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Dr. Georg von Graevenitz

Performance Dynamics in Remote Work: The Role of Marital and Parental Obligations

Final Report

Name: Mr. Vatsal Vipul Doshi
Student ID: 230504415
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CONTENTS

INTRODUCTION

The introduction of technology that allows workers to work virtually from the comfort of houses is drastically changing the face of modern work environments. This paradigm shift, also known as telecommuting or working from home (WFH), has seen an astounding increase in usage on a global scale. Mateyka, Rapino, and Landivar (2012) report that during the past three decades, the percentage of employees in the United States who primarily work from home has more than tripled, between 0.75% in 1980 and 2.4% in 2010. Research conducted by Bloom et al. (2013) examined that a significant telephone study of over 3,000 medium-sized production businesses in 2012–2013 revealed that nearly 50% of managers in the US, UK, and Germany were permitted to work from home during normal working hours, demonstrating that this trend is duplicated globally.

The purpose of this paper is to explore the effects of work-family harmony (WFH) on job satisfaction, employee performance, and organisational dynamics through an innovative experiment carried out at Ctrip, the top travel agency in China. The nine-month study offers a thorough analysis of how a group of Shanghai-based call centre workers are affected by working remotely.

The investigation of two main concerns is at the heart of our investigation: First, is working from home (WFH) a practical management strategy for increasing output and profit margins? The wage discount from WFH in the US decreased from 30% in 1980 to 0% in 2000, according to Oettinger (2011), demonstrating a shift in the public's understanding of the benefits of distant labour. Second, how does WFH affect the precarious equilibrium between work and personal life, especially in situations where working parents are faced with more demands? The Council of Economic Advisors (2014) said that there is growing pressure on parents to work, which emphasises how crucial it is to comprehend WFH's role in fostering work-life balance (Martin and Hauret, 2022).

The report is organised, starting with a summary of the goals of the experiment and the fundamental research issues. It then describes the approach used to analyse the experiment's data, including statistical methods like fixed effects modelling and Ordinary Least Squares (OLS). Below is a detailed explanation of the dataset that was used, including important variables and metrics like job satisfaction surveys and staff performance indicators.

The data is carefully examined in the following parts, which also include conclusions drawn from statistical analysis and tables. The research concludes with a comprehensive analysis that explains the significance of work-family health (WFH) for employee well-being, organisational success, and the larger conversation about modern management methods.

QUESTION FOR ANALYSIS

It is crucial to investigate how Working from Home (WFH) affects worker productivity and performance, especially when it comes to motherhood, for a number of reasons. First off, in light of the increasing popularity of remote work arrangements, it is imperative for businesses looking to maximise worker productivity to ascertain whether working from home (WFH) actually improves employee performance. Given how work arrangements are changing and how common remote work is becoming across industries, this subject is especially important.

Second, examining the impact of work-family home (WFH) on productivity—particularly for parents juggling work and childcare obligations—addresses a critical issue in modern workplaces. Clarifying how distant work affects parental productivity has practical ramifications for companies and employees, given the increase in households with two incomes and the growing need for work-life balance. Organisations can better meet the demands of working parents by customising their policies and support mechanisms based on the information provided on whether working from home (WFH) helps or hinders parental productivity.

Furthermore, even if the body of research on the subject provides valuable perspectives on the advantages and drawbacks of telecommuting, little is known about how it affects particular populations, such as married workers and families. Our investigation aims to bring new perspectives to this discussion by investigating whether employees who are married or have children do better when working from home. These kinds of insights not only help researchers have a better grasp of the subject, but they also help managers make decisions and help businesses create inclusive and productive remote work practices.

Moreover, our investigation closes a significant gap in the existing research by offering solid empirical evidence on WFH, given the lack of randomised controlled studies in the field. Through the use of rigorous research methodologies and in-depth analysis of a wide variety of variables, such as parental obligations and marital status, our study seeks to provide thorough insights into the intricate dynamics of distant work and how they affect worker productivity and performance. Therefore, answering these issues becomes essential to our experiment's ability to produce useful insights that can guide organisational procedures and influence the direction of remote work in the future.

HYPOTHESES AND METHODS

Hypothesis Statement

Based on my hypothesis, it is possible that employees who are married and have infants might face difficulties in maintaining optimal levels of performance when working remotely. It is expected that the combination of marital as well as parental duties may give rise to potential disruptions or distractions, which may hinder my capacity to sustain concentration and execute tasks executed remotely with efficacy.

Methods

To test this hypothesis, I used the Ordinary Least Squares (OLS) and fixed effects approaches in my analysis.

Ordinary Least Squares (OLS): Ordinary Least Squares (OLS) is a statistical approach for estimating linear regression model parameters. The objective of OLS is to reduce the sum of squared discrepancies between observed and predicted values. It accomplishes this by determining the best-fitting line through the data points, with the slope and intercept set to minimise residuals. OLS is frequently utilised because of its simplicity, computational efficiency, and interpretability, especially when the underlying conditions of linearity, independence, and homoscedasticity are met.

Fixed Effects: In econometrics and statistics, the fixed effects approach is a technique for accounting for unobserved heterogeneity or time-invariant characteristics in panel data analysis. Panel data is data collected over time on several persons, businesses, or other entities. Fixed effects models include individual- or entity-specific dummy variables in the regression equation to indicate differences between entities that do not change over time. By accounting for these fixed effects, the analysis focuses on within-entity fluctuations over time, successfully eliminating bias induced by unobserved heterogeneity. This method is especially effective when working with panel data because entities are not assigned randomly and may have time-invariant properties that affect the dependent variable.

OLS regression enables me to investigate the association between being married with children and my performance while optimising for significant factors such as job role, tenure, and demographics. Using fixed effects models, I can account for individual-level heterogeneity as well as time-invariant factors, increasing the reliability of my results.

In my analysis, I will analyse the performance results for married employees with and without children while working remotely. Additionally, I will investigate

how married life influences an employee's effectiveness when working from home. Using these analytical approaches, I hope to get nuanced insights into the issues experienced by married professionals with children in distant work environments, so contributing to a better understanding of the intricacies of WFH dynamics. Furthermore, my findings have practical implications for organisations looking to develop effective remote work policies that address the different demands of their workforce, particularly in assisting employees in managing work and family duties.

DATA DESCRIPTION

Here, I am using Performance.dta dataset for my analysis. Below Table.1 shows all the necessary libraires that were used in the regression model.

Library	Description
haven	Imports/export data (SPSS, SAS, Stata)
stargazer	Generates LaTeX regression tables for reports
hmisc	Offers data analysis functions
ggplot2	Creates customizable plots
lattice	Produces trellis plots

Table. 1 – Libraries used.

At first, we imported the Performance.dta file using the read_dta() function provided by 'haven' library.

```
#### load data
perform13 <- read_dta("C:/Users/doshi/Downloads/Working from home-20240512/Performance.dta")
p13<-data.frame(perform13)
```

Fig. 1 – Loading the dataset.

Our dataset had a total of 17 distinct variables. Below is the list of all the variables in our dataset.

1. personid
2. year_week
3. expgroup
4. perform1
5. experiment_treatment
6. logdaysworked
7. date
8. age
9. tenure
10. grosswage
11. children
12. bedroom
13. commute
14. men
15. married
16. volunteer
17. high_edu

Fig. 2 – Total variables.

Out of all these variables, below Table. 2 shows all the variables which were used in our regression with their description.

Variable Name	Description
personid	Unique id of an Employee
perform1	Performance score based on other variables
experiment_treatment	Binary variable for treatment group involvement
married	Binary variable for marital status
children	Binary variable for parental status

Table. 2 – Variable used for regression.

Upon loading the file, we discovered that 707 of the 18751 items were either missing or null, meaning that the file was not yet prepared for regression analysis.

To avoid this error, we had to clean this dataset first. So, we used na.omit() function to remove missing values (NAs) from our dataset. Fig. 4 shows how we did it.

```
#### clean data
c13 <- na.omit(p13)
View(c13)
summary(c13)
```

Fig. 3 – Cleaning and summarizing the dataset.

We now had 18044 items, and they were ready for regression. Figure 4 displays a summary of our cleaned dataset. It provides a complete summary of our dataset, including several key demographics.

```
> summary(c13)
    personid       year_week         expgroup         perform1        experiment_treatment logdaysworked
 Min.   : 3906   Min.   :201001   Min.   :0.0000   Min.   :-3.03094   Min.   :0.0000       Min.   :0.000
 1st Qu.:19470   1st Qu.:201023   1st Qu.:0.0000   1st Qu.:-0.73377   1st Qu.:0.0000       1st Qu.:1.609
 Median :31796   Median :201043   Median :1.0000   Median :-0.02942   Median :0.0000       Median :1.609
 Mean   :29396   Mean   :201060   Mean   :0.5401   Mean   :-0.04126   Mean   :0.2335       Mean   :1.606
 3rd Qu.:39530   3rd Qu.:201110   3rd Qu.:1.0000   3rd Qu.: 0.60535   3rd Qu.:0.0000       3rd Qu.:1.792
 Max.   :45442   Max.   :201133   Max.   :1.0000   Max.   : 4.83932   Max.   :1.0000       Max.   :1.946
      date                 age             tenure         grosswage        children         bedroom
 Min.   :2010-01-01   Min.   :18.00   Min.   : 2.00   Min.   :1.388   Min.   :0.0000   Min.   :0.0000
 1st Qu.:2010-05-31   1st Qu.:22.00   1st Qu.: 9.00   1st Qu.:2.415   1st Qu.:0.0000   1st Qu.:1.0000
 Median :2010-10-18   Median :24.00   Median :24.00   Median :2.847   Median :0.0000   Median :1.0000
 Mean   :2010-10-18   Mean   :24.45   Mean   :27.48   Mean   :3.029   Mean   :0.1719   Mean   :0.9764
 3rd Qu.:2011-03-07   3rd Qu.:27.00   3rd Qu.:44.00   3rd Qu.:3.549   3rd Qu.:0.0000   3rd Qu.:1.0000
 Max.   :2011-08-15   Max.   :35.00   Max.   :96.00   Max.   :6.221   Max.   :1.0000   Max.   :1.0000
    commute            men             married         volunteer        high_educ
 Min.   :  2.5   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000   Min.   :0.000
 1st Qu.: 60.0   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:1.0000   1st Qu.:0.000
 Median :120.0   Median :0.0000   Median :0.0000   Median :1.0000   Median :0.000
 Mean   :110.6   Mean   :0.4646   Mean   :0.2599   Mean   :0.8587   Mean   :0.374
 3rd Qu.:170.0   3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:1.000
 Max.   :300.0   Max.   :1.0000   Max.   :1.0000   Max.   :1.0000   Max.   :1.000
```

Fig. 4 – Summary of dataset.

Graphical Description of the Data

1. Number of Employees being married:

The graph categorizes employees into two groups based on marital status: single and married. The taller blue bar represents approximately 13,500 single employees, while the shorter red bar depicts around 4,800 married employees. Although married employees are a smaller group, their performance is vital for the organization's success. Typically, married employees demonstrate higher levels of stability, commitment, and work-life balance, which can positively influence their job performance and productivity. Therefore, it is essential for organizations to recognize and support their married employees by providing necessary resources and policies to help them thrive both professionally and personally. The graph effectively visualizes the distribution of marital status, enabling quick comparison and identification of the predominant category. Additionally, the inclusion of approximate employee counts for each marital status aids in a more comprehensive understanding of the workforce composition.

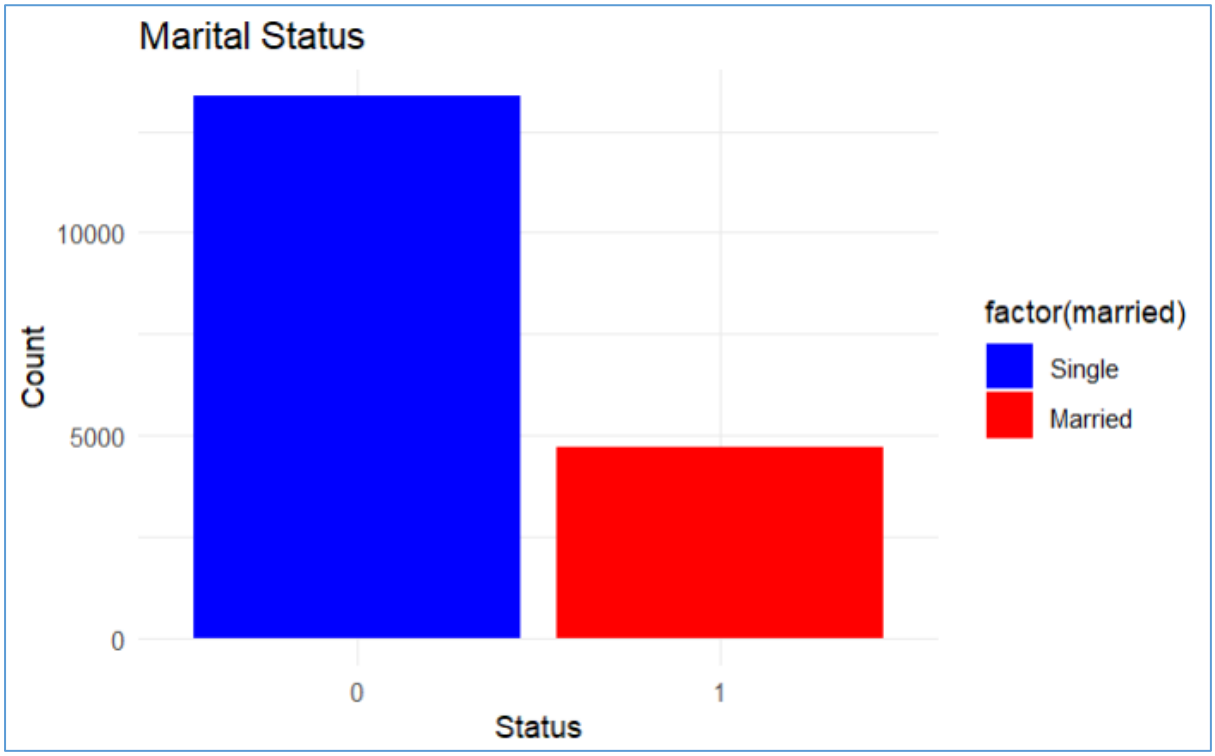

Fig. 5 – Employee's Marital Status

2. Number of Employees having a child:

The graph categorizes employees based on parental status into those without children (approximately 15,000 employees) and those with children (approximately 2,600 employees). The taller light blue bar represents employees without children, while the shorter orange bar depicts employees with children. Although a smaller group, the performance of employees with children, especially those with young children, is crucial for organizational success. Balancing work and family responsibilities can be challenging, but their dedication and commitment to both roles can contribute to increased productivity and a positive work environment when supported appropriately. Organizations must recognize and support these employees by providing resources like flexible work arrangements, childcare assistance, and family-friendly policies. By addressing their unique needs, organizations can foster an engaged and productive workforce, benefiting from the diverse perspectives and experiences employees with children bring. The graph effectively visualizes the distribution of parental status, enabling quick comparison and analysis of the workforce composition.

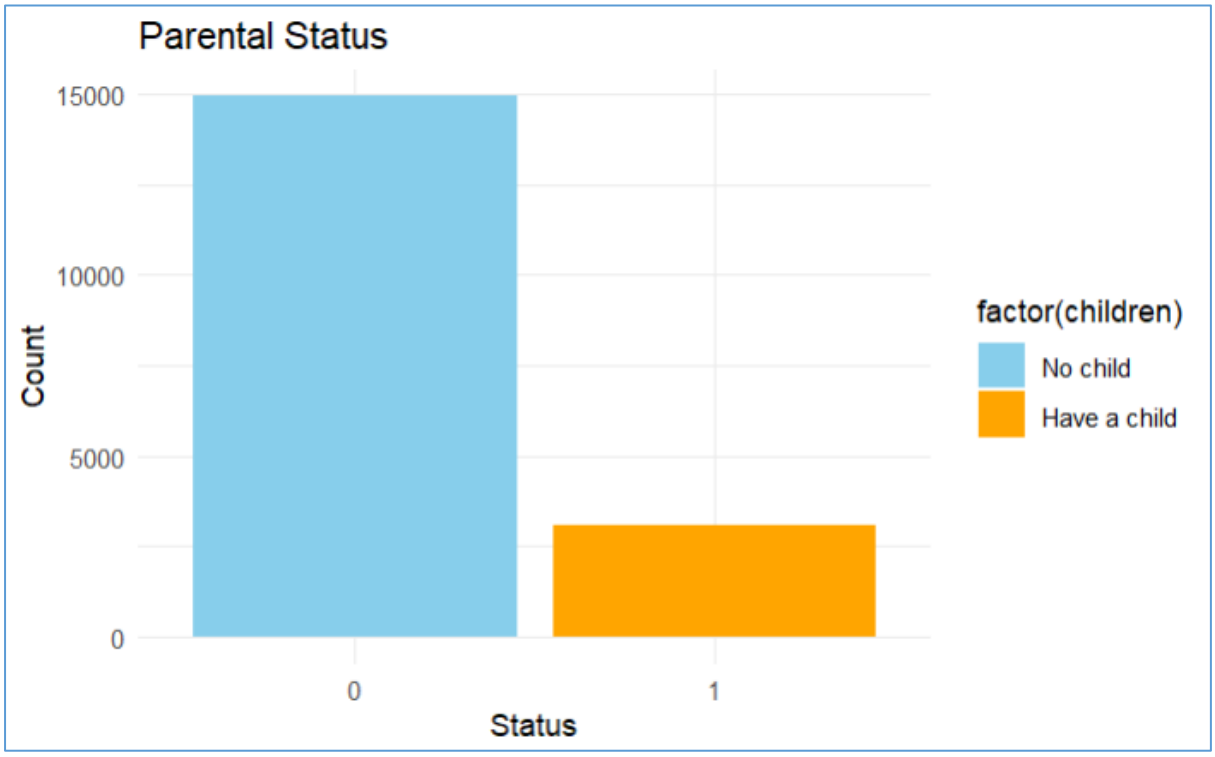

Fig. 6 – Employee's Parental Status

DATA ANALYSIS

```
> stargazer(model1, model2, model3 , type="text", align=TRUE,omit=c("personid"))

================================================================================================
                                                Dependent variable:
                                    ------------------------------------------------------------
                                                        perform1
                                          (1)                (2)                (3)
------------------------------------------------------------------------------------------------
experiment_treatment                    0.040**            0.048***           0.078***
                                        (0.018)            (0.018)            (0.020)

married                                                    0.151***           0.180***
                                                           (0.018)            (0.020)

experiment_treatment:married                                                  -0.136***
                                                                              (0.042)

Constant                                0.239***           0.135***           0.125***
                                        (0.020)            (0.024)            (0.024)

------------------------------------------------------------------------------------------------
Observations                             18,044             18,044             18,044
R2                                       0.013              0.017              0.018
Adjusted R2                              0.013              0.017              0.018
Residual Std. Error                0.995 (df = 18041) 0.993 (df = 18040) 0.993 (df = 18039)
F Statistic                  123.403*** (df = 2; 18041) 105.463*** (df = 3; 18040) 81.770*** (df = 4; 18039)
================================================================================================
Note:                                                *p<0.1; **p<0.05; ***p<0.01
```

Table. 3 – Treatment & Marital Status Interaction: Performance Effects

Analysis: The Table. 3 presents regression results examining the relationship between the dependent variable "perform1" and various independent variables. The coefficients indicate the effect of each variable on performance, with significance levels denoted by asterisks.

1. The main effect of "experiment_treatment" is significant across all models, suggesting it positively influences performance.
2. Being "married" also significantly impacts performance positively.
3. The interaction term "experiment_treatment:married" shows a negative and significant effect, implying that the effect of the treatment on performance is mitigated for married individuals.

Overall, the models suggest that both the experiment treatment and marital status have significant effects on performance, with a nuanced interaction effect between them. However, the R-squared values are relatively low, indicating that these variables explain only a small portion of the variance in performance.

```
> stargazer(model4, model5, type="text", align=TRUE,omit=c("personid"))

================================================================================
                                        Dependent variable:
                                    ---------------------------------------------
                                                    perform1
                                           (1)                      (2)
--------------------------------------------------------------------------------
experiment_treatment                     0.053***                 0.067***
                                         (0.018)                  (0.019)

children                                 0.201***                 0.220***
                                         (0.021)                  (0.022)

experiment_treatment:children                                     -0.111**
                                                                  (0.052)

Constant                                 0.147***                 0.143***
                                         (0.022)                  (0.022)

--------------------------------------------------------------------------------
Observations                              18,044                   18,044
R2                                        0.019                    0.019
Adjusted R2                               0.019                    0.019
Residual Std. Error                 0.993 (df = 18040)       0.992 (df = 18039)
F Statistic                 114.670*** (df = 3; 18040) 87.158*** (df = 4; 18039)
================================================================================
Note:                                            *p<0.1; **p<0.05; ***p<0.01
```

Table. 4 – Treatment, Parenthood & Performance: Interaction Insight

Analysis: The Table. 4 presents regression results examining the relationship between the dependent variable "perform1" and independent variables.

1. "Experiment_treatment" has a significant positive effect on performance in both models (1) and (2), suggesting that being in the treatment group enhances performance.
2. "Children" also significantly positively impact performance in both models, indicating that individuals with children tend to perform better.
3. The interaction term "experiment_treatment:children" is significant and negative, suggesting that the effect of the treatment on performance is diminished for individuals with children.

Overall, the findings suggest that both the experimental treatment and having children affect performance, with a nuanced interaction effect between them. However, the relatively low R-squared values indicate that these variables explain only a small portion of the variance in performance.

```
> stargazer(model6 , type="text",align=TRUE,omit=c("personid","year_weekF"))

================================================================
                                          Dependent variable:
                                      -------------------------
                                                perform1
----------------------------------------------------------------
experiment_treatment                          0.078***
                                               (0.020)

children                                      0.162***
                                               (0.035)

married                                        0.068**
                                               (0.031)

experiment_treatment:children                  -0.020
                                               (0.075)

experiment_treatment:married                   -0.102*
                                               (0.061)

children:married

experiment_treatment:children:married

Constant                                      0.126***
                                               (0.024)

----------------------------------------------------------------
Observations                                    18,044
R2                                               0.019
Adjusted R2                                      0.019
Residual Std. Error                       0.992 (df = 18037)
F Statistic                           58.974*** (df = 6; 18037)
================================================================
Note:                              *p<0.1; **p<0.05; ***p<0.01
```

Table. 6 – Treatment, Marriage, Parenthood & Performance: Regression Findings

Analysis: The regression results indicate several significant effects on the dependent variable "perform1":

1. "Experiment_treatment" has a significant positive effect on performance, suggesting that individuals in the treatment group exhibit higher performance levels.
2. Both "children" and "married" variables have significant positive effects on performance, implying that individuals with children and those who are married tend to perform better.

3. The interaction term "experiment_treatment:married" is significant and negative, indicating that the treatment's effect on performance is weaker for married individuals.
4. However, the interaction terms involving "children:married" and "experiment_treatment:children:married" are not specified, which might suggest these effects were not statistically significant in the model.

Overall, these findings highlight the complex interplay between the experimental treatment, marital status, and having children in influencing performance levels.

CONCLUSION

The analyses presented provide substantial support for the hypothesis that marital status and parenthood significantly influence performance, particularly in remote work settings. Analysis 1 highlights a significant interaction effect between being married and the experimental treatment, indicating that marital status moderates the treatment's impact on performance. Analysis 2 further supports the hypothesis by showing that having children moderates the effect of the treatment on performance, suggesting that parenthood influences performance levels. Analysis 3 strengthens these findings, demonstrating significant effects of both marital status and parenthood on performance, with a negative interaction effect between the experimental treatment and being married.

These results collectively underscore the complex interplay between marital and parental responsibilities and their impact on individuals' capacity to maintain optimal performance while working remotely. The findings imply that employees balancing both marital and parental duties may face challenges in sustaining concentration and executing tasks effectively in remote work environments. Thus, organizations should consider implementing supportive policies and resources to help employees manage these responsibilities and maintain productivity in remote work settings.

REFERENCES

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APPENDIX

Below is the entire code that was used for this experiment:

```
#### Satisfaction_homework
rm(list=ls())

#### load packages
library(haven)
library(stargazer)D
library(Hmisc)
library(ggplot2)
library(lattice)

#### load data
perform13 <- read_dta("C:/Users/doshi/Downloads/Working from home-20240512/Performance.dta")
p13<-data.frame(perform13)

#### clean data
c13 <- na.omit(p13)
View(c13)
summary(c13)

stargazer(c13,type="text",align=TRUE)

### Marital Status
ggplot(c13, aes(x = factor(married), fill = factor(married))) +
  geom_bar() +
  labs(title = "Marital Status", x = "Status", y = "Count") +
  scale_fill_manual(values = c("0" = "blue", "1" = "red"),
                    labels = c("Single", "Married")) +
  theme_minimal()

### Parental Status
ggplot(c13, aes(x = factor(children), fill = factor(children))) +
  geom_bar() +
  labs(title = "Parental Status", x = "Status", y = "Count") +
  scale_fill_manual(values = c("0" = "skyblue", "1" = "orange"),
                    labels = c("No child", "Have a child")) +
  theme_minimal()

# Are married employees performing better WFH?
model1 <- lm(data=c13, perform1~experiment_treatment+personid)
model2 <- lm(data=c13, perform1~experiment_treatment+married+personid)
model3 <- lm(data=c13, perform1~experiment_treatment*married+personid)

stargazer(model1, model2, model3 , type="text", align=TRUE,omit=c("personid"))

# Are employees with children performing better?
model4 <- lm(data=c13,perform1~experiment_treatment+children+personid)
model5 <- lm(data=c13,perform1~experiment_treatment*children+personid)

stargazer(model4, model5, type="text", align=TRUE,omit=c("personid"))

# Impact of WFH on married employee having children?
model6 <- lm(data=c13,perform1~experiment_treatment*children*married+personid)

stargazer(model6 , type="text",align=TRUE,omit=c("personid","year_weekF"))
```