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- Work stress and job performance
- Returning to the job after childbirth



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x	confidential
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F	too unreliable to be published

Highlights

In this issue

■ Work stress and job performance

- Workers with high-strain jobs were almost two times more likely than those with low-strain jobs to report reduced work activities (odds ratio for men, 1.7; for women, 1.6).
- On a long-term basis, both men and women with physically demanding jobs were about 1.6 times more likely than those in other jobs to reduce their work activities in the following two years.
- One in five women with high-strain jobs reported at least one disability day in the previous two weeks.
- Men in physical jobs were 2.2 times more likely to have a work absence than men in non-physical jobs.
- Workers who perceived their jobs to be less secure were more likely not to be in labour force two years later (odds ratios were 1.5 for men, 1.3 for women).

■ Returning to the job after childbirth

- Employment rates of mothers were consistently lower than those of other women, in both the short- and long-term. For example, the 84% short-term employment rate of the 1984 cohort of mothers was 13 percentage points below that of other women.
- About 8% of mothers who gave birth in the mid- to late-1980s withdrew from the labour market in the first three years after childbirth, but by the late 1990s and early 2000s the figure was less than 6%.
- During the 1980s, the birth of a child lowered earnings by about 28% in the year of childbirth. This increased to 30% in the 1990s, and to about 33% after 2000.
- Although earnings drops were greater for the early 2000s cohorts of mothers than for the mid-1980s cohorts, the earnings recovery process was shorter.

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Work stress and job performance

Jungwee Park

Work stress is defined as the harmful physical and emotional responses that occur when job requirements do not match the worker's capabilities, resources, and needs (National Institute of Occupational Safety and Health 1999). It is recognized world-wide as a major challenge to individual mental and physical health, and organizational health (ILO 1986). Stressed workers are also more likely to be unhealthy, poorly motivated, less productive and less safe at work. And their organizations are less likely to succeed in a competitive market. By some estimates work-related stress costs the national economy a staggering amount in sick pay, lost productivity, health care and litigation costs (Palmer et al. 2004).

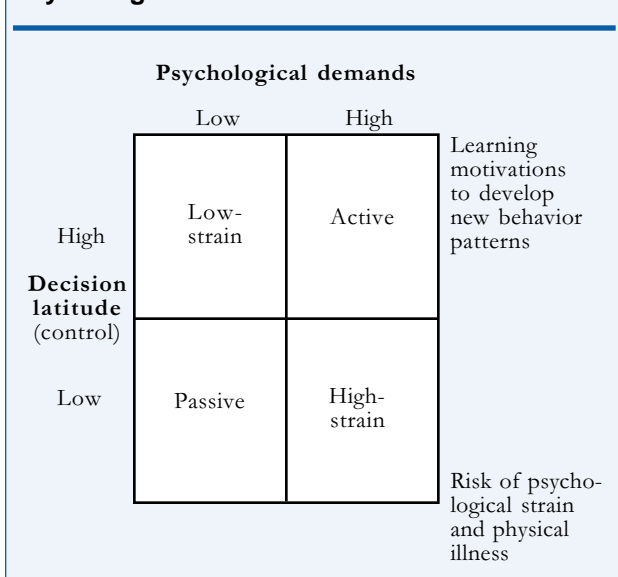
Work stress can come from a variety of sources and affect people in different ways. Although the link between psycho-social aspects of the job and the health and well-being of workers has been well documented (Dollard and Metzger 1999), limited work has been done on the effects of distinct stressors on job performance. As well, various protective factors can prevent or reduce the effects of work stress, and little research has been done toward understanding these mitigating individual and organizational factors.

One important source of work stress is job strain. According to the demand/control model (Karasek 1979), job strain is determined by the interactions between psychological demands and decision latitude (see *Work stress*). The first dimension, the psychological demands on the worker, relate to pace and intensity, skills required, and the ability to keep up with colleagues. The second dimension relates to the degree of creativity versus repetition, as well as the extent of freedom and responsibility to decide what

to do and when to do it (Lindström 2005). Four work environments can then be derived: high-strain jobs, active jobs, low-strain (relaxed) jobs, and passive jobs (see *Psychological demand/decision latitude model*).

Though simple identification of low- and high-strain jobs may be important, the distinction between job control and psychological demands must be retained because each category can have different effects on workers and their organizations. For instance, when job control is high and psychological demands are also high, learning and growth are the predicted behavioural outcomes. Much of the energy aroused by job challenges can be translated into direct action—effective problem solving—with little residual strain. The growth and learning stimuli are conducive to high productivity. On the other hand, low demand and low control lead to a very unmotivating job setting, which results in gradual loss of previously acquired skills (Karasek 1998).

Psychological demand/decision latitude model



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Work stress

To measure work stress, the CCHS and NPHS used an abbreviated version of Karasek's Job Content Questionnaire (JCQ) (Karasek 1985). The CCHS measured work stress of respondents working at jobs or businesses in the past 12 months, while the NPHS measured work stress of those employed at the time of the survey. Twelve items in the JCQ are used to measure job control, psychological demands, job insecurity, physical exertion and workplace social support. Each item is scored using a five-point Likert scale from strongly agree to strongly disagree (items 4 and 7 are reverse scored):

Item	Subscale
1. Your job requires that you learn new things.	control
2. Your job requires a high level of skill.	control
3. Your job allows you freedom to decide how you do your job.	control
4. Your job requires that you do things over and over.	control
5. You have a lot to say about what happens in your job.	control
6. Your job is very hectic.	demands
7. You are free from conflicting demands that others make.	demands
8. Your job security is good.	job insecurity
9. Your job requires a lot of physical effort.	physical exertion
10. You are exposed to hostility or conflict from the people you work with.	social support

- 11. Your supervisor is helpful in getting the job done. social support
- 12. The people you work with are helpful in getting the job done. social support

Based on scores from the psychological demands and job control items, four psycho-social work conditions are identified: active (above median on both demands and control), high job strain (above median on demands, below median on control), low job strain (below median on demands, above median on control) and passive (below median on both demands and control). Respondents who disagreed or strongly disagreed with the security statement were classified as having job insecurity. Respondents who agreed or strongly agreed with the physical exertion statement were classified as having physically demanding jobs. Respondents were classified as having low workplace social support if they either agreed or strongly agreed with the first social support statement, disagreed or strongly disagreed with the second, or disagreed or strongly disagreed with the third.

Additionally, respondents were asked if they were very, somewhat, not too or not at all satisfied with their jobs. Those not too satisfied or not at all satisfied were classified as having job dissatisfaction. Self-perceived work stress at the main job or business in the past 12 months was measured by asking: "Would you say that most days at work were: not at all stressful? not very stressful? a bit stressful? quite a bit stressful? extremely stressful?" Respondents answering quite a bit or extremely were classified as having high self-perceived work stress.

Job strain is only one stressor workers may face at the workplace. Physical exertion and job insecurity can also cause stress. Even in an era of increasing high-tech information industries, the physical demands of work are still relevant and important to many. Being seriously concerned about physical exertion of work can become a stressor. This is related to concerns about physical hazards and work injuries. Undoubtedly, uncertain job security and the fear of layoff is also an important source of psychological stress for some, especially during times of economic contraction (Williams 2003).

In addition, job satisfaction and self-perceived work stress can show different, yet important, aspects of job stress. Although these two may not identify specific sources of work stress, they show to what extent workers are dissatisfied with their jobs and perceive their daily work as stressful. Thus, many distinct sources and dimensions of work stress that could negatively

affect some people can be identified. This article investigates levels, sources and effects of work stress for different socio-demographic and occupational groups.

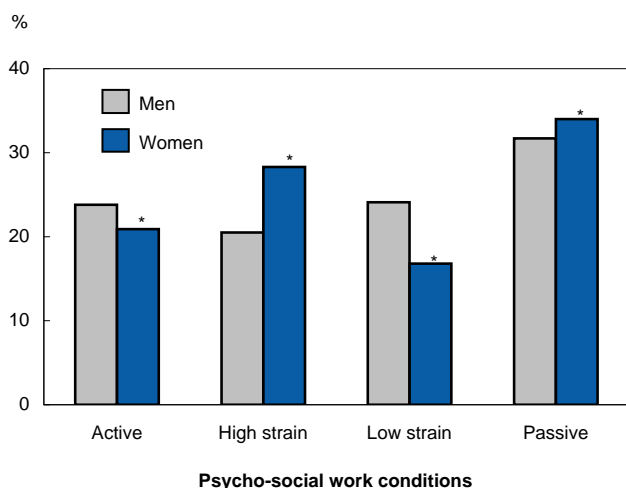
The 2002 Canadian Community Health Survey (CCHS) and various cycles of the National Population Health Survey (NPHS) are used to examine work stress and its effect on Canadian workers (see *Data sources*). First, the article describes work stress levels of employed persons aged 15 to 75 by selected characteristics. Second, cross-sectional and longitudinal analyses examine how work stress factors are associated with current and long-term productivity in terms of reduced work activities, disability days, and absence or separation from work. Multivariate techniques are used to control for employment characteristics and protective factors such as social support and individual coping behaviours (see *Job-related variables* and *Social support and coping behaviours*). Social support buffering

Data sources

The cross-sectional analysis on work stress is based on the Canadian Community Health Survey (CCHS): Mental Health and Well-being, which was introduced in May 2002 and conducted over eight months. The survey covered almost 37,000 people aged 15 or older living in private dwellings in the 10 provinces. Most interviews (86%) were conducted in person; the remainder, by telephone. Respondents were required to provide their own information—proxy responses were not accepted. The survey response rate was 77%.

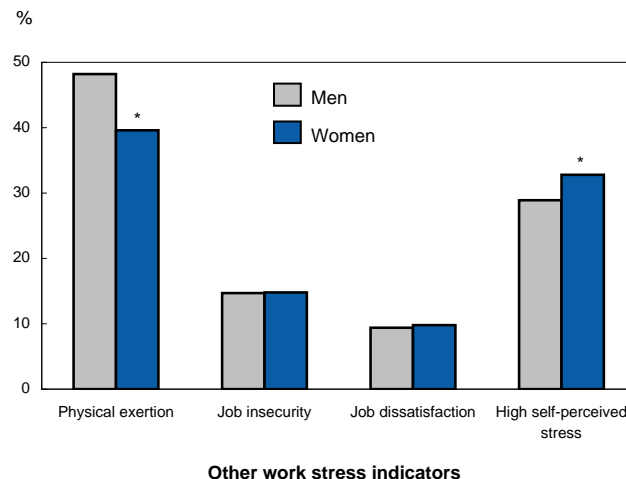
The longitudinal analysis is based on the National Population Health Survey (NPHS). The NPHS, which began in 1994/95, collects information about the health of Canadians every two years. It covers household and institutional residents in all provinces and territories. In 1994/95, about 20,000 respondents were selected for the longitudinal panel. The response rate for this panel in 1994/95 was 86.0%. Attempts were made to re-interview these respondents every two years. The response rates for subsequent cycles, based on the original respondents, were 92.8% for cycle 2 (1996/97), 88.3% for cycle 3 (1998/99), 84.8% for cycle 4 (2000/01), 80.5% for cycle 5 (2002/03), and 77.4% for cycle 6 (2004/05). This analysis uses the cycle 6 longitudinal square file, which contains all responding members of the original panel regardless of whether information was obtained in all subsequent cycles.

Chart A More employed women reported high job strain than men



* significantly different from men
 Note: Employed population 15 to 75, Canada excluding Territories.
 Source: Statistics Canada, Canadian Community Health Survey, cycle 1.2, 2002.

Chart B Employed women were more likely to report high work stress



* significantly different from men
 Note: Employed population 15 to 75, Canada excluding Territories.
 Source: Statistics Canada, Canadian Community Health Survey, cycle 1.2, 2002.

may depend on support from co-workers and supervisors as well as personal sources. Personal coping mechanisms may play an important role in controlling effects of work stress.

To account for survey design effects, the bootstrap technique was used to estimate coefficients of variation and p-values and to perform significance tests. The significance level was set at 0.05.

More work stress among women

Proportionately more employed women reported greater work stress than men—28% had high-strain and 17% had low-strain jobs, compared with 20% and 24%, respectively, for men (Chart A). Men were more likely to have active jobs than women. Small, but significant, differences were also found for self-perceived work stress (Chart B). One-third of women felt quite a bit or extremely stressed most days at work, compared with 29% of men. According to a multivariate analysis, employed women were 1.2 times more likely to report high self-perceived work stress, even after controlling for other socio-demographic and employment-related factors (data not shown).

Table 1 Work stress indicators

	Psycho-social work conditions				Physical exertion	Job insecurity	Job dissatisfaction	High self-perceived work stress
	Active	High strain	Low strain	Passive				
	%							
Age								
15 to 24	8.1*	28.0(*)	14.2(*)	49.7*	52.8*	13.4	14.4(*)	21.1*
25 to 39	26.1	24.6	21.4	28.0	44.2	15.6	10.4*	32.0*
40 to 54 (ref)	27.5	23.7	21.3	27.4	42.1	15.2	7.8	35.8
55 to 64	21.1*	19.5(*)	26.1*	33.3*	38.5(*)	13.2	5.6(*)	29.2*
65 and over	13.6*	10.2* ^E	32.5*	43.8*	31.0*	11.2 ^E	3.9(*)	14.7*
Personal income								
Less than \$20,000	9.4*	27.6*	13.6*	49.4*	51.9*	19.4*	13.3*	22.2*
\$20,000 to \$59,999	22.9*	25.5*	22.3(*)	29.4*	44.3*	13.7*	9.0*	32.3*
\$60,000 or more (ref)	34.8	18.0	24.9	22.3	36.4	11.8	5.0	36.0
Education¹								
Less than high school graduation	12.1*	24.4(*)	16.7*	46.8*	63.0*	13.9	8.8	26.0*
High school diploma	19.0*	27.8*	17.0*	36.2*	49.3*	13.2*	8.3	29.7*
Some college/university	20.1*	25.5(*)	21.5*	33.0*	41.1*	17.3	8.8	29.6(*)
Bachelor's or higher (ref)	31.9	21.2	25.4	21.5	35.1	15.6	8.4	36.0
Marital status¹								
Married (ref)	26.4	22.3	23.2	28.2	42.0	13.9	7.6	33.0
Never married	23.7*	26.0(*)	20.3*	30.0	43.4	18.7*	12.5*	30.1*
Divorced, separated, widowed	24.7	26.8(*)	17.8*	30.8	42.6	18.9*	9.7*	37.0(*)
Student status								
Yes	11.8(*)	26.2(*)	15.3(*)	46.6(*)	45.4	14.3	14.1(*)	23.4(*)
No (ref)	24.3	23.7	21.7	30.3	44.0	14.8	8.8	32.0
Shift work								
Yes	16.2*	29.4*	16.4*	38.1(*)	54.4*	15.3	11.5*	28.7(*)
No (ref)	25.3	21.7	22.7	30.3	39.5	14.4	8.7	31.5
Self-employment								
Yes	28.1*	13.7*	34.1*	24.2*	46.0	17.8*	4.8*	29.5
No (ref)	21.3	26.2	18.1	34.4	43.9	14.1	10.5	30.9
Full-time work								
Yes	25.5*	23.8	21.7(*)	29.0*	44.3*	14.2(*)	9.4	33.0*
No (ref)	8.4	25.2	15.9	50.5	43.5	16.6	10.8	19.4
Occupation								
White-collar (ref)	34.6	20.0	25.2	20.2	24.9	13.4	7.7	38.1
Sales and service	10.9*	31.1*	13.8*	44.3*	50.0*	15.4(*)	13.0*	25.9*
Blue-collar	12.3*	24.5*	19.5*	43.7*	72.8*	15.0	10.7*	23.3*

* significantly different from reference group (ref) ($p < 0.05$); (*) no longer significant after controlling for sociodemographic and employment factors

1. Excludes those aged 15 to 24.

Note: Employed population 15 to 75, Canada excluding Territories.

Source: Statistics Canada, Canadian Community Health Survey, cycle 1.2, 2002.

A higher proportion of men reported that their jobs required a lot of physical effort—48% versus 40%. However, the significance of these findings disappeared after controlling for other socio-economic and employment variables. This may be associated with

men's employment in blue-collar jobs. Job insecurity was the same for both men and women: about 15% reported a high amount. Similarly, the level of job dissatisfaction was equal (about 1 in 10).

Age differences

Compared with other age groups, core-age workers (aged 25 to 54), most likely at the peak of their careers, were more likely to be in active jobs and less likely to be in passive jobs (Table 1). Those aged 40 to 54 were most likely to perceive their work as stressful.

Almost half of young workers (aged 15 to 24) were in passive jobs, a significantly higher rate than their core-aged counterparts, even after controlling for other factors, including student status. More than half of young workers also reported physical exertion in their jobs. Interestingly, however, these younger workers were less likely to perceive their work days as stressful. This may be because they realize that their current jobs are not their long-term careers.

About a third of older workers (aged 65 or older) tended to have relaxed (low-strain) jobs. Also, less than 4% expressed dissatisfaction with their jobs. Many may be semi-retired or part-time workers returning to work after retirement.

Even after controlling for related factors such as work hours, student status or shift work, most of these age differences remained significant.

Socio-economic status matters

Individuals with low personal incomes were more likely to have high-strain or passive jobs than individuals with high incomes. Almost half of workers with incomes of less than \$20,000 had passive jobs compared with only about one in five workers with \$60,000 or more. A larger proportion of individuals with low incomes reported higher job insecurity and job dissatisfaction. This may be partly because they were less likely to have permanent or unionized jobs.¹ Also, they tended to have more physically demanding jobs than people with higher incomes. Individuals in the highest income group were more likely to have active and low-strain jobs due to greater job control—however, they tended to perceive their work as more stressful. Not surprisingly, psychological demands from work were highly correlated with self-perceived work stress ($r = 0.35$). However, job control and self-perceived work stress were positively associated as well—almost half of workers with active jobs expressed high self-perceived work stress, a higher rate than workers with high-strain jobs (41%) (data not shown).

Similar patterns were found for education levels. Individuals with more education were more likely to have low-strain, active, and less physically demanding jobs

than workers with less education. For example, one in four workers with a university degree had a low-strain job compared with only one in six workers with less than high school graduation. Finally, as with income, workers with the most education were more likely to perceive their work as more stressful than workers with less education.

Married workers were more likely to have active and lower-strain jobs than never-married workers. They also had significantly lower rates of job insecurity and job dissatisfaction than those never or previously married. For some aspects of work stress, however, other factors appeared more important than marriage. For instance, although a much higher proportion of divorced, separated or widowed women reported high self-perceived work stress than married women, the difference was not statistically significant when other factors were controlled for.

Work stress and job-related variables

Shift workers were more likely to have high-strain jobs than other workers (29% vs. 22%). They had higher levels of psychological demands and lower levels of job control. Furthermore, compared with regular-schedule workers, shift workers were more likely to perceive their jobs as physically demanding (54% vs. 40%) and less satisfying (12% vs. 9%). These findings are consistent with previous research indicating poorer general health and higher levels of work stress among shift workers (Harrington 2001; Shields 2006). Shift workers' stress may result from lack of socializing with

Job-related variables

Occupation was collapsed into three groups: white-collar (management; professional; technologist, technician or technical occupation; and administrative, financial or clerical), sales or service, and blue-collar (trades, transport or equipment operator; farming, forestry, fishing or mining; and processing, manufacturing or utilities).

Shift work refers to anything other than a regular daytime schedule (evening, night, rotating or split shifts).

The self-employed are those who worked mainly in their own businesses or professional practices, or on their own farms.

Those working 30 or more hours a week at their main jobs were considered full-time.

For respondents with more than one job, classifications were based on the one with the most weekly hours (main job).

Social support and coping behaviours

The emotional and informational support variable in the 2002 CCHS used an abridged version of measures in the Medical Outcomes Study (MOS). Respondents were asked: "How often is each of the following kinds of support available to you if you need it? Someone:

- you can count on to listen when you need to talk?"
- to give you advice about a crisis?"
- to give you information in order to help you understand a situation?"
- to confide in or talk to about yourself or your problems?"
- whose advice you really want?"
- to share your most private worries and fears with?"
- to turn to for suggestions about how to deal with a personal problem?"
- who understands your problems?"

Each item was scored from 0 (none of the time) to 4 (all of the time). Social support was considered a continuous variable, with a score ranging from 0 to 32.

In the NPHS, perceived emotional social support was measured by four yes or no questions in cycles 1 and 2, and by the above questions in cycles 3 to 5. The cycle 1 and 2 questions were:

- "Do you have someone you can talk to about your private feelings or concerns?"
- "Do you have someone you can really count on in a crisis situation?"
- "Do you have someone you can really count on to give you advice when you are making important personal decisions?"
- "Do you have someone who makes you feel loved and cared for?"

Respondents had low emotional social support if they answered no to at least one question. In cycles 3 to 5, respondents answering none of the time or a little of the time to any of the eight questions were considered to have low emotional/social support.

The CCHS asked all respondents how they coped with stress. It also asked how often (often, sometimes, rarely or never) they used each of 14 methods:

1. try to solve the problem
2. talk to others
3. avoid being with people
4. drink alcohol more than usual
5. smoke more cigarettes than usual

6. use drugs or medication
7. eat more or less than usual
8. sleep more than usual
9. pray or seek spiritual help
10. jog or other exercise
11. relax by doing something enjoyable
12. blame yourself
13. wish the situation would go away or somehow be finished
14. try to look on the bright side of things

The negative coping behaviours (3 to 8, 12, 13) and positive behaviours (1, 2, 9 to 11, 14) were identified by exploratory factor analysis. Chronbach's alpha of negative coping was 0.60 and that of positive coping 0.51. A response of often or sometimes was considered as use of a coping behaviour.

The NPHS measured heavy drinking by asking respondents how often they had had 5 or more alcoholic drinks on one occasion in the past year; having done so at least once a month (or 12 or more times in the past year for cycle 1) was classified as heavy monthly drinking.

Daily smokers were those who smoked cigarettes every day.

Obesity was based on a body mass index (BMI) of 30 or more for people aged 18 or older. Age/sex specific cut-offs were used to classify the BMIs of people under age 18 (Cole et al. 2000).

Physical activity was based on total accumulated energy expenditure (EE) during leisure time, calculated from the reported frequency and duration of all leisure-time physical activities in the three months before the interview and the metabolic energy demand (MET) of each activity, which was independently established (Statistics Canada 1995; Stephens et al. 1986).

$EE = S(N_i * D_i * MET_i / 365 \text{ days})$, where

N_i = number of occasions of activity i in a year,

D_i = average duration in hours of activity i , and

MET_i = a constant value for metabolic energy cost of activity i .

For each respondent, daily EE was the sum of energy expenditures of all leisure-time activities, expressed as total kilocalories expended per kilogram of body weight per day (K/K/D). An EE of 3 or more K/K/D was defined as high; 1.5 to 2.9, moderate; and less than 1.5, low (Statistics Canada 1995). Respondents with high or moderate EE were considered physically active; those with low EE, inactive.

family and friends, difficulty planning for family responsibilities, taking part in regular job activities or forming routines (Occupational Health Clinics for Ontario Workers 2005). It may also be related to the health effects shift work causes, such as disruption of circadian rhythm, reduction in quality and quantity of sleep, fatigue, anxiety, depression and increased neuroticism (Harrington 2001).

Being one's own boss should bring the ultimate control over work. In fact, job strain was significantly less prevalent among the self-employed: 14% had high-strain jobs compared with 26% of other workers. Almost 30% had active jobs. More than one in three self-employed workers had low-strain jobs. They also tended to be satisfied with their work—only 5% reported job dissatisfaction, significantly less than employees (11%). However, almost one in five self-employed workers felt their jobs were not secure. Unlike employees, who are paid even when business is slow, self-employed workers must market and promote their businesses in order to generate earnings. They are especially concerned about job security since they do not qualify for benefits or overtime, vacation or severance pay.

Since part-time employment often includes temporary, casual and term arrangements, it is not too surprising to find that full-time workers were much more likely to have active jobs than part-time workers (26% vs. 8%). That is, full-timers had greater psychological demands and more job control at the workplace. More than half of part-time workers were low in both job control and psychological demands (passive jobs). In contrast, full-time workers were more likely to perceive their work days as stressful. Overall, full-time workers were slightly more likely to perceive their jobs as requiring a lot of physical effort.²

A more in-depth analysis of work hours found that those working more than 40 hours a week were less likely than regular or part-time workers to have high-strain jobs and most likely to have active jobs.³

In general, white-collar workers had significantly higher levels of decision latitude than the other occupational groups (blue-collar, and sales and service). More than a quarter had low-strain jobs. And, white-collar workers were more likely to have active jobs—more than a third compared with about one-tenth of other workers. Since many blue-collar jobs involve manual labour, it is not surprising that a high proportion of blue-collar workers (73%) perceived their work as

physically demanding. Finally, a higher proportion of white-collar workers reported a high level of job satisfaction compared with other workers, but they were also more likely to perceive their work as stressful.

Multivariate analysis

To examine how work stress factors are associated with productivity, multivariate logistic regression models were developed. Models were first run for each of the four work-stress conditions⁴ to test for associations with selected job performance outcomes—reduced activities at work, at least one disability day in the past two weeks, and being absent in the past week. These models controlled for possible confounders: occupation, hours, shift work, self-employment, age, marital status, education and income. In the second step, the models were re-run to include a set of mitigating factors that could potentially protect against outcomes associated with work stress. These factors included co-worker support, emotional support, and positive and negative coping behaviours. To control for likely correlations and interactions, separate regression analyses for each source of work stress were run for the first two sets of models. Finally, in the third model, all work stress-related factors were controlled for simultaneously, in addition to all other confounding and protective variables. Since these multivariate analyses were based on cross-sectional data, neither causality nor temporal ordering can be inferred.

Reduced work activities due to long-term health issues

Workers with high-strain jobs were more likely than those with low-strain jobs to report reduced work activities due to a long-term health problem.⁵ The odds ratio for men was 1.7; for women, 1.6 (Table 2). For men, an active job was also associated with reduced work activities, while highly physical jobs and job insecurity were for both sexes. When social support and coping factors were accounted for, however, most associations with reduced work activities were no longer significant, with the exception of physical exertion among women and self-perceived work stress for both sexes. In other words, a supportive environment both at and away from work may help prevent reduced work activities by mitigating the effects of work-related stress. But, those relying on negative coping mechanisms are at risk of reduced activities. Detailed findings show that, for men, high workplace social co-worker support was associated

Table 2 Reduced activity at work due to a long-term health problem

	Men, controlling for				Women, controlling for			
	Prevalence	Employment and personal factors ¹	Employment, and personal ¹ and protective factors ²		Prevalence	Employment and personal factors ¹	Employment, and personal ¹ and protective factors ²	
		Separately	Separately	Combined		Separately	Separately	Combined
	%	Odds ratio			%	Odds ratio		
Psycho-social work conditions								
Active	10.0	1.37*	1.22	1.14	10.1	1.08	0.99	0.91
High strain	13.2*	1.69*	1.29	1.21	14.9*	1.60*	1.35	1.25
Low strain (ref)	8.2	1.00	1.00	1.00	9.9	1.00	1.00	1.00
Passive	10.5	1.26	1.16	1.16	9.6	0.93	0.86	0.87
Physical exertion								
Yes	12.0*	1.24*	1.16	1.16	13.5*	1.34*	1.35*	1.29*
No (ref)	8.9	1.00	1.00	1.00	9.8	1.00	1.00	1.00
Job insecurity								
Yes	13.1*	1.29*	1.05	1.00	13.4*	1.24*	0.98	0.94
No (ref)	9.9	1.00	1.00	1.00	10.9	1.00	1.00	1.00
High self-perceived work stress								
Yes	13.6*	1.73*	1.45*	1.42*	14.3*	1.64*	1.42*	1.35*
No (ref)	9.0	1.00	1.00	1.00	9.7	1.00	1.00	1.00

* significantly different from reference group (ref) (p<0.05)

1. Age, personal income, education level, marital status, student status, shift work, self-employment, full-time work and occupation.

2. Co-worker or emotional support and positive or negative coping behaviours.

Note: Employed population 15 to 75, Canada excluding Territories.

Source: Statistics Canada, Canadian Community Health Survey, cycle 1.2, 2002.

with a lower likelihood of reduced work activities, for women, it was high emotional and informational support. For both sexes, negative coping behaviours (for example, drinking alcohol, smoking or drug use) were associated with reduced activities at work (see *Social support and coping behaviours*).

Disability days in the last two weeks

In the CCHS, currently employed respondents had a disability day in the past two weeks if they stayed in bed all or most of the day (including nights in hospital), cut down on normal activities, or required extra effort in their daily activities because of illness or injury.

Men with active or high-strain jobs were 1.5 times more likely than those with low-strain jobs to report at least one disability day during the last two weeks (Table 3). This difference may not represent merely different levels of psychological demands. In a more in-depth analysis with active job as the reference group, the likelihood of men taking disability days in active

jobs was higher than for passive workers (data not shown). Being an active worker with high job control along with high psychological demands is associated with short-term work interruptions like disability days. With protective factors accounted for, however, the statistically significant associations of some work stress sources (physical exertion for men and high-strain jobs for women) to disability days disappeared. As with reduced work activities, detailed findings revealed that negative coping behaviours tended to increase the likelihood of disability days for both sexes.

High self-perceived work stress was strongly related to taking disability days. Almost one in five men and women who perceived their regular work days to be stressful took at least one disability day in the last two weeks. The association was significant in all models but one. When all work stress indicators were included, the association was no longer significant for women. This suggests that different sources of work stress do not occur in isolation but indeed interact with one another (Shields 2006).

Table 3 Disability day in the last two weeks

	Men, controlling for				Women, controlling for			
	Prevalence	Employment and personal factors ¹	Employment, and personal ¹ and protective factors ²		Prevalence	Employment and personal factors ¹	Employment, and personal ¹ and protective factors ²	
		Separately	Separately	Combined		Separately	Separately	Combined
	%	Odds ratio			%	Odds ratio		
Psycho-social work conditions								
Active	16.2*	1.53*	1.47*	1.39*	17.7	1.07	1.00	0.98
High strain	17.2*	1.54*	1.38*	1.33*	20.9*	1.30*	1.10	1.07
Low strain (ref)	11.3	1.00	1.00	1.00	15.9	1.00	1.00	1.00
Passive	11.7	1.01	0.98	0.98	16.7	0.98	0.91	0.93
Physical exertion								
Yes	15.0*	1.15	1.13	1.10	19.3	1.16	1.14	1.13
No (ref)	12.7	1.00	1.00	1.00	17.1	1.00	1.00	1.00
Job insecurity								
Yes	14.0	0.96	0.86	0.82	19.3	1.12	0.99	0.96
No (ref)	13.8	1.00	1.00	1.00	17.8	1.00	1.00	1.00
High self-perceived work stress								
Yes	17.2*	1.52*	1.39*	1.31*	20.0*	1.33*	1.16*	1.14
No (ref)	12.4	1.00	1.00	1.00	17.0	1.00	1.00	1.00

* significantly different from reference group (ref) (p<0.05)

1. Age, personal income, education level, marital status, student status, shift work, self-employment, full-time work and occupation.

2. Co-worker or emotional support and positive or negative coping behaviours.

Note: Employed population 15 to 75, Canada excluding Territories.

Source: Statistics Canada, Canadian Community Health Survey, cycle 1.2, 2002.

Absence from work

The CCHS asked: "Last week, did you have a job or business from which you were absent?" For this study, those who reported an absence from work and indicated own illness or injury as the primary reason were considered to be absent from work due to a health problem.⁶

A physically demanding job turned out to be an important factor for work absence for both men and women. Those who reported a lot of physical effort were about twice as likely to be absent from work. For example, men in physical jobs were 2.2 times more likely to have a work absence than those in non-physical jobs; for women, the odds ratio was 1.9 (Table 4). This result is consistent with previous research suggesting significant associations between sickness absence and physical load, and risk factors in the work environment (Lund et al. 2006; von Thiele et al. 2006).

Women with high self-perceived work stress were more likely than those without such stress to be absent from work. For men, however, self-perceived work stress and work absence were not significantly associated. Detailed analyses showed social support and positive coping behaviours (problem solving, physical exercise, being positive, etc.) did help to reduce the likelihood of work absence for women, whereas negative coping (drinking, smoking, drug use, etc.) increased the likelihood of women being absent from work.

Longitudinal effects of work stress

Longitudinal analysis is especially useful for work stress since it could reveal long-term cumulative effects of stress and clearer causal relationships between stress and job performance. Because some variables were not available, or were measured differently in the

Table 4 Work absence due to a health problem

	Men, controlling for				Women, controlling for					
	Prevalence	Employment and personal factors ¹		Employment, and personal ¹ and protective factors ²		Prevalence	Employment and personal factors ¹		Employment, and personal ¹ and protective factors ²	
		Separately	Separately	Combined	Separately		Separately	Separately	Combined	
	%	Odds ratio			%	Odds ratio				
Psycho-social work conditions										
Active	0.8 ^E	0.51	0.45	0.43	1.6 ^E	1.10	0.93	0.73		
High strain	1.4 ^E	0.64	0.56	0.54	2.7 [*]	1.54	1.24	1.02		
Low strain (ref)	F	1.00	1.00	1.00	1.3 ^E	1.00	1.00	1.00		
Passive	0.9 ^E	0.40	0.39	0.41	1.7 ^E	0.92	0.83	0.83		
Physical exertion										
Yes	1.7 ^{E*}	2.20 [*]	2.03 [*]	2.00 [*]	2.8 [*]	1.93 [*]	1.86 [*]	1.71 [*]		
No (ref)	0.6 ^E	1.00	1.00	1.00	1.2	1.00	1.00	1.00		
Job insecurity										
Yes	0.7 ^E	0.68	0.63	0.60	1.9 ^E	1.03	0.87	0.80		
No (ref)	1.2 ^E	1.00	1.00	1.00	1.9	1.00	1.00	1.00		
High self-perceived work stress										
Yes	1.3 ^E	1.49	1.25	1.41	3.0 [*]	2.39 [*]	2.11 [*]	2.05 [*]		
No (ref)	1.0 ^E	1.00	1.00	1.00	1.3	1.00	1.00	1.00		

* significantly different from reference group (ref) (p<0.05)

1. Age, personal income, education level, marital status, student status, shift work, self-employment, full-time work and occupation.

2. Co-worker or emotional support and positive or negative coping behaviours.

Note: Employed population 15 to 75, Canada excluding Territories.

Source: Statistics Canada, Canadian Community Health Survey, cycle 1.2, 2002.

NPHS, the longitudinal models differ slightly from the corresponding CCHS-based cross-sectional models. For example, smoking, drinking alcohol, physical activity and BMI variables were used in the longitudinal models as rough proxies of the coping behaviour available from the CCHS.

The long-term effects of work stress on job performance were examined by using repeated observations over two-year periods. Pooling of repeated observations was combined with logistic regression analysis. Three cohorts of pooled observations were used, with baseline years of 1994/95 (cycle 1), 2000/01 (cycle 4) and 2002/03 (cycle 5). Each cycle had questions on work stress. For each baseline year, employed persons aged 15 to 75 (15 to 54 for the model for being out of labour force) were selected for analysis.

Reduced activities at work two years later

Only workers reporting no reduced work activities in the baseline were included for analysis. The NPHS asked current workers: "Because of a long-term physi-

cal or mental condition or a health problem, are you limited in the kind or amount of activity you can do at work?" Those answering yes in the follow-up survey two years later were considered to have reduced activities at work.⁷

Workers with active jobs were twice as likely as those with low-strain jobs to have reduced work activities two years later, even after controlling for various confounding factors, including social support and coping behaviours (Table 5). This is not consistent with the assumption that active jobs create the context of growth and learning conducive to high productivity (Karasek 1998). Being in active jobs may raise current productivity, but working under high demands and high responsibility (control) may cost workers health and productivity later.

As well, physical exertion appeared to increase the long-term likelihood of reducing work activities. Both men and women who worked in physically demanding jobs were around 1.6 times more likely

Table 5 Longitudinal labour force outcomes, over a two-year period

	Men			Women		
	Reduced activity at work	Disability day	Out of labour force	Reduced activity at work	Disability day	Out of labour force
	Odds ratio					
Psycho-social work conditions						
Active	2.01*	1.39	0.66*	2.08*	1.36	0.87
High strain	2.29*	2.02*	0.87	1.72	1.06	0.80
Low strain (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Passive	1.53*	1.39	0.94	1.37	1.20	1.04
Physical exertion						
Yes	1.60*	1.05	0.93	1.67*	0.90	1.02
No (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Job insecurity						
Yes	1.10	0.85	1.45*	1.12	1.03	1.33*
No (ref)	1.00	1.00	1.00	1.00	1.00	1.00

* significantly different from reference group (ref) ($p < 0.05$)

Note: Employed population 15 to 75, Canada excluding Territories.

Source: Statistics Canada, National Population Health Survey, 1994/1995, 2004/2005.

than those in other jobs to reduce their work activities two years later. Men with passive or high-strain jobs were more likely than workers with low-strain jobs to reduce work activities two years later, suggesting that these types of work stress may have contributed to long-term health problems that eventually affect productivity.

Disability days two years later

Men with high-strain jobs in the baseline year were more likely to take disability days two years later.⁸ They were twice as likely as men with low-strain jobs to have disability days even after controlling for socio-demographic, employment and social support factors (Table 5).

As with reduced work activities, workers hit hardest by work stress may already have left the labour force and so were not included for analysis. Disability days may be affected more by concurrent conditions than longitudinal ones, as the concept focused on short-term effects such as staying in bed, cutting down on normal activities, or requiring extra effort for daily activities, whereas reduced work activities measured results from long-term health conditions.⁹

Being out of labour force two years later

Those working in the baseline survey but not two years later were considered as being out of labour force. To minimize the potential effect of retirement,

the analysis of out of the labour force was limited to workers aged 15 to 54.

Not surprisingly, workers who perceived their jobs to be less secure were more likely not to be in labour force two years later. The odds ratios were 1.5 for men with job insecurity and 1.3 for women, after controlling for various confounding factors (Table 5). Men with active jobs were more likely to remain in the labour market than men with low-strain jobs. While these findings are generally consistent with previous research reporting that job stress is a very important determinant of intentions to quit (Leontardi and Ward 2002), this analysis could not provide information on the reasons for leaving the labour market.

Conclusion

The negative implications of work stress are recognized as a challenge to both employers and workers, with women, youth, shift, part-time, and non white-collar workers being more likely to have high-strain jobs. Those with such jobs perceived their work to be physically demanding and less satisfying. Low personal incomes and low levels of education were also associated with higher stress.

Work stress can be measured by several indicators. As a result, some variables can at times show differing types of associations with various population groups.

In particular, self-perceived work stress often had a seemingly inverse relationship to other indicators of work stress. For example, white-collar workers were more likely than others to have low job strain and high job satisfaction, yet they also had higher levels of self-perceived work stress. Groups with high self-perceived work stress included middle-aged, married, high income, and high education. It seems workers were more likely to find their work stressful when it was based on their perceived responsibility rather than job strain or dissatisfaction.

Work stress factors have significant cross-sectional and longitudinal associations with job performance. For example, high job strain was associated with reduced activities at work and taking at least one disability day during the previous two weeks; active jobs were also positively associated with taking disability days; and physically demanding work was related to absence from work in the past week. Physically demanding work was associated with reduced activities two years later; active jobs were associated with reduced work activities; and self-perceived job insecurity was associated with subsequent non-employment.

Social support and positive coping mechanisms are protective factors for workers. Many associations between work stress indicators and job performance were mitigated by such factors. On the other hand, negative coping behaviours were likely to increase work impairments. Effective promotion of protective elements and reduction of negative behaviours, on and off the job, may help lessen the effects of work stress on reduced work activities, disability days and work absences.

Perspectives

■ Notes

- 1 Information on union membership and job permanency was not available in the 2002 CCHS or the NPHS.
- 2 Further analysis revealed an interesting difference between men and women in the relationship between work hours and physical exertion: among men, full-timers were more likely to perceive their jobs as physically demanding; whereas among women, this was the case for part-timers (data not shown).
- 3 This finding is inconsistent with previous research that has shown that extended work hours increased work stress especially when combined with shift work (NIOSH 2004; van der Hulst and Geurts 2001).

4 Job dissatisfaction was not included in the regression models due to its close association with self-perceived work stress (cf. Shields 2006).

5 Reduced work activities in the CCHS were based on a response of often or sometimes (versus never) to: “Does a long-term physical or mental condition or health problem reduce the amount or kind of activities you can do at work?”

6 Because of this specific definition, only 85% of the original study population was included: those who did not work due to a permanent disability or lack of a job (possibly caused by illness or injury) were excluded. As well, since those who worked, regardless of hours or types of work, were counted as present, a very low rate of work absence (1.4%) was found. This prevented a full analysis of some issues, and may have precluded statistically significant findings that would have emerged had the sample been larger.

7 Since this analysis could not include workers who might already have left work due to severe effects of work stress during the survey intervals, some work stress effects would not be captured here.

8 Only workers who took no disability days in the baseline survey were included.

9 Unfortunately, the NPHS does not have disability indicators with a longer reference period (e.g. the number of disability days taken in the past year). Such indicators may be more relevant to the measurement of longitudinal effects of work stress.

■ References

Cole, Tim J., Mary C. Bellizzi, Katherine M. Flegal et al. 2000. “Establishing a standard definition for child overweight and obesity worldwide: international survey.” *British Medical Journal*. May 6, 2000. Vol. 320, p. 1-6.

Dollard, Maureen F. and Jacques C. Metzger. 1999. “Psychological research, practice, and production: The occupational stress problem.” *International Journal of Stress Management*. October. Vol. 6, no. 4, p. 241-253.

Harrington, J. Malcolm. 2001. “Health effects of shift work and extended hours of work.” *Occupational and Environmental Medicine*. January. Vol. 58, no. 1. p. 68-72.

International Labour Office (ILO) and joint WHO Committee on Occupational Health. 1986. *Psychosocial factors at work: Recognition and control*. *Occupational Safety and Health Series* no. 56. December. ILO. Geneva. 81 p.

Karasek, Robert A. 1998. “Demand/control model: A social, emotional, and physiological approach to stress risk and active behaviour development.” *Encyclopaedia of Occupational Health and Safety 4th Edition*. Chapter 34. Geneva. International Labour Organization.

- Karasek, Robert A. 1985. *Job Content Instrument: Questionnaire and User's Guide*. Revision 1.1. University of Southern California. Los Angeles, California. 15 p.
- Karasek, Robert A. 1979. "Job Demands, Job Decision Latitude, and Mental Strain: Implications for Job Redesign." *Administrative Science Quarterly*. June. Vol. 24, p. 285-308.
- Karasek, Robert and Töres Theorell. 1990. *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*. Basic Books. New York. 381 p.
- Leontaridi, Rannia M. and Melanie E. Ward. 2002. "Work-Related Stress, Quitting Intentions and Absenteeism." Discussion Paper No. 493. May. Institute for the Study of Labor (IZA). Bonn, Germany. 29 p.
- Lindström, Martin. 2005. "Psychosocial work conditions, unemployment and self-reported psychological health: A population-based study." *Occupational Medicine*. October. London. Vol. 55, no. 7, p. 568-571.
- Lund Thomas, Merete Labriola, Karl Bang Christensen et al. 2006. "Physical work environment risk factors for long term sickness absence: prospective findings among a cohort of 5357 employees in Denmark." *British Medical Journal*. February 25, 2006. Vol. 332, p. 449-452.
- National Institute for Occupational Safety and Health (NIOSH). 2004. *Overtime and Extended Work Shifts: Recent Findings on Illnesses, Injuries and Health Behaviors*. Centers for Disease Control and Prevention, U. S. Department of Health and Human Services. April. Publication no. 2004-143, 49 p.
- National Institute for Occupational Safety and Health (NIOSH). 1999. *Stress...at Work*. Centers for Disease Control and Prevention, U. S. Department of Health and Human Services. Publication no. 99-101, 26 p.
- Occupational Health Clinics for Ontario Workers Inc. (OHCOW). 2005. *Shiftwork: Health Effects & Solutions*. 6 p.
- Palmer, Stephen, Cary Cooper and Kate Thomas. 2004. "A model of work stress." *Counselling at Work*. Winter. 5 p.
- Shields, Margot. 2006. "Stress and depression in the employed population." *Health Reports*. Vol. 17, no. 4. October 2006. Statistics Canada Catalogue no. 82-003-XIE. p. 11-29.
<http://www.statcan.ca/english/freepub/82-003-XIE/82-003-XIE2005004.pdf> (accessed November 21, 2007)
- Shields, Margot. 2006. "Unhappy on the job." *Health Reports*. Vol. 17, no. 4. October 2006. Statistics Canada Catalogue no. 82-003XIE. p. 33-37.
<http://www.statcan.ca/english/freepub/82-003-XIE/82-003-XIE2005004.pdf> (accessed November 21, 2007).
- Statistics Canada. 1995. *National Population Health Survey 1994-95: public use microdata files*. Appendix F: Derived variables. Statistics Canada Catalogue no. 82F0001XCB. Ottawa.
- Stephens, Thomas, Catherine L. Craig and Blake F. Ferris. 1986. "Adult physical activity in Canada: findings from the Canada Fitness Survey." *Canadian Journal of Public Health*. Vol. 77, issue 4, p. 285-90.
- van der Hulst, Monique and Sabine Geurts. 2001. "Associations between overtime and psychological health in high and low reward jobs." *Work Stress*. July. Vol. 15, issue 3, p. 227-240.
- von Thiele, Ulrica, Petra Lindfors and Ulf Lundberg. 2006. "Evaluating different measures of sickness absence with respect to work characteristics." *Scandinavian Journal of Public Health*. Vol. 34, no. 3, p. 247-253.
- Williams, Cara. 2003. "Sources of workplace stress." *Perspectives on Labour and Income*. Vol 4, no. 6. June. Statistics Canada Catalogue no. 75-001-XIE. p. 5-12.
<http://www.statcan.ca/english/freepub/75-001-XIE/75-001-XIE2003106.pdf> (accessed November 22, 2007).

Returning to the job after childbirth

Xuelin Zhang

A key family event, the birth of a child has important implications for the mother and the family. But childbirth also has a broader impact, especially in today's economy. Women now make up almost half of the work force, so any wholesale withdrawal by them would have major repercussions at both the micro-economic and the macro-economic levels. To better understand how new mothers balance career and domestic duties, researchers have paid particular attention to post-childbirth employment and earnings and their relationship with job-protected maternity leave and benefit systems.

One study found that about 60% of new Canadian mothers returned to work within six months of giving birth, and about 90% returned to work after one year (Marshall 1999). Another study suggested that maternity benefits (from Employment Insurance) increased the propensity for new mothers to take job leave, while job-protected maternity leave helped mothers return to the pre-childbirth employer (ten Cate 2000). A more recent study concluded that a modest expansion of job-protected maternity leave does not increase the time new mothers stay at home, whereas a substantial expansion of the system does increase the time (Baker and Milligan 2005).

In terms of the effects of childbirth on earnings, estimates of the income difference between Canadian mothers and childless women range from about 13% (Phipps et al. 2000) to a 4 to 5% wage penalty for young mothers after controlling for the differences in work history, labour force attachment, individual worker characteristics and job attributes (Drolet 2002).

Because of data constraints imposed by cross-sectional surveys, most previous research has focused on the short-term effects of childbirth on the employment of mothers. Longer-term effects can best be examined with longitudinal data sources. Using Statistics

Canada's Longitudinal Worker File, this article examines both the short- and the long-term effects of childbirth on the employment, job mobility and earnings of Canadian mothers over the past two decades (see *Data sources and definitions*).

Statutory maternity leave affects post-childbirth employment rates

If a mother stays home for an extended period after childbirth, her propensity to work in the future may be reduced since a long career interruption can affect job skills and chances of finding a new job. The percentage of mothers who return to work in the first post-childbirth year provides a measure of the short-term employment effect of childbirth.² Similarly,

Data sources and definitions

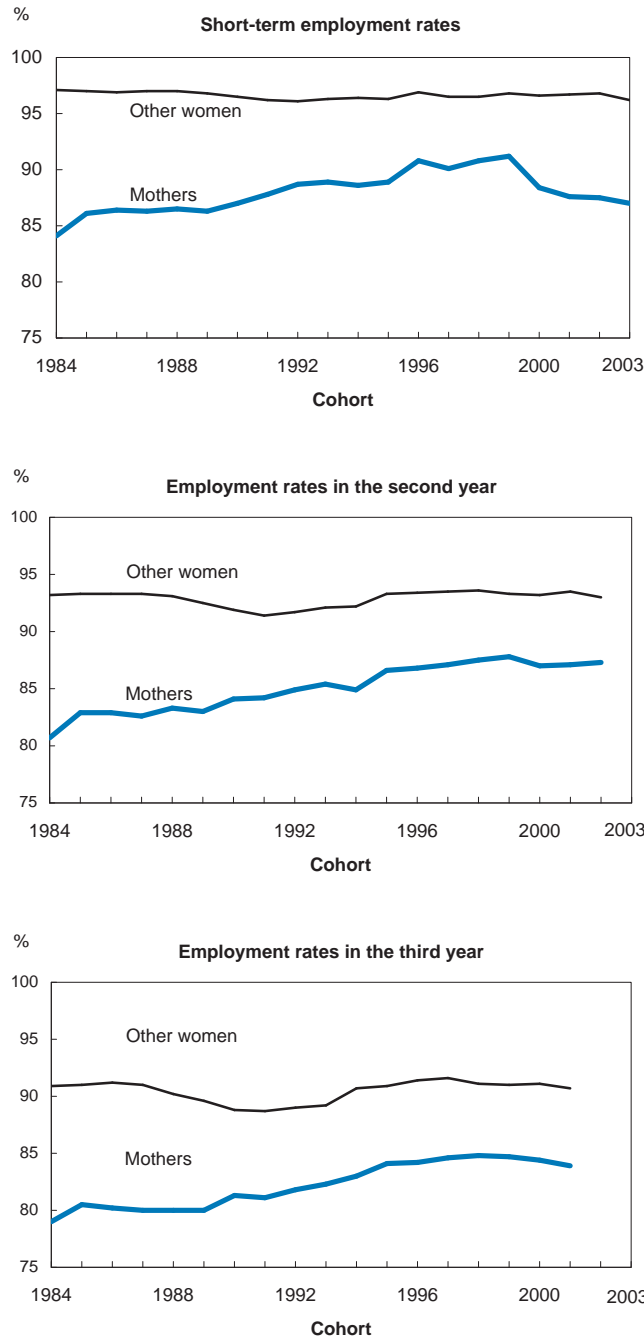
The Longitudinal Worker File (LWF) is a 10% random sample of all Canadian workers, constructed by integrating data from the Record of Employment (ROE), the T1 and T4 files, and the Longitudinal Employment Analysis Program (LEAP). The ROE indicates the reason for a job interruption, of which maternity leave is one. The resulting numbers compare well with those from Statistics Canada's Survey of Labour and Income Dynamics, which covers 1993 to 2004.¹

The mothers in this study sample were aged 20 to 39 in the year they gave birth, they were employed before taking maternity leave and experienced no other job separation that year, and in the previous year they worked and did not give birth. These restrictions allow the construction of 20 cohorts of mothers (beginning with the 1984 cohort and ending with the 2003 cohort)—with a sample of nearly 300,000 observations. They represent about 86% of all employed women who became mothers in the 1984 to 2003 period.

For each cohort of mothers, a comparison group was established. This cohort of other women satisfied the same restrictions as the mothers, except for giving birth. The comparison group provides a check whether changes in employment or earnings are due to the business cycle, since economic fluctuations should have similar effects on both mothers and the otherwise identical group of women.

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Chart A Employment rates of mothers consistently lower than those of other women



Source: Statistics Canada, Longitudinal Worker File.

employment rates in subsequent post-childbirth years measure the longer-term effects (Chart A).³ The corresponding employment rates for other women provide a comparison.⁴

Both long- and short-term employment rates of mothers were consistently lower than those of other women. For example, the short-term employment rate of the 1984 cohort of mothers was 84%, 13 percentage points below that of other women. While the employment rate of the 2001 cohort of mothers in 2004 (the third post-childbirth year) was 84%, the corresponding employment rate of their comparison group was 91%. Since the birth of a child increases the marginal costs and reduces the marginal benefits of working, it is not surprising that the post-childbirth employment rates of mothers were generally lower than those of other women.

The short-term post-childbirth employment rates of successive cohorts of mothers increased from the mid-1980s to the end of the 1990s and then started to decline in the early 2000s. For example, for the 1984 cohort of mothers, the employment rate in the first post-childbirth year was 84%. The employment rate reached 91% for the 1999 cohort of mothers, and then dropped to between 87% and 88% for the early 2000s cohorts. This suggests a non-linear relationship between short-term post-childbirth employment rates and the benefits of the job-protected maternity system (see *Job-protected maternity leave*). When protection is short, employment rates of new mothers in the first post-childbirth year are low. When protection is extended moderately, post-childbirth employment rates increase. But when protection is substantially extended to a year or longer, short-term post-childbirth employment rates decline.⁵

The non-linear relationship can be easily explained. Many factors affect a woman's willingness to return to work in the months following childbirth: the scarcity and cost of infant care; the desire to continue breastfeeding; and anxiety about leaving their infant in the care of others. As a result some women with shorter protected maternity leave may choose to stay home and give up their pre-childbirth jobs. Consequently, they would have to look for new jobs when they were ready to return to work and then might face a period of unemployment. But when the job-protected maternity leave becomes moderately long, as occurred during the 1990s in Canada, the above factors would disappear or at least be subdued and post-childbirth employment rates would increase.

Job-protected maternity leave

Job-protected maternity leave legislation in Canada is under provincial jurisdiction. In the 1980s, Canadian mothers had 17 or 18 weeks of job-protected maternity leave within which time their employers were legally obliged to give pre-childbirth jobs back to eligible mothers. In the early 1990s, leave was extended to between 29 and 52 weeks in all provinces except Alberta and Saskatchewan. By the early 2000s, pre-childbirth jobs were protected for 52 to 54 weeks in nine provinces; mothers from Quebec have had a 70-week leave since 1997.

But when the system is extended to more than a year, it becomes feasible for some mothers to take the whole first post-childbirth year off and still retain rights to their pre-childbirth jobs. For example, about 29% of mothers who gave birth in 2000 were from Quebec, Manitoba and New Brunswick. Under their provincial legislation, Quebec mothers were able to retain their pre-childbirth jobs for up to 70 weeks; Manitoba and New Brunswick mothers were able to do so for 54 weeks. Thus, Quebec mothers who gave birth from the second half of August to December, and mothers from Manitoba and New Brunswick who gave birth in the second half of December 2000, were all able to remain off work for all of 2001 and return to their previous jobs as of January 2002—hence the decline in the short-term employment rates for the 2000 cohort. The same explanation applies to the declines in the short-term employment rates of the 2001 to 2003 cohorts.⁶

The long-term post-childbirth employment rates of Canadian mothers increased steadily from the mid-1980s to 1999. A slight decline occurred thereafter. Since the employment rates for the corresponding comparison group also declined after 1999, the leveling off was likely not related solely to childbirth.

Long-term withdrawal rates by Canadian mothers provide an alternative measure for the post-childbirth employment patterns for Canadian mothers.⁷ Women who gave birth were less likely to withdraw from the labour market during post-childbirth years in the early 2000s than in the mid-1980s. For example, about 8% of mothers who gave birth in the mid- and late 1980s withdrew from the labour market in the first three post-childbirth years, but in the late 1990s and early 2000s the figure was less than 6%.

Returning mothers less likely to quit

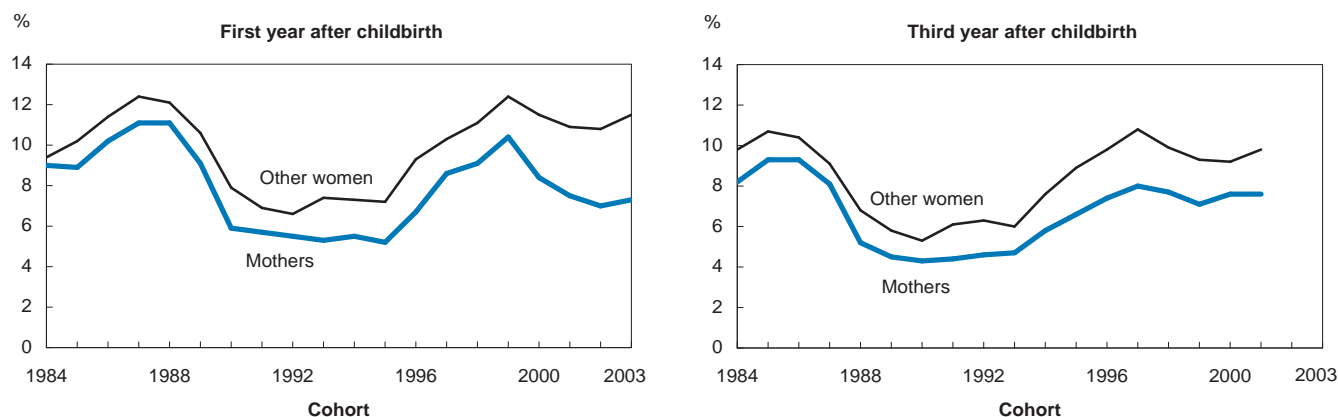
The birth of a child raises work-family balance issues for parents, particularly mothers. Although the tradition that women withdraw completely from the labour market upon giving birth has long gone, some mothers may still quit their jobs due to work schedule inflexibility, commuting difficulties, or lack of child care services.

Quit rates of new mothers and other women both fluctuated over time: mothers who gave birth during the downturn of the economy had lower quit rates than mothers who gave birth during the booming years. But more importantly, when compared with other women, mothers' quit rates, short- or long-term, economic downturn or upturn, were consistently lower, and the differences became more evident over time (Chart B). For example, in the mid-1980s, quit rates of new mothers in the first post-childbirth years were generally below those of the reference group by about 1 percentage point, and by the early 2000s, the difference had increased to more than 3 points.

Mothers having lower quit rates than other women could be anticipated since rates were measured for a group of women who returned to the labour market after giving birth. Those who had not yet returned to work were not part of the population upon which the quit rate is calculated. And on average, it is not unreasonable to assume that mothers who returned to the labour market had stronger labour market attachment, stronger career motivations, or more productive job matches than mothers who had not returned to work (and some of whom may never return), particularly in the longer term. In other words, the quit rates for mothers are defined using mothers with relatively strong labour market attachment and, hence, their quit rates were below the average of other women.

But why the increased differences in quit rates between mothers and other women in the early 2000s compared with the mid-1980s?⁸ In part, this can be attributed to the longer job-protected maternity leave system, which helps improve the job-worker match quality. With short job-protected maternity leave, the economic and emotional costs of a quick return to work will convince some women—particularly those with a poor job match—to remain at home. But with longer job protection, it becomes feasible for some mothers to invest time searching for a new job match, knowing they can still return to their

Chart B Quit rates of mothers consistently lower than for other women



Source: Statistics Canada, Longitudinal Worker File.

pre-childbirth jobs within a given period. Then those who find a new job likely obtain a better job match and their probability of quitting their new jobs is low. Those who choose to return to their pre-childbirth jobs would be more certain about their jobs and they should also be less likely to quit in subsequent years.⁹

Standard human capital theory suggests that returning to the same employer implies little loss of firm-specific human capital or job tenure, particularly for those who returned to their pre-childbirth jobs relatively quickly. Hence, it is interesting to directly examine the proportion of new mothers working for their pre-childbirth employers during post-childbirth years (Chart C). Of course, the likelihood of working for the same employer, for both mothers and other women, was affected by economic fluctuations primarily because less outside opportunity is available in economic downturn than upturn. However, more revealing is that, before 1992, Canadian mothers were slightly less likely to return to their pre-childbirth employers than other women during the first post-childbirth year, the difference being around 2 percentage points. But since 1992, the proportion of new mothers staying with their pre-childbirth employers rose to the same level as that for other women, and from 2001, new mothers became somewhat more likely than other women to stay with their employers.

In terms of the proportion of women staying with the same employers in the longer run, successive cohorts of new mothers were more likely than the reference

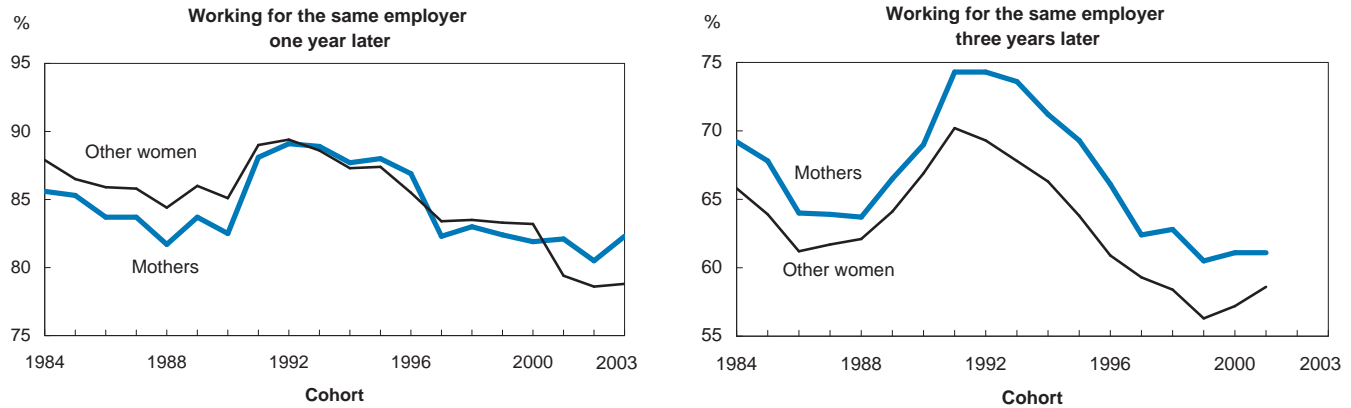
group to stay with their pre-childbirth employers and the differences stayed relatively constant over the past twenty years. One reason might be that mothers with young children were less mobile than women from the comparison group, the presence of young children perhaps making job change difficult. For example, some working mothers with young children need to make new child care arrangements when changing employers, while for the comparison group (women without children) such a barrier does not exist.

Short-term earnings drop steeper with extended maternity leave...

A simple way to measure the effects of childbirth on the earnings of mothers is to compare their pre- and post-childbirth earnings. This helps answer some interesting questions about the size of immediate earnings drops, the time required to regain pre-childbirth earnings, and the evolution of the earnings recovery process over the last twenty years.

The advantage of this approach is that it requires no strong sampling restrictions and thereby allows the use of a wide sample of Canadian mothers. The main disadvantage is that a simple comparison of pre- and post-childbirth earnings does not reveal the true earnings effects of childbirth since it is not known how earnings would have grown otherwise. Nevertheless, the comparison provides a rough guide to the earnings effects of childbirth.

Chart C Mothers more likely to remain with the same employer



Source: Statistics Canada, Longitudinal Worker File.

Earnings drops for Canadian mothers were quite strong during the year of childbirth and in the first post-childbirth year, and these drops tended to increase over time (Chart D). During the 1980s, the birth of a child lowered earnings by about 28% in the year of childbirth. This increased to 30% in the 1990s, and to about 33% after 2000. And for the first post-childbirth years, the earnings drop relative to the pre-childbirth level was between 14% and 18% before 2001, but about 37% to 39% since then.

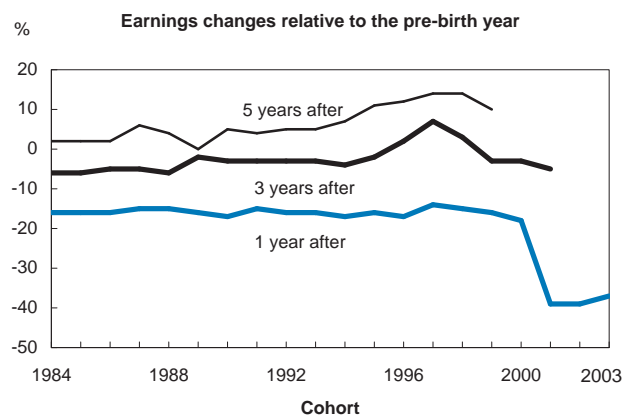
The earnings drops in the year of childbirth and in the first year thereafter were mainly the result of changing maternity leave benefits. Prior to 1991, the maximum duration of maternity leave benefits was 15 weeks. Those who gave birth in the first 37 weeks of a year would have been able to collect all of the benefits within the year of childbirth. Assuming childbirth to be uniformly distributed over the year, this group of mothers would account for about 70% ($37 \div 52 = 0.71$) of mothers who gave birth within that year. If they all exhausted their maternity benefits (by collecting for 15 weeks) and had no other earnings interruptions, they would have lost about 30% of their potential earnings ($15 \div 52 = 0.29$). Mothers giving birth in the last 15 weeks of the year would have incurred less than a 30% earnings drop during the childbirth year, but they would have incurred some earnings drop in the next year.

Similar calculations can be made for other cohorts of mothers. In particular, the large earnings drops in the first post-childbirth year for the 2001 to 2003 cohorts of mothers can be easily understood because, beginning in 2001, Canadian parents (primarily mothers) were able to receive Employment Insurance (EI) benefits for up to 50 weeks.¹⁰ Then, those who gave birth in the early part of a year were able to collect the benefits for almost a whole year, and, as such, the earnings drop during the year of childbirth was now higher than that for mothers who gave birth before 2001. Those giving birth in the second part of the year could continue to collect benefits for a significant part of the first post-childbirth year. And indeed, those giving birth at the end of a year could rely on EI benefits for most of the first post-childbirth year—hence the higher earnings drops in the first post-childbirth year.

...but longer-run recovery is stronger

Earnings of the 1990s and early 2000s cohorts of mothers also recovered faster than those of the mid-1980s cohorts. For example, for the mid-1980s cohorts of Canadian mothers, the earnings five years after childbirth were only slightly above their pre-childbirth earnings. But for mothers who gave birth after the mid-1990s, earnings five years thereafter were generally higher by 10% or more. The faster earnings recovery in the early 2000s may be explained by fac-

Chart D Mothers' earnings recovering more quickly in recent years



Source: Statistics Canada, Longitudinal Worker File.

tors such as higher education attainment, stronger labour market attachment, greater career motivation and longer job protection. Longer job protection might result in more appropriate job matches, while factors like higher education attainment are associated with steeper earnings growth. On the other hand, longer job protection will also result in longer future work interruptions for subsequent children, which likely accounts for the slight downturns in the 3-year- and 5-year-after curves.

Summary

Long-term post-childbirth employment rates of successive cohorts of Canadian mothers have increased relatively steadily over the last two decades. While short-term post-childbirth employment rates also increased from the mid-1980s to the end of the 1990s, they dropped for the early 2000s cohorts of mothers. Canadian mothers were less likely to quit, and more likely to stay, with their pre-childbirth employers in the post-childbirth years than women from the comparison group. Although earnings drops were greater for the early 2000s cohorts of mothers than for the mid-1980s cohorts, the earnings recovery process was shorter.

Unobserved factors like career motivation resulting from increasing education attainment, as well as institutional factors like an increasingly generous job-

protected maternity leave system, have all played important roles in the evolution of post-childbirth employment and earnings trajectories of Canadian mothers during the last two decades.

Perspectives

Notes

1 Details can be obtained from the author or the forthcoming research paper.

2 A woman is defined as employed in a year if she had earnings from one or more paid jobs during that year.

3 The horizontal axis of the figure represents different cohorts of mothers and non-mothers. It also measures time (year) implicitly. For example, the 84% for the 1984 cohort of mothers indicates the employment rate of this cohort of mothers in 1985 (the first post-childbirth year). Chart A contains the employment rates in the other post-childbirth years. The employment rates for the comparison groups can be found in the longer version of this study, to be published shortly. Note that these rates will differ considerably from those derived from the Labour Force Survey.

4 Women from the comparison group are also referred to as non-mothers or other women. These were women who did not give birth within the same period of time.

5 This echoes the finding of Baker and Milligan (2005) that a moderate expansion of the job-protected maternity leave system does not increase the time new mothers spend at home, while a significant expansion of the system does increase this time.

6 Probit analyses on both the short- and long-term employment of mothers controlled for age, cohort, employer size, previous earnings and province—none of these variables could explain the employment differences between mothers and other women.

7 A mother is a withdrawer in three (five) post-childbirth years if she did not receive any earnings in those years. A mother who does not work in the first post-childbirth year might just be taking her job-protected maternity leave, and not withdrawing from the labour market.

8 Probit analyses suggest that most of the differences observed in Chart B remain after controlling for age, cohort, industry, firm size, province, etc.

9 Strong labour market attachment and career motivation as a result of increased education attainment may also play an important role in the lower long-term quit rates for the mothers in the long run. But these cannot explain the large decline in the short-term quit rates for the early 2000s cohorts

of mothers since there were no data indicating these factors changed suddenly in the early 2000s.

10 Thirty-five of the 50 weeks (parental leave) can be used by either the mother or the father. In 2002, less than 10% of parental leave benefits went to fathers.

■ References

Baker, Michael and Kevin Milligan. 2005. "How Does Job-Protected Maternity Leave Affect Mothers' Employment and Infant Health?" National Bureau of Economic Research Working Paper No. 11135. 57 p.

Drolet, Marie. 2002. "Wives, Mothers and Wages: Does Timing Matter?" Statistics Canada Catalogue no. 11F0019MIE2002186. Ottawa. Analytical Studies Branch Research Paper Series, no. 186. 25 p.
<http://www.statcan.ca/english/research/11F0019MIE/11F0019MIE2002186.pdf> (accessed November 20, 2007).

Marshall, Katherine. 1999. "Employment after childbirth." *Perspectives on Labour and Income*. Vol. 11, no. 3. Autumn. Statistics Canada Catalogue no. 75-001-XPE. p. 18-25.
<http://www.statcan.ca/english/studies/75-001/archive/e-pdf/e-9932.pdf> (accessed November 20, 2007).

Pérusse, Dominique. 2003. "New maternity and parental benefits." *Perspectives on Labour and Income*. Vol 4, no, 3. March. Statistics Canada Catalogue no. 75-001-XIE. p. 12-15.
<http://www.statcan.ca/english/freepub/75-001-XIE/0030375-001-XIE.pdf> (accessed November 22, 2007).

Phipps Shelley, Peter Burton and Lynn Lethbridge. 2001. "In and out of labour market: long-term income consequences of child-related interruptions to women's paid work." *Canadian Journal of Economics*. Vol. 34, no. 2, p. 411-429.

Statistics Canada. 2006. *Report on the Demographic Situation in Canada 2003 and 2004*. Statistics Canada Catalogue no. 91-209-XIE. 115 p.
<http://www.statcan.ca/english/freepub/91-209-XIE/91-209-XIE2003000.pdf> (accessed November 20, 2007).

ten Cate, Adrienne. 2003. "The Impact of Provincial Maternity and Parental Leave Policies on Employment Rates of Women with Young Children in Canada." McMaster University, Hamilton. Department of Economics Working Paper Series no. 2003-03. 48 p.

Zhang, Xuelin. (forthcoming paper) "The post-childbirth employment of Canadian mothers and the earnings trajectories of their continuously employed counterparts: 1983-2004." Statistics Canada. Ottawa. Analytical Studies Branch Research Paper Series.