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If You Can Use Them: Flexibility Policies, Organizational Commitment, and Perceived Productivity

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Abstract

This study links workplace flexibility policies—formal, informal, and perceived ‘usable’-- to organizational commitment and self-reported productivity. Professional and technical employees of biotechnology firms were surveyed. Where employees could freely use policies, a positive association with outcomes is found. The paper contributes a new measure to capture employees' organizational experience.

IF You Can Use Them: Flexibility Policies, Organizational Commitment and Perceived Performance

> "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 Resource Manager in a biotechnology firm*

Introduction

All employees occasionally require day-to-day flexibility to manage demanding jobs and home or family lives. Those with two-job families and caring responsibilities are especially likely to need such flexibility. Yet researchers have shown that many employees are loath to use "family-friendly" policies, even intended beneficiaries, such as female employees with young children (Bailyn 1993, Williams 2000). While consultants market "family-friendly" policies as a popular benefit, few scholars have demonstrated the mechanisms through which such policies function (or do not) to enhance firm performance (for exceptions, see Drago *et al* 2000; MacDermid and Williams 1997).

Industrial relations researchers have shown specifically how firms benefit from flexible "high performance" work places. For instance, job enrichment-related policies require "bundled" implementation to be effective (MacDuffie and Krafcik 1992, Ich-

niowski *et al* 1996, Appelbaum and Batt 1994). Work-family scholars also study flexibility that supports employees, often focusing on scheduling and place of work (e.g. Perin 1991, Rayman and Bookman 1999). These studies pose the issue: under what conditions do flexibility policies contribute to positive *firm* outcomes such as employee commitment and productivity? A growing literature connects employer and employee flexibility, using both industrial relations and work-family concepts (e.g. Kossek and Ozeki 1999, Batt and Valeur, *this volume*).

This study uses original survey data to test hypotheses from the work-family literature about the role of firm-level flexibility practices for professional and technical employees.[1] The study focuses on workplace flexibility for two reasons. First, numerous studies of employee "benefits" already exist (e.g. Catalyst 2000) and these are often undertaken by firms themselves. Second, flexibility can be more important on a day-to-day basis for many employees than other benefits, such as a child care center. The key research questions are: Are firm-level flexibility practices significant predictors of organizational commitment and individuals' productivity, as reported by employees? And if so, under what conditions can flexibility be linked to these positive organizational outcomes?

Theory: Flexibility, Commitment, and Productivity

Flexibility is an essential factor in understanding 21st century jobs. Technology has made work more portable and ubiquitous. No one knows exactly how many firms offer "flextime," broadly defined as the ability to schedule flexible starting and quitting times, sometimes with a core hours requirement. A Hewitt Associates study of 1,050 major U.S. employers reported that 68% of all US firms offered flextime (1996). However, in many workplaces, flexibility is constrained

by the nature of the task to be performed (e.g. hospitals, 24-hour factories, or police departments). Hewitt also relies on Human Resource officers, rather than employees themselves, as sources.

Flexibility as a construct includes much more than starting and quitting times. Many employees require flexibility to visit children's schools, take elders to the doctor, or take time off during a family emergency. Flexibility may also mean taking days off in return for working at non-standard times, or being able to work part-time temporarily at certain points in life (Moen 1996).

Flexibility *formally* offered by the employer is insufficient as an indicator of flexibility available to the employee. Many employers limit flexibility to a small portion of the workforce or workday. When measuring formal flexibility policies, we should also seek informal ones. The culture of the workplace can determine whether work-family benefits are available and to whom; in some cases, using policies is discouraged or has negative career effects (Bailyn 1993, Williams 2000). Alternatively, supervisors can permit more flexibility than is formally allowed, encouraging employees to take time off unofficially, so that flexibility becomes invisible to higher-level managers (Eaton 1999). I call this 'informal' flexibility.

Here, I propose a distinct, more precise measure of available flexibility policies: the extent to which employees feel free to utilize such policies, whether formal or informal. I construct a new measure in the present study, drawing on multiple workplace interviews in which employees discussed the lack of usability of policies that formally or informally permitted flexibility, but where daily prac-

tice discouraged it. Specifics differed, but the concept was the same: some employees did not feel free to use the policies they theoretically enjoyed.[2]

Flexibility and Outcomes

Family-friendly policies in general can reduce absenteeism and turnover (Meyer and Allen 1997, Bailyn *et al*. 1996). Since turnover can cost 200% of an employee's salary, successful work-life programs can pay for themselves (Martinez 1997:111-2). Studies show that companies offering family-friendly policies are successful at retaining employees, even if individuals did not use the policies themselves (Grover and Crooker 1995; Thompson *et al* 1997). Policies do matter.

However, not all scholars agree that flextime and other family-friendly practices represent the solution to work-family conflict.[3] Some note organizational culture barriers, addressed in the construction of the present study. Jurzyck (1998) argues that "mommy track" working arrangements reinforce a sexual division of labor where women do most home work and sacrifice their wages.

Such disagreements in the literature led to this study to distinguish formal "flextime" from what is actually experienced as flexibility, and to learn what happens in practice at specific work places.

Relationship of Flexibility to Organizational Commitment

Flexibility includes but is not limited to autonomy on the job. Increased autonomy is linked with job satisfaction and motivation (Hackman and Oldham 1980), and can generate higher organizational commitment. Flexibility is defined

here to include the ability to change the temporal and spatial boundaries of one's job. I propose hypotheses concerning both flexibility and autonomy.

Hypothesis 1: Greater employee flexibility over the boundaries of work is associated with positive organizational outcomes.

Hypothesis 2: Control or autonomy over time, pace, and spatial aspects of work itself is associated with positive organizational outcomes.

While performance is influenced by many factors, organizational commitment (OC) is one key contributor, especially where loyalty and extra effort matter (Matheiu and Zajac 1990). More than for job satisfaction, higher levels of OC are correlated with lower turnover and better performance on the job (Meyer and Allen 1997). In this study I examine positive OC, of the 'affective' variety, not the negative 'continuance commitment' generated by having no other options.[4] Recent OC research shows no gender differences after controlling for the specific type of job involved (Marsden, Kalleberg and Cook 1993).

Hypothesis 3: For workers with similar jobs, organizational commitment will not vary by sex.

Given that affective commitment has positive organizational outcomes, do particular work place policies encourage higher levels of such commitment? Past researchers call for broader studies of OC to account for the effect of family life on commitment (e.g. Gray 1989: 810), and for cross-organizational studies (Mathieu and Zajac 1990). Researchers find a positive relationship between family-friendly policies and OC or citizenship behavior, in diverse settings.[5]

Hypothesis 4: Flexibility policies will be associated positively with affective organizational commitment.

Relationship Of Flexibility to Productivity

Critics skeptical that work-family policies have an impact on morale are even less convinced that they are related to productivity itself (e.g. Robinson and Godbey 1997). Few reliable measures of productivity in professional and white-collar workplaces exist, while few studies of flexible work-family policies have been done in blue-collar settings (see Appelbaum *et al* 2000 and Batt and Valeur, *this issue*, for exceptions). In professional workplaces, I predict such policies will be important to employees' productivity, as they report it.

Hypothesis 5: Increased flexibility in professional work settings will be associated with increased self-perceived productivity.

Defining Work-Family Flexibility at Work

What are "work-family flexibility" policies? Companies often measure their family-friendliness by whether they have a formal set of policies in place. I investigate flexibility policies that affect schedules, work practices, and the design of work for employees, rather than those that do not alter work routines.

Flexible approaches provide an alternative to working the traditional 9 to 5, five day a week schedule. While these may be company-wide policies, they often require an employee's supervisor to approve their use, whether one-time or long-term. By "formal policies," I mean written, officially approved human resource policies, as well as any official policies that give supervisors discretion to provide flexibility.[6]

*Hypothesis 6: Organizations' **formal** policies supporting employees' flexibility to manage work and family responsibilities are positively related to employees' organizational commitment and self-reported productivity.*

Research shows that an organization's informal culture is more important than formal policies in influencing and shaping employee behavior (Bailyn *et al* 1996). Hochschild (1997) and others document the low rate of utilization of work-family policies even when they do formally exist (see also MacDermid *et al.* 1999). By "informal policies," I mean flexible policies that are not official, and not written down, but are still available to some employees, even on a discretionary basis.[7]

*H7a: Organizations' **informal** policies (or practices) supporting employees' flexibility to manage work and family responsibilities will be positively related to employees' organizational commitment and perceived productivity.*

*H7b: Organizations' **informal** policies (or practices) supporting employees' flexibility to manage work and family responsibilities will be more strongly positively related to employees' commitment and perceived productivity than will formal policies.*

Rhetoric or Reality: Feeling Free to Use Existing Policies

Even informal policies may not be enough to create "felt" flexibility, and thus to influence employee commitment and productivity. One study showed that supervisors can apply policies inconsistently even within their work groups (Eaton and Bailyn 2000). On a day-to-day basis, managers often express ambivalence about whether to promote flexible policies. They worry about "everyone" wanting to schedule flexibly. In the least flexible company, no one was actually allowed to work nonstandard hours, though a flextime policy existed. One CEO refused to allow an assistant to adjust her working hours by 30 minutes a day to accommodate childcare for a newborn child. This demonstrates again that while policies are important, so is the perceived ability to use such policies.

I propose that flexible policies must be available, either formally or informally, to be used. The next hypotheses concern employee beliefs that they are free to use these policies. I call this concept "Perceived Usability," a new way to un-

derstand whether flexibility policies that exist are meaningful to employees. It is distinct from informal policies, because it applies to each individual's view of his or her own comfort level with using policies, not to whether others can use them.

H8a: Organizational commitment and productivity will be positively related to employees' perceptions of whether they are actually ***"free to use"*** *existing formal or informal flexibility-related policies .*

H8b. Employee commitment and productivity will be more strongly related to employees' perceptions of whether they are ***free to use*** *work-family policies than to whether either formal or informal flexibility-related policies exist.*

Research Setting: Biotechnology Firms

I study these questions in young, entrepreneurial organizations where male and female professionals work in nearly equal numbers. Many prior studies were conducted in large firms, so this adds a new dimension (MacDermid *et al* 1999). The U.S. biotechnology industry includes 1300 companies engaging in the research, development, production, and commercialization of products using recombinant DNA, cell fusion, and novel bioprocessing techniques (Office of Technology Asessment 1991).

U.S. biotech companies average 150 workers and employ a total of 153,000 people (BIO 1999), with a high concentration of "knowledge workers." Professionals compose at least 50% of the workforce, often including 20% or more PhDs (see PHRMA 1997). Scientific jobs in biotechnology are usually gender-balanced within occupations, since roughly 50% of biotech professionals are female (DeHaan 1997, RPPI 1999).[8] This presents unusual opportunities to study gen-

der-related issues at the job and firm level, since occupational segregation within organizations is still common (Baron and Bielby 1980, Reskin 1993).

This industry is a particularly good place to study flexibility policies, commitment, and productivity. The workforce is relatively young, with average age in the mid-30s. Two-career couples predominate. Many firms are less than 10 years old and have not developed traditional cultures or gender roles (see Baron *et al* forthcoming). Most biotech firms are networked in one form or another via partnerships, alliances, formal and informal collaborations, and agreements (Powell *et al* 1996). This network increases labor market information. Performance is rewarded contingently, with bonuses and stock. Long-term compensation is virtually absent. Firms are intensely competitive. Firm-specific skills involve advanced scientific work on projects that are highly specialized and take significant time to learn. In general, firms wish to retain workers, but cannot promise them security—since virtually no one can predict accurately the results of novel genetic experiments. Skilled biotech employees have considerable opportunity to move from one company to another, making loyalty a key concern of employers and a critical factor in organizational practices.

Methods and Data

The data for this study are drawn from original surveys of professional and technical workers conducted in seven biopharmaceutical firms in one state. The survey method was chosen to gather representative data on key issues after an intensive interview study. The firms were picked to represent a cross-section representing various sizes, ages, and technologies within the field. One firm was large, employing more than 1,000 people, and the others had fewer than 200 employees. Selection bias was

minimal, as 7 of the 8 firms invited to participate agreed to permit administration of the employee survey, resulting in a survey population of 1030 employees.[9] In these firms, professionals and technical workers are scientists, researchers, and managers. Employees were divided evenly between men and women. No systematic bias in size or age of firms was found in comparing this sample to a larger stratified random sample of biotechnology firms in the state.[10]

I developed an original pencil-and-paper survey of 105 items with 212 variables,[11] and administered the survey in the firms between January and June 1999.[12] I gave the survey to 1020 professional and technical employees. If I could not locate someone, I left the survey in the person's work mailbox.[13] Surveys included ID numbers so I could evaluate the response rate among different classifications and companies.[14] Most of the 463 completed surveys were returned via postage-paid envelopes, though I collected about 50 at work sites.

The overall survey response rate of 44% ranged from lows of 35% in the smallest and largest companies to 50 to 70% in the mid-sized companies.[15] Respondents overall were 56% female, 37% scientists, 27% other professionals, and 18% managers, with an average age of 37 and average tenure of 4.7 years. Means and standard deviations of the demographic characteristics of survey respondents are found in **Table 1.**

[Insert Table 1 about here]

Measuring Independent Variables: Formal, Informal &Usable Policies, Control

To estimate workplace flexibility, I constructed an "Index of Work/Family Policies." Generally indices provide more robust data than individual measures do. I combined seven flexibility practices to make the index. [16] The specific practices are: "**flex-time**" with flexible beginning or ending working time, sometimes

with core hours required; **part-time jobs**; telecommuting or "**flex-place**," such that all or part of the work week occurs at home; **job sharing** where one job is jointly undertaken by two or more persons; **compressed work weeks** where employees compact total working hours into four days rather than five; **unpaid personal leave** in addition to the 12 weeks mandated by the Family and Medical Leave Act (FMLA) for the serious illness of a family member or self; and whether employees can use their own **sick leave to care for ill children**.[17] While it is unlikely that any one person would use all of these policies, I join other researchers (e.g. Osterman 1995) in considering a range of possible approaches to work-family policy. These particular flexibility items are common in the literature.

Concerning each item, employees responded "Yes" or "No" to four questions. To create the independent variable, "Formal Policies," one of these questions was used: "Are these policies formally available?" If the employee did not respond, I concluded the policy was not available formally, to his or her knowledge.[18] I constructed an index by averaging the individual responses on the separate policies, so that each individual was associated with a score on "formal policies" from 0 to 7. The mean score on "formal" policies was 2.32(s.d. 1.66).[19]

I also measured whether these policies were available at an informal level from the employee's perspective.[20] The mean score on the Informal Index of work-family policies was 3.19 (s.d. 2.1), higher than for formal policies. This indicates face validity, since it seems likely that employees can perceive flexibility-related benefits in informal work settings, even if these are not formal policy. This

might consist of an informal arrangement between an employee and a supervisor for flexible hours. The standard deviation is larger, perhaps since informal policies are likely to be experienced differently, even within a single company.

The third independent variable is an index of the same flexibility items. I call this variable "Perceived Availability of Work-Family Policies **(**Usable)." In another survey question not reported here, one-quarter of respondents indicated concern that their careers would be affected negatively if they used the policies. This suggests possible problems with how policies are implemented. So the variable "Usable" combines an individual responses to the question: If the employer offers from one to seven benefits, either formally or informally (or both), does the employee feel free to use those benefits? The employee must respond that the employer offers the benefit(s), AND that she or he feels free to use the benefit(s), before the employee is included as a positive respondent. For an employee whose employer offers no formal or informal benefits, the employee's response is counted as "0" on Usable for all policies, since no policies are available to use.

The average Usable score on a scale of 7 was 1.5 (s.d. 1.52). Managers were more likely to give their firms high scores ($p<.05$), while no other demographic characteristics were associated with "Usable." This also suggests face validity, as managers are likely to control their schedules.

One additional factor could relate both to employees' productivity and commitment, as well as to flexibility. I call it Control, defined as a subset of issues related to employee control over the time, pace, place, and scheduling of work. I

created a three-item index called "Control-Time/Flex" that asked about their influence or control over the pacing, timing and place of work.[21] Being able to use flexible work policies could give employees a greater sense of control over the daily timing, pacing, and location of work. Control might also influence employees' perceptions of being able to use work-family policies. I cannot answer the question of influence direction definitively with these data.

No important multi-collinearity problems are found among the independent variables. The highest correlations are between Formal and Informal policies (r=.314) and between Informal and Usable policies (r=.473). While Informal policies are more likely to be perceived as Usable, the concepts are still distinct. Also, Usable policies were required to be either formally or informally available (by definition in the calculation of Usable) so the correlation is not surprising.

Dependent Variables

The dependent variables are organizational commitment (OC) and perceived productivity. Mowday, Steers, and Porter (1979) defined OC 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 (Mowday, Porter and Steers 1982:27).

The OC 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).[22] Applied to this data set, the Cronbach's alpha is .62. Although a higher alpha is

desirable, this level is acceptable.[23] The mean commitment score on this scale was 3.67 (s.d. 0.66) on a scale of 5, which is close to the mean from other samples (Kalleberg and Mastekaasa 1994).[24]

Experts measure productivity in complex ways, but in an industry where managers do not have a single or composite measure for productivity, self-report is one accepted method.[25] I measured productivity as employees estimated it, compared to other work periods in their lives, among a group of well-educated scientists, researchers, and managers.[26] I asked employees to think of the time in their lives when they had been most productive, and to evaluate how productive they were under present conditions if the former time had been a "10" on a scale of 1 to 10.[27] The mean of respondents' scores was 7.61 (s.d. 1.71), and the distribution skewed slightly to the right.

Control Variables

Various factors are known to contribute to employees' organizational commitment and productivity: these include tenure, position, income, age, education, and psychological predisposition. In general, I used the same control variables as Kalleberg and Reve (1993), with the goal of eliminating other possible explanations for organizational commitment or productivity.[28] I also controlled for household income, age, and presence of children at home.[29]

The control variables are not highly correlated.[30] Means, standard deviations, coding procedures, and Cronbach's alphas for all variables and scales are presented in **Table 2.**

[Insert Table 2 about here]

I used Ordinary Least Squares (OLS) multivariate regression analysis to test the hypotheses. Although all the data do not precisely conform to assumptions of normality, the survey sample size is large enough and the deviations slight enough that this method is appropriate (Kleinbaum, Kupper, and Muller 1988).[31] After deletion of missing data, the data set included 382 usable responses.

Analysis

Findings for predicting organizational commitment and productivity are reported in Tables 3 and 4. For Organizational Commitment, I present models testing all three types (Formal, Informal, and perceived Usable) of work-family policies without Control, and a fourth model with Usable only, with Control. For Productivity, I follow the same pattern; other possible models with Control are similar though not shown.

I find that Usability of work-family policies does have a small, positive, statistically significant effect (*Beta* = .118, $p < .05$) on Organizational Commitment, where all the controls but not the independent variable of Control are included. This confirms *Hypotheses 1* and *4*. The only other statistically significant predictor is working for a Small Company, associated with lower levels of OC.[32] This is consistent with other studies, as small companies offer less job security. No other control variables are statistically significant, and most are small.

Neither the presence of Formal nor Informal work-family policies is related to Organizational Commitment, partially disconfirming *Hypotheses 6* and *7a* and *b.*

However, the Usability of work-family policies is associated positively and significantly with Organizational Commitment, confirming *Hypotheses 8a* and *b.* Employees who feel free to use flexibility policies are likely to report positive OC – but the existence of flexibility policies alone, even Informal ones, are not associated with positive Organizational Commitment. This could explain previous studies that did not find positive associations between work-family policies and commitment, since it is possible a true measure of Usability was not tested.

The additional independent variable "Control" directly predicts both Commitment and Productivity outcomes, and it absorbs some of the effect of "Usable" when it is added to the model in predicting Commitment. This confirms *Hypothesis* 2 concerning autonomy. The positive association with work-family policies is smaller in Model 4, Table 3, and Usable work-family policies are only marginally significant predictors here (*Beta* = .093, $p < .10$). Small Company remains significant and negative, and Control is positive and significant in this model (Beta = .142, $p < .01$). Thus, one mechanism for the apparent effect of "perceived usable" work-family policies may be increased control of work time, place, and schedules. However, this does not account for the entire relationship, as Usable work-family policies still retain their own value in predicting Commitment.

The regression analysis explained up to 7.4% of the variation in Organizational Commitment among the biotechnology employees surveyed.[33] While this is modest in terms of explanatory power, it is consistent with other studies that examine the effect of structural variables on organization commitment (Gray

1989, Angle and Perry 1981, Aranya *et al* 1986, 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 his study, the purpose was not to maximize the variance explained, but to examine carefully an important predictor of OC. Similarly, in my tests and Gray's, neither personal characteristics such as education, nor organizational ones such as length of service were reliable predictors. This contradicts other research suggesting these two variables are significantly related to Organizational Commitment (see Marsden, Kalleberg, and Cook 1993, Angle and Perry 1981). Perhaps this is because average length of service is relatively short in this industry, less than 5 years. Further, this is a highly educated sample-- whereas 75% of all Americans have a high school degree or less, only 12% of this sample fit that description. The typical range of variation may be absent, or tenure and education may not matter as much with this population as Usability of flexibility-related policies.

In predicting Perceived Productivity (Table 4) the findings are different. *Hypotheses 6, 7a* and *b, and 8 a* and *b* are all confirmed with respect to Productivity. All three types of work-family policies are positively associated with higher Productivity, with or without Control included. However, the association is greatest with Usable policies *(B*= .18, p<.01), explaining 4.4% of the variance in perceived Productivity outcomes of individuals. When Control of time, pace, and place is added, the predictive power of Usability falls a bit *(B*=.157, p<.01), and Control is positive but smaller than Usability (B=.127, p<.05). This finding coincides with

research findings (e.g. Bailyn 1993) that providing work-family flexibility not only helps with recruitment and retention, but can help employees become more productive as well. Even if the reverse direction of causality is assumed, that more productive workers are drawn to firms with more flexible and usable policies, firms can rely on a positive association between these variables.

To evaluate *Hypothesis 5* concerning gender, I tested interaction terms for Female with each of the independent and control variables in predicting Commitment and perceived Productivity. No independent interaction was significant.[34] Separate data runs by gender did not show a sex difference, according to a Chow test.[35] So the hypothesis is supported: in similar jobs, men and women do not differ in the relationship of Usable flexibility to commitment and productivity.

DISCUSSION

What guidance do these findings give scholars and practitioners? First, perceived usability of flexible work-family policies is important to employees, more so than either the presence of formal or informal policies alone, for the desired outcomes of commitment and productivity. Put bluntly, if employees can't use the policies, they don't help them, at least for commitment purposes. When adding necessary controls, perceived Usability retains its strength. Second, if employees find policies to be usable, they are associated positively with perceived productivity for all employees, male and female. Even the presence of formal or informal work-family policies is significantly associated with higher productivity, though this relationship is stronger where they are perceived as usable. In addi-

tion, a related variable, Control over time, flexibility, and pace of work, is important in predicting positive levels of commitment, and productivity for all employees. The design of work-family programs and work structures, and the amount of control employees have over the pace and place of their work are all-important. Though the Usable effects are small, they are robust, which suggests that implementing accessible work-family policies may be necessary for knowledge workers to become committed to a firm, and to feel more productive.

This study shows an association of work-family flexibility policies to perceived productivity and organizational commitment. Further, it contributes a new concept and measure of perceived Usability to the work-family research field, as well as linking Usability positively to control of time and work flow.

Limitations of the research

One limitation with the study is the self-report nature of the data. Clearly some workers may have viewed the survey as an opportunity to express their need for flexibility, or more accessible flexibility. However, this does not reduce the value of their opinions; in fact, if they need more "usable" policies, perhaps companies would benefit from knowing this, and a survey is a relatively safe way to express this concern. In some cases, they may not feel safe expressing it verbally to a manager. Companies agreed to participate in the study at least in part because they are aware of the needs of this population, as indicated in the introductory quotation, and wanted to know these opinions. A precisely measurable

productivity indicator would also have strengthened the study, though none was available in this particular industry among any of the companies I studied.

Because the study is cross-sectional, I cannot demonstrate causality or direction of the impact of these policies; at most, I have shown demonstrable systematic relationships between flexible work-family policies and these two outcomes. Given other research, it seems unlikely that the most committed and productive workers would choose firms with extensive usable work-family policies--but it is hypothetically possible, and could even be a desirable finding for a firm. This study is also cross-level, which is at once a strength and a weakness (see Rousseau 1985). While I show patterns for a population of individuals, they are not randomly distributed but are grouped by firm, though I added variables with the effect of controls for firm effect. The results are still informative, but caution should be kept in mind in evaluating them. While this study has limitations because of its empirical grounding in biotechnology and focus on professional and technical employees, it is consistent with other findings of organizational commitment for different populations.

Conclusion: Future Research and Policy

Future researchers might craft better measures of productivity in technical and professional jobs, and might test the notion of "feeling free to use" the policies, while also measuring formal and informal work-family policies. These tests could also be made with work-family policies more similar to benefits, such as childcare centers, subsidies, referral services, etc. For policy makers, ensuring

that employees have some control over the boundaries of work and the flexibility with which to exercise any legislated rights (such as family leaves) will be important. Also, those evaluating programs need to probe deeply as to whether the policies are actually able to be used by the intended beneficiaries.

This study teases out the relationship between formal and informal policies, and adds another level of felt availability to employees. It is in the best tradition of industrial relations and work-family studies to link these two dynamic fields.

Table 1. Personal Characteristics of Biotechnology Employee Respondents (n = 383)

	Mean (S.D.)
Female	.55 (.5)
Scientists	.37 (.5)
Managers	.18 (.4)
Married	.64 (.5)
Married/Partnered	
With Children	.46 (.5)
With children and support at home	.15 (.36)
Dual Income	
Without Children	.27 (.5)
Single	
Without Children	.27 (.5)
With Children	.01 (.2)
Non White or Hispanic	.12 (.32)
Born Outside US	.18 (.39)
Promoted with Company	.64 (.5)
HS degree or more	.96 (.36)
Ph.Ds	.16 (.37)
Part time	.03 (.18)

Table 2.
Means, Standard Deviations for Dependent and Independent Variables;

Alpha reliabilities for Scales
(n = 383)

Dependent Variables:

	Mean (S.D.)	Cronbach's alpha
Commitment Index (1 = lowest commitment, 5 = highest)	3.65 (0.65)	0.62
Self-reported Productivity (O = lowest productivity compared to most productive work period; 10 = highest)	7.63 (0.55)	n/a

Independent Variables

	Mean (S.D.)	Cronbach's alpha
Formal W-F Flexibility Policies (0 = no usable policies, 7 = all usable policies)	2.32 (1.66)	0.59 *Index*
Informal W-F Flexibility Policies (0 = no usable policies, 7 = all usable policies)	3.19 (2.1)	0.77 *Index*
Perceived Usability of W-F (0 = no usable policies, 7 = all usable policies)	1.5 (1.52)	0.67 *Flexibility Policies Index*
Control - Flex/Time (1 = no influence, 5 = complete control of time/flex/pace of work)	3.8 (0.8)	0.68

Control Variables	**Mean (S.D.)**

Age (in years)	36.4 (8.2)
Education (Less than HS =0, HS degree = 1, Associates degree = 2, Four year college degree = 3, Master's degree = 4, and Doctoral degree + = 5)	3.2 (1.2)
Sex (female =1)	0.55 (0.5)
Have children (yes = 1)	0.52 (0.5)
Years of service	4.8 (3.5)
Manager (manager = 1)	0.20(.40)
Small company (less than 250 employees = 1)	0.32 (47)
Household Income (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 +)	5.03 (1.47)

Table 3.

Predicting Organizational Commitment Using Flexibility Policies Using OLS Regression
(n=383)

Dependent Variable	Model 1	Model 2	Model 3	Model 4

	Beta	Beta	Beta	Beta
Organizational Commitment[1] 3.49	3.74	3.73	3.37	
Independent Variable				
Formal Policies	0.061			
Informal Policies		0.052		
Perceived Usable Policies (Usable)			0.118**	0.093*
Control Flex/Time (Control)				0 .142***
Control Variables				
Age	.113*	.112*	.108	.09
Education	-.021	-.022	-.015	-.023
Female	.038	.037	.036	.034
Have Children	-.089	-.089	-.087	-.086
Household Income	-.08	-.08	-.092	-.093
Yrs. Of Service	-.042	-.044	-.039	-.048
Manager Dummy	.069	.066	.062	.07
Small Company	-.147***	-.15***	-.152***	-.157***
R-Square	**.047**	**.046**	**.057**	**.074**

*** t-test for 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)

Table 4.

Predicting Perceived Productivity Using Flexibility Policies Using OLS Regression
(n=383)

Dependent Variable	Model 1	Model 2	Model 3	Model 4

[1] Organizational commitment is defined by a five-item scale that includes measures of loyalty, willingness to exert effort, identity with company values, and intent to stay.

	Beta	Beta	Beta	Beta
Productivity (Perceived)[2]				
Constant	7.675	7.751	7.772	7.413
Independent Variable				
Formal Policies	0.110**			
Informal Policies		0.102**		
Perceived Usable Policies (Usable)			0.180***	0.157***
Control Flex/Time (Control)				0.127***
Control Variables				
Age	.022	.012	.008	.-.013
Education	-.025	-.028	-.016	-.02
Female	.017	.013	.01	.004
Have Children	-.054	-.054	-.069	-.062
Household Income	-.015	-.013	-.03	-.029
Yrs. Of Service	-.086	-.091	-.081	-.089*
Manager Dummy	.068	.062	.055	.062
Small Company	.012	.009	.002	-.001
R-Square	**.025**	**.022**	**.044**	**.062**

*** t-test for 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)

Data Appendix

Companies' Formal Flexibility Policies.

[2] Perceived productivity is a number from 1 to 10, in which the respondent described how productive he or she was under current conditions, compared to the most productive work time in his or her life, which would be labeled a 10.

Mean Scores of Companies on Work-Family Policies
(n = 383)

Company	Formal	Informal	Perceived Usability
Small Cos. (n = 18)	1.54	2.42	1.12
ImmuCo (n = 25)	1.92	2.81	1.64
Quattro (n = 268)	2.43	2.63	1.49
BioCo (n = 31)	1.52	3.24	1.31
GeneCo (n = 41)	2.98	3.00	1.74
All Cos. Avg.	**2.32**	**3.19**	**1.50**

Note that three small companies were combined to make one "small companies" category.

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[2] While I report here only on a survey, the survey was preceded by more than 70 semi-structured interviews where intensive case-study research was conducted in companies. I based some of the survey questions on interview data as to what mattered to employees. More details about the interview sample and the interview structure and questions are available from the author.

[3] Several authors have noted the possibilities and even probabilities of synergies in the realm of work and family, not only conflict. See Bailyn 1993, Barnett and Rivers 1996 and Rothbard 1999. My study does not discount this, though I do not explore it here. Flexibility can enhance synergy as well as ease conflict.

[4] Organizational commitment has been defined as including three types: affective, meaning the feeling of loyalty and willingness to 'go the extra mile'; normative, meaning a feeling that one "should" stay on the job; and continuance, meaning that one has little choice but to stay in the organization (Meyer and Allen 1997). Negative commitment is usually not a desirable state. I do control for it, however, in asking how hard it would be for employees to find a comparable job. Including this variable makes no difference in the outcomes I report later.

[5] 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 managers (Lankau and Scandura, 1999: 387.

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

[7] Remember that informal policies do not have to apply to the employee personally, but to someone in the company he or she knows.

[8] Women compose nearly 40% of life sciences graduates, even at the Ph.D. level, more than in any other natural scientific field (Valian 1999).
[9] The single firm declining to participate had about 700 employees, many young and single, and did not offer any formal work-family policies, so it was not an ideal site for this study.
[10] I stratified the population of firms into large and small-to-medium groups, and into age groups by 5-year intervals.
[11] It is available from the author, but is not reproduced here for reasons of space. For more detail on the survey methodology and the cross-level design, contact the author.
[12] The seventh firm was a very small start-up, and employees took the survey "on line." In all, 5 of 10 employees responded, and though 900 employees had the option of using the web-based survey at other firms, only 24 others responded using the web format. These data were translated into an Excel spreadsheet and added to the coded data already entered from the paper surveys. The survey was not in any one company for longer than 4 weeks.
[13] I am grateful to Judy Marshall for suggesting that I hand-distribute the surveys to improve response rate. In the smaller five firms, virtually all the employees were professional and technical.
[14] The data permit evaluation of within-organization differences as well as between-organization differences and trends in the entire sample.
[15] Those who responded were not significantly different from the total workforce in demographic characteristics, with two exceptions. A higher proportion of managers than in the firm (33% of the sample compared to 20% in the workforce) responded to the survey at one company. Second, slightly more women than men responded, perhaps because of a higher level of interest, though this was mainly true in the largest company. Detailed response rates available from author.
[16] I also looked at the policies individually, but here present the findings for an aggregated index. Disaggregated analyses are available from the author. No significant differences in findings resulted, except that for predicting productivity, feeling free to use part-time was singly significant, and for commitment, feeling free to use flextime was individually significant.
[17] I also analyzed the data for each of the policies separately, but most companies did not formally offer more than 2 or 3 of the policies (none allowed parental leave beyond the FMLA, for instance, and none allowed job sharing). The most popular benefit was use of employee sick leave for ill children, 5 of the 7 companies formally allowed that.
[18] I count missing data as indicating the policy was “not available”. The individual does not know that the policy “is” available, so he or she should be counted as saying it is not available, at least to his or her knowledge at the time of the survey. While this undoubtedly lowers the overall scores, my decision to require an affirmative sign that policies were available seems conservative and thus appropriate; otherwise the findings would have been much more dramatic (if I had used a single measure per company for formal availability), since not knowing about an existing formal policy could also be interpreted as not feeling free to use it.
[19] For company-specific responses on all three policy variables, see the Data Appendix.
[20] I piloted this survey question with eight biotechnology employees and they had no problem understanding the question's meaning. They understood that a policy might either be available both formally and informally, or just one or the other.
[21] Cronbach's alpha for the Control scale = .68. Factor analysis of these items confirmed one scale, despite the low Cronbach’s alpha. Factor loadings are: control over locale and time of work: . 79, control over pace of work: .81, and control over breaks: .74. There is one Eigenvalue over 1: it is 1.8, accounting for 63% of variance.
[22] Items comprising the commitment scale were: Effort: I am willing to work harder than I have to to help this organization succeed. Loyalty (R): I feel very little loyalty to this organization. NoMistake (R): I made a mistake working for this organization. Agree (R): I often disagree with this company's policies concerning employees. MorePay: I would turn down another job for more money to stay with this organization. Five-point Likert scale with 1 = strongly disagree and 5 = strongly agree. Source: Lincoln and Kalleberg 1990.
[23] A factor analysis of the five items produced only one factor with an Eigenvalue in excess of 1.0 (see also Marsden, Kalleberg and Cook 1993). While eliminating any item did not increase the reliability, possibly this scale should be updated or expanded for this workforce to achieve a higher alpha.
[24] 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.

[25] Productivity is notoriously hard to measure in non-manufacturing industries such as biotechnology. Research and development staffs typically measure their results by patents or publications achieved, experiments completed, and successful drug development—but all of these results require years of work, and the involvement of many people. When I asked managers in biotechnology firms how they measured their employees' productivity, they answered that they "knew" who was productive and who was not, but that there was no way to measure it specifically. Finally, while there may be a self-serving bias among respondents, where biases in self-report data are consistent across respondents, the results will be unaffected except for the intercept. For an example in evaluating absenteeism, using a similar measure, see Drago and Wooden (1992).

[26] I recognize that this means productivity cannot be compared between employees in the same workplace, as each employee is referencing his or her own previous experience. However, I believe this is warranted given the highly individual nature of people's work-family experiences and the flexibility they need. Results must be interpreted with caution, however, as "perceived productivity" differences will not be between employees, but within an employee's own work history.

[27] Thanks to Lotte Bailyn for the use of this question from a previous study.

[28] These included gender, education, managerial status, and size of the company (in this case I used small company v. not small company). I did not use "independent company" since all companies were independent. Some employees might value flexibility more at particular times in their lives (Moen 1996). I controlled in my more extensive analyses (not shown here) not only for age, having children, and marital status, but specific combinations of household groups. Means for each family group are available from the author. Differences are not great, but single parents and married parents with support at home have the highest levels of commitment. These differences were not significant in final outcomes.

[29] If someone does not have children, for instance, he or she is less likely to know, or to care, whether he or she can take sick leave to care for children. Although eldercare responsibilities could also enter into employees' valuing of work-family policies, relatively few respondents currently had eldercare responsibilities (13%), and those who did generally spent less than 1 hour a week on them. For this reason I did not include eldercare as a control variable.

[30] The highest correlation is between age and having children, .445; the next highest were between household income, and age and education. Managerial status was correlated at .27 with household income and .21 with years of service. All others were below 0.2. These are usual correlations and should not affect the analysis. Full information on correlations is available from the author.

[31] I have considered other methods of data analysis, such as ordered probit, but the dependent variables are continuous and reasonably normally distributed, since one is an index that combines multiple Likert scales while the other is a distribution skewed only slightly right.

[32] This is similar also to Kalleberg and Reve (1993).

[33] Note that the adjusted R-square statistic is .054, so I could increase the explanatory power of the non-adjusted R-squared statistic by adding more variables if that were the goal.

[34]Only one control interaction term, female x education, was significant, and it was associated with lower levels of commitment. Also, in this model, being female was positively associated with commitment (Beta = .7, $t<.01$). The interaction of female and years of service was the only interaction that was associated with perceived productivity (negatively). I tested all the equations including marital status, found no significant effects, and dropped it from the analysis. I also examined interactions between marriage and parenting status, and gender and family status, but found no important effects for these outcomes (complete summary available from the author). *This note could be included in the Data Appendix instead of here.*

[35] The Chow test was insignificant for both outcomes, using the test in Kmenta (1971:370-1). This is not to say gender is irrelevant, but it is not an important contributor to these outcomes given these variables. In a survey question not reported here, women were 30% more likely than men to say they thought using the policies might hurt their future with the company.