Job stress and Happiness

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Abstract

This study investigates the effect of job stress on happiness, using nationally representative data from *Canadian Community Health Survey, 2012: Mental Health Component (CCHS)*, produced by the Health Statistics Division (2023). Happiness is measured through life satisfaction, which closely tracks mental health but also carries broader implications for both productivity and well-being. While job stress has long been linked to psychological distress and reduced productivity, identifying its impact is complicated by endogeneity, as unobserved traits such as coping ability or personality may influence both reported stress and satisfaction. To address this, this study estimates a recursive system of three ordered probit models using the Conditional Mixed Process (CMP) estimator. The model specifies that job stress affects job satisfaction, and job satisfaction in turn affects life satisfaction. Using hectic work pace and interpersonal work conflict as instrumental variables for job stress, the findings reveal that job stress significantly reduces job satisfaction, and job satisfaction, in turn, strongly enhances life satisfaction. However, job stress does not have a statistically significant direct effect on life satisfaction. These results support a mediation pathway where job stress indirectly affects life satisfaction through job satisfaction, a path often linked to broader mental well-being in existing literature. The model also reveals meaningful correlations in the unobserved components across equations, highlighting deeper structural links between workplace conditions and individual well-being. These findings underscore the importance of creating supportive job environments and addressing psychosocial risk factors to improve happiness and mental health outcomes among workers.

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1 Introduction

What is the impact of job stress on happiness? This question lies at the intersection of economics and public health, where working conditions are recognized as key determinants of individual well-being. While prior research has often focused on job insecurity as a driver of psychological distress, this study shifts the focus toward job stress, a more immediate and observable workplace burden, as a critical factor affecting happiness and, by extension, Psychological strain. In this study, happiness is measured through life satisfaction. Drawing on evidence from Lombardo et al. (2018), who find a strong correlation between life satisfaction and self-perceived mental health in the Canadian Community Health Survey, life satisfaction can be viewed as closely tied to mental health outcomes. At the same time, Isham, Mair, and Jackson (2021) demonstrate that higher life satisfaction is linked to greater productivity. Framing the analysis around happiness, therefore, highlights its economic relevance, while the close relationship with mental health means that the results also provide indicative evidence of how job stress may affect broader mental well-being.

Job stress typically comes from time pressure, limited decision-making autonomy, and conflict with colleagues. Unlike job insecurity, which relates to future uncertainty, job stress reflects current job demands and the psychosocial work environment. The adverse consequences of job stress are well documented and include burnout, anxiety, and depression, with downstream effects on productivity and labor force participation. Yet, establishing a causal relationship between job stress and happiness remains challenging because of unobserved factors, such as personality traits, coping abilities, or workplace culture, that may influence both how individuals experience stress and how they report their mental health.

Much of the literature documents associations between workplace stressors and mental health using cross-sectional or short prospective designs, without instruments or structural models to address endogeneity. A one-year Belgian cohort, Godin et al. (2005), show ERI predicts subsequent mental health but still rely on adjusted logistic models rather than IV. Canadian evidence, such as the study by Kim et al. (2021), focuses on employment insecurity rather than day-to-day stress, and likewise does not correct for endogeneity. This thesis addresses that gap by modeling job stress as endogenous within a recursive system.

This study contributes to the literature in several ways. First, it employs a structural approach to clarify direct and indirect effects, using a recursive triangular system of ordered probit models estimated with the Conditional Mixed Process (CMP) estimator. Prior studies often used cross-sectional associations (e.g., Godin et al. (2005)), which did not correct for endogeneity. Second, it introduces an identification strategy that uses hectic work pace and interpersonal conflict as instrumental variables for job stress, Cooper, Rout, and Faragher

(2018) and Shigemi et al. (1997), highlighting these factors as direct stressors that operate independently of satisfaction or broader well-being. Third, it leverages nationally representative Canadian survey data, addressing a geographic gap in existing research. Much of the evidence on job stress and mental health comes from Japan Shigemi et al. (1997), Belgium Godin et al. (2005), or multinational reviews Hasin et al. (2023). Canadian research, such as Kim et al. (2021), has focused on job insecurity rather than daily stress. By using the *Canadian Community Health Survey (2012)*[1], this study provides nationally representative evidence on work stress, job satisfaction, and happiness in a North American context, filling a notable geographic gap. Together, these features allow for a more credible assessment of how job stress affects job satisfaction and, indirectly, happiness.

This study finds that job stress significantly reduces job satisfaction, and job satisfaction is strongly and positively associated with life satisfaction. For example, moving from "not at all stressful" to "extremely stressful" lowers the probability of reporting higher levels of job satisfaction by roughly 0.49 to 2.09, depending on the category. Conversely, being "very satisfied" with one's job raises the probability of reporting the highest category of life satisfaction by about 1.68. However, job stress has no statistically significant direct effect on life satisfaction, supporting the hypothesis that its impact is mediated through reduced job satisfaction. These results provide evidence for a layered, indirect pathway through which job stress affects happiness and eventually psychological strain.

The remainder of the thesis proceeds as follows. Section 2 reviews the literature on job stress, job satisfaction, and mental health, with attention to whether previous studies have addressed endogeneity. Section 3 outlines the empirical methodology and identification strategy. Section 4 describes the data and variables used. Section 5 presents the main results, including model estimates, marginal effects, and error term correlations. Section 6 concludes with policy implications and suggestions for future research.

2 Literature review

Job stress has increasingly been recognized as a significant factor affecting workers' mental health. Unlike job insecurity, which comes from the anticipation of job loss, job stress reflects the daily pressures and demands of one's work environment. These include heavy workloads, time pressure, lack of control, and interpersonal conflict. These factors can

1. Initially, the analysis was planned using both the 2012 and 2018 cycles of the Canadian Community Health Survey (CCHS 2012: Mental Health Component and CCHS 2017–2018: Annual Component). However, during the course of the analysis, it became evident that the 2018 cycle lacks key variables related to work stress, which led to its exclusion. Since measures of happiness (life satisfaction) were available and comparable across both surveys, the focus was retained on happiness using the 2012 data only.

contribute to a variety of adverse mental health outcomes, including anxiety, depression, emotional exhaustion, and burnout. Yet the pathways and strength of these associations vary across occupations, contexts, and methodologies.

Several studies have examined how job stress impacts mental health. One of the earliest large-scale occupational surveys was Cooper, Rout, and Faragher (2018), a study of general practitioners in the United Kingdom. Using a national sample, they identified six domains of stressors, including job demands, constant interruptions, practice administration, the conflict between work and family life, dealing with death, and medical responsibility for friends and relatives. These stressors were found to predict both reduced job satisfaction and diminished mental health. Importantly, they also uncovered gender differences: men were more affected by workload and administrative stressors, while women were more affected by interference with family life. The study showed that stress arises from both workplace demands and the interference of work with family and social life. Their framework, which positions stressors as determinants of both job satisfaction and mental health, is conceptually similar to the approach taken in this study. The present analysis extends this line of work by using nationally representative Canadian data and by explicitly modeling job stress as an endogenous determinant of job satisfaction and life satisfaction within a recursive system.

Evidence from Japan has provided further support for the negative association between job stress and mental health. Shigemi et al. (1997) conducted a cross-sectional study in Japan using the General Health Questionnaire (GHQ)[2] to assess mental well-being among employees in an electronics company. Their results showed that stress factors, especially excessive responsibility, poor relationships with superiors, and difficulty adapting to new technologies, were significantly associated with poor mental health. They also found that these effects persisted even when adjusting for family-related stress and physical health, highlighting job stress as a strong predictor of poor mental health. Similarly, Fujino et al. (2001) studied permanent night workers using both the GHQ and the NIOSH [3] stress questionnaire. They reported that a high quantitative workload nearly tripled the odds of psychiatric disturbance, while being unmarried also raised the risk. Interestingly, they found that higher job control worsened mental health in this group, suggesting that cultural context may shape how control is experienced. Their study highlights the critical role of job satisfaction in linking occupational stress to adverse mental health outcomes. This provides a rationale for explicitly modeling job satisfaction as a mediating variable between job stress

2. The GHQ is a widely used screening instrument designed to detect psychiatric disorders and assess overall mental well-being in general populations and occupational groups.

3. The NIOSH job stress questionnaire was developed by the U.S. National Institute for Occupational Safety and Health. It measures sources of workplace stress, including job demands, decision latitude, and interpersonal conflict.

and life satisfaction in the recursive framework used in this study.

A more dynamic perspective is offered by Godin et al. (2005), who carried out a study in Belgium using the effort-reward imbalance (ERI) model.[4] Following nearly 2,000 employees over time, they found that both newly emerging and cumulative job stress significantly increased the risk of depression, anxiety, somatization, and psychotropic drug use. Their findings also revealed gender differences: recent stress was more harmful to men, while long-term exposure had a stronger impact on women. This study highlights the importance of measuring job stress over time and accounting for both sudden and prolonged exposure in understanding its full effect on mental health.

Complementing these findings, Hasin et al. (2023) conducted a systematic literature review linking job stress to a range of physical and mental health outcomes. Their findings confirmed that job stress has a strong association not only with psychological disorders, such as depression and anxiety, but also with physical conditions, including cardiovascular disease, musculoskeletal pain, and gastrointestinal symptoms. The review also revealed how prolonged stress exposure at work contributes to deteriorating mental health and diminished workplace productivity, generating concerns for both public health and organizational performance due to the associated rising costs.

While most of this literature has focused on non-Canadian contexts, Kim et al. (2021) provides an important point of entry into the Canadian case. Using the 2012 CCHS, they examined how job insecurity affects mental health and found that insecure employment, whether full-time or part-time, was strongly associated with mental illness. Although their study focused on job insecurity, not daily job stress, it demonstrated the availability and usefulness of Canadian national data in studying mental health outcomes. The CCHS also contains direct information on diagnosed conditions such as depression, distress, and bipolar disorder; however, these variables have already been widely explored in the literature linking clinical mental health to job stress. By contrast, this study emphasizes on life satisfaction to examine a broader, subjective dimension of well-being. This focus follows recent contributions by Isham, Mair, and Jackson (2021), who show that happiness and life satisfaction are not only integral to mental health but also strongly related to productivity outcomes, reinforcing the value of examining stress through the lens of overall life satisfaction rather than clinical diagnoses.

4. The Effort-Reward Imbalance (ERI) model, created by Siegrist, explains job stress as what happens when the effort someone puts into their job isn't matched by the rewards they receive, like pay, recognition, or job security. When this imbalance lasts for a long time, it can lead to stress and health problems. The model also considers how some people are more prone to stress because they're overcommitted, they push themselves too hard, and find it hard to disconnect from work. In this study by Godin et al. (2005), workers exposed to this imbalance were significantly more likely to experience mental health issues.

In summary, prior research strongly suggests that job stress is a significant risk factor for mental health problems and a driver of productivity losses. Yet, causal pathways remain underexplored, particularly in the Canadian context, which has centered on insecurity rather than job stress itself. This study addresses these gaps by modeling job stress as an endogenous determinant of job satisfaction and, ultimately, life satisfaction, which is used here as a proxy for psychological strain. Consistent with Lombardo et al. (2018), who shows that life satisfaction is strongly correlated with self-perceived mental health in the Canadian Community Health Survey, this approach is supported by prior research. Moreover, consistent with Isham, Mair, and Jackson (2021), who link higher happiness to improved productivity, this interpretation situates life satisfaction as a bridge between mental health and economic performance. By situating job stress within a recursive framework, the analysis highlights how workplace conditions affect both individual well-being and productivity, contributing to the intersection of labor economics and public health research.

3 Methodology

The analysis addresses the interdependent relationships among job stress, job satisfaction, and life satisfaction using a recursive system of ordered probit models. Each observed outcome is ordinal in nature but is assumed to arise from an unobserved continuous latent variable. The observed categories are determined by thresholds that partition the latent scale, so that higher values of the latent variable correspond to higher reported categories. A key methodological challenge is endogeneity; unobserved factors such as personality traits or coping ability may simultaneously influence both stress and satisfaction, generating correlation in the error terms. To address this concern, the model employs an instrumental-variables strategy within a system estimated by the Conditional Mixed Process (CMP) estimator developed by Roodman (2011). This approach allows for a recursive triangular structure with multiple interdependent ordinal outcomes and is estimated by simulated maximum likelihood.

The recursive system for individual i is specified as follows:

$$S_i^* = Z_{Si}\delta_S + X_{Si}\beta_S + \varepsilon_{Si}, \qquad S_i = j \;\text{ if }\; \kappa_{S,j-1} < S_i^* \le \kappa_{S,j}, \tag{1}$$

$$J_i^* = Z_{Ji}\delta_J + \gamma_{SJ}S_i + X_{Ji}\beta_J + \varepsilon_{Ji}, \qquad J_i = k \;\text{ if }\; \kappa_{J,k-1} < J_i^* \le \kappa_{J,k}, \tag{2}$$

$$L_i^* = Z_{Li}\delta_L + \gamma_{SL}S_i + \gamma_{JL}J_i + X_{Li}\beta_L + \varepsilon_{Li}, \qquad L_i = m \;\text{ if }\; \kappa_{L,m-1} < L_i^* \le \kappa_{L,m}. \tag{3}$$

where S_i^*, J_i^*, and L_i^* are the latent variables for job stress, job satisfaction, and life satisfaction, respectively. The observed categorical outcomes S_i, J_i, and L_i are determined

by threshold values κ that partition the latent scales. X denotes a set of equation-specific covariates that vary across the three equations, including sex, age, immigrant status, personal income, full-time employment status, marital status, and education. The precise composition of X for each equation is described later in this section.

The error terms ε_{Si}, ε_{Ji}, and ε_{Li} from equations (1)–(3) are assumed to be jointly normally distributed with zero mean and correlation matrix Σ:

$$\begin{pmatrix} 1 & \rho_{SJ} & \rho_{SL} \\ \rho_{SJ} & 1 & \rho_{JL} \\ \rho_{SL} & \rho_{JL} & 1 \end{pmatrix}$$

The diagonal elements are normalized to unity, which is a standard identification restriction in ordered probit models since the variance of the latent variables is not separately identified. The off-diagonal elements ρ_{SJ}, ρ_{SL}, ρ_{JL} capture correlations across the unobserved determinants of stress, job satisfaction, and life satisfaction. This correlation structure accounts for unobserved traits (e.g., personality, coping ability) that may jointly influence stress, satisfaction, and well-being. Endogeneity, therefore, arises from these unobservables being embedded in the error terms. The recursive structure reflects the assumption that stress influences satisfaction, and both job stress and job satisfaction influence life satisfaction. Reverse effects are not modeled: for instance, job satisfaction is not assumed to feed back into stress. This recursive ordering captures the sequential impact of workplace stressors on well-being.

The recursive ordering assumes that job stress is driven mainly by workplace conditions such as workload, conflict, or pace, and therefore comes first in the system. Although job satisfaction may influence how stress is perceived, external pressures such as hectic pace or interpersonal work conflict are expected to dominate reported stress, which makes it reasonable not to include satisfaction in the stress equation. Life satisfaction is treated as a broader concept that combines many domains beyond the workplace. For that reason, it is modeled as being affected by job satisfaction, but not feeding back into it. This ordering follows a natural sequence: stress arises from work conditions, stress influences satisfaction with the job, and satisfaction at work contributes to overall happiness.

This recursive ordering reflects the approach taken in occupational health studies, which emphasize that job stress arises primarily from workplace conditions rather than from satisfaction itself. For example, Cooper, Rout, and Faragher (2018) identify specific domains such as workload, interruptions, and conflict as exogenous stressors shaping both satisfaction and health outcomes. Similarly, Shigemi et al. (1997) and Fujino et al. (2001) treat excessive responsibility, poor relationships, and workload as direct drivers of stress, independent of job

satisfaction. Following this evidence, this study restricts hectic pace and coworker conflict to the stress equation. Life satisfaction is modeled as a broader outcome influenced by job satisfaction. Using it as a proxy for Psychological strain is supported by empirical findings such as Lombardo et al. (2018), who argues that life satisfaction represents a fundamental measure of mental health. The exclusion of nervousness and restlessness from the stress and satisfaction equations, but their inclusion in the life-satisfaction equation, aligns with reviews like Hasin et al. (2023), linking these symptoms to overall well-being rather than job conditions. This strategy also differs from much of the existing literature. Earlier occupational studies (e.g., Cooper, Rout, and Faragher (2018); Shigemi et al. (1997); Fujino et al. (2001)) focused on specific groups and did not model the interdependence of stress, job satisfaction, and life satisfaction within a structural framework. Prospective designs such as Godin et al. (2005) emphasized the dynamics of effort–reward imbalance, whereas the present analysis addresses endogeneity in a cross-sectional setting by using exclusion restrictions (hectic pace, conflict) as instruments. Broader reviews, as in Hasin et al. (2023) linked job stress to both mental and physical health outcomes, but did not identify the pathways through which stress operates. In contrast, the recursive CMP approach applied here explicitly separates the direct and indirect effects of job stress, showing how stress shapes life satisfaction primarily through its impact on job satisfaction.

Finally, the endogeneity concern we address is due to unobservables (e.g., coping ability, personality) that may affect both stress and job satisfaction; estimating the equations jointly and instrumenting stress with job pace and conflict targets exactly this source of bias, not reverse causality. The three equations are identified by using a mix of common controls and exclusion restrictions. The stress equation includes demographic variables such as full-time status, occupation group, along with stressors specific to the job, hectic pace, and conflict with coworkers. The job satisfaction equation includes stress levels from the first equation, workplace characteristics such as learning opportunities and freedom of decision, and demographic controls including full-time status, sex, age, immigration status, and income. The life satisfaction equation combines stress and job satisfaction with broader factors, including indicators of emotional well-being, nervousness and restlessness, as well as marital status, education, sex, age, immigration status, and income. The exclusion restrictions are what secure identification: stressors like hectic pace and conflict only enter the stress equation, while nervousness and restlessness only enter the life satisfaction equation. The system is estimated by maximum simulated likelihood using Geweke–Hajivassiliou–Keane (GHK) simulation. To obtain population-representative results, survey sampling weights are applied, and robust standard errors correct for heteroskedasticity and the complex survey design.

4 Data

The *Canadian Community Health Survey, 2012: Mental Health Component* (CCHS–MH) is a nationally representative cross-sectional survey administered by Statistics Canada to gather information on the mental health status, service use, and functioning of Canadians aged 15 and older. The survey aims to assess both illness and positive mental health dimensions, including selected mental and substance disorders, access to formal and informal mental health care, and links between mental health and socio-economic variables. Data collection took place between January and December 2012, with a total of 25,113 interviews conducted via *Computer-Assisted Personal Interviewing (CAPI)*, resulting in an overall response rate of 68.9%. The survey excluded individuals living on Indigenous reserves, in institutions, or in full-time military service, representing about 3% of the Canadian population.

A multi-stage sampling strategy was employed. In the first stage, geographical clusters were selected from the *Labour Force Survey's (LFS)* area frame using *probability proportional to size (PPS)*. In the second stage, households were systematically sampled from dwelling lists prepared within each cluster. In the third and final stage, one respondent per household was randomly selected to participate, with selection probabilities adjusted based on age and household composition. This design ensured broad coverage of the non-institutionalized population aged 15 and older across all ten Canadian provinces.

To account for the complex survey design and ensure representativeness, each respondent was assigned a master sampling weight (WTS_M). This weight indicates the number of individuals in the Canadian population that each respondent represents. Weighted analyses are necessary to produce valid national-level inferences. Unweighted estimates may lead to biased or misleading conclusions due to the survey's clustered design.

The analytic sample in this study is restricted to working-age respondents between 20 and 65 years of age. Respondents younger than 20 or older than 65 were excluded. In addition, all non-substantive responses were coded as missing and dropped from the analysis. These include cases marked as *not applicable*, *not stated*, *don't know*, or *refused*. After applying these restrictions, the final sample consists of 73,311 respondents, representing approximately 40 million individuals when survey weights are applied.

The key outcome is *life satisfaction*, coded on an 11-point scale from 0 (very dissatisfied) to 10 (very satisfied). *Job stress* is self-reported on a five-point ordinal scale, ranging from "not at all stressful" to "extremely stressful." *Job satisfaction* is measured on a four-point scale (very satisfied, somewhat satisfied, not too satisfied, not at all satisfied). Additional workplace characteristics include whether the respondent's job requires learning new things, allows freedom in task execution, is hectic, and involves conflict with co-workers. Measures

of psychological distress are captured by two indicators: frequency of feeling nervous and frequency of feeling restless in the past month.

Sociodemographic controls include age (grouped into nine categories spanning 20–65), sex (male/female), marital status (married, common-law, widowed, divorced/separated, single), immigrant status (yes/no), education (less than secondary, secondary graduate, some post-secondary, post-secondary graduate), income (six grouped categories of total personal income), full-time versus part-time employment, whether the respondent worked in the week prior to the survey, and occupation group (management/health, business/finance, sales/service, trades/transport, or primary industry).

Table 1 and 2 present descriptive statistics for the analytic sample. Table 1 summarizes the distribution of respondents across age and income categories. The sample is on a nine-level age scale and on a six-level income scale. Table 2 reports socio-demographic characteristics. Just over half of respondents are female (53%), 38% are married, 18% are immigrants, and nearly half (50%) have some post-secondary education. About 85% of employed individuals report working full-time, and 70% were at work in the previous week. In terms of occupations, the largest share of respondents are in management, health, and education-related fields (41%), followed by sales and service (23%). Table 2 (continued) shows the distribution of the main analytic variables. Job stress is typically reported as "a bit stressful" or "quite a bit stressful," while job satisfaction and life satisfaction are skewed toward higher values.

Throughout the regressions, coefficients are interpreted relative to the following reference profile: a male, aged 20–24, married, non-immigrant, with less than secondary education, personal income under $10,000, employed full-time in managerial/professional occupations. In the attitudinal measures, the reference individual reports a job that is not at all stressful, not at all satisfied with their job (reference category), experiences no nervousness and no restlessness in the past month, and strongly disagrees that the job is hectic or involves interpersonal conflict. All reported effects should be read as deviations from this baseline.

Figure 1 shows the distribution of life satisfaction scores on the 0–10 scale. The distribution is heavily skewed toward the upper end, with more than half of respondents reporting values of 8 or higher. This pattern reflects the well-documented positivity bias in self-reported well-being measures. For the present analysis, the skew highlights the need to treat life satisfaction as an ordered outcome rather than a continuous variable, justifying the ordered probit framework.

This study focuses on modeling the pathway from *hectic work pace* and *workplace conflict* (used as instrumental variables) to *job stress*, and its downstream effects on *job satisfaction* and ultimately *life satisfaction*. The variables were selected based on theoretical relevance,

data availability, and their established significance in public health and labor economics literature.

5 Results

This section presents the findings of the recursive mixed-process model that jointly estimates three ordered outcomes: *job stress*, *job satisfaction*, and *life satisfaction*.

Table 3 reports the CMP regression results. In the first equation (job stress), occupational category and working conditions significantly predict reported job stress. Compared to individuals in managerial and professional roles, those in sales and service, trades and transport, and primary industries report significantly lower stress levels. Exogenous workplace stressors, perceptions of a hectic work environment, and interpersonal conflict also show strong positive associations with job stress. For example, respondents who strongly agree that their job is hectic have a substantially higher probability of being in a higher stress category compared to those who strongly disagree. Similarly, those who strongly agree that they experience interpersonal conflict are significantly more likely to report stress, with a coefficient of 0.96. Finally, Part-time workers report lower job stress than their full-time counterparts.

In the second equation (job satisfaction), job stress exerts a large and statistically significant negative influence. Higher levels of stress are associated with lower satisfaction: individuals who report being "extremely stressed" are less satisfied with their jobs than those who report being "not at all stressed." The strength and monotonic pattern of the coefficients across stress levels suggest a clear slope. Other workplace characteristics, such as learning opportunities and autonomy (freedom to decide how to do one's work), are also positively associated with job satisfaction. For example, respondents who strongly agree they have autonomy report significantly higher satisfaction (with the coefficient of 1.17). Women report slightly higher satisfaction than men, and older workers (particularly those aged 50–64) are more satisfied than their younger counterparts. And immigrant workers, on average, report significantly lower satisfaction.

The third equation estimates life satisfaction as a function of job stress, job satisfaction, emotional well-being, and background variables. Interestingly, job stress does not exhibit a statistically significant direct effect on life satisfaction. None of the stress levels show significance at the 5% level. In contrast, job satisfaction has a strong and statistically significant positive association with life satisfaction. Respondents who are "very satisfied" with their jobs report life satisfaction scores that are 1.69 higher than those who are not at all satisfied. these findings suggest that the effect of job stress on happiness operates

indirectly, working through job satisfaction.

Additional controls for emotional well-being, such as feeling nervous or restless, display the expected negative association with life satisfaction. For instance, respondents who report feeling nervous or restless "all of the time" have life satisfaction scores roughly 0.89–0.60 lower than those who rarely experience these symptoms. Among socio-demographic variables, being female is associated with slightly higher life satisfaction, while being single, divorced, or widowed corresponds to lower satisfaction compared to those married. The effects of age are nonlinear: satisfaction tends to decline in mid-life and rise again at older ages, then decline again.

To assess the magnitude of the effects and the mediation pathway, marginal effects were estimated and are illustrated in Figures 2, 3, and 4. The results confirm that the average marginal effects of job stress on life satisfaction are negative but statistically insignificant, reinforcing the absence of a direct effect. By contrast, job stress exerts a strong and statistically significant negative effect on job satisfaction across all stress levels, and job satisfaction, in turn, exerts a strong positive effect on life satisfaction. These figures help to visualize the effects on probabilities rather than only interpreting coefficients.

Figure 2 and Table 7 show that moving from the lowest to the highest stress category reduces the probability of being satisfied with one's job by approximately 2.10. Figure 3 and Table 6 illustrate that higher levels of job satisfaction are strongly associated with higher life satisfaction, with respondents who are "very satisfied" at work reporting life satisfaction scores nearly 1.69 higher than those who are not at all satisfied. Finally, Figure 4 and Table 5 confirm that job stress has no statistically significant direct effect on life satisfaction once job satisfaction is included, consistent with the mediation hypothesis.

As shown in Table 4, the estimated error term correlations (ρ) provide additional insight into unobserved linkages among the equations. The significant ρ_{12} (correlation between job stress and job satisfaction equations) indicates that there are unobserved factors, such as personality traits or work environment characteristics, that simultaneously influence both job stress and job satisfaction levels. The non-significant ρ_{13} (between job stress and life satisfaction) confirms that unobserved characteristics affecting job stress do not directly influence life satisfaction, reinforcing the lack of a direct link. In contrast, the significant and negative ρ_{23} (between job satisfaction and life satisfaction) suggests that unobserved factors that increase job satisfaction may actually reduce life satisfaction, possibly reflecting situations where individuals are highly satisfied with their job but make personal or health sacrifices that reduce their overall well-being.

For comparison, an ordered probit model without endogeneity correction was estimated. In this model, job stress appears to have a significant negative effect on life satisfaction, with

stronger coefficients across stress categories. However, once endogeneity is addressed using the CMP framework, these effects disappear. This highlights the importance of accounting for endogeneity in estimating the causal effects of job stress, as naive models may overstate its direct impact. Table 8 reports coefficients from the life satisfaction equation, estimated using CMP, and compared with a single-equation ordered probit model, and Figure 5 depicts the comparison completely.

Importantly, these findings contrast with much of the existing literature, which has shown that stress directly harms mental health, leading to outcomes such as depression, anxiety, and burnout, as documented by Shigemi et al. (1997) in Japan, Fujino et al. (2001) in studies of night workers, and Godin et al. (2005) in Belgium, with further confirmation in the review by Hasin et al. (2023). In contrast, the present study suggests that stress influences happiness, measured by life satisfaction, mainly through its effect on job satisfaction, with no statistically significant direct impact on life satisfaction once mediating factors are taken into account. Because life satisfaction is closely correlated with self-perceived mental health based on Lombardo et al. (2018), these results can also be viewed as indicative of how stress affects broader well-being. In this respect, the results are closer to the work of Cooper, Rout, and Faragher (2018), which emphasized that stress shapes both job satisfaction and health in the UK, but here the argument is extended using nationally representative Canadian data. By showing that life satisfaction is the key pathway linking stress to broader well-being, this study also supports the work of Isham, Mair, and Jackson (2021), which highlights the wider economic and social value of happiness as a component of mental health.

Overall, the results support the hypothesis that job stress affects happiness primarily through its impact on job satisfaction. These results highlight the importance of creating supportive and empowering work environments to improve job satisfaction and, in turn, happiness. Policies and workplace interventions aimed at reducing job stress may be more effective when they also focus on enhancing job satisfaction by promoting autonomy, providing learning opportunities, and strengthening social support at work.

6 Conclusion

This paper examines the causal relationships between job stress, job satisfaction, and life satisfaction using data from the 2012 Canadian Community Health Survey. Employing a recursive system of ordered probit models estimated through the CMP framework, the analysis addressed potential endogeneity in stress reporting.

The findings highlight a clear mediating pathway: job stress significantly reduces job satisfaction, and job satisfaction, in turn, has a strong positive association with life satisfaction.

However, job stress has no statistically significant direct effect on life satisfaction when controlling for job satisfaction. This supports the interpretation that job stress affects happiness indirectly, operating through diminished workplace satisfaction.

Key determinants of job stress include demanding workplace conditions, such as a hectic pace and frequent conflict, as well as being employed part-time. Job satisfaction is positively associated with workplace autonomy and opportunities to learn, but tends to be lower among immigrants and younger workers. Life satisfaction is strongly influenced by emotional states (e.g., feelings of nervousness or restlessness), relationship status, and age, with female respondents reporting slightly higher levels.

The error term correlations from the CMP model offer additional insights into how unobserved factors jointly influence the three outcomes. First, the significant and positive correlation between the error terms of job stress and job satisfaction indicates that some unobserved characteristics, such as personality traits, work environment, or managerial style, simultaneously influence both variables. For example, individuals with a high internal drive might report both higher stress and higher satisfaction from challenging roles. Second, the correlation between job stress and life satisfaction is not statistically significant, reinforcing earlier findings that there is no direct unobserved link between stress at work and broader life satisfaction once other factors are accounted for. Lastly, the negative and significant correlation between job satisfaction and life satisfaction error terms suggests a more complex relationship. It may suggest that, for some individuals, the unobserved drivers that increase satisfaction with one's job do not necessarily translate into greater overall life satisfaction, possibly due to trade-offs such as long hours, emotional burnout, or limited time for personal life. This counterintuitive result invites further investigation into how job satisfaction interacts with broader measures of mental well-being.

These results highlight the importance of creating supportive and empowering work environments to improve job satisfaction and, in turn, life satisfaction and, by extension, Psychological strain. Policies and workplace interventions aimed at reducing job stress may be more effective when they also focus on enhancing job satisfaction by promoting autonomy, providing learning opportunities, and strengthening social support at work. Moreover, evidence shows that higher life satisfaction is not only a marker of mental well-being but also linked to greater productivity and performance in the workplace, as demonstrated by Isham, Mair, and Jackson (2021). This further reinforces the broader economic value of policies that prioritize both stress reduction and improvements in job satisfaction.

Future research could extend this framework using longitudinal data or by exploring sector-specific dynamics, especially for immigrant populations and younger workers who appear to face unique workplace challenges. Integrating additional mental health indicators

or stress biomarkers may also help further validate the mechanisms explored in this study.

Use of Generative AI and AI-assisted tools

During the preparation of my thesis, I used ChatGPT (OpenAI) to support tasks such as refining written content and generating LaTeX code for tables and figures. After using this tool/service, I reviewed and edited the content as needed and take full responsibility for the content of my thesis.

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Appendix

Table 1: Summary statistics for age and income (grouped variables)

Variable	Percent%
Age (20–65, grouped 2–10) (ref: 20-24 years)	
20 to 24 years	8.41
25 to 29 years	4.80
30 to 34 years	9.54
35 to 39 years	11.83
40 to 44 years	13.43
45 to 49 years	12.62
50 to 54 years	12.60
55 to 59 years	12.67
60 to 64 years	14.09
Income (grouped 1–6) (ref: Less than $10,000)	
Less than $10,000	2.96
$10,000-$19,999	24.59
$20,000-$29,999	25.66
$30,000-$39,999	15.75
$40,000-$49,999	10.93
$50,000 or more	20.09

Notes: Age is grouped into nine categories (2–10) representing respondents aged 20–65. Income is a derived variable grouped into six categories of total personal income. Statistics are unweighted.

Table 2: Descriptive statistics for categorical variables: demographics and socioeconomic characteristics

Variable	Percent %
Sex(ref: Male)	
Male	46.77
Female	53.23
Marital status(ref: Married)	
Married	37.95
Common-law	14.03
Widowed	7.34
Divorced/separated	33.88
Single	6.80
Immigrant(ref: No)	
No	82.02
Yes	17.98
Education(ref: Less than secondary)	
Less than secondary	12.80
Secondary graduate	20.26
Some post-secondary	49.52
Post-secondary graduate	17.43
Employment status(ref: Full-time)	
Full-time	84.84
Part-time	15.16
Worked last week(ref: At work)	
At work	69.83
Absent	6.62
Did not work	22.70
Occupation group(ref: Management/health)	
Management/health	40.55
Business/finance	15.48
Sales/service	23.16
Trades/transport	14.02
Primary industry	6.80

Notes: Percentages are unweighted shares of respondents with valid responses for each category. Categories exclude "not applicable," "not stated," "don't know," and "refused."

Table 2: (continued) Descriptive statistics for categorical variables: job stress, satisfaction, and mental health

Variable	Percent %
Job stress(ref: Not at all stressful)	
Not at all stressful	9.68
Not very stressful	20.53
A bit stressful	42.00
Quite a bit stressful	23.06
Extremely stressful	4.73
Job satisfaction(ref: Not at all satisfied)	
Not at all satisfied	2.37
Not too satisfied	6.17
Somewhat satisfied	39.08
Very satisfied	52.37
Learn new things(ref: Strongly disagree)	
Strongly agree	44.96
Agree	39.99
Neither Agree Nor Disagree	5.87
Disagree	7.08
Strongly disagree	2.11
Freedom to decide(ref: Strongly disagree)	
Strongly agree	30.23
Agree	43.68
Neither Agree Nor Disagree	11.99
Disagree	11.64
Strongly disagree	2.46
Job hectic(ref: Strongly disagree)	
Strongly agree	24.67
Agree	37.00
Neither Agree Nor Disagree	16.59
Disagree	18.47
Strongly disagree	3.28
Job conflict(ref: Strongly disagree)	
Strongly agree	5.44
Agree	21.43

Variable	Percent %
Neither Agree Nor Disagree	11.29
Disagree	38.48
Strongly disagree	23.36

Variable	Percent %
Life satisfaction (0–10)	
Very dissatisfied (0)	0.35
1	0.19
2	0.47
3	0.76
4	1.30
5	4.61
6	5.37
7	16.78
8	31.90
9	19.73
Very satisfied (10)	18.57
Felt nervous (past month)(ref: None of the time)	
All of the time	1.48
Most of the time	5.20
Some of the time	20.48
A little of the time	32.83
None of the time	40.00
Felt restless (past month)(ref: None of the time)	
All of the time	0.80
Most of the time	2.05
Some of the time	7.05
A little of the time	11.35
None of the time	78.76

Notes: Life satisfaction is measured on an 11-point scale (0–10).

Table 3: CMP Results: Relations among Dependent Variables

Equation, Variable / Category	Coefficient	Robust Std. Error
Job Satisfaction		
Job Stress: Not very stressful	-0.491***	0.099
Job Stress: A bit stressful	-0.909***	0.123
Job Stress: Quite stressful	-1.455***	0.164
Job Stress: Extremely stressful	-2.099***	0.284
Life Satisfaction		
Job Stress: Not very stressful	-0.137	0.088
Job Stress: A bit stressful	-0.111	0.104
Job Stress: Quite stressful	-0.101	0.142
Job Stress: Extremely stressful	-0.073	0.204
Job Satisfaction: Not too satisfied	0.370**	0.135
Job Satisfaction: Somewhat satisfied	0.953***	0.172
Job Satisfaction: Very satisfied	1.687***	0.256

Notes: CMP recursive mixed-process model estimated with ordered probit equations. Relations among dependent variables (job stress $\rightarrow$ job satisfaction; job satisfaction $\rightarrow$ life satisfaction) are reported first. Base categories: managerial occupations, full-time work, lowest stress/satisfaction, and lowest symptom frequency. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 3: (continued) CMP Results: Job Stress Equation

Variable / Category	Coefficient	Robust Std. Error
Occupation Group (ref: Management/health)		
Business/Finance occupations	-0.004	0.064
Sales/Services	-0.261***	0.049
Trades/Transport	-0.337***	0.053
Primary industries	-0.485***	0.070
Job hectic (ref: Strongly disagree)		
Disagree	0.269**	0.116
Neither agree nor disagree	0.580***	0.116
Agree	0.865***	0.116
Strongly agree	1.441***	0.120
Job conflict (ref: Strongly disagree)		
Disagree	0.169***	0.046
Neither agree nor disagree	0.426***	0.065
Agree	0.494***	0.055
Strongly agree	0.963***	0.127
Employment status (ref: Full-time)		
Part-time	-0.275***	0.048

Notes: CMP recursive mixed-process model estimated with ordered probit equations. Relations among dependent variables (job stress → job satisfaction; job satisfaction → life satisfaction) are reported first. Base categories: managerial occupations, full-time work, lowest stress/satisfaction, and lowest symptom frequency. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 3: (continued) CMP Results: Job Satisfaction Equation

Variable / Category	Coefficient	Robust Std. Error
Learn new things (ref: Strongly disagree)		
Disagree	0.103	0.150
Neither agree nor disagree	0.149	0.157
Agree	0.354**	0.142
Strongly agree	0.571***	0.142
Freedom to decide (ref: Strongly disagree)		
Disagree	0.173	0.135
Neither agree nor disagree	0.445***	0.133
Agree	0.670***	0.137
Strongly agree	1.176***	0.136
Employment status (ref: Full-time)		
Part-time	-0.172**	0.058
Sex (ref: Male)		
Female	0.131***	0.043
Age (ref: 20-24 years)		
25–29	-0.009	0.081
30–34	0.016	0.075
35–39	0.069	0.077
40–44	0.083	0.093
45–49	0.067	0.084
50–54	0.209**	0.080
55–59	0.225***	0.081
60–64	0.348***	0.089
Immigrant (ref: No)		
Yes	-0.143***	0.044
Income (ref: Less than $10000)		
10,000–19,999	-0.060	0.139
20,000–29,999	-0.093	0.129
30,000–39,999	-0.009	0.132
40,000–49,999	0.106	0.135
50,000 or more	0.065	0.129

Notes: CMP recursive mixed-process model estimated with ordered probit equations. Relations among dependent variables (job stress → job satisfaction; job satisfaction → life satisfaction) are reported first. Base categories: managerial occupations, full-time work, lowest stress/satisfaction, and lowest symptom frequency. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 3: (continued) CMP Results: Life Satisfaction Equation

Variable / Category	Coefficient	Robust Std. Error
Felt nervous (ref: None of the time)		
Little of time	-0.163***	0.040
Some of the time	-0.289***	0.047
Most of the time	-0.512***	0.085
All of the time	-0.889***	0.153
Restless (ref: None of the time)		
Little of time	-0.238***	0.053
Some of the time	-0.399***	0.068
Most of the time	-0.415***	0.113
All of the time	-0.604***	0.168
Marital status (ref: Married)		
Common-law	-0.077	0.050
Widowed	-0.613***	0.148
Divorced/separated	-0.453***	0.061
Single	-0.438***	0.049
Education (ref: Less than secondary)		
Secondary grad.	0.097	0.113
Some post-sec.	0.063	0.149
Post-sec. grad.	0.142	0.105
Sex (ref: Male)		
Female	0.077**	0.036
Age (ref: 20–24 years)		
25–29	-0.160**	0.068
30–34	-0.161**	0.067
35–39	-0.358***	0.071
40–44	-0.282***	0.079
45–49	-0.347***	0.079
50–54	-0.439***	0.076
55–59	-0.438***	0.081
60–64	-0.416***	0.087
Immigrant (ref: No)		
Yes	-0.076	0.047

Variable / Category	Coefficient	Robust Std. Error
Income (ref: Less than $10,000)		
10,000–19,999	0.026	0.140
20,000–29,999	0.064	0.132
30,000–39,999	0.021	0.134
40,000–49,999	-0.038	0.138
50,000 or more	0.122	0.132

Notes: CMP recursive mixed-process model estimated with ordered probit equations. Relations among dependent variables (job stress → job satisfaction; job satisfaction → life satisfaction) are reported first. Base categories: managerial occupations, full-time work, lowest stress/satisfaction, and lowest symptom frequency. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 4: Correlations Between Equation Errors (ρ)

Parameter	Estimate	Std. Error
ρ_{12}: Job Stress ∼ Job Satisfaction	0.1925***	0.0565
ρ_{13}: Job Stress ∼ Life Satisfaction	-0.0479	0.0393
ρ_{23}: Job Satisfaction ∼ Life Satisfaction	-0.2421***	0.0748

Notes: Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 5: Marginal Effects of Job Stress on Life Satisfaction

Job Stress Level	dy/dx	Std. Err.
Not very stressful	-0.1368	0.0875
A bit stressful	-0.1112	0.1038
Quite a bit stressful	-0.1014	0.1423
Extremely stressful	-0.0735	0.2044

Note: dy/dx for factor levels is the discrete change from the base level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 6: Marginal Effects of Job Satisfaction on Life Satisfaction

Job Satisfaction Level	**dy/dx**	**Std. Err.**
Not too satisfied	0.3702***	0.1346
Somewhat satisfied	0.9531***	0.1723
Very satisfied	1.6866***	0.2562

Note: dy/dx for factor levels is the discrete change from the base level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 7: Marginal Effects of Job Stress on Job Satisfaction

Job Stress Level	**dy/dx**	**Std. Err.**
Not very stressful	-0.4910***	0.0994
A bit stressful	-0.9091***	0.1232
Quite a bit stressful	-1.4548***	0.1641
Extremely stressful	-2.0991***	0.2840

Note: dy/dx for factor levels is the discrete change from the base level. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 8: Comparison of Coefficients in the Life Satisfaction Equation: CMP vs. Ordered Probit Model

Variable	**CMP***	**Oprobit***
Job stress (ref: Not at all stressful)		
Not very stressful	-0.137	-0.185
A bit stressful	-0.111	-0.226
Quite a bit stressful	-0.101	-0.312
Extremely stressful	-0.073	-0.333
Job satisfaction (ref: Not at all satisfied)		
Not too satisfied	0.370	0.140
Somewhat satisfied	0.953	0.414
Very satisfied	1.687	0.852
Felt nervous (ref: None of the time)		
Little of time	-0.163	-0.201
Some of the time	-0.289	-0.382
Most of the time	-0.512	-0.588
All of the time	-0.889	-0.861
Felt restless (ref: None of the time)		
Little of time	-0.238	-0.224
Some of the time	-0.399	-0.377
Most of the time	-0.415	-0.440
All of the time	-0.604	-0.384
Selected controls		
Female	0.077	0.071
Immigrant	-0.076	-0.106
Age 30–34	-0.161	-0.192
Age 40–44	-0.282	-0.368
Widowed	-0.613	-0.466
Divorced/separated	-0.453	-0.486
Single	-0.438	-0.475

Notes: CMP corrects for endogeneity using a recursive system of equations. Oprobit treats all regressors as exogenous. Coefficients are reported without p-values for clarity.

Figure 1: Distribution of life satisfaction (0–10 scale)

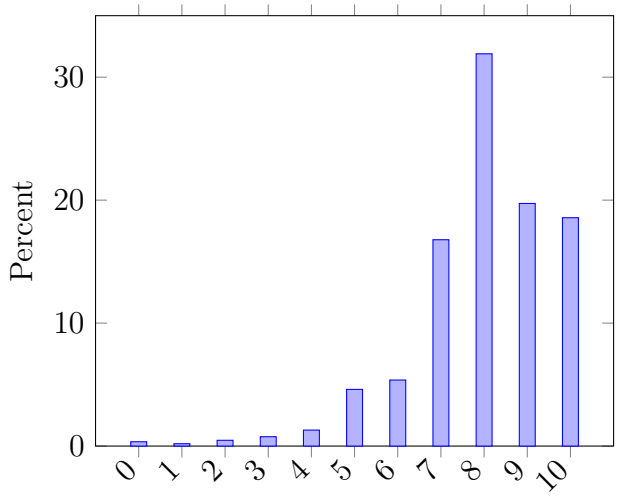
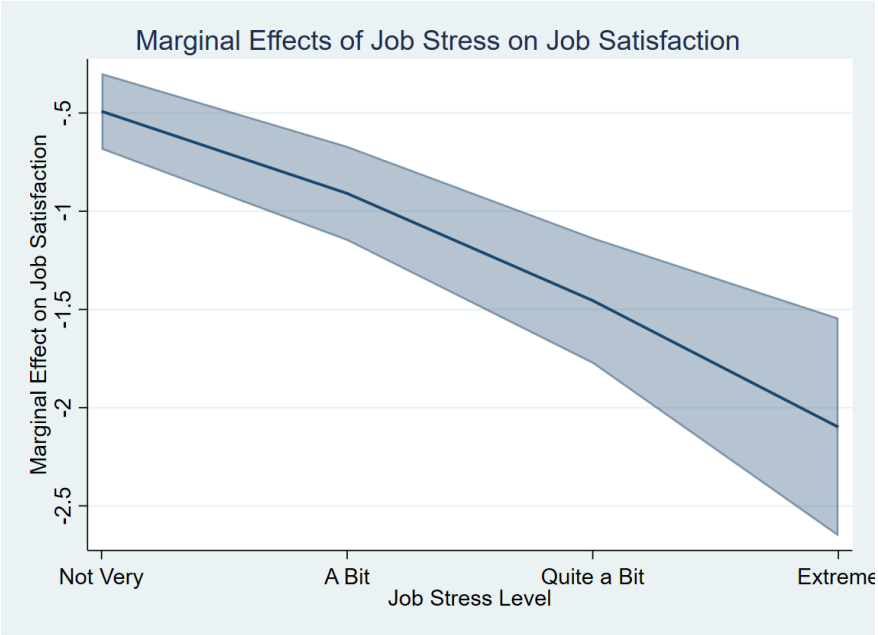


Figure 2: Marginal Effects of Job Stress on Job Satisfaction



Note: Job stress has a strong and negative marginal effect on job satisfaction.

Figure 3: Marginal Effects of Job Satisfaction on Life Satisfaction

Note: Job satisfaction has a strong and positive marginal effect on life satisfaction.

Figure 4: Marginal Effects of Job Stress on Life Satisfaction

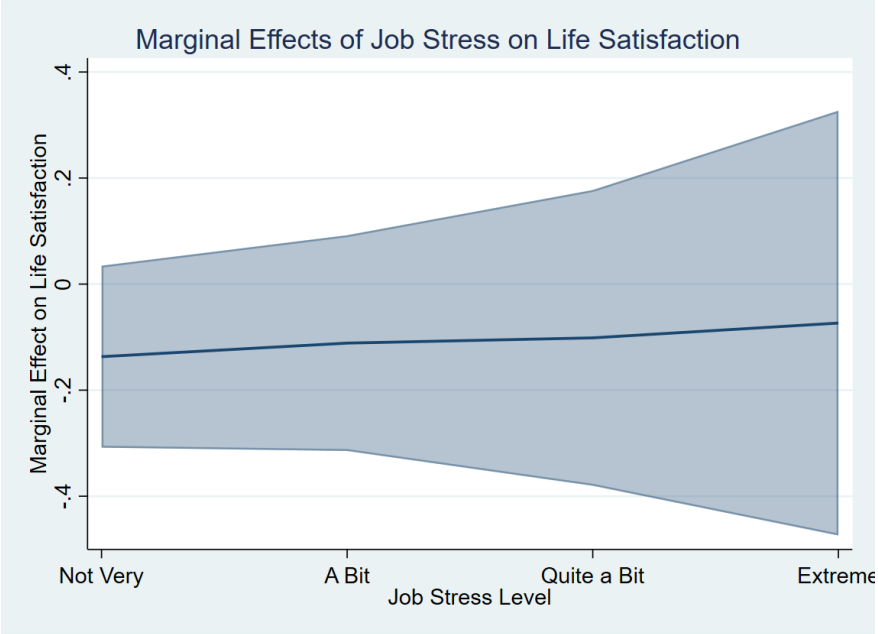


Figure 5: Marginal Effects of Job Stress on Life Satisfaction: CMP vs Oprobit