Mental Health in Tech 2016

W200 Final Project - Section 6, Team 1 - April 16, 2022

Eric Le, Alexandra Hurst, Abdulaziz Macabangon

Github repository: https://github.com/UC-Berkeley-I-School/Project2_Hurst_Le_Macabangon.git

Introduction/Background

Working at a tech company is a highly sought after job, especially in today's age. Good benefits. High pay. A balanced work schedule. What more could you ask for? While all this may be true, many seem to forget that the technology industry is fast paced with a rigorous work culture that demands unreasonably high levels of productivity. The industry is known for high-stress: late nights, abnormal hours, and tight deadlines, all while being constantly available at any time of day. This high stress level increases the risk of mental health disorder and can lead to deadly consequences. Our project seeks to investigate the relationship as well as the impact between the technology industry and mental health disorders so companies can practice prioritizing mental and physical health.

Research Questions

Our group worked on 3 major lines of inquiry with differing levels of perspective:

1) Tech & Non-Tech Companies: What is the relationship between mental health disorders and type of company (i.e tech companies vs. non-tech companies)?
    - ➢ Which type of company had a higher percentage of people who identified as having mental health disorder?
    - ➢ Does being in a company that provides resources for mental health have an effect on whether or not an individual has a mental health disorder?
    - ➢ Does the size of the company affect how comfortable people are discussing mental health?
    - ➢ Did having benefits help increase the amount of individuals who sought treatment?
    - ➢ Which company type scored higher in taking mental health seriously?
2) How common are different mental health conditions among tech workers?
    - ➢ What is the overall distribution of specific conditions within the industry?
    - ➢ How do demographic factors relate to the prevalence of different conditions?
    - ➢ Are any particular conditions correlated with specific types of work in tech?
    - ➢ How does family history with regard to mental health impact the answers to these questions?
3) What impact does being self-employed in the tech industry have on mental health versus being employed by an employer?
    - ➢ Is mental health better for people that are self-employed?
    - ➢ What support is available for those who are self-employed vs. employed by a larger company?

Data Source

We used responses to the 2016 OSMI Mental Health in Tech Survey as the basis of our analysis. The anonymized responses were published as an open dataset on Kaggle by Open Sourcing Mental Illness, LTD, the organization that administered the survey. The data contained responses from over 1400

individuals to a variety of questions aimed to measure attitudes towards mental health in the tech workplace and examine the frequency of mental health disorders among tech workers. The dataset is available via the following link: https://www.kaggle.com/datasets/osmi/mental-health-in-tech-2016.

Data Exploration, Cleaning, and Assumptions

Data Exploration:

Before starting to answer our questions of interest, we needed to get a high-level understanding of the data and ensure it was in a usable form. An initial check of the shape of the dataset revealed 1443 rows and 63 columns. The original name of each column in the dataset was the full text of the corresponding question on the survey, which was helpful in terms of understanding the meaning of each column, but which would have made referring to the columns in code extremely unwieldy. We manually renamed each column to a shorter encoded name that still captured the key purpose of the column (e.g. "Does your employer provide mental health benefits as part of healthcare coverage?" was mapped to "emp_mh_coverage").

#	Column	Non-Null Count	Dtype
0	self_employed	1433 non-null	int64
1	emp_num_employees	1146 non-null	object
2	emp_org_tech	1146 non-null	float64
3	emp_role_tech	263 non-null	float64
4	emp_mh_coverage	1146 non-null	object
5	emp_mh_coverage_knowledge	1013 non-null	object
6	emp_mh_communication	1146 non-null	object
7	emp_mh_resources	1146 non-null	object
8	emp_mh_anonymity	1146 non-null	object
9	emp_mh_leave_ease	1146 non-null	object
10	emp_mh_consequences	1146 non-null	object
11	emp_ph_consequences	1146 non-null	object
12	emp_mh_comfort_coworkers	1146 non-null	object
13	emp_mh_comfort_supervisor	1146 non-null	object
14	emp_mh_ph_equal	1146 non-null	object
15	emp_mh_consequences_coworkers	1146 non-null	object
16	self_mh_coverage	287 non-null	float64
17	self_mh_resources_knowledge	287 non-null	object
18	self_mh_disclosure_external	287 non-null	object
19	self_mh_disclosure_external_consequences	144 non-null	object
20	self_mh_disclosure_internal	287 non-null	object
21	self_mh_disclosure_internal_consequences	287 non-null	object
22	self_mh_productivity	287 non-null	object
23	self_mh_productivity_percent	204 non-null	object
24	prev_emp	1433 non-null	int64
25	prev_emp_mh_coverage	1264 non-null	object
26	prev_emp_mh_coverage_knowledge	1264 non-null	object
27	prev_emp_mh_communication	1264 non-null	object
28	prev_emp_mh_resources	1264 non-null	object
29	prev_emp_mh_anonymity	1264 non-null	object
30	prev_emp_mh_consequences	1264 non-null	object
31	prev_emp_ph_consequences	1264 non-null	object
32	prev_emp_mh_comfort_coworkers	1264 non-null	object
33	prev_emp_mh_comfort_supervisor	1264 non-null	object
34	prev_emp_mh_ph_equal	1264 non-null	object
35	prev_emp_mh_consequences_coworkers	1264 non-null	object
36	interview_ph_disclosure	1433 non-null	object
37	interview_ph_disclosure_reason	1095 non-null	object
38	interview_mh_disclosure	1433 non-null	object
39	interview_mh_disclosure_reason	1126 non-null	object
40	mh_hurt_career	1433 non-null	object
41	mh_negative_coworkers	1433 non-null	object
42	mh_disclosure_friends_family	1433 non-null	object
43	mh_negative_workplace_exp	1344 non-null	object
44	mh_observations_deter_disclosure	657 non-null	object
45	mh_disorder_family	1433 non-null	object
46	mh_disorder_past	1433 non-null	object
47	mh_disorder_current	1433 non-null	object
48	mh_disorder_confirmed	568 non-null	object
49	mh_disorder_potential	322 non-null	object
50	mh_diagnosed	1433 non-null	object
51	mh_diagnosis	711 non-null	object
52	mh_treatment	1433 non-null	int64
53	mh_interfere_treated	1433 non-null	object
54	mh_interfere_untreated	1433 non-null	object
55	age	1433 non-null	int64
56	gender	1430 non-null	object
57	live_country	1433 non-null	object
58	live_state	840 non-null	object
59	work_country	1433 non-null	object
60	work_state	851 non-null	object
61	work_type	1433 non-null	object
62	work_remote	1433 non-null	object

Because the data consisted of survey responses, most of the columns were categorical in nature and contained a small pre-defined set of responses, such as "Yes," "No," and "I don't know". The few columns that did not follow this pattern, such as those containing respondents' age, gender, specific mental health conditions, and job roles, provided the greatest challenge from a data cleaning perspective. However, they also yielded some of the deepest insight once appropriately processed.

Another interesting aspect of the data arising from the survey process was the fact that certain groups of columns were only filled out if previous questions were answered in a particular way. For instance, answers to questions about employer handling of mental health were only populated if a given respondent indicated that they worked for a company, and likewise a different set of responses were populated if they instead indicated that they were self-employed. We utilized this structure to perform comparative analyses between the groups.

Current or Past Condition	Diagnosed	Count
Yes	No	116
	Yes	676
Maybe	No	232
	Yes	38
No	No	369
	Yes	2

Respondents to the survey were asked about whether they self-identified as having a current or previous mental health condition, along with whether they had been formally diagnosed. Analysis of this data revealed that most respondents who answered "Yes" to having a current or past mental health condition had been formally diagnosed (n=676), but another non-negligible portion had not received a formal diagnosis (n=166). Additionally, most respondents answering "Maybe" to having a current or past mental health condition had not been formally diagnosed (n=232), but 38 had been. Since our analysis hopes to be as inclusive as possible of perceived mental health conditions, we opted to use respondent self-identified mental health disorders as our primary basis of analysis instead of formal diagnoses.

Data Cleaning Steps:

To prepare the data for analysis, we performed the following steps:

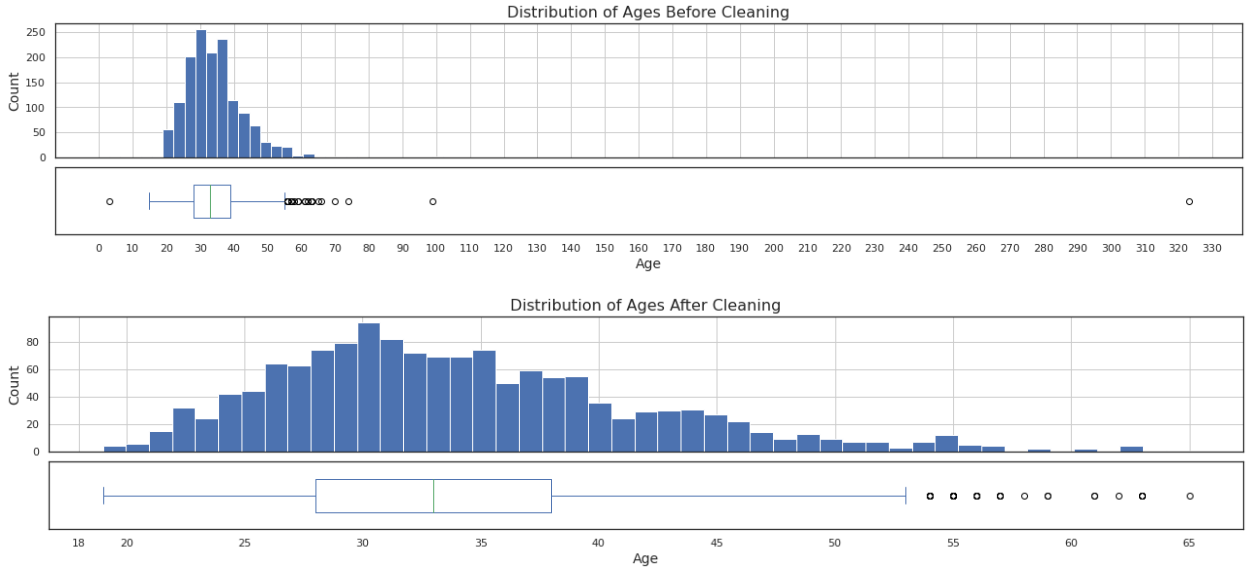
1. Drop columns with too much missing data.
2. Break out individual values from columns containing lists into separate indicator variable columns.
3. Filter out rows with age values outside the range of 18 to 65, inclusive.
4. Segment the free-text values in the gender column into distinct categories.
5. Filter out rows with a country of employment or residence other than the United States.

We determined that the “emp_role_tech” and “mh_observations_deter_disclosure” columns contained too many nulls to be useful, and there was no clear pattern to the nulls. This differed from some other columns in the survey that were conditionally null based on previous answers. We decided to drop the “emp_role_tech” and “mh_observations_deter_disclosure” columns.

In our initial exploration of the values in the data, we discovered that the “mh_disorder_confirmed,” “mh_disorder_potential,” “mh_diagnosis,” and “work_type” columns all appeared to contain multiple values each, separated by the "|" symbol. In order to more easily work with the data in these columns, we broke them out into a set of boolean columns, one for each individual value. Most of the individual values in the “mh_disorder_confirmed, “mh_disorder_potential,” and “mh_diagnosis” columns appeared to be selected from a predefined list, but there were also some values that seemed to have been entered as free text. Since advanced text processing was outside the scope of this analysis, we decided to discard values outside the predefined list when creating our indicator columns.

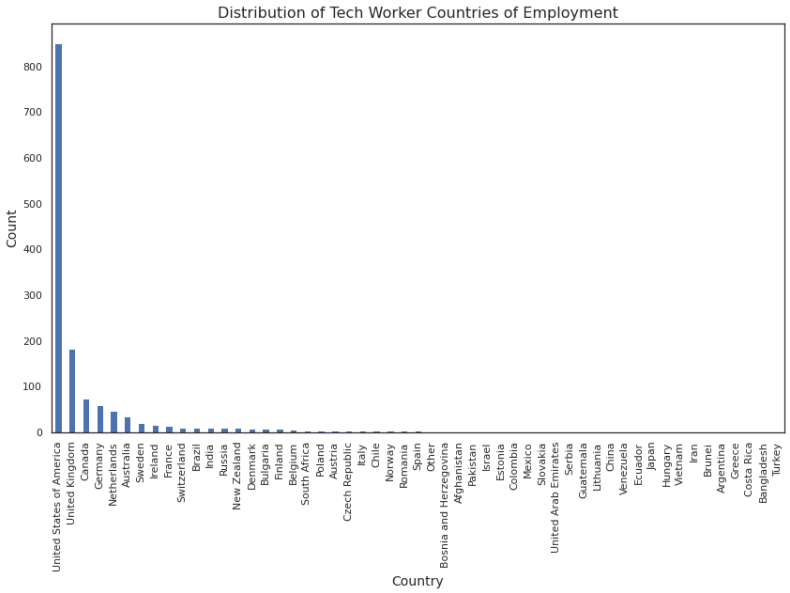
	mh_disorder_confirmed
0	NaN
1	Anxiety Disorder (Generalized, Social, Phobia,...
2	NaN
3	Anxiety Disorder (Generalized, Social, Phobia,...
4	Anxiety Disorder (Generalized, Social, Phobia,...
...	...
1428	NaN
1429	NaN
1430	NaN
1431	Anxiety Disorder (Generalized, Social, Phobia,...
1432	Obsessive-Compulsive Disorder|Eating Disorder ...

We found that the “age” column in our dataset contained only integer data, but some of the values were clearly outside the realm of possibility (e.g. 3, 99, and 323). Since the vast majority of values fell between 18 and 65 years old, and these ages correspond to the usual start and end of working life, we decided to discard outliers outside of this range.



Gender was entered on the survey as a free-text field, which allowed for greater freedom of expression for respondents, but introduced a challenge for our analysis since the data was not entered in a uniform way. An initial count of the unique responses in the column revealed around 70 different values. A large part of this variation was due to different conventions used by respondents to input the data (e.g. “Male,” “M,” “man,” “Dude,” and “cis male” were all examples of values that clearly would have mapped to “Male” in a drop-down column). However, there was also plenty of genuine variation in the gender data reported, from “non-binary” to “Androgynous” to “Genderfluid.” We decided to segment the column into the three categories of “Male”, “Female”, and “Other” in order to account for all respondents but still allow for categorical analysis. This was accomplished by way of regexes, where values that clearly mapped to “Male” or “Female” were marked as such, and all other values were translated to “Other.” We placed the segmented values into a separate column called “gender_segmented,” but retained the original values as well for reference.

When investigating the respondent location data included in the dataset, we observed that over half the responses were from the United States alone. Since different countries have vastly different healthcare systems and employment environments, we decided to filter our analysis to include only workers in the US. The survey captured both country of employment as well as country of residence, but these differed in only a limited number of cases (n=26). We decided to exclude these entries as well, given that it was unclear how to classify them and they made up only a small percentage of the total responses.

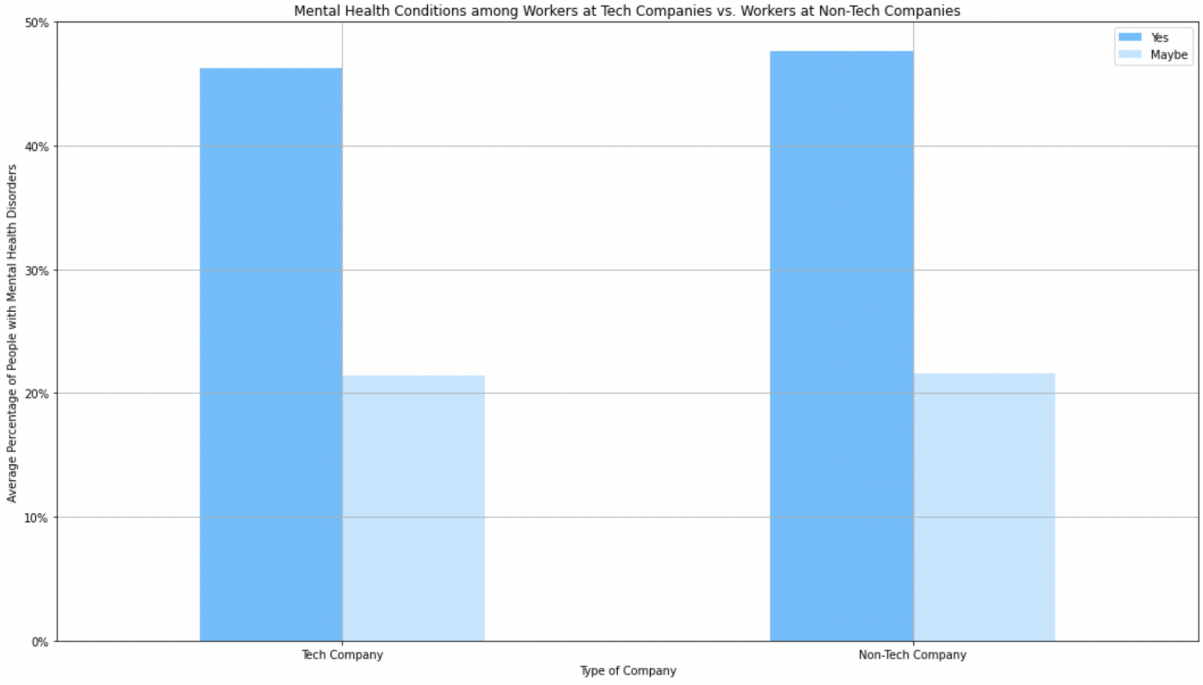


Analysis

Question One: Tech & Non-Tech Companies: What is the relationship between mental health disorders and type of company (i.e tech companies vs. non-tech companies)?

- ➢ Although we are primarily interested in tech companies, we wanted to include non-tech companies within our analysis to provide better insights.

Tech Companies & Non-Tech Companies vs. Mental Health Disorders



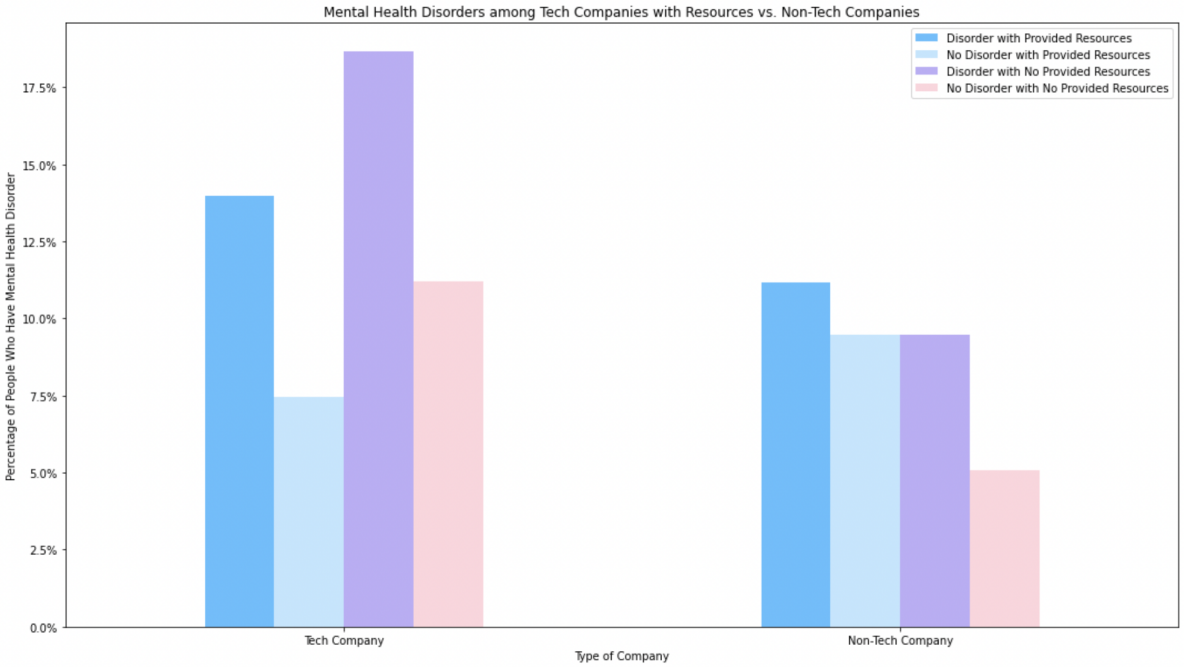
We started by looking at the relationship between tech companies and non-tech companies against mental health disorders. Which type of company had a higher percentage of people who identified as having mental health disorders? We organized our data to compare tech vs. non- tech companies on the x axis and the average percentage of people with mental health disorder on the y axis.

What we see here is rather interesting, the average percentage among people that identified with having mental health disorder at tech companies was 46% compared to non-tech companies scoring 48%. In addition to this the average percentage among people who answered “maybe” was 21% at tech companies and 22% at non-tech companies. Thus there is no distinct correlation between type of company and having a mental health disorder.

Tech & Non-Tech Companies with Resources vs. Mental Health Disorders

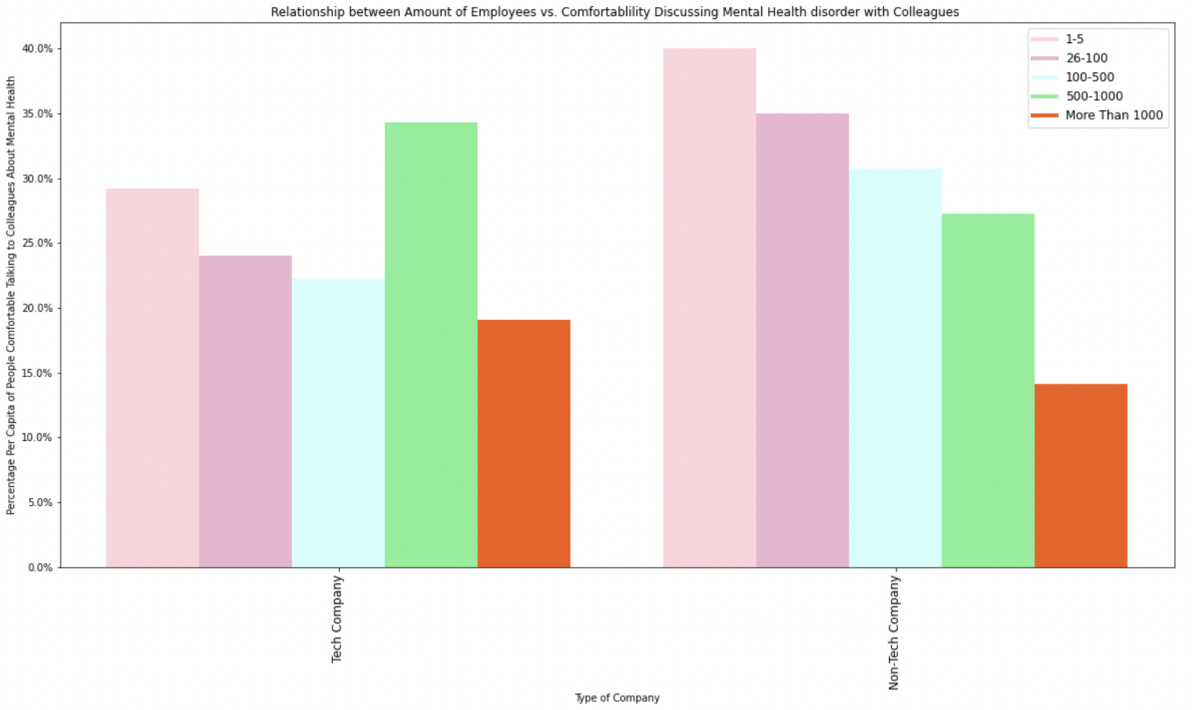
The next area that we wanted to visit was the impact of resources for mental health between tech and non-tech companies against mental health disorders. Does being in a company that provides resources for mental health have an effect on whether or not an individual has a mental health disorder? We organized our data to compare tech vs. non-tech companies on the x axis and the average percentages of people who have mental health disorders on the y axis.

Tech companies: Tech companies that provided resources had a lower number of individuals with mental health disorders compared to tech companies that did not offer resources. Tech companies that provided resources had 14% of individuals with mental health disorders compared to 19% in tech companies that did not offer resources.



Non-tech companies: An interesting finding was that the average percentage of individuals with mental health disorders in non-tech companies that provided resources was 11% compared to 9% in non-tech companies that didn’t provide resources. Resources in non-tech companies seem to have no influence on mental health disorders.

Tech Companies & Amount of Employees vs. Comfort Discussing Mental Health



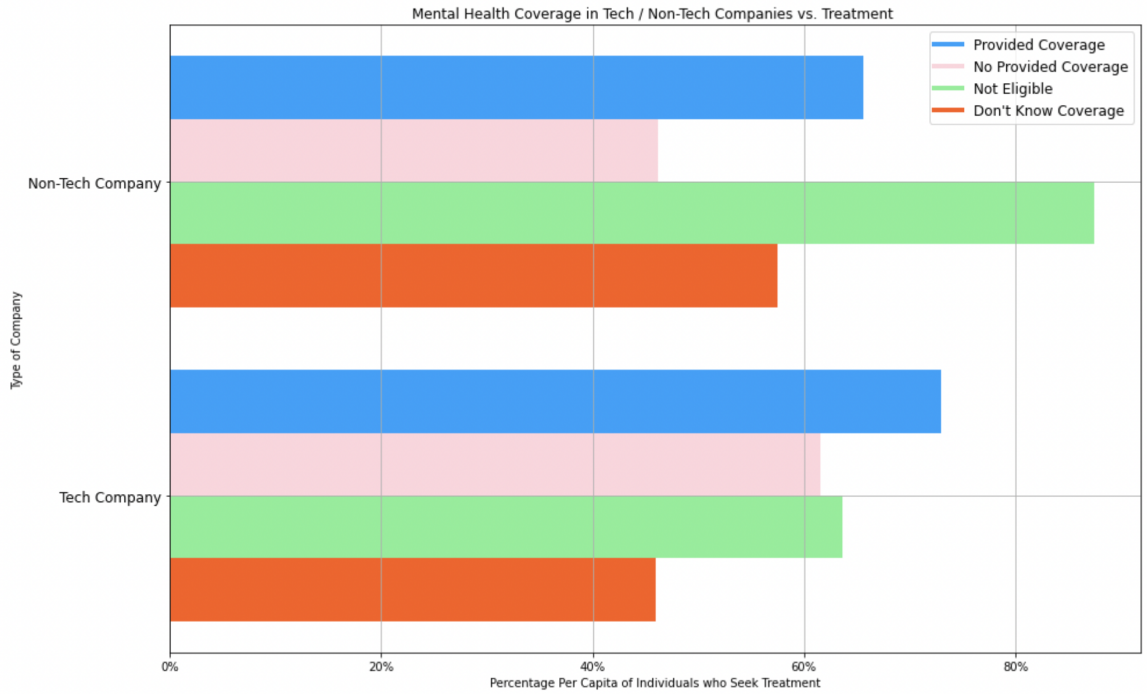
Another area we were curious about was whether or not the number of employees a company has affects how comfortable individuals are with discussing mental health among colleagues. Does the size of the company affect how comfortable people are with discussing mental health? We organized our data to compare tech vs. non-tech companies on the x axis and the percentage per capita of people comfortable talking to colleagues about mental health on the y axis.

Tech Companies: In a company size of 500 - 1000 employees, 34% of employees seem to be more comfortable discussing mental health disorders. The next highest percentage group would be small sized companies with 1- 5 employees at 29%. Otherwise there seems to be little to no correlation with having more employees and being comfortable with discussing mental health.

Non-Tech Companies: Unlike tech companies, the distribution tends to be more distributed as more people are comfortable discussing mental health disorders in small size companies and decrease as the amount of employees increases. 40% of individuals are comfortable talking about mental health in a company size of 1-5 employees and this decreases to 14% in companies with more than 1000 people.

Tech Company + Mental Health Benefits as Part of Healthcare Coverage vs. Treatment

On top of resources, we wanted to take a look at the relationship between seeking treatment and tech companies providing mental health benefits as part of healthcare coverage. Did having benefits help increase the amount of individuals who sought treatment? We organized our data to compare tech vs. non-tech companies on the x axis and the percentage per capita of people who seek treatment on the y axis.



Tech companies: When we first look at the data it seems that tech companies that offer mental health benefits as part of healthcare coverage seem to have a positive effect on individuals seeking treatment at 73%. However when we take a deeper look along with other variables, healthcare coverage seems to have minimal effect as 62% of individuals still seeked treatment with no provided coverage and 64% seeked treatment regardless of being not eligible. Thus healthcare coverage seems to have little to no correlation with treatment, as individuals will seek treatment regardless.

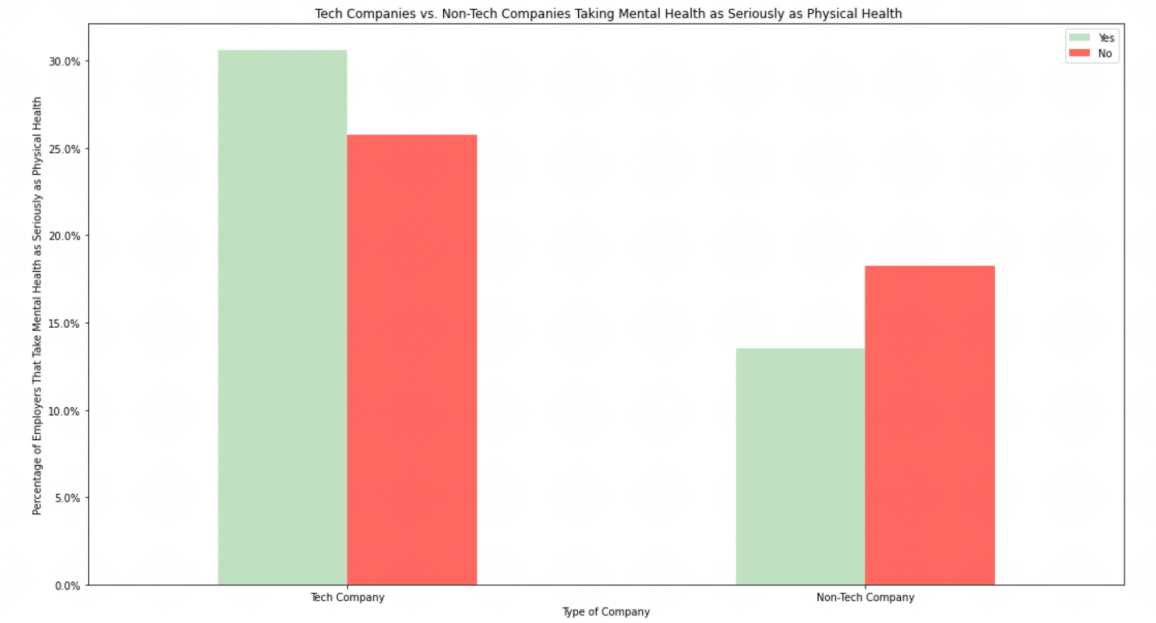
Non-Tech Companies: The same conclusion can be made about non-tech companies. Healthcare coverage seems to have little to no correlation with treatment, as individuals will seek treatment regardless.

Tech & Non-Tech vs. Employers Taking Mental Health as Seriously as Physical Health

The last area we wanted to observe was if there was a relationship between tech and non-tech companies taking mental health seriously as physical health. Which type of company scored higher in taking mental health seriously? We organized our data to compare tech vs. non-tech companies on the x axis and the percentage of employers in each group who take mental health seriously on the y axis.

Tech Companies: There was a higher percentage of tech companies taking mental health as seriously as physical health. 30% of employers in tech companies took mental health as seriously as physical health, while 26% did not. If a tech company takes mental health seriously, many individuals will less likely have mental health disorders. Positive correlation.

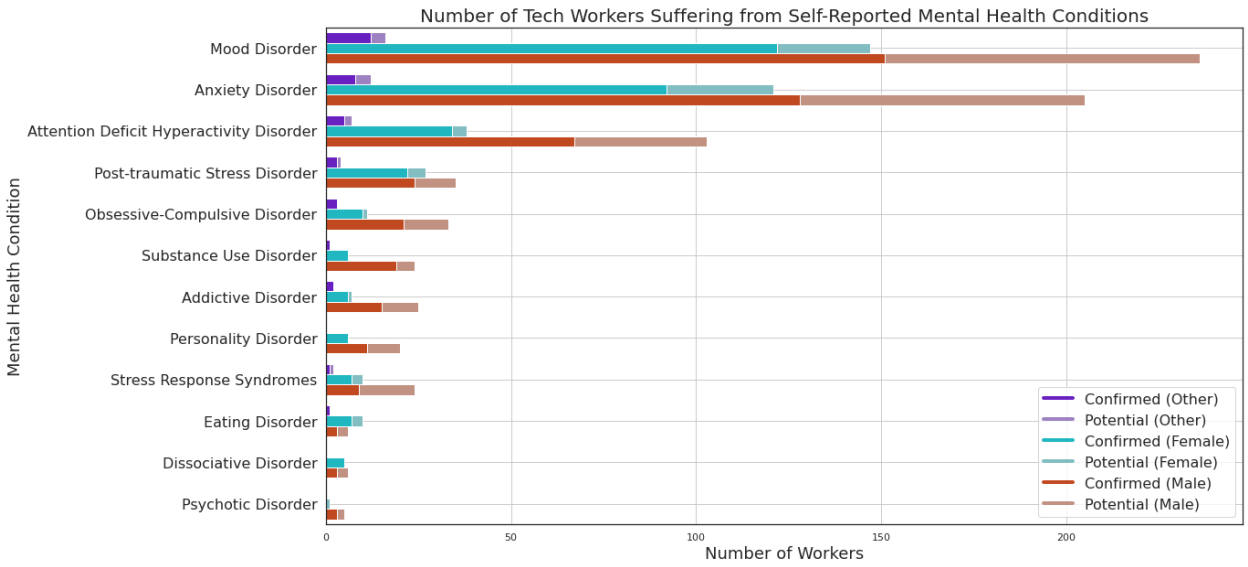
Non-Tech Companies: What's interesting here is that non-tech companies took mental health not as seriously as physical health (18% of employers).



Question One Conclusion: When comparing between tech and non-tech companies, tech companies seem to do a much better job minimizing and acknowledging mental health disorders by providing resources and promoting a healthier environment. However taking a look at tech companies on an individual level there is little to no correlation in type of company and mental health disorders.

Question Two: How common are different mental health conditions among tech workers?
Given that different mental health disorders can have different impacts on individuals' functioning and can require different treatment plans and accomodations, it is valuable to know the distribution of specific categories of disorders amongst tech workers.

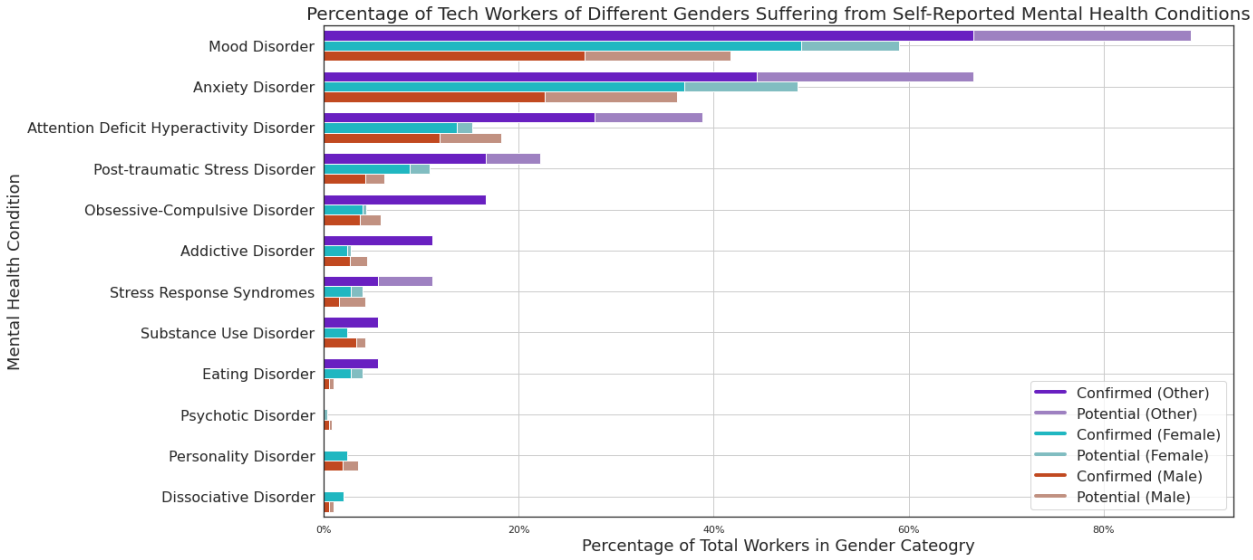
What is the overall distribution of specific conditions within the industry?



To begin, we look at the overall number of tech workers reporting as suffering from different mental health conditions. The graph includes both conditions that respondents have affirmatively stated they have ("confirmed" conditions) as well as those that respondents indicated they might have ("potential" conditions) in order to capture the full scope of the issue. The chart is further broken down by gender, since different genders might have different experiences in the workplace and in life in general that could impact mental health. Detailed graphs comparing potential vs. confirmed conditions can be found in the appendix.

The chart shows that mood disorders and anxiety disorders are by far the most common among the tech workers in the sample, followed by attention deficit hyperactivity disorder. Other disorders are less common, but still prevalent. From a total count perspective, men appear to suffer from the greatest number of conditions.

How do demographic factors relate to the prevalence of different conditions?

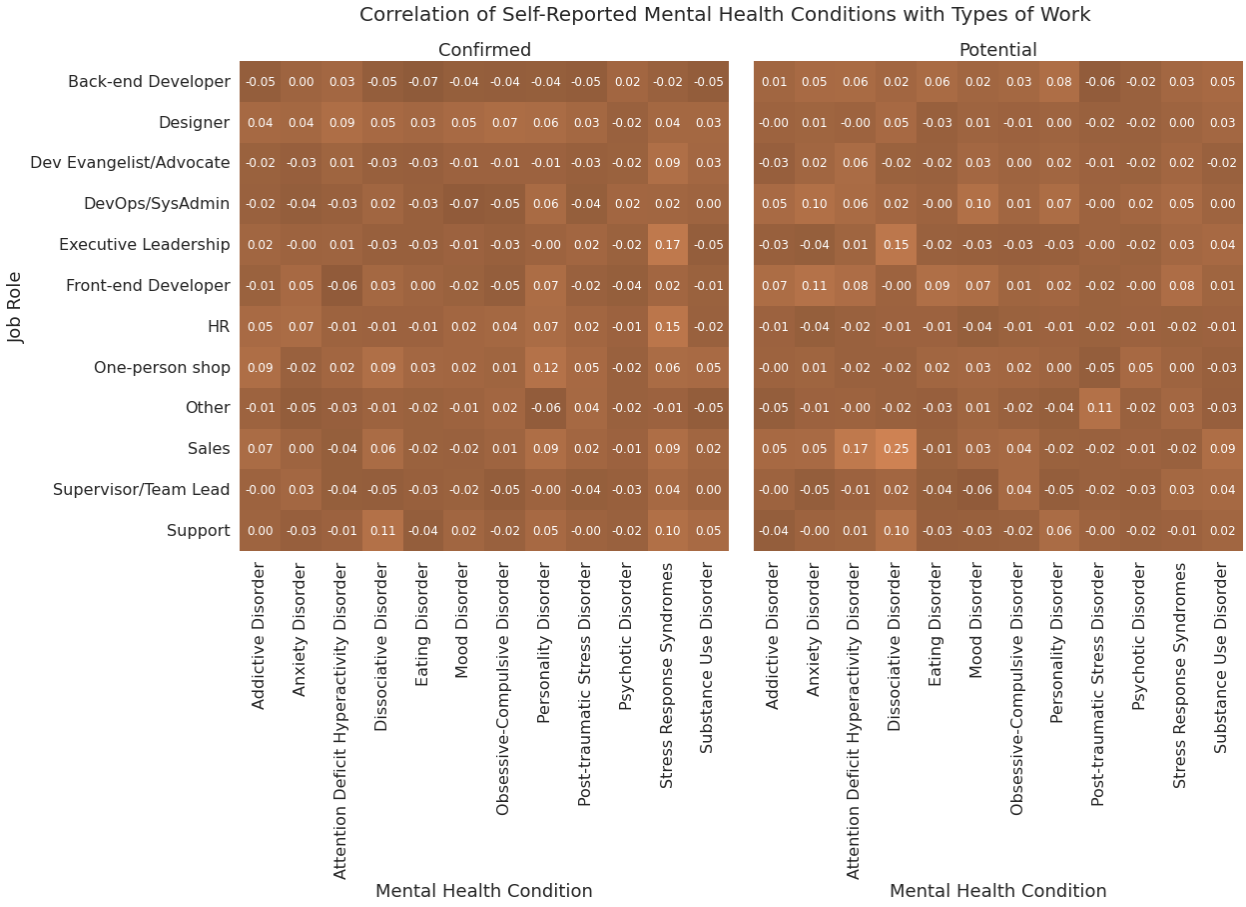


Performing the analysis based instead on the percentage of individuals of a given gender that are suffering from various mental disorders, a markedly different picture emerges. Almost 90% of individuals identifying as a gender other than male or female report having or suspecting a mood disorder, and approximately 70% have or may have an anxiety disorder. A similarly astonishing 60% of individuals identifying as female indicated that they suffer or believe they may suffer from a mood disorder, and around 50% of self-identified females indicate the same regarding anxiety disorders. Males suffer or believe they may suffer from mood and anxiety disorders at a rate of approximately 40%. The prevalence of mental health conditions across genders indicates a widespread issue. Additionally, the discrepancies among gender groups indicate that the tech industry may be failing to accommodate the needs of those identifying as non-male at a higher rate.

Are any particular conditions correlated with specific types of work in tech?

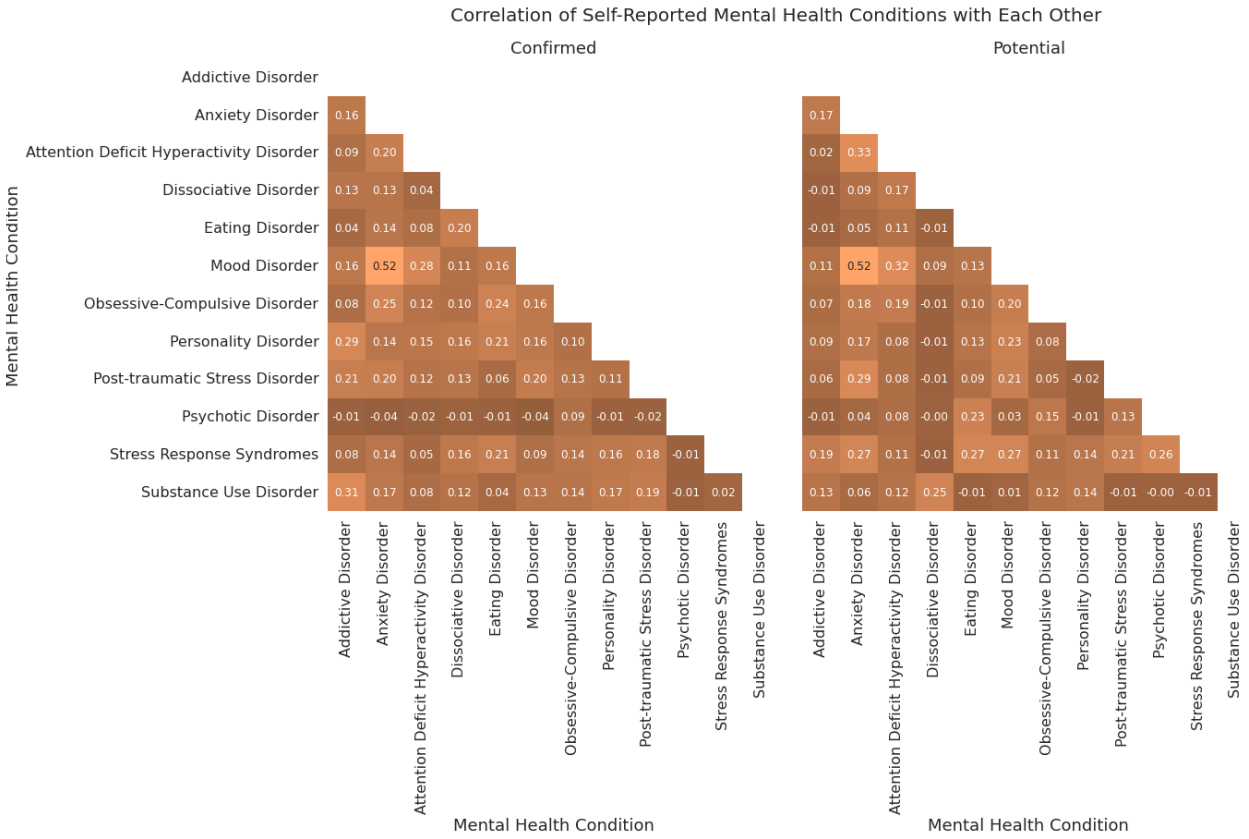
In addition to gender, we investigated if different types of work in tech were correlated with any particular conditions. To begin the analysis, it is useful to have an idea of the overall distribution of job roles among those who responded to the survey.

Back-end work was most common, followed by front-end work and then other roles. Men had the largest share of each role except for HR, confirming that the reason men showed up in our earlier analysis as having the greatest total number of conditions was due to their greater representation within the technology field.



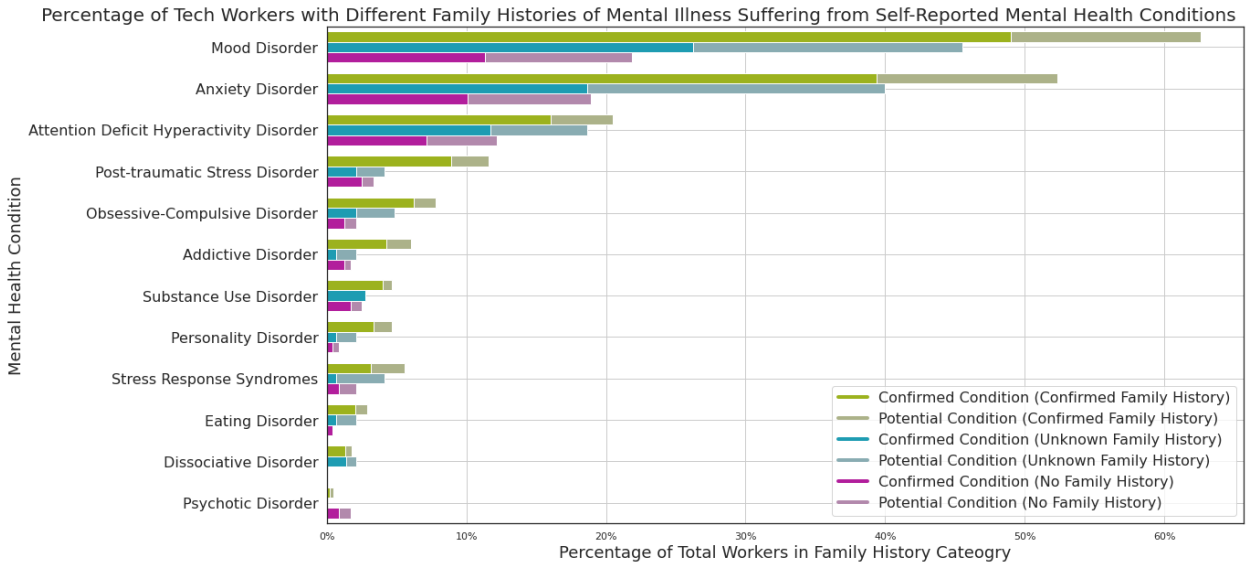
In order to analyze the relationships between different mental health disorders and different job responsibilities, we employ a correlation matrix. The correlation matrices of different job roles with confirmed and potential mental health conditions reveal only minimal correlations, suggesting that there is not a clear relationship between particular types of work and specific mental health conditions. As such, similar interventions and resources are likely to help workers regardless of role.

Although specific mental health conditions do not appear to correlate much with role, some mental health conditions do appear to correlate more strongly with each other.



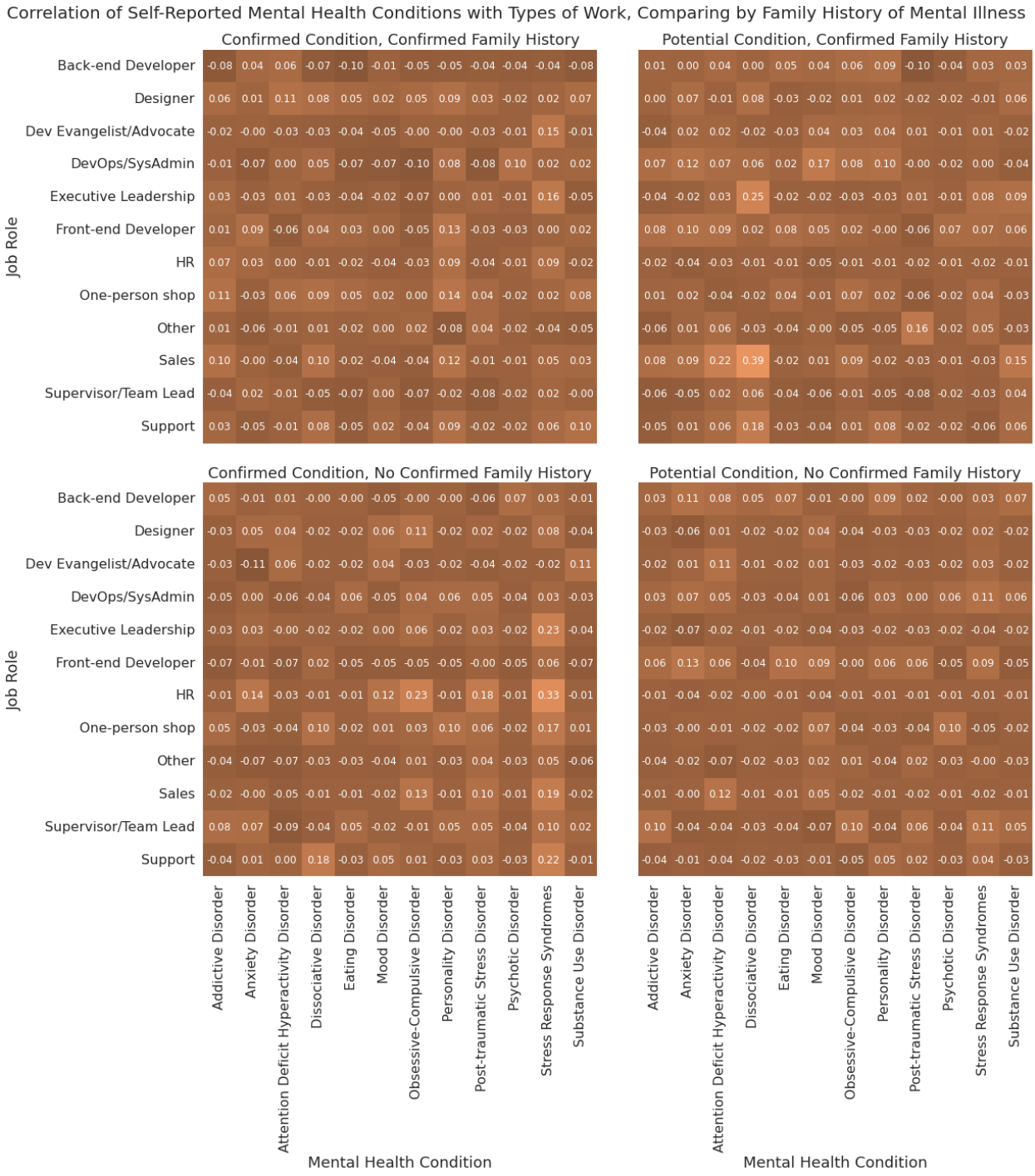
In particular, mood disorders appear to correlate to some extent with anxiety disorders. Interestingly, this correlation appears to hold regardless of whether respondents indicated that they affirmatively had both types of disorders or that they simply believed they might have them. Additionally, confirmed addictive disorder and substance use disorder showed some correlation, and potential cases of attention deficit hyperactivity disorder had some correlation with potential mood and anxiety disorders. The brighter overall color of the condition-condition heatmaps as opposed to the job role-condition heatmaps shows that mental health conditions are likely to be more highly correlated with each other in general than they are with job role. Although the correlations are not especially strong, they could offer some suggestions as to combinations of conditions for which companies employing tech workers could seek to provide comprehensive support.

How does family history with regard to mental health impact the answers to these questions?
To get a better picture of the factors contributing to the mental health burden experienced by tech workers, we analyzed the impact of family history of mental illness on our previous questions. The below graph shows the respective percentages of self-reported mental illnesses among tech workers who indicated that they had, did not have, or were unsure of their family history with regard to mental illness.



There was a clear correlation between a confirmed family history of mental illness and current mental illness across almost all conditions. Further, those indicating that they did not know their family history of mental illness tended to fall about midway between those who confirmed or denied a family history. This indicates that family history is likely an important factor in the manifestation of mental illness among tech workers. As such, tech workers who are aware of a family history of mental illness could potentially benefit from proactively seeking out resources or employers with favorable policies toward mental health.

We also examined the impact of family history of mental illness on potential correlations between job role and particular mental conditions. We plotted correlation matrices for both those who had a confirmed history of mental illness as well as those who did not. The resulting matrices still showed only relatively weak correlations, although there did appear to be slightly more correlation between job role and confirmed mental health conditions among those who did not have a confirmed family history of mental illness. This would make sense, since a smaller portion of the total mental illness seen in these cases would be attributable to family factors, leaving a larger portion to be explained by other factors like a stressful work environment. Additionally, certain correlations between potential conditions and job roles appeared to be stronger among the group of tech workers with a confirmed family history of mental illness. The reason for this is unclear, but one potential explanation could be that workers who are aware of their family history of mental illness might be more likely to suspect that their symptoms could indicate a current mental health issue.



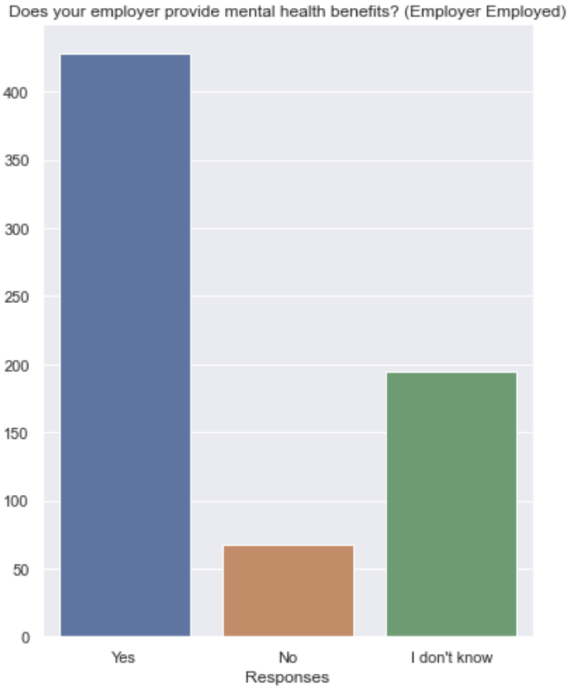
Question Three: *What impact does being self-employed in the tech industry have on mental health versus being employed by an employer?*

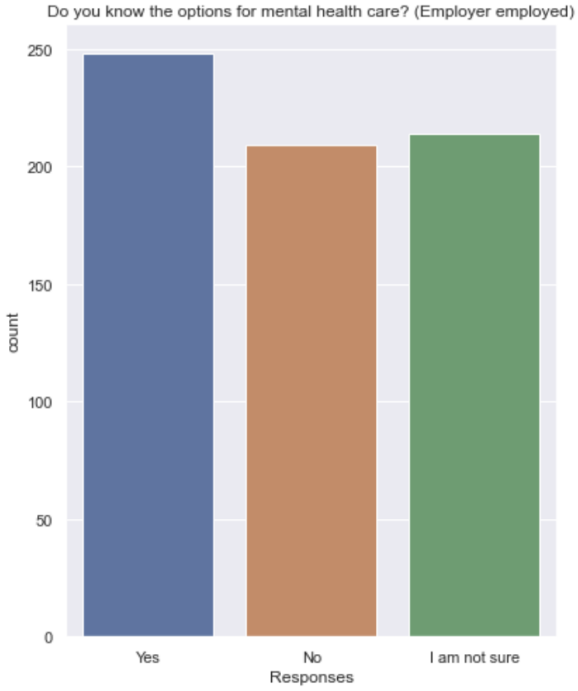
- ➢ Is mental health better for people that are self-employed?
- ➢ Support available for self-employed vs. employer-employed?
- ➢ Does openness about mental health disorder play an effect on overall mental health?

One of the questions we had when we were looking at this data set is if there is a correlation between being self-employed and "working for yourself" leading to generally being happier or having better mental health vs being employed by an employer. This was thought of as the general consensus is that business owners or being self-employed and having their own schedule and a goal to work towards are happier. And we really wanted to see if there is a correlation as the other side of the coin in our minds was because there were no set hours to work this could lead to overwork and longer hours and there is also something to consider that the uncertainties of working for yourself could contribute to being more prone to mental health issues. This dataset provided an opportunity to explore this relationship, as the first question prompted to respondents when they began the study was if they were self-employed or not, and depending on the answer this would prompt different sets of questions.

In terms of data cleaning, we have already mentioned it above, but for this research question there was a little more cleaning that had to be done to create two different data frames, one of which was for self employed and the other for employer employed. Something to note is that this did cause a bit of a population mismatch as the shape for self-employed people only was 131 rows, whereas employer-employed had 709 rows of data. This was considered as an issue as ideally having around the same amount of data would be better to ensure that percentages calculated are not skewed because of population size.

Findings on self-employed vs. employer-employed coverage and support



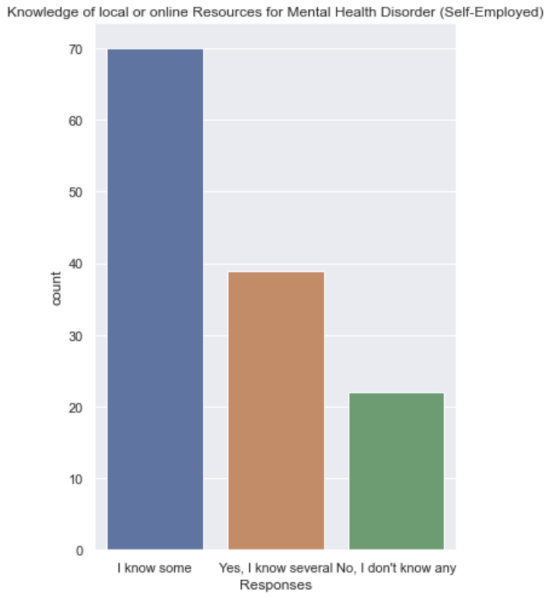


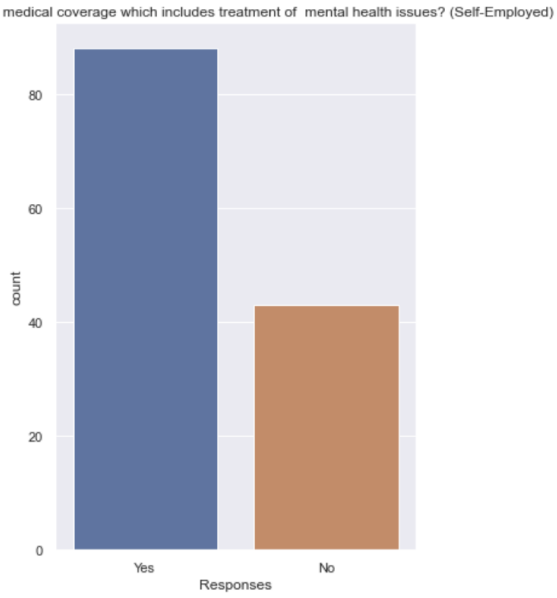

```
Yes             428
I don't know    195
No               67
```

```
Yes             0.62
I don't know    0.28
No              0.10
```

```
Yes             248
I am not sure   214
No              209
```

```
Yes             0.37
I am not sure   0.32
No              0.31
```





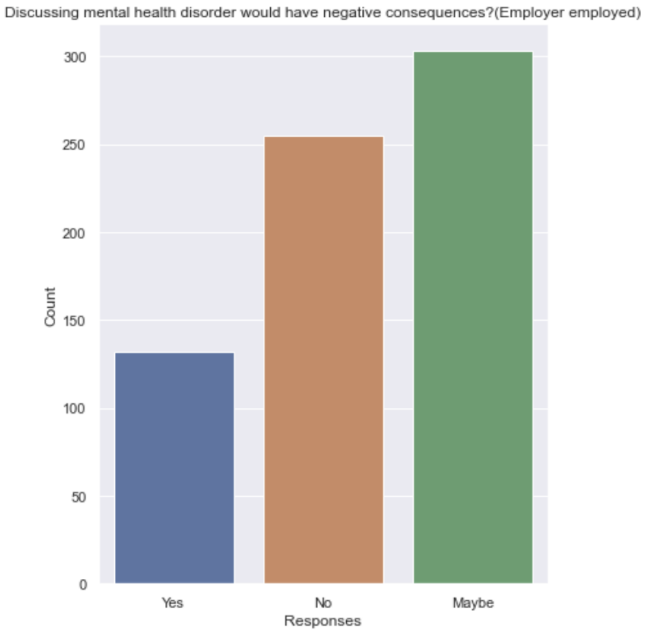
I know some	70	I know some	0.53
Yes, I know several	39	Yes, I know several	0.30
No, I don't know any	22	No, I don't know any	0.17

1.00	88	1.00	0.67
0.00	43	0.00	0.33

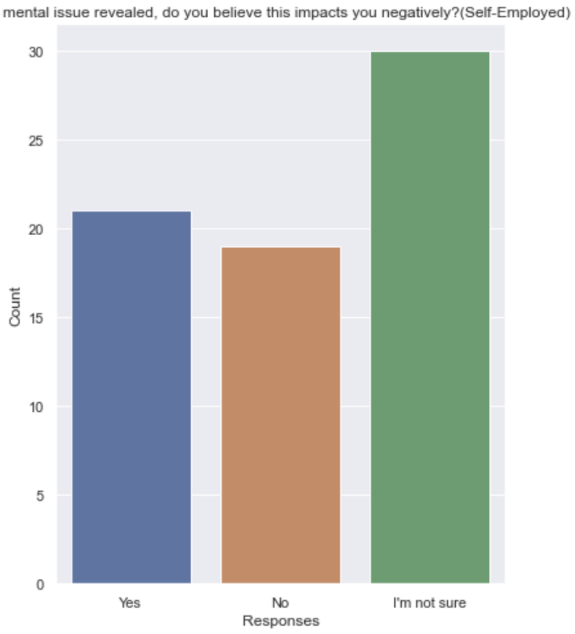
The first set of graphs to cover are those above. These graphs are to get an insight on what kind of support is provided for those that are self-employed vs. employer-employed and to see if there are any correlations between the two. From a first glance we can see that about two-thirds of both self-employed and employer-employed individuals have medical coverage for the treatment of mental health issues. One key difference was that there was an option of "I don't know" for the employer-employed data, which can be concerning as knowledge of a resource is the first step in utilizing a resource. This can also be supported by the graph labeled "options for mental health care under employer," in which we can see that about 66% of the population are either not sure or don't know the available resources in their health plan. The same pattern can be seen in the self-employed data, where about 70% are either unaware or only have an idea of the resources available. We're able to see here that while resources are available, the utilization and awareness of the resources is a potential problem.

Findings on self-employed vs. employer-employed openness

The below graph was generated to provide some insights on whether being open about mental health issues can affect mental health levels and if individuals believe that it can affect them negatively which can then also cause more mental health issues. We can see that the maybe/I'm not sure responses match almost identically to both data sets. But what's interesting is that for self-employed individuals there is a much higher chance of them thinking that it can affect them negatively. But all in all, this is very similar to the findings from the question before where the biggest factor is uncertainty and being unaware.

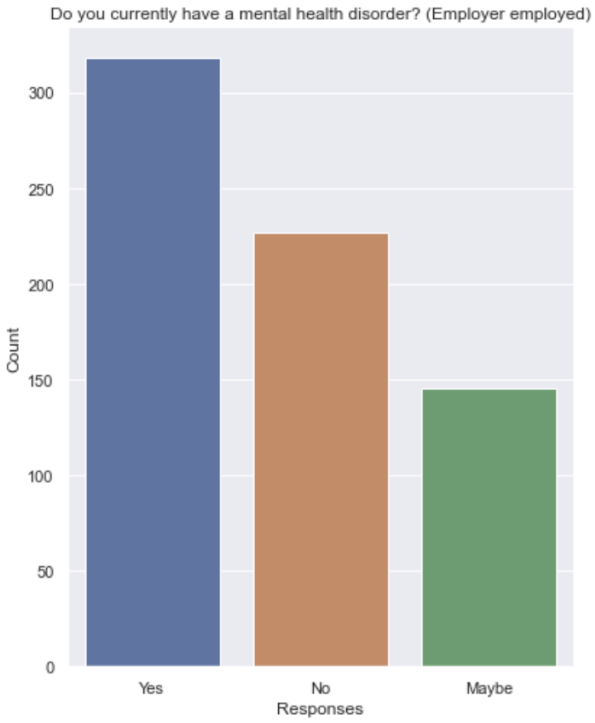


Maybe	303	Maybe	0.44
No	255	No	0.37
Yes	132	Yes	0.19

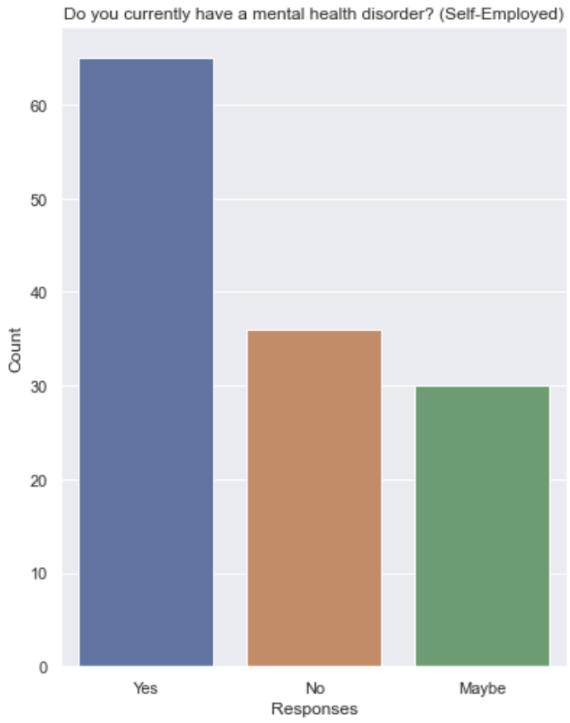


I'm not sure	30	I'm not sure	0.43
Yes	21	Yes	0.30
No	19	No	0.27

Findings on self-employed vs. employer-employed workers and current mental health disorders



Yes	65	Yes	0.50
No	36	No	0.27
Maybe	30	Maybe	0.23



Yes	328	Yes	0.46
No	232	No	0.33
Maybe	149	Maybe	0.21

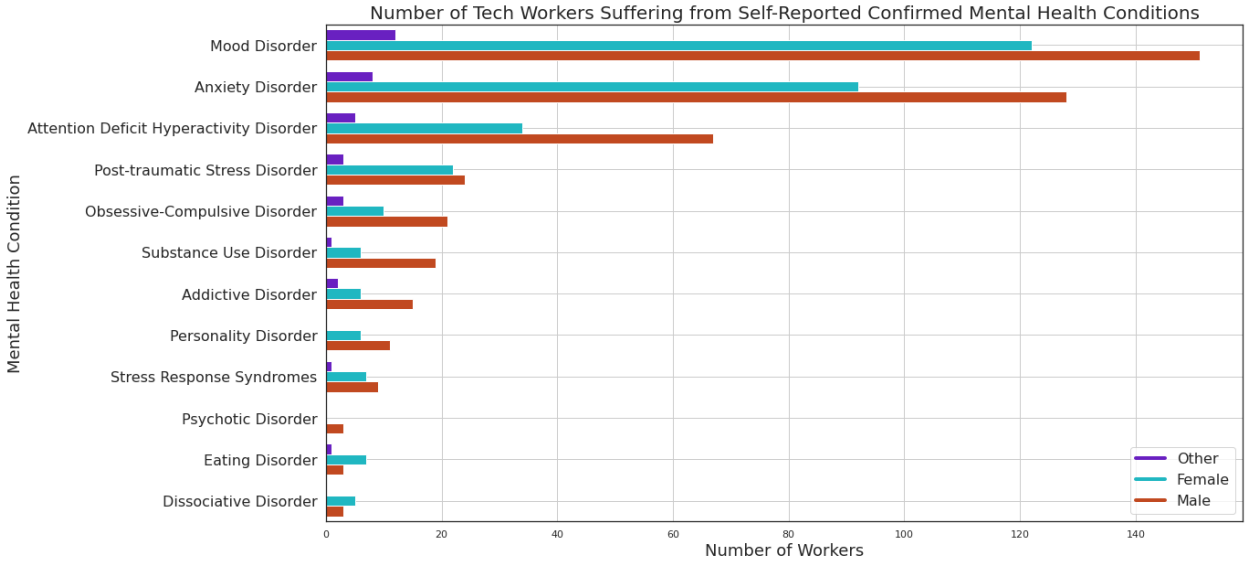
From the figure above we can see that there was no major difference between the two groups, but we can observe that despite the higher population there were generally less people that had mental health issues percentage-wise when it came to the employer-employed group. This could be because from the visualizations above it looks the experience for both are similar. The biggest factor of mental health based on the data available and the visualizations above in the workplace is the lack of awareness and uncertainty it brings. It would be very interesting to see what the distribution is like if both these groups were to have the same population sizes to see if this trend would stay the same where we can see that there is about a 50% chance of having a mental health disorder being self-employed.

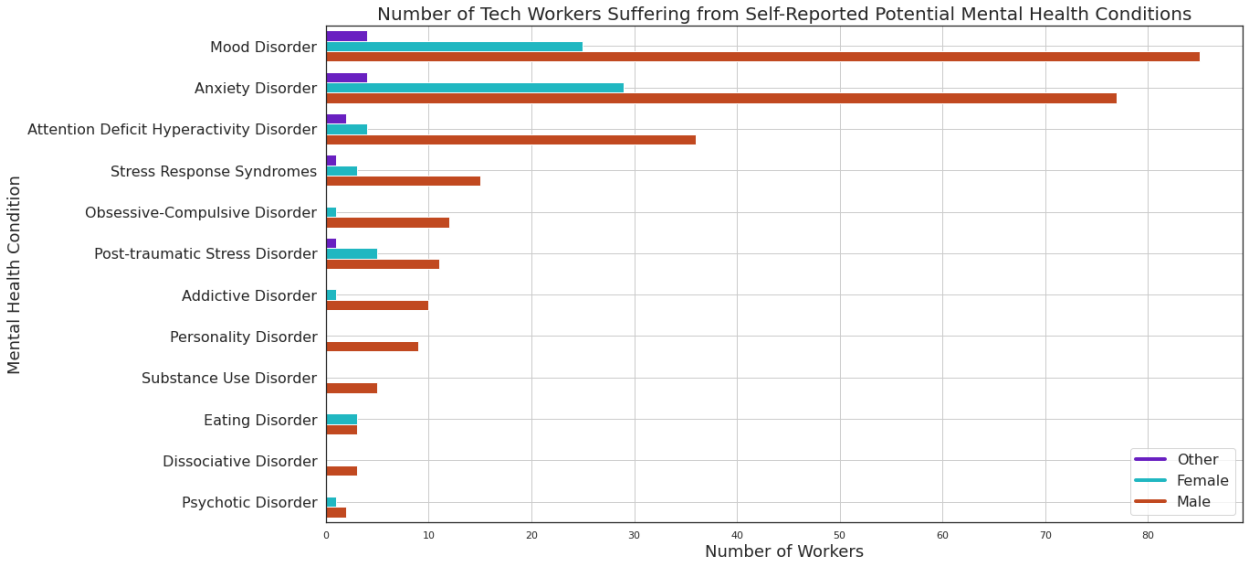
Conclusion

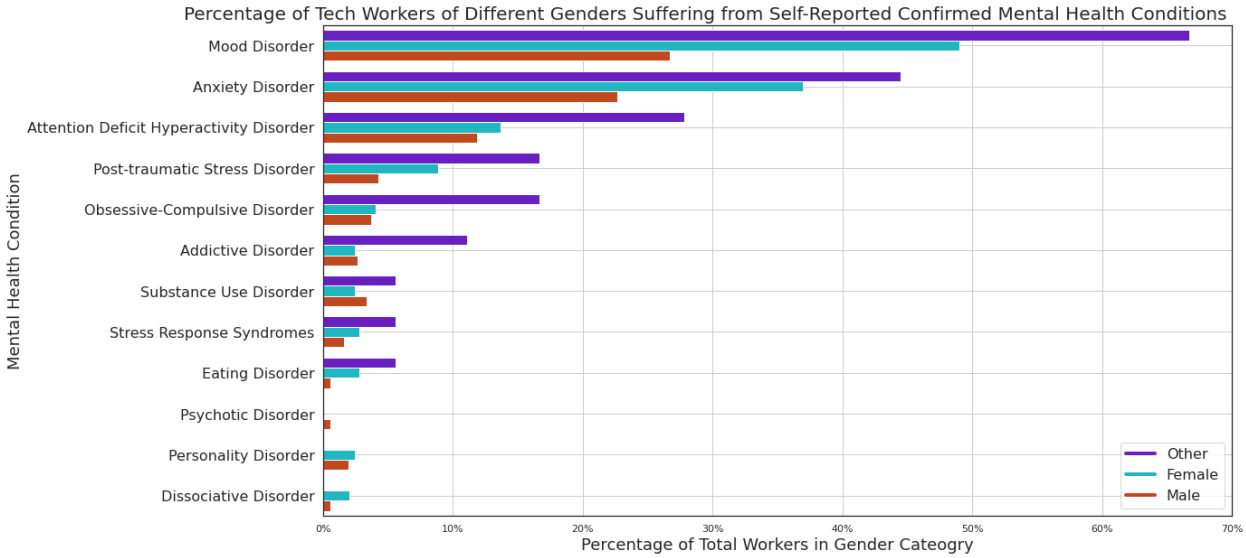
To conclude, our group really resonated with this data set, as we all currently work for tech companies in technical roles. The data explored here are data that we have insight on as people who have been in the field and who in some cases have had experiences when it comes to mental health. We really wanted to explore these three research questions and try to converge. Something to note from each section is that awareness is a common denominator found in each of the three sections of the analysis. Many workers in tech are unaware of the resources and treatment options available to them, and a lack of comfort with being open about mental health issues is pervasive in the industry. A large number of workers remain unaware of whether or not they have a mental health condition or whether they might have a family history that could put them at increased risk. Additionally, we can see that there may be an unequal mental health burden across demographic groups. This highlights the importance of ensuring that everyone is aware of every group out there that needs this support. There is definitely more work to be done, but even having this dataset available can make people more aware of these issues and help individuals remove their uncertainties on the issue of mental health disorders.

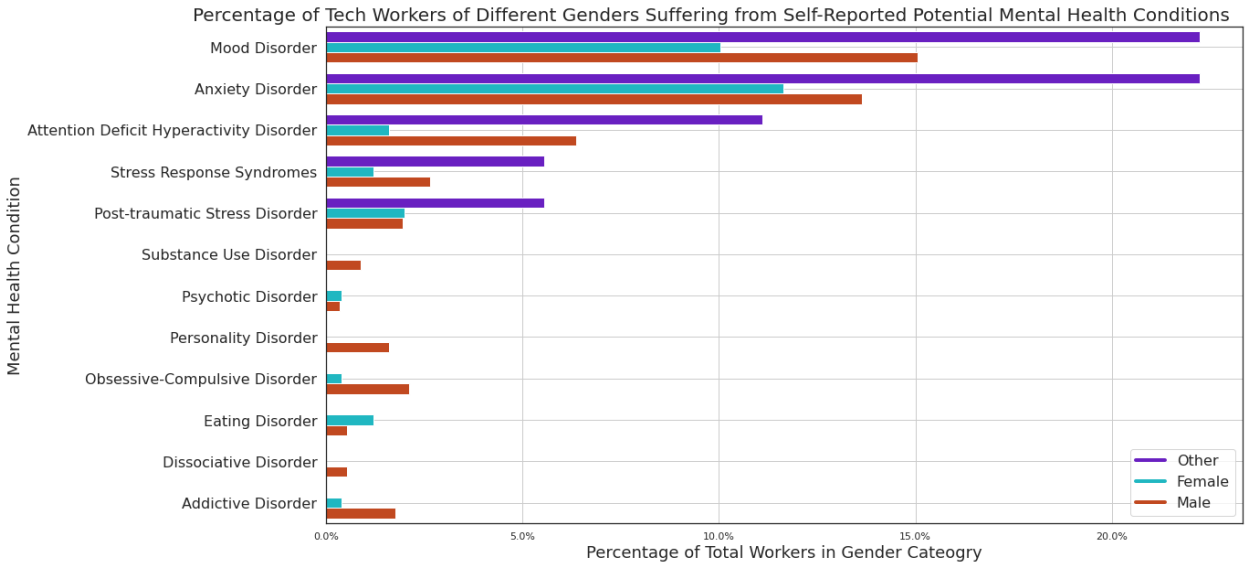
Appendix

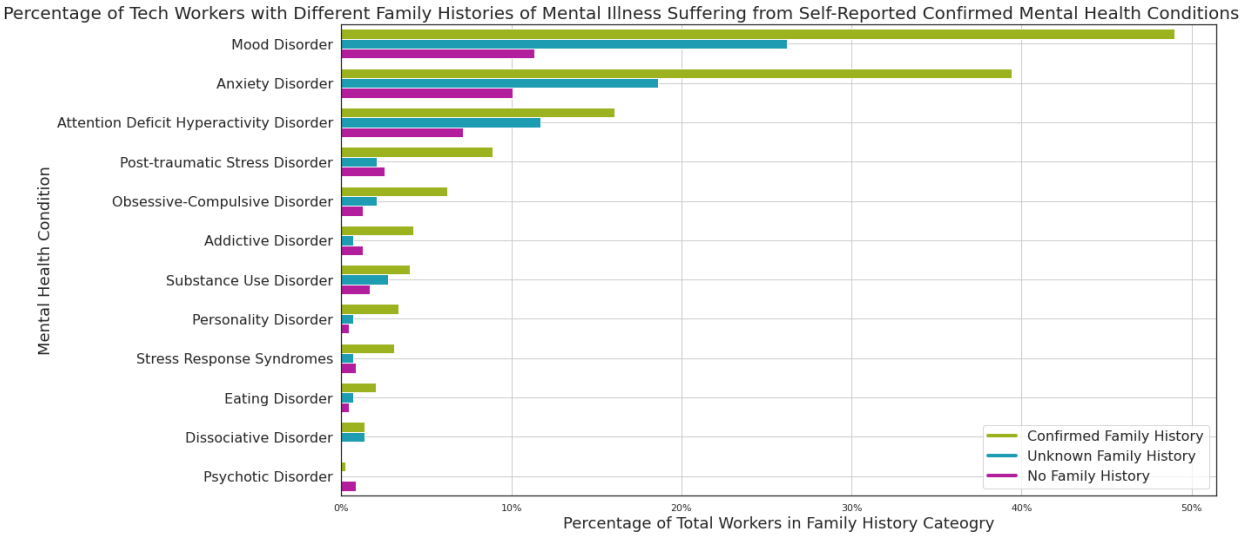
Unstacked Graphs Comparing Confirmed vs. Potential Mental Health Conditions:

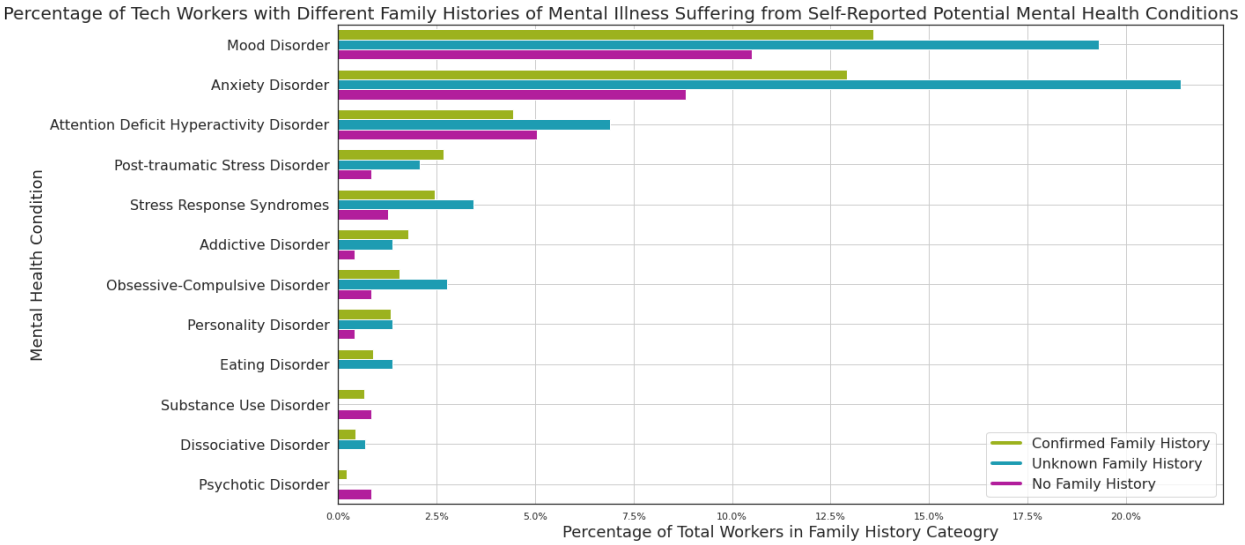





Percentage of Tech Workers of Different Genders Suffering from Self-Reported Confirmed Mental Health Conditions
Mood Disorder
Anxiety Disorder
Attention Deficit Hyperactivity Disorder
Post-traumatic Stress Disorder
Obsessive-Compulsive Disorder
Addictive Disorder
Substance Use Disorder
Stress Response Syndromes
Eating Disorder
Psychotic Disorder
Personality Disorder
Dissociative Disorder
Mental Health Condition
Other
Female
Male
0%
10%
20%
30%
40%
50%
60%
70%
Percentage of Total Workers in Gender Cateogry


Percentage of Tech Workers of Different Genders Suffering from Self-Reported Potential Mental Health Conditions
Mood Disorder
Anxiety Disorder
Attention Deficit Hyperactivity Disorder
Stress Response Syndromes
Post-traumatic Stress Disorder
Substance Use Disorder
Psychotic Disorder
Personality Disorder
Obsessive-Compulsive Disorder
Eating Disorder
Dissociative Disorder
Addictive Disorder
Mental Health Condition
Other
Female
Male
0.0%
5.0%
10.0%
15.0%
20.0%
Percentage of Total Workers in Gender Cateogry





Gender Segmentation Regexes:

Female	(f|fm|fem|.*m(t|2)f.*|(.*\b(i'm|am|is|identify as) (an?)?)?((cis|trans)(gender)?)?(|-)?(female|woman|girl)(/(female|woman|girl))*(\(.+\)| why.*)?)[^\w\s]*
Male	(m|malr|mail|.*f(t|2)m.*|(.*\b(i'm|am|is|identify as) (an?)?)?((cis|trans)(gender)?)?(|-)?(male|man|dude|guy)(/(male|man|dude|guy))*(\(.+\)| why.*)?)[^\w\s]*
Other	All cases not matching one of the above

Survey Question to Column Name Remapping:

Survey Question	**Encoded Column Name**	**Column Data Values**
Are you self-employed?	self_employed	boolean: 0, 1
How many employees does your company or organization have?	emp_num_employees	selection: "1-5", "6-25", "26-100", "100-500", "500-1000", "More than 1000"
Is your employer primarily a tech company/organization?	emp_org_tech	boolean: 0, 1
Is your primary role within your company related to tech/IT?	emp_role_tech	boolean: 0, 1
Does your employer provide mental health benefits as part of healthcare coverage?	emp_mh_coverage	selection: "Yes", "No", "I don't know", "Not eligible for coverage / N/A"
Do you know the options for mental health care available under your employer-provided coverage?	emp_mh_coverage_knowledge	selection: "Yes", "No", "I am not sure", "N/A"
Has your employer ever formally discussed mental health (for example, as part of a wellness campaign or other official communication)?	emp_mh_communication	selection: "Yes", "No", "I don't know"
Does your employer offer resources to learn more about mental health concerns and options for seeking help?	emp_mh_resources	selection: "Yes", "No", "I don't know"
Is your anonymity protected if you choose to take advantage of mental health or substance abuse treatment resources provided by your employer?	emp_mh_anonymity	selection: "Yes", "No", "I don't know"
If a mental health issue prompted you to request a medical leave from work, asking for that leave would be:	emp_mh_leave_ease	selection: "Very easy", "Somewhat easy", "Neither easy nor difficult", "Somewhat difficult", "Very difficult", "I don't know"
Do you think that discussing a mental health disorder with your employer would have negative consequences?	emp_mh_consequences	selection: "Yes", "No", "Maybe"

Do you think that discussing a physical health issue with your employer would have negative consequences?	emp_ph_consequences	selection: "Yes", "No", "Maybe"
Would you feel comfortable discussing a mental health disorder with your coworkers?	emp_mh_comfort_coworkers	selection: "Yes", "No", "Maybe"
Would you feel comfortable discussing a mental health disorder with your direct supervisor(s)?	emp_mh_comfort_supervisor	selection: "Yes", "No", "Maybe"
Do you feel that your employer takes mental health as seriously as physical health?	emp_mh_ph_equal	selection: "Yes", "No", "I don't know"
Have you heard of or observed negative consequences for co-workers who have been open about mental health issues in your workplace?	emp_mh_consequences_coworkers	selection: "Yes", "No"
Do you have medical coverage (private insurance or state-provided) which includes treatment of mental health issues?"	self_mh_coverage	boolean: 0, 1
Do you know local or online resources to seek help for a mental health disorder?	self_mh_resources_knowledge	selection: "Yes, I know several", "I know some", "No, I don't know any"
If you have been diagnosed or treated for a mental health disorder, do you ever reveal this to clients or business contacts?	self_mh_disclosure_external	selection: "Yes, always", "Sometimes, if it comes up", "No, because it doesn't matter", "No, because it would impact me negatively", "Not applicable to me"
If you have revealed a mental health issue to a client or business contact, do you believe this has impacted you negatively?	self_mh_disclosure_external_consequences	selection: "Yes", "No", "I'm not sure", "N/A"
If you have been diagnosed or treated for a mental health disorder, do you ever reveal this to coworkers or employees?	self_mh_disclosure_internal	selection: "Yes, always", "Sometimes, if it comes up", "No, because it doesn't matter", "No, because it would impact

		me negatively", "Not applicable to me"
If you have revealed a mental health issue to a coworker or employee, do you believe this has impacted you negatively?	self_mh_disclosure_internal_consequences	selection: "Yes", "No", "I'm not sure", "Not applicable to me"
Do you believe your productivity is ever affected by a mental health issue?	self_mh_productivity	selection: "Yes", "No", "Unsure", "Not applicable to me"
If yes, what percentage of your work time (time performing primary or secondary job functions) is affected by a mental health issue?	self_mh_productivity_percent	selection: "1-25%", "26-50%", "51-75%", "76-100%"
Do you have previous employers?"	prev_emp	boolean: 0, 1
Have your previous employers provided mental health benefits?"	prev_emp_mh_coverage	selection: "Yes, they all did", "Some did", "No, none did", "I don't know"
Were you aware of the options for mental health care provided by your previous employers?	prev_emp_mh_coverage_knowledge	selection: "Yes, I was aware of all of them", "I was aware of some", "No, I only became aware later", "N/A (not currently aware)"
Did your previous employers ever formally discuss mental health (as part of a wellness campaign or other official communication)?	prev_emp_mh_communication	selection: "Yes, they all did", "Some did", "None did", "I don't know"
Did your previous employers provide resources to learn more about mental health issues and how to seek help?	prev_emp_mh_resources	selection: "Yes, they all did", "Some did", "None did"
Was your anonymity protected if you chose to take advantage of mental health or substance abuse treatment resources with previous employers?	prev_emp_mh_anonymity	selection: "Yes, always", "Sometimes", "No", "I don't know"
Do you think that discussing a mental health disorder with	prev_emp_mh_consequences	selection: "Yes, all of them", "Some of them", "None of them", "I don't know"

previous employers would have negative consequences?		
Do you think that discussing a physical health issue with previous employers would have negative consequences?	prev_emp_ph_consequences	selection: "Yes, all of them", "Some of them", "None of them"
Would you have been willing to discuss a mental health issue with your previous co-workers?	prev_emp_mh_comfort_coworkers	selection: "Yes, at all of my previous employers", "Some of my previous employers", "No, at none of my previous employers"
Would you have been willing to discuss a mental health issue with your direct supervisor(s)?	prev_emp_mh_comfort_supervisor	selection: "Yes, at all of my previous employers", "Some of my previous employers", "No, at none of my previous employers", "I don't know"
Did you feel that your previous employers took mental health as seriously as physical health?"	prev_emp_mh_ph_equal	selection: "Yes, they all did", "Some did", "None did", "I don't know"
Did you hear of or observe negative consequences for co-workers with mental health issues in your previous workplaces?	prev_emp_mh_consequences_coworkers	selection: "Yes, all of them", "Some of them", "None of them"
Would you be willing to bring up a physical health issue with a potential employer in an interview?"	interview_ph_disclosure	selection: "Yes", "Maybe", "No"
Why or why not?	interview_ph_disclosure_reason	free text
Would you bring up a mental health issue with a potential employer in an interview?	interview_mh_disclosure	selection: "Yes", "Maybe", "No"
Why or why not?.1	interview_mh_disclosure_reason	free text
Do you feel that being identified as a person with a mental health issue would hurt your career?	mh_hurt_career	selection: "Yes, it has", "Yes, I think it would", "Maybe", "No, I don't think it would", "No, it has not"
Do you think that team members/coworkers would view you more negatively if they	mh_negative_coworkers	selection: "Yes, they do", "Yes, I think they would", "Maybe", "No, I don't think they would", "No, they do not"

knew you suffered from a mental health issue?		
How willing would you be to share with friends and family that you have a mental illness?	mh_disclosure_friends_family	selection: "Very open", "Somewhat open", "Neutral", "Somewhat not open", "Not open at all", "Not applicable to me (I do not have a mental illness)"
Have you observed or experienced an unsupportive or badly handled response to a mental health issue in your current or previous workplace?	mh_negative_workplace_exp	selection: "Yes, I experienced", "Yes, I observed", "Maybe/Not sure", "No", "N/A"
Have your observations of how another individual who discussed a mental health disorder made you less likely to reveal a mental health disorder?	mh_observations_deter_disclosure	selection: "Yes", "Maybe", "No", "N/A"
Do you have a family history of mental illness?	mh_disorder_family	selection: "Yes", "No", "I don't know"
Have you had a mental health disorder in the past?	mh_disorder_past	selection: "Yes", "Maybe", "No"
Do you currently have a mental health disorder?	mh_disorder_current	selection: "Yes", "Maybe", "No"
If yes, what condition(s) have you been diagnosed with?	mh_disorder_confirmed	multi-selection with free-text: 'Addictive Disorder', 'Anxiety Disorder (Generalized, Social, Phobia, etc)', 'Attention Deficit Hyperactivity Disorder', 'Dissociative Disorder', 'Eating Disorder (Anorexia, Bulimia, etc)', 'Mood Disorder (Depression, Bipolar Disorder, etc)', 'Obsessive-Compulsive Disorder', 'Personality Disorder (Borderline, Antisocial, Paranoid, etc)', 'Post-traumatic Stress Disorder', 'Psychotic Disorder (Schizophrenia, Schizoaffective, etc)',

		'Stress Response Syndromes', 'Substance Use Disorder'
If maybe, what condition(s) do you believe you have?	mh_disorder_potential	multi-selection with free-text: 'Addictive Disorder', 'Anxiety Disorder (Generalized, Social, Phobia, etc)', 'Attention Deficit Hyperactivity Disorder', 'Dissociative Disorder', 'Eating Disorder (Anorexia, Bulimia, etc)', 'Mood Disorder (Depression, Bipolar Disorder, etc)', 'Obsessive-Compulsive Disorder', 'Personality Disorder (Borderline, Antisocial, Paranoid, etc)', 'Post-traumatic Stress Disorder', 'Psychotic Disorder (Schizophrenia, Schizoaffective, etc)', 'Stress Response Syndromes', 'Substance Use Disorder'
Have you been diagnosed with a mental health condition by a medical professional?	mh_diagnosed	selection: "Yes", "No"
If so, what condition(s) were you diagnosed with?	mh_diagnosis	multi-selection with free text: 'Addictive Disorder', 'Anxiety Disorder (Generalized, Social, Phobia, etc)', 'Attention Deficit Hyperactivity Disorder', 'Dissociative Disorder', 'Eating Disorder (Anorexia, Bulimia, etc)', 'Mood Disorder (Depression, Bipolar Disorder, etc)', 'Obsessive-Compulsive Disorder', 'Personality Disorder (Borderline, Antisocial, Paranoid, etc)', 'Post-traumatic Stress Disorder', 'Psychotic Disorder (Schizophrenia, Schizoaffective, etc)',

		'Stress Response Syndromes', 'Substance Use Disorder'
Have you ever sought treatment for a mental health issue from a mental health professional?	mh_treatment	boolean: 0, 1
If you have a mental health issue, do you feel that it interferes with your work when being treated effectively?	mh_interfere_treated	selection: "Often", "Rarely", "Sometimes", "Never", "Not applicable to me"
If you have a mental health issue, do you feel that it interferes with your work when NOT being treated effectively?	mh_interfere_untreated	selection: "Often", "Rarely", "Sometimes", "Never", "Not applicable to me"
What is your age?	age	numeric: > 0
What is your gender?	gender	free text
What country do you live in?	live_country	selection
What US state or territory do you live in?	live_state	selection
What country do you work in?	work_country	selection
What US state or territory do you work in?	work_state	selection
Which of the following best describes your work position?	work_type	multi-selection: 'Back-end Developer', 'Designer', 'Dev Evangelist/Advocate', 'DevOps/SysAdmin', 'Executive Leadership', 'Front-end Developer', 'HR', 'One-person shop', 'Other', 'Sales', 'Supervisor/Team Lead', 'Support'
Do you work remotely?	work_remote	selection: "Always", "Sometimes", "Never"