The Effect of Working Environment on the Job Satisfaction

1. Research question

Many factors influence one's job satisfaction level. Some people claim that people are satisfied because they need income to support their life and their family. However, it doesn't take much effort to find contradictory examples. There are lots of high net worth individuals who are still working very hard and find their jobs very satisfactory. For example, the former CEO and current chairman of Microsoft Bill Gates is one of these people. No one would say that he works because he needs money. From this standpoint, some people would claim that people take a job to fulfill their ambition and realize their aspirations. Had it not been so many people quitting their jobs which provide good promotion and career development opportunities, it would be a legitimate conclusion.

To conclude, there is no simple answer for the question why people find a job satisfied or not. This study focuses on the one aspect of this question: working environment. While working environment is not on the top of the list when people think about factors influencing job satisfaction, it does have a great impact.

Firstly, cooperative working environment can promote the efficiency of work by encouraging cooperation among co-workers. High work efficiency enables a person to accomplish more work in a given amount of working hours. Thus, the person is less likely to be frustrated by his/her current job because he/she has to work over time. Meanwhile, the person is more likely to be satisfied with his/her job because this person can accumulate more human capital and is more likely to fulfill his/her career aspiration.

Secondly, a safe and comfortable working place can make people feel comfortable, thus increasing people's job satisfaction level.

To conclude, working environment can be a critical factor influencing people's motivation to work. This study examines the relationship between the working environment and people's job satisfaction. The results from this study can be very helpful to the employers. Especially under the pressure of cost control which makes material compensation unlikely, the employers can try to improve the working environment in order to retain or attract employees.

2. Hypotheses

The more cooperative and friendly the working environment is, the higher the job satisfaction would be.

The more safe and comfortable the working environment is, the higher the job satisfaction would be.

3. Data source, variables and measurements

The dataset used in this study is 2010 General Social Survey (GSS). GSS is a nationwide survey that collects demographic, behavioral and attitudinal information of residents of United States. As the sample is randomly selected and the sample size is quite large, GSS can be representative of the whole American population.

The study aims to analyze the association between working environment and the job satisfaction level. The dependent variable in the study is job satisfaction. One indicator from 2010 GSS can be used to measure one's motivation to work.

- satjob1: job satisfaction in general (1= very satisfied, 2=somewhat satisfied, 3=not too satisfied, 4= not at all satisfied)

The independent variable in the study is working environment. To better understand the effect of working environment, I decompose the working environment into two categories: physical working environment and soft working environment. Physical working environment refers to the working conditions that do not involve interactions with people. Usually it includes the location of working environment, the number of workers in one working site, whether the working place is safe and etc. Below indicators from GSS 2010 will be used to measure physical working environment.

- prodctiv: work conditions allow productivity (1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree)

- safehlth: safety and health conditions are good at work (1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree)

- wksmooth: work place runs in a smooth manner (1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree)

- hurtatwk: number of injuries on the job in the past 12 months

- localnum: number of employees at the respondent's work place

Another category of working environment is soft working environment, which refers to the working atmosphere created by the relationship among coworkers. It usually includes whether people are friendly, helpful and cooperative at work, how much help and instructions one may get at work and etc. Below indicators from GSS 2010 are used to measure soft working environment.

- cowrkhlp: coworkers can be relied on when the respondents need help (1=very true, 2=somewhat true, 3=not too true, 4=not at all true)

- trustman: the respondent trusts management at work (1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree)

- haveinfo: whether the respondent has enough information to get the job done (1=very true, 2=somewhat true, 3=not too true, 4=not at all true)

- hlpequip: whether the respondent has enough help and equip to get the job done (1=very true, 2=somewhat true, 3=not too true, 4=not at all true)

- suphelp: whether the supervisor is helpful to the respondent in getting the job done (1=very true, 2=somewhat true, 3=not too true, 4=not at all true)

- wkharoth: whether the respondent was threatened on the job over the last 12 months

- wkharsex: whether the respondents was sexually harassed on the job over the last 12 months

4. Data analysis

4.1 Descriptive information

Table 1 provides the descriptive information used in the study. Mean value, standard deviation, the minimum and the maximum value are listed in the table.

Table 1

Variable	Obs	Mean	Std. Dev.	Min	Max
satjob1	1161	1.698536	.7614004	1	4
prodctiv	1155	1.87013	.6664265	1	4
safehlth	1153	1.715525	.6310073	1	4
wksmooth	1150	2.021739	.727704	1	4
hurtatwk	1158	.2020725	.8224986	0	7
localnum	1154	2.909879	1.826049	1	7
cowrkhlp	1155	1.629437	.7661599	1	4
trustman	1157	1.928263	.7897734	1	4
haveinfo	1162	1.496558	.6459882	1	4
hlpequip	1160	1.718966	.8089143	1	4
suphelp	1124	1.733096	.8709872	1	4
wkharoth	1161	1.904393	.2941786	1	2
wkharsex	1160	1.969828	.1711353	1	2

On average, respondents are satisfied with their job with the mean at 1.70. It lies between "very satisfied" and "somewhat satisfied". Looking through the variables that measure physical working environment, we can see that, on average, people agree that work conditions allow productivity and safety and health conditions are good at work with the mean score at 1.87 and 1.72 respectively. People are less likely to agree that work place runs in a smooth manner with the mean 2.02, which means that a little more than half of the respondents disagree with the statement. While the mean of the injuries on the job over the past 12 months is only 0.20, the standard deviation is very large, 0.82. After examine the data, I find that most people(90.41%) do not get hurt while a few people frequently get hurt on the job. Generally speaking, the physical working condition is quite good in the US.

Variables that measure soft working environment tell a similar story. On average, people agree that coworkers can be relied on when the respondent needs help, the respondent trusts management at work, the respondent has enough information to get the job done, the respondent has enough help and equip to get the job done and the supervisor is helpful to the respondent in getting the job with the mean score 1.63, 1.93, 1.50, 1.72 and 1.73 respectively. To conclude, soft working environment is also in a good condition in the US.

4.2 Initial model

The initial analysis of the association between the job satisfaction and working

environment adopts the ordinal logistic regression model. The ordinal logistic regression model estimates simultaneous logistic equations for three categories of the dependent variables. It can tell us how the odds ratio of moving from "very satisfied" to "somewhat satisfied", or moving from "somewhat satisfied" to "not too satisfied", or moving from "not too satisfied" to "not at all satisfied" changes when the independent variables change. The assumption underlying the ordinal logistic regression model is that the odds ratio is thought to be the same for each category. It also means that the slope of the relationship between two adjacent categories is the same. For the time being, we assume that this is a valid assumption and we will test this assumption in the later part of this study.

Table 2

```
Ordered logistic regression              Number of obs   =      1086
                                         LR chi2(12)     =    442.72
                                         Prob > chi2     =    0.0000
Log likelihood = -905.79989              Pseudo R2       =    0.1964
```

satjob1	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
prodctiv	1.641062	.204187	3.98	0.000	1.285924	2.09428
safehlth	.886594	.1083727	-0.98	0.325	.6977154	1.126604
wksmooth	1.755983	.2346943	4.21	0.000	1.351306	2.281849
hurtatwk	1.070662	.0826724	0.88	0.377	.9202927	1.245601
localnum	.9343438	.0332071	-1.91	0.056	.8714743	1.001749
cowrkhlp	1.362447	.1264577	3.33	0.001	1.135831	1.634275
trustman	1.69905	.1994349	4.52	0.000	1.34987	2.138555
haveinfo	1.279773	.1475524	2.14	0.032	1.020923	1.604253
hlpequip	1.208893	.1187112	1.93	0.053	.9972437	1.465461
suphelp	1.46559	.1246598	4.49	0.000	1.240541	1.731465
trustman	1.69905	.1994349	4.52	0.000	1.34987	2.138555
haveinfo	1.279773	.1475524	2.14	0.032	1.020923	1.604253
hlpequip	1.208893	.1187112	1.93	0.053	.9972437	1.465461
suphelp	1.46559	.1246598	4.49	0.000	1.240541	1.731465
wkharoth	.7247169	.158369	-1.47	0.141	.4722362	1.112186
wkharsex	.4782754	.1634878	-2.16	0.031	.2447449	.9346357
/cut1	2.121941	.8276225			.4998311	3.744052
/cut2	5.281814	.8446673			3.626297	6.937332
/cut3	6.895017	.8600848			5.209282	8.580752

Table 2 shows the results of the initial ordinal logistic regression. The direction of the coefficients is the same as what I expected. They are all positive, confirming that, the better the working environment, the higher the level of job satisfaction would be. The coefficient of *prodctiv* is 1.64. It indicates that, controlling for all other variables, if the respondent is in the higher category of disapproving that work conditions allow productivity, his/her odds of being in the next (not satisfied) category of job satisfaction increase by 64.11%. Similar interpretations can be applied to other

variables. There are seven variables that show statistically relationship with the dependent variable on the 95% confidence level. They are *prodctiv*, *wksmooth*, *cowrkhlp*, *suphelp*, *trustman*, *haveinfo*, *suphelp* and *wkharsex*. The pseudo R^2 is 0.1964. Given the nature of the ordinal logistic regression, there is no clear meaning of pseudo R^2. It only makes sense when it's compared to pseudo R^2 of other models fitting the same data set.

Although this initial model shows some desirable results like positive association, it is subject to some limitations so that I cannot be positively convinced. Firstly, these indicators all measure similar aspect of the question. The above regression only reflects the effect of one variable when all other variables are held constant. Since these variables are highly correlated, it's unreasonable to assume that there is huge difference in the opinion about whether work place runs in a smooth manner when the respondents' opinion about whether work conditions allow productivity is held constant. Secondly, the model fails to rule out other variables that may influence working environment and job satisfaction at the same time. For example, high income job tends to provide a safe and comfortable working environment and at the meantime people are more satisfied with the job. Even though I observe the positive association, I cannot rule out the possibility that income is the variable that drives the changes in both dependent variable and independent variables. Thirdly, with all these variables measuring the condition of working environment, I can hardly tell whether the working environment affects the job satisfaction significantly.

Due to all these limitations, the model is improved and discussed in the below section.

4.3 Model improvement

4.3.1 Create scales for independent variables

In this section, I address the first limitation discussed in the above section. I create two scales to measure physical working environment and soft environment respectively. In this way, I can resolve the problem of multicollinearity among these independent variables. At the same time, the effect of working environment on the

respondents' job satisfaction is also easier to be detected.

First, I calculate the alpha score of the variables that I intend to put into one scales. The score measures how much these variables correlate with each other. A high alpha score indicates that these variables reflect a similar underlying idea and therefore it makes sense to put them into one scale. The below two tables show the alpha scores for two sets of independent variables. Table 3 tests the correlation among *productiv*, *safehlth* and *wksmoooth*. These are all variables measuring physical working environment. The alpha coefficient is 0.78, which confirms my hypothesis that these variables are highly correlated and therefore are suitable for a scale. Similarly, table 4 tests the correlation among soft working environment variables, *cowrkhlp*, *trustman*, *haveinfo*, *hlpequip* and *suphelp*. The alpha coefficient is 0.76, which is also high enough for me to construct a scale from these variables.

Table 3

```
Test scale = mean(unstandardized items)

Average interitem covariance:      .2452097
Number of items in the scale:             3
Scale reliability coefficient:       0.7763
```

Table 4

```
Test scale = mean(unstandardized items)

Average interitem covariance:      .2338538
Number of items in the scale:             5
Scale reliability coefficient:       0.7580
```

The new variable *wkcondition* is created as a new variable measuring physical working environment and *softcondition* is created to measure soft working environment. The high correlation coefficient among the new scales and their underlying variables confirms the feasibility of creating scales. Table 7 summarizes the descriptive information of the new variables, *wkcondition* and *softcondition*.

Table 5

	wkcond~n	stdpro~v	stdsaf~h	stdwks~h
wkcondition	1.0000			
stdprodctiv	0.8388	1.0000		
stdsafehlth	0.8043	0.4864	1.0000	
stdwksmooth	0.8516	0.6066	0.5188	1.0000

Table 6

	softco~n	stdcow~p	stdtru~n	stdhav~o	stdhlp~p	stdsup~p
softcondit~n	1.0000					
stdcowrkhlp	0.6757	1.0000				
stdtrustman	0.7275	0.3633	1.0000			
stdhaveinfo	0.7061	0.2936	0.3755	1.0000		
stdhlpequip	0.7428	0.3521	0.4233	0.4984	1.0000	
stdsuphelp	0.7228	0.4058	0.4380	0.3566	0.3830	1.0000

Table 7

Variable	Obs	Mean	Std. Dev.	Min	Max
wkcondition	1139	.6669545	.7530637	−.4798685	3.60544
softcondit~n	1118	.0092131	.7157395	−.8992136	3.003042

Table 8 shows the results of ordinal logistic regression using the scale variables I created. The coefficient of *wkcondition* is 2.03 (P < 0.001). It means that one unit increase (worse) in the physical working condition increases the odds ratio of the person in the one higher category (less satisfied) of job satisfaction by 102.73%, cateris paribus. Similarly, I can know from the coefficient of *softcondition* that one unit increase (worse) in the soft working condition increases the odds ratio of the person in the one higher category (less satisfied) of job satisfaction by 260.77%, cateris paribus. Both associations are statistically significant. The magnitude of the effect is also very large so that working environment does seem to impact the respondents' job satisfaction. The coefficients of *hurtatwk* and *localnum* are not statistically significant. And another regression (results not shown here) confirms that omitting these two variables do not change the coefficients of *wkcondition* and *softcondition* significantly. Therefore, these two variables are omitted from the model. This model still fails to rule out the possibility that other variables impact the working environment and job satisfaction at the same time. This problem is to be addressed in the next section.

Table 8

```
Ordered logistic regression                    Number of obs   =      1086
                                               LR chi2(6)      =    416.40
                                               Prob > chi2     =    0.0000
Log likelihood = -918.96146                    Pseudo R2       =    0.1847
```

satjob1	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
wkcondition	2.027306	.2093655	6.84	0.000	1.655821	2.482134
softcondit~n	3.607722	.443699	10.43	0.000	2.834962	4.591122
hurtatwk	1.026103	.0781266	0.34	0.735	.8838557	1.191245
localnum	.9493788	.0330126	-1.49	0.135	.8868308	1.016338
wkharoth	.7294435	.1570995	-1.46	0.143	.4782657	1.112536
wkharsex	.4864147	.1649702	-2.12	0.034	.2502171	.9455757
/cut1	-2.526323	.7583428			-4.012647	-1.039998
/cut2	.5605056	.7533097			-.9159543	2.036965
/cut3	2.151834	.7594677			.6633049	3.640364

4.3.2 Control variables

As discussed above, many exogenous variables can influence working environment and job satisfaction at the same time. Including these variables can help me examine the association I am interested in without the confounding effect. Besides, it's also interesting to know how the association between working environment and job satisfaction differs among different groups of people. Based on these two reasons, I select the below variables to be included in the model as control variables.

- **rincom06:** the respondent's income (1=under $1000, 2=$1000 to $2999, ..., 24=$130,000 to $149,999, 25=$150,000 or over)

- **prestg80:** the respondent's occupational prestige score (1980) (it ranges from 17 to 86; the high the score is, the high the occupation prestige)

- **age:** the respondent's age (it ranges from 18 to 89)

- **race:** the respondent's race (1=white, 2=black, 3=others)

- **sex1:** the respondent's sex (1=male, 0=female)

Rincom06 and *prestg80* are included to avoid spuriousness that may exist in the previous model. Preliminary regressions (results not shown here) show that both *rincom06* and *prestg80* are associated with *satjob1* and *wkcondition* on the 90% confidence level. *Prestg80* is also associated with *softcondtion* on the 95% confidence level. I can also conclude the similar results from the observations of daily life. Those who get paid well and enjoy high prestige like lawyers and surgeons also have a

relatively safe and comfortable working environment.

Age, *race* and *sex1* are included for me to better analyze different effects of working environment among different demographic groups.

Table 9 shows the descriptive information of these control variables.

Table 9

Variable	Obs	Mean	Std. Dev.	Min	Max
rincom06	1202	14.12146	6.225987	1	25
prestg80	1890	43.5291	13.767	17	86
age	2041	47.96717	17.67799	18	89
race	2044	1.331213	.6330622	1	3
sex1	2044	.43591	.4959968	0	1

Table 10 shows the results of ordinal logistic regression model when the control variables are included. The coefficients of *wkcondition* and *softcondition* are still statistically significant. But the coefficient of *wkcondition* is smaller than that of the previous model, which confirms my analysis that part of the association between *wkcondition* and *satjob1* is caused by exogenous variables like *rincom60* and *prestg80*. Once these variables are included, the size of the effect is reduced. Looking into the demographic variables, I find out that the only variable that has a statistically significant relationship with job satisfaction is age. Controlling for all other variables, getting one year older decreases the odds of the person in the one higher category (less satisfied) of job satisfaction by 2.53%. Also, I notice that the coefficients of *wkharoth* and *wkharsex* are both insignificant. Considering that these are relatively rare events, these two variables will be omitted in the further analysis. Table 11 shows the regression results when these two variables are omitted. There is no great change in the coefficients, confirming that these two variables can be omitted.

Table 10

```
Ordered logistic regression                    Number of obs   =        930
                                               LR chi2(9)      =     404.04
                                               Prob > chi2     =     0.0000
Log likelihood =  -753.4204                    Pseudo R2       =     0.2114
```

satjob1	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
wkcondition	1.987349	.2325422	5.87	0.000	1.580061	2.499621
softcondit~n	3.861533	.5524752	9.44	0.000	2.917273	5.11143
wkharoth	.7159305	.1632454	-1.47	0.143	.4579111	1.119336
wkharsex	.6690971	.2650665	-1.01	0.310	.3078088	1.454445
rincom06	.9672579	.0133066	-2.42	0.016	.9415258	.9936932
prestg80	.986339	.0054065	-2.51	0.012	.9757992	.9969926
age	.9747299	.0051677	-4.83	0.000	.9646539	.9849112
race	1.203455	.1339231	1.66	0.096	.9676228	1.496764
sex1	1.048707	.1504107	0.33	0.740	.7917183	1.389113
/cut1	-3.720059	.8958342			-5.475862	-1.964256
/cut2	-.4746492	.8848916			-2.209005	1.259707
/cut3	1.256736	.8917821			-.4911252	3.004597

Table 11

```
Ordered logistic regression                    Number of obs   =        930
                                               LR chi2(7)      =     400.37
                                               Prob > chi2     =     0.0000
Log likelihood = -755.25694                    Pseudo R2       =     0.2095
```

satjob1	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
wkcondition	2.036784	.2363992	6.13	0.000	1.622372	2.557053
softcondit~n	3.882956	.5520435	9.54	0.000	2.93864	5.130723
rincom06	.9681105	.0133124	-2.36	0.018	.9423672	.994557
prestg80	.9861893	.0053966	-2.54	0.011	.9756686	.9968233
age	.9744514	.0051488	-4.90	0.000	.964412	.9845952
race	1.19122	.1321533	1.58	0.115	.9584296	1.480553
sex1	1.017706	.1445397	0.12	0.902	.7704247	1.344355
/cut1	-2.322265	.3857522			-3.078325	-1.566205
/cut2	.9094719	.3797107			.1652525	1.653691
/cut3	2.627005	.4146202			1.814365	3.439646

4.3.3 Interactions

The above analysis establishes that working conditions, whether it's physical condition or soft condition, have statistically significant positive relation with job satisfaction level. In the section, I would like to find out if there are interactions between working condition and other control variables.

If the magnitude of the effect of working conditions on job satisfaction depends on a certain variable, these two variables are said to have interaction relation. To do a preliminary analysis, I run the same regression for the subgroups to see if the coefficient is greatly different from one group to another group (results not shown

here). The analysis shows that the effect of soft working conditions on job satisfaction differs between men and women. Below interaction variable is constructed to reflect this difference.

Sexsoft = Sex1 * softcondition

Table 12 shows the regression results when the interaction term is included in the mode. The coefficient of the interaction term is 0.70 (p value = 0.091). There is modest evidence that the impact of soft working conditions on the job satisfaction differs between male and female. Controlling for all other variables, given the person is male, one unit increase in the soft working condition increases the odds that the person is in the one higher job satisfaction category (less satisfied) by 427% (4.57 + 0.70 -1). On the other hand, the effect on women is 358%, cateris paribus. It indicates that men are more subject to the influence of soft working condition when they evaluate their job satisfaction level.

Table 12

```
Ordered logistic regression                    Number of obs   =        930
                                               LR chi2(8)      =     403.22
                                               Prob > chi2     =     0.0000
Log likelihood = -753.83291                    Pseudo R2       =     0.2110
```

satjob1	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
wkcondition	2.022926	.2350146	6.06	0.000	1.610984	2.540206
softcondit~n	4.57537	.7932212	8.77	0.000	3.257282	6.426833
rincom06	.9673969	.0133019	-2.41	0.016	.9416738	.9938227
prestg80	.986157	.0053989	-2.55	0.011	.9756319	.9967956
age	.9744388	.0051462	-4.90	0.000	.9644046	.9845775
race	1.178097	.1308051	1.48	0.140	.9477013	1.464504
sex1	1.046246	.1496253	0.32	0.752	.7905001	1.384731
sexsoft	.701608	.1472866	-1.69	0.091	.4649477	1.058729
/cut1	-2.337116	.3862654			-3.094182	-1.580049
/cut2	.9045287	.3798658			.1600053	1.649052
/cut3	2.629437	.4147725			1.816498	3.442376

5. Results and discussion

To conclude, below is the final model I use to evaluate the impact of working conditions on the job satisfaction level. Table 12 summarizes the regression results.

Ordinal logistic regression model is utilized to estimate simultaneous logistic equations between adjacent categories in the job satisfaction scale.

Logit(satjob1) = ß0 + ß1*wkcondition + ß2 * softcondition + ß3 * rincom06 + ß4 * prestg80 + ß5 * age + ß6 * race + ß7 * sex1 + ß8 * sexsoft + μ

Both hypotheses are supported under this model. Working conditions have positive association with the job satisfaction. The coefficients of *wkcondition* and *softconditon*, two main independent variables, are 2.02 and 4.58 respectively. Both coefficients are statistically significant (p value < 0.001). Controlling for all other variables, one unit increase in the physical working condition scale will, on average, increase the odds of being in one higher category of job satisfaction categories (less satisfied) by 102.29%. Controlling for all other variables, one unit increase in the soft working condition scale will, on average, increase the odds of being in one higher category of job satisfaction categories (less satisfied) by 357.54%. The magnitude of the effect of soft condition also depends on the respondent's sex. For those who are male, their odds of being in one higher category of job satisfaction categories (less satisfied) when the soft working condition increases by one unit increase by 0.7, relative to women, cateris paribus.

Pseudo R-sq = 21.20%. While it makes little sense to evaluate model fit by pseudo R-sq in the logistic model, it can still help me to compare two models which fit the same data set. Looking back to the initial model in which I put all the independent variables without scales, control variables and interaction term, the pseudo R-sq in the initial model is 19.64%. Although pseudo R-sq only increases a little from the initial model to the final model, the model is improved much in other aspects without compromising much in the model fit.

6. Model diagnostics and limitation

The ordinal logistic regression model is utilized in this study. The model assumes that the same slope but different intercepts are applicable to the adjacent categories.

Below test evaluates if this assumption is valid. As all p values in table 13 are greater than 0.10, the assumption is not violated. The test confirms the suitability of ordinal logistic regression model in this study.

Table 13

```
Brant Test of Parallel Regression Assumption

    Variable  |    chi2    p>chi2    df
 -------------+-------------------------
         All  |   18.87     0.275    16
 -------------+-------------------------
  wkcondition |    2.98     0.225     2
 softcondit~n |    3.45     0.178     2
     rincom06 |    3.45     0.178     2
     prestg80 |    0.23     0.892     2
          age |    0.34     0.842     2
         race |    0.21     0.900     2
         sex1 |    1.27     0.531     2
      sexsoft |    2.48     0.289     2
 -------------+-------------------------

A significant test statistic provides evidence that the parallel
regression assumption has been violated.
```

Although the model establishes the significant positive relation between working environment and job satisfaction, the model is still subject to the below limitations.

Firstly, I cannot conclude causal relationship from the model. Due to the lack of minimum requirements of a true experiment, such as random assignment of treatment, at least one control group, manipulations of the independent variables and the constancy of conditions across groups, the results cannot be seen as causal relationship. It's possible that some unobserved variables affect the working environment and job satisfaction level at the same time. An experiment can help to address this problem. A randomly selected sample of people receive randomly assigned treatment, i.e., a good working environment or a bad working environment. Job satisfaction level can be compared between these two groups and a causal relation can be established. However, this kind of experiment is difficult to be carried out because of research ethics.

Secondly, the variables chosen are only proxies of the underlying concepts. For example, the job satisfaction level is measured by the self-reported variable *satjob1*. As this variable is reported by the respondent, it needs to be further examined whether

it truly reflects people's satisfaction level about their job. It's possible that people tend to report that they are satisfied with their job because it's more socially acceptable. The more serious measurement problem lies in the independent variables which measure physical working condition and soft working condition. As I use the respondent's answer to several questions to construct the scale, it's very likely that some important aspects of working environment are not included in the scale because these questions were not asked in the GSS.

Thirdly, the model is also subject to selectivity issue. As only those who currently have a job are included in the model, the results of the model cannot be generalized to the whole population. If more people quit the job because of bad working environment, the model tends to underestimate the effect of working environment on the job satisfaction.

Finally, the model has not been tested for heteroskedasticity and outliers due to the difference between ordinal logistic regression model and the OLS model and the time constraint of the study. If there exists heteroskedasticity, the model will produce biased parameter estimates. If there exist outliers in the model, their influences should be downweighted to produce more reliable estimates.