strategies they could select and use.

Consider Nathan, a 45-year-old officer at BioCo. He lives in a comfortable suburb only 10 minutes away from the office. He and his wife have three sons who are in elementary and middle school. On a typical day, he works from 8 AM to 6 PM and he takes home reading at night and comes in on weekends on a "project basis." In his interview, he said that he and his wife, Eileen, decided they had "crazy lives" and *"never saw each other. So we get up at 5:30 AM and leave the house together at 5:45 to exercise for an hour."* How has that worked? *"We have been bad these past few weeks, but we have to get back to it."* One wonders how long he can keep up such a grueling schedule. Still, Nathan can afford to send his children to private schools and Eileen is at home part-time, so they are better off than are many biotech employees.

An ImmuCo employee with a comparable workload is Daria, a director with a number of people reporting to her. She works late several nights a week when her two children are at their father's home. She has fewer resources and is required to be at work nearly every day, even when there are issues she needs to deal with as a single mother. Her reaction is to "hide" the extent to which she tries to give flexibility to those who report to her, and in turn, they sometimes cover for her, as she works in a different part of the building from the CEO. She also asked researchers not to tell the ImmuCo CEO that sometimes she allows flexibility in

scheduling work. But her workload is such that she cannot miss much work, and because of ImmuCo's policies, most of it needs to be done at the office. Her choices of boundary management strategies are constrained, both for herself and for the employees in her division.

Though flexibility as a policy helps, it does not guarantee manageable arrangements, especially not for lower-level employees. For example, Bella, a 34-year-old quality control manager, was the pregnant mother of a 3-year-old at the time of her first interview. Her husband works full-time at a computer company. She describes her typical day:

"I get to work between 8:30 and 9:00 AM, and leave right at 5, because I pick up my daughter, so I have to leave definitely then. My daughter... is doing well in the nursery, but I feel my own life is crazy! I know I would not want to be home full time... My time is so limited with my daughter, now she's on a schedule she has to be in bed by 8:15, so once we get home, I have to fix dinner, give her a bath, and put her in bed. There can be no deviations! It seems, I said to my husband just recently, that all I am ever saying to my daughter is 'there's no time for that.' And I don't like doing that...I'm also conscious that I have dropped all my other interests by the wayside, even exercising. I haven't done anything else but go from work to home and do errands in months."

Bella told me she couldn't imagine coming back to work full-time after the second child was born. In the end, Bella asked to return to work three days a week after her maternity leave, but her manager refused. Although it was an exception to the norm, this was his prerogative at BioCo even with the flexible overall policy. Bella terminated her employment, gave up her benefits, and went to work as a "consultant" for BioCo on a part-time basis, for an indefinite period.

An alternative scenario was possible. Bella had initially submitted a written plan for doing her current job in three days a week, hiring someone less skilled and less expensive to do two days' work that she could supervise, and having the person fill in on backlogged lab work. Her supervisor accepted her proposal in the end, but without letting her work part-time as a regular employee. BioCo's flexible policy required formal agreement from a supervisor, which Bella could not obtain. For at least a year, in the end, her working part-time as a contractor worked well for the company and for her. BioCo's flexible policy helped many

employees, but even BioCo employed rigid supervisors. Bella's said "*I want her to be there, in case I need her.*"

Employees as a whole varied widely on how they dealt with the boundary between work and home. Some were like Nathan: "*I prefer to separate work and home, to draw a strict line between the two. Also, I have three kids in my face when I'm at home, so I can't get work done!*" Others treated work and home as seamless, taking a cell phone with them to handle overseas calls or calls from the lab, checking voicemail from home, working on holidays, or reading at home at night. Some parents always went back to work after children went to bed. Most employees took reading home with them. At BioCo most employees felt they could work at home in an emergency, such as a snow day. At ImmuCo, employees were expected to come to work on school snow days, a policy that had long-lasting negative morale effects.

The way managers structured their work often defined whether their employees needed to be present. This was evident in both firms, but more so at ImmuCo, where rigidity was most pronounced for lower-level employees. One ImmuCo director, Jerry, explained that he did not have a "preset schedule" but ran his group with a "*total open door policy. People come to me with issues.*" He felt his work was "more efficient" with the informal approach. However, he seemed not to notice that since he did not schedule his meetings, people would have to be present at the right time to be consulted on project developments. This meant some people were left out of the loop and did not know what was happening. In this case, ImmuCo's rigidity with respect to lower-level employees helped him see flexibility where none existed, except for himself.

Few employees spoke of bringing home matters to work—although those with young children sometimes worried about illness. In another case, a father whose wife had just gone to work full-time arranged for his children to check in with him. Because he was at BioCo, he was able to organize his work so that he would be out of the lab at 3 PM when they got home from school, and he could take their calls. Most employees found that when they were in the

lab, they could not deal well with matters from outside. At ImmuCo, phone calls to or from home were discouraged, but they were made anyway. This was more difficult after a re-organization that moved non-Ph.D. scientists out of cubicles and into the lab all day. ImmuCo employees were unhappy at losing semi-private phone access. While these may seem like small matters, they were important to employees.

As to bringing work home, besides cultural norms against it, the technical nature of the work can also play a role. This depends on the extent to which the work is lab-based, although the intellectual and thinking part of work, as well as writing, could be taken home and often was. Pelz and Andrews (1976) show that the most hours worked does not correlate with the highest productivity or creativity. *"I've had my most creative ideas in the shower,"* one scientist said. Both the absolute amount of time required to do a given professional job, and the flexibility with which that time can be committed and deployed, seem to vary a great deal, and the specifics of work situations are essential to understanding professional work (Catalyst 1997; Bailyn 1988; Abbott 1988).

In sum, employees' boundary management strategies and the impact on their work, productivity, and morale were shaped directly by the two employers' contrasting levels of flexibility, as well as by the situations of employees' partners, spouses, or other family members.

Time, Communications, and Decision-Making in Two Companies

Employees took varying approaches to time issues, which affected their boundary management. Those whose workload and deadlines were particularly pressing reported more stress. This was exacerbated in the rigid company. At ImmuCo, Caterina, a scientist director in her forties, had two daughters, 7 and 14. She dropped her daughters off at school and daycare on her way to work. The younger daughter left the daycare center to go to school, then returned there after school until 6 p.m., for a total of 11 daily hours away from home. Her husband was a computer programmer who worked from home in the late afternoon until

time to pick up the younger daughter. This left Caterina free to work late, which she viewed as a mixed blessing. When I asked how she managed time in her job, she complained:

“My work is quite variable. There are lots of phone calls. I have no predictability. I could be in the lab, get caught up, and not be able to leave. We are understaffed now, so I am in the lab a lot... It is not career-enhancing to spend time in the lab. I am writing memos, reports, and making calls. I have different projects, so there are multiple project meetings, several of which I have to organize, at least monthly.... I have minimal secretarial support, and I am the only one who's been at the company long enough to keep files on everything.”

She came in one weekend a month to work on Saturdays. Caterina would like to see work reorganized at ImmuCo:

“Time is used badly here. We spend all our time in meetings and get nothing done... I would do it differently. I would make meetings more focused, invite fewer people, and do more communication in memos. You can give the same information in a memo that it would take 10 to 20 minutes in a project meeting to give. And of course meetings interrupt the flow of experiments... Most of the communication is one-way, not interactive; there might only be two or three substantive comments, and all that time is wasted.”

Caterina argued that ImmuCo was spending her and others' time in a wasteful way, affecting everyone's work-family boundary negatively. Like her, scientists generally disliked spending time in meetings, though most did not feel they could be totally eliminated.

At BioCo, one morning a week was set aside for company-wide meetings for one hour, and some managers called project or group meetings after that. These regularly scheduled meetings helped employees plan. ImmuCo had monthly meetings for all employees, but managers called more project meetings.

Communication there was erratic. To the extent that communication was informal, employees agreed that it put more pressure on people to be at work all the time. Even in the more flexible firm, some employees felt the need to work long hours to get access to decision-makers. Lester, a BioCo Ph.D. scientist in his 30s with no children, came in at 7:30 AM and stayed until 6:30 PM, partly because the CEO came in at 8 AM, and had coffee and breakfast

in the company lunchroom, and *"sometimes talks to people before 9 AM."* He also could talk to the CEO after 5 or 5:30, but Lester did not *"even try during the day, because he has meetings and is tightly scheduled."* So an employee with family responsibilities like Bella, who because she was at BioCo was free to come in at 8:30 and to leave at 5 PM to pick up her child from day care, never got the same chance to "cross paths" informally with the CEO unless a formal meeting was scheduled. Clearly, Lester gets more "face time" and private consultation with the CEO than Bella, or any working parents with constrained hours. This was even more evident at ImmuCo, the more rigid company.

In this sense the informal culture at both firms encouraged long hours, although they were not always required. Certainly people noticed the number of hours worked. Lester told me that *"the parking lot is like a time clock. I know the cars and I can just look out the window and see who is here, when people go in and out."* So, even in the more flexible firm, "face time" matters in terms of private time with managers or leaders to talk about your work. Lester also noted that *"there is a lot of information you need, that relies on other people. Most meetings are not important; most of the important communication is informal and unplanned."* He said the weekly meetings at BioCo were *"just to catch people up who have not heard about things... But the scientists keep up to date with each other, so the news is not news to us."* The weekly meeting was designed for data that everyone agreed on, and not for "controversial data," according to Lester. If he had something problematic, he would see his supervisor instead. Lester said, *"If I have a question, I would prefer an ad hoc meeting. Get the people together who need to be there and make a decision."* He agreed this strategy suggests people have to "be there" if they want to be in on making decisions. *"If you were not there, we'd have the meeting without you. We need to make decisions as soon as possible."*

In summary, the issues of how companies manage time relate to communication opportunities and decision-making roles. They suggest an important area for thinking about work design, including how meetings are used, whether formally or informally, as well as alternative means for processing complex information and making important decisions.

Employees found different levels of flexibility in their work environments, based partly on whether they worked at BioCo or ImmuCo, and also based on their particular job and work group dynamics. In addition, some work groups at each company might be more or less flexible. Most BioCo supervisors were generous in their interpretation of policies, while most ImmuCo supervisors repeatedly said "no" to requests for alternate work schedules. Gender had an impact too. Some employees (more women than men) felt quite constrained by ImmuCo's official rules, while others (more men than women) seemed to feel the official rules were not so important. Women were more convinced their careers would be affected if they did not keep long hours, although not as much at BioCo as at ImmuCo.

Men were able to do more informal non-traditional scheduling than women, with less attention from higher-level managers (Bailyn and Rapoport 1998). Some evidence indicates that men are more likely to need alternative scheduling infrequently, while women are more likely to need it on a day-in, day-out basis. In my sample, more women than men dropped off children or spouses on their way to work or picked them up on the way home. More than half the women, and less than one-third of the men, had such obligations.⁸ Men were more likely to have the option to "drop by the men's club or the gym" on the way home if they had a stressful day.

⁸ This mirrors a phenomenon coming to be known in the popular press and planning communities as "trip-chaining," and this also is mostly done by women. See Sipress 1999. See also Jurczyk 1998 on the gendered experience of time.

In sum, company decisions about organizing time, communication, and decision-making intersect with flexibility patterns of the firms and work groups to help determine each person's constraints. BioCo offered more opportunity for experimentation, alternate schedules, work at home, flexible boundaries, and limited hours than did ImmuCo.

ANALYZING EMPLOYEES' WORK AND HOME DEMANDS

Within BioCo and ImmuCo, I identified the structural work and home demands that each individual interviewee confronted. I analyze these patterns in the following sections. First I categorized each employee as to whether she or he had high work demands, as defined below. I looked separately at the employee's family situation to determine if the person had high demands at home. I focused on care-taking needs for which the employee was responsible on a regular basis, since those are not optional, as home repair or gardening might be. I separately developed from the interview data a rating of each individual's degree of satisfaction with work and home, and allocated the employees to the various "demands" and "satisfaction" categories, organized around work and home demands. This gave me the basis for systematic comparison.

High Work Demands

After reviewing all the transcripts with a colleague,⁹ I developed a set of indicators to categorize each person as having either High Work Demands or Moderate to Low Work Demands. I was careful to ascertain that these were structural features of the job, rather than a temporarily high workload or set of circumstances. Although a supervisor often either exacerbated or mediated these demands, I did not include that factor here, as I consider that a non-structural condition. Indicators of high work demands included: required long hours,

⁹ Kate Kellogg, MBA, was an incoming Ph.D. student in Organization Studies at MIT's Sloan School of Management during the summer period in 1999 when she assisted me with coding many of the interviews, and working to clarify categories and assignments. I am grateful for her assistance.

extensive travel, unusually high job insecurity, and major responsibility for the work of others without sufficient authority to control it. Below I outline each indicator briefly and offer examples.

Long Hours. I defined long hours as a job requiring at least 45 hours spent at work in a seven-day workweek. I focused on whether the job required these hours, not on whether employees preferred to work them. This was sometimes hard to discern. Nathan, an officer of BioCo, was at work by 8 AM each day and never left before 6 PM. This was also true of Jerald and Angela at ImmuCo. Lester at BioCo rarely took a lunch break, but ate at his desk, as did Ursula and Karen who also worked there. Most of them also took reading home at night and came in on weekends on a project basis. I decided their work required long hours. Another scientist, Lawrence, worked 11 hours a day, 5 days a week. When I asked Lawrence if he could do his job in less time with a different means of organizing tasks, he said he could not shorten his hours through greater efficiency by more than 15 minutes a day. I classified him as “high demand” and found this to be accurate for the others mentioned above as well. In contrast, Bella and Amy could usually finish their work in 8 hours a day, and I classified them as having moderate or low demands. So required long hours constitute one facet of high work demand.

Extensive Travel. Extensive travel mostly affected firm officers who traveled for scientific conferences and international collaborations but they also went to financial markets in New York and Chicago and to visit partners in Europe and Asia. Some scientists were good at presenting scientific information to investors or financial analysts, and they were pressed into fund-raising or collaborative trips. An example of a completely demanding officer's schedule is Ursula's; one week of her grueling travel schedule follows:

“I flew to Zurich on Sunday night, arrived Monday morning, and had meetings in Zurich in the afternoon. I flew on Tuesday morning to London, and had

meetings in London in the afternoon. I flew back to the US on Wednesday, to Maryland for a meeting at Johns Hopkins, and then to Chicago for Thursday morning meetings with bankers. On Thursday afternoon I went to New York for more meetings with bankers there, and then my daughter took me out to the theater Thursday night— that was my 'relaxation.' Now (Friday) I'm back here in the office, trying to catch up."

Ursula hadn't taken a vacation in twenty years, aside from a day or two on a trip here and there. While her week is an extreme version of extensive travel, others also traveled nearly weekly.

Sometimes those who wished to avoid travel could work through phone conferences and faxing, although international collaborations generally required in-person visits. On the day I shadowed one of BioCo's top officers, he and a research director were planning a trip to New York to meet with investors for the next day. They would leave their homes by 6 AM, be in New York at a hotel by 10, present a five-hour meeting, lunch talk, and slide show, and be back in town by 6 PM if all went well. Of course travel had its own burdens, and there was more work to do back in the office upon one's return. Usually officers traveled so often that they had frequent flyer miles to upgrade to first or business class seats for international flights, which reduced the physical strain of travel. Occasional conferences did not qualify as extensive travel, although even these posed problems for people with carefully balanced home arrangements.

High Job Insecurity. Working in a job with a significant amount of job insecurity also adds to work demands, in part because employees must be sure to keep up their own network of contacts, as well as doing a variety of work assignments under pressure at their company.¹⁰ When layoffs and high turnover occur in biotech projects, scientists who remain have to finish other people's projects. One ImmuCo scientist who had survived a layoff told me that his current project:

¹⁰ By particularly high job insecurity I mean more than the company's as a whole, since most biotech companies have a high level of uncertainty about their futures.

"... was out of control from the beginning and was not well recorded, what they were using for assays, etc. There is a certain way things need to be done, stages it needs to go through, once it is submitted to the FDA [U.S. Food and Drug Administration, a regulatory agency] It matters how it is done, and how the records are kept... Since lots of hands touched it, no one kept track of everything they did."

Insecurity in particular types of jobs also reduces support for flexibility, as shown in this comment by Cathy at ImmuCo, who had been turned down for a part-time schedule:

"Previous part-timers here (note: those with child care issues were allowed to work part-time years ago at ImmuCo) were laid off in early cuts. So asking for part-time work is like asking to become expendable." Similarly, when Bella at BioCo found that when she could not come back to work part-time, she was stressed by not having a "permanent" job slot. *"I had to commit to daycare for a month at a time, not week by week, and I had to know if I had a regular source of income or not."* The uncertainty of her contract position added to her work demands.

Responsibility for Others: Managing without Control. Having responsibility for the work of others can create high work demand. Fully 45% of the interviewees had one or more persons directly reporting to them. *"As a manager,"* said Lester, *"it's important for me to keep everyone happy and productive, to keep them interested in their work... You want to make sure that they are not spending the day doing experiments that mean nothing. Of course, it may turn out to mean nothing, but you don't want to have them doing things that may not turn out at all... It's very difficult to find good people."*

Lester did not intensively supervise people, but he did seem to rely on their presence as a partial measure of performance. This meant he had to be there long hours too, so this type of "presence monitoring" affects both manager and employee. At ImmuCo, one officer was particularly demanding, wanting to know from the HR officer *"why so and so had not come in yet."* His concern reflected a culture organized around times of arrival and exit rather than on what quality or quantity of work was being produced.

In another example, Angela felt she had “responsibility without authority” for her lab technician.

“I expect him to think and plan, but he does not have the background. I cannot catch up on my notebooks. I have a month of extra work right now. I have lab and documentation work and tracking data generated by Armando. I tried ... to give him responsibility for tracking the data he generated, but it was too much for him. He did not get it, so I took it back.”

Having responsibility for others could lessen work demand if the employee’s level was high enough to be able to require the other person to fit their hours and schedule around one’s own preference. In that case, control outweighed responsibility, for those with high control could dictate the terms of the relationship. This was true for the highest-level officers, but seldom for scientists, and rarely for research associates who supervised lab techs.

Others felt that they needed to be present to manage, but not as much as ImmuCo required. One crucial woman manager at ImmuCo said she would leave if she was not allowed a 4-day, 40-hour workweek after the birth of her first child. Despite having turned down all previous requests for non-standard work schedules, the officers agreed to grant this one, on a temporary basis, purely because of the individual’s role in a critical process. So despite the difference in the companies’ overall patterns of flexibility, the individual supervisors and the labor market position of each individual made a crucial difference. If one was prepared to quit entirely, one might have to do so, or one might get a concession even at ImmuCo. Flexibility in some cases seemed to relate to the ability of the employee to “exit” if flexibility was not forthcoming.

I defined those with two or fewer high work demands as having “low work demands,” which includes moderate or reasonable work demands. An example of someone with reasonable work demands is Elizabeth, from BioCo. My definition of “reasonable” includes a schedule that is relatively predictable. Elizabeth says,

“So far my work schedule has been regular. I work Monday to Friday, 40 or 45 hours. Some weeks it is more. So far I have not spent Saturdays at BioCo. I drive in about 8:00 AM... Why is 40 hours not enough? Another former BioCo person is working 60 to 80 hours a week at a new job. I am a believer in free time. Free time,

exercise, and fresh air are very important to me. I go to the gym on the way home. I leave here around 5, spend 1 or 2 hours there, and get home around 6:30 or 7:30 PM”.

Elizabeth also had low or moderate levels on the other three work demands indicators: she did not have anyone reporting to her, she did not have high travel demands, and her job was not exceptionally insecure. Her moderate work demands helped her exercise and stay healthy as well.

High Home Demands

To determine the level of home demands, I re-analyzed all the interviews, looking at what structural conditions contributed to employees experiencing high demands in their family lives. Those with the most demanding home situations were those with significant dependent care responsibilities—and they were most often the mothers in the group. For these employees, the majority of dependent care concerns were with young children, as more than 75% of married employees (and one single woman) had children under six years of age, and more than one-third had children between 6 and 12, or teenagers (some had both). Although elder care is on their future horizons, few were spending significant time providing direct care for an elder. They were more likely to be handling a relative's finances, using vacation time to visit ill relatives, or spending weekends helping older parents.

For two-thirds of the 42 interviewed biotech employees, high home demands meant having young children. Many of the scientists and research technicians struggled on a daily basis with toddlers and infants, diapers and bottles, getting children to daycare, relatives' homes, or pre-school programs, picking them up by closing time, and dealing with the question of who stayed home when the child (or the family daycare provider) was ill. Virtually all the partnered female scientists had full-time career spouses, while few of the men did. More than half the fathers had spouses who worked part-time for pay or not at all.¹¹

¹¹ See Chapter 6 on the effects of this fundamental difference on gender equity; for now we can see that at least a quarter of the workforce, in this case all men, had significant support at home.

In a few cases, a person had high home demands, but not because of children. This involved a long commute or a spouse's job that was in conflict with one's own. For example, Lester left home at 6:30 AM with his wife. After their 45-minute commute, she doubled that time on the subway to get to her job as a research scientist in a local university. He noted that by the time they reached home at 7:30 PM and ate dinner by 9 PM, they needed to be in bed by 10:30 (to get up at 5:30 AM) and so they had very little time for anything else besides work, food preparation, and 7 hours of sleep.¹²

Summary: Initial Findings on Work and Home Demands

After analyzing the levels of demands at work and home for all 42 professionals, I compared BioCo and ImmuCo by looking at those with similar levels of demands (separated into men and women), to see what differences emerged.

Overall, the level of demands by company and gender show remarkable similarity, when looking at either one in isolation (see Exhibit 4-3). Given interview data from 21 employees of each sex, 13 women and 14 men have high home demands, and 8 women and 7 men have low or moderate home demands. For work, the patterns are also similar: 11 women and 10 men have high work demands, compared to 10 women and 11 men with non-high work demands.

But when we look at the combination of company and gender, things are less equal. Twice as many ImmuCo women (6) have high work demands as do not (3), compared to

¹² Two other scientists had long-distance, commuting marriages because of the location of either their home or their spouse's jobs, but I did not count them as having high home demands despite the fact that they were maintaining two households. Neither had children living full-time at home; one had no children as yet and the other had a college-age son who lived part-time at home. Their commuting relationships certainly added psychological strain, but in terms of managing the daily boundary it might actually have been easier logistically.

Exhibit 4-3 Structural Conditions at Work and Home

		WORK High Demands		WORK Low Demands				
		BioCo	ImmuCo	BioCo	ImmuCo			
HOME High Demands	Women	3 Women	4 Women	5 Women	1 Woman	High home demands = 27 13 women 14 men		
	Men	4 Men	3 Men	3 Men	4 Men			
HOME Low Demands	Women	2 Women	2 Women	2 Women	2 Women		Low home demands = 15 8 women 7 men	
	Men	3 Men	0 Men	2 Men	2 Men			
		21 = High work demands 11 women 12 BioCo 10 men 9 ImmuCo		21 = Moderate/Low work demands 10 women 12 BioCo 11 men 9 ImmuCo				

BioCo, where 5 women have high work demands and 7 do not. For the men, the picture is the reverse. Seven of 12 BioCo men have high work demands compared to only 3 of 9 at ImmuCo.

When it comes to home demands, it is the BioCo women who seem to be more burdened: twice as many have high home demands (8) compared to low (4). In contrast, at ImmuCo, 5 women have high home demands (compared to 4 with low). It is probably more difficult for women with high home demands to function easily at the more rigid ImmuCo. BioCo's men are more evenly split between high (7) and low (5) home demands than are ImmuCo's men, where 7 have high home demands compared to only 2 with low, just the reverse of the women. Of 7 men with high home demands, 5 have wives who work part-time, providing them with high home support even in the rigid company setting.

Thus, the interaction of company and gender leads to different patterns of pressures on individuals within companies.

To understand more deeply the differences among employees in the same or similar circumstances, I compared within (instead of across) categories, to see if different male or female employees in the same "demands" situation experience different levels of satisfaction with their work and family situations, and why that might be. This analysis suggests explanations for the ways in which a person's structural context is not determinative of satisfaction, and what kinds of strategies within a given context can help employees achieve more integrated satisfaction.

ANALYZING SATISFACTION AT WORK AND HOME

The outcome of interest is satisfaction with one's life, at both home and work. I examine especially those situations where a tradeoff of good outcomes in either realm is unnecessary, i.e., the conditions under which employees have achieved what I call "integrated

satisfaction.”¹³ Those who are dissatisfied in both realms and those who are satisfied in one or the other are also relevant. From these intensive interviews we learn the conditions that enable or constrain achieving satisfaction in work and home realms.

With the assistance of a colleague in coding interviews, I focused on felt characteristics of the work or family setting that influenced employees’ ability to achieve “integrated satisfaction,” meaning a high level of satisfaction with both work and home experiences, as opposed to a tradeoff of one for the other. I developed a grounded set of self-report indicators to show if employees were satisfied at work, at home, both, or neither. These data are based on the time of the interview.¹⁴

Satisfaction with Work

Two-thirds of the employees interviewed, including 75% of BioCo and 50% of ImmuCo employees, were highly satisfied with work. I asked directly, “How do you feel about your actual day to day work?” Those who were highly satisfied said things like, “*I love to come to work in the morning,*” and “*I am always learning something new.*” Since the levels of work demands were similarly divided (half of those interviewed in each company had high and low work demands), it was clear that flexibility at work was crucial to the overall large difference in work satisfaction levels. Most of those at ImmuCo who were satisfied were in sufficiently high positions, such as directors or senior scientists, that they had control over their time on a day-to-day basis, and sometimes had control over the time of others. The

¹³ I do not hold the “depletion” view that additional interest in one realm must be associated with reduced interest in another, though certainly people sometimes experience tradeoffs; on the other hand, I am sympathetic to the “enrichment” or “synergy” view which suggests that work and family experiences can and often do supplement each other for a healthier and more balanced life, and a trade-off assumption is unwarranted (Bailyn 1993). I do not assume either one here. I suspect the most inclusive and parsimonious explanation lies somewhere in between, and allows for both at different times, life stages, organizational settings, family makeup, etc. In this I agree with Rothbard (1998) and Bailyn (1993).

¹⁴ I completed repeat interviews with three individuals, and in these cases I assigned an overall satisfaction score based on the totality of data.

range of employees who reported being satisfied at BioCo was broader, including lower-level employees. Also, flexibility around work schedules clearly helped BioCo employees deal with higher work demands at times. Reggie of BioCo said, *“I have to pick up my little girl at 5 at the day care center. So I come in at 7 and leave at 4, pretty much every day.”* He had moderate work demands, but was happy, and he could arrange this schedule even when work was pressing, if he took work home. Harris of BioCo also had flexibility in scheduling his hours, even though he had very high work demands. He chose to work intensively while he was at work and not to take work home. But he could make adjustments for family needs even on a daily basis, if necessary. The flexibility at BioCo extended to helping people work on multiple projects at once, and to have extensive responsibility (which often led to more control).

In contrast, one ImmuCo researcher, Ariel said,

“I work on projects. I feel as if I am doing business right now and not science. I am not sure I want to do that forever. Now, it’s repetitive procedure I’m doing. In a few months... well, they went to look at robots that could do my job. So, I just keep up my networks, focus on doing my job, and my kids and husband.”

I classified her as having low satisfaction at work. Later in the interview she said: *“I have already applied to another job. It came along and I put my resume in, so I’m thinking....”* and in fact she later moved to a different company. She is someone who had relatively low demands at work (in terms of hours, travel, and the other factors identified above), but whose work was not satisfying. Rather, the job was unchallenging and boring. The rigid company environment exacerbated that.

Overall, 11 women and 16 men were satisfied at work, and 10 women and 5 men were dissatisfied at work. BioCo women were 7 of the 11 satisfied women, and 5 of the 10 dissatisfied women. BioCo men were 11 of the 16 satisfied men, and only 1 of the 5 dissatisfied men. So the rigidity at ImmuCo affected both women and men.

Satisfaction with Family

In contrast, satisfaction at home was more evenly divided. Fourteen women and 16 men were satisfied at home, while 7 women and 5 men were dissatisfied. Fifteen BioCo and fifteen ImmuCo employees were satisfied at home, but 9 BioCo and only 3 ImmuCo were dissatisfied at home.

Ariel of ImmuCo, quoted above as having low work satisfaction, is in contrast very satisfied with her home life: "What do you do and how do you feel on weekends?" I asked.

"I am home and happy to be there! I drove three hundred miles during the week, and I do not want to get into the car! I do the soccer games. Being with one child at a time is good. I like being home, there are a lot of gardens that I work in. And the kids too. I'm much more interested in things like flowers now. The younger one is more social. He's interested in friends, so I do drive. We have friends to the house, who are older, and the kids' friends too. Then I take them to Sunday school; it's social, with the kids.

I used the same indicators of satisfaction for men and women. A new ImmuCo father, asked about the experience of fatherhood, said:

It's pretty cool. I had no idea. But... life after children is tough. No one explained to me, the time and extra work that it means! I have to come home, no matter what happens! And I pick up Cheryl; she's so interactive. She's smiling, it's great! [He shows me a picture of her] ... But there's always something I need to do....

So while he was happy with fatherhood as a state of being, he had not yet adjusted to the daily realities of parenting. This comment is ambiguous for satisfaction. I classified him as having "low" satisfaction at home, based on several other factors, including having his mother-in-law as his landlord, living an hour away from work, stress with his wife, and his mother-in-law's refusal to babysit.

Another example of low satisfaction with family is based on a long-distance commuting marriage. A Bio scientist-manager, Eugene, lives in an apartment near the firm four nights a week, and commutes two and a half-hours home every weekend. He and his wife arranged to eat the same food every night they were apart (she prepares it and he

microwaves it!), to watch the same videos, and to listen to the same music at the same times, in an effort to make their experiences during the week more similar. *“I try to live in her world,”* he said. *“I do not have a life here.”* I classified this employee as not happy with his home life under these circumstances, although he and his wife tried to make the best of it and had developed elaborate and creative means to stay “connected.” This employee felt it would be hard to find a comparable job closer to his home, but also did not want to ask his wife to move. However, it was clear the long-distance commuting pattern of the previous eight years, had taken its toll on his home life. In speaking of his son, who had to return to college to make up missed classes, he said regretfully, *“Of course, one of the things I missed while being down here so much was all the classes he cut in high school. Then again, most fathers don’t know if their sons are cutting classes.”*

A male scientist from BioCo, in contrast, was “highly satisfied” with his home life. He had a short commute, so he could get home to dinner most nights, and attend his sons’ Scout meetings once or twice a month. He spent about two hours a night with his children, and saw them for a half-hour in the morning. He was pleased with this amount of family time, and seemed very satisfied with his home life.

FINDINGS: USING SATISFACTION AS A BELLWETHER

Having identified employees with high demands at work, high demands at home, and varying levels of satisfaction in each sphere (see Exhibit 4-4), I examined both work and home spheres, focusing on what different satisfaction levels occurred within each category and across categories. Using varying levels of satisfaction helped to give insight into what supports or constrains employees' ability to deal with high demands.

I examined “integrated satisfaction” by gender and company. Company alone did not make much difference, but gender did. Ten BioCo employees (of 24) have high integrated satisfaction, 3 women and 7 men. Eight ImmuCo employees (of 18) also do, 4 women and 4

Exhibit 4-4 Satisfaction at Work and Home

		HIGH Work Satisfaction		LOW Work Satisfaction				
		BioCo	ImmuCo	BioCo	ImmuCo			
HIGH Home Satisfaction	women	3 women	4 women	4 women	3 women	High home satisfaction = 30 14 women 16 men 15 BioCo 15 ImmuCo		
	men	7 men	4 men	1 man	4 men			
HOME	women	4 women	0 women	1 women	2 women			
	men	4 men	1 man	0 men	0 men			
LOW Home Satisfaction	women	4 women	0 women	1 women	2 women		Low home satisfaction = 12 7 women 5 men 7 BioCo 5 ImmuCo	
	men	4 men	1 man	0 men	0 men			
		27 = High work satisfaction 11 women 18 BioCo 16 men 9 ImmuCo		15 = Moderate/Low work satisfaction 10 women 6 Prima 5 men 9 Segunda				

men. While only 1 BioCo employee, a woman, is dissatisfied both at work and home, 2 female ImmuCo employees are the only ones in that company who share these characteristics. What is most notable besides gender is that BioCo employees have more overall satisfaction, because their *work* satisfaction is on average higher, while ImmuCo employees have only a 50% chance of high *work* satisfaction.

Gender is still a crucial factor in work satisfaction, support at home, and the level of family responsibility experienced. Seventy-six per cent of men are satisfied at work, while this is true of only 52% of women. Virtually no women have support at home. Very few women, in this interview sample at least (only 3 of 21, or 14%), are able to combine raising children and working in a way that is satisfactory, and two of them are officers and one is a high-level manager. Four other women have high satisfaction at home and work, but none of them have children living at home. Compare this with men, where 9 of 21 (42%) have "integrated satisfaction" and children living at home, while only 1 of 21 is single and satisfied, and he is engaged to be married. Those three employees who are dissatisfied both at work and home are all women, all with young children, two of them at ImmuCo.

Note that among the 13 individuals in the "High Demands at Work and Home (H/H)" setting, we find all four possible combinations of integrated satisfaction. Three of the seven people in the Low Work/Low Home demands setting have at least one "low" level of satisfaction (all are with work, and none with home). In the mixed settings, we find all four possible combinations of satisfaction in the High Work/ Low Home demands setting, and three of the possibilities in the Low Work/ High Home demands setting. Demands alone, in other words, do not determine satisfaction—a highly demanding job can be greatly satisfying, as can a demanding home life, complete with caring needs.

So, what explains such large variation? With family demands and work demands held constant for each group within a cell, how can we understand the widely varying levels of satisfaction? What key factors allow employees to manage high work demands, high home demands, or both in a satisfactory way? What is missing from the lives of those who are less satisfied?

Responding to Demands

Who is most satisfied? Let us begin with the 15 people (8 women and 7 men) who have high work and home demands. Five of them report "integrated satisfaction," including four men and one woman. Not coincidentally, every single person with integrated satisfaction in high-demand settings is a top officer of his or her company. As officers, they have resources and discretion to get support at home and to ask other people to meet their schedules. For instance, one BioCo officer with three children explained that his life is *"mostly pretty good.... I can get home for dinner most nights."* The family has had a new au pair each year for 10 years, and finds that it works out *"well, it is a good solution for child care. We have a furnished third floor, so they are not in our face. The kids all adapt very quickly [to a new au pair each fall]."* He likes his work because it has high responsibility, but at BioCo he can organize his supervision informally. Another male BioCo officer said, *"I enjoy the science. I help people work through problems and issues. I deal with outside academic collaborators. They are fun and interesting, smart people."* He acknowledges he would rather be at work than at home full-time with his two young children, as his wife is. However, he can see them enough to relish what he does at work and home equally, in part because he has many choices about control at work.

The lone woman ImmuCo officer has children who are teenagers and do not require much attention, according to her. In her case, not having a spouse actually reduces her

schedule. She can be flexible with respect to home without any problems at work, or can work hard without problems at home. For many women, being married is more demanding in terms of household work, health, and stress than being single (Pitt-Catsouphe and Googins, 1999).

Of the four satisfied men, three have wives who work part-time and take primary responsibility for their children. One of those whose wife works part-time, Jerald, also has a live-in nanny. Jerald can come and go as he needs to. Yet even his elaborate family care arrangement is fragile. His satisfaction can be disrupted if any of his home supports are removed. When his wife's father was ill and she left town for a few days, the children "went whacko," he said. But, most of the time his support at home allows him to meet the demands of a 10-hour workday and some travel. The only highly satisfied man with a full-time working wife is married to an academic who can work from home at times and comes home early if needed. She does not teach in the summer, so her schedule meshes with the children's.

I conclude that "level" at the company, and its attendant "control," is crucial to meeting high work demands. It gives these officers flexibility even in a non-flexible company, ImmuCo, since they can decide when and where to work, granting themselves permission, perhaps justifying it because some work longer hours than other employees. "Support at home" is crucial as well. A housekeeper or spouse taking major responsibility for cooking, cleaning, childcare, and home care is essential to integrated satisfaction for people with multiple high demands. All these officers are compensated enough to pay for such support, even if their spouses were not providing it. But even having an au pair requires managing her, her hours and schedule, her transportation—and remember that Jerald's wife does all this work in their case.

On the other end of the spectrum, three people are unsatisfied at both work and home and have high demands in both realms. All are non-officer women with two or more children, whose husbands work full time (one is separated), and who themselves have primary responsibility for their children. They feel that they cannot do either their home or paid job well enough for satisfaction under their current circumstances. The ImmuCo woman who is

separated finds that she works late when her children are with their father, but that she needs more flexibility when they are with her, since no one else cares for them on a daily basis. She brought her pre-teen son to work during the summer, to find work for him to do. A dissatisfied woman from BioCo proposed several alternate schedules to help balance and integrate her life, but was turned down, because her supervisor said she needed to "be there" in case he wanted her. As a result, she is not happy at work, experiencing a rigid work environment even in a firm that has flexible policies. Nor is she happy at home, since she cannot spend enough time with her family to feel unstressed.

These examples again point to the importance of having control. Having control over your own and others' work hours helps in creating satisfaction at work and helps people manage their home lives. Low-level employees generally do not have this flexibility, either informally or formally, and thus find it more difficult to achieve integrated satisfaction. High-level jobs and more control—of your schedule and others'—make achieving integrated satisfaction easier.

Mixed Outcomes in the Dual "High Demands" Setting

Those with mixed outcomes in high dual demand settings include only one person with high work and low home satisfaction: she does not have support at home, so she feels pressured during time with her children, as if she cannot be a good mother and work full time. The four people with low work and high home satisfaction include two at BioCo and two at ImmuCo, three men and one woman. While all of them have children and full-time working partners, they are able to limit their work hours (even in a situation of high demand) and take some flexibility with scheduling. Being in a "flexible work" environment can contribute to higher satisfaction at home.

Integrated Satisfaction within a Context

Seven people with low work and high home demands have "integrated satisfaction." Five of the seven work at BioCo, so their high home demands are more manageable in part because of a flexible setting. Their work demands are also more manageable because of flexibility. Of those who have integrated satisfaction in these circumstances, four of the seven are men. Two of the three women either have no children (Marion) or one child (Cheryl). Cheryl is unusual in being both a working mother and part of a two-career couple, but her work demands are low because of reasonable work hours and high flexibility at BioCo. She is also a manager of six Ph.D. scientists who are competent at their jobs, so she has a high level of control. She *"used to work more hours, leaving at 6 or 6:30, but now I leave at 5 to pick up my baby. I find I can get just as much done, I just am more focused while I'm here."* That she is married to another scientist at the same flexible company (BioCo) means that they have a joint commute, can decide when to come and go together, and can share both childcare and pick-ups.

Of the five men in this circumstance, Gene and Lee are each married to women who work part-time and who take primary care of each family's two children. This "support at home" eases the high home demands of having young children, and lets them enjoy fatherhood. Annette is at ImmuCo, but her husband works from home, so he is available if the children need something during the day. Roger is a manager with high control at work, and his wife is a secretary with constrained hours and a job that demands no travel or work outside normal hours. Chester is also a director, though he does not supervise anyone, as he is an inventor and independent contributor. Chester's wife just went back to school after working part time from home for years, and the children are now old enough to be left alone at home. So, even with high home demands, critical conditions for integrated satisfaction include having both sufficient control at work, and support at home.

Mixed outcomes with low work and high home demands are found for five people: three people are satisfied at work but not home, and two are satisfied at home but not work.

Serena of BioCo is unhappy at home because her husband left her after their child was born, so she is an unwilling single mother. Jasper of ImmuCo has a long commute and a pressured home life. Harriet's husband lived out of town for two years when he could not find a job in the area, and she has had to act as a single mother of two children. The family is having some trouble readjusting to his presence. None of these three has support at home, which explains why their satisfaction at home is low. Yet they do have sufficient control of their work to be relatively satisfied at work, and they enjoy their jobs.¹⁵

Of the two employees satisfied at home but not work, Karl of ImmuCo likes to be at home with his daughter and wife, but is frustrated at work partly because he has little control. He has a lower-level job in the laboratory, in a rigid environment with an unsympathetic manager, so he has trouble getting time off to be at home. Karen of BioCo is unhappy at work mainly because she works part-time, and does not get challenging work, but rather the dregs of what anyone else does not want. She experiences at least a temporary tradeoff between work and home satisfaction—if she were working full time, her job would be more interesting, but she would have less time with her young sons. Her outcome seems to arise from the unchallenging nature of the part-time work made available to her at BioCo. But if she were an ImmuCo employee, she would not have been able to work at all, and she is glad she is working. The change needed here is structural and attitudinal; managers have to decide that part-time employees do not have to give up interesting work for Karen's situation to improve.

Gender seems to play a role here, too, as four of six employees with mixed outcomes are women. In the entire 21 employees (50% of the sample) in two firms who have low work demands (including those with low demands in both areas), no one is unsatisfied on both fronts of their lives. Reasonable work demands lend themselves to more integrated satisfaction and more home satisfaction, whether home demands are high or low.

¹⁵ These three are the only individuals of 42 I interviewed whose situations were similar to those highlighted by Hochschild (1997); for them, work is a relief when home is chaos.

What Else Contributes to Satisfaction?

So far I conclude that "level" and "flexibility" act as enablers of dealing with high-demand situations at both work and home, that "support at home" is crucial to high satisfaction at home, and that "long commuting" acts as a constraint on satisfaction in both arenas. What other factors are important?

Of the seven people with high work demands and low home demands, only one individual is highly satisfied with both work and home. Ursula is a BioCo officer, and she has considerable support at home even though she carries a major workload. Her grown children live in other cities, and her semi-retired husband manages their household to some extent. Her demands at home are low, partly because of her life stage issues, and that facilitates her satisfaction. Clearly, some people like Ursula thrive on high-demand jobs and find them inherently satisfying. For those people to be happy at home, they must have low home demands, or a lot of support at home, as well as work place flexibility, which is determined by the level of their jobs and authority.

Finally, 10 employees with low work and low home demands have a 50% chance of being satisfied in both domains. Two of the 5 satisfied people are younger employees, single and without children, and one is a woman living with her partner and no children. A fourth is engaged to be married to a woman he met at work, though he is planning to change jobs to have greater job security. The last is a 37-year-old confirmed bachelor, who keeps work and home separate "like church and state." He pursues his hobbies at home and comes in briefly on weekends to start experiments. Those without children at home are freer to work long or irregular hours, and three of the five satisfied in this situation are from ImmuCo, the more rigid company

One person has high work and low home satisfaction, mainly because of his long commute home only on weekends, when he sees his wife. He is resigned to this, but he does not like it. BioCo provided him with flexibility in his starting and ending times so he can avoid the worst traffic. The only improvement he could suggest about his situation would be

for him to work from home at some times—which he did once during a snowstorm. He got a lot of work done then, but unfortunately for him, it was a one-time event.

Three people in low demand situations report low work and high home satisfaction. All are non-Ph.D. scientists in low to mid-level jobs who had been working for their companies for more than five years. This is a long time in biotech. They were unable to move toward further promotions in either company with their present credentials, and their jobs were not exciting to them. One woman with aging parents and no children wanted more time off, and was willing to take unpaid leave, but was not allowed to do so, even at BioCo. Another woman was pregnant with her first child, and after the birth of her daughter, she decided not to come back to work. Her work was not very interesting to her before the birth, and her husband ran a good business. The last was an older bachelor "stuck" in his work and "going through the motions." All felt more fulfilled in time away from work more than at work, though all three also valued their workplace friends. They were not parents and did not have a community through their child's friends. Flexibility or making more time off available would have helped at least one of these three persons. More interesting part-time work might have attracted another one back after childbirth.

Satisfaction with work, whether in a high or low demand setting, seems to relate specifically to whether and how much the person can influence when and how she works. If she can, this seems to alleviate a good deal of stress and tension. Being able, satisfactorily, to deal with high work demands depends on the level of autonomy and interdependence experienced by particular employees, and also on their job level. And satisfaction at home is highly dependent on the amount of support each person has at home. This has clear gender implications (as will be seen in Chapter 6) because men have more support at home than women.

SUMMARY AND CONCLUSIONS

Control over hours, timing and place of work, flexibility on organizing work hours and boundaries, level in the organization (which also increases flexibility and control), and support at home account for most of the positive outcomes that I observed. Constraints that hampered satisfaction included required long hours, rigid supervisors or policies, a middle or lower level job with little challenge or control, and long commutes, as well as family settings without much support at home. Level in the organization and support at home are individual-based characteristics, though more men than women enjoy these favorable conditions.

BioCo provided more of the work-related flexibility and control opportunities than ImmuCo, and to more individuals. But though BioCo was the more flexible company, in some instances a supervisor or work group manager behaved rigidly, thus constraining a BioCo employee's behavior. And though ImmuCo was more rigid overall, one woman manager had hidden some flexibility from the CEO and tried to offer such control to her direct reports. Still, one would be more likely to have the workplace conditions for integrated satisfaction at BioCo than ImmuCo.

Workplace flexibility in particular correlates with greater levels of satisfaction at work and at home. For example, the only two employees with two or more children and a full-time working partner who were happy at home were two officers, a woman at BioCo and a man at ImmuCo, whose work control and flexibility enabled them to meet home demands. Having one child was generally experienced as easier, but no guarantee of satisfaction. Those with the best situations are challenged and satisfied in their work environments (with both high and low demands), and have support at home. But in my study such support was completely provided by wives to male employees.

My main finding is straightforward: employees are not happy when they are forced to "trade off" work and family, to do a poor job at one so they can do a good job at the other. If family settings can be flexible, that provides support for demanding work. But in real life, as here, that is possible only for men or a few single women. If work situations can be flexible, that provides support for demanding home settings. Such home demands often will not last forever, but only for a period when children are young and require more constant care. The few employees who had teenage children were more free to work late, though they also wanted to be home for nights and weekends; those with grown children were able to re-dedicate themselves to work if they wanted. Those with high demands at home needed more flexibility at work at the time of those demands, but it paid off in increased loyalty and commitment to an employer who provided it. Employers like ImmuCo who do not provide it (or who do so sporadically and selectively, generating resentment and poor morale) often find that turnover rates are higher. At ImmuCo, turnover was higher by 50% than at BioCo during the study. Employers like BioCo who do provide flexibility, in contrast, find their employees are more loyal and willing to stay with the company during hard times.

BioCo and ImmuCo have different company cultures and practices that make similar work into a different experience for those performing it. The more rigid culture at work leads to more dissatisfaction, in general. Similarly, because of gender differences at work and in society, men have more home support and thus in general find it easier to reach integrated satisfaction. (See Exhibit 4-3: eleven men and only 7 women have integrated satisfaction, and most of the women do not have children while all the men do.) But for any individual, her or his actual work situation is most strongly determined by interactions with a single supervisor and work group. Thus company culture and company policies are not determinative; it is the *policies as experienced by the individual* that make a difference in

outcomes. In the next chapter I call this "perceived usability." This includes whether a person feels free to take advantage of the potential flexibility and control in biotech work, to ask for support from colleagues and supervisors, and to make decisions about time that increase his or her satisfaction with both work and home.

There are also gender differences. Compare, for example, Jerald and Nathan at BioCo (who both report integrated satisfaction) to the less-satisfied Karen and the dissatisfied Caterina at ImmuCo. While Caterina, like Jerald and Nathan, has high demands at work and home, her options for dealing with her demands are more constrained, partly because she has less support at home than the men, and partly because her company yields less control to its employees who are not top executives. Karen's satisfaction at work could be greater if the company made an effort to make her part-time job more challenging, but because of internalized norms about the lesser value of part-time professional positions, she has not asked for this, nor have supervisors tried to provide it.

Thus the key factors that contribute to employees' "integrated satisfaction" at both work and home include: flexibility on the job and on boundaries; control and autonomous interdependence; support at home; and job level, especially the extent to which the employee can set the rules. Gender also plays a role because of the different amounts of support at home that men and women experience. Very few women can combine raising children and working professional jobs in biotechnology, at least, in a way that is fully satisfactory.

I analyze these findings on company policies and practices further, using a broader sample and survey data, in Chapter 5. I analyze the gender implications for firms and employees in Chapter 6.

Perceived Flexibility at Work: Its Relationship to Commitment, Integrated Satisfaction, and Well-Being

“How can we be # 1 in having a flexible work environment?” asked one biotechnology Vice President for Compensation and Benefits “This will help with both retention and recruitment of key people.”

“How do we keep people? Through flexibility, in part. We particularly need to retain people while the primary product is being developed, and sometimes the managers continue to want to [retain them] because they want to maintain a pipeline.... In small biotech firms, you know everyone well, you know their personal situations, and you can make accommodations. I bend over backwards because individual people are our most important asset. I try to create an environment supportive of scientists, who are expressive and creative, like artists. Also, many managers are young, in their 40s but with young kids at home. When they are thinking of leaving, flexibility plays a big part. Also it helps me in hiring.”

—Human Resources Manager in a biotech firm

This chapter uses original survey data to test hypotheses developed in Chapter 4 and in the work-family literature about the role of firm-level policies and practices designed to reduce work-family conflict, specifically those having to do with flexibility and time. The key research question is:

- Are such firm-level flexibility practices predictive of organizational commitment, employee satisfaction levels for “integrated” satisfaction—a new construct I develop here—and/or individuals’ well-being, measured as lowered stress levels?

In this cross-sectional study, I cannot prove that the causal direction of any impact of the policies is from firm to employees; at best I can show that statistically significant relationships do exist between the work-family policies and these outcomes. Given other research in this field, it seems unlikely that the most satisfied, committed, and unstressed workers would choose firms with extensive work-family policies-- but it is hypothetically possible, and could even be a desirable finding from a firm’s perspective. I discuss this further in the conclusion.

One contribution of this study is the multi-level data I present here: I collected data both from individual employees and at the firm level of seven companies I studied. Thus, I am able to evaluate within-organization differences as well as between-organization differences and trends in the entire sample.¹ Most studies collect data either at the individual or organizational level, but not both simultaneously.

CHAPTER OUTLINE

The structure of the chapter is this: first I review the relevant literature and describe the primary data I use for this chapter. I set out my hypotheses. Next I explain the independent variables, including formal and informal policies within firms and employees’ perceived access to work-family policies and practices. I show a large variation in firm-level practices, drawing both on survey data and on interviews with executives and Human Resource Management (HRM) staff. To evaluate the realistic ability of employees to use work-family practices, I develop a new construct, Perceived Usability (USABLE), to measure employees’ self-reported

¹ See Kalleberg and Mastekaasa 1994, p. 283 for one explanation of why this is useful.

experience of the policies in the workplace. This construct extends previous research by incorporating not just the existence of formal work-family practices (from the employee's perspective rather than the HR director's), but also the extent of informal practices, and whether or not the employee feels free to use the policy. I argue USABLE is a more reliable and externally valid research construct than those used in most previous studies (see, for example, a widely cited study at the establishment level (Osterman 1995) which relies mainly on plant and HR managers' reports, and the Families and Work Institute's National Study of the Changing Workforce 1997 (Bond *et al.* 1998), which uses telephone interviews without collecting samples at multiple workplaces).

After explaining how I measure the three independent variables, I outline each of the three outcomes of interest, or dependent variables, in turn. I explain how I derived the measures I used for Organizational Commitment (OC), Satisfaction, including Work Satisfaction, Family Satisfaction, and a new construct of "Integrated Satisfaction," and Well-being (or reduced stress). I describe the control and possible moderating variables I include, to see if other mechanisms or omitted variables could explain whatever results I find. I inspect correlations of the dependent and independent variables, and descriptive data on the controls and potential moderators. The hypotheses are operationalized using methods and techniques from industrial relations research. Then I present and discuss findings for each of the major outcomes and identify important outstanding questions for future research.

What I find in this study is that the perceived availability of work-family policies is important to both male and female employees, more than either the formal or informal practices alone. Further, this perceived availability is significantly predictive of higher levels of organizational commitment and "integrated satisfaction." Though the effects are small, they are robust, which suggests that implementing truly accessible work-family policies may be a key part of a strategy to induce valuable knowledge workers to become committed to a firm and to increase their level of satisfaction. In addition, a moderating variable I call CONTROL, meaning control of the time, pace, and place of work, shows a positive relationship to

commitment and satisfaction. I also find that the work-family policies I examine here with these data are not systematically predictive of greater well-being or less stress. However, I do find that both gender and work insecurity (which is closely linked with working in small firms) are associated with increased stress and lowered well-being.

THE STUDY VARIABLES

An interesting outcome regarding the value of work-family policies to biotechnology companies and their employees is whether employees' commitment to the organization is associated with the presence or availability of these policies. Other studies have shown that family-friendly policies reduce absenteeism and turnover (e.g., Meyer and Allen 1997; Bailyn *et al* 1996). Since the cost of turnover can be priced at salary plus 93% for higher-level employees, work-life programs "easily pay for themselves" if turnover can be sufficiently reduced, according to experts (Martinez 1997). At least two studies found that companies that offer access to work-family policies are more successful at retaining employees, even if employees do not use the policies (Grover and Crooker 1995; Thompson *et al.* 1997). Although debate continues over the relationship of employee satisfaction (measured in various ways) to performance, a review of multiple studies shows convincingly that there is a consistent relationship between organizational commitment to higher performance levels (Meyer and Allen 1997). Since firm-specific skills are particularly important in the case of the biotechnology firms analyzed for the present study, and long-term compensation is limited, questions of organizational commitment are highly relevant to managers in this sector.

There is also evidence that employee satisfaction levels are related to reduced turnover and absenteeism, less burnout and withdrawal behavior, better health and well-being, and to more organizational citizenship behaviors (OCBs) (Spector 1997). Satisfaction studies have often focused on job satisfaction, broken into ten or more components (*Ibid.*). In contrast, I wanted to develop a concept and measure of satisfaction that was neither solely work or job

satisfaction, nor home/family satisfaction, but incorporated both, as well as satisfaction with the ability to balance both sets of responsibilities and the ability to integrate them.²

Finally, when approximately 70% of U.S. employees say they are stressed from trying to balance and simultaneously manage work and family responsibilities (Bond *et al.* 1998, Robinson and Godbey 1997), I am interested in whether the presence or perceived usability of work-family policies is related to overall employee well-being, here measured by lower physical and psychological stress levels. I use self-report data to measure commitment. There is precedent for the self-report strategy in the absence literature (Drago and Wooden 1992). In the absence of a demonstrably better way to measure commitment, the strategy is parsimonious and consistent with interview data.

Despite the possibility that formal work-family policies alone are insufficient to demonstrate significant benefits to firms, few studies have taken the next logical step to develop indicators of those work-family policies that are meaningful from an employee perspective. While work is in progress to develop such measures, I used qualitative evidence in this study which showed that formal policies do matter to employees. If there is no policy, they are less likely to request arrangements such as part-time work or flexible hours. Informal policies also matter to employees since these are the primary determinant of many people's actual day-to-day working relations. Finally, even when formal and informal policies exist, employees may feel discouraged from using them, and/or that their careers will suffer if they do. I call this the issue of whether they "feel free" to use policies. Thus the independent variables I examine are the presence of formal, informal, and perceived usable work-family policies and practices.

As noted above, the dependent variables used are organizational commitment, satisfaction, and well-being, as reported by employees at the time of the study. Appropriate

² There are important differences between the ability to "balance" work and family, a concept that implies a trade-off, often experienced in terms of time or hours, and the ability to "integrate" the two, by which I mean being able to conduct work at home and deal with home issues at work to the extent necessary to accomplish important goals in each setting. I explain this further when developing the measure of the scale for "perceived usability."

control variables are added to ensure that the study does not mistakenly conflate work-family policies and practices with other possible contributing factors.³

VARIABLES EXAMINED	
Dependent	Independent
Organizational Commitment	Presence of <i>formal</i> work policies
Satisfaction	Presence of <i>informal</i> work policies
Well-Being	Presence of " <i>perceived usable</i> " work policies ("USABLE")
CONTROL VARIABLES	
Age	
Education	
Female	
Have Children	
Household Income	
Years Service	
Manager	
Small Company	
Female	
Have Children	
MODERATING VARIABLE	
"CONTROL" (of time/pace/workplace)	

What is the relationship between the dependent variables and issues of "work and family?" Past researchers (e.g., Gray 1989) have called for studies of organizational commitment to be broadened to account for the effect of family life on organizational commitment to work. This issue has generally been ignored in previous studies of men, and perhaps overemphasized in studies of women's commitment. Feldberg and Glenn (1979) point out that men are typically studied with respect to the job alone, while women are studied with respect to gender roles, rather than focusing on the job alone. Other more contemporary researchers have found evidence of a positive relationship between family-friendly policies and

³ As explained in more detail below, controls include sex, industry, firm size, age, education level, and household income, managerial status and in some cases level of control of work.

organizational commitment or citizenship behavior in diverse settings.⁴ Feldberg and Glenn recommend integrating the “job model” and “gender model” in future research to avoid gender stereotypes. In response to these concerns, the present study provides joint and separate estimates of commitment, stress, and satisfaction for men and women employees at multiple levels of the occupational hierarchy.

Not all scholars agree that simple flextime and other family friendly practices are the solution to work-family conflicts.⁵ First, there is skepticism about whether these policies have real effects in terms of utilization, an issue addressed in the construction of the present study. Second, there is concern that “mother-friendly” working arrangements will simply reintroduce and reinforce the sexual division of labor where women do more work at home and sacrifice their career and earnings prospects as a result. Karen Jurczyk (1998), for instance, holds that:

.... solutions to these problems [of social inequity, including inequity at work] cannot be found in additional special social models for women such as mother-friendly working hours. Parents need parent-friendly work hours, and people need time structures which allow for a balance between the various things that matter in life.... These time structures must be flexible so that they allow for changes in working hours when certain life situations and phases require it and where phases of extensive professional involvement can alternate with phases of leisure time. (pp. 303-4)

These disagreements in the research literature help explain why the present study offers a new contribution, both in distinguishing formal “flextime” from what is really experienced as control over flexibility, scheduling, etc., and in seeking to answer the question of what happens in real life, in practice at specific workplaces rather than on the public relations front. I do not hypothesize differential gender effects, although this is a possibility if women typically have more home responsibilities than men.

⁴ See for example Scheibl and Dex (1999) on female workers, and Lankau and Scandura (1997), specifically with respect to family-friendly policies for male and female managers across organizations. The existence of flexible work programs was shown to be significantly related to organizational commitment and job satisfaction of female manager (Lambert 1997).

⁵ Several authors have noted the possibilities and even probabilities of synergies in the realm of work and family, not only conflict. See e.g., Bailyn 1993, Barnett and Rivers 1996. My study does not discount this possibility, although it is not the primary subject of investigation in this chapter.

RESEARCH FRAMEWORK

The general framework of my hypotheses and argument can be summarized in a simple figure (see Exhibit 5-1).

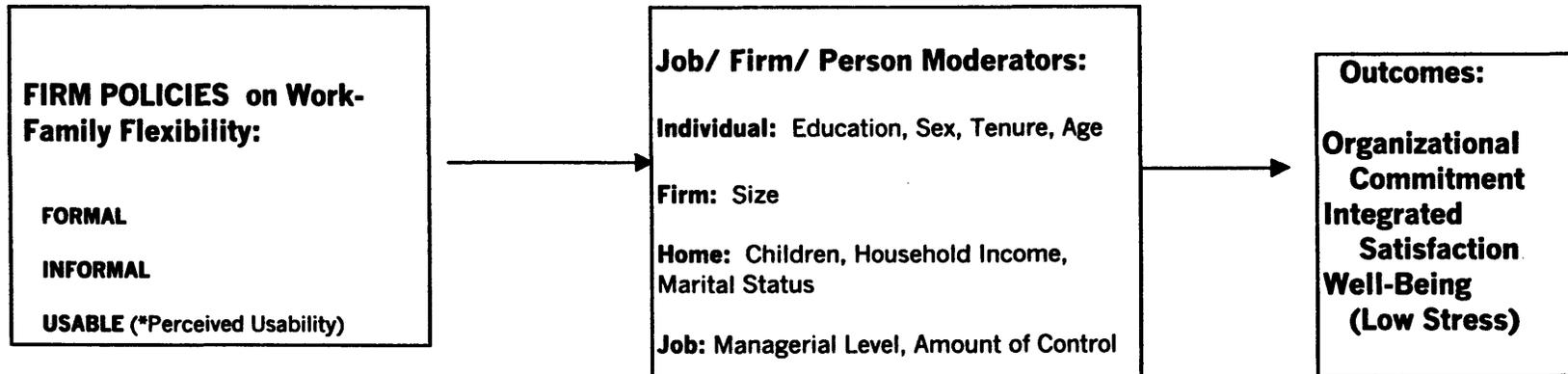
I propose that firm policies and practices on work-family flexibility, as measured by one of three ways (formal, informal, and perceived usable), will have an influence on organizational outcomes. The specific outcomes of interest here include organizational commitment (the affective type, which is positive for employers), "integrated satisfaction" (which includes work, family, work-family balance, and integration satisfaction, equally weighted), and employee well-being.

While this study is limited both in its scope and data, testing these hypotheses is possible using multivariate linear regression analysis. Although all the data do not precisely conform to assumptions of normality, the sample size is large enough ($n=463$) and the deviations slight enough that this method is appropriate (Kleinbaum, Kupper, and Muller 1998). Of course, a larger and completely random sample would be best, but I have not been able to obtain survey data that meets those criteria. Accordingly, my results should be considered as having appropriate limitations, as I discuss in the conclusions to this chapter and in the final chapter of this dissertation. Finally, recall that I cannot prove a causal or directional relationship with cross-sectional data, so the figure outlined in Exhibit 5-1 cannot be proven to be causally directional. I believe it is unlikely that the organizational outcomes predict the organization's policies, although it is theoretically possible. Further longitudinal study or a "before and after" comparison, rather than the simultaneous comparisons between firms that I employ here, would be required to show this.

This study is also cross-level, which is at once a strength and a limitation (Rousseau 1985) of the analysis. While I show patterns for a population of individuals, they are also

Exhibit 5-1

Research Framework



grouped by firm, which I acknowledge by adding variables with the effect of controls for firm effect. Two-thirds of the employees work at one firm, but even they are located in three geographically distinct establishments. The results I report below are still interesting and useful, but these limitations should be kept in mind when evaluating them.

Hypotheses Concerning Commitment, Satisfaction, and Well-Being

In general, I predict that organizations' policies and practices of assisting and supporting employees in integrating work and family are positively associated with employees' affective organizational commitment (Meyer and Allen 1997), employee satisfaction, and reduced stress. But what do I mean by "work-family" policies? Most companies measure their "family-friendliness" by whether they have a formal set of family-related policies in place. Certainly *Working Mother* magazine, *Business Week*, the Families and Work Institute, and Catalyst, Inc. all seem to define "family-friendly" as congruent with the existence of a written set of policies and benefits intended to ease potential conflict and stress between work and family.⁶ Some economic benefits are often included in studies of work and family issues. These usually include only benefits specifically related to the presence of dependents in the household: e.g., childcare subsidies, resource and referral for eldercare, pre-tax deduction plans, emergency childcare provision, providing household services or a childcare center at or near work, etc. While such benefits can be extremely helpful to families, much prior research has focused on them (see, for example, Osterman 1995). In contrast, I am investigating flexibility policies that affect day-to-day schedules, work practices, and the design of work for

⁶ See also the summary of the RPPI HR managers' survey (Radcliffe 1999). Frequently these include such policies as permitting flex time, flex place or telecommuting, job sharing, alternative work schedules (compressed work weeks, part-time jobs), family or personal leaves beyond what is required by the Family and Medical Leave Act or other applicable law, and the ability to use sick leave to care for dependent children as well as for oneself.

employees, rather than benefits which can be purchased and offered without changing work routines.⁷

In general, the policies I study require little or no direct financial expense to the company, but instead are related to the organization of work, which is always an area of company attention. Flexible policies provide an alternative to completing work in a traditional 9 to 5, five-day-a-week, schedule. While these may be company-wide policies, in most cases they require a person's individual or work group supervisor to approve their use, either on a short-term or long-term basis. By "formal policies" I mean written, officially approved human resource policies, as well as any written policies which give supervisors discretion to provide flexibility.⁸ By "informal policies" I mean flexibility policies that are not officially offered, and are not written down, but are nonetheless available to at least some employees and their supervisors, even on a discretionary or irregular basis.

I consider seven practices related to flexibility and combine them to make an index of flexibility-related policies.⁹ The specific practices are:

1. "flex-time," i.e., flexible starting or ending of work times, sometimes with core hours required;
2. part-time jobs;

⁷ Those economic or HR-administered benefits are more likely to make it easier to work additional hours rather than allowing employees to choose to change, adjust, or relocate their hours of work in a way that particularly benefits them (Bailyn 1993). This is most evident in examining benefits, such as emergency backup childcare, that are usually offered to highly paid professionals where employers can calculate the policies' cost-benefit ratio by comparing the billable hours of their employees when they are able to come to work vs. the hours when they have to stay home. These benefits are important to employees and employers, but I argue, along with Bailyn (1993) and others, that they fall into a different category. They are often cost items offered as incentives or benefits rather than ways of doing the work differently, rescheduling traditional hours, or allowing employees more flexibility and control. They tend to ease the difficulties of working long hours, not to reduce, reorganize, or relocate the hours worked and/or how the work is done.

⁸ These definitions were developed in part through my interviews with HR personnel in this industry and others. Few companies, particularly small ones, have extensive formal written policies on all these areas, or even one or two, but they do seem to cluster together, and at least some biotech firms had formal or informal examples of each policy in effect.

⁹ I also looked at the policies individually, but chose to present the findings as they are aggregated because of the small amount of data for individual policies. Individually, the most common practice is providing unpaid personal leave in addition to the FMLA, but that is completely optional. Most firms formally or informally allow employees to use their own paid sick leave for sick dependents. The others are more rare, as I show in Exhibit 5-4, Formal Work Family Practices.

3. telecommuting or “flex-place,” meaning all or part of the work week occurs at home;
4. job sharing, where one job is jointly performed by two or more persons;
5. compressed work weeks, where employees can compact total working hours into fewer days rather than the standard five days;
6. unpaid personal leave, in addition to the twelve weeks mandated by the Family and Medical Leave Act for the serious illness of a family member or self; and
7. whether employees are free to use their own sick leave to care for dependent children.

While it is unlikely that any one person would make use all of these policies, I sought to know whether employees at least believed they were being offered, whether formally through the firm’s HR department; through some sort of policy handbook, employee manual, or other documentation of rules and policies; or informally by general understanding or agreement with supervisors.

I argue that such flexible policies and practices, if usable, will engender higher levels of organizational commitment, satisfaction and well being. These policies can offer employees greater control of the pace, location, and timing of work, as well as greater flexibility on a day-to-day and year-round basis.

My first hypotheses concern the effect of formal written policies.

H-1a: Organizations’ formal policies supporting employees’ flexibility to manage work and family responsibilities will be positively related to employees’ organizational commitment.

H-1b: Organizations’ formal policies supporting employees’ flexibility to manage work and family responsibilities will be positively related to employees’ satisfaction.

H-1c: Organizations’ formal policies supporting employees’ flexibility to manage work and family responsibilities will be negatively related to employees’ stress levels.

The literature suggests that a company's informal culture is more important than formal policies in influencing and shaping employee behavior. For instance, Hochschild (1997) studied a *Fortune* 500 company with excellent formal policies on work-family. In fact, she found that firm's culture encouraged working long hours and putting in "face time" for professional workers as a sign of their commitment to the firm and to their work. The firm even encouraged overtime among hourly workers because it did not want to hire additional workers. Similarly, she and other scholars have documented the low ratio of utilization of work-family policies even when they do formally exist (e.g. Bailyn *et al.* 1996; MacDermid *et al.* 1999).

My second hypotheses therefore concern the existence of informal policies — those that are not found in the formal written policies of a company but which are permitted at an informal level, usually through managers' or supervisors' agreement. For instance, the company handbook might clearly say that sick leave can only be used when an employee is ill, but on occasion an employee's supervisor might also approve sick leave for an employee to care for an ill child. Similarly, some companies reserve the right to treat some employees better than others, granting them personal leaves beyond what is mandated or making flexible or part-time schedules available on a case-by-case basis. The work of Aryee, Luk and Stone (1998), for instance, showed that satisfaction with work schedule flexibility and supervisor work-family support were related both to organizational commitment and reduced intention to leave. This and many other studies suggest that supervisors can informally create or constrain work-family policies on a day-to-day basis, and thereby exert significant influence of the commitment, satisfaction, and well-being effects of such policies.

While some employee handbooks articulate this delegation of authority to managers, others are silent, and then company tradition and past practices rule. These are recognized in national labor law, so if a labor union wins an organizing drive and is certified as the exclusive representative of employees, the company is constrained from making unilateral changes either in its formal policies without negotiations, or its past practices or informal policies that have

become accepted workplace practice.¹⁰ My second set of hypotheses concerns these informal policies, or practices.

H-2a: Organizations' informal policies or practices supporting employees' flexibility to manage work and family responsibilities will be positively related to employees' organizational commitment.

H-2b: Organizations' informal policies or practices supporting employees' flexibility to manage work and family responsibilities will be positively related to employees' satisfaction.

H-2c: Organizations' informal policies or practices supporting employees' flexibility to manage work and family responsibilities will be negatively related to employees' stress levels.

Even informal policies may not be enough to create flexibility and thus influence employees' commitment, satisfaction, and well-being. Informal policies may not be applied consistently and employees may still fear that policy use will generate reprisals. For example, a study on part-time work showed that supervisors can apply policies inconsistently within their work groups or across them (Eaton and Bailyn 2000). On a day-to-day basis, many managers express ambivalence about whether to promote flexible policies even informally. Managers often express concerns about "everyone" wanting to make use of formal or any informal policies; they worry that this would put more control in the employees' hands and thus out of their hands. They often cite this concern as a reason not to permit a flexible schedule for an individual. This tendency among managers may well show up in the data as different views from employees of the same firm as to which work-family policies their employer offers.

¹⁰ While there are many cases that uphold this tradition on file at the National Labor Relations Board, the most famous one concerns a Thanksgiving Day turkey that an employer decided to withhold from employees after a successful union drive. My knowledge of this area of practical labor law comes from filing a number of successful complaints in this area.

I believe that flexible policies must be available, either formally or informally, to be used. In addition, the employee must feel free to use the policies without negative consequences for her or his career or other work-related rewards (Bailyn 1993; Rapoport, Bailyn *et al.* 1996). Even in the Xerox corporation, one of the nation's leading promoters of family-friendly policies, data from a recent study showed that only two salespersons in the entire company had succeeded in a job-sharing effort (Eaton 1996; see Bailyn *et al.* 1996 for summary of study).

My third set of hypotheses concerns employees' actual belief that they are free to use the policies that are either formally or informally in place. I call this concept "Perceived Usability," and I use it as a new way to understand whether flexibility policies, whether formal or informal, are meaningful to employees. If this concept is useful, it could be employed in future individual-level studies of work-family policies, particularly within firms.¹¹ The relevant hypotheses are:

H-3a: Organizational commitment will be most strongly related to employees' perceptions of whether they are actually "free to use" existing formal or informal flexibility-related policies of the organization without negative consequences for their work lives.

H-3b: Employee satisfaction will be most strongly related to employees' perceptions of whether they are actually "free to use" existing formal or informal flexibility-related policies of the organization without negative consequences for their work lives.

¹¹ It is more typical to use a simple measure of whether policies are part of an official posture of the company, often as evaluated by an HR manager, or are announced as informally existing in the culture. The measure I develop here takes the employees seriously as actors making choices, and tells us about their actual feeling of being able to take advantage of policies which do often require individual negotiation with individual supervisors, in many cases. Of course, employees could perceive that they are not free to use certain policies because they are not accessible enough, or that the policies themselves are inadequate. I hope that this measure will capture any such concerns. While this is not as often true of the "benefits" type of work-family policies, such as a pre-tax dependent care account, or a mandated leave for family illness or maternity, the qualitative research in Chapter 4 and from other sources show that flexibility-related policies nearly always require renegotiating traditional places, paces, or timing of work with an individual supervisor.

H-3c: Employee stress will be negatively related to employees' perceptions of whether they are actually free to use existing formal or informal flexibility-related policies without negative consequences for their work lives.

H-3d: Formal policy effects will be less than informal policy effects, which in turn will be less than effects of "feeling free" to use either formal or informal policies. This could also be expressed as $F < I < U$.

Next I explain variation in firm practices, formally, informally, and in terms of "perceived usability", and how I measured these three independent variables. Then I explain the indicators and measures of the key dependent variables, Organization Commitment, Satisfaction, and Well-being. I outline control and possible moderating variables, and I present and discuss the findings of the models.

Variation In Firm Practices

Differences among the seven firms whose employees I surveyed may provide insight into firm practices in general, and the biotech industry in particular. The seven potential formal work-family flexibility policies studied are detailed in Exhibit 5-2.

I found a large variation both in formal policies and in informal policies and practices among the firms. None of the firms permit all seven flexibility-related policies, and one, Octo, a start-up firm, has no formal policies. The others are mixed, with Quattro having only one policy and GeneCo having three and a half.

**Exhibit 5-2:
Companies' Formal Flexibility Policies**

Formal/Written Work-Family Policies							
Company	BioCo	ImmuCo	GeneCo	Quattro	Pente	Octo	Nente
size	62	48	107	753	20	35	10
Policy							
Flextime	Yes	No	yes, limited	no	no	no	yes
Job sharing	No	no	no	no	no	no	no
Flex place	no	limited	limited	no	no	no	yes
Compressed work week	no	no	yes*	no	no	no	no
Parental Lve. Beyond FMLA	no	no	no	no	no	no	no
Use sick days for kids	yes	yes	yes	yes	yes	no	no
Part time available	mixed	no	no	no	yes	no	no

* Required for some production workers, 1/3 of respondents

These results cast suspicion on national statistics on flexibility, in the sense that they have rarely been matched specifically with first-hand employee accounts or site-specific researcher documentation.¹² (See Bond *et al.* 1998 for an employee survey; see Osterman 1995 for a variety of benefits.) When asked, two-thirds of all firms say they offer flextime, half say they permit telecommuting, and so forth, according to a recent *USA Today* poll conducted by Hewitt Associates. The problem with most national statistics is that we do not know to whom these options are offered nor can we know how they are implemented in practice.

Researchers have found that firms adopting “high-performance work practices” are more likely to have work-family policies in place, at least in a national survey of representative establishments with more than 50 employees (Osterman 1995). These are mostly policies of the “benefits” type and the application is to the core or most numerous type of employees in a firm. Thirty-three firms that responded to a 1998 statewide survey by the Radcliffe Public Policy Institute and the Massachusetts Biotech Council reported great variation as well, from having virtually no policies to having extensive flexibility-related benefits (Radcliffe 1999). The present study avoids these problems through the use of matched organizational and individual level data, managers’ data collected at the work group level matched to responses from employees in those work groups.

In addition, I wanted to know whether employees felt free to use the policies if they needed them. Employees report through the survey reasons why they might not use such policies. The options were drawn from existing research that shows employees fear negative consequences to careers for taking time off for family reasons or drawing attention to their non-work interests and needs. A summary of survey responses is given below in Exhibit 5-3. Employees were asked to choose no more than two reasons why they had not used the policies.

¹² Another example is a report that “Eighty percent of employees who work for small companies say they have job flexibility, compared with 30 percent of corporate workers,” according to Linda Duxbury, a professor and researcher at Carleton University in Ottawa, Ontario (Amy Gage column, *St. Paul Pioneer Press*, 10/20/99).

Exhibit 5.3: Why Work-Family Policies/ Options Not Used			
	Men (n=200)	Women (n=240)	Total (n=440)
Do not need the policy	58%	51%	53%
Cannot use and also get work done	24%	27%	25%
Feel it might hurt future w/company	19%	25%	22%
Options do not interest me	22%	15%	18%
Not deemed appropriate for people in my situation	15%	18%	17%
Supervisor might disapprove	13%	15%	14%
Might put pressure on colleagues	12%	14%	13%

Some employees said in interviews that they do use a flexible schedule, informally, but do not view it as a flextime policy of the company. Rather, they might view it as an individually negotiated “perk.” After all, 62% of professional and technical employees surveyed in biotech said they could change the start and end times of their work, which is higher than those who said they used or even were aware of a flextime policy. So this response gives us a conservative view of the policies they believe they are free to use. Still, a clear majority of employees noted at least some culture-related reasons why they could not use the policies (excluding “don’t need it” and “am not interested in it.”). The most common responses were that it might hurt their future with the company, or that their current workload or work structure did not permit it. Women were more likely to cite these cultural or career-related reasons than men, though the gender differences are small.

OTHER FACTORS INFLUENCING EMPLOYEE OUTCOMES

The size, demography, and age of the firms could have something to do with the extent of work-family related policies reported by employees (including the age of its work force, and their tenure with the company), but my interviews led me to believe that no one of these structural factors was determinative. More important was the company's culture, according to the scientists interviewed. In one firm, the CEO believed that written HR policies, or policies in general, were bureaucratic and contributed to squelching scientific creativity, so the company made almost no rules regarding time off or flexibility, at least at its central level. In another case, a small firm had addressed flextime in its policy manual. The ability to use this policy was as follows:

Flextime is available, with the agreement of the supervisor, the department supervisor, and the human resources manager, only for 40-hour employees. Requests for flextime must be in writing, and must meet the requirements of business interests, convenience, and necessity. Once flextime has been negotiated and approved, the hours are considered fixed, and a minimum of six months must elapse before any change will be considered.

In the view of some employees, a more inflexible definition of flextime could hardly be crafted! However, in other companies flextime was allowed only informally, could be changed at any time or not allowed at all. In the least flexible company, no one was allowed to work nonstandard hours. The CEO even refused to allow an assistant to adjust her working hours by a half-hour a day so she could arrange her choice of childcare for her newborn infant. After her request to arrive at 7:30 AM and leave at 4:30 PM was denied, the assistant resigned to stay home. While formal and informal policies are important to measure, so is the perceived ability to use such policies according to employees.

MY STUDY

I describe the design, distribution, and response rate of my survey in Chapter 3. My original survey was 12 pages containing 105 items and 220 variables. It is attached as Appendix 1. Below I explain the scales I used to measure the dependent variables Organizational Commitment, Integrated Satisfaction, and Well-Being, and show their alpha reliabilities.¹³

Measuring the Independent Variables: Formal, Informal, and Usable Policies

A. *Formal Policies*

I measured formal policies from the employee's perspective by constructing an "Index of Formal W/F Policies," which includes seven areas of flexibility outlined above: flex time, job sharing, flex place (also called telecommuting), compressed work week, family leave beyond the legally required amount of FMLA time off, whether sick leave can be used to care for sick children, and whether part-time work was available. I could have used the official written records of the company, but I was concerned with the level of employee knowledge of whether the policy was formally available.

On each of these items, employees responded to four "Yes" or "No" questions: "Are these policies formally available?" was one of them. If the employee did not respond, I

¹³ The overall survey response rate was 44%, ranging from a low of 35% in the smallest and largest companies to 50 to 70% in the mid-sized companies. Those who responded were not significantly different from the total workforce in important demographic characteristics, although a slightly higher proportion of managers and professionals responded at GeneCo where the most manufacturing employees worked. The respondents were 56% female, and included 37% scientists, 27% other professionals, and 18% managers, with average age 37 and average tenure 4.7 years. The survey was administered in the seven companies over a total six-month period, but never for longer than four weeks in a single company. Only 29 respondents (6.3%) used the Internet version of the survey, and their responses were integrated with the other data produced by handwritten responses.

counted the policy as not available formally.¹⁴ I constructed the index by adding up the seven individual "yes" (1) or "no" (0) responses on the separate policies, so that each individual was associated with a score on "formal policies" as she or he saw them, from 0 to 7. The mean score on "formal" policies was 2.24 (st.dev.=1.66) for the 461 respondents, which seems to fit with the policies listed in Exhibit 5-2.

B. Informal Policies

I wanted to measure whether the same set of policies were available at an informal level, meaning not necessarily a written or stated formal part of the employment contract, but "worked out" or "permissible" from the employee's perspective. I piloted this question specifically with eight biotechnology professionals, and the employees had no problem understanding the question's meaning. The survey takers understood that a policy might either be available both formally and informally, or just one or the other. Surveyed employees were asked to circle "yes" or "no" as to whether the policy was available informally. I repeated the adding process for informal policies, using the same seven flexibility indicators as in the previous paragraph. The mean score on the Informal Index of work-family policies was 3.10 (st.dev.=2.47), which is higher than for formal policies.

I find this reasonable in terms of face validity, since it is likely that more employees perceive the existence of at least some flexibility-related benefits in their own informal work setting, even if they are not part of formal company policy (this might include using sick leave for sick children, for example, or an informal agreement, between an employee and a supervisor, for flexible hours). It is also sensible that the standard deviation is greater, since

¹⁴ My logic for labeling missing data as indicating the policy was "not available" in these measures only is that many individuals told me they did not know about the availability of particular policies. I told them to leave it blank if they did not know. From my perspective, that individual does not know that the policy "is" available, so they should be counted as saying it is not available, at least to their knowledge at the time of the survey. While this is a conservative interpretation and undoubtedly lowers the overall scores of the companies, I required an affirmative sign that policies were available.

informal policies would be more likely to be experienced in a broad variety of ways, even within the same company, so there is more variation for each measured policy.

C. Usable Policies: Developing and Measuring “Perceived Availability”

The third key independent variable of interest in this chapter is an index compiled of seven items, with three contributing items to each of the seven. I call this variable “Perceived Availability of Work-Family Policies” (USABLE). It is constructed to measure carefully not only whether work-family policies exist in the organization (whether formally or informally, a distinction which many researchers do not make), but whether individual employees feel free to use them. I am most interested in whether this variable makes a systematic difference in outcomes of commitment, satisfaction, and stress, controlling for other factors.

This is important because of extensive prior research indicating that even when generous or extensive work-family policies exist on paper, many employees are reluctant or unable to use them. This may be either because of a real concern for negative impact on their careers (Bailyn *et al.* 1996; Hochschild 1997; Bailyn 1993), or because they have to negotiate individually with their supervisors and are unable to use the policies as they wish. (The responses summarized in Exhibit 5-3 above suggest that many people who need the policies feel they cannot use them, either because they are concerned about career impact, they do not want to burden their coworkers, or someone at work has defined the benefits as “not appropriate” to their situation.) One-quarter of employees answered that they cannot complete all their work if they do take advantage of the policies, which suggests a problem with the policies in the context of the employees’ workload, apparently in such a way that workers do not feel free to use them.

So the variable USABLE is constructed from the combined responses of employees to the question of whether their employer offers any of seven flexibility-related benefits (flex time, job sharing, flex place or telecommuting, compressed work weeks, parental leave beyond FMLA requirements, using sick leave for dependents' illnesses, or working part-time). If the employer offers from one to seven benefits, whether formally or informally, do the employees feel free to use those benefits? The employee must respond that the employer offers the benefit(s), and that they feel free to use the benefit(s), before the employee is included on the scale of positive responses. So the range of the scale, like the others, is 0 to 7.¹⁵

The overall average USABLE score on a scale of 7 was 1.46 (st.dev.=1.52), with 461 responses. Managers were more likely to give firms high scores ($p < .05$), while no other demographic characteristics were significantly associated with USABLE. This is reasonable, again on its face value, because managers probably feel more free than non-managers to use the policies and to control their schedules. A list of the firms with their mean scores is found in Exhibit 5-4, in order of increasing perceived flexibility (note that the smallest three firms, all with fewer than 20 employees, have been grouped together as "Small Companies").

¹⁵ Another way to measure the combination of having access to policies and feeling free to use them would be to construct an interaction term, combining "formal policies" and "feel free." I did construct interaction terms, not just for the entire sample but for all five family groupings and constructed models using each of them. The interactions for the entire sample are significant mainly for Satisfaction, marginally for Commitment, and not at all for Well Being. This shows in a different way that having formal policies is insufficient if people don't feel free to use them, but this matters most for satisfaction. Looking at the family sub-groups in predicting commitment, only one becomes marginally significant (single no kids * PERC), but PERC continues significant with these used as controls, except for Dual Income No Kids. These were all two-tailed t-tests with listwise deletion. The highest r-squared statistic was for married parents with children, at 0.081. There were no new effects with Integrated Satisfaction. I also completed separate estimates dividing the group between those who "feel free" to use policies and those who do not, and discovered that for those who do not feel free, income and years of service were more important to their commitment levels, while for those who do feel free, working for a small company (negative) and having children (positive) were the more important elements, along with control in both cases. Again, there is no effect for formal or informal work-family policies in the absence of the perceived ability to use them, which supports my interpretation above. And for those who can use them, having children contributes positively to organizational attachment, more than income or tenure.

Exhibit 5.4: Mean Scores of Companies on Work-Family Policies			
Company	Formal	Informal	Perceived Usability
Small companies (n=26)	1.54	2.42	1.12
ImmuCo (n=36)	1.50	2.81	1.28
Quattro (n=311)	2.34	3.18	1.47
BioCo (n=37)	1.84	3.24	1.59
GeneCo (n=51)	2.80	3.00	1.63
All Companies, Average	2.24	3.10	1.46

**Measuring the Dependent Variables :
Organizational Commitment, Satisfaction, and Well-Being**

Since one aspect of organizational commitment is a primary outcome of interest in this chapter, and extensive scholarship exists about this construct, I explain its development as a construct, and the use of different scales as well as behavioral and attitudinal outcomes to which organizational commitment is most related.

Organizational Commitment: Theoretical Background

The study of organizational commitment (OC) has been a major research concern in organizational sociology, industrial psychology, and management and industrial relations since the early 1970s (Gray 1989), particularly beginning with Mowday, Porter and Steers' (1982) work in the mid to late-1970s. They defined organizational commitment as:

.... the relative strength of an individual's identification with and involvement in a particular organization. Conceptually, it can be characterized by at least three factors: a) a strong belief in and acceptance of the organization's goals and values; b) a willingness to exert considerable effort on behalf of the organization; and c) a strong desire to maintain membership in the organization. (p. 27)

This definition suggests that OC is a multidimensional construct, and further research has supported this argument, identifying three principal dimensions of OC: (1) affective or value commitment, an attitudinal dimension that describes the employees' links to the organization in an emotional sense; (2) willingness to exert effort on behalf of the organization, which is closely linked to affective commitment (Kalleberg and Mastekaasa 1994); and (3) attachment or intention to stay (also called "continuance commitment") that is identified with Becker's 1960 side-bet theory and has a more negative connotation than the other two. "Continuance commitment" can be seen as a measure of whether an employee feels compelled to stay, either because of a lack of other options, or a too-great investment in employer-specific benefits (Meyer, Allen and Smith 1989; Meyer and Allen 1997; Kalleberg and Mastekaasa 1994). Continuance commitment is associated negatively with performance, unlike the other two major dimensions of organizational commitment identified through a meta-review (Meyer and Allen 1997).

These three dimensions of commitment are highly interrelated, but as continuance commitment is distinguishable in its effect on performance, so I measure it separately with a two-item scale indicating whether the employee feels it would be difficult to find a comparable job (Marsden, Kalleberg and Cook 1993). (I make a different choice than Kalleberg and Mastekaasa (1994) because continuance commitment is not my main concern here; I am interested in commitment which has been found to have positive outcomes for both employees and firms.)

Affective commitment and normative commitment are associated with longer-term tenure, something that organizations generally wish to encourage, at least those where any firm-specific training and tacit knowledge are involved. These two, while differing slightly (normative commitment implies a belief that staying with the organization is the "right thing" to do, while affective commitment is associated with feelings of loyalty and a positive identity

with the firm and its values, and is the most positively correlated with performance), are closely related, and I focus on affective commitment in this chapter.¹⁶

Scholars' and practitioners' interest in organizational commitment is heightened because it seems to be a mediating employee attitude associated with positive empirical outcomes for the organization. One related aspect is almost true by definition: those employees who are more committed to a particular organization are less likely to leave it voluntarily for another job (Mowday, Porter and Steers 1982). So, higher organizational commitment is associated with reduced turnover, thus saving high replacement and training costs (depending on the level of the employee being replaced, these costs can amount to 95% of a year's salary, particularly when considering tacit knowledge which is not easily replaced). In addition, higher organizational commitment is associated with positive, desired behavior in employees, including higher levels of organizational citizenship behavior (OCB), reduced absenteeism (Meyer and Allen 1997), and more positive attitudes toward coworkers and supervisors.

Even more important to managers, organizational commitment seems to be positively related to performance for professionals, as well as for blue-collar employees (Meyer, Allen, and Smith 1993). In some cases researchers have emphasized the performance-related value of commitment to a supervisor as well as to an organization. While the evidence is not conclusive, and most researchers agree that performance is influenced by many other considerations (see Hackman 1990, Hackman and Oldham 1980, and Zajonc 1965), organizational commitment is clearly one factor in overall performance for many employees in contexts where loyalty and extra effort matters, such as small, insecure firms trying to retain scientists and professionals.

¹⁶ Other scholars who have made the same choice include Lincoln and Kalleberg (1996). For me, affective commitment was the most important indicator of a positive outcome which might be associated with longer intent to stay in a cutting-edge, insecure industry where employers do not want scientists to leave in short-term fashion, but want to keep them as long as the current or other projects they can adapt their skills to are alive.

Measuring Organizational Commitment

The organization commitment scale is drawn from Lincoln and Kalleberg (1990). It is a five-item scale that is a subset of items developed by Mowday, Steers and Porter (1979). Applied to our data set, the alpha is 0.62. Although a higher alpha is desirable, this level is acceptable.¹⁷ The items are listed in Exhibit 5-5:

Exhibit 5 -5: Organization Commitment Scale: (n = 453)

EFFORT: I am willing to work harder than I have to to help this organization succeed.

LOYALTY: I feel very little loyalty to this organization (reverse coded).

NOMISTAK: I made a mistake working for this organization (reversed)

AGREE: I often disagree with this company's policies concerning employees (reverse coded)

MOREPAY: I would turn down another job for more money to stay with this organization.

Intercorrelation (alpha) for Commitment Scale =0.62

Mean = 3.663 (s.d .658), n = 453

Notes:

Response categories for each item: 1=Strongly Disagree to 5=Strongly agree

Source: Lincoln and Kalleberg 1990, originally from Mowday, Porter and Steers, 1982, Organizational Commitment Questionnaire)

¹⁷ These items no longer accurately reflect the context of the professional workforce. For instance, one of the questions states, "I would turn down another job for more money to stay with this organization." While the item might have measured organizational commitment some years ago, it is not a popular answer in our sample as many respondents disagreed, while agreeing on the other commitment items.

My decision to use a single scale to measure OC was supported by a factor analysis of the five OC items below, which produced only one factor with an Eigenvalue in excess of 1.0 (Kalleberg and Mastakaasa 1994; Lincoln and Kalleberg 1990; Marsden, Kalleberg and Cook 1993). The responses were measured with a five-point Likert-type scale. Three items were reverse-scored so that higher scores accurately indicate higher commitment. Question 1 is designed to measure willingness to exert extra effort for the organization, Questions 2 and 3 are designed to measure loyalty to the firm, Question 4 to measure identification with the organization's values, and Question 5 to measure the strength of a person's attachment to the organization.

Exhibit 5-5 above presents details on my measures of OC, as well as means and standard deviations. The answers that indicated agreement with these specific elements were added, and I created a mean "commitment" score for each employee based on the average of his or her five responses.¹⁸ The mean commitment index score was 3.67 on a scale of 5, which is close to the mean from other samples. Kalleberg and Mastekaasa (1994) found the mean U.S. commitment score was 2.78 on a scale of 4, slightly lower when adjusted for my 5-point scale than my finding. Norwegian employees' commitment, as measured by similar questions, was slightly higher, at 3.09 on a scale of 4 (*Ibid.*). In a principal component factor analysis of the five items, only one Eigenvalue emerged with a value > 1.¹⁹

¹⁸ Where the employee answered four of the items, I averaged the responses to impute the answer to the fifth; where s/he did not answer at least four, I discarded the data.

¹⁹ Factor loadings for the Commitment scale were as follows: AgreeCo=0.68, Loyal=0.66, NoMistak=0.66, Effort=0.49, and MorePay=0.67.

Integrated Satisfaction: Constructing a New Measure

Thousands of studies have been conducted in the effort to measure and understand the construct of job satisfaction, and hundreds more have been conducted to look at other aspects of satisfaction, including "global" satisfaction and satisfaction with home and family life. (For an excellent overview of these various studies and measures, see Spector 1997.)

I chose to create a new measure that does not focus solely on job satisfaction nor only on family satisfaction (although I measured and tested each of these separately, results not shown). Rather, my new measure includes four factors. One is a combination of two items to measure satisfaction with "work-family balance," or the ability to manage both work and family responsibilities satisfactorily. I added one measure of work-family "integration," or the possibility of complementary, synergizing experiences with work and non-work experience. (See Barnett *et al.* 1999 for a review and summary of the ways in which work and family have been assumed to be in conflict, and how they can better be seen as related to each other in complex ways which may be conflicted or may be synergistic; see also Bailyn 1993.) I also used a measure of work satisfaction and one of family satisfaction.

The satisfaction measure is scaled in several ways. First, to ensure that I consider work satisfaction and family satisfaction as distinct, a general satisfaction item for each is included. I did not include more specifics (such as satisfaction with salary, benefits, etc.) since breaking out individual elements of satisfaction for each person was not my concern in this study. Second, I constructed a new measure of "integrated satisfaction" which includes four items: satisfaction with (a) job, (b) family, (c) work-family balance (measured two ways, and averaged) and (d) "integration," an additional item dealing explicitly with satisfaction with the way that work and family responsibilities complement each other. This last suggests that people do not have to artificially separate work and family unless that is their choice; I am asking them about their satisfaction with their own desired level of "integration," whatever that might be. I created a four-item scale to measure INTEGSAT, or Integrated Satisfaction. The

items are listed below in Exhibit 5-6. The alpha for all items is .63. A factor analysis of these four items shows only one factor with an Eigenvalue above 1 ($E = 1.958$).²⁰

Exhibit 5-6: Measuring Integrated Satisfaction (INTEGSAT)

Most generally, at this time, how satisfied are you with the following aspects of your life? (1=Not Very Satisfied to 5 =Very Satisfied)

1) Job

2) Family²¹

3) W-F Balance Variable (*computed by averaging results of the following two responses:*

****** How satisfied are you with the following aspect of your life?

• Balance of work and non-work in your life

****** "I am satisfied with the way my work and family responsibilities complement each other." – also on a 1- 5 scale

4) Work-Family Integration:

My job lets me integrate work and personal life.

(1=Strongly disagree to 5=Strongly agree)

Reliability coefficient (alpha)= .63, n = 435.

Averaged 4 responses to obtain :

Integrated Satisfaction = an index of the 4 items listed above:

Mean of Integrated Satisfaction = 3.56 on a scale of 5 (s.d. .692)

²⁰ The factor loadings are as follows: Job Sat: .67, Integration.56., family .67, balance .86.

²¹ I recognize that general satisfaction with "family" is a broad characterization, and that it may capture both momentary happiness or dissatisfaction, as well as dispositional factors. However, this is also true for measuring job satisfaction. I am not principally concerned with family satisfaction here, but I do not wish to restrict my analysis only to the workplace, since the essence of this study is about the interaction between the two realms. Thus I find it important to include this measure, despite its limitations. More exact measurement would improve the analysis or future studies.

Employee Well-Being and Its Relationship to Stress

Employee well-being is nearly always a desired outcome, both in terms of workplace harmony and a positive working atmosphere, and in humanitarian terms. Psychologists measure well-being in complex ways, which I was unable to do in this brief workplace-based survey. However, I did want to explore whether a relationship existed between work-family practices and the employee's well-being at an individual level. I chose to measure well-being as the lack of stress, as reported by a series of physical symptoms.

One of the goals of work-family programs is to improve employees' health and well-being both at work and at home, by use of flexible work scheduling and benefits which enable them to feel confident in both their work and family settings. Interestingly, not long ago scholars used to measure men's well-being by how well they were doing at work and women's by their satisfaction with their home and family lives. However, recent research has shown that both men and women benefit from having multiple roles in life, including a strong family or home role and a strong work role (e.g. Barnett and Rivers 1996). In fact, these authors find that men's psychological health is better predicted by their family situation than their work situation, and that both men and women do better with multiple role commitments. In general, women who work are better off than women who don't work, both financially and psychologically, since positive experiences at work can buffer stress at home and vice versa. Other researchers have also looked at measures of work-family stress in particular and found that those who approached these issues synergistically rather than conflictually (usually women) were less likely to experience stress (Andrews and Bailyn 1993).

Past research has also discovered differences between women and men concerning stress, particularly related to work-family roles and their salience. Barnett and her colleagues (Barnett *et al.* 1995) show that contrary to sex role socialization theory or the social role hypothesis, men and women relate similarly to job-related stress. However, for women the effect of marital disruption on their distress status is greater than for men, perhaps because women still bear a disproportionate feeling of responsibility for family matters. In my study,

where I am trying to measure overall levels of stress after having researched specifically the domains of work and family, I also hypothesize that sex will play a role in stress levels. In part I draw this hypothesis from prior research and in part from my own qualitative interviews, in which a pattern became clear: more women were experiencing increased overall workloads due to lower levels of support at home than existed among men.

While there are many ways to measure well-being, I chose a compromise between rigorous psychometric testing and a simple set of questions about being "stressed out" since we know from previous research (e.g., Robinson and Godbey 1997) that many people report feeling stressed in their daily lives and that does not necessarily correlate with physical or psychological harm. In fact, some people depend on stress as a motivator to help them accomplish their work. Because I had no way of differentiating between stress-affirmative and stress-negative people, I tried to discern the effects of stress itself that had negative consequences for individuals. I was particularly interested in knowing if the stress had made itself felt in physical symptoms that were disrupting people's lives at work and at home. Future researchers could use more complex scales to test my results. I determined that reporting an absence of physical symptoms of stress would be a reasonable way to determine well-being, which would allow for the inclusion on the positive side of those who enjoy stress, rather than trying to measure stress directly and discern whether they liked it or not.

Measuring Well-Being

To measure well-being, or the absence of stress, I used a series of six physical measure questions previously tested in psychological and industrial relations scales (drawn from Lincoln and Kalleberg 1990; these items also matched six of the 24 items used in a psychological stress scale used by Barnett *et al.* 1999). The items asked for the frequency at which the employee experienced various physical symptoms ranging from headaches to depression. A factor analysis (principal component analysis) of the six items yielded only one factor with an

Eigenvalue over 1 (Eigenvalue = 2.61, explaining 44% of variance), so it was appropriate to combine them into one overall scale (see Exhibit 5-7 below).

Respondents could answer on a four-point Likert-type scale, answering for each symptom “never”, “rarely,” and “sometimes” to “often.” I created a new stress index by combining the “never” and “rarely” indicators on all six items to indicate a lack of stress (0), while an answer of “sometimes” or “often” indicated the presence of stress for each item (1). Each person received a “0” or “1” on each individual symptom. Then I added the responses for all six items, so that each individual had a combined stress “score” between 0 and 6. Where a respondent answered five of six questions, I imputed his or her answer to the missing item as the average of the five previous responses; where respondents answered four or fewer, I coded them as missing (final n = 450). The means, component matrix for factor loadings, and the six items are listed below in Exhibit 5-7. The alpha reliability of this stress scale is acceptable at 0.74. Then I reversed them to create a Well-Being index.

Exhibit 5-7: Stress Index – Symptoms (n = 450)		
	Principal Component Matrix	Means (s.d.)
Headaches	0.540	2.62 (.89)
Upset Stomach	0.635	2.33 (.88)
Trouble Sleeping	0.654	2.56 (.97)
Feel Tired Most of Day	0.655	2.76 (.78)
Feel Nervous, Fidgety, or Tense	0.725	2.32 (.85)
Feel Depressed or Blue Most of the Day	0.730	2.09 (.81)
Cronbach’s alpha:	0.74	
Stress Index		2.78 (1.74)
Well Being Index: = 7 - Stress Index:		4.22 (1.74)

Note that I constructed the Well-Being index by subtracting the Stress Index from 7. Thus, a high score on the Well-Being index (1 to 7) indicates positive well-being, with 1 being the lowest level (and highest stress level, at 6) and 7 being the highest level of well-being (and lowest stress level, at 0). On the well-being index, the companies are scattered around the middle of the range of well-being. See Exhibit 5-8, Well-Being Index by Company, below.

Exhibit 5-8: Well-Being Index by Company		
	<i>Well-being (on a scale of 1 to 7)</i>	
<i>Company</i>	Mean	(std. dev.)
BioCo	4.24	(1.83)
ImmuCo	4.33	(1.84)
GeneCo	4.56	(1.59)
Quattro	4.16	(1.76)
Small Cos	4.07	(1.52)
Total	4.22	(1.74)

Correlations between the key dependent and independent variables are included in Exhibit 5-9.

**Exhibit 5-9:
Dependent and Independent Variables and Their Correlations**

	Org Comm	Int Sat	Stress	Formal W/F	Informal W/F	Perc Usable (PERC)
Organizational Commitment	1.000					
Integrated Satisfaction	.403**	1.000				
Stress	-0.092	-.362**	1.000			
Formal W/F practices	0.086	0.069	0.045	1.000		
Informal W/F practices	0.062	0.058	0.052	.314**	1.000	
Perceived Usability USABLE	.124**	.173**	-0.021	.241**	.473**	1.000

- *** t-test for each item is significant at $p < .001$
- ** t-test for each item is significant at $p < .01$
- * t-test for item is significant at $p < .05$ (2-tailed tests)
- ~ t-test for item is significant at $p < .10$

Commitment and Job Satisfaction: Their Relationship

Organizational commitment is related to job satisfaction, but it is a different concept. Job satisfaction in particular has a long history of debated measurement and has been found in general not to have a direct causal link to performance, although it may still be a desired outcome at work. Some even suggest that a causal direction works from performance to satisfaction (Hackman 1997). As Lincoln and Kalleberg (1996) note, “unlike, for example, job satisfaction, OC is a work attitude complex having an obvious bearing on employee participation and performance” (p. 40). Organizational commitment is associated with better performance more frequently than is satisfaction and at times when satisfaction is not found to be relevant to performance (Meyer *et al.* 1989). Of course, commitment to the organization has other implications as well; for example, some scholars have found it to be related to expectation of promotion (Gunz and Gunz 1994). Satisfaction has other implications in terms of general health and well-being for employees. Satisfaction is more strongly positively related to well-being, for example, than is commitment. That is why I measure separately the levels of employee commitment and satisfaction.

Control Variables

A number of factors might contribute to employees' levels of organizational commitment, according to previous studies: length of service, work experiences in a particular firm, satisfaction with the job's intrinsic aspects, supervisory relationships, co-worker relations, and educational level, as well as the psychological predisposition to have committed relationships at all.²²

²² Psychological traits-- Aside from stress levels and the importance of work to the person (work identity), I am unable to measure directly and independently any psychological traits in this survey, so these factors are pooled in with other results. This is also true of many other organizational researchers with a background in sociology and organizational behavior rather than clinical psychology (Marsden, Kalleberg and Cook 1993). Those with concerns about dispositional tendencies to evidence commitment can consult the psychological literature, which does not generally find large effects on this specific type of organizational commitment.

Given my concerns, four levels of potential control variables are included in the analysis: individual, home, job, and firm. The need for work-family policies is related to demands at home and the kind of concerns an employee has. If someone does not have children, for instance, he or she is less likely to know, or indeed to care, whether he or she can take their sick leave to care for children, unless the employee is frequently responsible for nieces, nephews, or other children.²³ Also, a family with higher total income might feel less pressure than one with lower income to use or even know about policies such as family and medical leave beyond the period of that required by law (90 days), as the family may be able to afford quality child care or even a full-time caregiver in the home, such as an *au pair* or a nanny.

So one set of potential variables that might make a difference as to whether work-family policies contribute to higher organizational commitment, more satisfaction, or less stress involves the family circumstances: household income, and whether the employee has children or not. I have controlled for income and the presence of children. I also tested the equations with a control for marriage and found no significant effects. This confirmed my own observation that marriage itself was not determinative in satisfaction or well-being. Some married people have more support at home; other married people find marriage actually generates more responsibility than support.²⁴ The interesting effects are for different family groups, which are more complicated than “married” or “not married.” In general, as family

²³ Although eldercare responsibilities could also enter into the value of work-family policies for employees, relatively few employees currently have eldercare responsibilities (13%), and those who do generally spent less than one hour a week on them. So I did not include this as a moderating variable.

²⁴ Nearly two-thirds, or 62% of respondents, are married. Adding marital status as a control did not change the r-squared or any of the other betas or their significance levels. It has no effect. The only time family status matters in estimating commitment is for married persons with children, when marriage and children are omitted as separate predictors. Estimates are available from the author on request.

groups have greater need for flexible policies, USABLE becomes more relevant. Exhibit 5-10 shows the means for the various groups on each of the three dependent variables and also for USABLE and CONTROL

Characteristics of the individual employee also might make a difference in whether work-family policies were important in their feelings about work and their overall satisfaction or stress levels. Gender has been shown in many other research studies to be an important factor in the amount of housework done. Schor (1991) estimates that women on average perform up to a month's more full time work per year, and other studies have also shown women generally having more dependent care responsibility. Although men's hours on housework and childcare are increasing and women's are decreasing, men's total hours are still substantially below women's on average. So I included the employee's gender as a potential control factor, even though gender is also a major variable of analytic interest to me. I also do a separate analysis by gender and family status, below. (The main gender analysis is discussed in Chapter 6). I also included a measure of the employee's education, which is often associated with higher job status and therefore greater ability to schedule one's own time. This might lead to less need of work-family flexibility policies. Finally, given the possibility that older employees might have fewer choices of employment and also have more positive commitment, I included an "age" control.

It is also possible that the structural demands (and prerogatives) of the person's work or job influence his or her relationship to work-family policies, as well as to the company. So I included a dummy variable for managerial status, since managers are often found to have higher organizational commitment, and might also have more ability to construct their own

Exhibit 5-10
Means of Family Groups

<u>FAMILY STATUS</u>	<u>CONTROL</u>	<u>USABLE</u>	<u>Commitment</u>	<u>Int Satis.</u>	<u>Well-Being</u>
Sing Parent	3.63	1.06	3.78	3.3	3.33
Sing No Kids	3.76	1.48	3.61	3.47	4.09
Marr No Kids	3.74	1.4	3.59	3.57	4.17
Marr, K, Support	3.99	1.59	3.77	3.6	4.64
Marr, 2 Jobs, Kids	3.79	1.59	3.72	3.56	4.16

Note: Married includes living with partner

schedules without need of formal or informal policies, given that they are “in charge” of their staff and presumably themselves.

Organizational experience was taken into consideration, since it might influence the ability to perceive work-family policies as usable as well as directly influence (usually positively) a person’s organizational commitment. I would expect longer tenure in the organization to be related to higher organizational commitment, if nothing else than from “sunk costs” and perhaps benefits that are tied to the organization itself. Thus I added a control variable called “Years of Service,” which measures organizational tenure. The employee’s organizational level has been accounted for, in most cases, between the education measure and the manager dummy variable. Interestingly, age and organizational experience do not duplicate each others’ effects.

In thinking about what company variables are important, the companies all operate in the same sector and are located in the same general geographic area. The major difference in the companies in this survey is their size. Basically, they divided into two groups: small (less than 250 employees) and large (one company with 3000 employees). Small companies tend to generate lower commitment than large companies (Kalleberg and Reve 1993) so I included a “small company” dummy variable, to see if that alone was a factor in predicting these outcomes.²⁵

I checked all these variables (small companies, years of service, having children, gender, etc.) for correlations to each other, and none are highly correlated (see Exhibit 5-11).

²⁵ A related variable to include for companies might have been whether employees felt they were “likely to lose their jobs” for reasons not of their choosing in the next year or two. I did test this predictor, which is highly correlated with “small company,” and not surprisingly, found it contributed negatively to well-being (-0.126) and to satisfaction (-0.161) and commitment (-0.210). This could be substituted for small company, but to include both in the estimate would create problems of collinearity. I also substituted a company dummy variable, but found no significant differences in results from those I report here.

**Exhibit 5-11:
Correlations Between
Control Variables**

	Age	Education	Female	Have Children	Hsehold Inc	Yrs Service	Mgr Dummy	Small Co	Control/Time
Age	1.000								
Education	.150**	1.000							
Female	-.126 **	-0.070	1.000						
Have Children	.445***	.082~	-.143**	1.000					
Hsehold Inc	.369***	.346***	-0.016	.247***	1.000				
Yrs Service	.324***	0.119	-0.024	.178***	.224***	1.000			
Mgr Dummy	.277***	.156***	-.107*	.183***	.277***	.210***	1.000		
Small Co.	.180***	0.026	-0.063	.168***	-0.03	.137**	0.159***	1.000	
Control/Time	.082~	.133**	-0.039	0.048	.106*	0.078	0.044	0.046	1.000

*** t-test for each item is significant at p<.001

** t-test for each item is significant at p< .01

* t-test for item is significant at p<.05

~ t-test for item is significant at p<.10

2-tailed tests

Pearson's Correlation Coefficient

Potential Moderating Variable: Control

Finally, one other variable seemed important to test as a potential moderating variable. Much research on work and workers, at least since the time of Marx, has focused on the importance for employees of controlling their environment. The most alienated workers are typically those who have no discretion and make no decisions at work, but have their every motion scripted for them, as in the famous recommendations of Frederick Taylor. White collar jobs have been held to be better than blue collar jobs because they often are seen as offering employees more control of their day-to-day environment, as well as more pleasant physical settings and the chance not to be paced by an assembly line. In fact, sociologists and economists write with concern about the "proletarianization" of white-collar jobs, meaning their tendency to become more repetitive and less subject to the individual's control (see e.g., Braverman 1974; Osterman 1984; Stinchcombe 1965; Garson 1978 who pay specific attention to low-status women's jobs).

The key potential moderating factor I wanted to test in the biotech industry is theoretically related to employees' satisfaction and well-being, as well as to their work-family concerns. It is CONTROL, particularly control over time, pace, and the scheduling and organization of work. I drew up a series of three survey questions about personal influence or control over the "location and pacing" of work, the "pace or speed" at which the employee worked, and "deciding when to take breaks," since even this last is important for parents who want to check in with a child coming home from school, etc. I created an index of "Control-Time/Flex" that averaged the results of the three responses, having not to do with the content or tasks of work, or even the tools, but specifically the scheduling, pacing, timing and location

(Cronbach's alpha for the scale = .68).²⁶ This variable is related positively to the perceived usability of work-family policies, as well and might overlap in its influence on the three outcomes I investigated (refer back to Exhibit 5-9). Being able to use work-family flexibility should give employees a greater sense of control over the timing, pacing, and location of work. Of course, control might also influence their perception of being able to use work-family policies, which raises a question of influence direction I cannot answer definitely with these data. But much of my interview and observation data suggest that being able to choose flexible arrangements does give employees a greater sense of control, even those who are in similar jobs and so have the same technical requirements for work.

Factors that might influence stress include the same moderators I have discussed in looking at the other outcomes: individual-level influences could include sex, education, age, and length of service. Job level influences could include control at work (particularly over scheduling and pace issues) and whether one is a manager (which is often found to increase stress because of more responsibilities). Firm-level influences could be a company's small size (which is often a proxy for insecure status; see the Radcliffe 1999 biotechnology report). While relationships with co-workers undoubtedly contribute to stress to a greater or lesser degree depending on job situation, I did not measure those for this study, since they were not a research target.

The coding procedures I followed with these variables and their measures are presented in Exhibit 5-12 below. The descriptive data concerning the control variables is shown in Exhibit 5-13 below. Correlations between the control variables are shown in Exhibit 5-14 below.

²⁶ Factor loadings for this scale are: control over locale and time of work: 0.79; control over pace of work: 0.81; and control over breaks: 0.74. There is one Eigenvalue over 1: it is 1.8, accounting for 63% of variance.

Exhibit 5-12: Measures of Control and Moderating Variables

<u>Education:</u>	measured from 0 to 5, with less than HS =0, HS degree = 1, Associates degree = 2, Four year college degree = 3, Master's degree = 4, and Doctoral degree + = 5
<u>Age :</u>	measured in years
<u>Female person:</u>	0 = male, 1 = female
<u>Manager:</u>	0 = non-manager, 1 = manager
<u>Household Income:</u>	1= less than \$20K, 2 = \$20 - 39,999K, 3 = \$40 -49,999K, 4 = \$50 - 74,999K, 5= \$75 - 99,999K, 6 = \$100-149,999K, 7 = \$150K +
<u>Years of Service:</u>	measured in years
<u>Small Company:</u>	0 = large company, 1 = small company
<u>Have Children:</u>	0 = no children, 1 = have children
<u>Control:</u>	1 = no influence, 5 = complete control of time/flex/pace of work

Exhibit 5-13
Descriptive Information on
Control/Moderating Variables

Control Variables	No. Responses	Mean	Std. Dev	Min.	Max
Age	449	36.6	8.34	19 yrs	68 yrs
Education	450	3.18 (college+)	1.24	Less than HS	Doctoral+
Sex/Female	453	0.56	0.5	Male= 0	Female = 1
Have Children	461	0.52	0.5	No = 0	Yes = 1
Household Income	439	4.94 (\$70K)	1.47	Less than \$20K=1	More than \$200K = 8
Yrs. Service	446	4.7	3.39	0	16
Manager Dummy	460	0.18	0.39	Non-Mgr=0	Manager=1
Small Co.	461	0.33	0.47	Large = 0	Small = 1
Control-- of Time, Pace, Flexibility	452	3.81	0.8	No Control 1	Total Control 5

Exhibit 5-14
Key Variables and Correlations with Moderating Variable

	Org Comm	Int Sat	Well-being	Stress	Formal W/F	Informal W/F	Perc Usable Control (PERC)	
Organizational Commitment	1.000							
Integrated Satisfaction	.403**	1.000						
Well-Being	0.092	.362***	1.000					
Stress	-0.092	-.362**	-1.000	1.000				
Formal W/F practices	0.086	0.069	-0.045	0.045	1.000			
Informal W/F practices	0.062	0.058	-0.052	0.052	.314**	1.000		
Perceived Usability (USABLE)	.124**	.173**	0.021	-0.021	.241**	.473**	1.000	
Control/ Time-Flex	.145***	.290***	.159***	-.159***	0.065	.101*	.191***	1.000

Additional Considerations: Household Status

Before I present the results of the Ordinary Least Squares (OLS) regression analyses, I consider household status specifically with respect to the dependent and independent variables. While some might argue that flexibility benefits all workers regardless of family status, it seems logical that some employees might value and need such flexibility more, at particular times in their lives especially. Although I found in my analyses that marital status made no difference to the outcomes, and I controlled for the presence of children, I looked separately at five distinct household groupings and their relationships to the outcomes of interest.

First I considered single people, with and without children. We might expect that single parents (SPWK) would have a greater need of and interest in flexibility, but at the same time, they might be more concerned about not appearing to be unreliable or to need special consideration. Single people without children (SINK) might be expected to be most flexible in their outside commitments, almost at an opposite extreme from single parents. While the number of single parents in the survey population is small ($n=16$), we might still benefit from looking at this group.

Then I considered married or partnered couples, with and without children. Those without children, whom I called “dual income no kids” (DINK), presumably have less need of flexibility to meet their dependents’ needs, but they might still need flexibility to deal with a spouse or partner. Those with children I divided again into two groups—those with support at home (MPWS, for married parents with support), and those with two full-time working parents (DUWK, or dual income with kids). Again, those with support might have less need for the policies and flexibility, while those with two full-time career parents might have the most need for support through work since they do not have it at home.

In Exhibit 5-15, I present the means for each of the five family status groupings on the key outcome and moderating variables. While the differences are not vast, note that single parents have the least well-being and control at work, while married parents with support at home have the highest well-being and the greatest control at work. At the same time, the two family groups are virtually identical in having the highest levels of commitment to the organization—but perhaps for different reasons. Single parents may need the job and identify with the company and work harder for that reason, while married parents with support at home and higher levels of control may be getting all they want out of the job with few distractions from home. Married parents in general perceive the work-family policies as most usable, and single parents feel the least free to use such policies. Those without children, whether single or married, are in the middle on this issue. Those who are married with children or without seem most satisfied in an “integrated” manner, while those who are single without children are next and the single parents are the least satisfied as well. So family status does make a difference, though the differences are not large except in the cases of well-being and perceived usability of policies.

After analyzing the effects of USABLE, if any, on the dependent variables, I return to the matter of family status to see if the outcomes differ by family group.

Exhibit 5-15
Means of Family Groups for Key Variables by Gender

		<u>CONTROL</u>	<u>USABLE</u>	<u>Commitment</u>	<u>Int Satis.</u>	<u>Well-Being</u>
<u>FAMILY STATUS</u>						
Sing Parent		3.63	1.06	3.78	3.3	3.33
n = 1	men	3.67	0	3.4	2.88	5
n = 15	women	3.62	1.13	3.8	3.33	3.43
Sing No Kids		3.76	1.48	3.61	3.47	4.09
n = 40	men	3.83	1.25	3.5	3.44	4.44
n = 80	women	3.74	1.6	3.67	3.48	3.93
Marr No Kids		3.74	1.4	3.59	3.57	4.17
n = 43	men	3.77	1.12	3.58	3.51	4.77
n = 80	women	3.72	1.54	3.62	3.6	3.85
Marr, K, Support		3.99	1.59	3.77	3.6	4.64
n = 61	men	4.01	1.66	3.74	3.57	4.66
n = 6	women	3.89	1	4.07	3.86	4.5
Marr, 2 Jobs, Kids		3.79	1.59	3.72	3.56	4.16
n = 47	men	3.67	1.43	3.74	3.67	4.75
n = 87	women	3.85	1.68	3.74	3.51	3.84

Note: Married includes living with partner
Note: May need to separate out older/younger kids

FINDINGS: PREDICTING COMMITMENT, SATISFACTION, AND WELL BEING

I present the analysis by outcome, so the first models test Hypotheses 1 a, 2a, and 3a concerning organizational commitment; the second set test Hypotheses 1b, 2b, and 3b concerning integrated satisfaction; and the third set test Hypotheses 1c, 2c, and 3c concerning well-being. Looking at all the outcomes enables me to evaluate Hypothesis 3d, the relative strength of any effect. For all the analyses, I used listwise deletion of missing data, resulting in a number of responses (“n”) that varied from 394 to 407 depending on the particular combination of variables. Specifics for each model are noted in Exhibits 16, 17, and 18 below.

FINDINGS: WORK-FAMILY POLICIES AND ORGANIZATIONAL COMMITMENT

For Organizational Commitment, I present two complete sets of models (see Exhibit 5-16), the first testing work-family policies without CONTROL as a moderator, the second testing them with CONTROL. (For INTEGRSAT and Well-Being, I present CONTROL only with USABLE; the other models are similar but not shown.). As can be seen, "Control of time and flexibility" does predict all three outcomes, and it also absorbs some of the effect of USABLE when it is added to the model in the cases of Commitment and Integrated Satisfaction.²⁷

²⁷ I have considered other methods of data analysis, such as ordered probit, but the dependent variables I analyze here are all continuous and reasonably normally distributed; they are all indices that combine multiple Likert scales. Further analysis in this area might be helpful.

Exhibit 5-16
Effect of W-F Policies on Organizational Commitment

Dep Var Organizational COMMITMENT	Model 1 Formal n = 397	Model 2 Informal n = 397	Model 3 Perceived Usable n = 397	Model 4 F w/Contr n = 394	Model 5 Inf w/Control n = 394	Model 6 PERC w/Control n = 394
Constant	3.49	3.51	3.5	3.1	3.12	3.15
IND VARIABLE	Beta	Beta	Beta	Beta	Beta	Beta
Formal Policies	0.061			0.045		
Informal Policies		0.052			0.039	
Perceived Usable Policies (PERC)			.118*			.093~
MODERATING VARIABLES						
Age	.113~	0.112~	0.108~	0.094	0.093	0.09
Education	-0.021	-0.022	-0.015	-0.03	-0.031	-0.023
Female	0.038	0.037	0.036	0.036	0.035	0.034
Have Children	-0.089	-0.089	-0.087	0.087	0.087	-0.086
Household Income	-0.08	-0.079	-0.092	-0.084	-0.083	-0.093
Yrs of Service	-0.042	-0.044	-0.039	-0.05	-0.052	-0.048
Manager Dummy	0.069	0.066	0.062	0.075	0.074	0.07
Small Company Control/ Time	-.147 **	-.15 **	-0.152	-.154**	-.156**	-.157 **
				0.157***	0.156***	.142**
R-SQUARE	0.047	0.046	0.057	0.068	0.066	0.074

*** t-test for each item is significant at p < .001
 ** t-test for each item is significant at p < .01
 * t-test for item is significant at p < .05
 ~ t-test for item is significant at p < .10
 (2-tailed tests, listwise deletion)

The first finding from the regression analysis is that "perceived usability" of work-family policies does have a small, positive, statistically significant effect (Beta = 0.118, $p < 0.05$) on organizational commitment, where all the controls (but not "control of time") are included. The only other statistically significant predictor is a negative one, that of working for a small company, which is associated with lower levels of commitment. This is reasonable, since small companies offer far less job security than large ones, and a lack of job security is associated with low levels of commitment.

Age is the only other variable that is marginally statistically significant (Beta = 0.108, $p < 0.10$), which is consistent with prior research concerning the positive relationship between age and commitment. None of the other control variables are significant, most are small in effect, and several of them (education, income, years of service) seem to have a negative relationship with commitment. There may be some co-linearity operating here as well.

The only surprising negative result seems to be "years of service," suggesting that the longer people work for a biotechnology company, the less committed they are, which flies in the face of other evidence. But it is not statistically significant here, so we cannot draw such a conclusion with any confidence.

What is most interesting with respect to the hypotheses is that neither the presence of formal nor informal work-family policies seems to be related to organizational commitment, at least of the affective variety (remember I am not testing "continuance commitment," where an employee feels he or she has little choice but to stay with the firm). But the newly constructed variable intended to capture employees' real experiences, "perceived usability" of work-family policies, is associated positively with organizational commitment. This means that employees who feel free to use the family-friendly policies might reap more benefit from them for the organization and their feelings toward it—but that policies alone, even informal ones, are not

sufficient for this positive commitment state to be associated with them. This could help explain some previous studies that did not discover positive links with commitment, since perhaps the appropriate level of usability was not tested.

Also interesting are models 4, 5, and 6, which examine the presence of work-family policies with the addition of “Control of time, pace, place, and flexibility” of work. The positive associations with work-family policies are smaller, and even “perceived usable” work-family policies are only marginally significant predictors here (Beta = .093, $p < 0.10$). Small company remains significantly negative, and “control” is positive and significant in all three equations (Beta = .142 to .157, $p < 0.01$). This suggests that one way the effect of “perceived usable” work-family policies may be experienced is through increased control of time and schedules that an individual has at work. However, this does not account for the entire effect, as actually usable work-family policies still have their own salience in predicting commitment, even when used with CONTROL.

The regression analysis explained up to 7.4% of the variation in organizational commitment among the biotechnology employees surveyed. While this is a modest figure in terms of explanatory power, it is consistent with other studies that examine the effect of structural variables on organization commitment (Gray 1989; Brief and Aldag 1981; Angle and Perry 1981; Aranya *et al* 1996; Chusmir 1986). Gray notes that including a measure of job satisfaction in the equation could have increased the R-squared, but in this case as in that one, the purpose is not to maximize the variance explained, but to look carefully at an important predictor of organizational commitment. Similarly, in my tests as well as Gray’s, neither personal characteristics such as degree of education, nor organizational ones such as length of service, were significant. This contradicts other research which suggests these two variables are significantly related to organizational commitment (see Brief and Aldag 1981; Angle and

Perry 1981). Perhaps this is because average length of service is relatively short here in this newly emerging industry—less than 5 years. Further, this is a highly educated sample; whereas 75% of Americans have a high school degree or less, only 15% of this sample has a high school degree as the highest educational credential. So there may not be the typical range of variation on these areas, or they may not matter as much with this particular population as the perceived usability of flexibility-related policies.

Some scholars argue that a negative relationship often exists between professionalism and commitment to an organization. They suggest that professionals are more committed to their occupations than to their employing organizations. This argument is contested, but at times professionals clearly do think more about their careers and peer communities than about loyalty to a particular organization. Indicators of professionalism among nurses, specifically those with more education, showed a negative relationship with organizational commitment. In my survey data, professionals are positively inclined to high organizational commitment, overall.

FINDINGS: INTEGRATED SATISFACTION AND WORK-FAMILY POLICIES

Results for models predicting Integrated Satisfaction are shown in Exhibit 5-17. Multivariate regression analysis, using the same control variables as above with Organizational Commitment, shows that the "perceived usability" of work-family policies is a statistically significant predictor of Integrated Satisfaction (Beta = .180, r-square = .045, $p < 0.001$). This effect is larger than with OC and more definitely indicated. Once again, neither formal policies nor informal policies appear to have a statistically significant effect on employee satisfaction,

Exhibit 5-17
Work-Family Policies and Integrated Satisfaction

Dep Var INTEGRATED SATISFACTION	Model 1 Formal n = 397	Model 2 Informal n = 397	Model 3 Perc. Usable n = 397	Model 4 Perc. Us. w/ Control n = 394
Constant	Beta 3.43	Beta 3.41	Beta 3.41	Beta 2.71
IND VARIABLE				
Formal Policies	0.032			
Informal Policies		0.073		
Perceived Usable Policies (PERC)			.180***	.132**
Control VARIABLES				
Age	-0.017	-0.016	-0.023	-0.048
Education	-0.053	-0.056	-0.046	-0.068
Female	-0.031	-0.036	-0.039	-0.039
Have Children	0.03	0.029	0.026	0.022
Household Income	.111~	.109*	0.091	0.084
Yrs of Service	-0.017	-0.023	-0.015	-0.025
Manager Dummy	-0.065	-0.073	-0.079	-0.069
Small Company	0.01	0.014	0.011	-0.001
Control/ Time				.268***
R-SQUARE	0.014	0.019	0.045	0.113

*** t-test for item is significant at $p < .001$

** t-test for item is significant at $p < .01$

* t-test for item is significant at $p < .05$ (2-tailed tests, listwise deletion)

~ t-test for item is significant at $p < .10$

though informal policies have a larger Beta coefficient than formal policies, which might be expected.

The control variables included household income, being female, having children, level of education, working for a small company, age, years of service, and whether one is a manager. None of these, including "small company," is statistically significant in predicting "integrated satisfaction." So while working for a small company is associated with lower levels of organizational commitment, it is not unsatisfying in itself, particularly in the larger sense of a work-non-work balance in life. This corresponds with research by Shelley MacDermid and her colleagues that suggests small workplaces can provide more flexible environments for employees with respect to work-family issues, particularly because of their greater informality and people's closer personal relationships (MacDermid *et al.* 1994; MacDermid and Williams 1997). Again the R-squared statistic is small, but robust.

What is interesting here, as above with OC, is that adding the measure of "control" over time and flexibility more than doubles the explanatory value of the model predicting integrated satisfaction. Even more than with commitment, where adding control added one or two percentage points to our explanatory capacity, here "control" seems to be essential to higher levels of satisfaction. As before, adding CONTROL takes away some of the explanatory strength of USABLE but that factor is still strong (Beta = .132, $p < 0.01$), even more so than initially in predicting OC (for control, Beta = .268, $p < 0.001$). None of the other moderators change significantly in their direction or magnitude, except that small company's influence almost disappears; but this was so small before adding control (Beta = 0.011, n.s.) that it does not appear to contribute to satisfaction one way or the other.

It is interesting to note that age, education, being female, longer service, and being a manager are all associated with lower levels of satisfaction. Of the control variables, only

household income and having children are significantly associated with higher levels of satisfaction. If biotech employers want more satisfied employees, these results suggest they should give them more control, more usable work-family policies, pay them more, and encourage them to have children.

FINDINGS: WELL-BEING AND WORK-FAMILY POLICIES

The models for predicting Well-Being are shown in Exhibit 5-18. These results differ from those for the other two outcome variables and are different than predicted in the "c" set of hypotheses. Here we see that the presence of formal, informal, or perceived usable work-family policies seems not to contribute directly to greater well-being. When "control of time and flexibility at work" is added to the model, which itself is a statistically significant predictor of well-being, none of the other contributors change very much. The only other important factor in predicting stress, or the absence of well-being, is being a female person. In all six models, being female is negatively associated with well-being (and positively associated with stress), at Beta = -.226 to -.234, $p < 0.001$. No other variables are statistically significant at the 95% confidence level, though higher income seems to be positively associated with well-being at a slightly lower level (Beta = .108, $p < 0.10$), for instance in the case of formal policies without control.

Overall, we see that having children, being in the company longer, having more education, and being a manager seem to be all associated with slightly lower well-being (though not significantly) while working in a small company and being older are all associated with a more positive sense of well-being.

Exhibit 5-18 Work-Family Policies and Well-Being

Dep Var WELL BEING	Model 1 Formal n = 407	Model 2 Informal n = 407	Model 3 Perceived Usabl n = 407	Model 4 w/ Control n = 403
Constant	3.78	3.69	3.6	2.75
IND VARIABLE	Beta	Beta	Beta	Beta
Formal Policies	0.061			
Informal Policies		0.052		
Perceived Usable Policies (PERC)			.118*	.093~
MODERATING VARIABLES				
Age	.113~	0.112~	0.108~	0.09
Education	-0.021	-0.022	-0.015	-0.023
Female	0.038	0.037	0.036	0.034
Have Children	-0.089	-0.089	-0.087	-0.086
Household Income	-0.08	-0.079	-0.092	-0.093
Yrs of Service	-0.042	-0.044	-0.039	-0.048
Manager Dummy	0.069	0.066	0.062	0.07
Small Company	.147 **	.15 **	.152	.157 **
Control/ Time				.142**
R-SQUARE	0.081	0.077	0.079	0.094

** t-test for each item is significant at $p < .01$

* t-test for item is significant at $p < .05$ (2-tailed tests)

~ t-test for item is significant at $p < .10$

I interpret these results to mean that work-family policies in and of themselves, *even if they are usable*, are not as much associated with reduced stress levels for employees as are certain related areas that I measure more directly, such as control of work. This finding confirms the interview data, discussed in greater detail in Chapter 4, that on the whole women employees experience more stress and less satisfaction than men. Keep in mind that the women being surveyed are not the spouses of men in the biotech industry (for the most part) but women scientists in biotech themselves. Unlike the men, almost none of them had spouses at home full-time or even part-time working spouses.

I do not interpret this to mean that work-family policies are unimportant, since previous evidence in this study and others demonstrates that they are associated closely with increased self-reported productivity, increased organizational commitment (and thus lower likelihood to leave or be absent as well), and increased satisfaction, measured as a summary of satisfaction with all of life, not just one's work or home life. At the same time, I find being female is associated with higher overall stress, while control over time and space and the work itself, along with higher income, contributes to well-being. Still the advantages offered by control are not enough to offset the challenges imposed by gender, at least for women in this sample.

FINDINGS: PERCEIVED USABILITY, PARENTAL AND MARITAL STATUS, AND COMMITMENT, SATISFACTION AND WELL-BEING

Although having children is not significant in predicting most of the outcomes I reported above, and marital status made no difference, I looked at the five family groupings investigated earlier to see if there is a relationship between family status, perceived usability of work-family flexibility, and the outcomes. Although, when dividing the sample into the five groups, none is large enough to prove significant by itself, I was able to look at correlations between “perceived usability” for each of the five groups (single no kids, single parents, married no children, married parent with support at home, and married dual-career parents)

and the three outcomes. I also looked at each group for men and women respondents, to see if there were gender differences. Results are reported in Exhibit 5-19.

Note that single parents who perceive work-family policies as usable (only women) are more satisfied ($r = .49, p < 0.10$), while those single people without children are as well, but to a lesser degree ($r = .16, p < 0.10$). Married people with no children are both more committed and more satisfied ($p < 0.05$) if they perceive flexible policies as usable, though this is particularly true for men. Married parents with support at home show different results for men and women (although there are hardly any women in this situation). For married men, being able to use the policies is associated with higher levels of commitment and satisfaction ($r = .29$ and $.20, p < 0.05$). I had suggested earlier that these parents might have the least need of policies, but apparently there is an important relationship. Finally married parents with two jobs are not more committed but they are more satisfied and less stressed (especially the men) if they have a high level of perceived usability of flexible policies.

These findings suggest that family status does matter, even more than the means would suggest, when it is combined with perceived usability. While in the larger sample these effects seem to offset each other, when the groups are separated and family status is carefully delineated, we can see different patterns.

**Exhibit 5-19:
Correlations:
USABLE ("Perceived Usability") with Family Status**

<u>FAMILY STATUS</u>	<u>Commitment</u>	<u>Int Satis.</u>	<u>Well-Being</u>	Number n =
Sing Parent	0.322	.492~	0.179	16
men	0	0	0	1
women	0.308	.477~	0.223	14
Sing No Kids	0.015	.161~	-0.004	124
men	0.088	0.23	0.043	38
women	-0.038	0.135	-0.002	82
Marr No Kids	.226*	.198*	-0.047	124
men	.277~	.265~	-0.1	42
women	.216~	0.161	0.021	80
Marr, K, Support	.297*	0.17	-0.008	68
men	0.347	.197**	-0.002	61
women	0.09	0.08	-0.136	6
Marr, 2 Jobs, Kids	0.076	.198*	0.069	150
men	-0.05	.285*	.241~	47
women	0.136	0.172	0.008	87

CONCLUSIONS

In conclusion, the data analysis of the survey responses for my sample suggests several things:

- First, that “perceived usability” of work-family policies, not simply their existence in the firm, is the best way to measure their effectiveness and any possible impact they might have on employee or firm outcomes.
- Second, if policies are perceived as usable by employees, they appear to be able to make a positive difference in organizational commitment and satisfaction, broadly defined to include both work and home factors, for all employees, male and female. However, perceived usability of flexibility is not significant in affecting overall physical/psychological stress as I measured it, where gender is more salient.
- In addition, a new variable, "control over time, flexibility, and pace" of work, turns out to be very important in predicting higher levels of commitment, satisfaction, and well-being, for all employees. Employers who wish to increase commitment among employees of the type I surveyed might wish to consider these factors in designing and evaluating their work-family programs, their work structures, and the amount of control employees have over the pace and place of their work.

While this study is limited in scope and generalizability, it is broadly consistent with other studies of U.S. workers, and it contributes a new concept of "perceived usability" to the work-family research field, as well as linking it to control of time and work flow.

In summary, Hypotheses 3(a), 3 (b), and 3(d) were supported in this study, while Hypotheses 1(a, b, and c) concerning formal policies, and 2 (a, b, and c) concerning informal policies, and 3(c) concerning stress, were not supported. However, the study teaches more than these results might suggest, since interesting patterns emerged even in the non-confirmed hypotheses. New ideas for measuring factors that contribute to satisfaction, commitment, and

well-being also emerged from this study, as well as an improved measure of work-family policies' availability.

Note on Gender: A Bridge to the Next Chapter

While the next chapter focuses on gender, it is not organized around the concepts of commitment, satisfaction, and well-being. So here, to create a bridge between the chapters, I comment on the interesting theory and findings concerning gender and these outcomes in the industrial relations and work-family literature.

The relationship between gender and organizational commitment has been investigated by a number of respected scholars (e.g., Gray *et al.* 1989). One reason is that women's increasing presence in the U.S. workforce over the last thirty years means that their commitment to work and organizations has had an increasing economic impact, as well as social import for families and communities. Some scholars have argued that women demonstrate lesser organizational commitment than men, in part because of a presumed "role overload" when combining paid work and domestic responsibilities (Terborg 1977) that will cause conflict for them. While other authors have hypothesized the same mechanism, at least one empirical study has demonstrated connections between "role stress" (measured by the difference between actual and preferred times in different roles) and found had a significant negative relationship to organizational commitment (Bhagat and Chassie 1980).

Other earlier research (both within and outside of the mainstream of organizational commitment study) argued that women are typically less committed than men to jobs, the workforce, and even their professions. However, most studies did not look carefully at women's specific job circumstances. In at least some studies where women show higher "continuance commitment," or belief that they must stay in the organization because of few perceived alternatives, this is negatively related to their education and level in the organization, for instance. That particular issue would not apply in this study, because biotech is gender-

integrated by occupation, and to the extent it did, it would also be accounted for by the education dummy variable. Another study of professionals (Chusmir, 1986) found that even though sex-role stress was higher for women, neither this nor family pressure was related to their job commitment. A careful, recent study using a nationally representative data set has demonstrated that, typically, initially measured gender differences in commitment disappear after controlling for the type of jobs held (Marsden, Kalleberg, and Cook 1993). The spurious relationship sometimes found between lower commitment and gender is entirely due to the fact that women's jobs are typically the types of jobs which generate or are associated with lower commitment for any job holder, male or female, young or old.

In my study, the gender of survey respondents is not indicative of their organizational commitment or their "integrated satisfaction." This finding is the same as the most recent research that takes account of job-related factors. I also tried to ensure taking account of home-related factors by including household income and whether the employee had children or not as moderating variables. Again, being male or female does not make a difference in the outcomes, except for well-being and stress.

There are two instances when gender matters, however. As noted above, I found that women are more stressed than men, to a significant degree. This seems to go along with their higher household responsibilities at home and perhaps their lower incomes. Women have far less support at home, as a rule. Also, women who perceive that flexible policies are available to them may experience these differently than men do, at least as far as they are related to commitment, satisfaction, and well-being.

The qualitative interviews as well as the household patterns I found in the survey data (but did not have space to report here) show that women do far more housework and family care than men, while men appear to work several more hours a week for pay than women. Stress is higher for women in part because of their typically higher workload at home, documented in many studies more specifically investigating that issue. Perhaps there are other issues at the work site or at home, within work groups or with supervisors or loved ones,

which this survey failed to investigate, that are associated with stress. An omitted variable related to higher stress in women in these jobs could be the explanation, but more research would be required to ascertain this.

Gray (1989) finds in his study of nurses that women who find that work interferes with family life have lower organizational commitment. This is consistent both with Bhagat and Chassie's (1981) findings about "role stress" and with Terborg's (1977) study that "role overload" affects women because of their double duty at work and home (see also Hochschild 1987). At the same time, female nurses who had children also had significantly higher levels of organizational commitment, as parents do here, though not by much in my study.

In his study there was also an interaction with being married, which I see in the context of family constellations, mentioned above. Earlier studies have shown married men with children have higher levels of organizational commitment than those without children. Since the Gray study shows working women with children having higher levels of organizational commitment, one possibility is that employment is beginning to play a role in women's lives more like the role in men's lives.

Evaluating Gender Equity at Work: Opportunities and Constraints in Biotechnology Firms

What most women seek is not simply equal access to opportunities traditionally reserved for men, but equal recognition of the concerns and values traditionally associated with women. To achieve equality on these terms will require sustained efforts in virtually all spheres of life: in the ways we raise our children, structure our workplaces, divide our family responsibilities, respond to media images, and frame our laws.

—Deborah L. Rhode, *Speaking of Sex*, 1997, viii

INTRODUCTION

Gender equity at work is a complex goal, the meaning of which is not entirely clear even to those who seek it. What would a gender-equitable workplace look like? For one thing, we would not expect to see highly gender-segregated jobs at the establishment level (as exist today in approximately 95% of workplaces; see Bielby and Baron 1986). For another, the structure and organization of work on a day-to-day basis would be flexible and accommodating for men and women at all life stages. Finally, we would expect to see promotions and opportunities to advance that are available and earned as frequently by women as by men. In the words of Bailyn and her colleagues, we would want “opportunities and constraints to be equal” (Bailyn 1993; Bailyn, Rapoport and Fletcher 2000), understanding that this condition does not guarantee equal outcomes but should ensure equitable ones. Furthermore, such opportunities and constraints cannot be confined to the

equitable ones. Furthermore, such opportunities and constraints cannot be confined to the workplace, since the dynamic interaction of work and family has demonstrable effects on women's careers and opportunities. Few workplaces provide the opportunity to study anything close to the idealized setting since most workplaces are older and characterized by institutionalized gendered job descriptions, organizational cultures, specific histories of men's and women's work, etc. However, biotechnology is a relatively new industry; the first biotech firm (Genentech) was really founded in 1976. During the 1980s and 1990s, a total of only 1,300 firms have arisen in the U.S.

Reducing the influence of gender as a fact that can negatively determine employment outcomes is a goal shared by scientists and others outside science (Sonnert and Holton 1995). The Sloan Foundation supported a 1997-99 research study which enabled me to learn about 33 of these biotech workplaces that participated in a statewide HR survey, and I also observed ten more in considerable detail through interviews and field research.¹

This chapter investigates the opportunities for and barriers to gender equity I found in a sample of biotech firms in one state near the turn of the millennium. In this chapter I combine data from interviews with 50 employees in 10 firms (56% of interviewees were women) and from an original survey of 463 biotech employees (56% of respondents were women) to shed light on existing constraints and opportunities. I slightly oversampled women when interviewing to ensure I heard from women from different firms. I chose these 50 employees' interviews to analyze for the diversity of gendered experiences they represented.² While biotechnology firms can, and sometimes do, offer surprising opportunities for women to succeed in industrial settings, this is by no means guaranteed. The opportunities for a gender-equitable workplace can create a "virtuous cycle" in which policies and practices that attract women create a climate that draws more women into the field and firm.

¹ An earlier version of this chapter, without the survey data, was published in the *Annals of the New York Academy of Science* as "Surprising Opportunities: Gender and the Structure of Work in Biotech Firms" (Eaton 1998). I am grateful to Cecily Selby and the NYAS for the opportunity to present these findings at the conference in February 1998 that honored women scientists.

² See Chapter 3 for details of data collection and methodology.

However, I caution that opportunities and flexibility in biotech occur only for some individuals and within some work groups and some firms, and still depend on a particularistic combination of circumstances. For fuller gender equity, and for women to advance further and faster to their appropriate ratios in top management, workplace innovations such as part-time jobs would have to be shared among many more employees (male and female) and more firms. In particular, Ph.D.-degreed women still do not seem to be able to negotiate part-time jobs, even if they have long years of service. Innovative policies and practices need to become part of the culture of the biotechnology workplace to eliminate both structural deficits and individual discrimination.

Even in this relatively new workplace context, I find that women still have much more family work than men in addition to their paid work, and that most men still have much more support at home than most women. These differences matter profoundly for men and women employees in their day-to-day lives and in their careers. Firms can reduce the potential effects of this social inequity if they so choose, and policies on work structure can promote or constrain gender-equitable participation in family life. But gendered views and work structures still profoundly inhibit innovation and integration.

In previous chapters, I have shown that men and women have different levels of support at home, with roughly half of men interviewed and surveyed having a spouse or partner who works for pay part-time or not at all, while this is true of few of the women. Far more women than men are parts of “two-career” couples in which both partners have professional or demanding long-hour jobs. More than half of all women’s spouses who work put in more than 40 hours a week. From the interview data, at least, I showed that women are less satisfied both at work and at home. Fully 80% of men are satisfied at work and nearly as many at home. While women have higher home than work satisfaction, their work satisfaction level is only 50% on average, and many fewer of them experience “integrated satisfaction,” meaning both at work and at home.

From the survey data, I learned that while gender does not predict commitment or satisfaction per se, being female emerges as the strongest predictor of stress. Women are far more likely to be stressed, as indicated by physical symptoms, and somewhat less likely to have “control” or autonomy over their place, time, and pace of work. The interviews highlighted the fact that women who did seem to be able to achieve “integrated satisfaction” were often in high-level jobs (where they are not well represented) where they had extensive control of their own schedules and workloads as well as those of others. We also saw that men were more likely to be managers (24% of the survey respondents, compared to 15% of women).

In this chapter I seek to answer the research questions:

- What are the range of opportunities for gender equity for professionals in the biotechnology field?
- What defines the constraints on these opportunities, in a relatively new industry where women make up 50% of the professional and technical workforce?

How Scholars Have Framed Gender Equity

Many authors helped to create the field of gender studies, and they have taken many different conceptual approaches to gender equity. One of the most influential was Gary Becker, who proposed an economic theory he titled “human capital,” in which he speculated that women and men divided the labor in the workforce and at home based on their specialized qualifications to earn the greatest return to their “investments” (Becker 1964). Thus, if women invested in homemaking skills, they became more efficient at them (not to mention already being more efficient at bearing children, by natural design).

Thus, it was only sensible for men and women to divide labor into public and private spheres of competence, with men performing the public sphere, paid labor, and heterosexual couples assumed as the norm. In his view, this was equitable since it provided the most efficient outcome for the unit of the couple or family (Becker 1964).

Other economists followed Becker with theories of discrimination in which they showed that it was rational for employers to statistically discriminate, for instance, if they felt there was a greater chance that women in general would leave the workforce, at least for a time, for family duties. This was grounds for not hiring, or hiring into lesser jobs, all women—whether or not they had a specific intention or actual likelihood of leaving the workforce (Arrow 1971).

As the women's movement gained strength in the 1970s and 1980s, social scientists began looking into other reasons for persistent wage and promotion differentials between men and women in a time of converging educational and workforce participation levels. Some pointed out that gender needs to be seen in historical context, and that many jobs and occupations had become “gendered” or populated predominantly by either men or women, with negative economic effects on women, for the most part. Even within occupations, men and women tended to work at different kinds of firms and in different kinds of specialties. For instance, women lawyers more often practiced family law, and women doctors more often practiced family medicine, compared to their male counterparts who might practice investment law or surgery. Women more often worked at small firms with fewer benefits, men at larger ones with more benefits and career paths. One economist found that “occupational” segregation (controlling for other factors) accounted for 11% of the male-female wage gap in manufacturing and 26% in services—where most women work. In addition, wage gaps from establishment and job-cell segregation amounted to about 6% each (Groshen 1990). This meant that if men and women were paid according to theories of “comparable worth,” those doing the same jobs in different settings would be paid similar wages—which would have a large impact (Acker 1992; Acker 1990).

A team of sociologists confirmed in the mid-1980s that jobs at the establishment level (rarely examined previously because of data problems) were as much as 90-96% sex-segregated, an extraordinarily high degree of gender separation, with major consequences for careers, wages, and other equity issues (Bielby and Baron 1986a, 1986b). Other economists

and industrial relations scholars began looking at mechanisms for gender and racial inequity, and found that internal labor markets accounted for some of the “sorting” of workers into primary- and secondary-level labor markets, with different conditions in each one (Doeringer and Piore 1985). In part the theory was that women, part-time workers, minorities, and youth all tended to be “secondary workers” in the sense that their primary commitment might not be to the labor market but to other priorities (family, school, their farms in Italy, for instance). However, it soon became clear that even when women were full-time participants in the labor market and did not devote themselves to families, they were not able to earn equally. For a long period, women had to make this choice, and thus many tenured women academics and business leaders, for instance, chose to remain childless and in some cases did not even marry, as marriage was perceived to reduce the amount of time and effort that could be devoted to work (Sonnert and Holton 1995; Sonnert 1998).

In the 1990s, scholars began pointing out that many jobs were designed for an “ideal worker” (Bailyn 1993) who was assumed to have a family member at home to provide support for children and relatives, and to handle household maintenance, cooking, and a variety of other physical and emotional needs. This ideal worker was assumed to be male, in most cases. Feminist scholar Joan Acker noted that workers were assumed to have “male bodies,” in the sense that jobs, uniforms, and visualizations of workers were usually male. Women were considered to be the exception, except in a few occupations (teaching, nursing, waitressing, housekeeping, and secretarial roles, for instance) where they were found in an occupational ghetto with correspondingly lower wages and meager benefits, poor working conditions and little unionization or other protection. Organizations were even “gendered” on the basis of how work and hierarchies were arranged (Kanter 1977; Acker 1992) In the U.S., racial minority women were also ghettoized into particular subsets of women’s work (Jones 1985). Few occupations even approached gender-equal ratios under any conditions.

As gender scholarship became more sophisticated, scholars began to look at allegedly different levels of commitment to work and the ways family commitments might interfere with

women's ability to compete equally in the market workplace. Early studies showed that women had lower commitment and higher turnover ratios than men did. However, recent studies have added controls that show once you account for the different types of jobs that men and women typically hold, the commitment levels and turnover ratios are not unequal between women and men (Marsden, Kalleberg and Cook 1993). In fact, women show slightly higher commitment. A similar finding emerged when a Yale economist showed there was no gender differential in wages as long as one controlled for "level" of job—except there were no women in the higher-level jobs, and few men in the lowest-level ones, so he had explained away a crucial difference for which there was no gender-neutral explanation.³

Also, women's participation in the workforce has continued to increase over the past three decades, to its current levels of 67% of 18 to 64-year-old women. This compares to 75% of comparable men. Today women are actually more likely to graduate from college than are men, although men still earn more Ph.D. degrees. And while women used to drop out of the workforce at least while children were young, today a substantial majority come back to work and fully 65% of mothers of children under 6 are in the workforce, and even larger proportions of those with older children.

Soon the idea of looking at organizations and society through the eyes of a "gender lens" became at least academically plausible, if not fully accepted. By taking this view, one does not need to accept "essentialist" notions that men and women are fundamentally different in all respects. Rather, one can look at socialization and other kinds of learned behavior to explain why women tend to show more traits associated with the private sphere in the workplace, while men are seen as more appropriately exercising public sphere traits in public (Fletcher 1999). This is apparent even at early ages, as child psychologists have shown (Gilligan 1982; Tannen 1990; Valian 1998). Boys bond with one another by playing competitive games, while girls seem to play more cooperative games and avoid what they see

³ This anecdote was used by Prof. Judith Singer at the Harvard Graduate School of Education in a lecture in her Spring 1995 introductory statistics class to cite the inappropriate use of certain controls in analysis.

as unnecessary conflict by playing new games if a problem arises. Even speech patterns and behavior and learning patterns are influenced by gendered socialization and role modeling. It is not surprising then, that occupational choices and opportunities mirror the deeply gendered structure of the family and society.

Kanter (1977) examines work and organizational structure in a corporation, and proposes that women act like anyone else who inhabits less powerful positions—since they usually do, especially in the corporate setting she was studying, but also in the family and other workplaces, historically. Many gender scholars reject the idea of any innate important differences in the sexes, and attribute differential outcomes totally to structural factors. While I do not hold that view in its entirety (for example, I think social cues and learning are important both cognitively and psychologically), I believe that structure can reinforce and strengthen socialization, sometimes creating a near-impermeable barrier to gender equity. That is what I will explore in this chapter—to see how the structures of the biotech workplace, combined with women's and men's home situations, affect gender equity.

In this study, I adopt the lens of investigating gendered organizations. Rather than looking at individuals, solely, or exploring particular charges of discrimination or inequity, I want to look at systems, both work systems and reward systems, network systems and career paths. These will tell us much more about the overall patterns than looking at any individual case, although individuals are obviously crucial in any organization and system. I do not intend to deprive anyone of their ability or interest in modifying and challenging systems, but I do try to understand the patterns of gender equity (or inequity) in biotech companies and in the industry generally.

I expected that this background would provide information about why a gender perspective provides a useful, but not always adopted, way to look at workplace systems, particularly in their interactions with home life and societal-level expectations. Furthermore, of all the topics in the field of gender equity, perhaps work-family issues have been the least explored in terms of their impact on the work structure itself. Rather, most of the focus has

been on the individuals making alternative arrangements to work, or the firms that implement policies designed to make “balance” easier for women (and sometimes for men, although it is apparent in talking with firm HR officers that they think women constitute the primary market for this “benefit”).⁴ HR officers somehow seem to think that men do not bring family problems to work but that women do. I do not make this assumption; I interviewed and surveyed both men and women holding always to the assumption that each person has family issues and concerns, whether married or single, older or younger, parent or not. That is the frame for my study.

Women in Science

Why do women make up 50% of professional scientists in biotechnology firms, compared to 28% of doctoral-level scientists in biological sciences overall, and a far smaller percentage of all biologists, chemists, biochemists, and immunologists in academia (Radcliffe 1996; Babco 1997, in Sonnert 1998)? Biotechnology is just one small part of the overall experience of women scientists in U.S. workplaces, including universities. Of course there have been outstanding success stories among women scientists (such as Gertrude Elion, who won a Nobel Prize but collected only honorary doctorates since women were not admitted to doctoral programs in science when she was in training). And there are many documented horror stories—women scientists who were forced to make unacceptable choices between success at work or caring for their families, who did not achieve tenure or equal status with male peers despite their credentials and accomplishments (Valian 1998; MIT 1999).

While these conditions are changing (Pitt-Catsoupes *et al.* 1999; Eaton and Bailyn 1999, Eaton 1999, Sonnert and Holton 1995, Sonnert 1998), women generally have a difficult time achieving employment equity in academic settings. A recent study documents that even in 1997, “in almost every field, in almost every cohort and at almost every point in their teaching and research careers, women advance more slowly and earn less money than men”

⁴ For exceptions, see Bailyn 1993, Bailyn *et al.* 1996, Perlow 1996, Fletcher 1999, among others.

(Valian 1998). This difficulty is amplified for women scientists and engineers, where the salary and tenure disparities between women and men are greater than they are in the humanities (*Ibid.*). Data for 1993 showed that 61% of men in science and engineering were tenured compared to 35% of women, even controlling for various factors that might influence this outcome⁵ (*Ibid.*). In contrast, women make up nearly 50% of all scientists in biotech firms (DeHaan 1998; Resnick 1997), and seem to be doing well by comparison to other spheres.⁶

My focus in this chapter is the underlying structures of work, in addition to firm-level policies and their implications, in this new, growing industry of biotechnology. I have addressed policies and practices in previous chapters. These work structures provide the real-world context for potential gender equity in professional and personal life, particularly in comparison with the other choices available to these skilled scientists, such as pursuing an academic career, working in a large pharmaceutical firm, or carrying out full-time research in a large institution such as a teaching hospital. Some work structures and common practices in biotechnology actually seem to increase opportunities for women, while others serve as constraints to advancement and equity. This chapter explains how this may be.

METHODOLOGY AND DATA USED IN THIS CHAPTER

Studies with a specific focus on gender and work have been completed in many industries and organizations (see, for example, Milkman 1985; Reskin and Padavic 1994, Bailyn, Rapoport, *et al.* 1996, among others). I chose to examine biotechnology because it is one of the few industries in which jobs are not highly segregated at the occupational level

⁵ This holds true even when both tenured and tenure track positions are included, 60% of women compared to 77% of men. This controls for differences in average age and tenure in academia between women and men.

⁶ Women may be slightly less well represented in R&D jobs (39% women compared to 61% men in one preliminary survey recently conducted with a state biotechnology council), and are definitely less equally represented in top management roles. We discuss this later in the thesis (RPPI and MBC, 1997 Human Resources Survey, unpublished report, Radcliffe College, February 1998).

(aside from administrative jobs, which are mostly female at the lower levels and male at the higher levels, but which make up a small portion of biotech jobs in all). In fact, most biotech companies state that fully half of their scientific workforce is female, as is their technical support and laboratory workforce. At least one study in the San Diego area verified this, while showing that women were still underrepresented in officer and top positions (DeHaan 1997). The Radcliffe survey also showed that approximately 50% of employees in biotech firms in Massachusetts, which mainly employ R&D employees except in the late stages when manufacturing and marketing personnel are more important, were women. Also, these relatively new firms were less likely to carry over other more traditional practices, such as isolating women in certain departments or at certain levels. So biotechnology offers a good base from which to see whether occupational desegregation is associated with gender equity, in a variety of areas.

I report here on interviews conducted with scientists and managers; they were chosen because they are professional and technical employees, not administrative and production personnel. All but one of the ten companies where the interviewees worked employed between 50 and 150 employees; and one large firm had multiple sites. The firms included the two I profiled in Chapter 4 (the paired comparison), and five additional firms where I conducted a 120-item survey among professional employees at all education levels, with a 44% response rate for a total of 461 answers.⁷ I also interviewed employees in the same metropolitan area at three medium-size biotech firms at different stages of development, with the aim of learning about different work structures and histories across firms. In all, I interviewed employees at five public and five private firms. Exhibit 6-1 gives the demographic characteristics of the interviewees on whose data I draw for this chapter. Exhibit 6-2 gives the demographic characteristics of those who returned usable surveys. In both cases, I focus

⁷ I also surveyed some manufacturing workers, a total of 11% of responses, and a similar number of administrative employees.

on the scientists and other professionals, including managers, who responded to interviews and surveys.

Characteristics of Survey and Interview Respondents

Here is a brief outline of the respondents in the larger sample, using data from the survey. In this data set, 40% of women and 32% of men are scientists, 23% of women and 30% of men are other professionals, 10% of women and 4% of men are office and administrative, and 25% of men and 14% of women are managers. Exactly 7% of men and women are in manufacturing. Not surprisingly, given the managerial difference, 45% of men have people reporting directly to them, compared to 30% of women. Fully 99% of men and 93% of women are full-time employees, 6% of women are part-time employees, and 1% of each are contract employees. Men and women have similar chances to feel they might lose their job soon, and a similar percentage of men and women (37%) are “not sure” how long they will stay with their present employers. In this sample, men are slightly older, averaging 37.7 while women average 35.6 years of age, but their years of service in the biotech companies where they work are virtually identical (averaging 4.7 for men, 4.6 for women).

Family status in this sample (and in the workforce) differs by gender, too. Men are more likely to be married (70%) than women (56%). Married men professionals in this sample are also more likely to have children (76%) compared to married women scientists who responded (64%). Fully 59% of married women compared to 32% of married men live in dual-career families with children, meaning both partners work full-time. Two-thirds of married men with children, then, are in families where their wife works not at all or less than full time for pay, and takes care of the household and children at least part-time. Women’s spouses work an average 46.3 hours per week, while men’s spouses who work for pay do so

Exhibit 6-1

Characteristics of Professional and Technical Biotech Employees Interviewed

(n= 50)

Sex

	% Female	
Male	22	44%
Female	28	56%

Highest Degree Obtained

	Female	Male	Totals	% Female
PhD or equiv	8	9	17	47%
Master's	4	5	9	44%
BA/BS	17	5	22	77%
Less than BS	0	2	2	0%

Position in Co

	Female	Male	Totals	% Female
Manager (sci)	5	4	9	56%
Scientist*	18	14	32	58%
Administrative	3	2	5	60%
Technician	2	2	4	50%

* Note that many scientists have at least one employee to manage; all managers listed here are also scientists but manage full-time

Full or Part Time Status

	Female	Male	Totals	% Female
Full time	25	22	47	53%
Part time	3	0	3	100%

Length of Service

	Female	Male	Totals
Mean	6.4	6.6	7.0
Shortest	1	1	1
Longest	12	14	14

Age (est)

	Female	Male	Totals
Oldest	57	54	57
Youngest	26	25	25
Median	39	38	39

Family Status

		Female	Male	Totals	% Female
Single - no children		2	2	4	50%
Single - w/children		3	0	3	100%
Spouse home	Married - w/children	0	2	2	0%
PT wk. partner	Married - w/children	1	7	8	13%
2 FT job/career	Partner- no children	7	4	11	64%
2 FT job/career	Married- w/children	15	7	22	68%

Note on table: All figures as of time of last interview.

Exhibit 6-2

Characteristics of Biotechnology Employees Surveyed

(n= 463)*

Sex	no.	%
Male	200	44
Female	253	56

Highest Degree Obtained	Female	Male	Totals	%
PhD or equiv	30	42	72	16%
Master's	56	34	90	20%
BA/BS	118	88	209	46%
Less than BS	48	34	82	18%

Position in Co	Female	Male	Totals	% female
Manager (sci)	38	47	85	45%
Scientist*	101	68	169	60%
Administrative	29	9	38	76%
Professionals	63	61	124	51%
Manufacturing	20	15	35	57%

* Note that many scientists have at least one employee to manage

Full or Part Time Status	Female	Male	Totals	%
Full time	235	197	432	97%
Part time	14	0	14	3%

Length of Service	Female	Male	Totals
Median	4.6	4.76	4.7
Shortest	0	0	0
Longest	14	16	16

Age (est. in years)	Female	Male	Totals
Oldest	59	68	68
Youngest	22	19	19
Median	35.6	37.7	36.5

Family Status	Female	Male	Totals	% female	
Single - no children	83	41	124	67%	
Single - w/children	15	1	16	94%	
At home spouse	Married - w/children	0	19	19	0%
PT wkg ptr	Married - w/children	7	42	49	14%
2 FT job/career	Married/Ptnrd- no children	81	43	124	65%
2 FT job/career	Married- w/children	88	47	135	65%

* not every employee answered every question; therefore, the totals are not all 463.

on average 35 hours per week. Perhaps not surprisingly, women are more dissatisfied with their ability to balance work and family (27% to 19%), and men are more satisfied with this ability (51% to 42%). Men in the study averaged 44.4 hours of work in the previous week, while women averaged 41.7. But they have similar levels of control and autonomy at work, according to the survey, so their hours may relate in part to different levels of support at home or to the difference in managerial status. Male managers averaged 47.7 hours in the previous week of work, while female managers averaged 47.1, not a statistically significant difference. Male scientists worked 43 hours on average during the past week, and female scientists averaged 41 hours, suggesting the differential levels of “support at home” factor is more relevant.

Thirty percent more women have Master’s degrees than men, but 80% more men than women have Ph.Ds. College degrees are roughly equal (45% each). Women are slightly more likely to perceive that there are either formal or informal work-family policies in place in their workplaces, but women also have more concerns about their careers suffering if they take time off to spend with family members than men. More than twice as many men as women have filed patents, perhaps reflecting the educational differences. But in promotions within their company, nearly two-thirds of both men and women have been promoted at least once. It is only at the level of two, three, or more promotions that men have been promoted far more frequently than women. Women are somewhat more likely (70%) to work in small companies compared to 64% of men (this is also true at a national level).

Women earn less of their family’s income than do men. Both live in households averaging just under \$75,000 in annual income, although men’s households averaged slightly higher incomes than did women’s households. On average, women earned about 55% of

their families' income (many earned less, but some earned 80 to 100%, especially at certain companies). In comparison, men earned 70% of their family income.

A GENDER ANALYSIS: COMMITMENT, SATISFACTION, TIME, AND WELL-BEING

In previous chapters I analyzed the workforce for levels of organizational commitment, “integrated satisfaction” (at work and at home) and well-being (or absence of stress-related physical symptoms). Now I analyze the survey data to explore what gender differences exist in these areas, as well as in the use of “time,” which is critical to the gender issues identified above.

Commitment and Well-Being

In how they feel about their organizations, especially whether they are willing to expend more effort than is required on behalf of the company, there is no statistically significant difference in men's and women's commitment to their companies. Although some academics and managers believe that organizational commitment is lower among women generally, recent studies show no differences in level of commitment when women and men are in comparable jobs (Marsden, Kalleberg, and Cook 1993). In fact, women in this study show slightly higher levels of job-adjusted commitment than men since they are in lower-level jobs and managing fewer people and lower on the ladder in terms of promotions.

There is no difference in men's and women's intention to leave their present job. Fully 37% of both men and women are “not sure” how likely they are to stay at this company. Men are more likely to think in terms of lifetime employment than women, averaging 3.9 agreement on a scale of 5, compared to a neutral average of 3 for women ($p < 0.001$).

As far as well-being, men seem to be better off. Women are more stressed, on average, as shown by physical symptoms, perhaps because they have much less support at home, as noted above. In Chapter 5 I noted that gender is one of the strongest negative predictors of well-being, just as “control” is a strong positive predictor of well-being. This implies that women may have less control, although a direct comparison does not show that. If control at work is not making the difference, something else is.

Women’s increased stress may be related to the interaction between work and their responsibilities at home, and to being in lower-level jobs generally, where they have less authority to ensure that other people meet their schedules. We saw in Chapter 4 that a high-level job, such as an officer or top manager of the company, allowed some women to achieve “integrated satisfaction,” but that most women who were in these positions did not have significant obligations at home. Men in these positions could have high demands at home and still have integrated satisfaction; women generally did not find it possible to do both and to feel good about both. Women are also more likely than men to worry that any time off they take will affect their careers ($p < 0.05$), which also increases stress if they need or want to take time to be with their families or when elders or children are ill.

These findings are similar to national findings which show that women in general have more stress, more physical complaints, more depression, more doctors’ visits, and less time for relaxation and enjoyment. It is interesting that even in these highly paid scientific and professional jobs, women still experience more stress than men despite having important stress-reducers in their lives, such as relatively high salaries.

Satisfaction

In the surveys, women and men report satisfaction, in an “integrated” sense combining work and family satisfaction, at relatively similar levels. The average for men is 3.7 on a scale of 5, and for women it is 3.6; the difference is not statistically significant. Gender is not a strong predictor of satisfaction throughout the entire sample. Women scientists also have significantly less integrated satisfaction than men scientists ($p < 0.05$), while female managers have levels of integrated satisfaction equivalent to their male counterparts.

Women report that they spend significantly less time on their own needs as one way of dealing with work-family conflict ($p < 0.05$). Remember the evidence in Chapter 4, drawn from the interview data, that far more men in situations of similar demands are able to achieve integrated satisfaction than are women. The overall survey result appears to contradict this, but when we compare men and women in similar situations, we see that women in less powerful positions have lower “integrated” satisfaction than men do. One reason that women and men come out equal in the entire sample is that an important percentage of women had to construct their home lives with fewer demands—not the smaller percentage of women who are married, and also the smaller percentage of married women who have children. They truly appear to have made tradeoffs that men have not made in order to feel reasonably satisfied at both work and home.

This does not mean that fewer women would prefer to be married or to have children, although I do not have any independent measures of that preference. We cannot assume that not having children means one does not want to have them, particularly when the patterns are so gender-influenced. In fact, I would argue that having to choose one or the other (or be highly stressed if one chooses both, as are the vast majority of two-career women with children) is an undesirable outcome.

Time

To some extent, we can see from the surveys that men and women make different uses of time. Men work about three hours more per week, on average. Women, on the other hand, do two-thirds of the picking up and dropping off that occurs while commuting, a phenomenon recently dubbed “trip-chaining” by a *Washington Post* reporter, quoting urban transit planners. (About 22% of the entire group does pickups daily.) Most of these pickups are of children, and they lengthen the commute by at least 15 to 30 minutes each way, according to employees. In one case, a woman spent nearly an hour each weekday morning at the childcare center dropping off her four-and-a-half-year-old daughter, calming her down and preparing to leave her for the day. (She said, “*Thank goodness, Michael, at 6 months isn’t old enough to notice,*” but I could tell she was dreading when Michael did notice.) This dropoff responsibility came out of what would otherwise have been her work time—her husband took that hour to work—in addition to the extra half-hour at the end of the day, too, when she picked up the children. Men and women have similar commutes in general, averaging 38 minutes for men and 36 minutes for women. But note that time spent at the childcare center did not show up in commuting time on the survey.

In the survey, 43% of men and 41% of women say they would like to work more at home during the workday. This is especially true of scientists and managers. Most know they can work at home since more than half take work home at night and/or over the weekends. But a minority of women and men (21 and 17%, respectively) are likely to state they do not want to work more at home during work time. Fully 53% of women and 50% of men would prefer to work fewer hours per week. Nearly everyone, 96% of women and 91% of men, said that he or she did not want to work more hours per week.

In both the surveys and the interviews, women express more frustration with the lack of flexibility, choices, and innovations for scheduling and planning work. More women than men (52% to 37%) say they have to negotiate work-family conflicts or time off individually with their supervisor, and more women than men (49% to 42%) feel their supervisor does not usually or always implement policies fairly. And a majority of women are at least somewhat worried (52% compared to 38% of men), with 13% worrying “a great deal”, that taking time off to be with family will harm their careers.

So it would appear that the companies have quite a bit of work to do in implementing policies more fairly (at least according to employees) and removing the fear of negative career consequences—especially for women, but also for more than a third of men—if they want to become more family-friendly.

The use of time seemed to be the most complicated and contested area of work-family integration in this study as in others (Bailyn 1993). Some authors have even proposed that time itself is “gendered,” at least in the way it is divided and managed in everyday life today. Jurczyk writes of “different logics of time”(1998). This includes both the logic of work time, which she takes generally to be efficient and ordered and also more or less under the control of the employee, and the logic of family time which she tends to describe as time spent caring for others, usually by women. I would suggest that for many women, going to work often means caring for other people (and animals and cells), even in biotech settings.⁸ I think that is one reason that “control” of the timing, pacing, and place of work makes such a difference to all employees in predicting satisfaction and even commitment.

⁸ Arlie Hochschild made a related point in her 1997 work, *The Time Bind*, but I am not arguing here that women substitute work for home and experience home as work, though clearly women tend to have more responsibilities at home in this study as in almost every other. See the NSCW report, Bond *et al.* 1999.

Jurczyk (1998) notes that the process of adapting to new time structures (as in the event of a move, or change in locale, in the large sense-- but why not also the change from family time at home to work time at work on a daily basis?) itself takes time and attention! "Patterns of everyday life, routines, and habits must be firmly established in order to enable one to work efficiently in mind, body, and spirit," she suggests. The women in this study agreed; more than 57% of them agreed or strongly agreed that they spend less time on their own needs than they would like in order to care for others and balance work and family; this compares to an also high 46% of men. But only 16% of men "strongly agreed" with this, compared to 29% of women, nearly twice as many. This difference is statistically significant ($p < 0.05$).

Much more could be said about time and how biotech professionals manage it. One of the most interesting examples with gender implications is that the few women who worked part-time or on non-traditional schedules all felt extremely productive during the time that they were working. Their managers tended to agree with them, at least in the interviews I conducted. One quality control manager who had been on a 4-day, 40-hour schedule for several months said, when I asked her about how the schedule affected her work,

"I came in one hour earlier, around 7:45, and got a lot done in that first hour. I was more focused, I think I got just as much work done then in four days as I do now in five days. I am not more productive now on five days. Partly, I knew I would only be here four days so I made sure to get things done. The only difference is that Victoria, who reports to me, called me at home on Fridays when she had questions. Yesterday, when I was out with a sick child, she called too."

So innovative or non-traditional ways of arranging time could benefit work productivity, in part because of the increased motivation of the person who asked for the schedule, and in part because the time spent at work was often more focused and intensive, even if it was for fewer total hours.

GENDER EQUITY OPPORTUNITIES IN BIOTECHNOLOGY

In the following sections, I review the opportunities that I drew out of my qualitative interviews and compare the interview data with the survey data, where possible, to see if these insights are upheld in a larger sample of employees. Of course, respondents to the questionnaire may not be representative of the workforce as a whole; at a minimum, they might well be more interested than the average employee in issues related to work and family. But with a 44% response rate, which demographics do not differ dramatically from the population of the firms,⁹ we can be sure we have gained a significant portion of employee representation in the seven firms represented.

The opportunities for increased gender equity in biotechnology jobs can be placed in three categories:

1. the comparably beneficial work environment in these smaller biotech firms, compared with academic science, particularly for women.
2. the actual work structures themselves, that make biotechnology more potentially flexible as a work environment, having nothing to do with management policy on flexibility.
3. the positive effect of “scale,” by which I mean having a significant proportion of women, and the ways that factor changes the work environment for both women and men, favoring more equity.

This last point was made effectively by Rosabeth Moss Kanter (1977), in which she posits the effect of being a “token”, and suggests that at least 35% women in a given workforce are required in order to reduce or eliminate these “token” effects.

Gender Equity Opportunity 1: The Difficulty of Academia

Academic science is a particularly difficult career option for women, making biotechnology look good in comparison. even the insecurity which is ubiquitous in the biotechnology industry applies relatively equally to men and women; therefore the downside burdens of the work are shared without respect to gender.

Job Insecurity in Academia. The women I interviewed who left academe felt particularly strongly about the low chances of success in an academic environment, which may explain why biotechnology employs nearly 50% women scientists. One woman Ph.D. biologist said, *“I was not happy in my post doc. It was difficult to communicate with my advisor”*. This was a common concern; in graduate school and after, students and post-docs are often tied to one individual “star” scientist who controls funding for their work, defines their learning and day-to-day experience, and also can determine how well-recognized the person’s own work will be in comparison to his or her own. Some post-docs have recently organized committees and other structures to try to improve their pay, benefits, and career paths (see the website for *Science* magazine, www.sciencemag.com). So the biologist began looking at a company where she had worked during graduate school, and found through the grapevine that BioCo was hiring.

Problems with Academia It is well accepted in the research community that “women scientists have a more difficult time in academia than men scientists” (Sonnert 1998; Valian 1998). Both men and women in these biotech firms had left academia in part because of being “pushed” out. But women seemed more troubled by the problems in academia. Eight of 13

⁹ The exception is that the survey respondents include a slightly higher percentage of women employees (56% vs. 44%), compared to the average 50% population reported by the firms.

women scientists who had received post-doctoral fellowships and had considered academic careers, when I asked them about academia specifically, characterized their experience with these problems as severe. This compared with 3 of 13 men in similar situations to whom I addressed the same question. Problems included the long hours required, problems with advisors, geographic moves that did not fit in with a partner's career, and a low perceived likelihood of getting tenure. *"It's too tough for a woman to get tenure in academe,"* said one high-level biotech female Ph.D. biochemist. *"I had friends in academe, and friends in industry. I didn't want to work 80 hour weeks in academe and then not get tenure".*¹⁰

Even for non-Ph.D. scientists who could have worked in university research labs, the environment was not particularly friendly. A female MS scientist at BioCo said she found biotech to be more accepting of her than an academic environment with its hierarchical structure. She said of her three-year university research lab experience, *"I learned a lot about how infantile the scientists were. There was a very elitist attitude. If you were not a Ph.D., you were nothing. The post-docs would make 'technician jokes'".* She found that BioCo offered a more respectful, challenging work environment for her, particularly since she was not going to pursue a Ph.D..

Pay. It is significant for women as well as men—since women tend to make less money even with similar qualifications and experience (Bielby and Baron 1986)---that biotech also pays well in comparison to academia. One female BS scientist who had worked in a university medical school research lab for several years said, *"They didn't pay very much...I made the change to make some money."* Another MS immunologist said that for her, *"There was a huge salary difference, about three times what I was making at [Research University*

¹⁰ For data that support this woman's perception, see Aisenberg and Harrington 1988.

X].” While Ph.D. women had less immediate financial concerns compared to less-educated coworkers, they too could make more in biotech, including stock options. And they did not have to raise their own funds directly as in a university setting with grant requirements.

Overall, I found through the interviews that biotech offers a less male-dominated and a more predictable, rewarding, and egalitarian environment than academia, at least to many women scientists.

The survey confirmed these patterns. Fully 14% of women had come to their current job from a university setting compared to only 9% of men ($p < .05$). Men were 50% more likely to have worked previously at a pharmaceutical company, and somewhat more likely to have worked at a non-profit research institute or other kind of employer. Fully 40% of women and 38% of men had come from another biotech company, the most likely previous job for both men and women. The current biotech job was a first job after their highest degree or post-doc for 19% of the women but only 14% of the men. This suggests that men were slightly more likely to move around in the industry or in other types of jobs, while women were more likely to come directly from school or an academic job to biotech firms, including their current employer. This is interesting because men and women were reasonably similar in age (averaging 37.7 for men and 35.2 for women), years since their highest degree (11.6 for men, 10.3 for women) and length of service (4.7 vs. 4.6 years) at their current employer. Men were more likely to have left their previous jobs for a promotion (59% vs. 51% of women), and women twice as likely as men to report they left for personal or family reasons (14% to 7%), though both these were low figures.

On the financial front, it appears women do well in biotech, but men do even better. Men had been making an average of around \$38,000 when they left their previous job, while women had been making barely \$26,000 ($p < .001$). Men were slightly more likely to get

stock options than women, but with 93% of all employees getting at least some stock options, that was not significant. Men and women also tended to live in households with similar total incomes (between \$75,000 - \$99,999), but men earned nearly 70% of their family's income compared to an average of 50% for the women ($p < 0.001$).

Stock Purchases. Another interesting difference emerged in the financial analysis: men were more likely to have purchased company stock. Of the 77% of employees who own company stock, this includes 84% of men and only 73% of women. At least 80% of men in all education levels, and 90% or more at Master's and Ph.D. levels, own company stock. But for women, the figures are more dispersed: 70% of high school graduates, 93% of those with associates' degrees, 68% of those with college degrees, and 69% of those with Master's degrees. Only at the Ph.D. level do 82% of women become stock owners. The college and Master's degree women are far less stock-owning than are the less-educated men. This may reflect different levels of risk tolerance, or financial conservatism between men and women, or a lack of knowledge of the value of stock by women. At some companies, the contrast is more dramatic: Only 44% of BioCo women and 52% of ImmuCo women own stock, compared to 65% of men in BioCo and 82% in ImmuCo.

Insecurity Generalized. The interviews showed that insecurity in biotech, while pervasive and unsettling, is more impersonal and generic, applying to everyone, not just women. Uncertainty is the watchword of the industry, as experts estimate only one in ten firms will succeed in getting a product all the way to market. But uncertainty in the industry is generic, not personal; almost all the firms are in an uncertain status, except for the few largest and most established. This uncertainty is not gendered, since it arises from the nature of the developing scientific knowledge base and the vagaries of drug development, clinical trials, and regulation.

Because biotech firms are small and represent loci of innovation, they are able to experiment with unusual and potentially rewarding drug designs, but they are also far from certain to succeed. Nonetheless, this uncertainty does not particularly fall on the women involved, but is spread fairly evenly among all concerned—in contrast to academia, where women are more at risk than are men. “*Job insecurity goes with the business,*” one male scientist told us. “*There is no such thing as a secure job.*” Women tended to agree with this, although many indicated more desire to have and keep a long-term job than men did. This may have been the result of female gender socialization, or of men’s tendency to contribute more to their family incomes, and thus to move more frequently to increase earnings. It also may be that women felt they did better where their work was known, or that they were tied to the firms by negotiated flexibility or other arrangements. Most employees, male and female, knew generally how long the firm could survive and pay its scientists. It seemed to put everyone on an equal footing.

Plans to Stay. The survey confirmed these interview findings. Both men and women in the larger sample of 461 reported similar levels of uncertainty and intentions to leave their firms, as discussed above in the section on “Commitment.” Less than one-third of either men or women said they were “very” or “somewhat” likely to lose their jobs in the next year or two, for reasons not of their own choice. Only 19% of men and 17% of women planned on short-term stays of three years or less, and 46% of men and 43% of women planned to stay four or more years at their present jobs. None of these differences is statistically significant at the level of $p < .05$. Both men and women were about equally likely to recommend their current job to friends, and to feel they would be comparably secure at another company. Though women were slightly more likely to work at smaller companies, which were themselves more insecure, this did not change the overall results.

Gender Equity Opportunity 2: Work Cycles and Autonomous Interdependence

The way work itself is structured and scheduled in this industry seems to create possibilities for flexibility in scheduling and work organization which are especially important to working women in two-career families.

The long-term nature of product development in biotech—development from idea to market takes 15 years on average—means that daily deadlines are the exception, not the norm. In many biological processes (nurturing a cell line, for instance), success does not depend on the hours put in, but on the care and creativity with which the work is done and the results recorded. *“You can’t force the cells to grow... it just takes a certain amount of time, sometimes up to a year,”* said one male research director. *“The mouse has to do the work,”* said another woman, indicating that when immunity is involved, often animals are used in experiments, and their bodies take a period of time to process and develop immunities.

Cycles. Similarly, I learned that those biotechnology employees involved in the production of transgenic drugs have to adhere to varying animal life cycles. (For example, one firm creates drugs that can be produced in goats’ milk, but this requires altering the genetic structure of goats in embryo, then implanting them in a female goat, allowing them to be born and mature into an adult female goat, before any drugs can be “harvested” through milk production.) This characteristic of biotech is in sharp contrast to other high-tech work studied by Bailyn *et al.* (1996) and others, such as computer software design. In such firms, supervisors believed that more hours worked amounted to more computer code written, in general, and thus directly equated hours with productivity. Also, in computer engineering, product development cycles tend to run closer to nine months than the eight to ten years that are common in biotechnology. There the long product cycles generally reduced the time pressures felt by employees.

Interdependence. Likewise, the nature of the experiment and discovery process means that interdependence among employees is both necessary and incomplete. Since professional employees work in project teams together, they can often cover for each other for some period; yet their autonomous responsibilities are sufficient so that the specific hours when people work do not have to be tightly coordinated. Some people can come in early and work fewer hours in the late afternoon, while others can put in time on weekends that is just as valuable as weekday time, or even more so; for instance, they can feed several cell lines or start several experiments that need to develop overnight so that Monday's work will be more productive. All the employees I interviewed spoke of occasionally helping out other employees in these ways.

Flexibility At some firms, flexibility extended to making part-time scientist jobs available to some existing employees who had outside major responsibilities such as family care. In real life, these part-time employees all happen to be women, and none have Ph.D. degrees. From the firm's perspective, completely losing a full-time experienced scientist is a far greater problem than defining some kind of work arrangement that enables them to retain a known and experienced colleague who is available part-time.¹¹ The three part-time jobs I identified in the study were granted to female employees who had been working for the firm several years when they requested their new schedules for family reasons.

For this admittedly small group of female scientists, flexibility opportunities offered in their company definitely keep them working there. The three women working part-time

¹¹ One CEO commented that he could hire unknown people, but he would rather work with those whose strengths and weaknesses he knows. Work observation shows that working relationships and the ability to get along with others matters in these firms where cross-disciplinary projects are the norm and not the exception. One barrier to offering new part-time jobs to women scientists, however, is one employee's observation that a good deal of the startup time is spent reading and getting to know the specific projects. If someone were doing that and only working half time, perhaps that would be seen as too great an investment.

explained, independent of one another, that the opportunity to work part-time was the key reason they were staying at the firm, and that their commitment to their jobs had increased because of the chance to meet both their family and work commitments under these circumstances. *"I'm not going anywhere,"* said one well-respected 30-hour scientist. All the women also spoke of working more productively for the hours they were at work than when they worked full-time.¹² Their non-standard hours turned out to benefit the firm in unexpected ways, at least in one case, because one woman works at least one weekend day a week, and she now can feed cells and start experiments for others to complete later. Besides being interdependent in helpful ways, most biotech work is autonomous enough to permit significant achievement and control but integrated enough to allow for support from others.

Science Excitement. For nearly half of all scientists I interviewed, whatever their initial reason for entering biotechnology firms, the work of science itself keeps them employed in the industry. The small size of biotech firms gives scientists a chance for exciting and varied work, since many scientists move from project to project over time and learn to handle problems across disciplines in a way that seems rare in a university setting. At least half the scientists, both men and women, said they came to biotech companies at least in part because of the "excitement" of being able to do applied science. Half of both men and women scientists spoke of the excitement and autonomy of working in their scientific areas as a reason for staying. *"I understood biotech to give you as a scientist more independence, less organizational structure, and a little more freedom,"* said one woman Ph.D. associate director. She valued most about biotech a *"friendly, collaborative work environment."*

¹² There is an interesting study to be done here, which might also encourage compressed workweeks or other alternative schedules. Those who are able to work more effectively in fewer hours (when they have to or have an incentive to) could create new and more efficient ways of working for themselves, and perhaps for others. This is a phenomenon we have observed in other industries.

Autonomous Interdependence The survey data at seven biotech firms confirmed both the relative freedom and the frequently interdependent nature of biotech work, a combination I call “autonomous interdependence”. Nearly all the workers reported a relatively high level of control of crucial factors for workplace flexibility: specifically, the timing, pacing, and place of work (see Chapter 5 for more detail on this “control” variable). Both men and women average 3.8 as a level of “control” on a scale of 1 to 5. Similarly, both men and women felt fairly satisfied with their flexibility in starting and quitting times: men reported 2.7 on a scale of 3 and women 2.6 that they could change their starting and quitting times as needed. More women than men (13% compared to 8%) were dissatisfied with their flexibility, but in both cases these are relatively small numbers of employees. Overall, a high number said they could change their schedules as needed and were satisfied with their flexibility.

As for interdependence, fully 54% of biotech workers surveyed (including 62% of men and 49% of women) said they needed access to co-workers “all the time” to do their job, and another 45% said they needed such access “some of the time” (including 47% of women and 37% of men). Note that more men need co-workers constantly, and more women need co-workers sometimes, suggesting that the women work more autonomously or provide more support for the men. Only 3% said they never needed access to co-workers. When asked about their need to get away from co-workers, 15 % of professionals said they needed uninterrupted time “all the time,” fully 77% said they needed uninterrupted time “some of the time,” and fewer than 6% said they never needed uninterrupted time. This suggests that in the way biotech work tends to be structured, co-workers are sometimes indispensable, and, at other times, employees need quiet blocks of time to concentrate, analyze data, write, or prepare presentations.

The complex pattern of combined interdependence and autonomy appears to be true in both senses—of needing others and needing time alone. Women particularly demonstrate a mix of requirements. This provides opportunities both for sharing work and its burdens or requirements, and for having one's own projects that work on one's own time schedule, more or less. Since 47% of male and 41% of female employees work at home beyond scheduled work hours on nights, weekends, or both, this suggests also that some work can be done outside the lab and by one's self. Women may work less at home because of their greater responsibilities there. (Those women who work outside regular scheduled hours average 4.5 hours per weekend at home, and men 3.9 hours, while men work 4.7 hours during the week at home on average, compared to women at 4.1, suggesting different patterns of home obligations.) This may be how they get their "quiet time" (Perlow 1997), but I suggest it is probably not sufficient. A majority of women (53%) and exactly half of men would prefer to work fewer hours in total. This compares to only 4% of women who would like to work more hours, and 8% of men; most of these are hourly-paid employees who are at the lower end of the pay scale and would make more money this way. Not surprisingly, 97% of salaried employees do not want to work more hours.¹³

All in all, both surveys and interviews confirmed that the work structure in biotech makes flexibility in scheduling and in conducting work eminently feasible, in a technical sense. However, cultural factors can still mitigate against it, as I discuss later in this chapter. Still I

¹³ Note that I did not ask them whether they would like to work more hours for more pay, or fewer hours for less pay; the question was intended to find out their hours preference irrespective of their economic concerns. But I suspect salaried employees would associate more hours with no more pay, and hourly employees the opposite. Whether salaried employees would accept fewer hours for less pay is not clear from these data, but that was not my primary interest here. Other studies have shown that many would, if this were an option (Schor 1991).

found no reason why biotech work had to be conducted in rigid ways either in place or in time.

Gender Equity Opportunity 3: A Scale Effect

Biotech benefits from a scale effect: hiring and promoting more women makes it more attractive to other women scientists, as well as to men with reasonable work expectations.

The relatively large number of women biologists and doctoral degree holders in the life sciences makes a positive difference for women's status in biotechnology (Simmons and Thurgood 1995). Women earn more degrees in the biological and life sciences than in other scientific disciplines and are found more often in these fields than in academia. In 1994, 42% of all doctorates in the life sciences were awarded to women, compared to 20% of physical sciences doctorates (Valian 1998).

So having sufficient numbers of trained women in the general fields of biology and life sciences helps make these more welcoming ones in which women can work. Kanter (1977) argues for a scale effect in companies: in other words, having sufficient numbers and percentages of women present effectively changes the workplace culture. When this occurs (although the necessary numbers or percentages are debatable), women are no longer "tokens," and they cease to be treated in the same way by both insiders and outsiders.

Women Not Tokens. It seemed clear to other researchers and me, from the beginnings of our studies, that women are not tokens in biotech (Radcliffe 1999; Liebeskind 1997; Powell, Koput, and Smith-Doerr 1996; Baron, March and Burton 1998). The presence of 40% to 50% of women in professional roles, in turn creates a different kind of culture in

which women are not structurally “the other”, and where their concerns are at least somewhat less likely to be marginalized, ignored, or diminished.

Hours of Work. One example of this scale effect that I observed was that hours of work in these firms were not extreme, at least as they might be expected to be for highly paid professional jobs. Half of the employees regularly worked more than 40 hours; the average was between 45 and 50. These are not short hours, especially when an average commute of one hour a day is added on, but they are not much different for women or for men. Perhaps men who might also like to be home for dinner benefit from the women’s more frequent need to leave between 5 and 6 PM. to pick up children or to get home for a meal; at least, that was the culture I observed in several firms. “Face time” became slightly less important, at least at the end of the day. Men who wanted to work reasonable hours were attracted to these jobs as well as women.

Interdisciplinary Work. Another interesting characteristic of biotech that seemed to create opportunities for women was that the firms were interdisciplinary in their very essence. Biotechnology companies hire biologists, microbiologists, biochemists, immunologists, chemists, and other kinds of scientists who must learn to work together. In the firms we studied, women were most likely to have a background in biological science fields, while men were more likely to be chemists, immunologists, physicists, or biochemists. So even within biotech firms, some typical gender biases of academic training are evident; yet in these cases, the interdisciplinary nature of the work encourages boundary-crossing and collegial work with men and women. This seemed of interest to both the men and women I interviewed, but especially to the women, who commented on it frequently.

Another effect of having qualified and well-trained women, combined with the typical structure of project management in the biotech firms I observed, is that the nature of the work

creates opportunities for women to gain management skills and thus to earn promotions to managerial roles. In most firms, Ph.D. scientists supervise other less-educated scientists and technicians to work on a series of tests, experiments, analyses, and research efforts that are often pulled together in a “project.” In fact, project management takes on distinct meanings in the scientific world, and provides excellent opportunities to demonstrate leadership, supervisory skills, judgment and decision-making, etc. (see Perin 1997 and Perin in Radcliffe 1999) for an anthropological analysis of project management work in biotech firms). These projects are by their nature collaborative and interdisciplinary, and their leaders also work closely with other project managers and directors in other areas of the firm, such as development, as well as with the research director. This provides opportunities for women to earn leadership positions, outside a context of affirmative action, or being promoted without knowing if this is the kind of work one likes (see Bailyn and Lynch 1983 on engineers).

Women Managers. I interviewed more women in management roles than men (women were 56% of the managers interviewed), although men were twice as likely to be managers among the survey respondents. Most Ph.D. scientists begin their work in biotech firms by managing at least one or two BS/MS-level scientists. This is not unlike their experiences as a post-doc, when PhDs managed them, and they themselves managed technicians and other less-credentialed employees. Then they advanced to managing a small group or a project, and so gained management experience in small steps. Those who are particularly skilled find themselves managing larger portions of the business. This does not appear to be true uniformly at the highest levels, but at mid-level women are managing projects and even departments. Still, only 15% of surveyed women, compared to 23% of surveyed men, were managers in their firms, at least in their own job definitions. This may be related to the smaller percentage of women in the survey sample who had completed their

doctoral degrees: 1 in 8 women respondents, compared to 1 in 5 men, had earned PhDs. But it is also likely that even women with comparable education are not as likely to have the business experience, financial resources, or the scientific networks to become the chief executives or very high-level managers (Powell *et al.* 1996).

Women's tenure, in the interview sample, is almost identical to men's, averaging 6.5 years. While advancement in biotech firms does not follow a single track, a single set of job titles, or even a predictable degree-based order, promotion still occurs for the majority of employees. This seems surprising in the insecure environments of the biopharmaceutical companies, but perhaps not so surprising when we realize that promotions are one of the few ways to reward employees. Giving them bonuses is difficult in tight financial times (always), giving them stock options is of limited value if the stock is hovering at a low value (as has happened in many firms), and interesting or luxurious travel and time off are both limited by the time requirements of the work.

Summary of Opportunities for Gender Equity

I identified three aspects of work structure in biotechnology firms which help to create "surprising" opportunities for women:

- First, the difficulties for women of succeeding in an academic science career make working at these firms more attractive. Even the significant uncertainty experienced in this industry is generic, and not particularly a risk for women, as it seems to be in academia.
- Second, the way work itself is structured and scheduled in these firms at least, seems to create potential flexibility in scheduling and work organization that is especially important to working women in two-career families. Specifically, the work is autonomous enough to

permit significant achievement and control but integrated enough to allow for support from others.

- Third, the number of women already in biotech firms creates a “virtuous cycle” of attracting other women as well as putting pressure on firms to meet women’s needs if they want to retain them over time.

In a related phenomenon, the structure of project management and doctoral supervision of projects creates opportunities for women to gain management skills and to earn promotions to managers.

BARRIERS TO GENDER EQUITY IN BIOTECHNOLOGY

Restrictions on Opportunity

The constraints on achieving a gender-equitable workplace in biotechnology firms also can be understood in three major ways:

1. First, variations in voluntary firm practices and cultures mean that any one firm, despite having the structural features mentioned above, may not in reality provide the opportunities that exist potentially.
2. Second, most flexibility or other family-friendly supportive policies still are negotiated individually rather than offered or implemented in a more systemic or collective manner. This means that individual managers’ beliefs and concerns often have a large impact on defining the work climate for a specific employee or group of employees.
3. Finally, despite the 50% presence of women in most biotech professional jobs, men still hold the top leadership and management positions in officer roles, boards of directors and advisors, and even senior managers’ jobs. This reduces the amount of equity that can be

achieved, both because of the lack of role models and also the lack of female experience in the most important decision-making roles.

While the work structures outlined above give biotech firms the opportunity and potential to create more gender-equitable environments, such environments are far from universally adopted. I identified a number of ways in which these equity-supportive influences were limited by current practices, old assumptions, or structures that inhibit full flexibility and adaptation to both work and family needs.

- First, firms vary considerably in their policies, practices, and philosophies which are supportive to women and men with significant family commitments. Even “innovations” such as part-time jobs can be highly satisfactory to everyone involved—and still forbidden—because of old assumptions about the requirements of work. Individual negotiation and discretionary accommodation remain the primary way to negotiate even the most basic alternate arrangements, which in turn undermines their effectiveness and equitable distribution.
- Second, promotions do not seem to be evenly distributed among employees, notwithstanding some of the aggregate data presented above. Doctoral degrees still seem to be necessary if women desire to move very far up the ladder in this industry, while men may be able to move up with lesser degrees. And women who are interested in alternative work schedules are seldom able to negotiate them if they are doctoral-degreed scientists, creating an additional inhibition to women’s promotion. Thus, men are still the main founders, board members, CEOs, and research directors of biotechnology firms, holding the most influential and well-compensated positions.
- Third, time and structure of work in biotech varies according to the specific projects, firm stage, and scientific subject matter, and also according to how the manager structures them,

or is willing to let employees structure them. This leads to a reluctance to innovate and a reinforcement of old assumptions unless top managers are committed to alternatives, or lower-level managers are able to protect their direct reports and support their interest in non-traditional or flexible ways to work.

Barrier to Equity 1: Particularity, Individualism, and Negotiation

Firms vary considerably in their policies, practices, and philosophies which are supportive to women. Non-traditional arrangements, and gender equity in general still depend on the particular firm, management, and time in the firm's history. Some firms clearly provide less friendly or supportive environments for women scientists than others. In Chapter 4, we saw that according to employees interviewed, BioCo was far more flexible than ImmuCo, and in Chapter 5, the survey results again showed significant differences between firms. If biotech companies are in a startup phase or in a highly competitive race to develop particular drugs, the long-term perspective I described may not characterize them. Certainly in *Making PCR*, Rabinow (1996) describes a culture of working extraordinarily long hours—24 to 48 hours at a time for weeks or months on end—on deadlines; these rival any long-hours descriptions of Silicon Valley. Also in *Billion Dollar Molecule*, Werth (1994) describes families collapsing as the nearly all-male scientific team sought to achieve their goals in tight competition with a university scientist.

Part of the variation among firms in the extent of flexible work practices is explained by the particular type of science being practiced, and part of it by the strong influence of individual CEOs (some of whom are fathers of young children themselves; the relatively few women CEOs tended to have older children). Part of the variation reveals itself in contrasting top management styles and strategies. HR directors, all members of the Human Resources

Committee of the Massachusetts Biotech Council, reported widely varying rules on hours of work, in a 1998 meeting of their subcommittee. Some firms were very flexible, others were completely rigid, and a number fell in between. Also in the MBC HR survey conducted by Radcliffe, nearly all employees still worked more than 40 hours a week on average, with managers averaging 47 hours a week (Radcliffe 1999). These are not family-friendly schedules.

Individual negotiation and discretion accommodation remain the primary ways to work out long-term alternative work arrangements between managers and employees, according to my interviews. This can undermine both their effectiveness and equitable distribution, thus making them less legitimate, especially in a small workplace. In some cases, one example will encourage another person to ask, but often the managers feel the need to deny a reasonable request because of their fears that “everyone will want this if I grant it this once.” These are often unfounded fears, at least based on my interviews; a shorter-hours or alternative work schedule does not work for everyone. This individualized approach also prevents taking systemic, collective look at the underlying structures of work and time demands.

In the survey, 461 employees were asked to rate to what extent they felt they needed to negotiate family/work conflict individually with their supervisor.¹⁴ As reported above in the section on Time, men gave an average “neither agree nor disagree” answer, while significantly more women tended to agree that they did have to negotiate ($p < 0.05$). A third of men said that they did not need to negotiate these issues, while only a quarter of women agreed with them.

¹⁴ I appreciate the assistance of a research assistant, Wellesley College student Jennifer Kiest, in analyzing these survey data.

However, the extent of individual negotiation required differed by company, and for men and women within companies. For instance, only 6% of employees at BioCo and GeneCo felt they had to negotiate “a great deal” their work-family issues, while nearly three times as many, 17%, felt that way at ImmuCo, the most rigid company, and 15% also did at Quattro, the largest company. Seventy percent of employees at all the companies felt they had to negotiate either “somewhat,” a “fair amount” or “a great deal,” and the variation between companies was not very high, with at least a third of employees at all companies (except in the non-FMLA very small companies) feeling they had to negotiate this issue “a fair amount.” For men and women, the biggest differences were at Quattro, where one-third of men felt they did not have to negotiate work-family much or at all, compared to only one-fifth of women. Fully 41% of ImmuCo women said they had to negotiate this a fair amount of the time, compared to 24% of men. But a similar number, 17% of women and 14% of men, felt they had to negotiate a “great deal.” This is the company, along with ImmuCo, that has the greatest individualized culture of negotiation, but it is an issue everywhere. Clearly, this fact reflects how firm policy is now implemented, with a particularistic emphasis. Later I show that significant numbers of both women and men do not believe these individualized decisions are made fairly.

A paradoxical effect of the high internal mobility documented above may be that it ties employees more closely to their current firm, especially those without doctoral or medical degrees. Ad hoc work-family flexibility and individual mobility may lead not to an overall, system-wide culture that creates innovative opportunities to integrate important realms of life, but rather to a series of individual successes and failures that depend on a variety of factors. These factors seemed to include the particular stance and opinions of a supervisor, the

flexibility of particular coworkers, and the specific kind of project work involved, as much as the firm's policies and practices.

Women may feel especially tied to the firm if their schedules depend on arrangements with a particular supervisor, or their family lives may fall apart if a supervisor leaves. Also, they do not know what to expect if their lives change, since flexibility is so individualized, and they may suffer from backlash since fathers and people with needs other than the care of young children may be denied flexibility. One woman who was denied a part-time schedule after the birth of her second child was terminated and then offered a no-benefits temporary contract to continue her job. While she took it, neither her morale nor her loyalty were encouraged by this practice.

Many women would have been interested in part-time work, at least when their children were young. Although a small number had arranged this in a flexible firm, it was definitely unusual, and none of the women were Ph.D. scientists, suggesting that professional career advancement is dependent on working full-time. Richard, a former HR manager in an unusually flexible biotech firm, said that women certainly have to demonstrate their value to a firm before requesting a part-time schedule. *"It is common if the person has worked there before maternity, to work out a part-time schedule. But it would be 'virtually impossible' to enter a firm as a part-time scientist. People typically do not hire part-time professionals, working 20 or 30 hours a week, not 40."* He still agreed that even this arrangement was restricted to women, that he has never seen or heard of a man working part-time in the industry, though he himself would have been interested!

Even if managers do grant part-time work to a limited number of non-Ph.D. scientists, each arrangement still has to be "individually negotiated" depending on the person and their job; it is not automatic. Landers, Rebitzer and Taylor (1996) point out that for certain

professional occupations, such as legal work, long hours are a “signaling” device to firms to show that employees are committed; even the request for part-time status, however temporary, would undermine one’s reputation for commitment. Biotech employers agreed with this analysis. Richard continued:

“If [Company X] ran an ad for part-time scientists, they would be flooded with applications, and it would be mostly female. It is not a standard benefit, even though a lot of people would like it. I have seen that it is mostly women who do the child rearing. I have never seen a part-time male scientist. I tried to get a 25-hour workweek as the VP of HR [in my firm], which would not be much different than I am in the office when I travel, but it was not acceptable. I think people, men I mean, are worried that they will be seen as ‘not committed.’ That is the problem women have.”

One woman had not wanted to work part-time, but she became pregnant with her second child sooner than she expected and had trouble finding adequate daycare for the first son. Then, she found that daycare with two kids was too expensive, particularly in her uncertain work climate. *“There also was not a lot of job security for me,”* she said. She told me that she had moved her son from being cared by her at home, to a first daycare provider, who was unsatisfactory, to the second daycare provider, back home again with her, and she didn’t want to move him to yet another daycare provider. So, she felt very “fortunate” to arrange a half-time job, compressed into two long workdays, and to arrange for family daycare when she could not be at home.

If something happened to the company, what would she do? I asked. She replied,

“I would look for a part-time job, but I have little or no hope of finding one. It’s very hard to find a part-time job in this industry—I only have one because I already worked here. You work on very specific products, and so much of your time in the first couple years, is spent reading, and catching up on the literature—the companies don’t see it as worthwhile to invest that in you if you are part-time.”

I asked if she could work for a company with a similar product, but she said, *“No, you have to sign an agreement when you come to work there that you won’t go to work for the*

competition for at least a year.” She said, “You can look, but not find part-time. You have to be established somewhere.”

Other professionals I interviewed agreed. One female Ph.D. scientist explained that she had put off child-bearing when she changed jobs, as she had to demonstrate her commitment as a full-time employee before becoming pregnant with a second child. After three years and two promotions, she felt established enough, but she was now just over 40 and was having difficulty with conception. Her five-year old daughter might end up being an only child as a result of the need to “prove” her commitment, and this clearly made her and her husband unhappy. I heard other stories of equal seriousness; it seems many fundamental decisions are affected by the concerns of employees and managers about demonstrating their hard-working commitment to the work, regardless of the consequences to their family plans.

More unacceptable choices had appeared to male employees as well if their wives were in scientific careers. I asked one employee, Leroy, about his plans for having children. He responded, “Maybe,” explaining that his scientist wife had just changed jobs, going to Boston University to work. In her previous job, having children was not an option, apparently.

“She hated it there. She was in a difficult situation. The big question is whether there is time for this. There never was while she was at Massachusetts General... and in addition, all three women who had kids while she was there were fired! They were said to be ‘not available’ for the long hours that were required. She was told that for women in science, that’s how it was.”

And it wasn’t just an issue of men thinking this either. Her supervisor was a woman who didn’t believe that women scientists should have children! Leroy says that he is unfortunately familiar with this argument because his first and last boss before this said that if you “*have no children you can do good science.*” So, they may not have kids. “*It would be a lot more work. It’s not equal, especially for women, but it’s a fact. Especially it’s true that often people have no kids with two people in science.*” As of the writing of this thesis, Leroy

and his wife, who were in their late 30s, had not found it possible to have children without severe career consequences.

I was unable to find many innovative arrangements besides the occasional part-time work schedule, although a large number of employees indicated that they would like to be able to work outside their usual office or lab space at least some of the time. Nearly half of women and men already work at home, but they do this for the most part above and beyond scheduled work hours. Most people who have children do work at home sometimes; only 78 women and men with children do not work at home beyond scheduled hours (of a total of 342 employees with children). Of employees without children, the women are equally split between those who work at home and those who do not, while childless men are slightly more likely than not to work at home.

But nearly half of all employees would like to work more at home during work time, 42% of all the survey respondents. This included 33% of scientists, relatively evenly divided between men and women. Of managers and supervisors, fully two-thirds of women and one-third of men would like to work more from home, while half the men and one-fifth of women say it's not possible, and about 20% of men and women prefer not to work at home. For other professionals, 45% of them would like to work more at home, 36% say it's not possible and 19% aren't interested. Most interesting in these results is that while more women than men both want to and don't want to work at home, men are more likely to say it's not possible in their jobs, while women are more likely to say it is possible! Since except for management, men and women are relatively equally divided into job categories, this suggests that whether work can be done at home is somewhat related to whether you want to work at home and how you see it can be done.

Wanting to do some portion of work at home does not seem to be directly related to having children, as more employees without children prefer to work at home than those with children. In all, 48% of all women with children and 55% of all women without children would like to work more at home. For men, 40% of those with children would like to work at home more, and 47% of those without would. For both men and women with children, about 18% would not like to work more at home. Those with children who say it is not possible in their job to work more at home include 32% of mothers and 44% of fathers. For those without children, 42% of both women and men say it's not possible in their jobs, and 22% of women and 13% of men do not want to work more at home,

I have tried to show in this section that alternative schedules do exist, can be productive according to job incumbents and their supervisors, and are even mandated in some places for production reasons (GeneCo, where weekend work is routinely required, is on a 4-day, 40-hour schedule for many employees, where one day is a weekend day). Yet, in other workplaces, non-standard work arrangements (NSWAs) are relatively infrequent, despite a high demand for them, especially from managers and supervisors, and women. When they do exist, it is often in a patchwork, catch-as-catch-can way, with many cultural assumptions constraining them. The woman who had to take a 20-hour a week job because of childcare problems was discouraged about her work; she found her present work somewhat repetitive and boring, but “someone has to do it.” Like employees in other work-family studies (see Bailyn 1993, for example), she felt she had to be “grateful” for her part-time accommodation and give up hope of interesting work if she was not working 40 to 50 hours a week. For firms that are generally thought of as newer, “nimble” and more flexible, biotech companies

still seem embedded in fairly traditional assumptions and completely individual arrangements about work structure and productivity.¹⁵

Barrier to Gender Equity 2: Degrees, Previous Jobs, and Promotions

In general, degrees still seem to matter in biotechnology, in different ways for women and for men. In my interviews, I found that some men were able to move up with lesser degrees provided they proved themselves as creative individuals. The women who had been promoted in the firms nearly all had PhDs. Men non-Ph.D. scientists seemed to have advanced further than women with similar credentials, though their careers were slightly more uneven and idiosyncratic. One male BS scientist became an associate director, even though he does not manage a group; he is recognized as the source of many creative ideas by everyone in the firm, but his career path is defined by many as “unique.” In ImmuCo, two male BS Research Associates advanced through the ranks to Scientist jobs, one without being promoted to Associate Scientist first. One male BS employee who entered as a temporary quality control technician has not only been hired on a permanent basis, but was promoted to Research Associate II during his seven years with the company. Two women BS associate scientists with long tenure became Scientists 1 at BioCo, but they are unusual.

These promotion patterns suggest that for women, the doctoral degree is still an essential “entry” pass to high level scientific jobs at this level, while not necessarily so to the same degree for men. It may be that women with Ph.Ds compete well with men without

¹⁵ Of course in one sense, biotechnology would not be expected to have a model of “collective” rights or action; most of the employees are highly educated ‘knowledge workers’ who have been nurtured and tested in a culture of individual accomplishment in graduate programs in science. As far as I know, there are no unions in biotech firms, so collective negotiation or systemic scheduling that applies to everyone were virtually unheard of concepts to my informants.

Ph.Ds in this kind of firm, knowing they have the type of respected, credentialed knowledge that firms require (annual reports, FDA applications, and other public documents often cite the number of Ph.D scientists as a major asset or resource of the firm).

The survey showed somewhat different gender patterns for promotions, while confirming frequent promotions. For promotions in general, 64% of all employees have been promoted within their current company, with no gender differences. Of the 265 employees (58%) who had been promoted multiple times, again the numbers are almost equal. Just over half of men and women had been promoted more than once. But 28% of men, compared to 20% of women, had been promoted three or more times. Of those expecting promotion, 72% of women and 71% of men did expect a promotion, again almost identical numbers. A few more college degreed men (57%) than women (50%) have been promoted. But 72% of female Ph.Ds have been promoted multiple times, compared to 48% of male PhDs. Perhaps this last figure, although exceptional and involving small numbers, portends a transition to more gender equity in process. Alternatively, perhaps the first promotion or two are nearly pro-forma, a way of recognizing seniority, while more extensive promotions are where the gain in position and power really come. It is difficult to tell from these data, although we know that men came in having earned previously higher salaries than women, so perhaps they started at higher levels in the organization as well. Further research in this area is indicated, as promotions seem to be both routine and expected in the industry, and yet are not systematic in their implementation as far as I could tell, particularly in examining promotions to the highest levels of leadership.

Men are still the main founders, board members, CEOs, and research directors of biotechnology firms, holding the most influential and well-compensated positions. Perhaps one reason is that many men have more support at home, as shown in Chapters 4 and 5.

This would allow them to put in the long hours traditionally associated with being an officer of an entrepreneurial company.

Only about 4 or 5 of 130 biotechnology CEOs in Massachusetts are women, less than 4% in all. Data on other top management jobs are elusive, but if the ten firms where I conducted interviews and observation are typical, and Massachusetts Biotech Council official confirmed this, most of them are occupied by men. These jobs include directors of research and/or development, department heads, as well as CEOs. This is even true to some extent of project directors.

In my interview sample, men had done better in overall number and magnitude of promotions than women, just as in the survey data. Assuming there are no systematic differences in competence, perhaps this has something to do with the greater burden of combined domestic and market work that most of the women carry. Most of the women have relatively little support at home to deal with family demands, while between half and two-thirds of men with children do have wives at home at least part-time. Of those I interviewed who had been promoted furthest and fastest, two single men without children and three fathers with significant home support had done the best, moving to higher level jobs much faster than women who were parents without such support.

One male scientist I interviewed expressed his opinion that women scientists have a harder time getting recognized for their work, both based on his own experience in a small startup. Terrence said,

“They do the same things, the same science. Women have more of an uphill battle, I think. The glass ceiling is still there. I’m privileged in being a man; I’m not a threat to anybody in terms of my success threatening anyone’s masculinity. That’s still there, I see it with the women PIs [Principal Investigators] in the research institute. They have to work a little harder, make sure their data is more solid, they get more criticism than men do. It’s grossly unfair, I’m ashamed of it, but it’s real... Most criticisms come up in work in progress seminars, which take place once a week—

everyone presents on a two to three year cycle. When the women present there, they get taken apart— more so than the men.”

One woman Ph.D. scientist manager, Rio, at a successful growing biotech firm told me she knows only two women who have made it into top leadership in biotech. One, Vicki Sato, is a Vice President at Vertex, and another was the research director at Ariad Pharmaceuticals in Cambridge. I later learned that the female research director had just returned to academic work. Rio told me that biotech is a “business not a science,” which had been a big lesson to her. *“So the strategic direction, the growth, the vision, are important. That may be why there are fewer women in leadership, because it’s not about good science, where women often shine, but about business, which is far less open to women.”* Perhaps her hypothesis is right.

I told Rio that Vicki Sato, the Vertex Vice President, had explained to me that she only took off two weeks when her second child was born. Further, for one of them she had been hospitalized because of the difficult birth. Even though this was before the Family and Medical Leave Act, about eight years ago, I was surprised, as most maternity leaves are a minimum of six weeks, especially with hospitalization. Rio told me she too had only taken two weeks off when she had each of her two children. This seemed remarkable, and a sign of extensive visible dedication to work and career that only affected women.

Men were affected by the same culture, though. Even with the FMLA in effect, which entitled them to three months’ leave for the birth of a child, most men in biotech reported not taking paternity leaves; some took a week or so of vacation when they became new fathers, but most barely took that. The culture of attending to work no matter what was pervasive enough that besides Vicki’s and Rio’s stories, I heard similar “heroic” tales from

other women. One told me she had worked up until the day of her delivery, even though it became progressively harder to use the microscope with her expanding waistline.

So the culture of each company has a great deal to do not only with how promotions are distributed, but how much pressure to work continuous full-time hours exists. Even in the most flexible firms, there were obvious remnants and internalized experiences among employees of a more rigid and less accepting culture of work. While this affects both men and women negatively, I have tried to show that it affects women more predictably and more often, at least if they are having families, as 85% of women do.

Gender Equity Barrier 3: Specificity in Work Structures

Time and structure of work in biotech varies according to the specific work, the life stage of the firm, and how the manager structures the project and the coordination.

While I identified and documented a number of work structures that were flexible, or potentially so, each workplace has its own requirements and culture which are very much related to the particular manager's approach. Development professionals seemed to have a more manufacturing-related approach than researchers, for instance. This meant they were more concerned about time, keeping to deadlines, making consistent and sometimes rigid rules for everyone, etc. Research directors seemed to know that some work is done regardless of plans or scheduled hours; as one scientist said, "*I often get my best ideas in the shower.*" Some research directors were more inclined than others to recognize this and to trust their scientists to use time well. In contrast, some managers still seem to adhere to traditional assumptions that more hours automatically lead to more productivity, and that employees' presence at work, is required to ascertain that they are really working, even when working at

home might be more effective. In some cases, this may be true; in others, it was assumed rather than tested.

Some rare managers were more thoughtful and willing to bend. One such manager, a female Ph.D. biologist, said, *“People have very different work styles. Some people work full out and can get more done in 7 hours than some other people who work 10 hours a day.”*

One is not necessarily a better worker than the other, she said, but *“most people’s work is not set up where number of (assay) plates done per day is important as a measure or a real indicator of productivity.”* (Assays are tests of proteins or other biological agents, and are usually conducted in large batches that have to be assembled simultaneously, not in a very creative context.) She thinks *“slower people tend to be good at more analytical kind of work, compared with faster people who are more data churning people. So the trick is to try to get people to do things they are the best at. You can’t make everybody into one thing.”*

When asked how she managed people’s work, she said, *“I try to deal with content, not time... Most people probably can do their jobs in a 40-hour week”*. However, this manager was worried that the CEO would “probably die” if that person found out what she had said about 40 hours. When assured her identity was confidential, she elaborated, *“But I just don’t believe that more hours is more productivity. If you expect 60 hours a week of people, I find that they burn out. Once they burn out, they can’t do much of anything well.”*

Part-time schedules negotiated (individually) at one of the companies were described as very satisfactory to both employees and their supervisors. One employee works 20 hours weekly during two days, coming in one weekend day and working one long day during the week. This allows her to monitor cell cultures and experiments at odd hours so that others do not have to check them then, and enables her family members to care for her children.

Another woman works 30 hours weekly, the minimum for benefit eligibility, but would prefer

to work fewer if she could and still have the right to insurance. All the part-time employees (and their managers) were pleased with the amount of work they are doing on these schedules. The women said they were even more productive as part-timers than they were as full-timers, because they focus more intently on what they have to get done in more limited time.

However, at another firm, the company still has a policy against part-time work, and still another firm makes it a case-by-case negotiation which is not always successful at meeting the employees' needs. The scientists too, all women, find themselves feeling "grateful" for this opportunity rather than as if they are contributing effectively to both their work and home obligations. So it appears that individual arrangements do not suffice to create a climate of equal constraint and opportunity for men and women.

Further, the Radcliffe survey of Massachusetts HR directors showed that in their estimates, 95% of all jobs are still full-time. In my survey data, 99% of the men and 95% of the women worked full time, though more than half of them would have preferred to work fewer hours. This does not suggest a widespread pattern of adaptation to family circumstances.

These examples about part-time work are really only manifestations of more traditional attitudes about work—that then interfere with the potential innovations and adaptations to make work, promotions, productivity, and work-family integration more accessible to men and women. Because biotech firms are so different in the specific nature of the work their scientists are doing, no single model of work organization is sufficient. Some work involves screening assays, thousands at a time, while other work involves altering genetic materials under tremendous magnification, and still other work involves testing and harvesting recombinant DNA in animal models. While there are similarities (e.g., in all cases, lab

notebooks and scrupulous documentation should be kept, for the FDA as well as for future employees), there are many differences. In each stage, a firm may set priorities on different kinds of work. Yet if its leaders want continuity and expertise in its workforce, it would seem logical to do whatever possible, within reason, to keep people loyal and tied to the firm itself. We know, not only from this research, but also from the work of others, that flexible work schedules are one thing that does accomplish that. One biotech executive spoke eloquently when she said she would rather work with people she knows, whose skills are known, and who have working relationships with her other scientists, than take the time, cost, and risk of hiring someone unknown who might not work out. She felt this even though the market was full of skilled people looking for new jobs after a local layoff.

I propose that the “old attitudes” I have described, which are not borne out as necessary in the work processes I observed, interviews I conducted, or surveys that nearly 500 employees answered, stand in the way of retaining and supporting skilled employees, particularly women.

CONCLUSIONS

I conclude that biotechnology firms can (and some do) offer surprising opportunities for women to succeed in R&D and industrial settings. These opportunities in turn create a virtuous cycle that draws more women into the field and create precedents, for instance, for successful part-time work experiences that could be imitated. Gaining managerial experience for women, through project management, provides an important path to promotion. However, I caution that the flexibility and opportunities I find are still very much distributed individually and differ at a firm level, and they are dependent on a particularly happy

combination of circumstances. For fuller gender equity to be achieved, and for women to advance further and faster to their appropriate ratios in top levels of management and leadership, these innovations would need to be shared among all employees, whether women or men, and more firms. They would need to become part of the “culture of the workplace” to truly eliminate both structural deficits and individual discrimination, both of which still, unfortunately, exist.

Another important point is that none of the situations of younger women and men will stay the same, over the years. As Kathleen Gerson noted in 1985:

Women as well as men are increasingly likely to experience change over the course of their lives. Women are increasingly likely to move in and out of a diversity of work and family arrangements throughout adulthood.... Among women coming of age today, there is no single dominant pattern of adult development. Life course in adulthood has become more fluid, more diverse, less stable, exposing increasing number of women to unanticipated events that are likely to induce and maybe require change (1985:214).

So meeting employees’ needs today does not have to mean changing work in the same way forever. Instead, taking a flexible and innovative attitude to boundaries between work and home, and to getting work done in new ways, could pay off over the generations as well as immediately.

Conclusions and Implications

REVIEW OF ARGUMENTS AND FINDINGS

I sought to address two major research questions in this dissertation:

- What dynamics at work, particularly related to time, boundaries, or control of schedules or work process, influence satisfaction at work and home, commitment to the company, well-being, and gender equity?
- Under what conditions are “family-friendly” practices by firms, as they are actually experienced in a day-to-day context by employees, associated with positive outcomes for firms and employees?

To answer these questions, I examined the boundary between paid work and home life from the perspective of a group of professional employees of small and medium size high-technology firms in the life sciences. The employees are relatively young, and most are married with small children. Thus work-family issues are highly salient to them. The gender balance between men and women professionals in this new industry is as even as anywhere else in the U.S., so it could provide unique opportunities for gender equity. The firms, while often unstable financially, have good reasons to want to retain highly educated employees

who contribute to their very specific research and discovery activities. So organizational commitment, employee satisfaction and well-being are meaningful outcomes to firms as well as to employees.

I identify four major learnings, or contributions, in the research presented here in response to those questions.

First, I found that at least three conditions are necessary before employees in situations of high demands report experiencing “integrated satisfaction” (at both home and work).

- First, they require **significant flexibility at work**, including the ability to change their schedules to meet outside obligations, sometimes on a daily or weekly basis.
- Second, and related to the first, they require “**control**” at work of key aspects of their jobs, including the pace, place, and timing of work processes. This requirement is similar to traditional measures of autonomy, but specifies more precisely what parts of autonomy are important. It is not so much the ability to decide “what” to do at any given moment or on any day, but how to do it, when, and where, within the constraints of the work itself.
- Third, employees who report integrated satisfaction nearly all have **support at home**, of the type which can rarely be provided if they are married to or partnered with another full-time worker. Thus, support at home exists for a relatively small percentage of professional employees, mostly men whose wives work part-time.

When a professional has flexibility at work, control at work, and support at home, the person often reports satisfaction in both realms. Alternatively, when someone holds a high position in the hierarchy, he or she can often purchase support at home, and require others to

work around their schedules at the office or lab. Yet fewer than 15% of those I interviewed and surveyed have such favorable combinations of work and family conditions. For professionals with high demands but without these job and home characteristics, stress and problems are likely unless either work or home demands can be adjusted.

For work demands to be reasonable, a job must ordinarily require 45 hours or fewer a week, not involve extensive travel, and have an appropriate level of responsibility for the authority the job has been given. It appears easier to adjust demands at work than at home, at least if one does not want to leave children in outside care for 12 hours a day. At the same time, situations of high home demands are generally limited in duration. Lives change, as children grow and depart, or as parents age and require more care. Those without children at home have fewer constraints on work time than their coworkers, but most people have children sometime during their lives. Life course analysis, as exemplified in the work of Phyllis Moen (1996) and her colleagues, is vital to exploring changes in demands and accommodations to family life over time.

Time itself is another area where work literature and family literature overlap and can be compared and integrated in studies like this dissertation. Different conceptions of time might promote different institutional “logics of action” (Friedland 1991) in the workplace and in family settings. We might distinguish different kinds of time, such as project time, something like Gersick’s (1994) ‘time as an arrow’ that has a beginning, middle, and end. Budget and birthday times are more like ‘time as a cycle’ (Gersick 1994), with repeating patterns on a regular basis. I might add a notion of “time as a spiral,” in which project types repeat, but with different levels of knowledge and understanding each time, building on past learning, like research or strategic planning. Family time might be more repetitive and

cyclic, and at the same time, growth and aging constitutes time as an arrow at least in the journey from birth to death. Some events can be postponed or changed in time, others demand immediate attention. These may vary between work and family realms, or overlap. I barely begin to identify these issues in this dissertation. In examining both work and home in this setting, I concur with Bailyn's (1993) insight that planning itself may increase flexibility, and that measures other than simple "time spent" are most useful in evaluating outcomes.

The second contribution of this dissertation is an identification of the conditions under which organizational policies and practices meant to be "family-friendly" or "family-supportive" actually function to help employees. I learned that what really matters in influencing organizational commitment and satisfaction was the employees' perceptions of whether they "felt free" to use the policies. Surprisingly, neither formal nor informal policies' existence in these companies had a reliably positive relationship with organizational commitment or satisfaction, but "perceived usable" policies do relate positively to both. This relationship is especially strong for satisfaction, after controlling for a variety of other factors.

I also found that commitment, satisfaction, and well-being are all predicted by "control," focused not on work-family boundaries, but on the employee's ability to decide on the time, place, and pace of his or her work. Both "perceived usability" and "control" were small (in magnitude) but reliable predictors of commitment and satisfaction, along with working for a larger and more stable biotechnology company.

A third contribution of this dissertation is to gender studies and gender understanding. I found, as have others, that greater control at work is positively related to

well-being for both women and men. I also found that gender is the strongest negative predictor of well-being. In other words, being female is the best predictor of physical symptoms of stress—at least if you are a full-time biotech employee. For an explanation, we can look to the household division of labor, and the fact that almost no women have support at home, despite greater responsibilities on average than men. This imbalance is changing. In 1965, U.S. men did about 20% of the total housework and childcare (reported by both genders), and women did 80% (Converse and Juster 1980). More recently, Pleck (1997) reported that the proportional engagement of fathers in childcare is 43% that of mothers, and their accessibility to children is 65% that of the mothers' accessibility. The ratios are narrowing, but Hochschild (1989) and Schor (1991) report that women on average still do one extra month of total paid and unpaid work a year compared to men on average. For now, full-time working women especially seem to pay the price with high stress.

A fourth contribution of this dissertation is to the literature on organizational commitment and careers. For years, career scholars have viewed career paths individualistically. And commitment scholars have investigated commitment as an individual-level variable. I show in this dissertation that employees' decisions about work are not made in a vacuum, thinking mainly about themselves or even about their jobs. This is a simplifying error initiated by economists (Becker 1964). Researchers can explain a small percentage of variance in how people choose their careers by looking at traditional factors like human capital, parental or class influences, opportunities for making more money, etc. A large percentage remains unexplained. I argue one reason is that researchers often fail to evaluate the extent to which people are embedded in relationships and families. These

relationships profoundly affect their choice of career in the first place, and also whether they stay in a job and for how long.

Family status does make a difference in my study—single parents are the most committed to their jobs, and married parents with support at home are second most committed. For those who are not parents, I found that a specific job is not so binding, and change is less complicated. For those with two incomes and two careers, I suspect that change is more of an option, and sometimes more of a necessity when one person must move on for some reason. Without looking at the “whole person,” scholars and employers miss a large part of what is important to people. At the same time, rumors of wholesale abandonment of commitment to organizations are overstated (see Arthur and Rousseau 1996). In the past, researchers (e.g. Abbott 1988) found that professionals are generally more loyal to their profession or occupation than to a specific firm. In part this can be explained by the fact that their skills are related to their professional identity and their accomplishments in a larger professional world. They are less like firm-specific skills, which we might associate with an autoworker at a car plant who begins a job with a few general skills and learns specific additional skills related to that company’s jobs over time. Thus, we would not expect to find strong internal labor markets for professionals, in comparison with some blue collar workers (Doeringer and Piore 1985, Osterman 1985).

I show here that professionals in biotechnology exhibit greater firm and organizational loyalty than we might expect based on this human capital theory, and also given the changing expectations of the social contract (Kochan 1999, Eaton 2000b). The average tenure of survey respondents was nearly 5 years in companies that are barely 10 or

15 years old. The average tenure of professionals interviewed in the case study companies was even higher, nearly 7 years.

How can we explain this? I argue that work-family policies, practices, and effective integration of their work and non-work lives make a bigger difference in day-to-day lives than one might predict from most careers research (Fletcher and Bailyn 1997 is an exception). These biotech firms have helped this commitment along by promoting at least two-thirds of their employees, and fully 71% of employees expect to be promoted again soon. Employees are also subject to inertia, ties to coworker relationships, sunk costs, commuting considerations, and sometimes 401Ks or stock options. Although I cannot specify the exact role of work-family concerns based on this research, I hope that researchers will attend to these when studying internal labor markets or career changes in the future.

This dissertation challenges, once again, assumptions about the traditional separation of spheres, such that men's primary work is in the public paid sector and women's primary work in the private unpaid sector. These assumptions no longer hold, when fewer than 12% of households fit the stereotype of the 1950s. Fully 40% of women are heads of household, and 99% will work full-time in their lives. Yet, many cultural effects of these hidden assumptions are still strong in the U.S. The separation of spheres has led to gender inequity at the social level. Women have had a hard time achieving equal status in the workplace, and men have had difficulty spending time and energy at home, while pressured to be the main breadwinners in a family. And because work at home is still unequally distributed, women are on average less available to work long hours in the public sphere, or they have to pay a high price in "privatizing" commitments to family and home, through long days at childcare,

fast food, and so forth. Men also pay a price, forfeiting time with children and community, or having to settle for less rewarding work if they seek to limit their hours.

One reason I chose the biotech sector was the relative parity of men and women in most professional jobs. As one might predict, newer industries like biotech hold great promise for women professional workers. Biotechnology firms do not have old, highly institutionalized cultures that restrict women's roles and potential. Their high pay rates, relatively reasonable hours (nearly half the employees reported working less than 45 hours a week), and high representation of women already working there serve to attract more women, in a kind of "virtuous cycle" for gender equity on the job.

However, and surprisingly, many factors we associate with older, more institutionalized workplaces (see, for example, Rapoport and Bailyn *et al* 1996) have transferred with little change to the biotech sphere. Individualized arrangements for flexible schedules are still the norm; such schedules are seen as rewards, not simply as efficient ways for employees to get their work done. Collective opportunities to utilize flexible scheduling, job sharing, or part-time work opportunities are generally discouraged, and even in the most flexible, they are idiosyncratically available. The fact that men get so much more support at home on average still permits them to put in extra hours, long travel days and weeks, and other high-commitment activities often associated with officer or high-ranking status in small start-up firms. While some women have managed to do this, none with young children did in my study; the long-hour/high-profile/high-reward jobs were often filled by men with young families or by older women.

As in the rest of the economy, men make more money from the very beginning—usually reflecting that they made more money in their previous jobs. Men also get promoted

more and farther, it seems, even when they are working reasonable hours. While the structure of the work in biotechnology does not mandate long crisis-oriented deadline-focused days and nights in many cases, most women have not yet been able to take advantage of the potential existing in this industry. At the same time, most are glad they chose it, compared to their alternatives in academia, pharmaceutical companies, or nonprofit research institutes.

I was surprised to find that opportunities for innovations in work process are rarely realized in biotechnology firms. Managers in biotech also seem reluctant to try flexible new arrangements as they do in older workplaces. Female employees felt they should be grateful for part-time jobs, or a half hour's flexibility in arrival time, even if they worked at home frequently when they were not at the workplace. Productivity still seemed to be defined in part by the number of hours worked, rather than the amount accomplished. Creativity, essential in research and discovery, was rarely encouraged by simple things like freeing people from routines and habits. Work and family were still primarily assumed to be conflicting competing realms, rather than areas of life that could be synergistic, complementary, or integrated by the choice of the participants in them (Bailyn 1993).

I address one additional outstanding question in the work-family literature in this dissertation. MacDermid and colleagues have argued that small firms tend to be more flexible on work-family issues (1994, 1999). However, I found that the smallness of the biotech firms seemed to cut both ways on the question of boundary. On the one hand, everyone knew everyone else, and they filled in for each other to cover work if they were so inclined. On the other hand, each person's presence or absence was quickly noticeable, and without a change in culture and expectations, that put more pressure on people to 'be there.'

The informality of decision making meant that coming in early or staying late might enabled you to have a discussion that would result in an important decision—without a formal meeting ever being called. And these small workplaces were experienced as more volatile and insecure, a condition that did nothing to promote family stability or peace of mind for employees.

CONTRIBUTIONS TO THEORY

Flexibility in Work Arrangements

Underlying the findings summarized above is the importance of flexibility in work arrangements. Research on flexibility in the workplace is carried out in two main domains: one is in management studies, including industrial relations, and focuses on changing organizational and customer requirements, relationships to suppliers, reducing rigidity in work rules, setting up 'just in time' inventories, and cross-training employees. Research of that type is generally conducted primarily in industrial and telecommunications workplaces, where flexible response times and customized production are more prominent features of the work than in biotech (MacDuffie 1996; Kochan and Osterman 1994; Ichniowski *et al.* 1996). It also includes recent studies on the service sector that focus on discretion for front-line workers, developing teams that are closer to the customers, and combining different services across traditional job boundaries in telecommunications, health care, airlines, information technology, and banking (Batt 1998; Appelbaum and Batt 1994, Frenkel *et al.* 1999, Eaton 2000a, Ichniowski 1999, Preuss 1999, Charns and Gittel 2000, Gittel 1998). In all these

customer-focused arrangements, flexibility is important and necessary in the design of the work from the perspective of employers, though not necessarily for individual employees.

The second domain of flexibility scholarship focuses on flexibility related to scheduling and is often connected with work-family studies. Research on telecommuting, compressed work weeks, flextime and flex place, and other innovations to do with work timing and location fall into this category (Perin 1991, 1997; Rayman and Bookman 1999; Sirianni 1990). In these studies, employees can sometimes change schedules as needed, have back ups arranged both at work and home, and are less constrained by traditional assumptions about the organization of work.

A small but growing literature connects the two, as this dissertation does. The theoretical contribution is to focus on the potential synergies between work scheduling that meets the needs of employees (and simultaneously gives them more control of their daily schedules) and work process organization that meets the needs of customers, whether internal or external. In some cases, researchers have shown that engaging with work-family dilemmas can lead to new ways of organizing work, as in studies by Rapoport and Bailyn (1999), Drago *et al.* (2000), and Perlow (1997). Some authors have argued that the two are intertwined in numerous areas of the economy, such as health care, software and high tech, and consulting (see, for instance, Rapoport and Bailyn *et al.* 1996 on reprographics; Perlow 1998 on software design; Fletcher 1999 on engineering; Eaton 2000b on nursing homes; Appelbaum *et al.* 2000 on medical instruments; Herzberg *et al.* 1998 on other industries).

This study makes a contribution to bringing these two disparate literatures together by examining carefully the actual structure of biotechnology work organization, such as the way experiments are scheduled and the amount of control that specific scientists have over their

work schedules and pace. But unlike most studies focused on details of work organization, this study incorporates employees' demands at home and on the boundary between work and home, such as commuting time and whether they pick up or drop off others on the way to and from work. In the study I found evidence of important flexibility related to work organization. Specifically, a combination of autonomy, close co-worker relations, and control—what I call “autonomous interdependence”—seems to be important. It also has strong implications for work and family integration and satisfaction.

“Social Contracts” in Employment

A second area of theory to which I contribute concerns the “social contract” in employment. Both industrial relations scholars (Kochan 2000) and psychologists and organization scholars (Rousseau 1995) have addressed this issue. Scholars are particularly concerned with what is happening in newer industries like biotechnology. While the professional employees I studied are not hopping from job to job, they feel less tied to a single firm than their fathers might have in the past. Few agreed that they would turn down another job for more pay to stay with their organization, even if they were positively identified with the company, willing to work harder than necessary to help it succeed, and so on. Fully 80% of them don't expect employers to offer lifetime employment. Researchers may have to change their idea of what “commitment” means. Maybe it should no longer be focused so much on sacrificing for work and on willingness to stay at the company. Perhaps one can be highly committed while one is at a job, but not necessarily be willing to commit to long hours, to staying for a long time if family or work circumstances do not mesh well

with each other. I suggest a reconstruction and reconsideration of commitment scales in light of these new data.

Gender Inequities at Home and at Work

Finally, I sought to specifically identify ways in which gender inequity at home and on the job are intertwined. Not only are men and women enmeshed in a whole set of relationships in family and community as well as the workplace, but they have entire life histories of gendered experience which do not disappear overnight. A woman's feeling of responsibility for not keeping a child in daycare longer than 8 hours may mean that she does not stay late to do the extra experiment that will get her promoted. A man's feeling of responsibility to manage a crisis at work may mean that he has to give up eating dinner with his children. These decisions are not independent of each other, and they are not made in a gender-neutral context. Until employers are willing to change their notions of "real work" and the "ideal worker" (Bailyn 1993, Williams 2000), gender inequity based on hours and "face time" is likely to continue, even where hours are not the crucial factor in productivity.

New Measure of "Perceived Usability"

In the dissertation, I also contribute a new measure to work-family researchers: the concept of "perceived usability" of work-family flexibility policies. Because these policies are almost always made available "with the permission of the supervisor," or "at management's discretion," researchers need a reliable way to measure employees' real experiences with them. At least in this study, the measure I call "perceived usability" predicts results for the employees and the firm. How to change employees' perceptions, if

one wanted to, would be a topic for another study. Those who did not “feel free” to use the policies said mainly it was because of concern for their careers, or that their supervisors might disapprove, or that their work was not organized in such a way that they could.

IMPLICATIONS FOR PUBLIC POLICY AND PRACTICES

U.S. public policy had not been significantly amended since the 1930s in the area of work-family intersections, at least at the federal level, until the Family and Medical Leave Act (FMLA) of 1993. However, the FMLA excludes half of all workplaces, i.e., those with fewer than 50 employees, which includes a number of biotechnology firms. Also excluded are “essential” employees, a nebulous definition at best and one that comprises a good portion of a biotech firm’s top-level managers as well as those who have not worked at least 1,000 hours in one year for one employer.

Despite these limitations in the law, I found that federal policy made a difference, both in covered and non-covered workplaces. FMLA guidelines were observed, as a normative practice, even in some workplaces not required to abide by them. This suggests that federal policy extensions (to smaller workplaces and/or to more employees) could have an even larger impact on those who are formally covered by the protection of a three-month unpaid leave for the birth or adoption of a child or the serious illness of a family member. Employers are more likely to make innovations when encouraged by public policy.

This dissertation also documents that expectations of a standard 40-hour work week are unrealistic for most of the professional workforce. Half the surveyed employees worked more than 45 hours per week, and most others worked between 40 and 45 hours weekly. The Fair Labor Standards Act does not provide much protection to many jobs in the new

economy. Perhaps professional workers ought to have some clearer guidelines to hours worked or entitlement to flexibility in exchange for longer hours normally worked.

Recently the notion of a “family work week,” which would include all combined hours of working adults in the family has been suggested (Bailyn 1993; Levitan and Conway 1990). In the case of the families portrayed here, a reasonable total *family* work week might be closer to 60 hours, rather than the 80 hours many have come to expect of two full-time working adults. For all family units with two full-time workers and young children, significant stress accompanied a 40-plus hour work week for each parent, and single mothers in my study were even more stressed.

Finally, work-family issues highlight another policy concern. While there are no formal labor organizations in biotechnology firms, these dissertation findings clearly suggest the importance of collective, rather than individual ad hoc entitlements in this area. Under these conditions, I propose, firms gain the most and employees do too. Most employees are willing to help other employees, but right now the individualistic nature of much accommodation undermines a sense of fair play in some workplaces. Revision of the National Labor Relations Act (NLRA) to include professionals who sometimes manage, to increase flexibility in negotiating topics for unions and employers, and to make organizing for collective bargaining more accessible to all employees, would be helpful to work-family integration as well as many other areas of employment practice, in my view (see Kochan 2000 for a partial critique of the current system).

Regarding private sector policies and practices, this dissertation supports previous research that focuses on practices, not just on formal written policies, as the most important factor for employees’ work-family satisfaction and integration. Employers who have no

policies create the most confusing work environment and leave everything up to individual supervisors and work groups. Employers with policies that are not implemented equitably create other kinds of problems, where some people have access to them and others do not. Even employers with policies that are formally available to all employees may find that female employees, especially, avoid using the policies for fear of negative career consequences. Employers have a responsibility to make family-friendly policies as accessible and equitable as possible, understanding that “equality” is not the same as “equity,” and that different families require different kinds of flexibility at different times in the life cycle. Employers who do this are the most likely to reap benefits such as creativity and innovation, as well as higher morale and lower stress, among their employees.

The dissertation also documents the importance of focusing on work processes as well as on human resource policies. It is a combination of feeling free to exercise flexibility, and control over one’s pace, place, and timing of work that is most likely to lead to greater satisfaction and commitment, as documented here. While employers cannot directly influence support at home, they can be sensitive to the extra burdens that female professionals with family demands are likely to have, and try to create a work environment that allows them to attend to both work and home.

In sum, both public and private policies require revision to be relevant and to provide meaningful support to today’s and tomorrow’s workforce and families.

LIMITS OF THE STUDY

Like every study, this one has limitations. First, the survey data are cross-sectional, although I was able to observe some change over time in interviews and firms. So the

direction of causation cannot be determined. It is possible that more committed employees choose workplaces with many “perceived usable” policies, for instance, rather than the policies leading to enhanced commitment. I do not believe this is likely, but there could be a reciprocal effect if an organization becomes known for a family-friendly culture. Only a longitudinal study would solve this problem.

Second, my survey response rate was 44%. While this is better than many surveys, it is not sufficiently high to eliminate the possibility of selection bias. Although I have no reason to believe that non-respondents were systematically different than respondents, I suspect that some people who responded do have a special interest in these work-family areas. As many men as women filled out the survey in six firms, but not in the largest firm; though even there 42% of respondents were men. This confirms that “work-family” is not only a women’s issue. Men are taking more responsibility for home and family, and they are confronting some similar issues as women in this area.

A third limitation of the study is that the biotechnology firms where I interviewed employees and conducted intensive case studies may not be typical of the industry as a whole, particularly outside Massachusetts. It would be interesting to replicate the study in California biotech firms, where the different cultural context might have an influence on how time and work are organized. While 90% of the workforce in Massachusetts was white, that would not be likely in California, so new interactions and patterns might emerge. Within Massachusetts, I made every effort to seek diversity in the size, climate, ownership status, type of science, and firm life cycle stage when I chose the twelve firms and two university settings where I conducted interviews and observations. Still, the firms do not comprise a random sample. So the findings cannot be generalized without further research.

Concluding Note:

Biotech firms rely on creative work accomplished by highly educated employees. The real question is whether this leads firms to structure flexible work environments to encourage creativity in ways that might also allow employees to manage work and family commitments simultaneously. We saw in ImmuCo that only a limited number of people were permitted the flexibility they needed. And even in BioCo, which is more flexible, it was not always easy to make such an arrangement.

As a scholar, I feel fortunate that the organization of academic work permits a variety of opportunities for flexibility, even as it presents new challenges both for managing workloads, encouraging creative collaboration, and measuring results. Now, just as in biotechnology, the open question is whether those opportunities can be realized in practice, or will remain as offering unrealized, but interesting, potential.

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APPENDIX ONE
Survey Instrument

Radcliffe College

RADCLIFFE EDUCATIONAL PROGRAMS



RADCLIFFE INSTITUTES FOR ADVANCED STUDY
RADCLIFFE PUBLIC POLICY INSTITUTE

April 20, 1999

Dear

Attached is a survey being given to employees at about ten Massachusetts biotechnology firms. It is part of a study being conducted by Susan C. Eaton, an MIT doctoral student and a researcher for a Radcliffe Public Policy Institute project entitled "Work and Family Integration among Biotechnology Professionals and Technical Employees." This study will help us learn how you manage multiple commitments in your lives.

This survey will take about only about 20 minutes to complete. Your participation in this survey is important, since each additional response improves the validity of the results. Each person's participation is completely voluntary. You should feel free to leave any question blank and go on to the next one. Each person's survey response will be kept confidential and will not be shared with anyone; no responses will be attributed to any individual. Only summary results for each company (compared with summary responses for all other companies) will be made available to participating companies and to you if you request a copy.

Please return your completed survey by May 7, 1999 in the enclosed postage-paid envelope to: Susan C. Eaton, c/o DataStar, 85 River Street, Waltham, MA. 02453. If you prefer to take the survey on the Internet, go on-line to "<http://bio.med.harvard.edu/survey>." Just use the six-digit Unique ID number on the back of your paper survey to access the survey. After completing the survey in either format, please mail the enclosed prepaid post card separately. If you request them on the card, summary results will be mailed to you in Summer 1999.

As a small way to thank you, if your primary job is working in life sciences, I will be glad to sign you up for a free subscription to The Scientist or Genetic Engineering News. If you are eligible and would like such a subscription, please indicate this on your postcard. Please call (617) 496-1077 with any questions, or email me at "seaton@mit.edu."

Sincerely,

A handwritten signature in cursive script that reads "Susan C. Eaton".

Susan C. Eaton
Ph.D. Candidate
MIT Sloan School of Management

69 Brattle Street • Cambridge, MA 02138-3442
Telephone 617/496-3478 • Fax 617/496-2982 • E-mail rppi@radcliffe.edu

Radcliffe Public Policy Institute

Biotechnology Project



WORK-FAMILY ISSUES FOR BIOTECHNOLOGY EMPLOYEES SURVEY

INSTRUCTIONS:

Please answer these questions the best you can. All individual responses will be kept confidential. If you have questions, call Susan Eaton at 617-496-1077 or email seaton@mit.edu.

A. JOB INFORMATION

(Please answer the following questions concerning your current job.)

1. Job title: _____

2. How would you best describe your job type? *(Check only one. If more than one category applies, please check what you spend most of your time doing.)*
 Scientist Manager or supervisor
 Other professional or technical Manufacturing or production
 Office, administrative, or clerical
 Other *(Please specify:)* _____

3. Does anyone report directly to you?
 Yes No
If so, how many people? _____

4. When did you begin work at this company, including its immediate predecessor(s) if its name has changed?
_____ *(month and year)*

5. Job Status:
 Full time employee Part time employee Contract employee
 - a. Number of hours per week you are scheduled to work: _____
 - b. How are you paid?
 Hourly Salaried

6. Do you receive any of the following? *(Please check all that apply.)*
 Bonuses Stock options Regular salary adjustments
 - a. Do you own stock in the company?
 Yes No

7. How long do you think you will remain with your present organization?
 Less than 1 year 3 to 4.9 years Not sure
 1 to 2.9 years 5 years or more

8. If you worked for a different company in this industry, would you expect to have less, about the same, or more job security?
 Less About the same More

9. If a good friend told you that they were interested in working in a job like yours at this company, what would you say?

- I would recommend this job.
- I would have some doubts.
- I would advise against this job.

B. JOB HISTORY

1. Please answer the following 4 questions regarding your first job after achieving your highest degree, or after a post-doc. [Check here if your first job is your current job:

a. Job Title: _____

- 1. Start date of employment: _____ (month/ year)
- 2. End date of employment: _____ (month/ year)

b. Type of employer:

- University Non-profit research organization
- Biotechnology company Pharmaceutical company
- Other (Please specify: _____)

c. Main reason you left this job (if applicable):

- Promotion or career move Layoff
- Family or other personal reason Return to school
- Other _____

d. What was your approximate yearly salary when you left (if applicable)?

- \$15 to \$24,999 \$35 to \$44,999 \$55 to \$64,999 Over \$75,000
- \$25 to \$34,999 \$45 to \$54,999 \$65 to \$75,000

2. Please estimate the number of paid jobs (with different organizations) you have held between your first job (after school or post-doc) and your present job: _____

a. How many of these were in the biotech industry? _____

3. What was the first job title you held in your current company? _____
 Same as current title

a. What was your approximate annual salary range for that job? (Include bonuses but not overtime, stock options or grants.)

- \$15 to \$24,999 \$35 to \$44,999 \$55 to \$64,999 Over \$75,000
- \$25 to \$34,999 \$45 to \$54,999 \$65 to \$75,000

4. Have you been promoted during your work history with this company (including its predecessors if its name has changed)?

Yes No
 a. If yes, how many times? _____

b. For each promotion, please check the box if it included:

	Promotion #			
	1	2	3	4
1. base salary increase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. new job title	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. increase in responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. increased eligibility for other compensation (stock options, bonuses, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. HOURS OF WORK, COMMUTING, AND WORKING PATTERNS
(Please answer the following questions about your current practices.)

1. How many hours did you work on your job during the last week?
 _____ hours
 - a. Is that a typical week?
 Yes No
 - b. If no, how many hours a week do you usually work? _____ hours

2. Which days are you regularly scheduled to work? *(Please check all that apply.)*
 Mon Tues Weds Thurs Fri Sat Sun

3. Do you typically do work for your job on weekends if not scheduled?
 Yes No
 If yes, about how many hours per week? _____

4. Do you typically do work for your job in evenings if not scheduled?
 Yes No
 If yes, about how many hours per week? _____

5. Does your regularly scheduled work shift coincide with the times you feel you can work most productively?
 Yes Sometimes No

6. How long does it take you to get to work, on a normal day?
 _____ minutes, one way

7. Do you pick up or drop off anyone on your way to or from work?
 Yes No

8. Can you change your starting and ending work times as needed?
 Yes, can change Limited flexibility No, must work a set schedule

9. How satisfied are you with the current flexibility in your working hours?
 Dissatisfied Neither satisfied nor dissatisfied Satisfied

10. Do you need immediate access to the following to do your work?

	Yes, All the time	Yes, Sometimes	No
a. a lab	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. a computer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. interaction with co-workers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. uninterrupted time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Do you ever work at home during scheduled work time?

- Yes No

a. If yes, how often?

- Daily Several times a week Several times a month Rarely

12. Do you ever work at home over and above your regularly scheduled work hours?

- Yes No

a. If yes, how often?

- Daily Several times a week Several times a month Rarely

13. Would you like to be able to substitute working at home for scheduled hours at work, more than you do now?

- Yes Not possible in my job No, I would not like to

14. Would you like to work fewer hours per week overall?

- Yes No

15. Would you like to work more hours per week overall?

- Yes No

16. Would your company make it possible to work part-time if you wanted to?

- Yes Not sure No

D. WORK AND WORKING CONDITIONS

1. How much training would be required for someone similar to you in background and education to learn to take over your present job?

- A few hours 2 to 4 weeks 5 months to a year
 A few days to a week 1 to 4 months A few years

2. How easy would it be for you to find a job with another employer with approximately the same income and fringe benefits you have now?

- Very easy Somewhat easy Not easy at all

3. How easy would it be for you to find a job with another employer with approximately the same amount of flexibility in working hours that you have now?

- Very easy Somewhat easy Not easy at all

4. Do you expect to be promoted to a higher level job in this company?

- I do not expect to be promoted
 I expect to be promoted within _____ months
 I expect to be promoted within _____ years

5. How likely is it that during the next couple of years you will lose your present job (from a layoff or other reason not of your choosing), and have to look for a job with another employer?
 Very likely Somewhat likely Not too likely Not at all likely

6. How much vacation were you eligible for in the last year? _____ days

a. How much vacation did you take in the last year? _____ days

7. Which of the following statements best describes your feeling about your job?

- I work only as hard as I have to.
- I work hard but not so much that it interferes with the rest of my life.
- I make a point of working as hard as I can even if it interferes with the rest of my life.

8. Please answer the following questions, using a five-point scale, where strongly disagree = 1 and strongly agree = 5.

	Strongly Disagree					Strongly Agree
	1	2	3	4	5	
a. I never seem to have enough time to get everything done on my job.....	<input type="checkbox"/>					
b. My job lets me integrate work and personal life.....	<input type="checkbox"/>					
c. Employees at this company have an advantage over outsiders in filling job openings here.....	<input type="checkbox"/>					
d. I look forward to going to work every day.....	<input type="checkbox"/>					
e. If I had to do extra work occasionally to accommodate the personal or family needs of coworkers, I would feel resentful.....	<input type="checkbox"/>					
f. At my job, employees have to choose between advancing in their jobs or devoting attention to their family or personal lives.....	<input type="checkbox"/>					
g. In today's world, workers should not expect any company or organization to provide a lifetime job.....	<input type="checkbox"/>					
h. When I first started working, I imagined I would spend my working life within one company or organization.....	<input type="checkbox"/>					
i. I am willing to work harder than I have to, to help this company succeed.....	<input type="checkbox"/>					
j. I feel very little loyalty to this company.....	<input type="checkbox"/>					
k. I often disagree with this company on matters relating to its employees.....	<input type="checkbox"/>					
l. Deciding to work for this company was a real mistake.....	<input type="checkbox"/>					
m. I would turn down another job for more pay in order to stay with this company.....	<input type="checkbox"/>					
n. I like this company, but it demands too much of me.....	<input type="checkbox"/>					

9. Please rate how much personal influence you have over the following things, on a 1 to 5 scale where 1 = no influence and 5 = complete control.

	No Influence					Complete Control
	1	2	3	4	5	
a. Deciding what tasks or work assignments to do.....	<input type="checkbox"/>					
b. Deciding what tools or procedures to use.....	<input type="checkbox"/>					
c. Controlling the location and timing of work.....	<input type="checkbox"/>					
d. Controlling the pace or speed at which to work.....	<input type="checkbox"/>					
e. Deciding when to take breaks.....	<input type="checkbox"/>					

10. Think of a time in your life when you have been most productive at work. On a scale of 1 to 10, where most productive = 10, how productive would you say you are under your present working conditions? _____

Why? _____

11. Please evaluate the following items on a five-point scale, where strongly disagree = 1 and strongly agree = 5.

	Strongly Disagree					Strongly Agree
	1	2	3	4	5	
a. Family responsibilities have interfered with my getting ahead at work	<input type="checkbox"/>					
b. My work makes it difficult to have a meaningful personal life	<input type="checkbox"/>					
c. I used to care more about my work, but now other things are important to me	<input type="checkbox"/>					
d. How I feel about myself depends more on what I do at work than on what I do in my spare time	<input type="checkbox"/>					

12. Please assign a total of 100 points to indicate how important the following areas are in your life at the present time. The more important a particular area is, the more points you should allocate to it:

Avocations and personal life	_____
Work/ career	_____
Family (broadly defined)	_____
Community	_____
Religion	_____
total =100	

13. How important is it to you that your work life contains the following? Please indicate the importance of the following aspects of your work life, using a 5 point scale where 1 = not at all important, 3 = moderately important, and 5 = extremely important.

	Not at all important					Moderately important			Extremely important
	1	2	3	4	5				
a. Opportunity to learn new things	<input type="checkbox"/>								
b. Good relations with co-workers	<input type="checkbox"/>								
c. Flexibility in work hours	<input type="checkbox"/>								
d. Time & energy to pursue non-work interests	<input type="checkbox"/>								
e. Opportunity for promotions	<input type="checkbox"/>								
f. A lot of autonomy	<input type="checkbox"/>								
g. High pay	<input type="checkbox"/>								
h. Chance to contribute to society	<input type="checkbox"/>								
i. Good job security	<input type="checkbox"/>								

E. ASSOCIATIONS AND PUBLICATIONS

1. Do you belong to at least one professional society or association?
 Yes No

a. If you do belong to a professional society or association, please indicate how important each of these possible reasons is to you using a 5 point scale where 1 = not important at all and 5 = very important.

	Not at all Important				Very Important
	1	2	3	4	5
a. Networking, collegueship	<input type="checkbox"/>				
b. Keeping up with scientific developments in the field	<input type="checkbox"/>				
c. Access to conferences	<input type="checkbox"/>				
d. Job or career info. for the future, including salary info.	<input type="checkbox"/>				
e. Part of professional identity	<input type="checkbox"/>				
f. Other _____	<input type="checkbox"/>				

2. Have you ever published any professional articles, papers, or books?

Yes No

3. Please estimate the number of published papers you have authored or co-authored, if any:

a. How many of them while in your present company? _____

4. Have you ever received a patent?

Yes No

If yes, how many? _____

a. Are there patent applications on file including your name?

Yes No

If yes, how many? _____

b. If yes, how many were filed while you were working at your present company? _____

F. COMPANY POLICIES AND PROGRAMS ON WORK-FAMILY INTEGRATION

This section asks about work/family attitudes, policies, and programs in your company. Please comment on the following statements using a 5 point scale where 1 = not at all, 3 = somewhat and 5 = a great deal.

	Not at all	Somewhat	A Great Deal		
	1	2	3	4	5
1. Do the leaders of your company actively support work-family programs and options?	<input type="checkbox"/>				
2. Do your managers have a good understanding of people's work and family needs?	<input type="checkbox"/>				
3. Does your company expect employees to keep family matters out of the workplace?	<input type="checkbox"/>				
4. Are you expected to work long hours on short notice?	<input type="checkbox"/>				
5. Does your supervisor implement the company policies impartially?	<input type="checkbox"/>				
6. Do you need to negotiate individually with your supervisor when you have a personal life concern that might conflict with your work?	<input type="checkbox"/>				
7. Do you worry that requesting time off for personal reasons will hurt your career?	<input type="checkbox"/>				

G. AVAILABILITY OF WORK-FAMILY PROGRAMS AND POLICIES IN YOUR COMPANY

Please mark, for each policy or option, in all four columns below.

- a) Is the option a formal policy in your company?
- b) Is the option available by informal arrangement?
- c) Have you personally used the option/policy?
- d) Would you feel free to use such an option if you needed it?

	Formal Policy?	Available Informally?	Personally Used?	Feel free to use it?
Flextime	Y N	Y N	Y N	Y N
Part-time work	Y N	Y N	Y N	Y N
Job sharing (2 people in one job)	Y N	Y N	Y N	Y N
Flex place (telecommute)	Y N	Y N	Y N	Y N
Compressed work week	Y N	Y N	Y N	Y N
Parental leave (beyond FMLA)	Y N	Y N	Y N	Y N
Use of sick days to care for dependents	Y N	Y N	Y N	Y N
Employee assistance plan	Y N	Y N	Y N	Y N
Eldercare resources	Y N	Y N	Y N	Y N
Child care resources	Y N	Y N	Y N	Y N

2. Please check the two most important reasons that could make you reluctant to use these kind of options:

- Do not need the option or program
- Cannot use the option and also get my work done
- Concerned that using it might hurt my future with the company
- Using it might put pressure on my co-workers
- The options do not interest me
- My supervisor might disapprove of my using the option
- Option not deemed appropriate for people in my situation (*indicate whether by company policy, or by informal means*) _____
- Other: _____

3. The following questions refer to your schedule with respect to your spouse/partner, if any:

- a. Taking into account your current work hours and schedule, how well is your arrangement working for your spouse/partner?

Very poorly		Very well	Not Applicable
1	2	3	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		4	
		5	
		<input type="checkbox"/>	

- b. Taking into account your spouse/partner's current work hours and schedule, how well is his/her work arrangement working for you?

Very poorly		Very well	Not Applicable
1	2	3	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		4	
		5	
		<input type="checkbox"/>	

H. WORK AND FAMILY INTEGRATION

1. Indicate how much you agree with each of the following statements, using a 5 point rating scale where 1 = strongly disagree and 5 = strongly agree.

	Strongly Disagree					Strongly Agree
	1	2	3	4	5	
a. I am satisfied with the way my work and family responsibilities complement each other	<input type="checkbox"/>					
b. My involvements outside of work enhance my work performance.	<input type="checkbox"/>					
c. My health suffers as a result of work pressures	<input type="checkbox"/>					
d. My health suffers as a result of family pressures.....	<input type="checkbox"/>					
e. I handle my work and family responsibilities by spending less time on my own needs than I would like	<input type="checkbox"/>					

2. Do you do any volunteer or community work on a regular basis?

- Yes
- No, but I would like to
- No, my interests are in other areas

a. If yes, how many hours a week do you usually spend on volunteer or community activities? _____ hours

3. Most generally, at this time, how satisfied are you with the following aspects of your life? Please indicate your level of satisfaction with each of the following using a 5 point rating scale where 1 = not very satisfied and 5 = very satisfied.

	Not Very Satisfied					Very Satisfied
	1	2	3	4	5	
a. Your job.....	<input type="checkbox"/>					
b. Your family life.....	<input type="checkbox"/>					
c. Your personal relationships.....	<input type="checkbox"/>					
d. Balance of work + non-work in your life.....	<input type="checkbox"/>					
e. Your health/physical fitness.....	<input type="checkbox"/>					
f. Amount of fun and pleasure in your life.....	<input type="checkbox"/>					

4. Listed below are some common problems which sometimes bother people. How often have you had each of these problems in the last year?

	Never	Rarely	Some- times	Often
	1	2	3	4
a. Headaches.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Upset stomach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Trouble sleeping.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Feeling tired most of the day.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Feeling nervous, fidgety or tense	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Feeling depressed or "blue" during most of the day.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. If you are currently living with your spouse or partner, please compare your spouse's or partner's job and household involvement/commitment to your own using a 5 point scale where 1= much less than mine, 3 = same and 5 = much more than mine.

	Much Less Than Mine		Same		Much More Than Mine	Not Applicable
	1	2	3	4	5	
a. Job involvement day to day	<input type="checkbox"/>					
b. Career commitment overall	<input type="checkbox"/>					
c. Family involvement.....	<input type="checkbox"/>					
d. Household work time.....	<input type="checkbox"/>					

I. DEMOGRAPHIC INFORMATION FOR EVERYONE
(For statistical purposes only.)

1. How old are you? _____ years

2. Sex :

Male Female

3. Current Household Status: (Check the option that best applies.)

- Single head of household
- Married
- Not married, but live with partner
- Live with roommates or relatives
- Other (Please explain:) _____

4. Race / Ethnicity: (Check all that apply.)

- White Non-Hispanic Hispanic (of any race)
- African-American Asian/ Pacific Islander
- Other _____

5. Country of Birth:

U.S. Non-U.S. (Please specify:) _____

6. Do you have children?

Yes No

a. If yes, what are the ages of those who live with you? _____

b. If yes, what are the ages of those who do not live with you? _____

c. If you have children under 18, who takes care of them while you work? (Check all that apply.)

- Spouse/partner Children care for themselves
- Formal day care (e.g. center) Paid caregiver
- Other relative School (& before/after programs)
- Other _____

d. How satisfied are you with the quality of their care?

Very satisfied Moderately satisfied Not especially satisfied Not at all satisfied

7. Do you now have elder care responsibilities?

- Yes No

a. If so, what type(s)? (Please check all that apply.)

- Administrative Daily tasks Financial Emotional support
 Physical care Other _____

b. About how many hours per week do you spend on this care? _____

8. Do you expect to have some responsibility for the care of someone 65 years or older in the next five years?

- Yes No Don't know

9. Paid work status of spouse/partner (if applicable)?

- Full time paid work Part time paid work No paid work Not applicable

a. If spouse/partner is working for pay, average hours worked/week: _____ hours

EDUCATIONAL BACKGROUND

10. What is the highest level education you received? Your spouse/partner? Your parents? (Please check the appropriate boxes.)

	You	Spouse/ Partner	Mother	Father
Less than high school				
High School Diploma or equivalent				
Some College				
Associate's Degree				
4 Year College Degree				
Master's Degree				
All but dissertation (ABD)				
Ph.D. or equivalent				
Postdoctoral training				
Other (explain) _____				

Field of your highest degree _____

Date of your highest degree _____ (year)

11. What is your annual total household income, before taxes:

- Less than \$20,000 \$75,000 to \$99,999
 \$20,000 to \$29,999 \$100,000 to \$149,999
 \$30,000 to \$49,999 \$150,000 to \$199,999
 \$50,000 to \$74,999 \$200,000 or more

a. What percentage of this total comes from your current salary?

- 100% 80 to 99% 61 to 79% 40 to 60% 20 to 39% 1 to 19%

12. I have _____

I have not _____ been interviewed by a member of the Radcliffe Public Policy Institute research team.

OPEN ENDED QUESTIONS

(Attach additional sheet(s) if needed.)

Do you feel you have the ability in your present work and life situation to be fully engaged in both your work and non-work domains? *(Please explain.)*

If not, what is the biggest barrier to full engagement in both domains?

Thank you for filling out the Survey Questionnaire on Work and Family Integration in Biotechnology!

Please mail the survey in the enclosed postage-paid envelope to:

Susan Eaton
c/o DataStar
85 River Street
Waltham, MA. 02453

Don't forget to fill out and mail the enclosed, postage-paid postcard, to ensure you get a copy of the survey results, and to receive your free subscription *(if eligible)* to The Scientist or Genetic Engineering News.

If you have questions about the survey, please call Susan Eaton at 617-496-1077, or email her at seaton@mit.edu.

APPENDIX TWO

Interview Guide

INTERVIEW GUIDE for scientists at companies studied for the Sloan/RPPI project

Susan C. Eaton

Introduce self and Review voluntary nature of project.

1. Explanation of project, share one-pager. Interested in structure of work and careers, how professionals balance or integrate their work and family lives, what makes that easier or harder to do. Particularly looking at issues of working in small, entrepreneurial companies. Interested in experiences of men and women. For people who volunteer, will also be interviewing some family and community members later in the project-- but starting at work.

2. Tell me about your work here at _____. What are your responsibilities? How long have you worked here, and how has it changed in that time?

3. What has your career path been like, to this point? (education, training, jobs)
What do you envision doing in the future? want to do?

4. How do you structure your work? how much autonomy do you have? what do you stay late over? how do work pressures influence your home life?

5. What is your life outside work like? What family responsibilities do you bring to work? Do you work at home? how often?

6. What expectations do you have of this employer? of any employer?

Why did you choose biotechnology as an industry to work?

What do you think of the benefits, compensation, etc.?

7. What portion of your compensation is contingent, ie dependent on either your individual or the company's performance? (PIP? bonus? salary? etc.)

8. What would make your work life easier? your family life easier?:

9. Do you work in groups? teams? who manages them? how does it work? do you feel you are able to develop your skills? get more training?

10. What has changed with changes in the company? in the strategic direction? in the security or insecurity of your job? How important is stability/ security to you? would you be able to find a new job if you needed to ?

11. What do you like about your work? not like? what would you change? About your schedule?

12. Is there anything you'd like to mention that I haven't asked about?

First version 3/4/97

Second version 6/18/97 - add the following questions:

-- what do you expect from this job? from this employer? are your expectations met?

-- what do you think they expect from you?

-- what do you think your expectations will be in 5 years? 10 years?

-- what do you worry about? (if anything?)

probe for-- retirement; insecurity; new job;

Additional Questions 7/5/97 - added to interviews:

== Can you think of a time in last six to 12 months when you had to make a difficult radeoff, either on the work side or the family side? Can you tell me about that?

== What kind of support do you need in managing the boundaries between work and home? From whom do you get it?

== Professional associations-- what professional associations are you a member of, if any? what is the extent of your participation? Would you de-

scribe them as important in maintaining or building your network?

More changes in the Interview Outline for scientists --
as of 12/4/97, developed during fall 1997

1. Delete the reference to "balance."
4. In addition to this question, ask them to describe a typical day, beginning in the morning at home, both weekday and weekend.
5. In addition to this question, ask them about their level of participation and interest in community activities.
8. In addition to this question, add, what would enable greater participation in the community? Probe for organizational policies and practices that might enable life being made easier, as well as home or personal management issues.

Additional questions:

Mobility-- what has been your actual mobility within the firm? what about anticipated? how do you plan for the future, outside the firm if you were to make a change? what is the role of personal networks?

Business/ Science Tension - how do (or do you) experience the business and science tension in your work? Does this affect your interest in or ability to publish or do your own research? How do you think about publication? patents?

For Managers only:

_____ How do you manage the work/ non work boundary for those who work for you? can you give me some examples? has this changed over time?