Pittsburgh

CODE & SUPPLY Co.

2022-2023 Compensation Survey Results

2022–2023 Compensation Survey Results and Analysis[1]

presented by Code & Supply

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[1]Thank you to the rest of C&S Compensation Survey Working Group and the many other members of the team--survey channel of the C&S Slack workspace. Thank you especially to our draft reviewers, Sarah Withee and Philip Kyler.

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Chapter 1

Introduction

This survey and resulting analysis aim to capture a snapshot of technology workers' compensation and lifestyle. The questions asked in the survey focused primarily on compensation and benefits but also involved other data points to answer these primary questions:

- What is the average compensation of a tech worker?
- Given the amount of training and experience, how much and in what ways can a tech worker expect to earn in their city?
- How are tech workers compensated beyond salary?
- Where do they live and work? Where are the tech booms?
- How much of their day do they spend traveling between work and home?
- What do these tech workers do at work?
- Where did they learn their skills?

This document attempts to answer the above questions without uniquely identifying any survey respondent.

1.1 Aims

We aim to equip professional and aspiring tech workers to make data-driven decisions about their careers.

We also want to provide information to those establishing budgets and negotiating offers on behalf of their companies so that they can offer a reasonable compensation package from the start of negotiation with tech workers.

Code & Supply Company, LLC (C&S) was the primary conductor of this survey and publisher of this analysis report. C&S will also use this data to improve its programming. See sec. 1.7 for more information about C&S.

We are open to suggestions to improve subsequent editions of this report, including new sections and new visualizations.

1.2 Methodology

This report is the third such that C&S produced since 2017. This cycle's all-volunteer survey development team first convened in April 2022. Initial meetings focused on developing questions and hypotheses. This development included brainstorming new questions, creating hypotheses, organizing meetings, dividing tasks, checking questions for bias and consistency, and eliminating questions.

The group reviewed questions from the previous cycle, 2020. We wanted to keep valuable questions yet decrease the length, as the 2020 survey's 70+ questions required significant time investment. It also made

analysis challenging.

The survey team decided to use surveys platform Typeform[1] again as it provided a lauded user experience for 2020.

The group took the survey dozens of times to catch any problems and posted it in our C&S Slack channel `#team--survey` to get feedback from others. We analyzed each question's wording before releasing the survey, including the type of question and the potential answers.

We then opened the survey for responses for a three-month timeframe between May & August 2022.

Once the response period ended, the team cleaned data, reviewing the previous cycle's graphs to see what was needed and to select a style. We used the outputs of this analysis to design charts and ultimately implement a significant data analysis and writing pipeline.

1.3 History

The first survey effort emerged from conversations during C&S Build Night spontaneous coworking sessions in Pittsburgh in late 2016. Launched in 2017, the inaugural C&S Compensation Survey was largely a one-person effort with input from dozens of C&S members. 256 people, mostly C&S Slack members, responded. The report was limited to a pair of blog posts. After some false starts in the intervening years, finally, in January 2020, we initiated the Compensation Survey Working Group. We launched the survey collection drive coincident with the onset of the COVID-19 pandemic in the United States, where C&S is based in Pittsburgh, Pennsylvania. We had 785 valid responses and produced a 107-page report.

In 2022, we launched again, but with a clearer long-term vision, a more focused set of questions, and the intent to build a reusable and mostly automated analysis pipeline for our 781 valid responses.

1.4 Privacy

Neither raw response nor cleaned data are available for purchase, not even in aggregate form. The raw response data is not shared outside the C&S surveys team. C&S respects survey respondents' financial privacy.

We generally avoid analysis on datasets with fewer than ten qualifying respondents and aim for 30 responses for statistically significant analysis.

1.5 How You May Use This Report

With some restrictions, our survey reports are open for all to read and share. Individuals are welcome to use the insights gained to improve their lives. We ask that companies and organizations that find our survey reports useful and actionable become sponsors to fund our work.

Our survey results report are licensed for use under the terms of Creative Commons BY-NC-ND 4.0[2], which allows sharing but requires attribution and prohibits commercial use and derivatives. Please review the license text at the beginning of the report.

Contact C&S if you want to use our survey report for commercial purposes, such as using our data to influence individual or organization-wide compensation decisions. Corporate generosity does right by the community to enable those who give freely of their time, as that which is freely given is not without cost.

[1] https://typeform.com
[2] https://creativecommons.org/licenses/by-nc-nd/4.0

1.6 Contributors

C&S volunteers conducted this survey and analysis. C&S paid the principal volunteers an honorarium, but this report was no one's full- or part-time job. Tbl. 1.1 lists the primary contributors.

Table 1.1: Contributors to this report

Name	Primary Role(s)
Yvette Menase	Director, Project Manager, and Writer
Alex Zharichenko	Lead Statistical Data Analyst
Colin Dean	Writing, Pipeline Development, Marketing, Typesetting, Sponsor Outreach

Other contributors in the various phases of the project included:

- Stephen Gross
- Philip Kyler
- Sarah Withee

See sec. 1.8 for entities that provided financial and promotional support. See sec. 17 for technical notes about typesetting and attributions. While most of the analysis is first-party, see sec. 18 for works cited herein.

1.7 About Code & Supply

Figure 1.1: Code & Supply "Imprint" logo

Code & Supply Co. (C&S) is Pittsburgh's premiere community of software professionals and those who aspire to build software for themselves or others. Founded in 2013 and formalized in 2014, C&S hosts events of interest to all involved in creating, selling, maintaining, and deploying software to solve real problems or amuse fellow developers, designers, engineers, etc.

C&S membership is free and open to anyone who interacts with C&S in any form, whether through in-person events or online communities. Paid membership supports our operational costs and helps us afford our Workspace and Community Center, Pittsburgh's only software-focused – but not software *exclusive* – coworking space and meeting facility. C&S hosts its events in this space on the border of Pittsburgh's East Liberty and Friendship neighborhoods and hosts nearly a dozen other groups' events in the space, as well.

C&S works with companies, too. Most of our interaction with companies as sponsors for our conferences – Abstractions[3], Heartifacts[4], and Uptime[5] – or for our efforts such as this survey. See sec. 1.8.2 for how you can sponsor!

We love to work with companies that want to stand out in the Pittsburgh and Rust Belt software communities. C&S members are conscientious people actively engaged in learning their craft and becoming better coworkers, friends, and humans.

[3] https://abstractions.io
[4] https://heartifacts.codeandsupply.co
[5] https://uptime.events

1.8 Sponsorship

Sponsorship helps us cover costs, pay our survey team an honorarium, and fund some C&S operations during survey time. Sponsorship also helps us promote the survey to a broad audience, which increases in size each time we conduct the survey.

1.8.1 Sponsors of this cycle's report

We thank these illustrious sponsors for their financial and promotional support of this survey, its team, and the C&S audience: everyone involved in the software world. We appreciate their recognition of the importance of talking about compensation.

- devrelate.io[6] (fig. 1.2)
- Truefit[7] (fig. 1.3)
- Technical.ly[8] (fig. 1.4)
- Rust Built[9] (fig. 1.5)
- Women in Tech PGH[10] (fig. 1.6)

Figure 1.2: Logo of sponsor devrelate.io

Figure 1.3: Logo of sponsor Truefit

Figure 1.4: Logo of sponsor Technical.ly

1.8.2 Becoming a Sponsor

C&S uses sponsorship revenue to promote the survey and the report, for excellent commercial survey tools, and to pay our volunteers an honorarium for their hard work. Sponsorship opportunities for future surveys are ongoing. Contact us at `sponsorship@codeandsupply.co` for more information. If you're interested in also helping financially support C&S, talk to us about it.

C&S is protective of its membership and its data. We treat collected data how we would want our data to be treated. Sponsors of the C&S Compensation Survey do not receive the raw data, do not influence the questions asked beyond optional participation in the C&S Compensation Survey working group as peers in the industry, and receive no non-public results analysis.

[6] https://www.devrelate.io
[7] https://www.truefit.io
[8] https://technical.ly
[9] https://rustbuilt.org/
[10] https://witpgh.org

Figure 1.5: Logo of sponsor Rust Built

Figure 1.6: Logo of sponsor Women in Tech PGH

1.9 How to get involved with the next survey

We have conducted the survey every few years so far. That is, in 2017, 2019 [11], 2020, and 2022. We will conduct it more frequently if we can secure recurring funding.

A start is generally the announcement of forming a Compensative Survey Working Group on our Meetup, chat, email, and social media channels. From there, we identify contributors, staff, promoters, potential sponsors, and others who will drive the survey.

To get involved, follow `@codeandsupply` on social media, join the mailing list[12] and chat[13], and keep your eyes peeled and ears to the ground for the flashes and rumblings of the next survey working group announcement.

In C&S Slack chat, join the channels `#team--survey` and `#compensation-survey-results` for the team and public chatter, questions, errata discussion, and more.

If you find a problem in *this* document, please see sec. 2 for how to let us know.

[11] We halted the 2019 survey in late 2018 due to unfortunate circumstances resulting in team unavailability.
[12] https://codeandsupply.co/#mailing-list
[13] https://codeandsupply.co/chat

Chapter 2

Changelog & Errata

This chapter tracks changes since the original release of this document. This report is the culmination of more than a year of hard work by nearly a dozen volunteers to report on the lives of their fellow software professionals. We consider this document to be of quality, but as volunteers, it is also a "best effort" guide. We will address as a team any problems that arise as quickly as our schedules allow.

2.1 How to Report a Problem or Suggest a Change

If you discover an error or would like to suggest something as small as a rewording or as large as a new section, let us know at survey@codeandsupply.co[1]. We will credit you in sec. 2.2 or sec. 2.3 if we change the document based on your input.

Always include the version number from the title page, the page number, and the nearest section header text. These coordinates help us find it in the source code more quickly.

2.1.1 What to Look For

As with any multi-author work, some sections may read slightly differently from others. This is OK! We have some style conventions and desire to ensure the entire document meets these standards.

1. Style consistency
    a. Numbers written out: $143,000 OK, $143k BAD
    b. Percentages written out when at the beginning of a paragraph, e.g. Ten percent OK, 10% BAD
2. Cross-reference, glossary, or figure embedding markup errors
    a. No "fig. **??**" or "sec. **??**" or "tbl. **??**" indicating a bad cross-reference.
    b. No `(+SOMETHING)` indicating a bad glossary reference.
    c. Floating sentences that read like captions mean a graphic is missing.
3. "People" should refer to everyone while "respondents" refers to people who took the survey.
4. Additional glossary terms or term that are in the glossary but unhighlighted, indicating missing glossary reference markup in the document source code.
5. Tense consistency
6. No contractions
7. "Significant" written without a number to back it up

[1] mailto:survey@codeandsupply.co

2.2 Changelog

2.2.1 2024.3.10.0 - March 10, 2024

- Added a paragraph to sec. 12.4.2 about the Kalzumeus salary negotiation article as a service to readers. Thank you to Mick Bransfield for the suggestion.
- Fixes author names in one of the references listings.

2.2.2 2023.6.20.0 - June 20, 2023

- Initial public release.

2.2.3 2023.6.22.0 - June 22, 2023

- Fixed a chart cross-reference bug in sec. 8.3.
- Inlined a table with the number of transgender respondents in sec. 5.1.
- Fixed a bug in sec. 17 and added minor things to it.
- Fixed a typo in sec. 5.
- Clarifies paragraphs in secs. 8.5, 9.1.
- Fixes figure partially obscured titles in several figures: figs. 12.11, 16.1, 10.2, 8.12, 12.12
- Adds authors to several bibliography entries in sec. 18, fixing inline references, too.
- Removed an incomplete section in sec. 10.

2.2.4 2023.6.23.0 - June 23, 2023

- Removed a confusing sentence in the license's definition of "non-commercial" that was appended to the CC BY-NC-ND template. This report is licensed for non-commercial use, and we interpret that to include individuals but organizations that use this report to influence their decision-making are expected to become sponsors to receive a proper license to use the report.

2.2.5 2023.6.27.0 - June 27, 2023

- Renamed sec. 8.2 to include levels explicitly.
- Added fig. 8.8 in place of a table in sec. 8.2.
- Clarified that fig. 8.9 includes professional levels only.
- Adds "Working Remotely from Allegheny County" in sec. 15.3.

2.2.6 2023.6.29.0 - June 29, 2023

- Fixed chart titles in figs. 8.3, 15.1, 15.2, 15.3, 7.2.
- Use country names instead of ISO 3-letter codes in tbl. 15.1.

2.2.7 2023.6.29.1 - June 29, 2023

- Added a reference to sec. 1.9 in sec. 15.2. Thank you to reader **Matt C. Wilson** for pointing out a problem!

2.3 Errata

None.

2.3.1 Known problems

- Some box plots' annotations may overlap if the distance between labels is shorter than the length of the text. We have not found a way around this. Let us know if you're a Plotly annotations expert and want to help us figure it out.
- Some graphs may have an unreadable text box in the lower left corner. You can ignore this box, an artifact of some types of PDF output in Plotly.
- We omitted some sections from the first release: Interview Questions, much of Living & Commuting, and some sections and subsections of other chapters and sections. We will continue to polish these and release them as they are ready.
- Some citations use a link-style citation instead of a bibliographical reference. We will address this in a future release.

Chapter 3

Transparency and Caveats

We believe that we must take an open position when presenting these results. This means explaining our methods of promoting the survey, collecting responses, processing and cleaning responses, and analyzing the results.

Notably, participation in this survey was voluntary, and respondents self-reported their compensation data. Responses could be inflated or deflated. We acknowledge the effects of participation bias[1], self-selection bias[2], and response bias[3] on our data collection process.

We've taken care to remove from the data set any responses which seemed impossible. Sec. 3.2 lists most such actions and others. We encourage and welcome scrutiny of these methods, which is especially valuable when presented with suggested alternatives or methods for future surveys.

3.1 Promotional Effort

We promoted this survey through various channels in this non-exhaustive list:

- Code & Supply official channels
  - Social media (Twitter, Instagram, Facebook, Twitch, YouTube)
  - Slack chat community
  - Mailing lists
- Sponsor channels
  - Technical.ly social media (Twitter)
  - WITPGH mailing lists
  - Rust Built mailing lists
- Other communities in our team participates
  - /r/pittsburgh on reddit
  - Rands Leadership Slack chat community
  - Engineering Management Slack chat community
  - Tech By Choice Slack chat community
  - Women in Tech Slack chat community
  - Personal LinkedIn accounts
- Advertisements on social media paid for by C&S
  - Meta platforms Instagram and Facebook
  - Twitter
  - LinkedIn

[1] https://en.wikipedia.org/wiki/Participation_bias
[2] https://en.wikipedia.org/wiki/Self-selection_bias
[3] https://en.wikipedia.org/wiki/Response_bias

If you would like to help us promote the next survey cycle, we'd be happy to have you, as it is a challenging component of this effort for our team. Email surveys@codeandsupply.co[4] on behalf of yourself as someone who could help us post and nudge, or consider reading about our sponsorship opportunities in sec. 1.8.2 if you want to provide funding as an organization.

3.2 Data Cleaning Actions

Some questions allowed answers outside of what we expected due to oversight or misconfiguration. Others were needfully broad because we accepted the burden of needing to group responses later in the process. See also sec. 5.2 for notes about excluded responses not removed in manual cleaning.

[4] mailto:surveys@codeandsupply.co

Chapter 4

Conventions and Terms Used In This Document

If you are reading this document digitally, red text indicates a hypertext link that will scroll to a figure, table, section, glossary entry, or open a web browser to an external website.

We use several acronyms, initialisms, and more throughout this document. See the Glossary at the end of the report.

4.1 Example Charts and Diagrams

These are some examples of charts and diagrams used in this report.

Note that graph colors are seemingly random throughout this report. Graph color choices generally start with light red that tends to stand out when printed in color but be a gray that doesn't overuse ink when printed. We believe that the colors should be differentiable to readers with colorblindness but have relied on our plotting framework's colorsets for this accessibility feature. See sec. 2.1 if you find problems with the color scheme.

Fig. 4.1 shows a *box and whiskers* plot. We use this chart style to analyze a single range of numbers, like salaries or durations. Note the annotations showing the quartiles, median, minimum, maximum, and sometimes some others. Also, note the limitations and count under the title. Nearly all visualizations will list any restrictions placed on the data used to generate them. Generally, we limit data to make the chart easier to read or to respect our respondents' privacy (sec. 1.4).

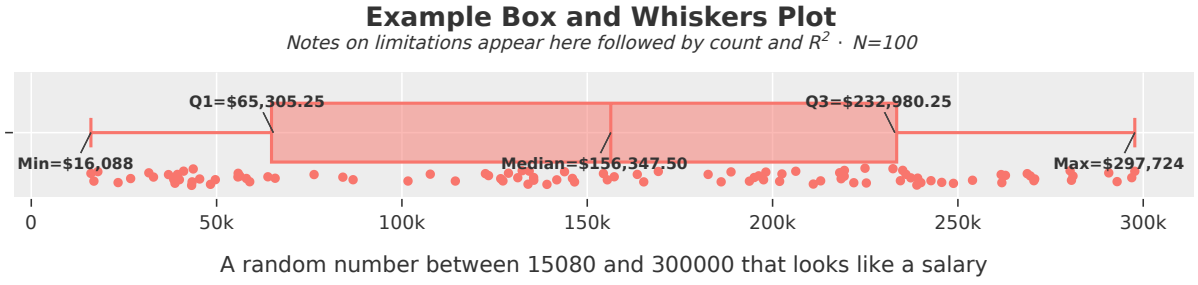


Figure 4.1: Example box and whiskers plot

Fig. 4.2 shows a *scatterplot* that compares two numerical responses. The numbers are randomly generated

for this example, so they probably will not make sense in the context of a salary versus years of experience. We have included trendlines, generally using Ordinary Least Squares (OLS) or Locally Weighted Scatterplot Smoothing (LOWESS) regression on graphs where appropriate. Note the OLS trendline and the R^2 figure on the subtitle in fig. 4.2.

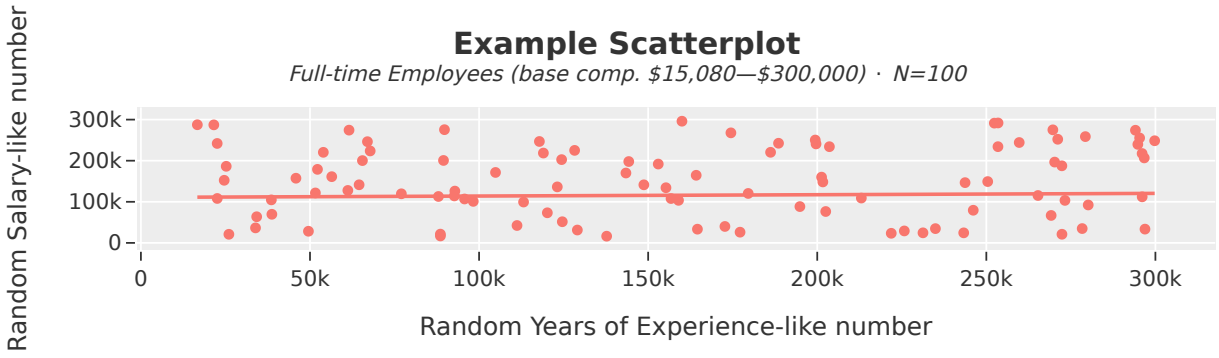


Figure 4.2: Example scatterplot

Fig. 4.3 shows a *histogram* for a randomly-generated satisfaction score. We generally use histograms to show frequency for a closed set of responses, such as a Likert scale satisfaction score, or buckets of open-end responses, like age groups (18-24, 25-35, etc.). Note the count on each bar.

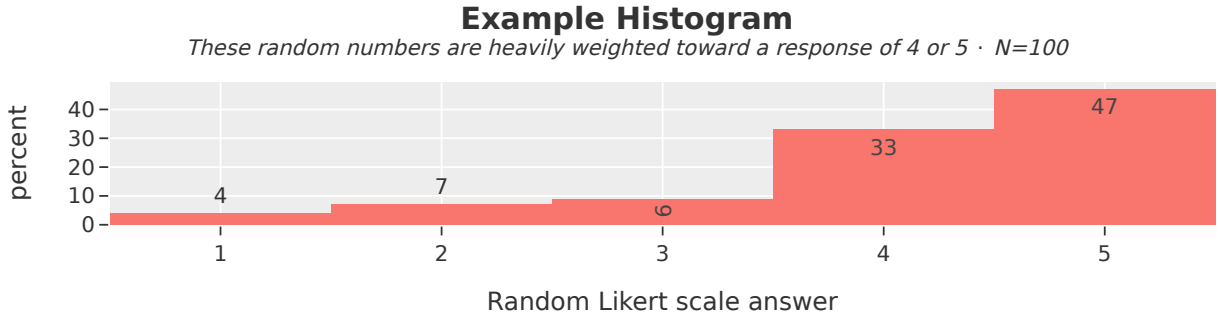


Figure 4.3: Example histogram

Fig. 4.4 shows a *treemap* for displaying percentages of a whole. We prefer treemaps to pie charts because they're generally easier to perceive the difference between rectangles' area than between a circles' sectors' area.

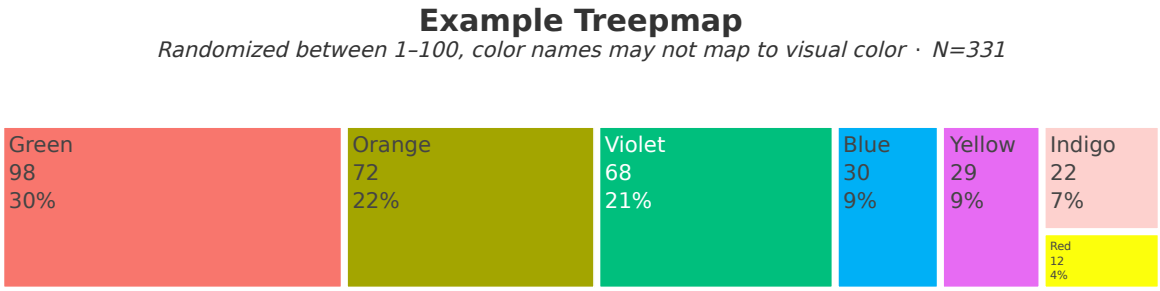


Figure 4.4: Example treemap

Chapter 5

Notes About This Cycle and Past

The 2017 survey analysis pipeline was a collection of Ruby scripts that generated tables imported into Apple Numbers to create graphs. This was a mostly unrepeatable process. In 2020, we used Tableau to generate the graphs. We found this was still a mostly manual process that was not easily automated or shared among our authors. While many readers appreciated the in-depth report, the resounding advice was that 107 pages were daunting despite the wealth of information.

For 2022, we committed to the content of the survey questions for the long term after reducing the number of questions asked to focus our analysis on the sections our readers felt most relevant to them. Keeping the data easily compared from survey to survey became an architectural value of the project. We built the graphs and analysis tooling as an internal data pipeline product developed primarily in Python with tools like Plotly for graphs and Polars for data manipulation. We are interested in doing more with location data related to where participants live and work, commutes, and any effect or impact on job satisfaction. We also aimed to keep the report shorter than 2020's 107 pages, reducing the time commitment from a whole day to an afternoon or evening. While we met this goal initially, by release time, we'd failed for a technical reason: we have more charts that occupy a whole page despite having fewer charts than 2020.

Despite the economic uncertainty caused by the pandemic, the tech industry continued to grow. In fact, according to the Bureau of Labor Statistics, the tech sector added 91,000 jobs in the first quarter of 2021 alone. The demand for tech talent was so high that some companies offered unprecedented perks and benefits to attract and retain employees.

However, as the pandemic has dragged on, many tech workers have become increasingly burnt out and disillusioned. The "great resignation" trend, in which employees are leaving their jobs in record numbers, has hit the tech industry particularly hard. In a 2022 survey Chen (2022), 80% of the 6,802 tech workers surveyed in March 2022 said they were considering leaving their current job, 57% had applied to another job within the last month, and 49% said they had interviewed with another company.

There are a number of factors driving the great resignation in tech. Media reports indicated many workers reported having been forced to work longer hours and take on heavier workloads during the pandemic, leading to burnout and fatigue. Others have reevaluated their priorities and decided they want a better work-life balance, more fulfilling work, or higher pay. The rise of remote work has also made it easier for workers to search for jobs outside their local area, increasing the competition for talent.

The great resignation has created a challenging job market for tech workers. While many job openings are still available, there is also fierce competition for those positions, especially with many tech companies announcing layoffs for 2023. To stand out in the crowded job market, tech workers may need to focus on developing in-demand skills, building their professional network, and crafting a strong personal brand.

By the time we distributed the survey in the summer of 2022, the job market had generally settled. However, we did ask about job changes and respective salary jumps.

5.1 Sample size

The total sample size for this survey is 784 respondents, with **781 valid responses**. See sec. 5.2 for the reason for the reduction. Inclusion into the survey data required at least two points of data: consent and reporting base salary. All other information was provided optionally. The majority responded to all questions analyzed. Fifteen respondents worked part time. Half of the respondents were between 32 and 41 years old, and only ten respondents were fifty-five years old or older.

Our survey reveals that tech workers of the minimum age, 18 years old, are employed in the industry. This indicates that individuals can enter the tech workforce at an early stage, laying the foundation for their professional growth. The first quartile, representing the 25th percentile of ages, is reported at 32 years. This means that 25% of tech workers fall within or below this age, while 75% are older. The median age, a pivotal point in our survey, is reported at 36 years. This implies that 50% of tech workers are younger than 36, while the other 50% are older. The third quartile indicates that 75% of tech workers are 41 years old or younger, while the remaining 25% are older. The survey results reveal a maximum age of 66 years. This shows that few respondents are working later in their careers. There are about 10 outliers excluded from this analysis.

Understanding the relationship between age and compensation can help you assess your own trajectory within the tech industry. It is important to note that compensation is influenced by various factors such as experience, skills, and job responsibilities, in addition to age. Therefore, this survey serves as a **general guideline rather than an absolute determinant of compensation** at different ages.

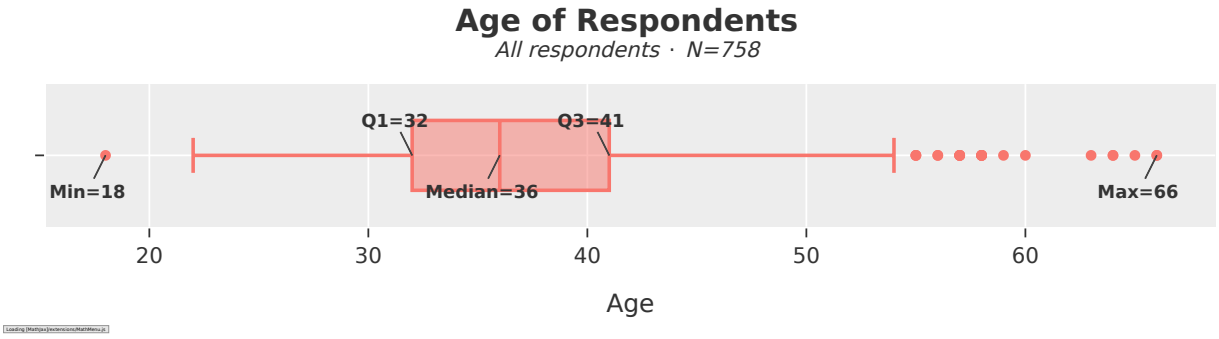


Figure 5.1: Age of Survey Respondents

We asked for gender as well to understand its relation to compensation, satisfaction, and more. Fig. 5.2 shows the responses. 72% of respondents identified as men, 24% as women, and 4% as non-binary, with a single respondent identifying as agender (the sliver in the chart). There were 30 transgender respondents.

5.2 Excluded responses

Three respondents provided responses that when considered together were nonsensical, such as free input responses indicative of keyboard mashing. This exclusion reduced number of analyzable responses to 781.

The top salary reported was $2,000,000, 2.4 times greater than the second highest salary. For this reason, it was excluded from many analyses involving salary. Salaries for part-time employees are not reported separately because the size of this group, 15, is too small to be representative.

Tbl. 5.1 lists some other limitations we placed on several analyses and visualizations in order to limit the potentially distortive effect of outliers.

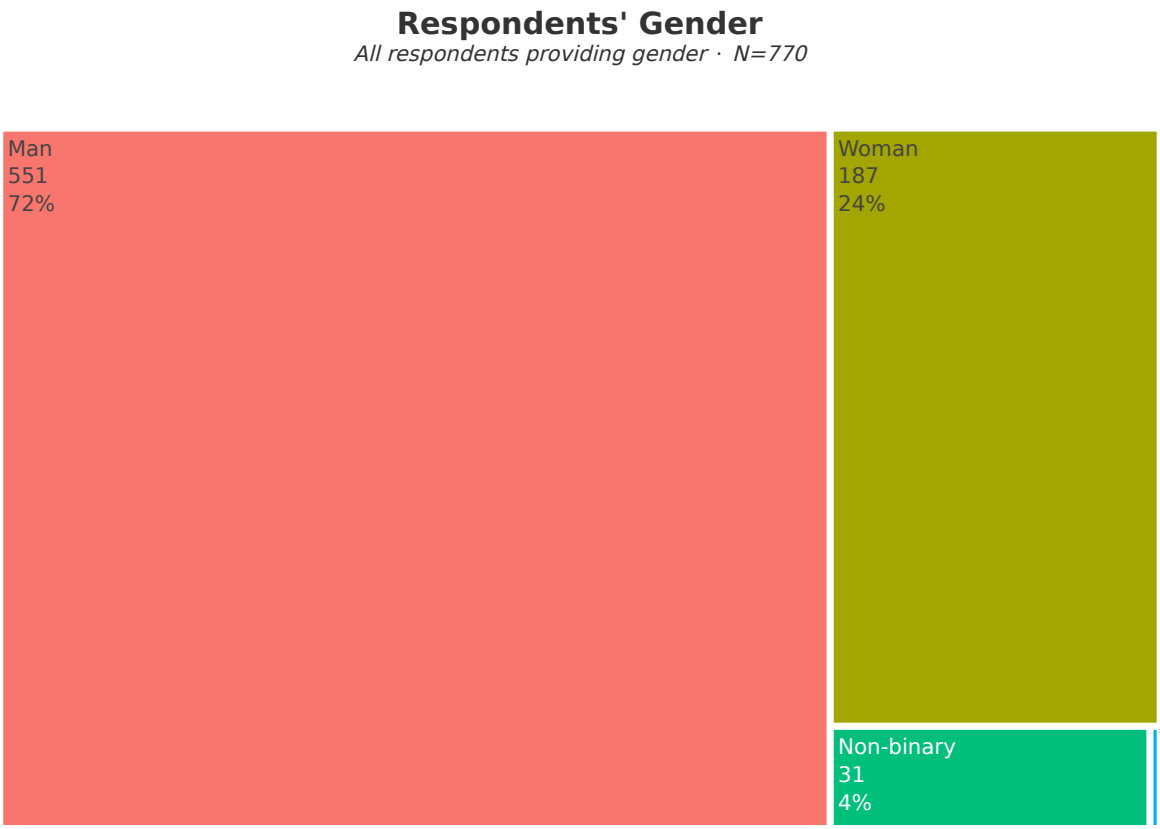


Figure 5.2: Gender of Respondents

Table 5.1: Limits on analysis for most graphs

Description	Value
Generalized maximum base compensation	$300,000
Generalized maximum expected total compensation	$400,000
US federal minimum wage	$7.25
Annual salary for full time minimum wage	$15,080

Chapter 6

Quick Takeaways

In this section, we've provided a series of quick takeaways to see metrics at a snapshot in time.

6.1 2022 data

Tbl. 6.1 shows most important observations from our response analysis for this cycle.

Table 6.1: Quick Takeaways for 2022

Metric	All respondents	Allegheny County respondents
Valid survey responses	781	462
Median Base Compensation (BC)	$140,000	$126,000
Median Total Compensation (TC)	$150,000	$133,834
First quartile mean BC	$100,000	$95,000
Mean Years of Experience (YoE)	12y 2m	11y 10m
Median YoE	10y	10y
Mean Years Tenure at Current Employer	3y 3m	3y 4m
Median Years Tenure at Current Employer	2y	2y

6.2 2020 data

Tbl. 6.2 shows similar data to tbl. 6.1, but from the 2020 C&S Compensation Survey Report, Dean et al. (2022).

Table 6.2: Quick Takeaways data from the 2020 C&S Compensation Survey Report

Metric	All respondents	Allegheny County respondents
Valid survey responses	785	436
Median BC	$117,000	$114,000
Median TC	$126,352	$127,000
First quartile mean BC	$75,000	$85,675
Mean YoE	10 years	11 years
Mean Years Tenure at Current Employer	3.16 years	3.58 years

Chapter 7

Basic Salary Analysis

Note: This section does not include respondents who reported no income, worked part-time, or had high salaries, considered outliers among respondents. See sec. 5.2 for more information.

The median Base Compensation (BC) for all respondents was $140,000, with an interquartile range of approximately $100,000 up to $172,000. The lowest response to the survey's only required question was $0, while the highest was over $2,000,000.

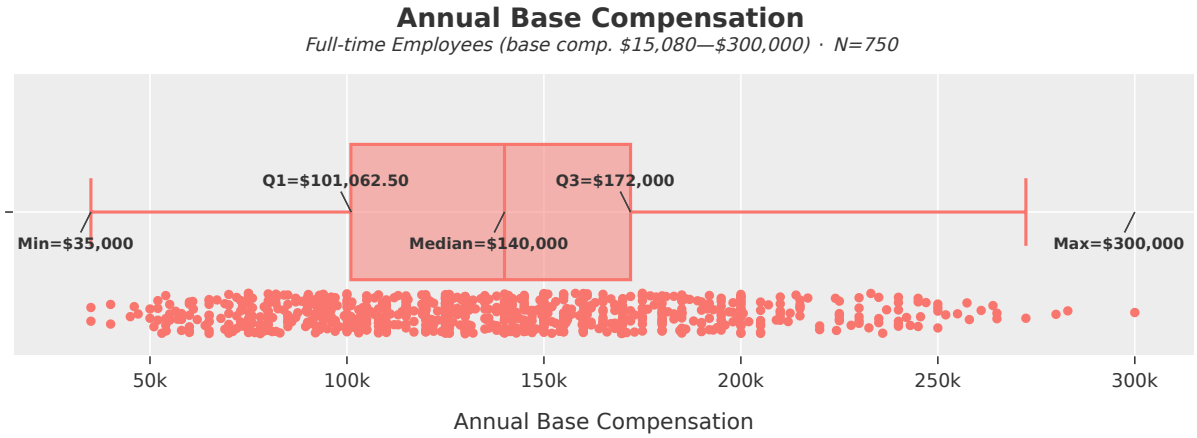


Figure 7.1: Annual Base Compensation, all responses

Code & Supply has members worldwide, but most of our responses were from our members in the United States. We want to set expectations within this report to reflect Cost of Living (CoL) differences when relevant.

Fig. 8.22 shows the range for respondents who reside inside and outside of Allegheny County, Pennsylvania, where 59% of respondents live. The median and interquartile range rises significantly but uniformly across the three key lines.

According to Numbeo (2022), Pittsburgh has a CoL Index of 80.90, with the baseline of 100.0 being New York City, San Francisco is 100.50, Seattle is 96.2, and Washington, D.C. is 84.80.

See sec. 8.6 for a comparison of nationwide versus Allegheny County data.

7.1 First Quartile: Our Ideal Starting Point for Entry-Level

C&S holds that the *first quartile* should be the target for software professionals entering the field with a four-year degree in computer science, computer engineering, design, or management information systems.

Tbl. 7.1 reflects the change in this metric across the years of the C&S Compensation Survey.

Table 7.1: First Quartile History 2017–2022

Year	First Quartile	Increase, annualized [1]
2022	$95,000	5.3%
2020	$85,675	6.88%
2017	$75,000	-

7.2 Looking into the Future

During the COVID-19 pandemic starting in December 2019, remote work became necessary. Our data in later sections reflect a rise in the number of remote workers in Allegheny County. As more tech workers consider moving to Allegheny County and other medium CoL areas to enjoy a more affordable lifestyle than in higher CoL areas, they can enjoy some of the benefits of salaries paid to those living in high CoL areas.

We intend for the survey and the corresponding report to empower job seekers to advocate for themselves in terms of pay. Under the *National Labor Relations Act* of 1935 (29 U.S.C. §§ 151-169), employees are allowed to discuss their salaries with other employees.

In the future, we'd like to track salaries in the states with salary disclosure laws, specifically the higher-encompassing ones such as Colorado, with its *Equal Pay for Equal Work Act* (2021). According to Zippia[2], some other states also have laws requiring disclosure at different parts of the interview cycle.

Here are some of them, while fig. 7.2 shows the current state nationwide as of January 2023.

- Connecticut: House Bill 6380 (2021) – *only by request*
- Maryland: Equal Pay for Equal Work Act (2016/2020) - *provides salary info by request*
- Nevada: Senate Bill 293 (2021) – *automatic report after first round*
- New Jersey: Jersey City - Ordinance Amending Chapter 148
- New York: New York City and Ithaca: Senate Bill 9427 (2022)
- Ohio: Toledo and Cincinnati: Pay Equity Act (2021)
- Pennsylvania: Title 9 – *applies to state agencies only*
- Rhode Island: Equal Pay Law (2021, in effect 2023) - *by any mention of compensation*
- Washington: Equal Pay & Opportunities Act (2019) - *salary disclosed Upon offer*

Asking for a salary range or the exact salary for the position may help a candidate gain information. We'll be paying attention to these disclosure laws, salary transparency, and how we might use this data in survey reports.

The Simon and Arslan (2023) also highlights the California Pay Equity Law, which requires companies to provide more transparency in their compensation practices. Some of these practices require companies with more than 100 employees to submit data on their employees' pay by gender, ethnicity, and job category to the state each year.

We believe the California Pay Equity Law is a significant step towards more pay transparency and equity, but it may not necessarily result in substantial changes in pay for underrepresented groups and may have some unintended consequences.

[1] We calculate this from the *compound annual growth rate*, $\text{CAGR}(t_0, t_n) = \left(\frac{V(t_n)}{V(t_0)}\right)^{\frac{1}{t_n - t_0}} - 1$ where $V(t)$ is the value at year t.

[2] https://www.zippia.com/advice/pay-transparency-laws-by-state/

While the law is a step towards more pay transparency and equity, it may not necessarily result in significant changes in pay for underrepresented groups. The article suggests that companies may still find ways to justify pay disparities, such as citing differences in experience or qualifications.

Simon and Arslan (2023) also highlights some potential unintended consequences of the law, such as companies being more hesitant to hire individuals from underrepresented groups to avoid possible legal repercussions for pay disparities. As a caveat, companies may face challenges in accurately reporting and analyzing their compensation data due to differences between job titles and actual responsibilities.

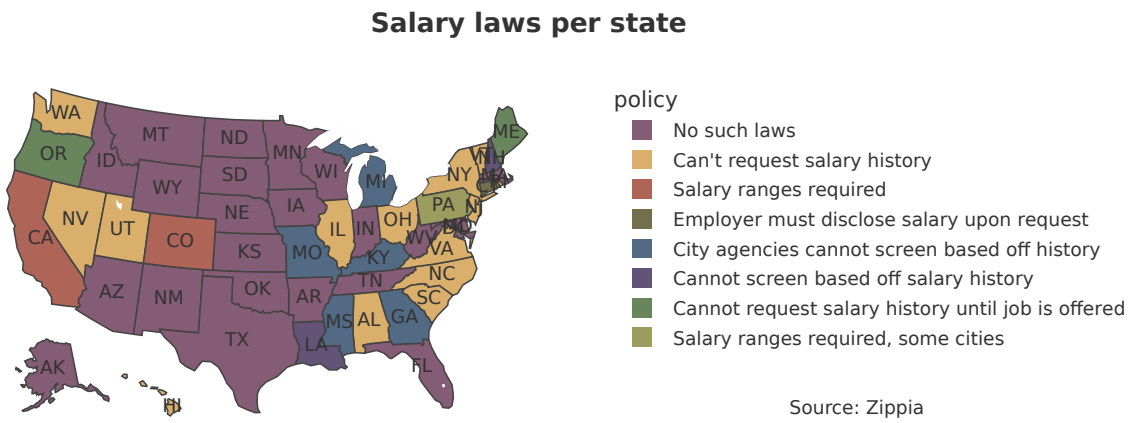


Figure 7.2: Salary Disclosure Laws by U.S. State

Chapter 8

Compensation and Its Influence on Satisfaction

This section includes a deeper analysis of compensation-related responses of the respondents. It is important to note that Base Compensation (BC) equates to the pre-tax amount of wages and salary. Additional Compensation (AC) includes stock options, Restricted Stock Units (RSUs), profit-sharing, and cash bonuses.

8.1 Compensation Analysis and Comparisons

This survey is meant to be another way of sharing compensation data, while contributing to greater compensation discussions. Cross-referencing salary data adds credibility to your salary negotiation and provides you with another data point. Some of the most highly-regarded websites for sharing compensation data include Payscale[1], Salary.com[2], and Glassdoor[3]. We did look into those websites, as well as others, and created a comparison for two of our most common job titles – software engineers (SWE) and senior software engineers (SSE).

The *Code & Supply Compensation Survey* is an additional data point, and we hope that it is utilized similarly given the added context and nuanced areas we explore with each iteration. All of these sources have robust data analysis, minimum responses to create a reliable report, data validation rules, and checks for duplication of data. They each, of course, have inherent limitations. Payscale's data only includes responses from the past year, for example.

Below, we compare three compensation websites and their 2022 data for the two mentioned most-common job titles.

Source	Job Title	Salary
Payscale	SWE, nationwide	$89,086.00
Payscale	SWE, Pittsburgh	$80,820.00
Payscale	SSE, nationwide	$121,778.00
Payscale	SSE, Pittsburgh	$107,056.00
Glassdoor	SWE, nationwide	$90,321.00
Glassdoor	SWE, Pittsburgh	$96,361.00
Glassdoor	SSE, nationwide	$118,148.00
Glassdoor	SSE, Pittsburgh	$125,855.00

[1] https://www.payscale.com/content/PayScale_Methodology.pdf
[2] https://swz.salary.com/docs/salwizhtmls/methodology.html
[3] https://www.glassdoor.com/research/app/uploads/sites/2/2019/04/Methodology-Glassdoor-Job-Market-Report-2-2.pdf

Source	Job Title	Salary
Salary.com	SWE, nationwide	$76,127.00
Salary.com	SWE, Pittsburgh	$73,433.00
Salary.com	SSE, nationwide	$116,500.00
Salary.com	SSE, Pittsburgh	$114,800.00

As a comparison to the results of our 2022 survey, fifty percent of our respondents reported that they make between $100,000 and $172,000.

The data in "Total Base Compensation" – salary or other regular, recurring wages – indicates that there is a significant range in salary changes for tech workers, with a base compensation for Q1 at approximately $101,000, a median of $140,000, and a Q3 of $172,000, with the lowest reporting being $35,000. This indicates that while some tech workers may earn relatively modest salaries, others are highly compensated for their work.

Overall, we found that the full-time median total compensation was $150,000 for engineers and about $120,000 for non-engineers, and the minimum total compensation was $28,000 for engineers and $44,000 for non-engineers. Total compensation includes base compensation and significant other expected payments like merit and profit-sharing bonuses, equity in the form of stock options or stock grants, retirement contributions, and other perquisites that the respondent considered a part of their compensation package. This suggests that while engineering roles may offer higher salaries on average, there may also be a wider compensation range for these roles. The difference in minimum compensation could be attributed to factors such as experience, education, and location.

Overall, this data suggests that engineering roles may offer higher compensation than non-engineering roles, but it is important to consider factors such as experience and location when analyzing compensation trends. Additionally, the broader range of compensation for engineering roles highlights the importance of negotiating fair salaries and benefits, regardless of industry or role.

Fig. 8.1 reflects the base compensation for all full-time respondents reporting $300,000 or less, around 98% of respondents.

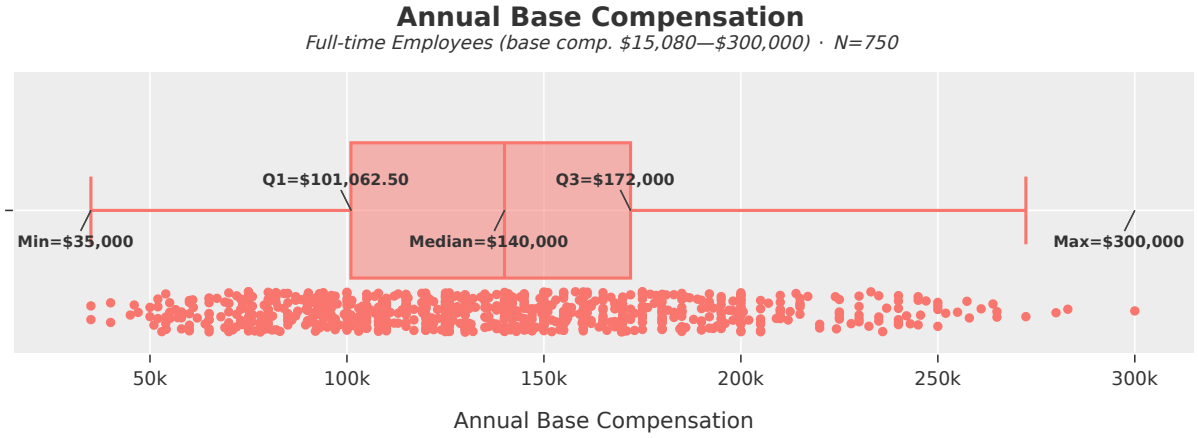


Figure 8.1: Annual Base Compensation

Fig. 8.4 breaks down respondents further, grouping by whether or not they're in a role we classified as generally associated with programming software. Tbl. 19.1 lists the titles we included in this classification. Tbl. 19.2 lists the level-related titles we excluded when considering this group.

Some of our respondents are rather highly compensated. Many of our analyses exclude these few because

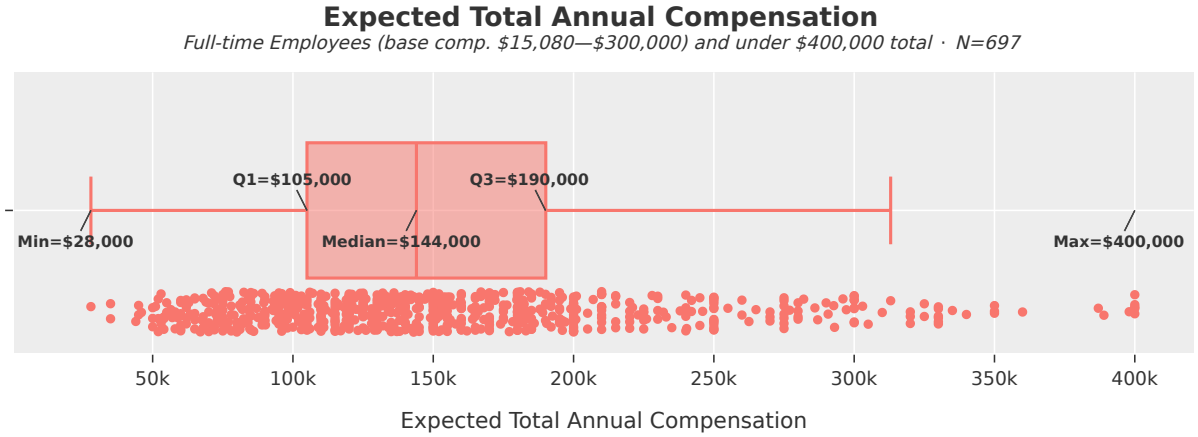


Figure 8.2: Expected Total Compensation

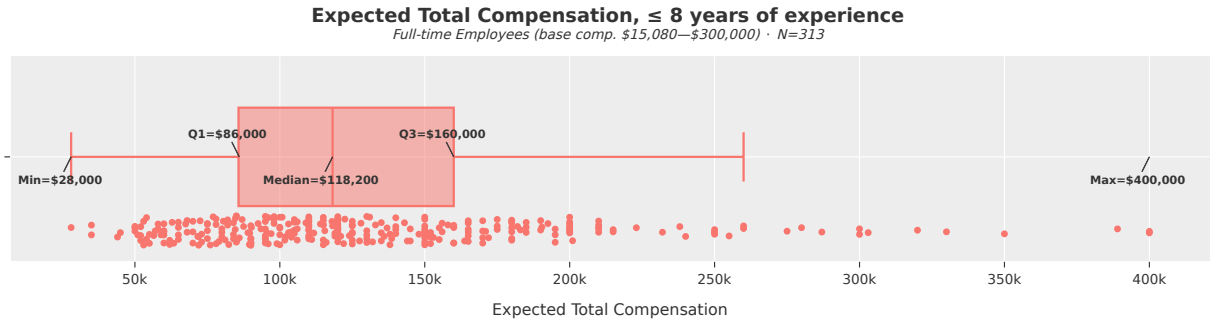


Figure 8.3: Expected Total Compensation, <= 8 Years of Experience

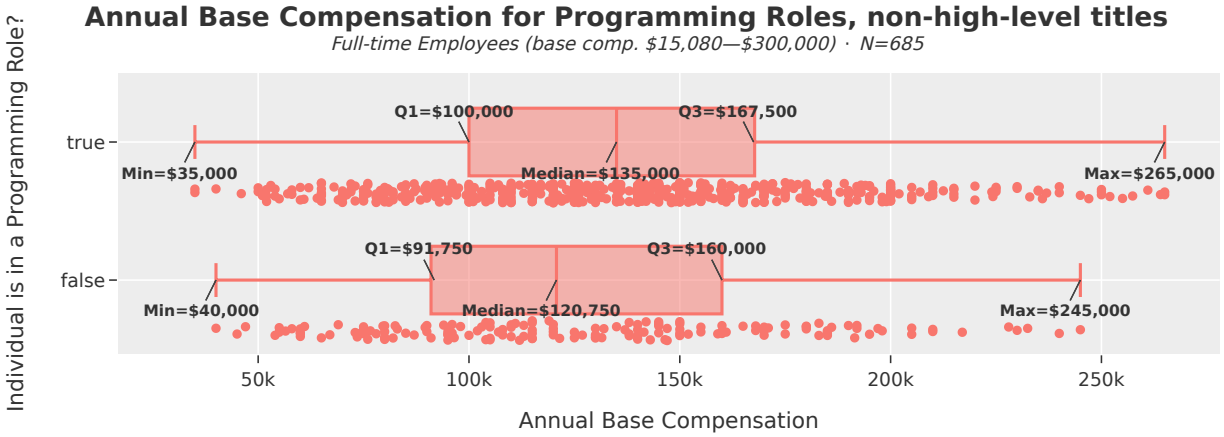


Figure 8.4: Annual Base Compensation for Programming Roles, non-high-level titles

they are outliers in nearly every case. We thought we'd give them a chart of their own in fig. 8.5. However, this chart still excludes the lone respondent with a base annual salary higher than this range.

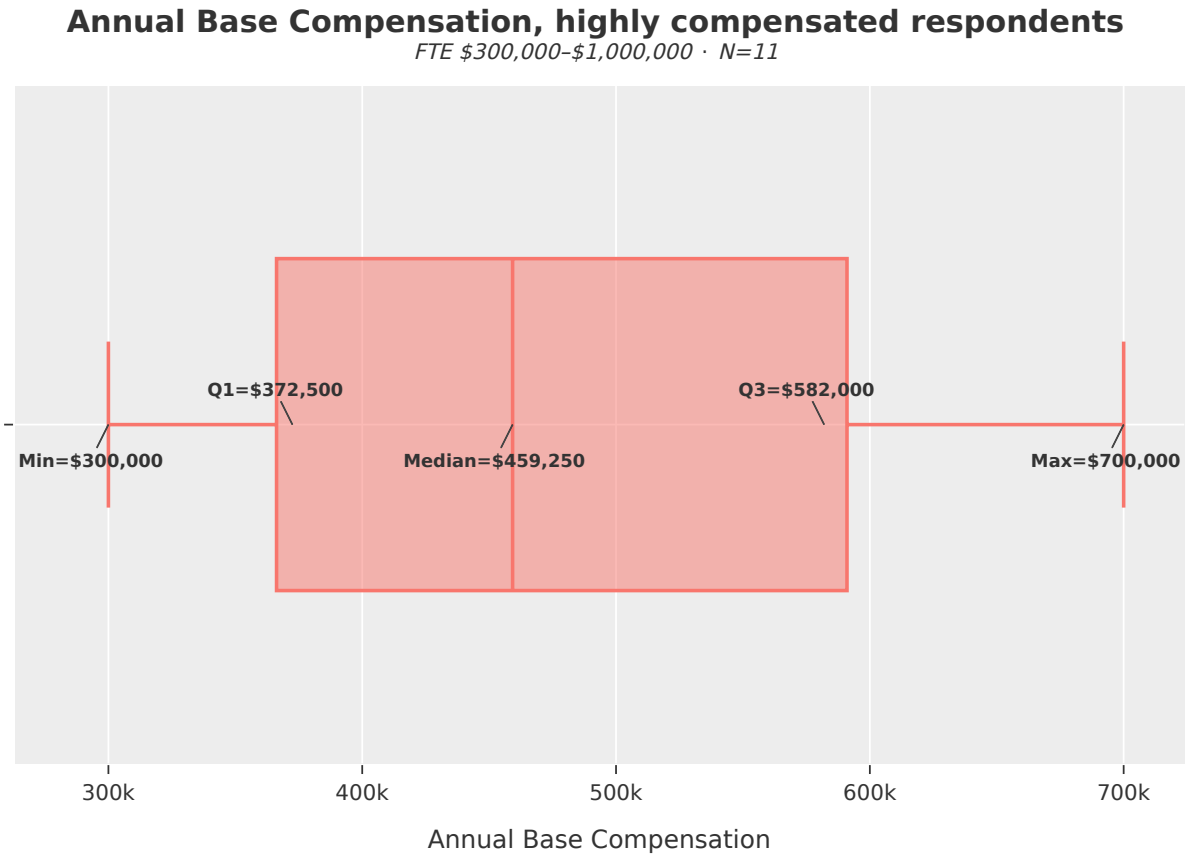


Figure 8.5: Annual Base Compensation, highly-compensated respondents

8.2 Job Titles and Levels

Respondents reported 42 different job title families, representing their tech industry work experience, ranging from a few months to 30 years, and with base salaries ranging from $30,000 to $2,000,000. Fifty-three percent, or 411 are software engineers, and 445 work closely with software development.

As in previous years, and due to the communities which Code & Supply engages with, the vast amount of analysis in this section pertains to software engineers. This is because the vast majority of responses were so overwhelmingly from software engineers. As such, if you are not a software engineer then this data in this section may skew things higher or lower for you.

26% of software engineers have "Lead or Principal" in their titles. Those engineers who are not Lead or Principal have an median base compensation of $135,000, with a third quartile of $167,500.

Only 113 respondents – 14% – earn $200,000 or more in base salary, whereas 176 respondents – 22.5% – earn $200,000 or more in Estimated Total Compensation (ETC).

While fig. 8.9 shows the count of respondents per job level, fig. 8.8 lists the job seniority titles by percentage.

Almost 79.5% of survey respondents consider themselves mid-level or higher – only 7.9% are junior or entry-level. When we looked explicitly at years of experience by job title, we found that the average tech

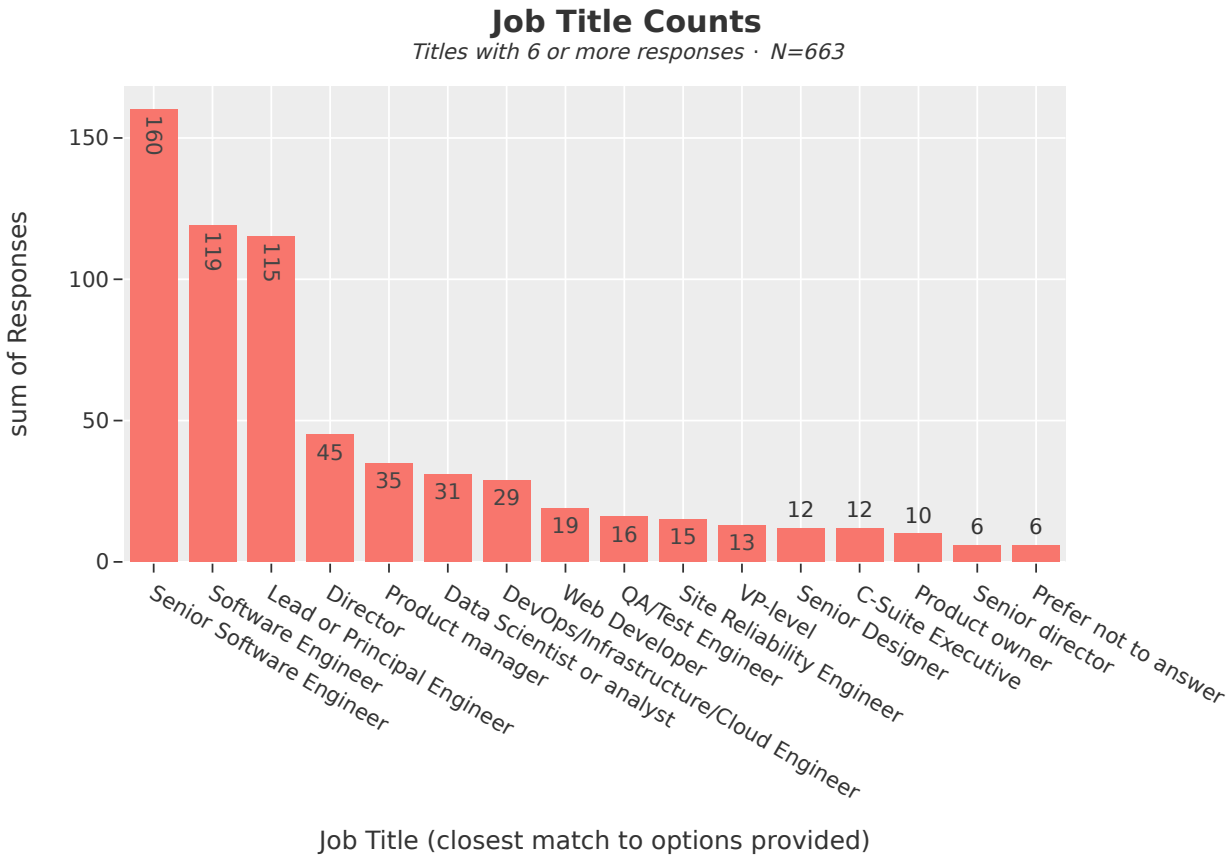


Figure 8.6: Job Title Counts

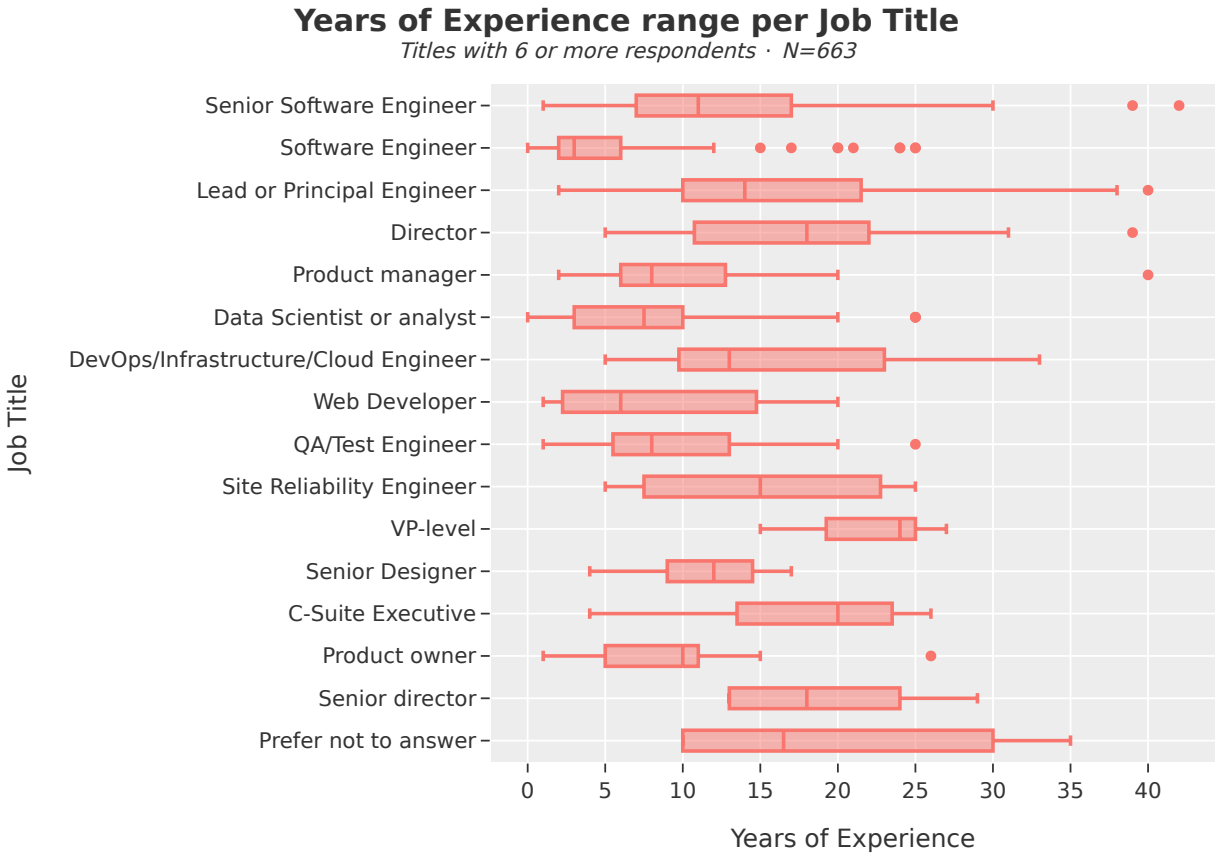


Figure 8.7: Years of Experience vs. Job Title

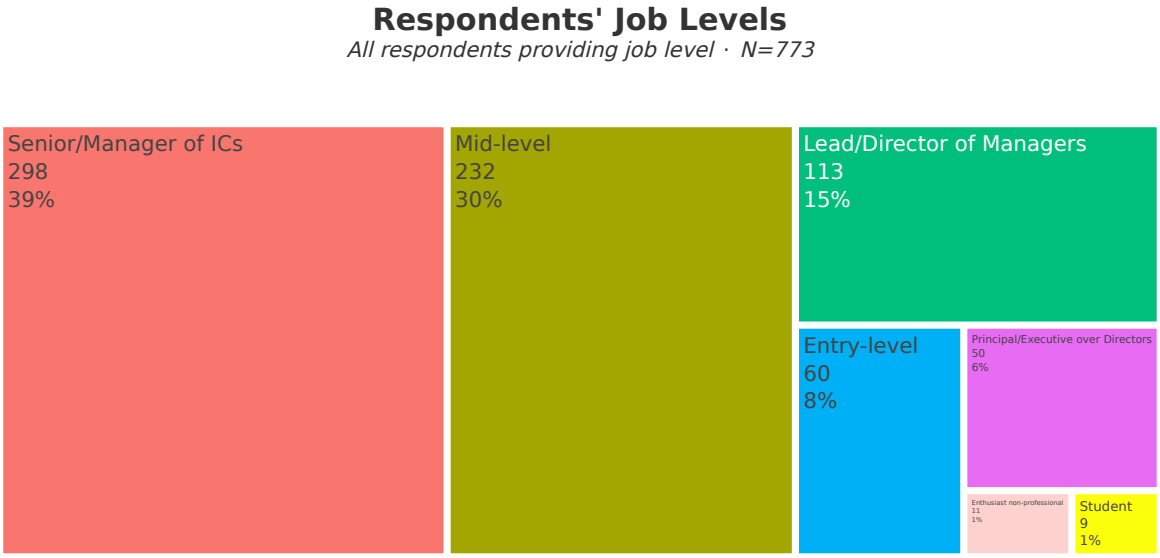


Figure 8.8: Respondents' Job Levels

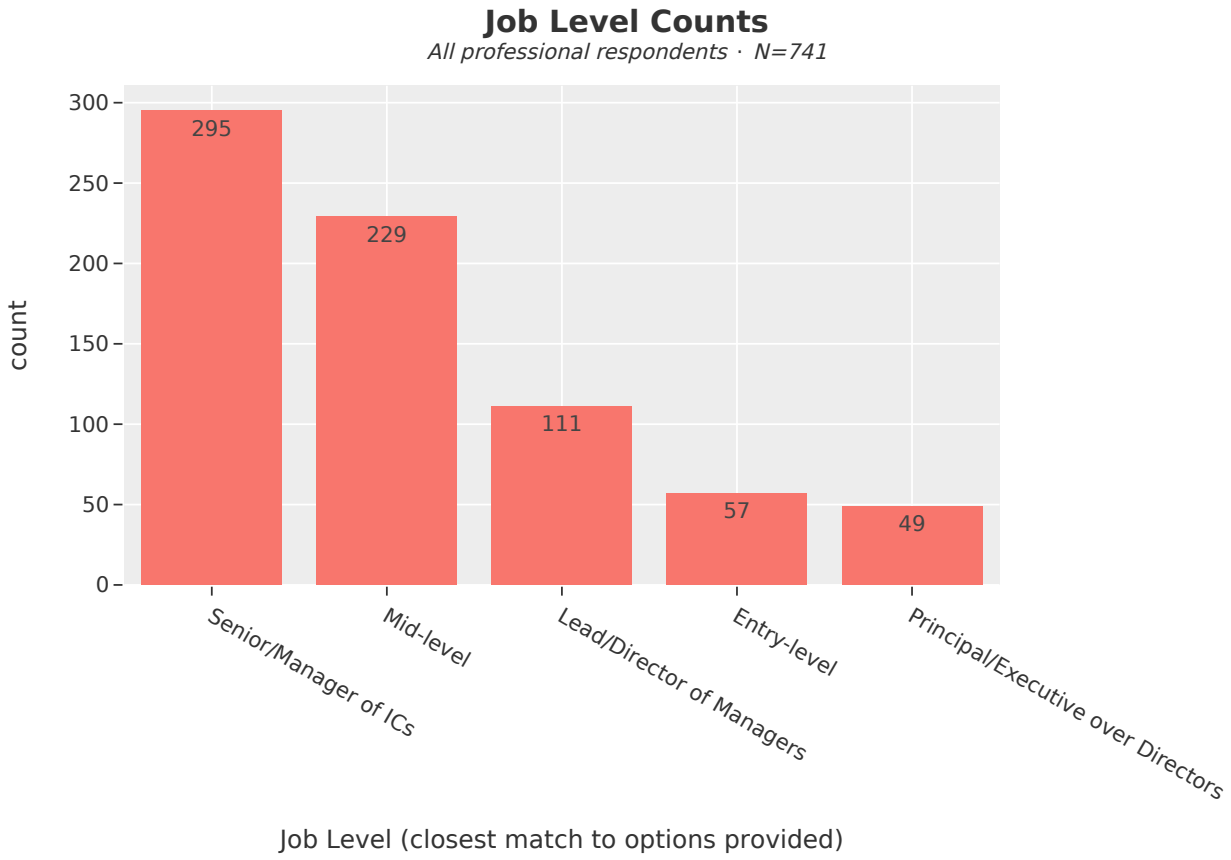


Figure 8.9: Count of professional Respondents by Job Level

industry years of experience for senior-level respondents was 14 years. Read more on that in fig. 9.4.

However, requirements to achieve a job title are not equivalent across companies, but employees and employers may use job titles to seek out compensation data.

8.3 Years of Experience and Compensation

According to fig. 8.10, years of tech experience does not correlate strongly with salary. The median salary for generally every group is around $150,000, though the early carer folk have a shorter range and a smaller median.

Figure 8.10: Base Annual Salary by Years of Experience group

Fig. 8.11 shows that, except for earners making less than $100,000, there is almost no relationship between ETC and Years of Experience (YoE). For those making less than $100,000, as industry experience increases, salary rises.

Fig. 8.12 shows that salary does increase steadily with age for respondents with ETC between $90,000 and $150,000. Fig. 8.12 also shows that while most of our respondents have up to 20 years of experience, salary does increase with age even further than that.

Fig. 8.13 shows that while most of respondents with under 15 years of experience, solidly average $60,000 ETC to start and can go up $20,000 or more from that.

Fig. 8.14 shows that respondents with over six years of experience have considerably higher salaries, over $200,000, more frequently than those earlier in their careers.

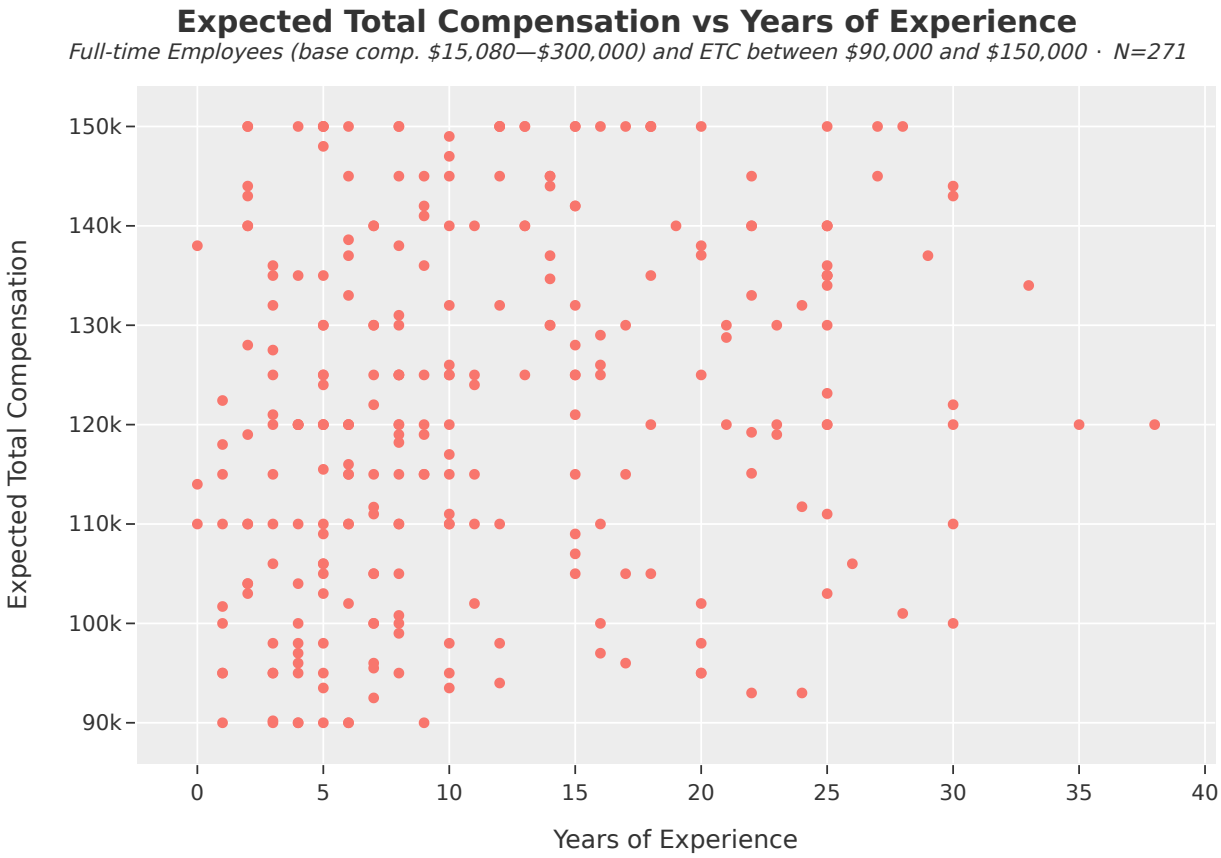


Figure 8.11: Expected Total Compensation vs. Years of Experience, $90k–$150k

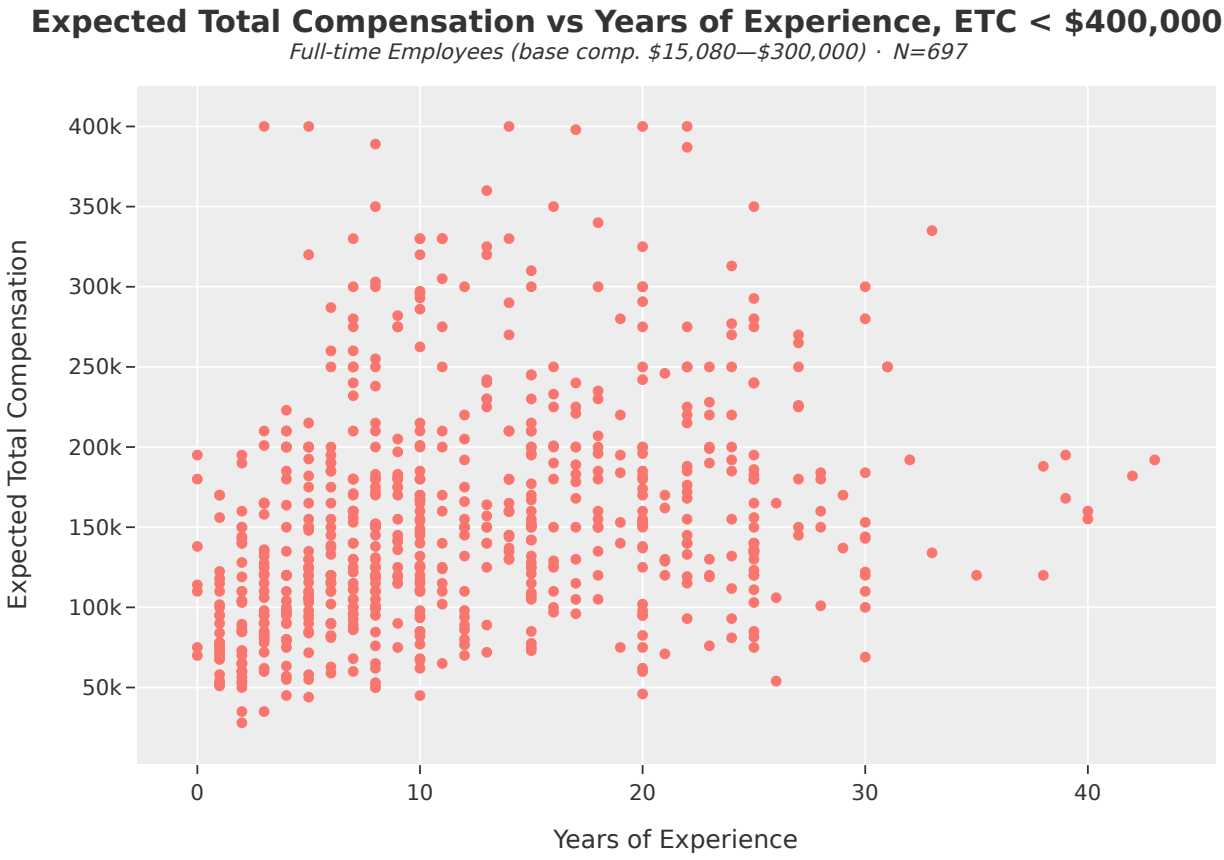


Figure 8.12: Expected Total Compensation vs. Years of Experience

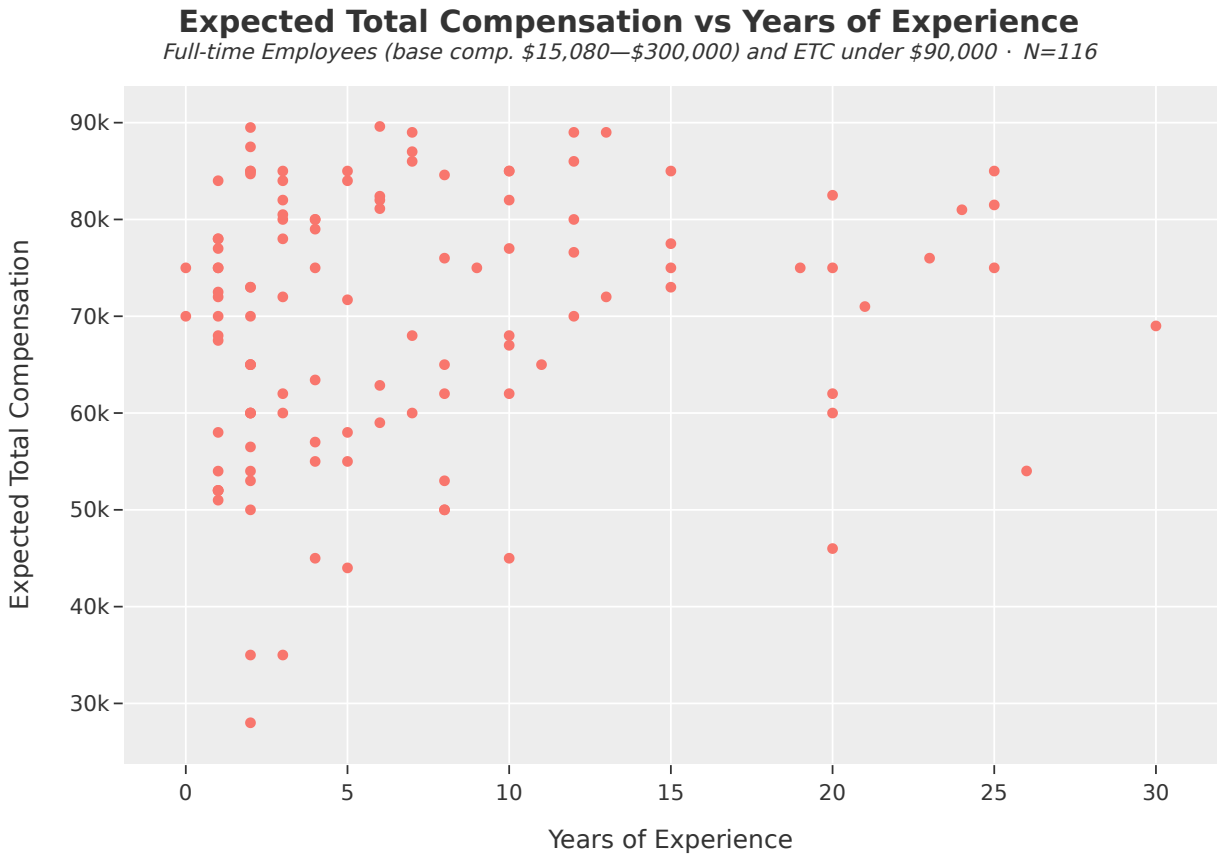


Figure 8.13: Expected Total Compensation vs. Years of Experience, under $90k

Figure 8.14: Years of Experience vs. Expected Total Compensation, <= 8 yrs

8.4 Bonuses as a Component of Compensation

Fifty-seven percent of respondents receive a bonus; on average, they have a higher total compensation than those who do not. Median compensation for everyone who gets a bonus is $10,000 higher than those who do not receive one, shows fig. 8.15. The inter-quartile range (IQR) for receiving a bonus starts $16,000 higher and ends $30,000 higher than those who do not receive a bonus. In other words, your compensation will likely be much lower if you do not receive a bonus.

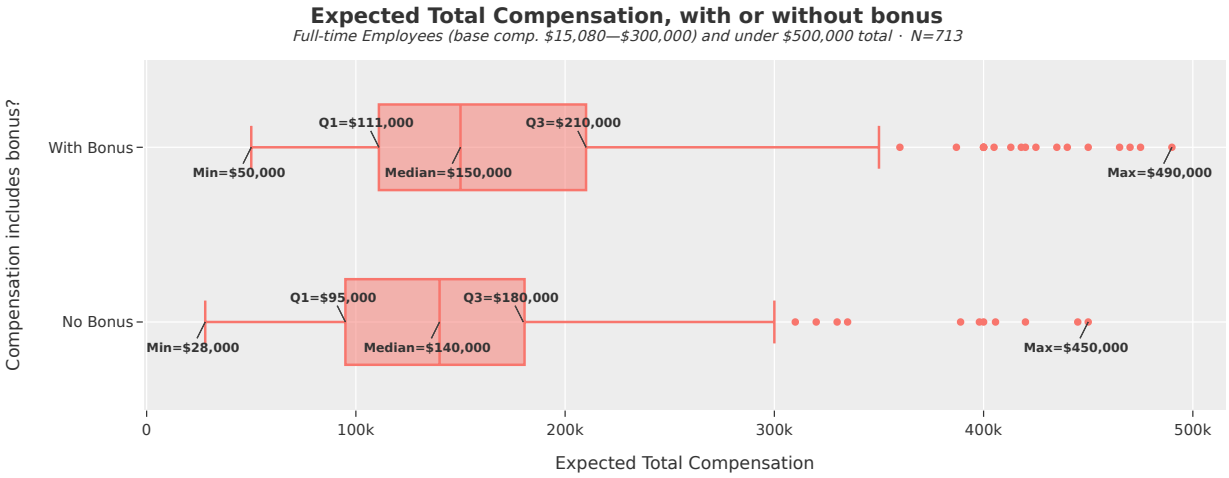


Figure 8.15: Expected Total Compensation, with and without bonus

We analyzed the bonuses for everyone but managers of managers.

We had an oversight while creating the survey. Our bonus threshold sections overlapped with each other. For the sake of this analysis, we will consider the range as exclusive of the higher and inclusive of lower amounts. For example, the second row includes respondents who received a one percent or two percent. The third row includes respondents who received a bonus of three or four percent, and the fourth row reports bonuses of five to nine percent.

Bonus amount	Percentage of respondents
None	42.8%
1-3%	11.6%
3-5%	7.3%
5-10%	18.4%
10-20%	15.9%
Over 20%	4%

Forty-two percent of respondents do not have an equity component to their compensation. Twenty-eight percent of respondents received stock options grants, while 25.2% received RSUs. Five percent (42 respondents) received profit sharing, while the remaining received something we did not list. Interestingly, ten respondents said they had over 5% equity in an organization, which means they are probably considered founders.

We cross-checked using The U.S. Bureau of Labor Statistics (2022) data. In that data, Computer and Information Research Scientists surveyed tend to have Master's degrees, with median pay of $131,490 for Software Developers, $98,220 for Quality Assurance Analysts, and $109,020 for Testers. BLS data also notes that some occupations within this field have particularly high median salaries. For example, computer and information systems managers had a median annual salary of $151,150 in May 2020, while software

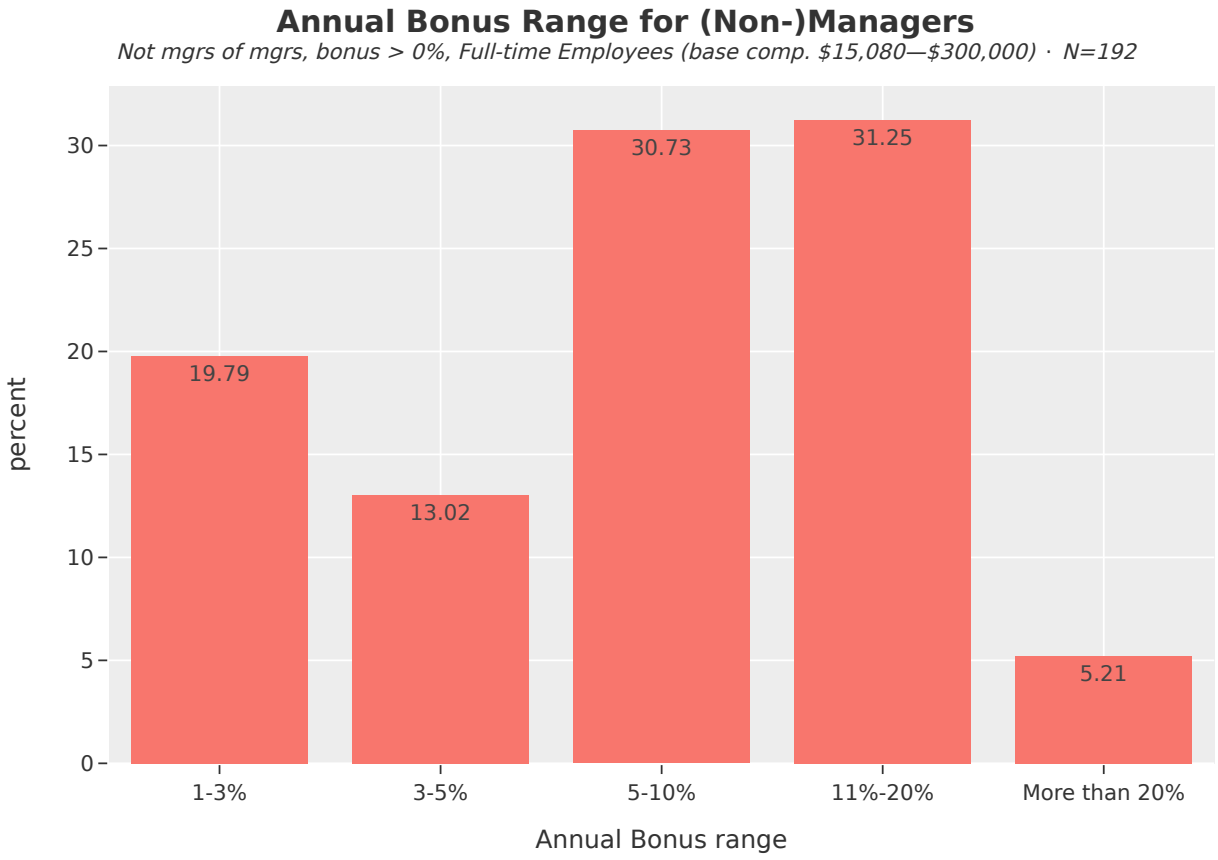


Figure 8.16: Bonus Range for non-managers of managers

developers of applications had a median yearly salary of $108,080. Web developers/digital designers were making $78,300. For context, the BLS defines *web developers* as those who create and maintain websites and *digital designers* as those who develop, create, and test website or interface layout, functions, and navigation for usability.

8.5 Current Compensation and Employment Satisfaction

An important component of the *Code & Supply Compensation Survey* over the years is the measuring of respondents' satisfaction with their compensation.

It encompasses factors such as the perceived fairness of compensation, the alignment of compensation with job responsibilities and performance, and the overall sense of fulfillment derived from the compensation received.

When taken into account with the other factors, there are a few dimensions of compensation satisfaction which can provide further insights related to tenure and job seeking.

For example, the likelihood of staying at a current employer is related to both compensation and *compensation satisfaction*.

Fig. 8.17 illustrates that 61% of respondents are positively satisfied with their compensation, and only 13% are dissatisfied. This indicates that, overall, the majority of tech workers surveyed feel fairly compensated. However, when analyzed by gender in fig. 8.18, only 48% of non-binary respondents and 57% of women respondents were positively satisfied with their compensation. In an industry that is relatively high-paying but also beset with highly variable salaries, seeing that so many respondents still feel fairly compensated is a good sign.

Looking at compensation satisfaction as a function of annual base salary in fig. 8.19, we can see that

- at the first quartile of the survey respondents' BC, around $101,000, they'd be nearing the third quartile for compensation satisfaction score of 1 or 2, be below the median for a 3, and be below the first quartile for a 4 or 5. Someone making around $100,000 is more likely to be neither satisfied nor dissatisfied with their compensation.
- at the median of $140,000, they'd be unlikely to be dissatisfied and would be above the median likelihood of scoring a 3, but slightly better than unlikely to say they're satisfied.
- and at the third quartile of $172,000, they're almost definitely going to be satisfied.

While there are no surprises here, it is interesting to see the wide range of what BC can satisfy some respondents while dissatisfying others.

While fig. 8.19 shows a relationship between compensation and compensation satisfaction, it's clear from fig. 8.20 that compensation does not have a strong influence on employer satisfaction ("How satisfied are you with your current employment situation?"). However, we believe that we can say that a BC above $125,000 is like to generate a combined satisfaction score indicating overall satisfaction in fig. 8.21.

8.6 Salaries, Nationwide versus Allegheny County

Fig. 8.22 shows salary comparisons for respondents inside or outside of Allegheny County. Respondents based in Allegheny County made $24,000 less median salary than those who live outside of Allegheny County. See sec. 15.2 for information on where respondents live. The high salaries of the San Francisco Bay Area, Seattle, Boston, and New York City respondents pull the numbers upward.

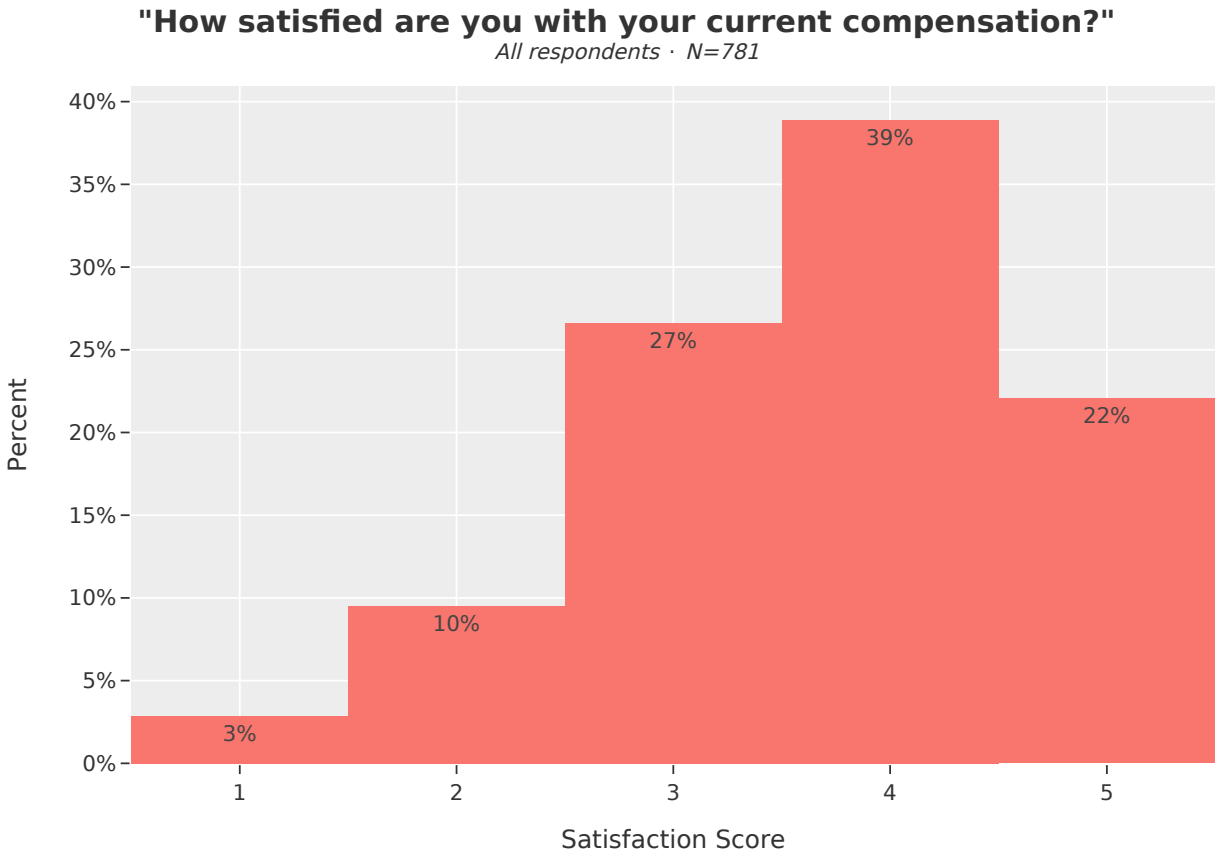


Figure 8.17: Compensation Satisfaction

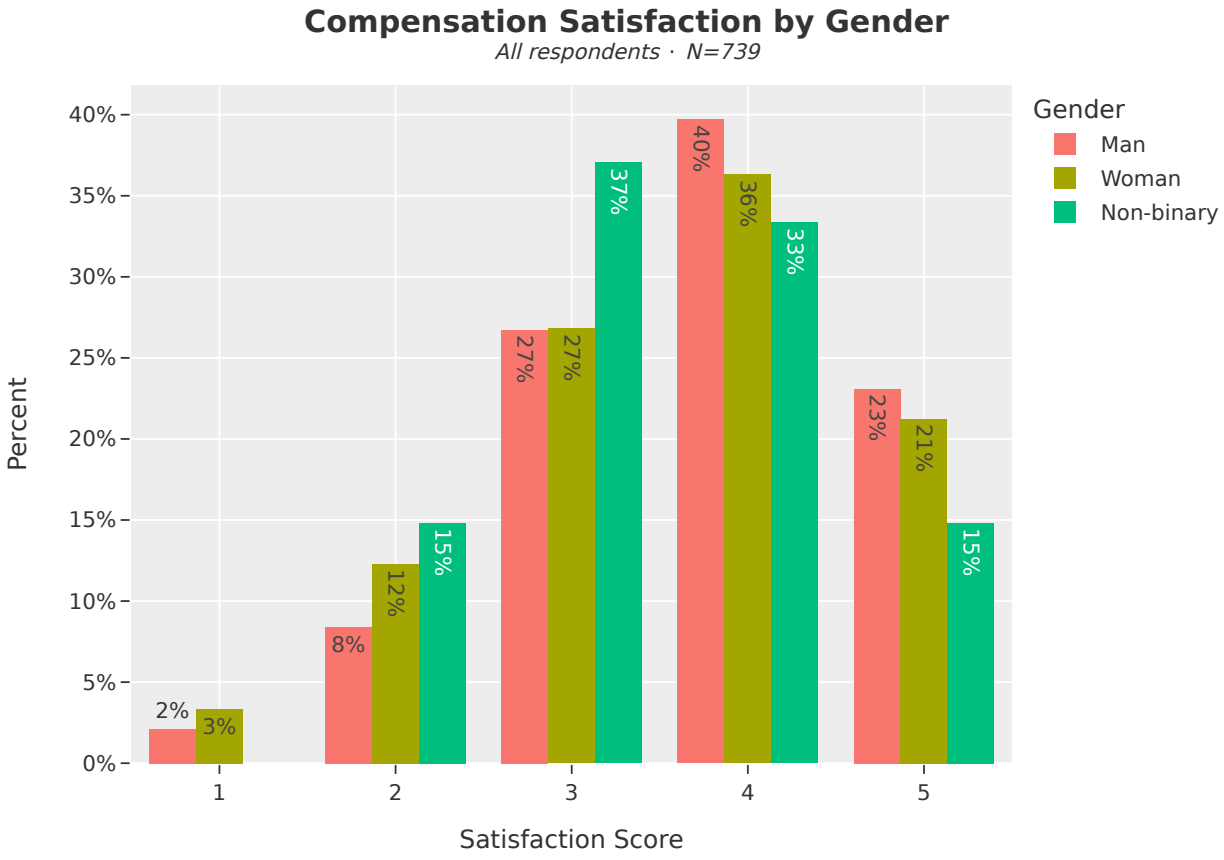


Figure 8.18: Satisfaction by Gender

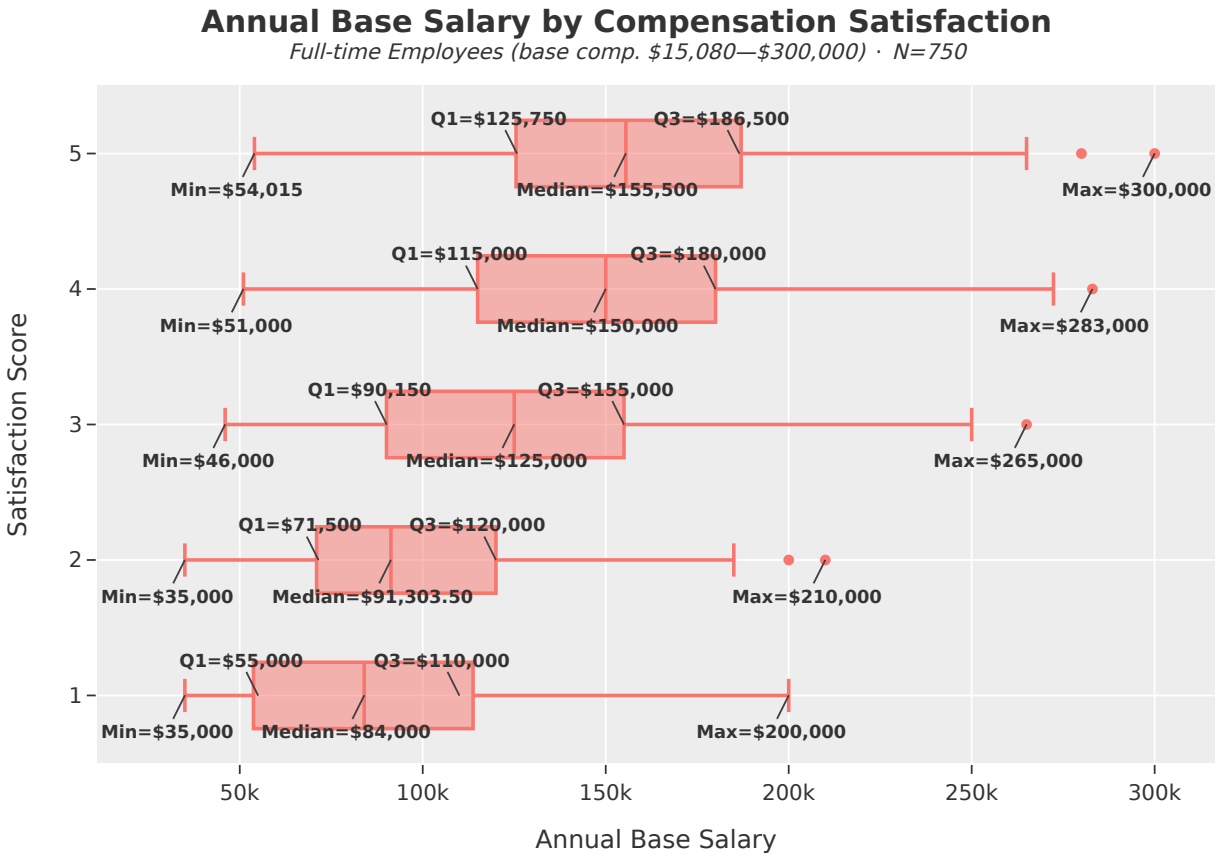


Figure 8.19: Annual Base Salary by Compensation Satisfaction

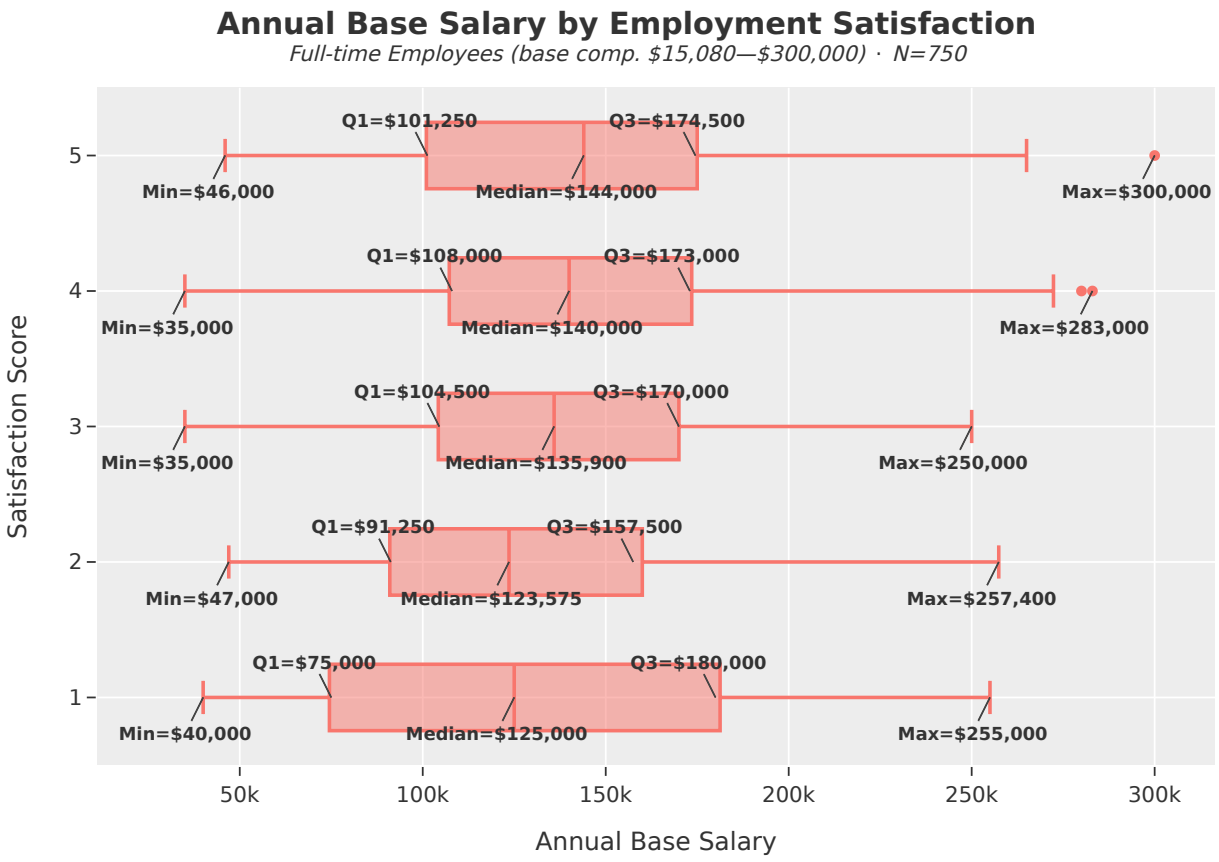


Figure 8.20: Annual Base Salary by Employment Satisfaction

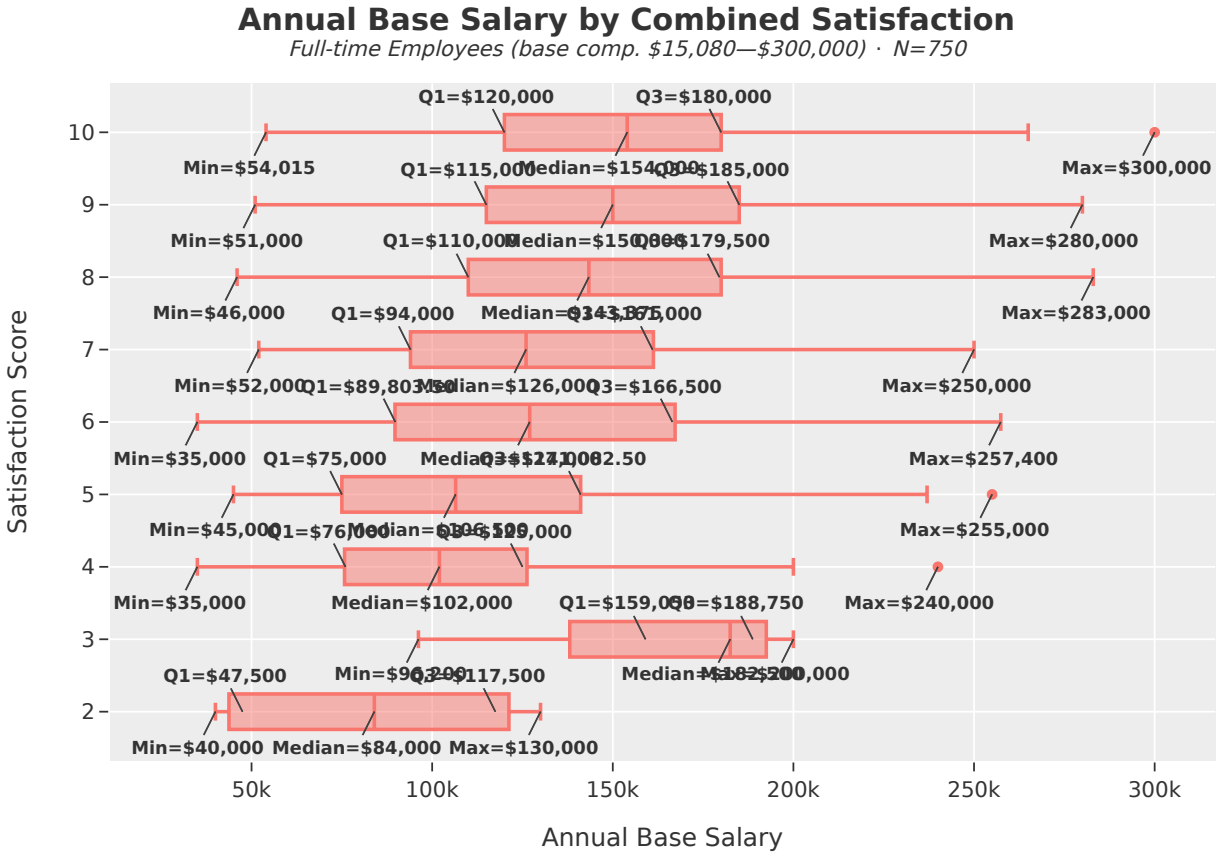


Figure 8.21: Annual Base Salary by Combined Satisfaction

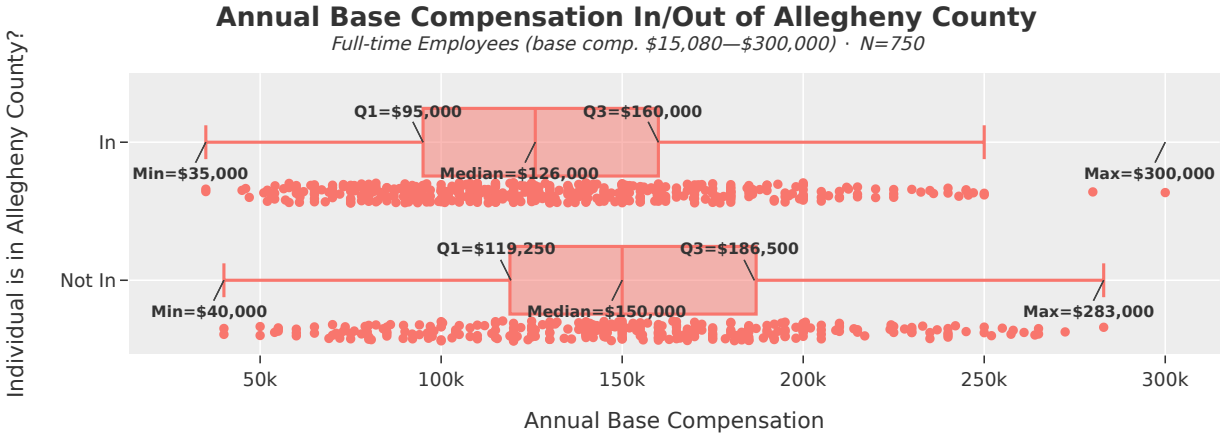


Figure 8.22: Base Salary in and outside of Allegheny County

Chapter 9

Years of Experience

The dimensions of *years of experience* and *age* of the survey respondents provide valuable insights related to *compensation* and *job level*.

The respondents' ages ranged from 18 to 66, with the inter-quartile range (IQR) at 32 to 41 (fig. 5.1). Our survey respondents reported a wide range of experience, with a median of 10 years of experience in the field, with a range between zero and 44 years of experience, with IQR of six to 18 years. Fig. 9.1 highlights the breadth of perspectives represented in our sample.

Interestingly, respondents in the 35–40 age range reported the broadest Years of Experience (YoE), with reported YoE spanning from one to 30 years. In contrast, those in the 22–30 age range reported zero to 17 years of experience. These findings in fig. 9.2 provide valuable insights into the distribution of experience levels among professionals in our field and may inform future research on career trajectories and advancement opportunities. It also reflects that some respondents started very young.

YoE is expected to increase as someone ages, but there can be outliers when it comes to career changes or professionals moving to paths in tech from other industries. Fig. 9.3 reflects the reality that Estimated Total Compensation (ETC) does not predict YoE very well because of the wide pay range of professionals at every level of experience.

Fig. 9.4 did not surprise us in its analysis of YoE for each job level. Respondents with more YoE tend to have job levels with higher responsibility. Our data show this is especially true for principal and executive roles. At the same time, some senior or lead individual contributors or first- and second-level managers have far less experience than their peers in the survey.

9.1 A Deeper Look into Age and Job Levels

We also looked at the age range for job level. Predictably, older respondents held more senior roles. The box and whiskers, excluding outliers which are visible, graph displays the age range per job level across various positions in the industry.

When it comes to age ranges for different job levels, there are a variety of factors to consider. Our survey showed that entry-level positions often attract candidates between the ages of 21 to 49. For those who are just starting out in their technology careers, these roles can offer a great opportunity for individuals to gain valuable experience, develop their skills, and grow professionally. The higher end of the age range for the lower job level may be representative of professional pivots as software companies attract talent from other industries.

We've found that as individuals progress in their careers and move into mid-level positions, the age range tends to shift slightly, with many professionals in this category falling between the ages of 22 and 50. These

Figure 9.1: Years of Experience

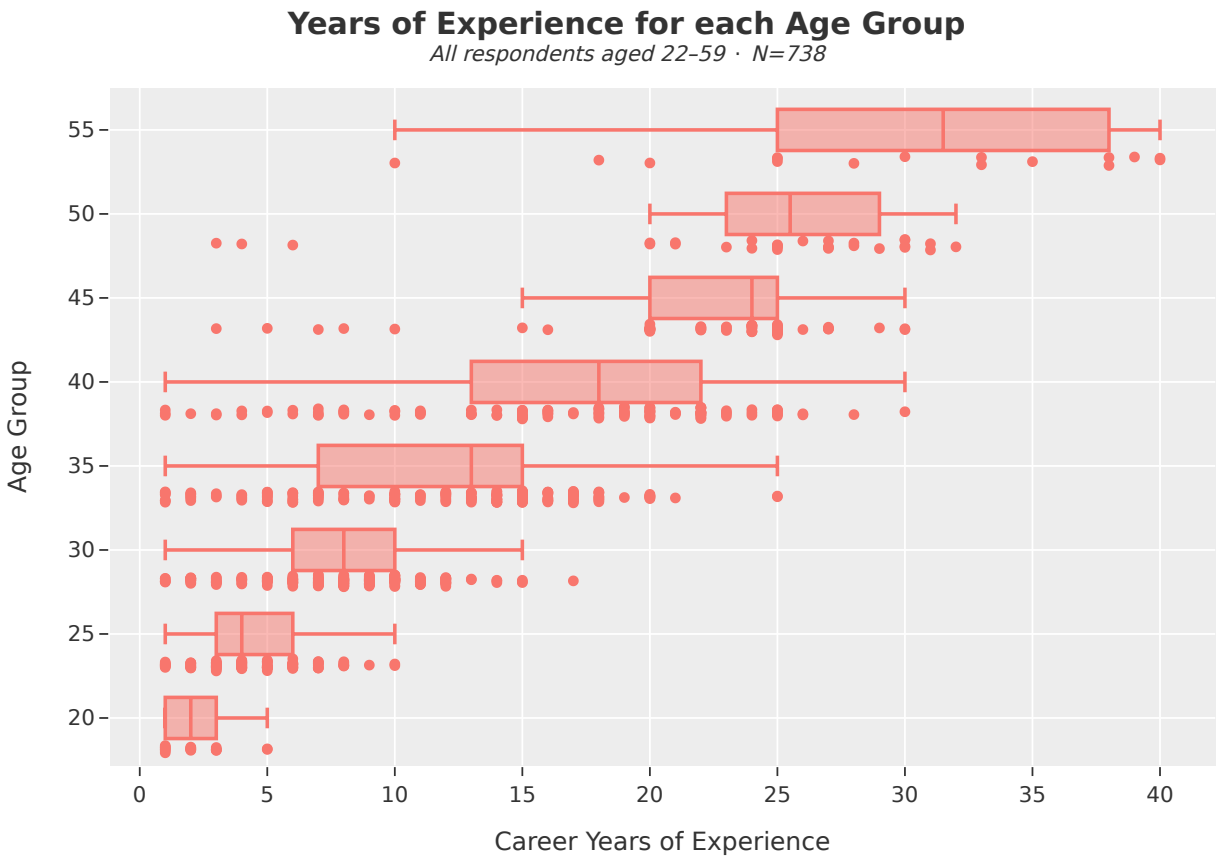


Figure 9.2: Years of Experience vs. Age

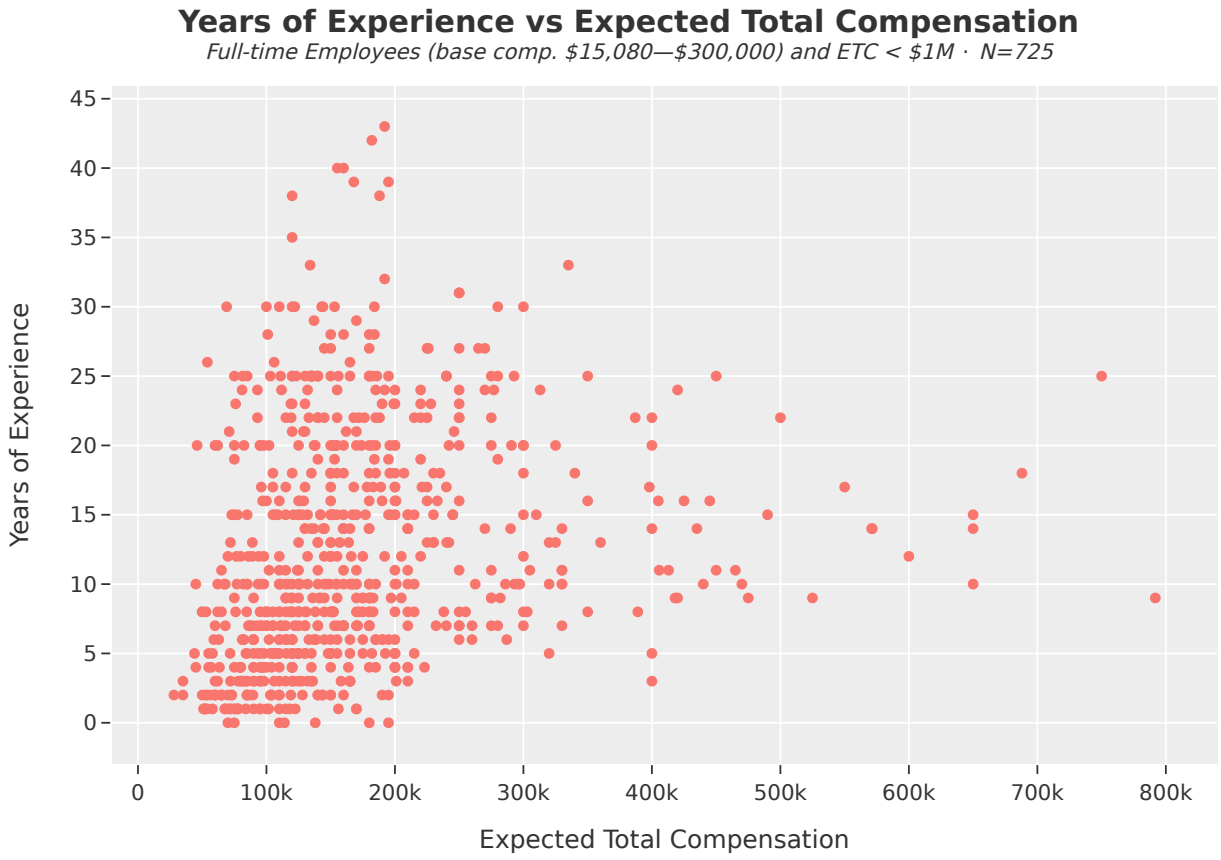


Figure 9.3: Years of Experience vs. Expected Total Compensation

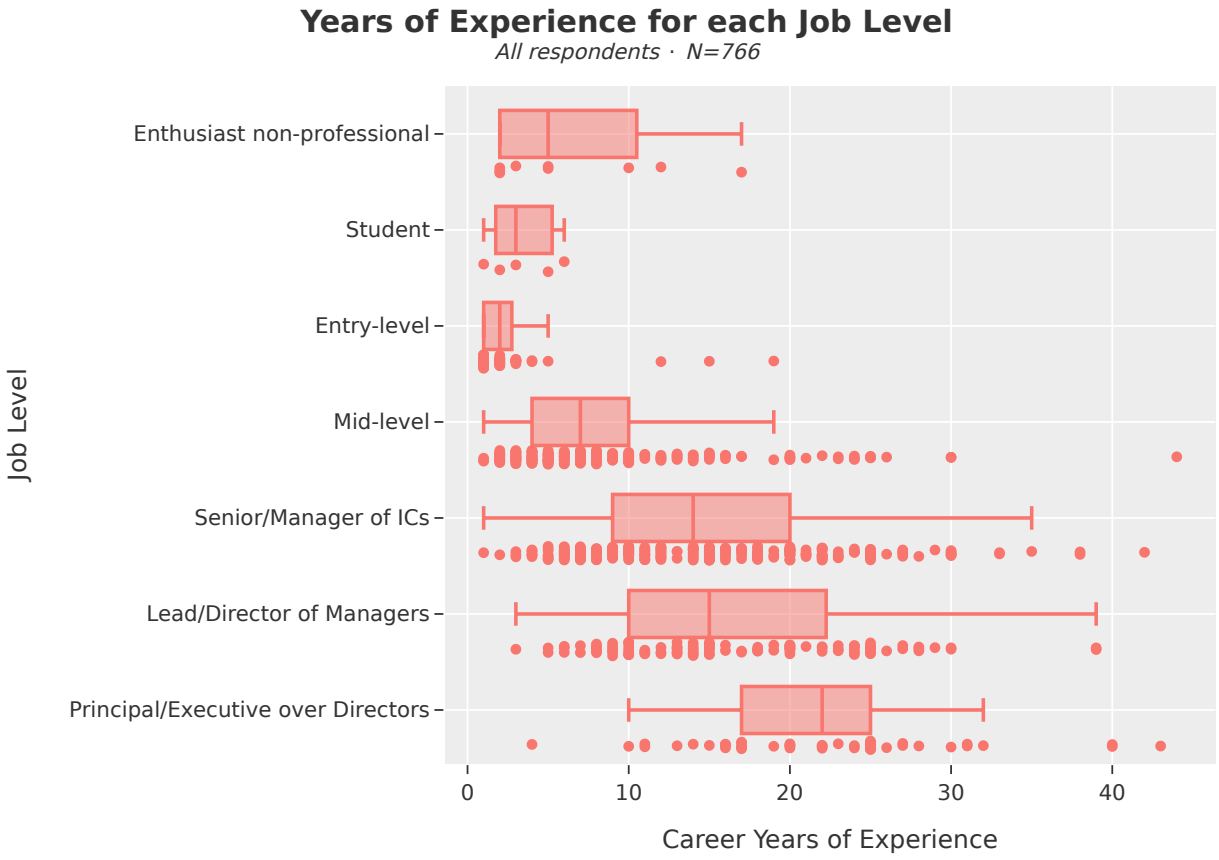


Figure 9.4: Years of Experience for each Job Level

positions typically require more experience and expertise than entry-level roles, but can still offer room for technical skill growth and professional development.

For senior and lead positions, the age range widens, spanning from 25 to 55. This reflects the increased responsibility and leadership roles that these positions often entail, requiring individuals to have a significant amount of experience and expertise.

Finally, for the most experienced and high-ranking positions, such as principal roles, the age range tends to fall between 32 and 59. These positions often require extensive experience, advanced skills, and a track record of success.

Of course, it's worth noting that these age ranges are not set in stone and may vary depending on the industry and specific company practices. Nevertheless, understanding the age demographics for each job level can be a useful tool for both career planning and recruitment strategies, providing valuable insights into the skills and experience that are most valued by different employers.

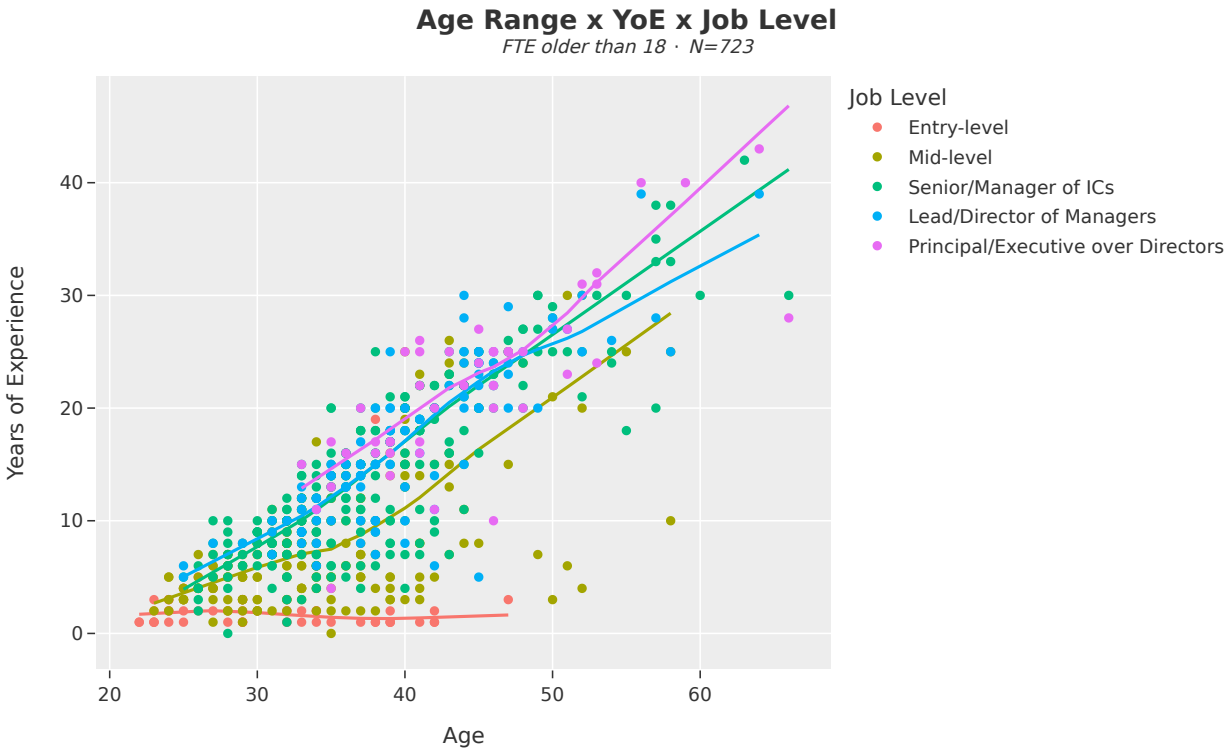


Figure 9.5: Age Range vs Years of Experience vs Job Level

Fig. 9.5 provides insight into the career trajectories of professionals across various age groups and job levels. One striking finding is the emergence of "second-career" professionals in their 30s and 40s, who bring diverse experiences to their new roles. We're defining the career-switchers as those in their 30s+ but with entry-level or slightly higher jobs. Additionally, the chart reveals that some individuals under the age of 30 are already considered senior, highlighting the growing importance of early career development.

The chart also sheds light on the impressive achievements of young leaders, with some individuals as young as 26 already occupying leadership positions. At the same time, it is noteworthy that the youngest principal identified in the chart is 33 years old but with an impressive 15 years of experience already under their belt.

Finally, the chart suggests that age 40 appears to be a significant milestone for professionals, with a concentration of principals right around this age and next to no entry-level people. This is a curious milestone as

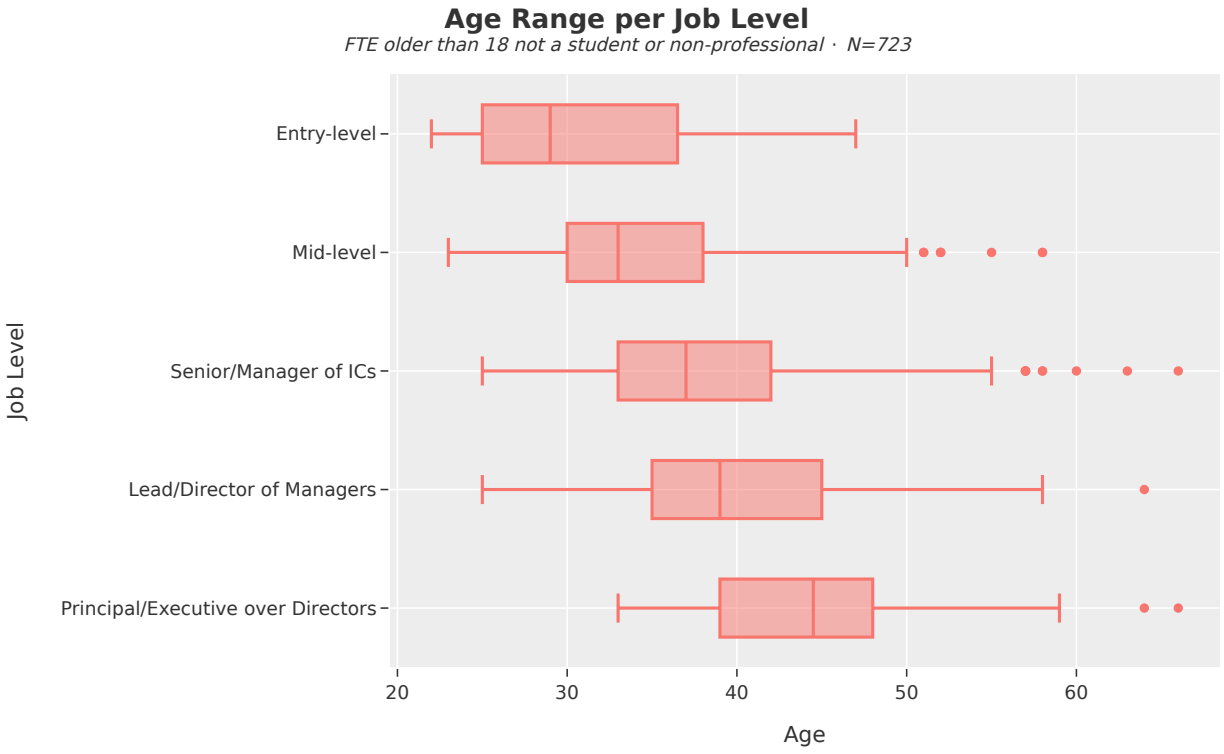


Figure 9.6: Age Range per Job Level, FTE older than 18

the age at which US discrimination laws begin protecting people against age-related discrimination [1].

Overall, the chart underscores the importance of experience and highlights the value of diverse career paths and early career development.

[1]The U.S. Equal Employment Opportunity Commission has an excellent document on age discrimination[2].

Chapter 10

Managers

<!–> ## Satisfaction & Tenure –>

10.1 Manager Compensation & Tenure

The median Base Compensation (BC) for a manager is $167,000, and $200,000 for managers of managers. A manager's top BC is $600,000, and the highest Estimated Total Compensation (ETC) is $750,000.

Both reflect the conventional wisdom that managers of managers are paid more than managers, but the difference between managers and managers of managers' *total* compensation is greater than the difference between their *base* compensation. This reflects that managers of managers are more likely to receive significantly more total compensation, often in the form of higher bonus percentages and equity grants.

10.1.1 Manager Compensation in various industries

According to ARAGÃO (2023), 25% of employed U.S. adults across all industries are currently a manager or manager of managers. Thirty-three percent aspire to be a boss or a top manager in the future, while 41% have no interest in such a position. Men are more likely than women to hold a managerial position, with 28% of men and 21% of women currently in such a role.

10.2 Manager Satisfaction Scores

We surveyed managers on their career satisfaction. Fewer than 20% of respondents were dissatisfied. Fig. 10.3 shows the satisfaction levels for managers. Interestingly, managers and individual contributors reported similar satisfaction levels, as fig. 10.4 shows. This satisfaction result is surprising in some ways because managers tend to have greater control and authority to make decisions, set goals, and delegate tasks. This level of control and autonomy can lead to a sense of accomplishment and job satisfaction. They also have a more comprehensive range of job responsibilities than individual contributors. They may have to manage projects, develop and implement strategies, supervise employees, and handle administrative tasks. This variety in job responsibilities can make the work more exciting and challenging, leading to greater job satisfaction. Managers often receive higher pay than individual contributors, as fig. 10.1 alludes. This higher pay can contribute to their job satisfaction.

However, individual contributors may have more opportunities to specialize in their field and develop deep expertise, which can be fulfilling and rewarding. Particularly in the software development field, they may have fewer administrative tasks and responsibilities than managers, allowing them to focus more on the work they enjoy and find fulfilling.

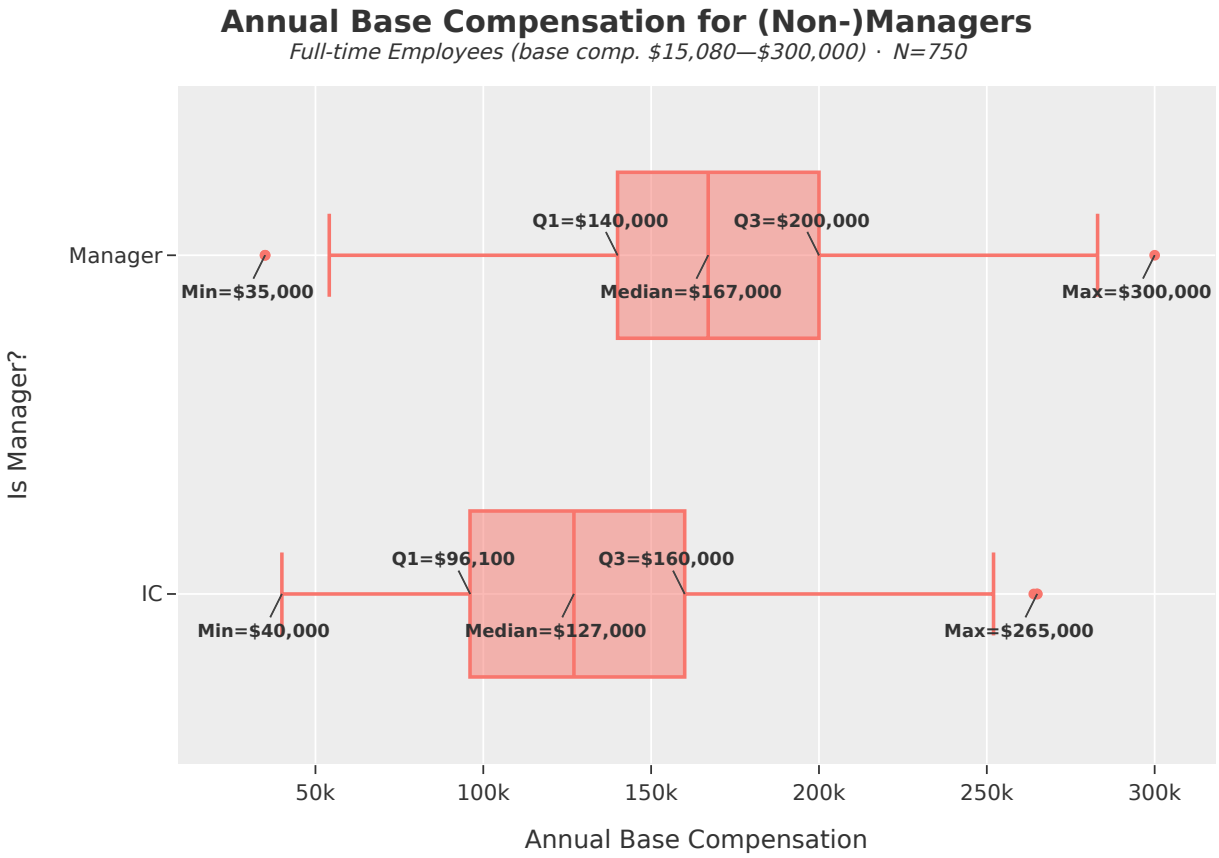


Figure 10.1: Annual Base Compensation for (Non-)Managers

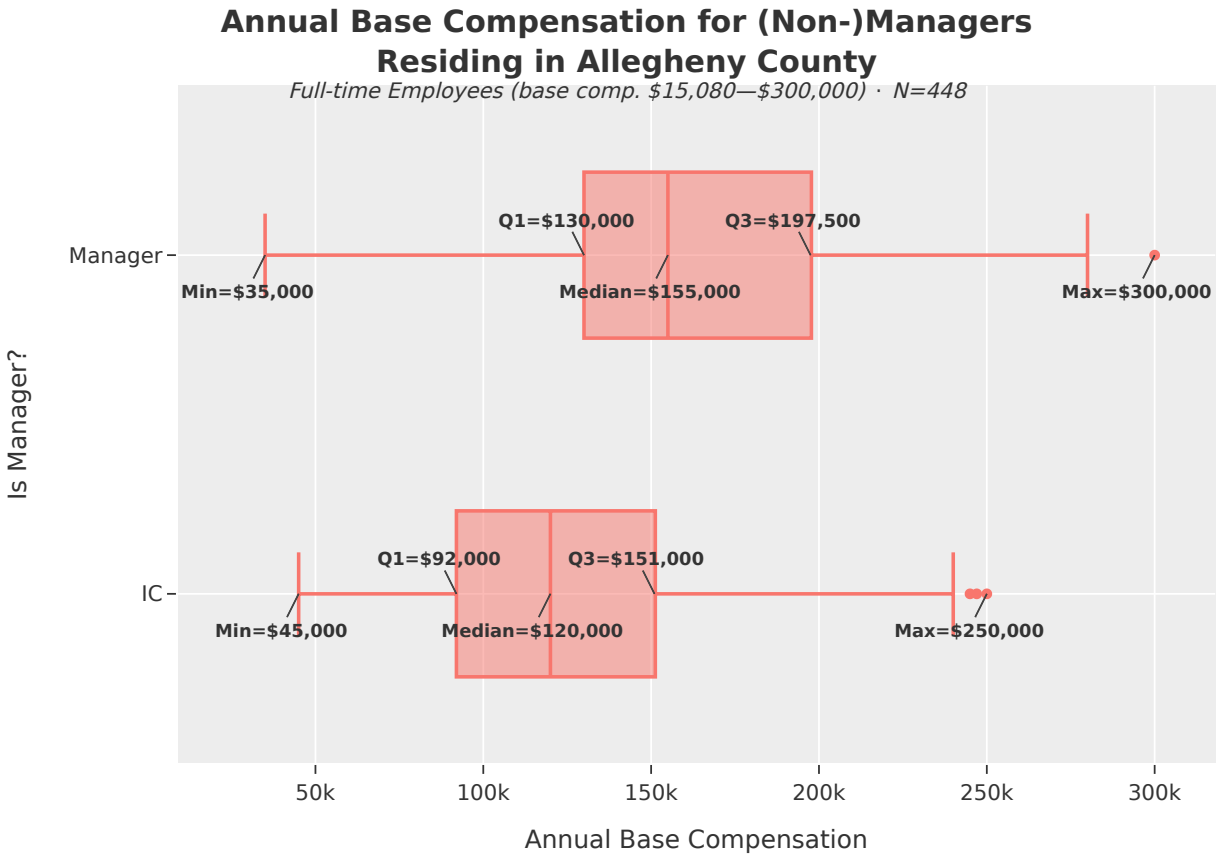


Figure 10.2: Annual Base Compensation for (Non-)Managers Residing in Allegheny County

It is important to note that job satisfaction can vary significantly among individuals, regardless of their job title or position. Some individual contributors may have higher job satisfaction than some managers, depending on the nature of the work, the work environment, and personal preferences and values.

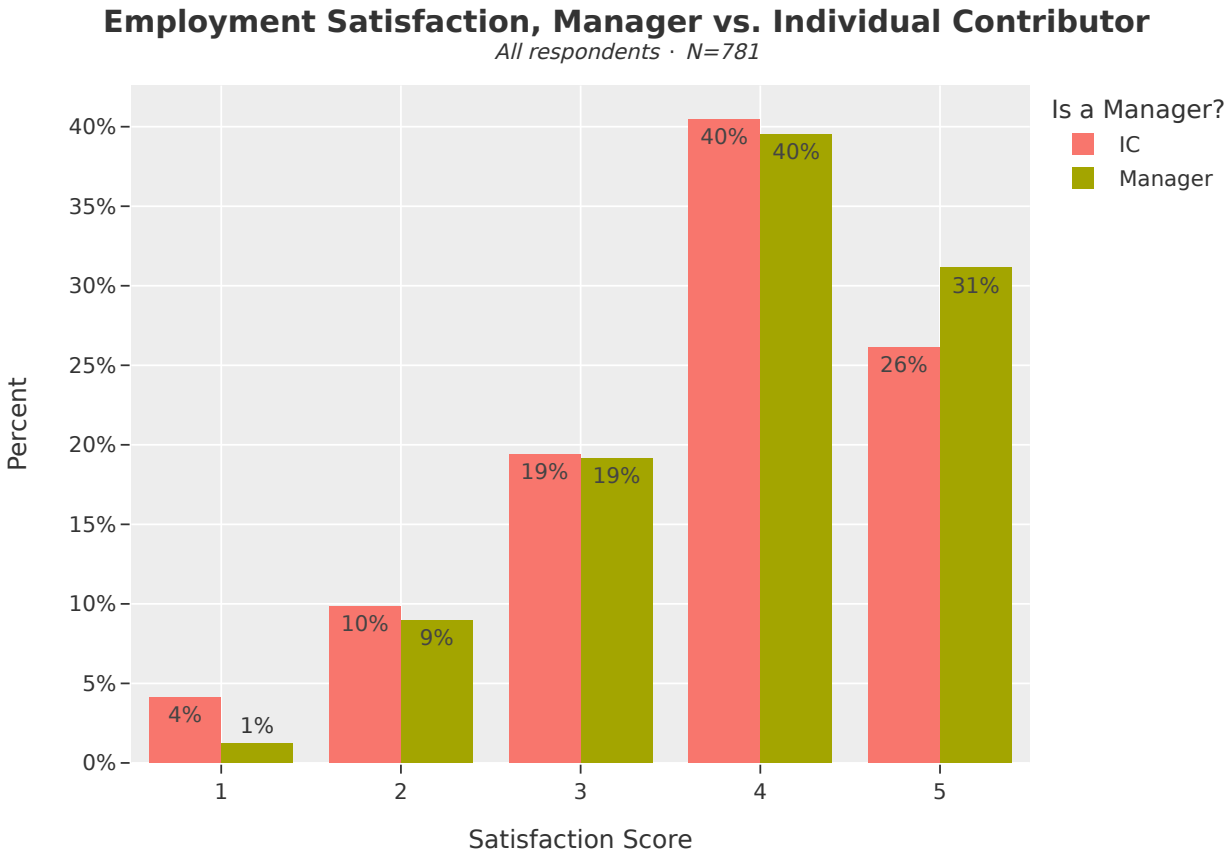


Figure 10.3: Employment Satisfaction, Manager vs. Individual Contributor

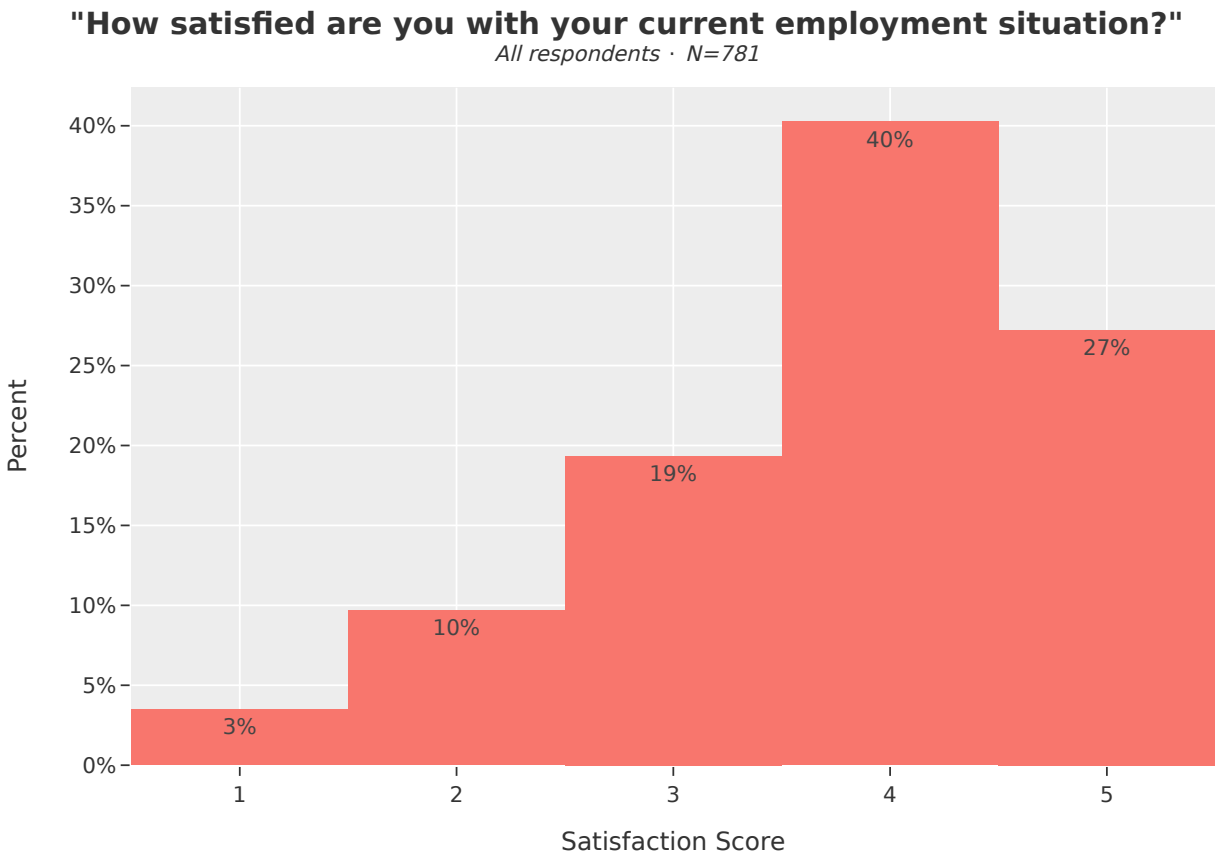


Figure 10.4: “How satisfied are you with your current employment situation?”

Chapter 11

Gender Wage Gap and Other Differences

The gender wage gap or pay gap refers to the sizeable difference between the salary paid to men and to women and non-binary people for the same work with the same qualifications.

It remains a pressing concern, with numerous studies highlighting the salary disparities between men and women. According to a comprehensive analysis conducted by PayScale in 2021 (Payscale (2023)), women in tech earn, on average, 81 cents for every dollar earned by men with similar qualifications and experience.

In future surveys, we might ask respondents about equitable measures employers might take.

Men reported salaries the median of which was 22% higher than that which women reported. To account for median years of experience for men being higher than that of women, likely because more of the respondents were men, we reran the calculation this time excluding respondents with more than eight years of experience, which was women's median reported years of experience. Even after limiting to this set, men's median salary was 3% higher than what women's.

Despite this disparity in pay, 57% of women reported feeling "satisfied" or "very satisfied" with their compensation, compared to 63% of men and only 48% of non-binary respondents.

We reviewed fig. 8.18, and noticed some trends. Fewer than 5% of all respondents reported being highly dissatisfied with their compensation. Factors such as gender pay gaps, inequitable salary structures, or biases in promotion and advancement opportunities might contribute to this dissatisfaction.

- Somewhat satisfied:
  - Men: 8%
  - Women: 12%
  - Non-binary: 15%

These numbers indicate a noticeable difference in satisfaction levels among genders. Potential reasons behind this disparity include disparities in salary negotiation outcomes, representation in higher-paying roles, or perceptions of unequal treatment in compensation practices.

- Neutral:
  - Men: 27%
  - Women: 27%
  - Non-binary: 37%

The relatively high neutral satisfaction rates (see above) across all genders could suggest a lack of clarity or transparency in compensation practices. Factors such as limited understanding of pay structures, unclear pathways for career advancement, or ambiguous performance evaluation processes might contribute to this neutrality.

The majority of respondents (above 60%) expressing a high level of compensation satisfaction indicates

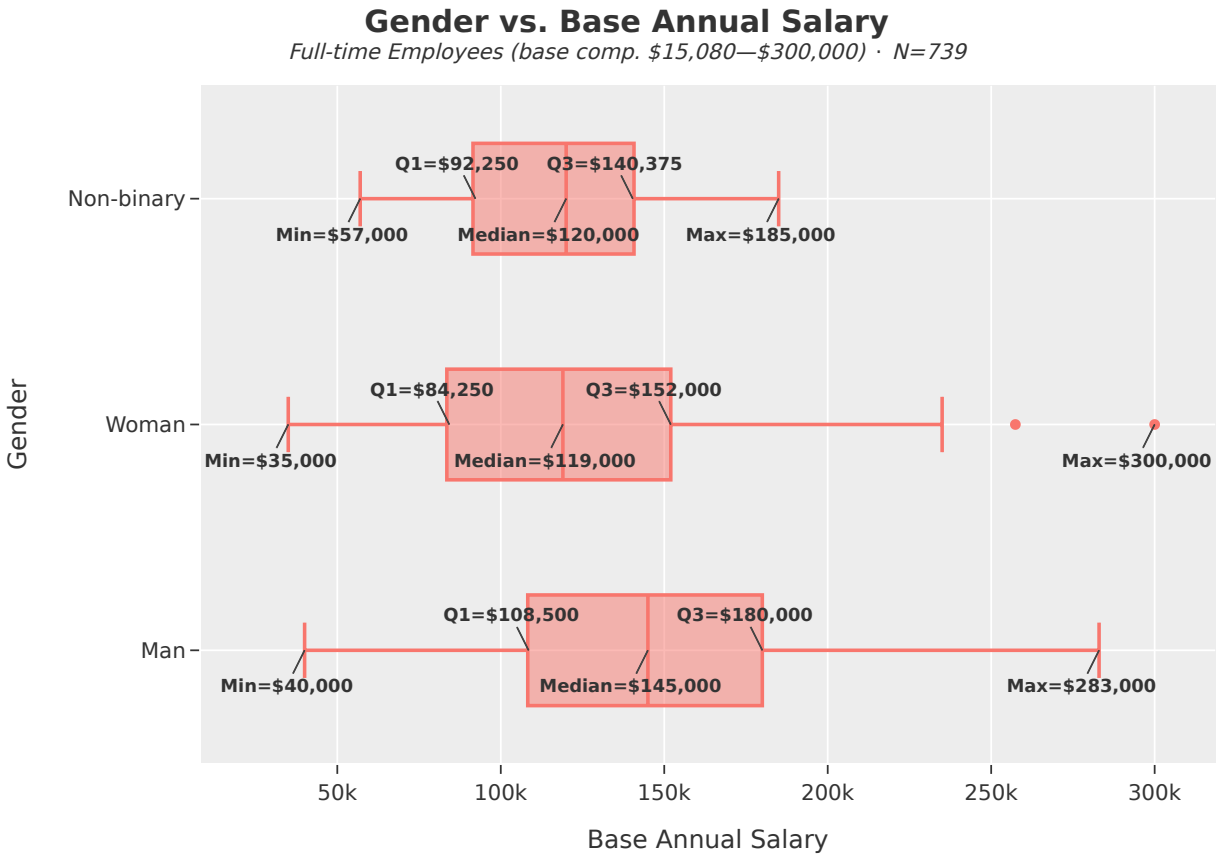


Figure 11.1: Gender vs. Annual Base Salary

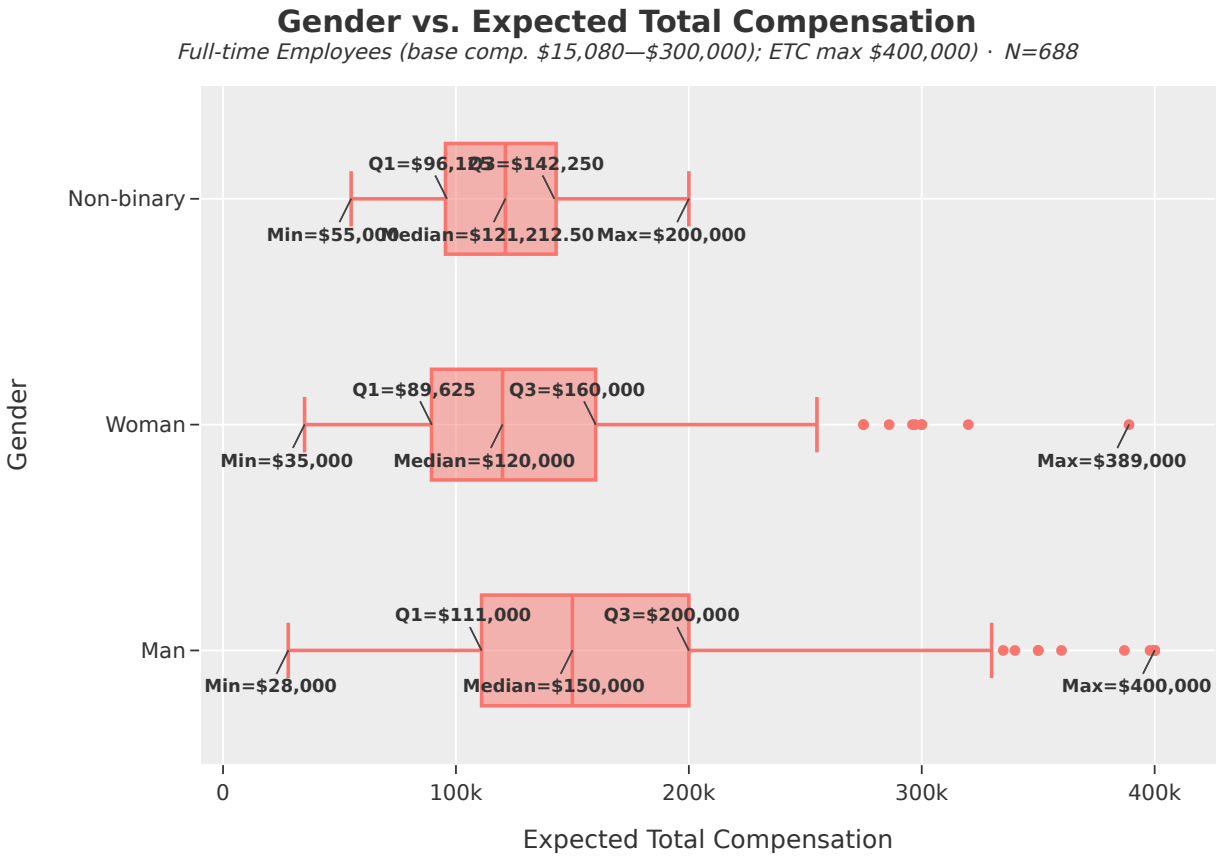


Figure 11.2: Gender vs. Expected Total Compensation

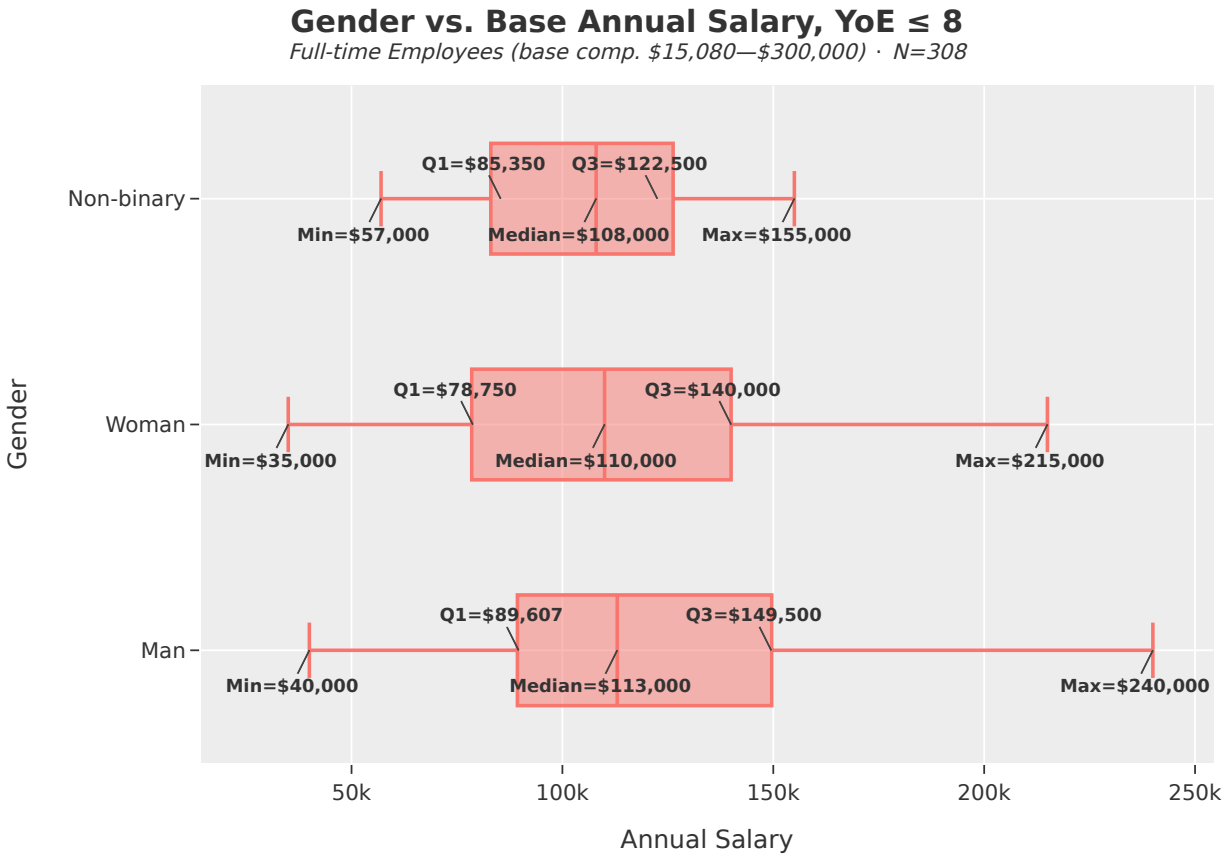


Figure 11.3: Gender vs. Annual Base Salary, <= 8 YoE

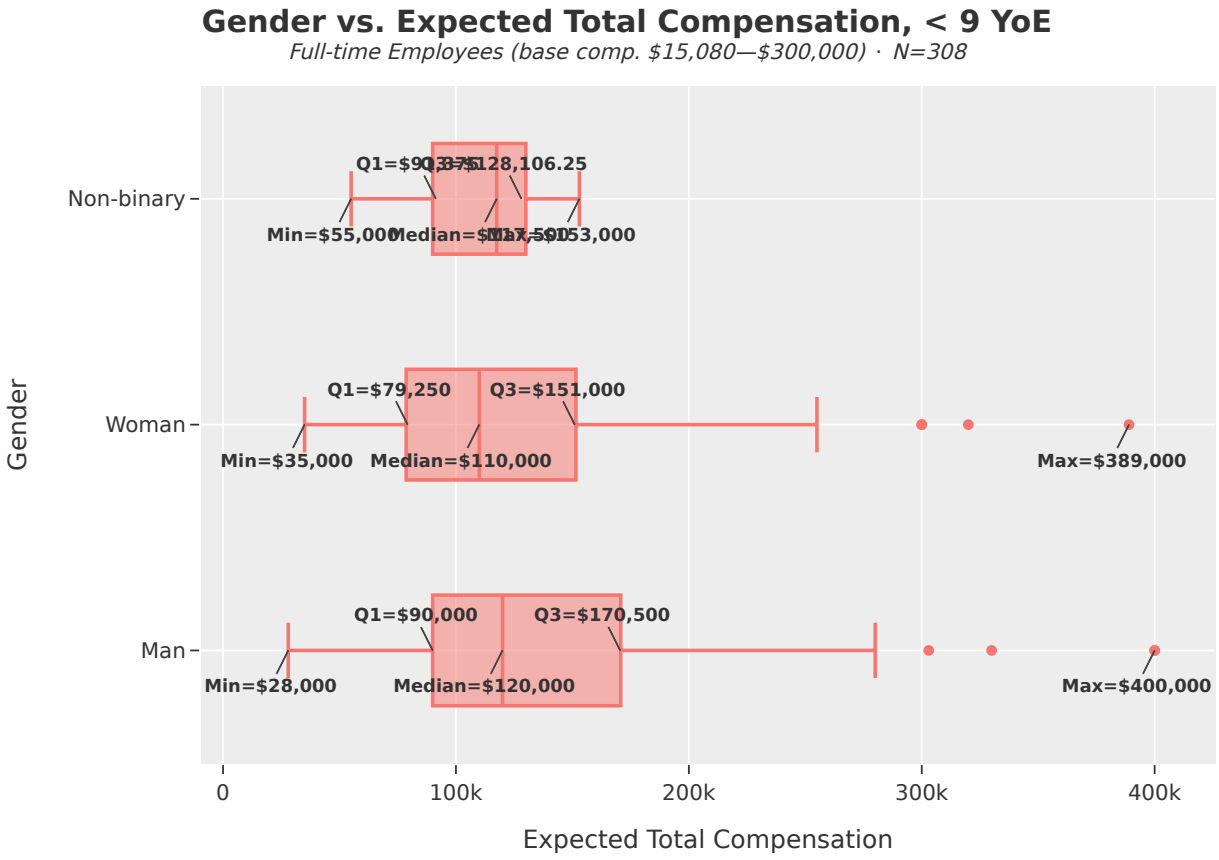


Figure 11.4: Gender vs. Expected Total Compensation, <= 8 YoE

positive experiences with their earnings. Possible reasons behind this satisfaction could include fair and competitive salaries, transparent compensation policies, or a proactive approach to addressing pay equity and diversity within organizations.

While slightly lower than the "mostly satisfied" category, these "very satisfied" numbers still demonstrate a significant level of overall compensation satisfaction among professionals. Possible contributing factors may include comprehensive benefits packages, rewards for performance, or equitable opportunities for career growth.

We note that compensation satisfaction is influenced by a range of factors, including organizational practices, industry norms, and societal dynamics. Addressing gender-based disparities in compensation requires efforts such as pay equity initiatives, inclusive hiring and promotion practices, and fostering an environment that values and recognizes the contributions of all employees.

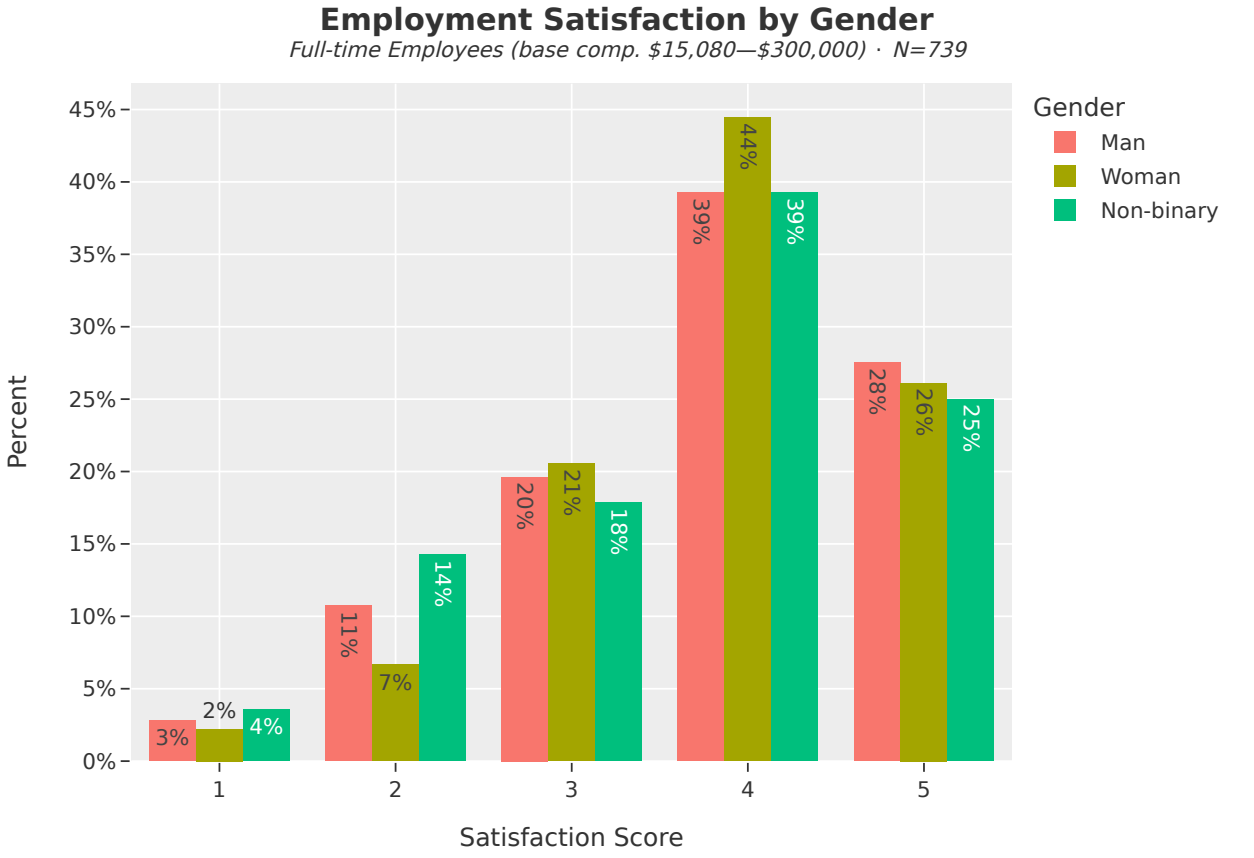


Figure 11.5: Employment Satisfaction by Gender

Looking at fig. 11.5, we found that the strikingly low satisfaction level among all genders, or that over a third of respondents are not satisfied with their job situation, might suggest the presence of potential systemic issues within the industry.

The relatively high neutral satisfaction rates across all genders might indicate a lack of engagement or fulfillment in their current roles. Factors like stagnant career growth, limited autonomy, or inadequate work-life balance could contribute to this neutral stance.

The majority of professionals across genders expressing a high level of satisfaction suggests positive workplace experiences for a significant portion of the workforce. Potential reasons behind this satisfaction might include challenging and meaningful projects, supportive work environments, and opportunities for personal

and professional development.

While these trends offer valuable insights, it's important to note that job satisfaction is a complex and multifaceted aspect influenced by various factors, both within and outside the workplace. Addressing gender disparities and creating inclusive environments that promote equal opportunities, diversity, and fair treatment for all employees can contribute to a more balanced and satisfying professional landscape.

Through ongoing data analysis and dialogue in future survey and in between, as well as individuals, we can continue to identify areas for improvement, advocate for change, and foster environments where individuals from all gender identities can thrive and find fulfillment in their careers.

Given that the survey only includes 31 respondents who identify as non-binary, any statistics calculated may be skewed. However, trends shown in figs. 11.1, 11.2, 11.3, 11.4 suggest that compensation for non-binary respondents follows the same pattern as compensation for women; non-binary respondents make less than men.

Women's median Estimated Total Compensation (ETC) is about $30,000 less than men's. Non-binary respondents face a slightly smaller gap of about $29,000.

11.1 Gender and Years of Experience

Looking at how experience level plays into the wage gap, there is a greater density of women and non-binary people who are still early in their career. This may indicate that the wage gap may close with some time, but that necessitates that the growth outpaces that of men's compensation to experience ratio. Fig. 11.6 is a version of fig. 8.12 with gender highlighted and fig. 11.7 is a version of fig. 9.3 also with gender highlighted.

11.2 Gender and Negotiation

We hypothesized that perhaps women would be less likely to negotiate. In fact, this was not the case. To assess if differences in pay were due to differences in salary negotiation success, we compared how many men and women reported successfully negotiating. Differences between men and women were marginal. 55% of men negotiated successfully, 9% had their negotiation denied, and 36% did not negotiate, as compared to 49% of women who negotiated successfully, 13.6% had their negotiation denied, and 36% who did not negotiate. Notably, 12% of women attempted to negotiate, were denied, and took it anyway, while only 7% of men did this. See fig. 11.8.

Non-binary respondents reported less negotiation success; 52% negotiated successfully and 16% had their negotiations declined. As compared to men and women, 39% of non-binary respondents did not negotiate at all. It is possible that these differences are not representative– we do not have sufficient data to make conclusions about the workplace experiences of non-binary respondents– but this is still a trend worth investigating further in future research.

According to Leibbrandt and List (2014), women's negotiations are turned down more often than men's – women would receive a raise of 15% vs men's 20%.

"Women's Earnings – the Pay Gap: Quick Take." (2022) presents data that shows that women earn less than men across various industries and occupations, despite equal qualifications and experience. The article highlights the pay gap's impact on women's earning potential over their lifetime and their ability to save for retirement. For example, the women make 83.2% of what men do for architecture and engineering, and 86.1% for Computer and Mathematical occupations. The article also explores the reasons for the pay gap, including occupational segregation, unconscious bias, and discrimination. Of course, the wage gap increases for women of color. Across all professions, compared to every $1 earned by White men in 2020:

- Black women earned 64 cents
- Latinas earned 57 cents
- White women earned 79 cents

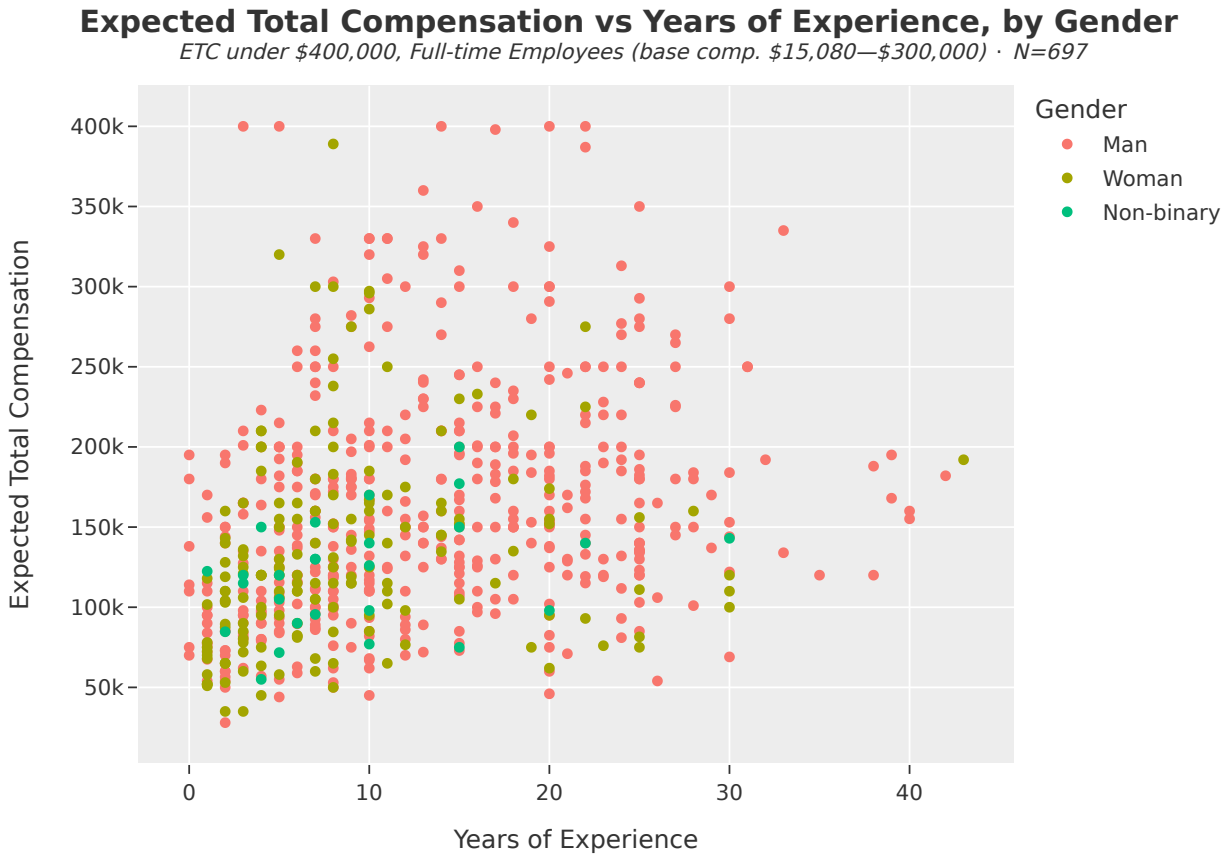


Figure 11.6: Expected Total Compensation vs Years of Experience, by Gender

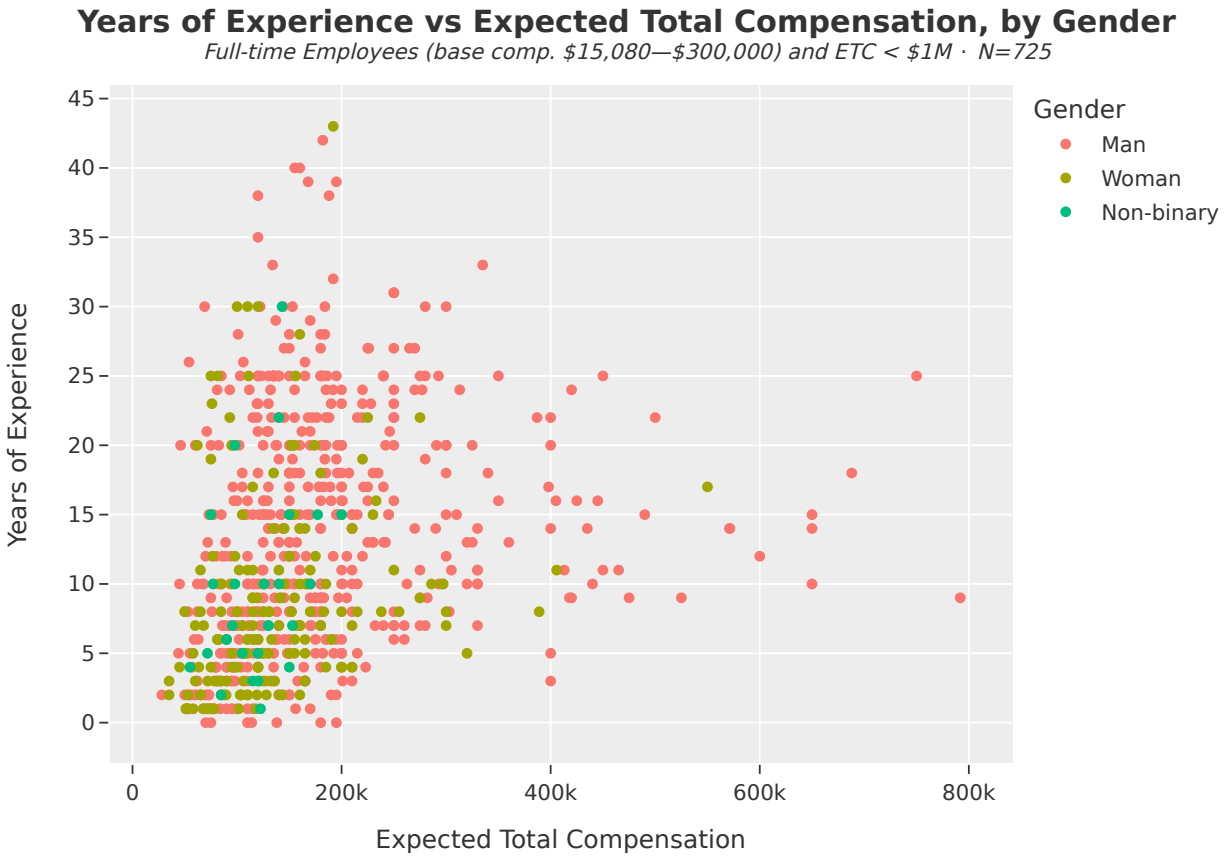


Figure 11.7: Years of Experience vs Expected Total Compensation, by Gender

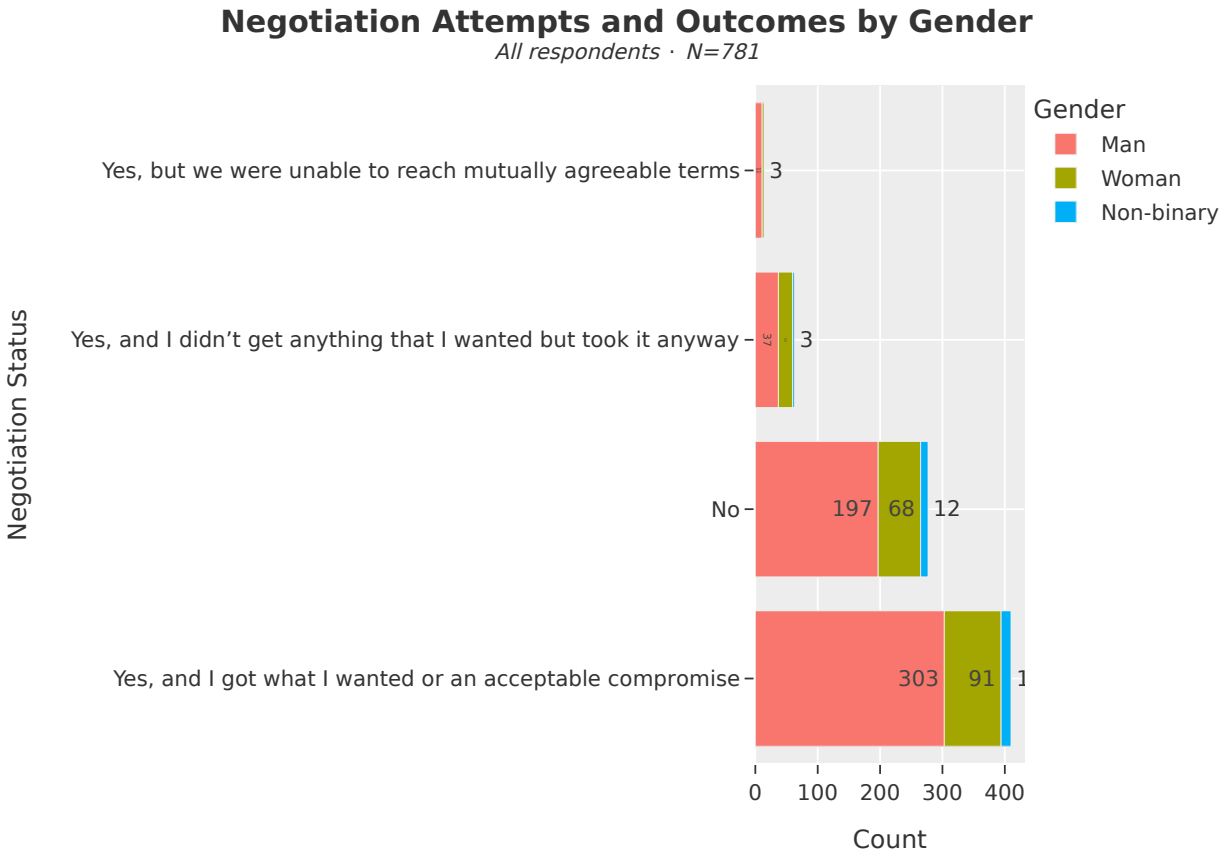


Figure 11.8: Negotiation Attempts and Outcomes by Gender

ARAGÃO (2023) says similar. They found that the gender pay gap in the US has remained relatively stable over the past two decades, with women earning an average of 82% of what men earn. The gap is smaller among younger workers, with women aged 25 to 34 earning 92 cents for every dollar earned by men. However, women continue to be overrepresented in lower-paying occupations. The narrowing of the gap over the long term is largely due to women's gains in educational attainment, occupational segregation and work experience. The gender pay gap remains despite women's increased presence in higher-paying, traditionally male-dominated jobs.

Stieg (2022) reports, in tech, specifically, men were offered higher salaries than women for the same job title at the same company 59% of the time, according to a 2021 survey from Patel (2023). On average, women were offered salaries 2.5% less than the ones that men were given for the same roles, the survey found. The Hired survey also mentioned that 84% of women believe there's a gender wage gap, while 63% said there was.

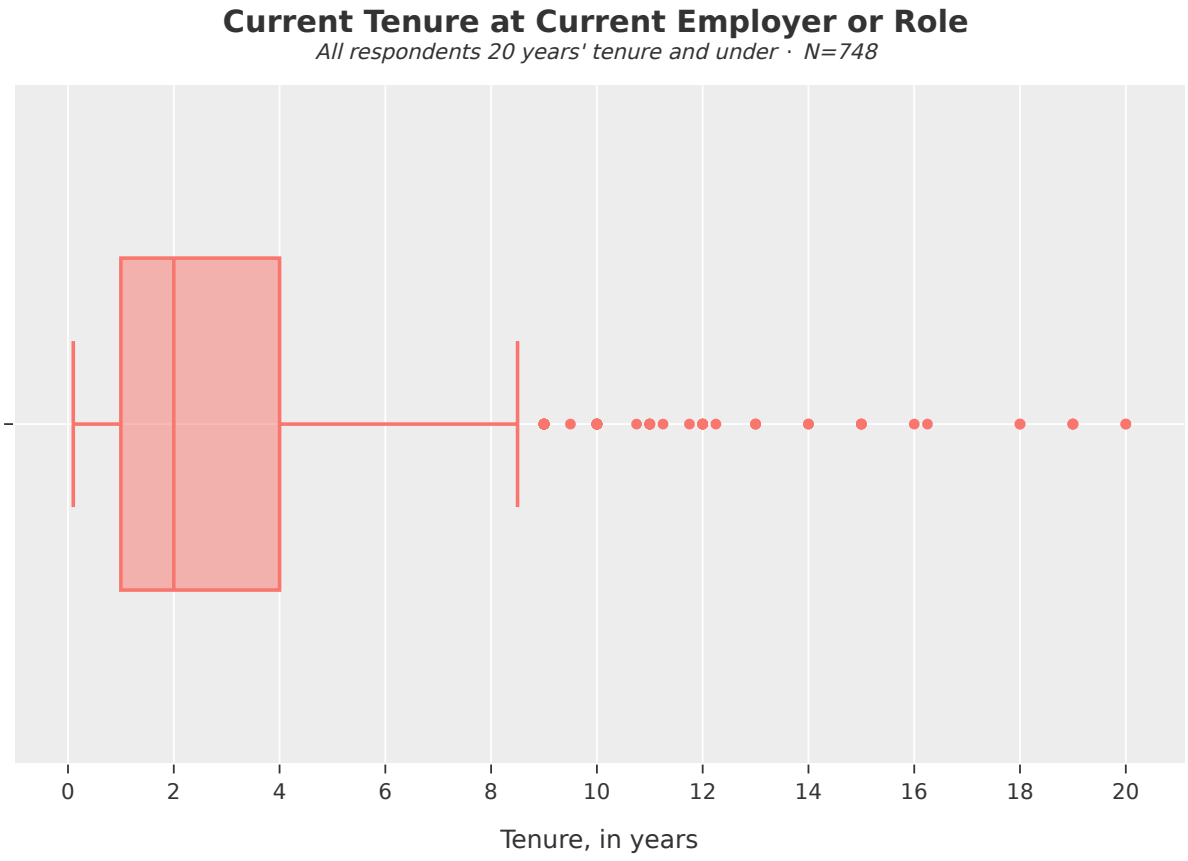


Figure 11.9: Current Tenure, respondents under 20 YoE

Chapter 12

Career Path

We explored why people change jobs and how long people plan to stay at their current employer. Salary changes and job switches are common occurrences for many respondents, while promotions are seemingly not: 28% of respondents were promoted in the last year (fig. 12.1). This trend follows conventional wisdom about the industry.

Based on the provided data in the question "How much did your salary change after a promotion?" it appears that promotion salary changes can vary significantly for respondents. Interestingly, most respondents (38%) received raises in the range of 6-10% following a promotion, while a significant portion (36%) saw even larger increases in the range of 11-25%. This suggests that promotions can lead to substantial salary changes for many employees.

A significant portion of respondents (12%) received raises that were 5% or less, while 19% had raises in the range of 6-10%. This figure suggests that while some employees may see small salary increases, others may see more substantial changes. Additionally, it confirms typical advice that job switching can lead to more significant salary increases, as 65% of respondents who switched jobs saw raises of more than 11% (fig. 12.13). This could indicate that some employees may be more likely to switch jobs to achieve higher salaries rather than relying on raises within their current position.

However, it is also notable that a small percentage of respondents (16%) received raises of less than 5%, indicating that not all promotions lead to significant salary increases. It is possible that these individuals may have received promotions with added responsibilities but without a corresponding increase in pay, or they may have been promoted to a position with a lower pay range than their previous position.

Overall, the data suggests that promotions can be a valuable tool for increasing one's salary, but the actual amount of the raise may vary depending on a range of factors, like tenure at the company, budget, and the type of company. We want to explore this further.

12.1 Tenure at Current Employer, Nationwide & Allegheny County

Fig. 12.3 shows the analysis of the current tenure of all respondents. Fig. 12.4 shows only respondents under ten years' tenure at their current employer.

Allegheny County tech workers have been at their current employer or role for 24 months, while national median is 18 months. Fig. 12.5 shows for those under ten years while fig. 12.6 shows for those ten years and more.

How long do people stay at their employers in Allegheny County? Do they stay longer or shorter when compared to the national average? The 2017 Code & Supply compensation survey found that Allegheny County worker tenure was *longer* than the national average, but the 2020 survey found that worker tenure in Allegheny County is *shorter* than the national average.

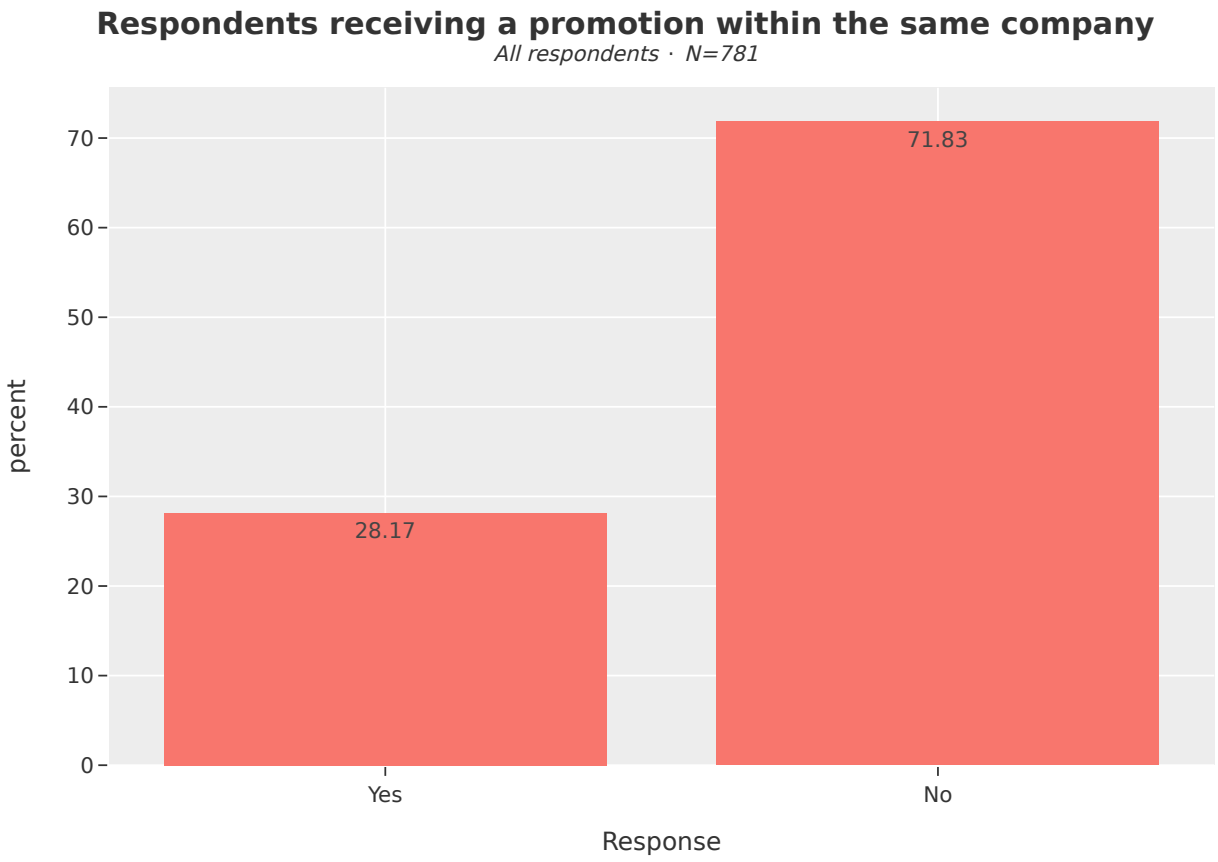


Figure 12.1: Respondents receiving a promotion within the same company

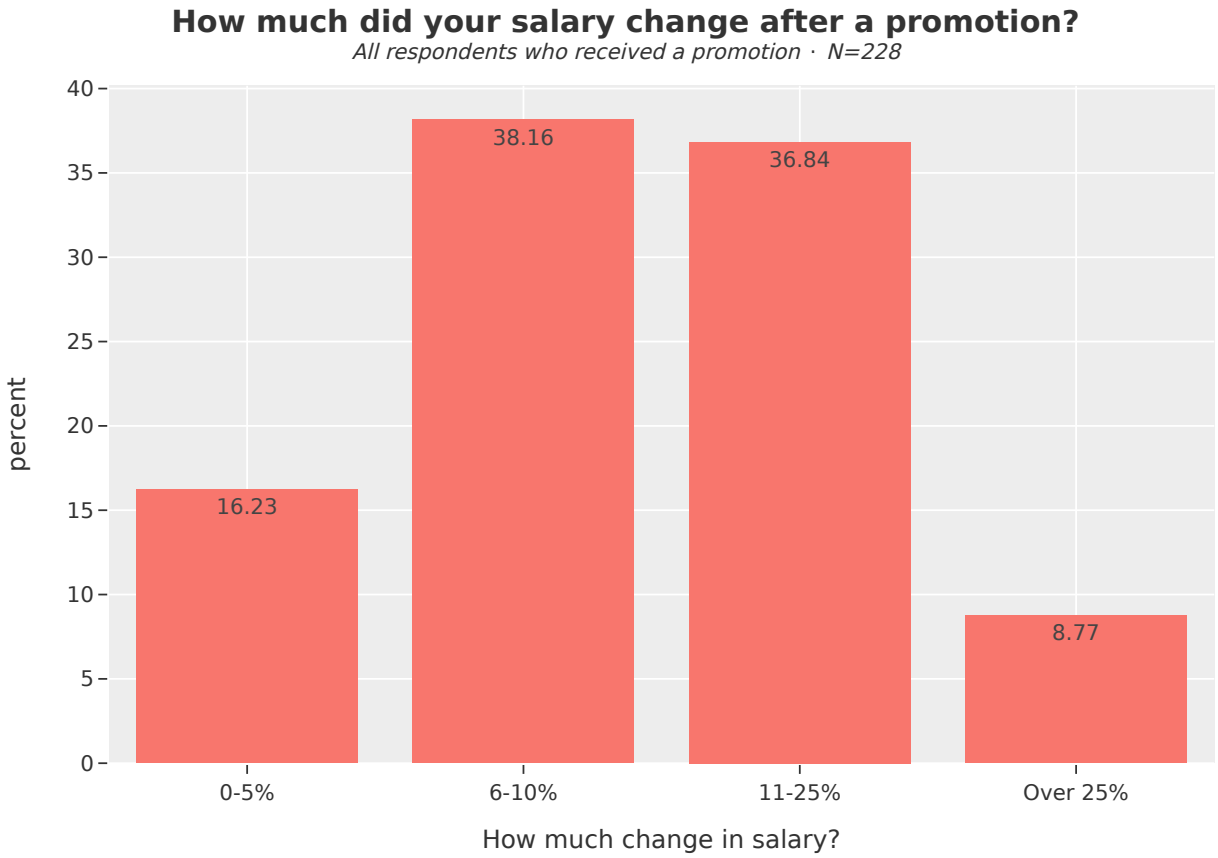


Figure 12.2: How much did your salary change after a promotion?

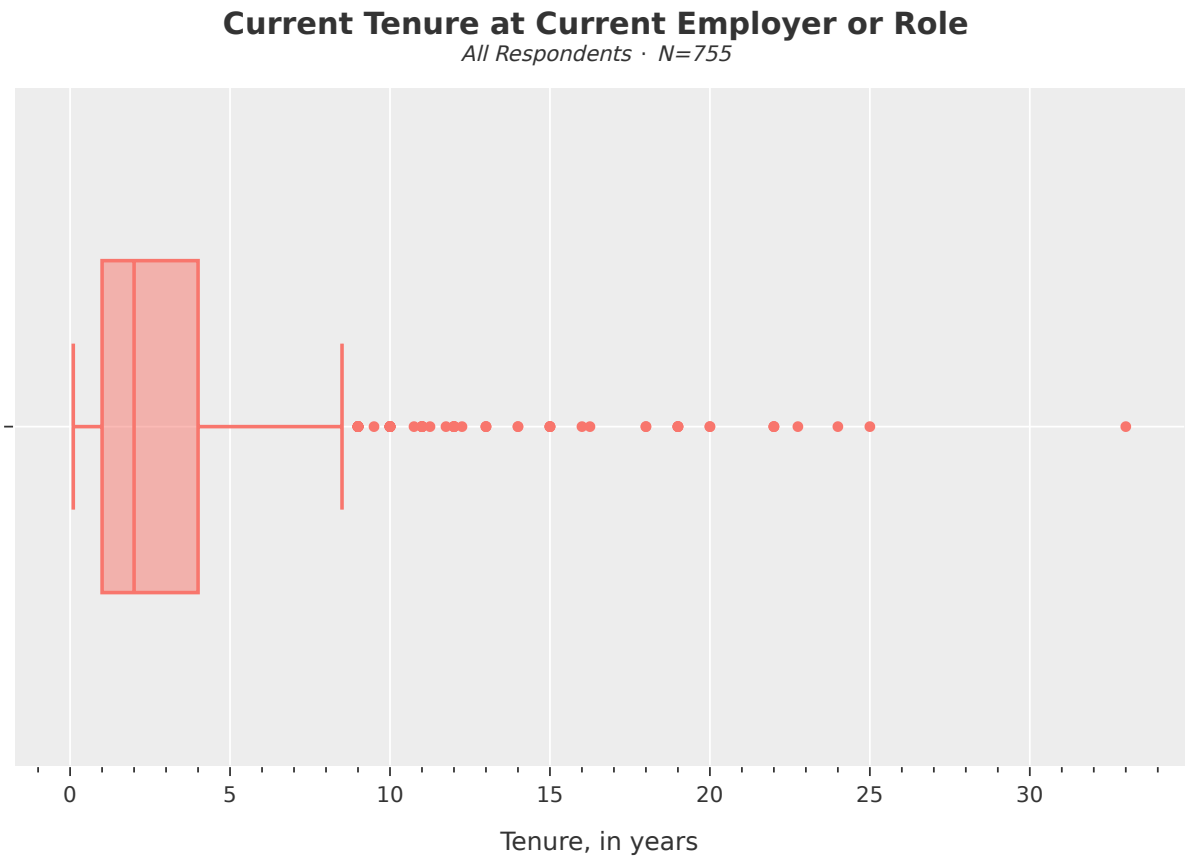


Figure 12.3: Current Tenure

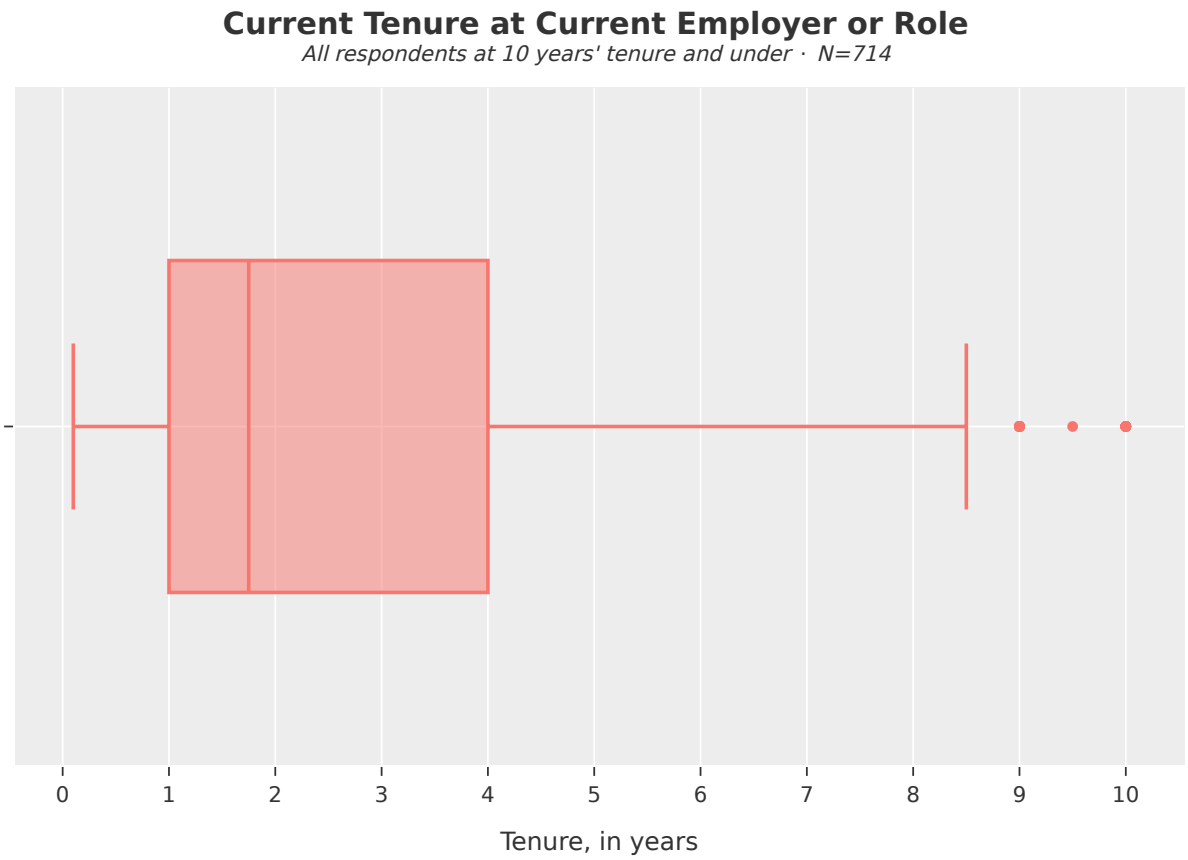


Figure 12.4: Current Tenure, under ten years

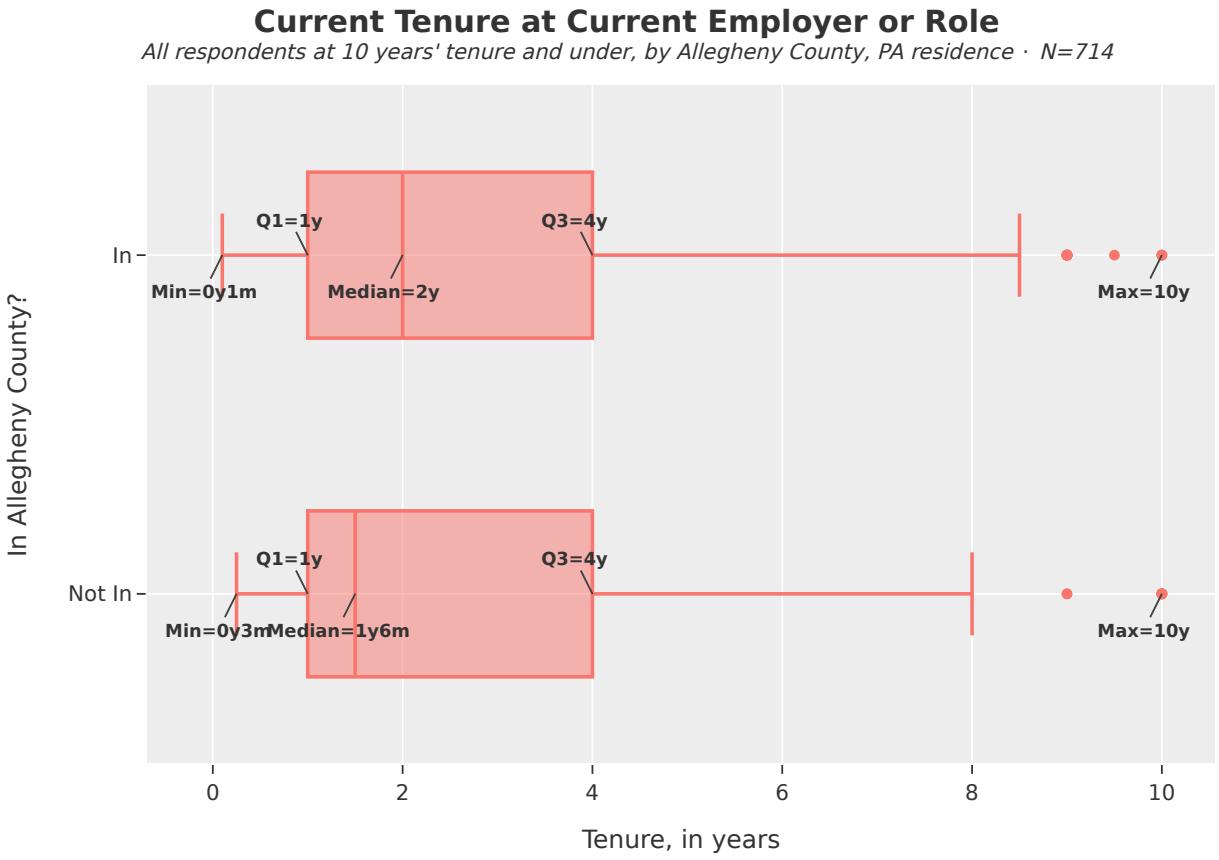


Figure 12.5: Current Tenure under 10 years in and out of Allegheny County

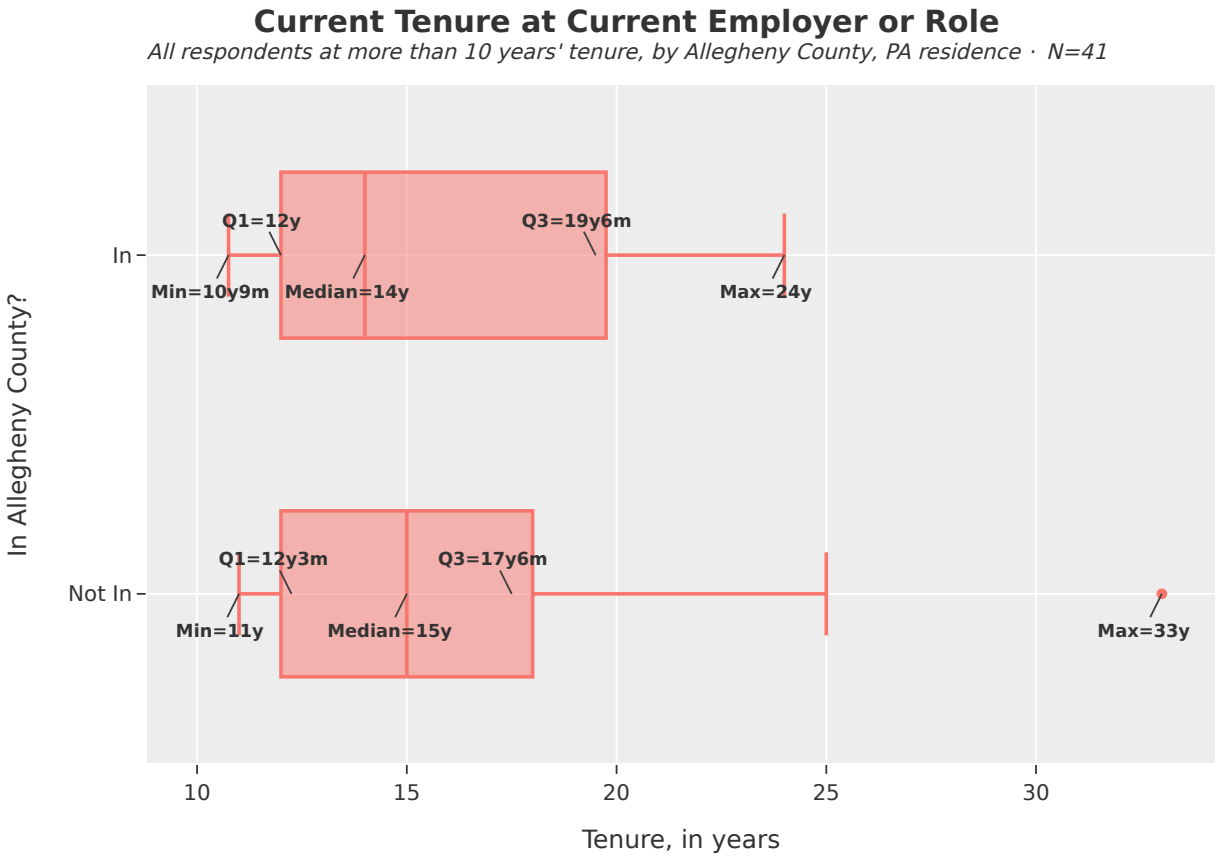


Figure 12.6: Current Tenure over 10 years in and out of Allegheny County

12.2 Current Tenure by Job Title

Respondents surprised us with shorter-than-expected tenures for software engineers, including senior software engineers and lead or principal engineers. While (senior) software engineers reported a lower tenure than we estimated, lead or principal engineers, generally considered highly marketable, are sticking around longer at the higher end of tenures but about the same at the first quartile of tenures. Fig. 12.7 shows the ranges.

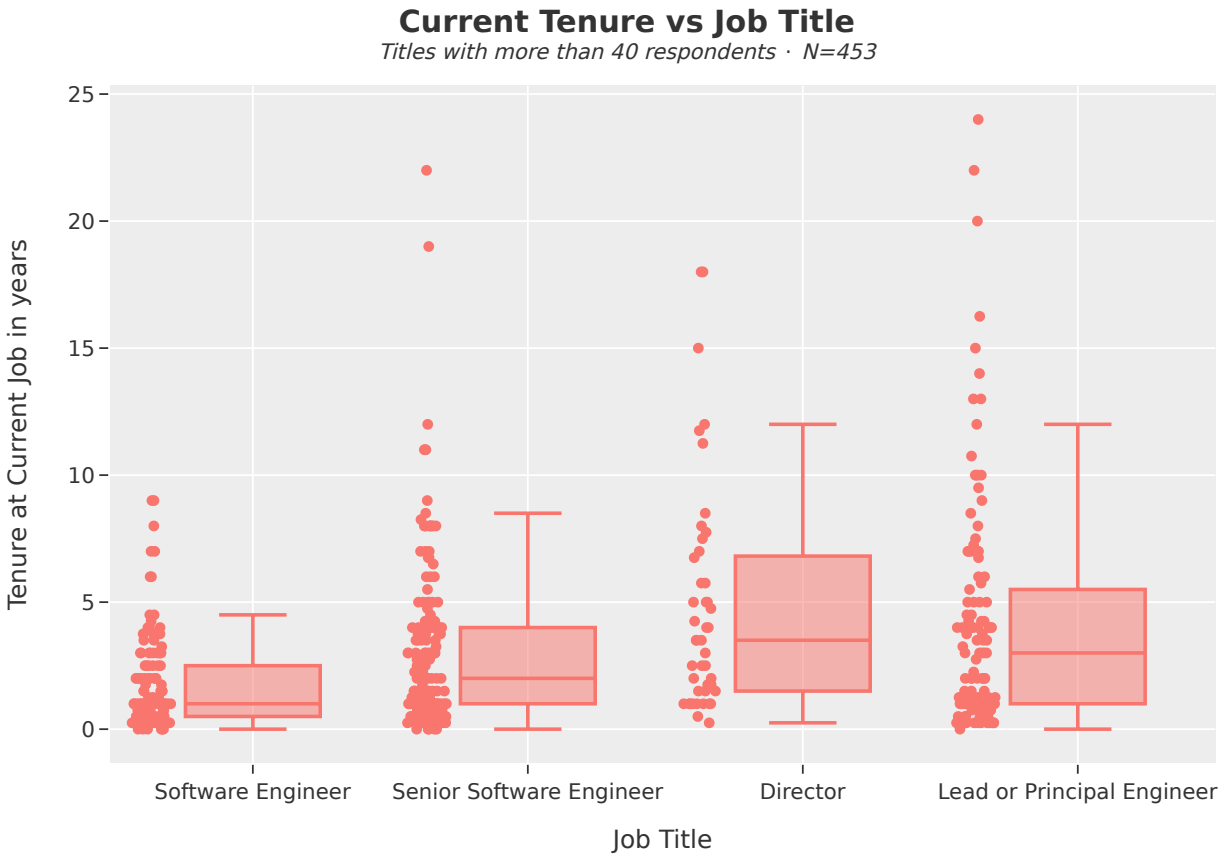


Figure 12.7: Current Tenure by Job Title; titles with more than 40 respondents

Fig. 12.8 tells us that web developers have not been at their current job very long while QA and test engineers have stuck around for a long time.

12.3 How much longer do you plan to stay at your current employer?

Fig. 12.9 shows responses to the "How much longer do you plan to stay at your current employer?" question. Many respondents are uncertain about how long they plan to stay at their current employer, with 30.7% indicating that they do not know. Among those with a timeframe in mind, the largest group, at 17.8%, plan to stay for 2-4 years. The following largest groups are those who plan to stay for 1-2 years, at 14.8%, and those who plan to stay for more than four years, at 12.3%. A smaller portion of respondents, at 9.9%, plan to stay for six months to a year, and an almost equal amount, at 9.8%, plan to stay for less than six months. Finally, 4.6% of respondents plan to stay with their current employer indefinitely. These statistics suggest that many factors influence employee retention, and employers may need to adapt their strategies to accommodate their workforce's various needs and goals.

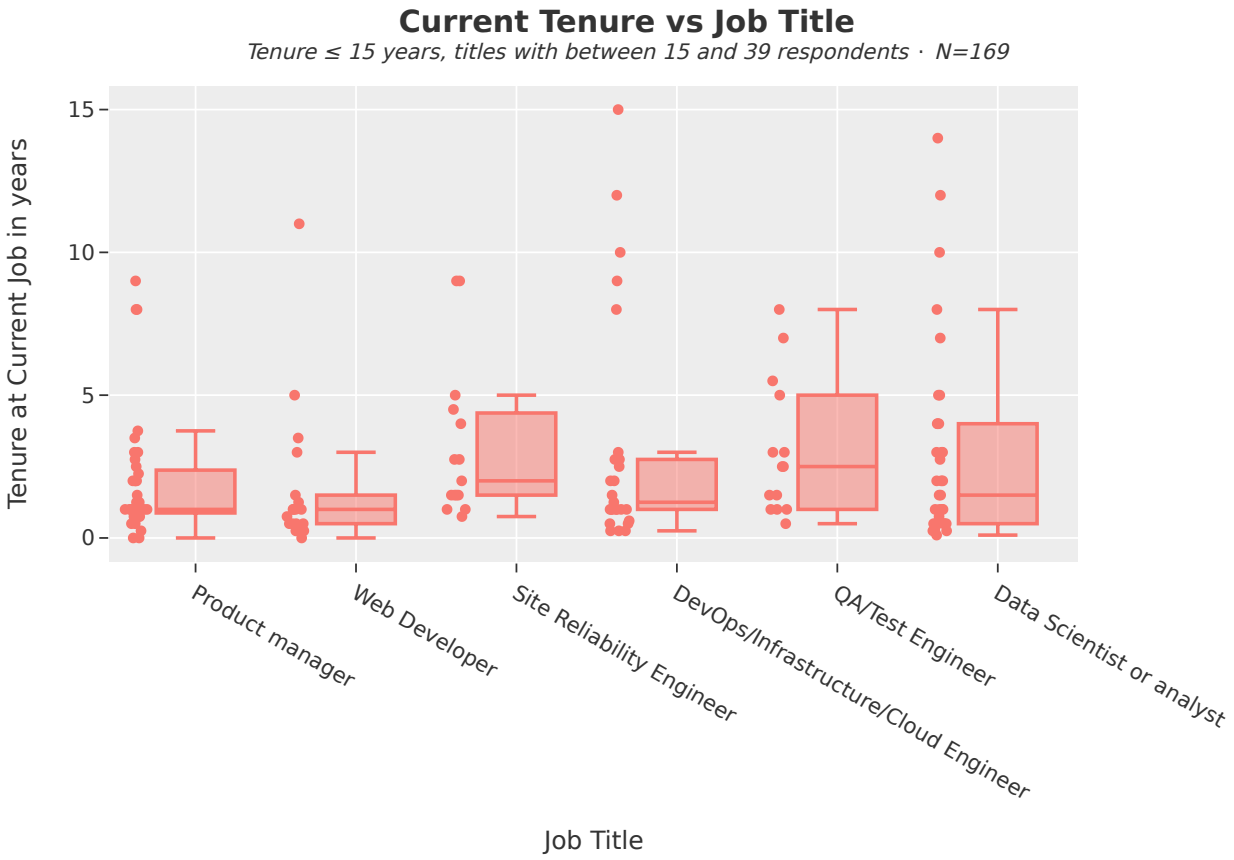


Figure 12.8: Current Tenure by Job Title; tenure <= 15 years, titles with 15–39 respondents

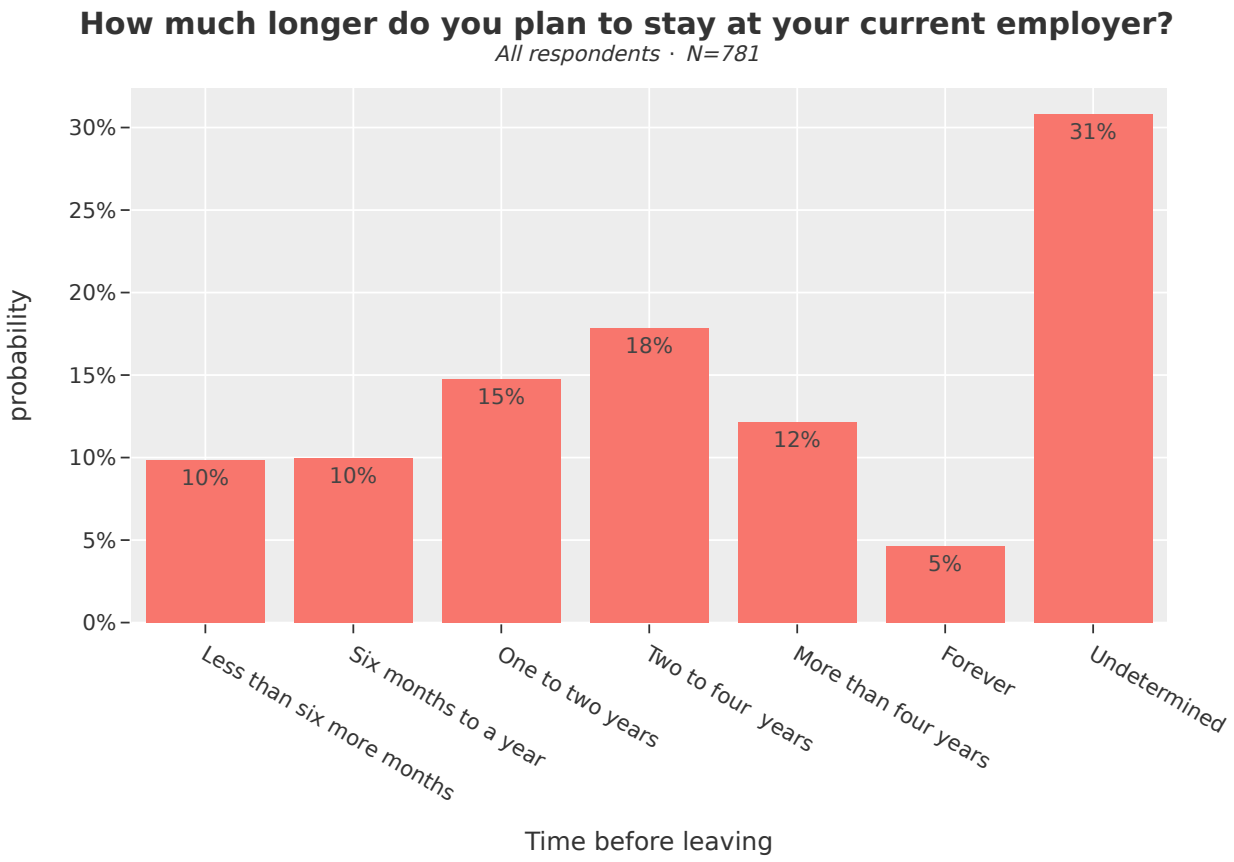


Figure 12.9: How much longer do you plan to stay at your current employer?

12.4 Looking for Work

We explored the various parts of the job search and interviewing process. As remote work becomes increasingly prevalent, the process of interviewing candidates for tech positions has also undergone significant changes. According to a study by Hired[1], remote technical interviews have increased by 106% since the start of the pandemic, as companies have had to adapt to the new reality of remote work.

This shift has presented new challenges for both interviewers and candidates. For example, video conferencing tools may not always work as expected, leading to technical difficulties that can negatively impact the interview experience. Additionally, interviewers may have to work harder to establish a rapport with candidates when they can't meet in person. Few respondents were trained or experienced with online interviewing prior to the pandemic. However, there are also potential benefits to remote tech interviews, such as the ability to easily record and share interview sessions with other team members, which can improve the overall hiring process. Overall, while remote tech interviews may come with some challenges, they have become an essential part of the hiring process for many companies in the current remote office culture.

12.4.1 Job Search

569 respondents – 72.8% percent – interviewed in the last three years before the survey, since the summer of 2019.

Fig. 12.10 shows that 4% of respondents had one round of interviews, 13% had two rounds, 28% for three rounds, 15% for four rounds, and 12.6% had five or more. 27% can't remember!

We asked about the respondents' most recent search-to-hire cycle. We are interested to understand how long respondents' job hunting lasts. Fig. 12.11 shows that 18% of respondents found a job in one month or less and 43% found a job within three months. However, 27% of respondents had *no* appreciable time to hire in the current role. We speculate this was in-company movements or spot asks.

Regarding technical roles, interviews have evolved to incorporate different assessment methods. Traditional practices like technical oral questions/technical questioning, technical whiteboarding, and architectural whiteboarding have remained popular, but there is a growing trend toward utilizing live coding platforms for interviews. Platforms such as Karat, HackerRank, or Coderpad have gained prominence, enabling interviews to be conducted remotely, and eliminating the need for both the interviewer and the interviewee to be physically present in the same location.

With the aid of these platforms, the interview process seamlessly transitions to a virtual environment. During a live coding interview, the format remains akin to whiteboarding questions. The interviewer poses a technical problem or challenge, and the interviewee solves it directly on the live coding platform. While the interviewer is typically available to clarify doubts or provide additional context, they do not offer direct assistance in solving the problem. This remote setup allows for greater flexibility in scheduling and facilitates interviews between individuals in different geographical locations. Candidates can showcase their technical skills and problem-solving abilities, while interviewers can assess their approach, code structure, and overall competence in real time.

By incorporating live coding platforms into the interview process, companies can streamline their hiring procedures and efficiently evaluate candidates' technical aptitude. The results obtained from such interviews, combined with data from compensation surveys, aid in determining appropriate salary ranges and ensuring fair and competitive compensation for technical roles within organizations.

Some other types of interview categories are:

- Pre-screening: Many companies start with a pre-screening stage to filter out candidates based on their resumes or initial application. This could involve reviewing the candidate's qualifications, experience, and specific technical skills relevant to the role.

[1] https://hired.com/blog/highlights/2020-state-of-remote-work-report/

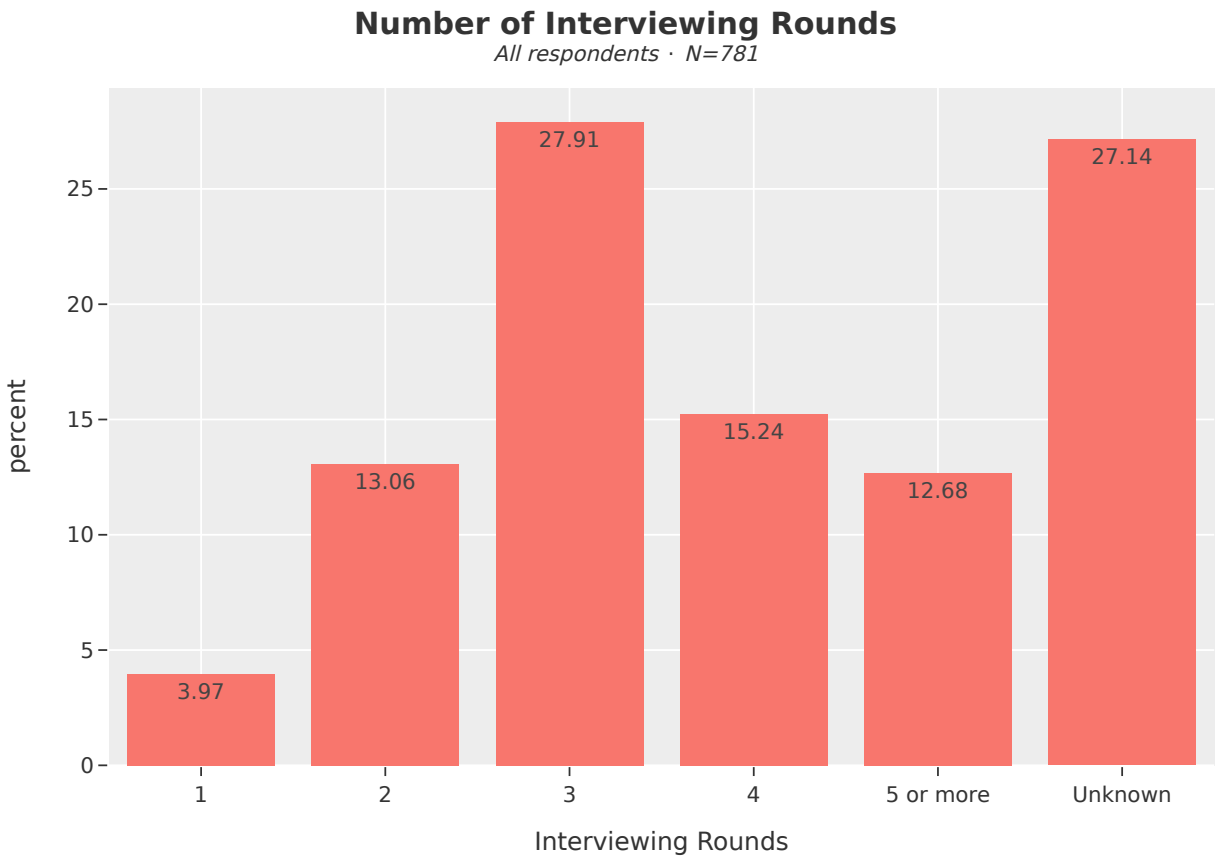
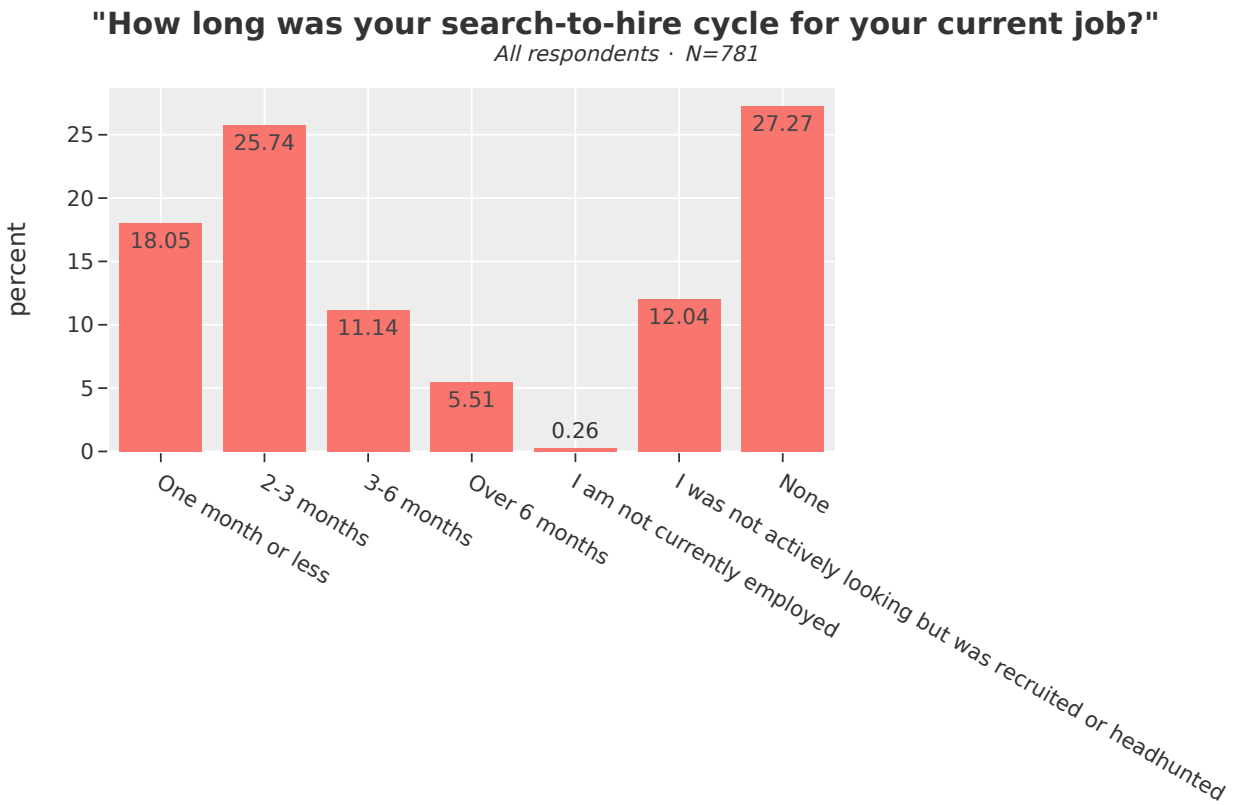


Figure 12.10: Number of interviewing rounds



"How long was your search-to-hire cycle for your current job?"

Figure 12.11: “How long was your search-to-hire cycle for your current job?”

- Behavioral and Cultural Fit: In addition to technical skills, companies often assess a candidate's behavioral attributes and cultural fit within the organization. This may involve behavioral interviews where candidates share their past experiences, teamwork abilities, and problem-solving approaches. Companies may also evaluate candidates' alignment with the company's values, work culture, and their ability to collaborate effectively in a team environment.
- Final Interviews and Decision: Following the technical and behavioral assessments, successful candidates may be invited for final interviews with key stakeholders or senior management. These interviews may focus on aligning the candidate's goals and expectations with the company's vision, discussing compensation packages, and addressing any remaining questions or concerns.

It's worth noting that the tech interview process can vary across companies and roles. Some organizations may incorporate additional steps such as take-home assignments, pair programming exercises, or technical presentations. Candidates should prepare by studying technical concepts, practicing coding problems, and researching the company's values and culture to showcase their technical prowess and potential fit within the organization.

12.4.2 Negotiation

Respondents were much more satisfied with their jobs when they negotiated and their negotiations were either somewhat or completely fulfilled. Those who negotiated and had their negotiations declined outright where the least satisfied of all respondents, even moreso than the respondents who did not negotiate at all. A strong takeaway here is that companies should always accept some negotiation or say that negotiation is not possible upfront, as soon as it is brought up.

We found that over half of our respondents negotiated their most recent job offer, and most of those were successful. This goes to show that if you are hesitant to negotiate, you should try because your about-to-be-new employer is likely prepared for it. Negotiating a salary in the tech industry can have numerous benefits for workers. Firstly, it can help ensure that they are paid fairly and in line with industry standards. This can be especially important in the fast-paced and rapidly-evolving tech industry, where skills and experience can quickly become outdated. A negotiated salary can also help employees feel valued and motivated, leading to increased job satisfaction and productivity. Additionally, negotiating a salary can set the stage for future negotiations and career advancement opportunities.

There is no evidence to suggest that tech workers with higher salaries are more likely to be laid off, according to Forbes and Business Insider. In fact, many companies may prioritize retaining highly skilled and experienced employees, which may include those with higher salaries. However, it is important to note that economic conditions and company-specific factors can impact job security for all workers, regardless of their salary. Therefore, while negotiating a salary can provide numerous benefits, it is also important for workers to remain aware of broader economic and industry trends and to continue to build and improve their skills and experience.

According to an Adobe's Future Workforce study[2] that studies Gen Z, 85% reported they are "less likely to apply for a job if the company does not disclose the salary range in the job posting."

In future surveys, we may explore non-salary negotiation options such as vacation time or working arrangements, as suggested in "Salary Negotiation: Make More Money, Be More Valued" McKenzie (2012), a seminal essay in the area of tech job offer negotiation that was course-correcting in the careers of we the authors of this report. We highly recommend reading it.

12.5 Switching Jobs

For this question, we considered a "job switch" to be that the respondent switched jobs or roles or had a significant change in responsibilities in the last year.

[2] https://blog.adobe.com/en/publish/2023/01/24/adobes-future-workforce-study-reveals-what-next-generation-workforce-looking-for-in-workplace

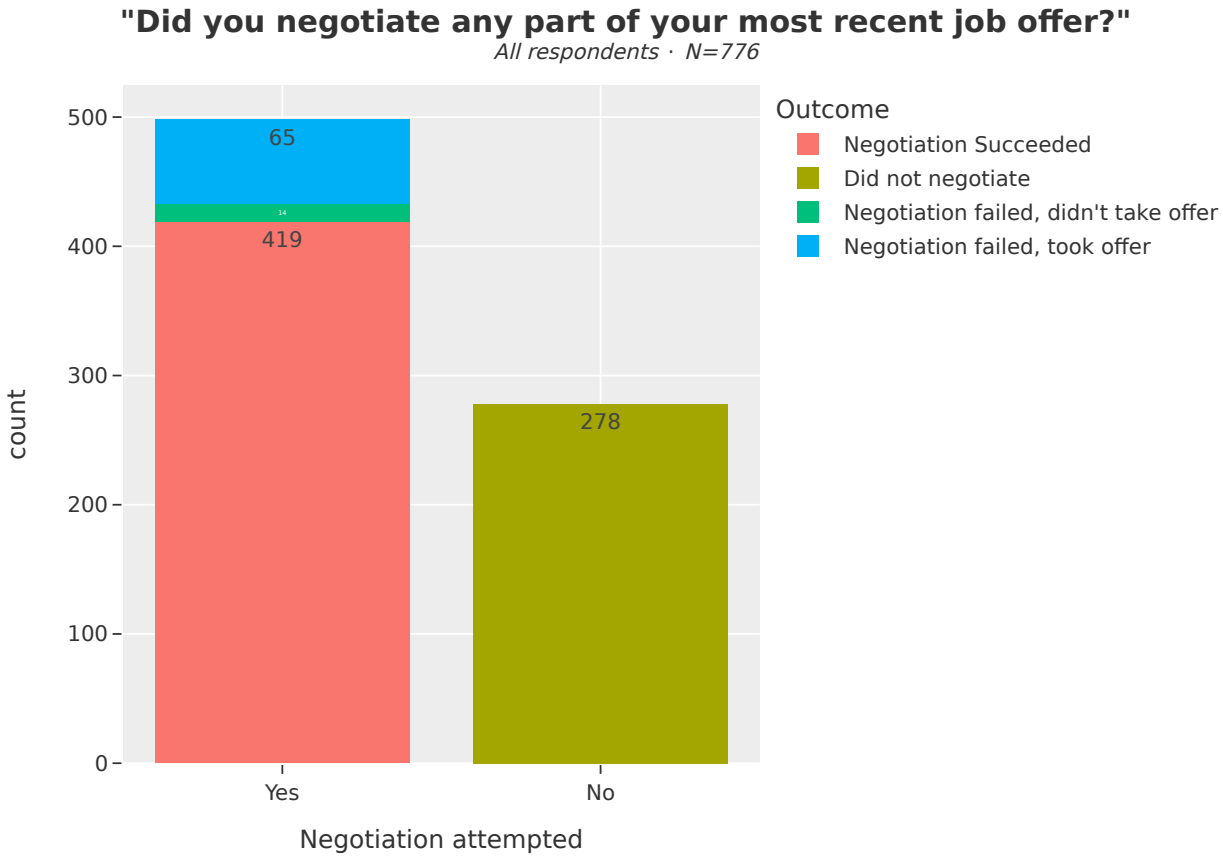


Figure 12.12: Respondents who negotiated job offer

More than half of the respondents changed jobs in the previous year. Around eight percent of those who changed jobs accepted a salary less than their last salary. Fig. 12.13 shows the analysis.

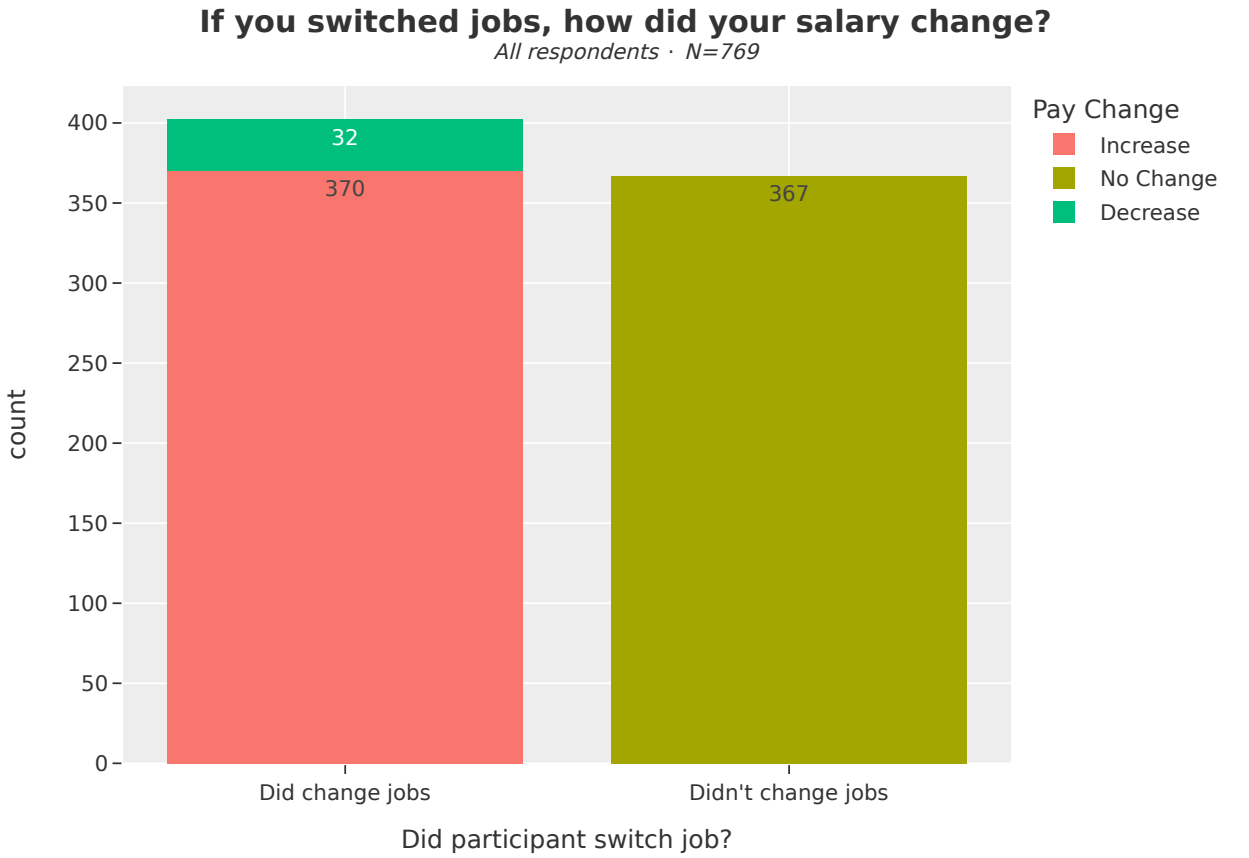


Figure 12.13: If you switched jobs, how did your salary change?

A heartening figure is that nearly two-thirds of respondents who switched jobs received a salary increase of more than an 11%. This supports tremendously the idea that switching jobs is the fastest way to increase salary. Fig. 12.14 has the analysis.

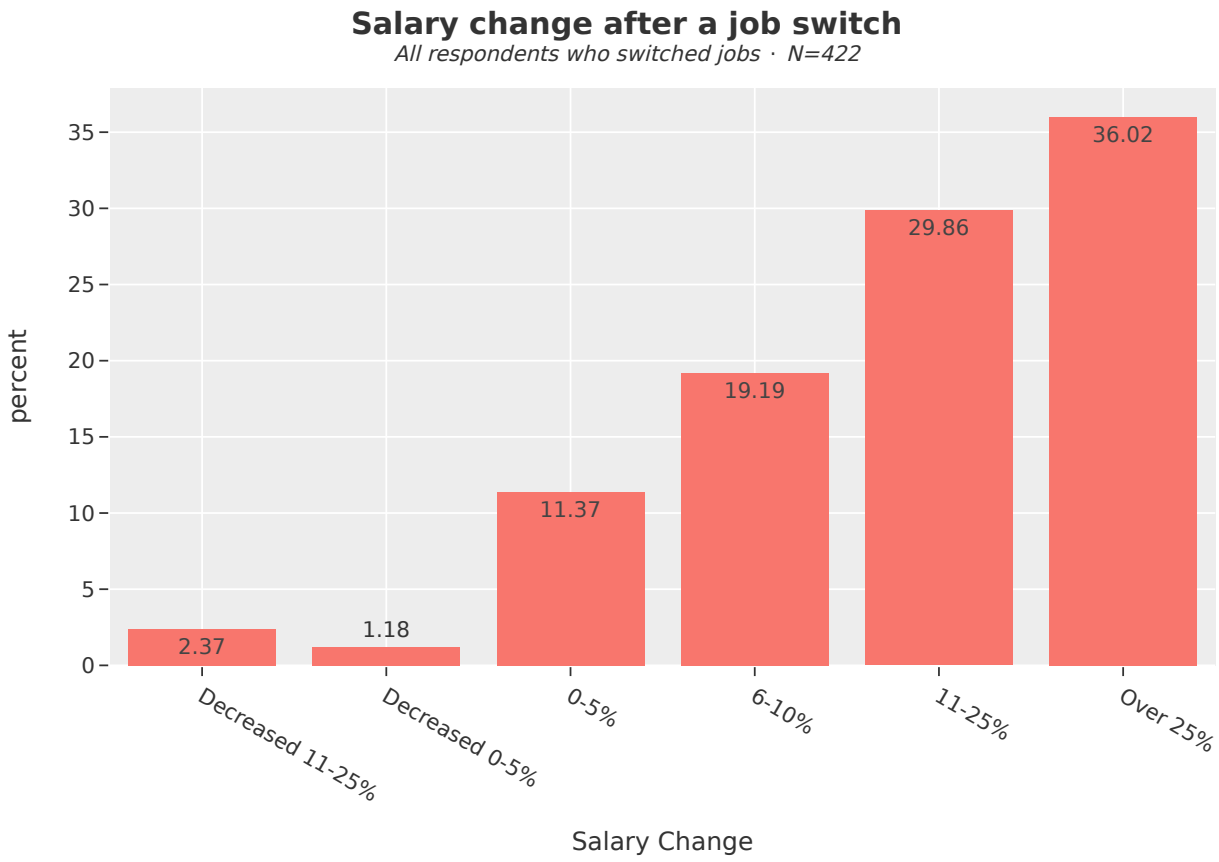


Figure 12.14: Salary change after a job switch

Chapter 13

Current Employer, Position, and Future Plans

We explored people's position at their current job, their skills and how they relate to the position, as well as technology used. We also asked about raises that people received and asked questions about work-life balance, to answer if particular titles received higher raises, worked more hours, and more.

13.1 Employer data

Respondents' employers are predominately small businesses at 51-250 employees or in the single-digit thousands of employees. Tbl. 13.1 shows the counts of respondents' companies by size. Tbl. 13.2 shows the count of respondents by the industries in which they are currently working.

Table 13.1: The counts of respondents' employers by number of employees

Company Size	Count
50 or fewer employees	115
51 - 250	185
251 - 500	66
500 - 1000	65
Over 1,000	159
Over 10,000	58
Over 50,000	118

Table 13.2: The counts of respondents' employers by industry

Company Industry	Count
Other	139
Big Tech (Amazon, Facebook, Apple, Google, Microsoft, etc)	80
Healthcare	73
Business Services	72
Fintech	70
Consulting	64
Education	62

Company Industry	Count
Retail	38
Automotive & Autonomous Vehicles	35
Banking	33
Government/Public sector	27
Robotics	16
Non-profit	16
Shipping & Logistics	11
Big Media (Netflix, Spotify, Hulu, etc).	10
Smaller entertainment & gaming (Local companies, theaters, indie apps & gaming)	6
Scientific computation	5
Tech incubator	4
Simulation/CAD/EDA	3
Big Gaming (EA, Microsoft Gaming, Sony, etc.)	2
GIS	2

13.2 Working in the Office

In the summer of 2022, fewer than 4% of respondents worked fully in-person. Around 20% worked in an office infrequently, ostensibly quarterly or monthly on-site work days or meeting days. Just 18% were in the office regularly but not every day. The remaining 57% were fully remote. Fig. 13.1 shows this data.

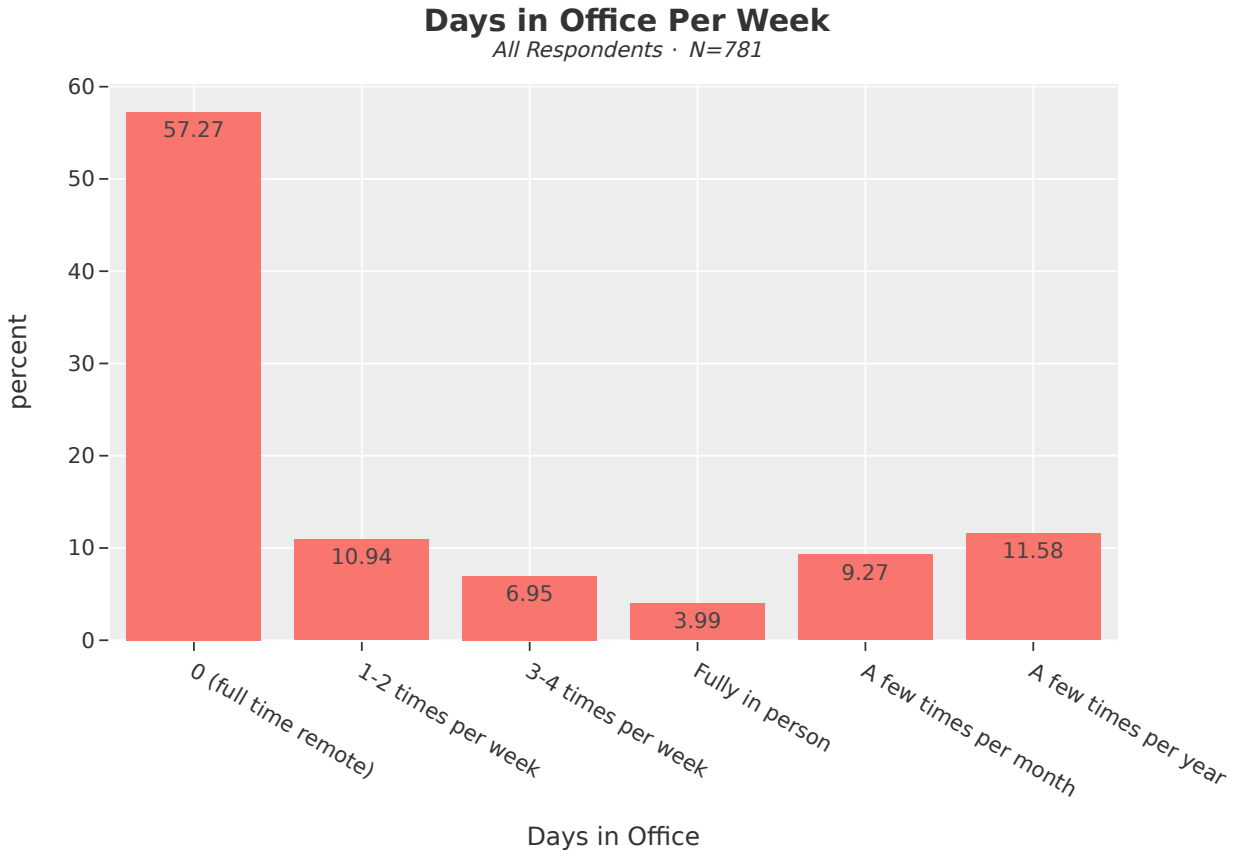


Figure 13.1: Days in Office per week, All Respondents

Fig. 13.2 didn't surprise us when we looked at the manager versus non-manager breakdown of the frequency of in-office days. More respondents who are individual contributors are also full-time remote employees. Managers spend more time in office than individual contributors.

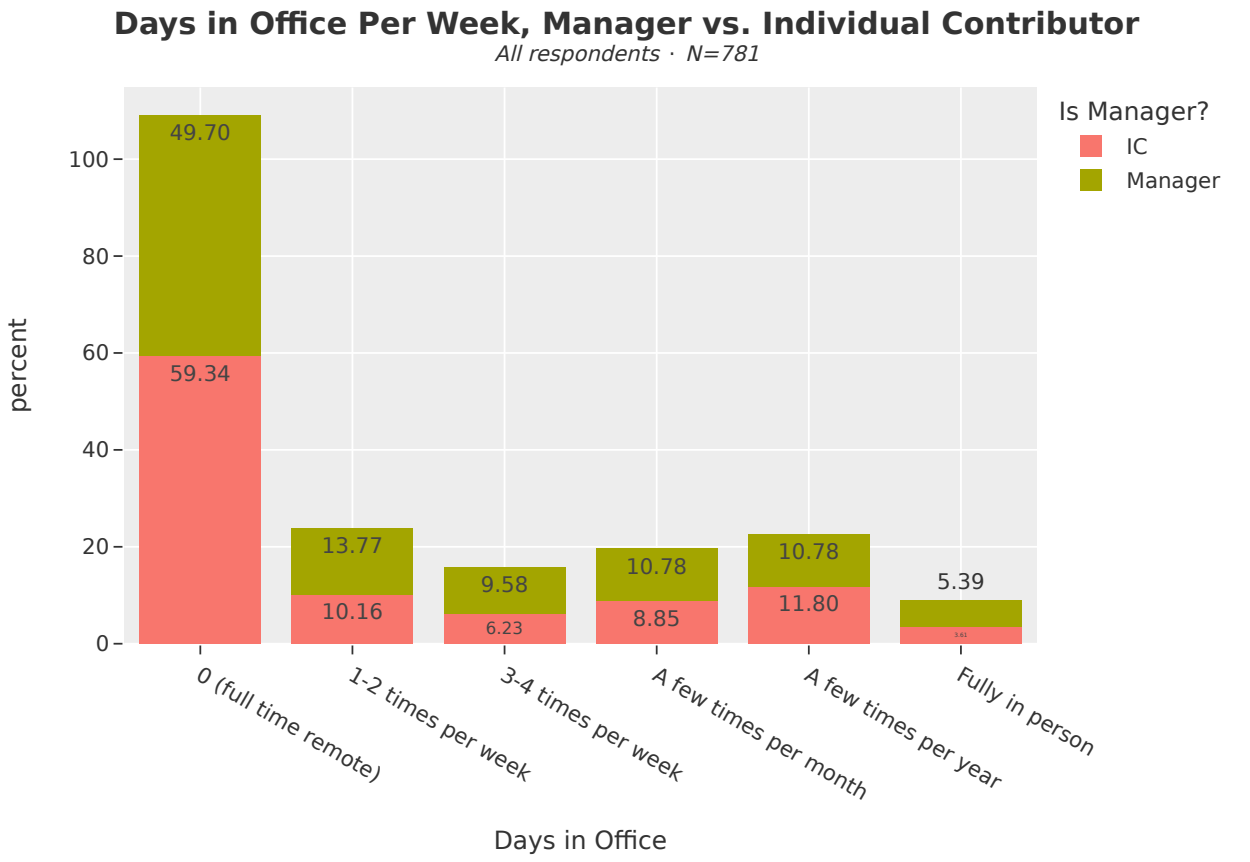


Figure 13.2: Days in Office per week, Managers vs. Individual Contributors

As in other analyses, in-office habits changed between the summer of 2022 and spring 2023.

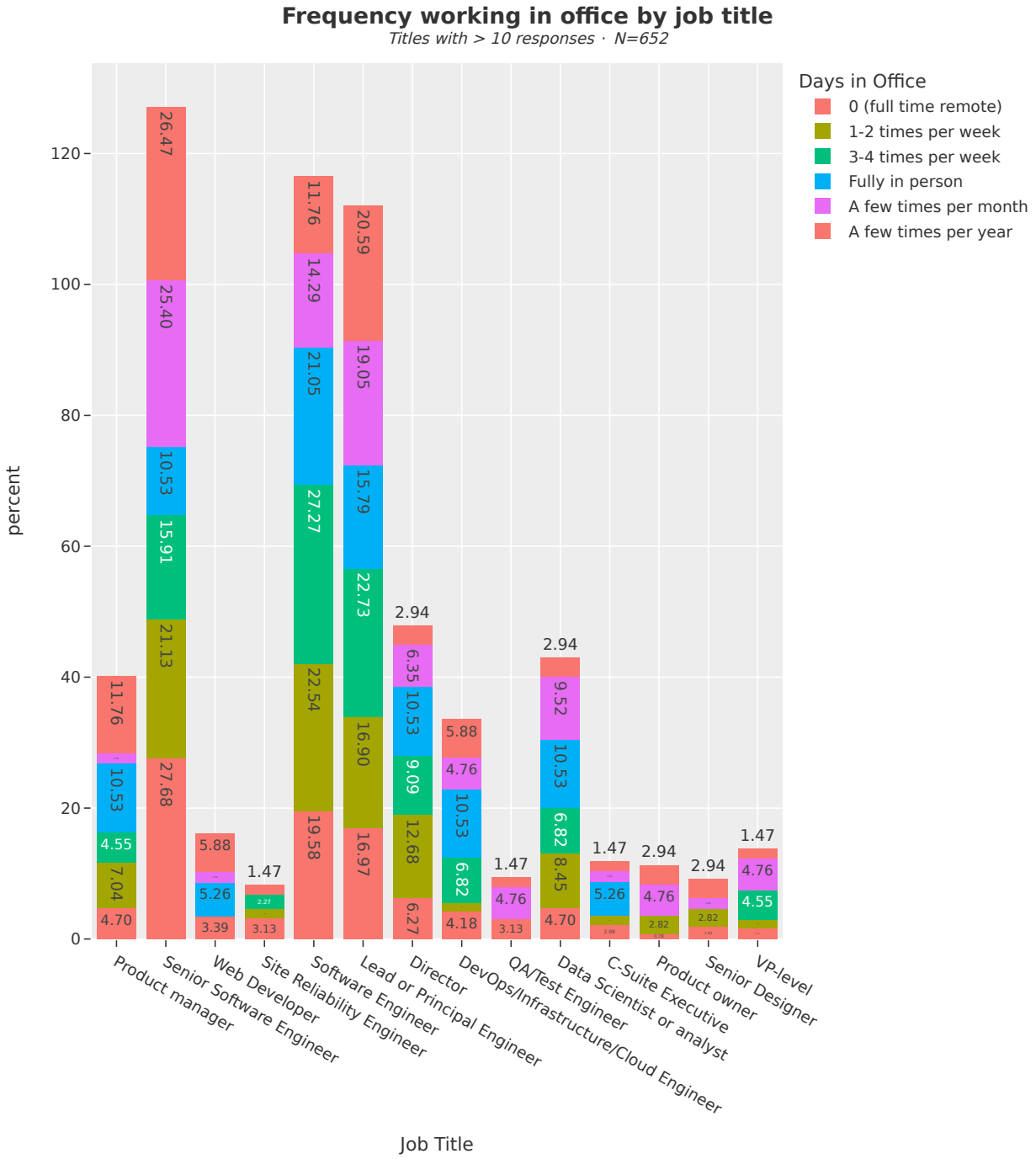


Figure 13.3: Days in Offer per week, by Title

Chapter 14

Tech Stack: Languages & Other Technology Used

We asked about technologies respondents use in their daily work. We provided a set of options we felt most common based on a few popular developer surveys, such as those published by Stack Overflow[1], GitHub[2], and Jetbrains[3] plus our own experience and past survey results. We also have an open-ended "other" box for this to surface some things that were once popular or are gaining popularity.

Fig. 14.1 shows the popularity of the static options for all valid responses, while fig. 14.2 limits the data set to Allegheny County.

We note the tremendous popularity of JavaScript, Python, and Java among respondents. We recognize the continued popularity of React as a framework.

We revise the list of technology options each cycle and are always looking for new things gaining popularity. We received more than 100 unique suggestions in the "Other" option, but only those shown in fig. 14.3 had more than five respondents offering them. We should have included SQL in the options list; we'll fix that in the next cycle. For future surveys, we might ask about proficiency levels for the selected technologies.

[1] https://survey.stackoverflow.co/2022
[2] https://octoverse.github.com/
[3] https://www.jetbrains.com/lp/devecosystem-2022/

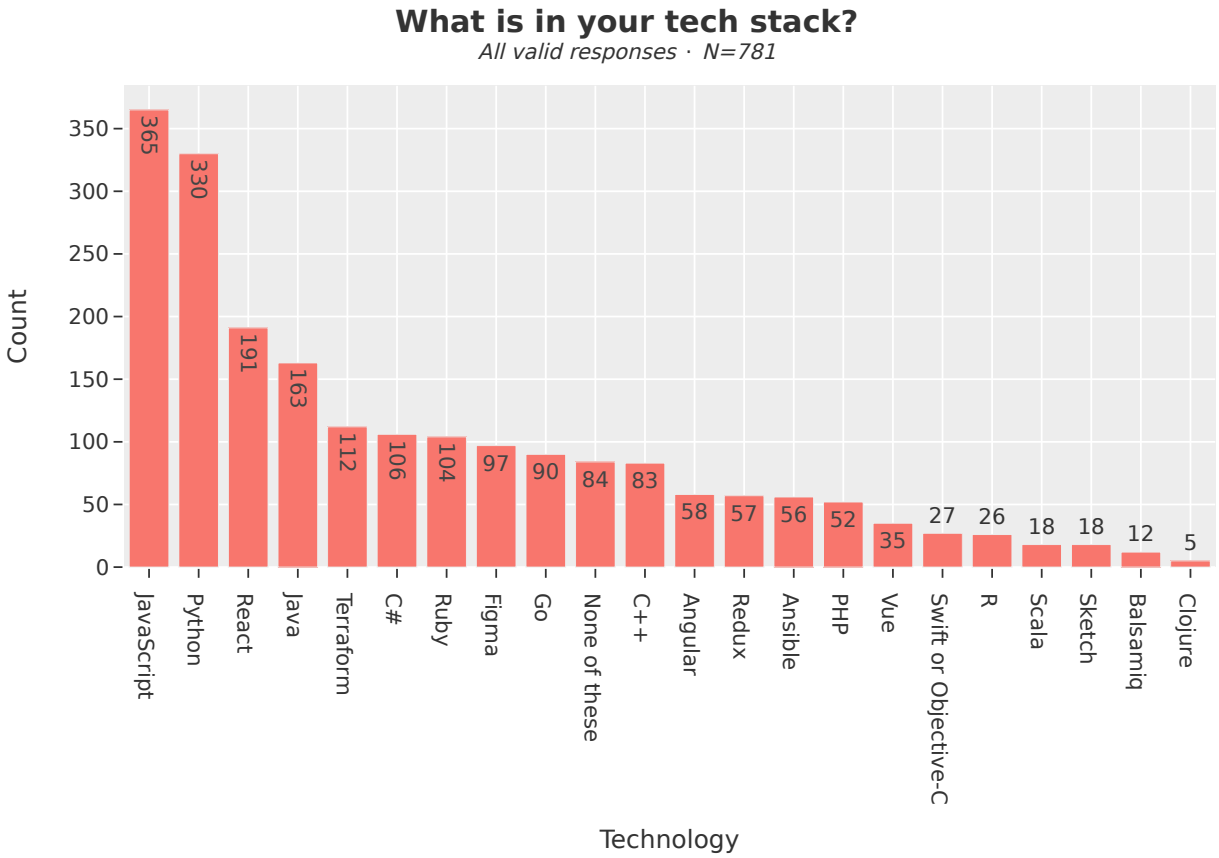


Figure 14.1: What is in your tech stack?

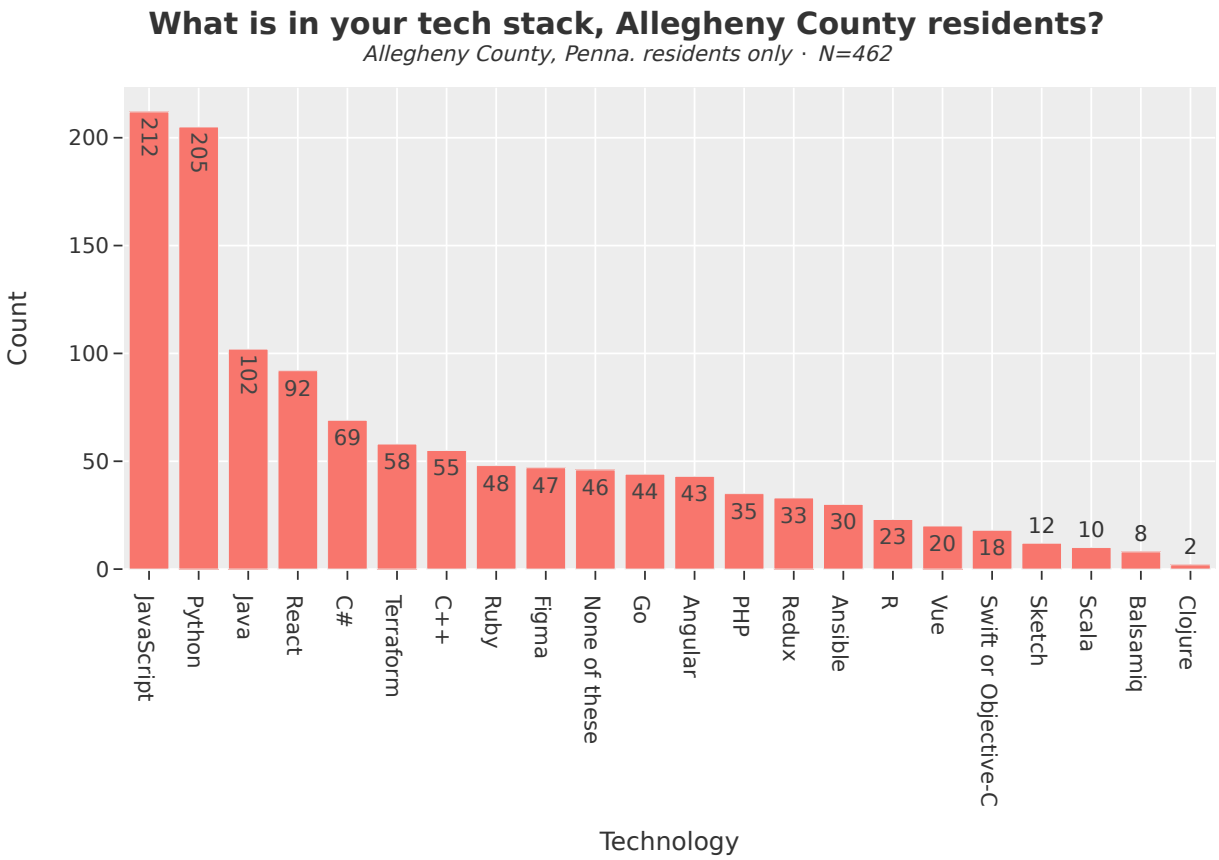


Figure 14.2: What is in your tech stack, Allegheny County?

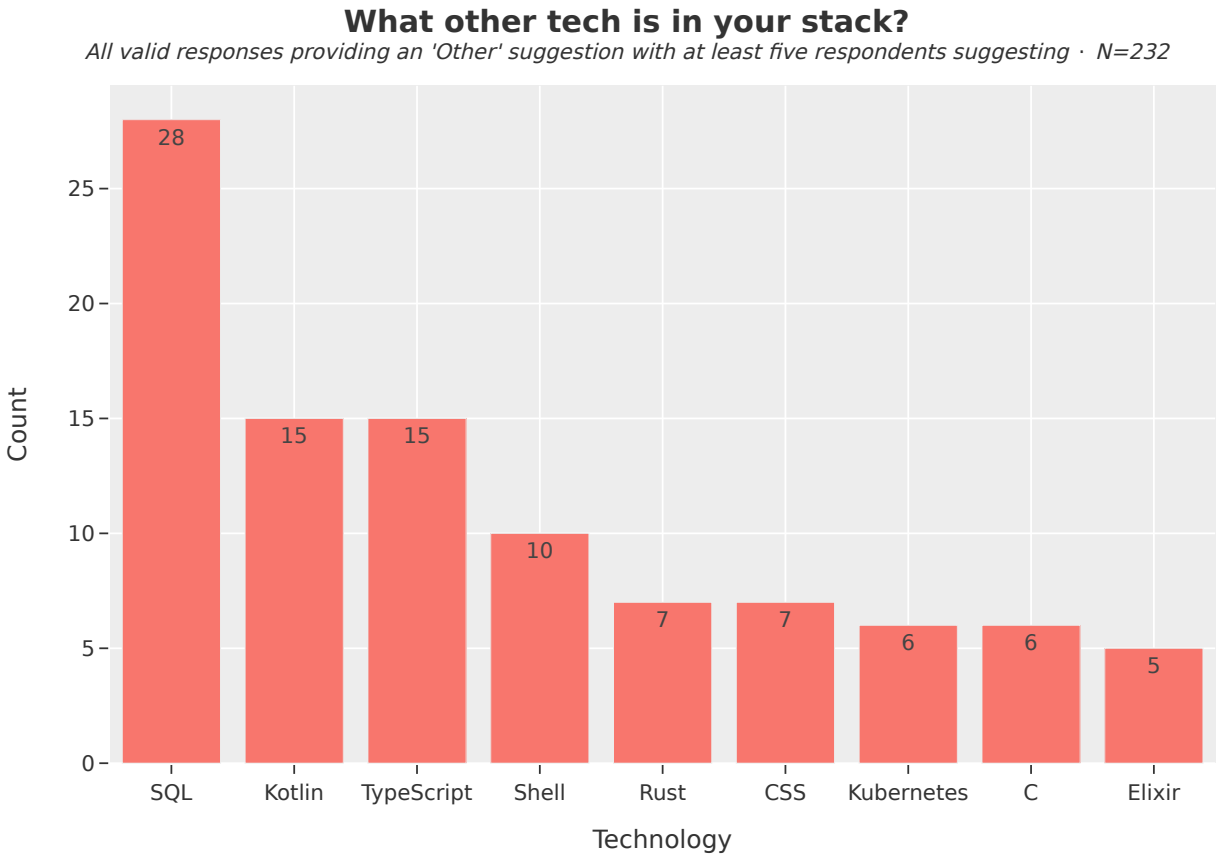


Figure 14.3: What other tech is in your stack?

Chapter 15

Living and Commuting

Code & Supply is a nationwide brand in 2022. It has hosted several major conferences drawing nearly 5,000 attendees total. Those attendees reside predominately in the United States. Dozens are from Canada, Mexico, United Kingdom, Australia, and a host of other countries. As C&S reaches across the globe, we're fascinated with where people are living and working.

In this chapter, we explore where respondents live and work.

15.1 Respondents worldwide

Not all respondents provided their country of residence, but we were happy to see some responses from outside of the United States. Tbl. 15.1 shows the counts.

Table 15.1: Count of Respondents by Country

Country of Residence	Count
United States of America	746
Canada	8
United Kingdom	3
Australia	2
Brazil	1
Switzerland	1
The Netherlands	1
New Zealand	1

While C&S has an international audience, we have work to do to motivate them to respond to our survey for meaningful analysis. The remainder of our analysis for location purposes is scoped to only the United States.

15.2 Respondents in the United States

Respondents residing in the United States were predominately from Pennsylvania (527), followed by New York (22), Massachusetts (21), Ohio (19), and California (18). Fig. 15.1 shows a map of all states with their respondent counts, while fig. 15.2 shows that same map without Pennsylvania data.

This outcome is unsurprising, given C&S' operations primarily in the Pittsburgh area and significant promotional assistance from Technical.ly (sec. 1.8), which is based in Philadelphia. The cities are on the west and east sides of Pennsylvania, respectively, and approximately five hours drive apart.

We would like to improve the efficacy of our outreach for the survey so we can capture a statistically significant number of responses from people living in all American states and territories. See sec. 1.8.2 to help financially or sec. 1.9 to help with promotion.

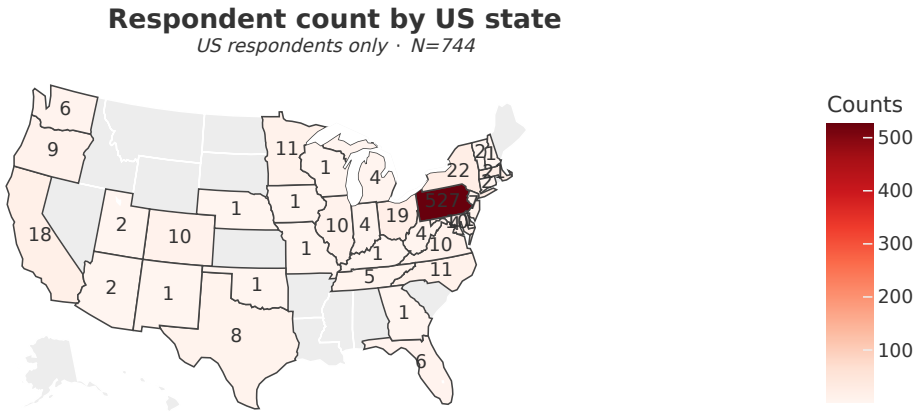


Figure 15.1: Respondents throughout the United States

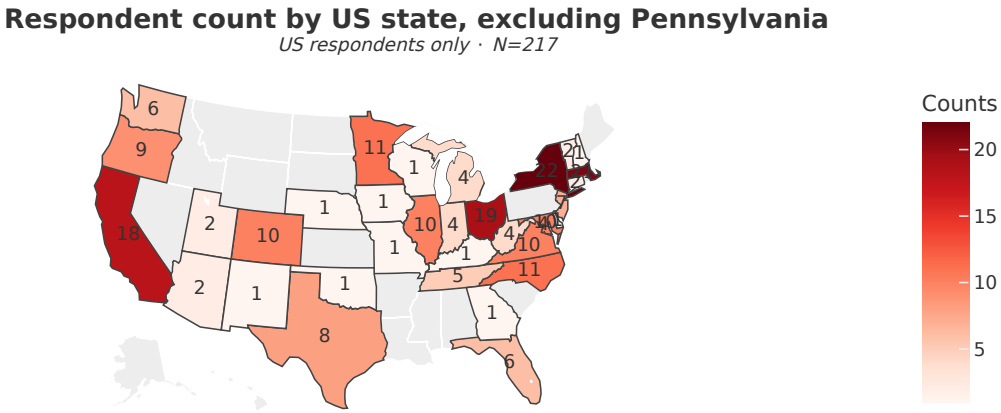


Figure 15.2: Respondents throughout the United States, excluding Pennsylvania

15.3 Working Remotely from Allegheny County

34 respondents said that they had moved to Allegheny County for a job in the last five years. 13 of these respondents are now remote workers as of the summer of 2022.

Fig. 15.3 shows that residents of Allegheny County who work remotely, regardless of when they moved to the county, have a median Base Compensation (BC) negligibly higher than residents who do not work remotely. The difference in first quartile is within easy negotiation ask, but the third quartile difference of more than $8,000 is significant.

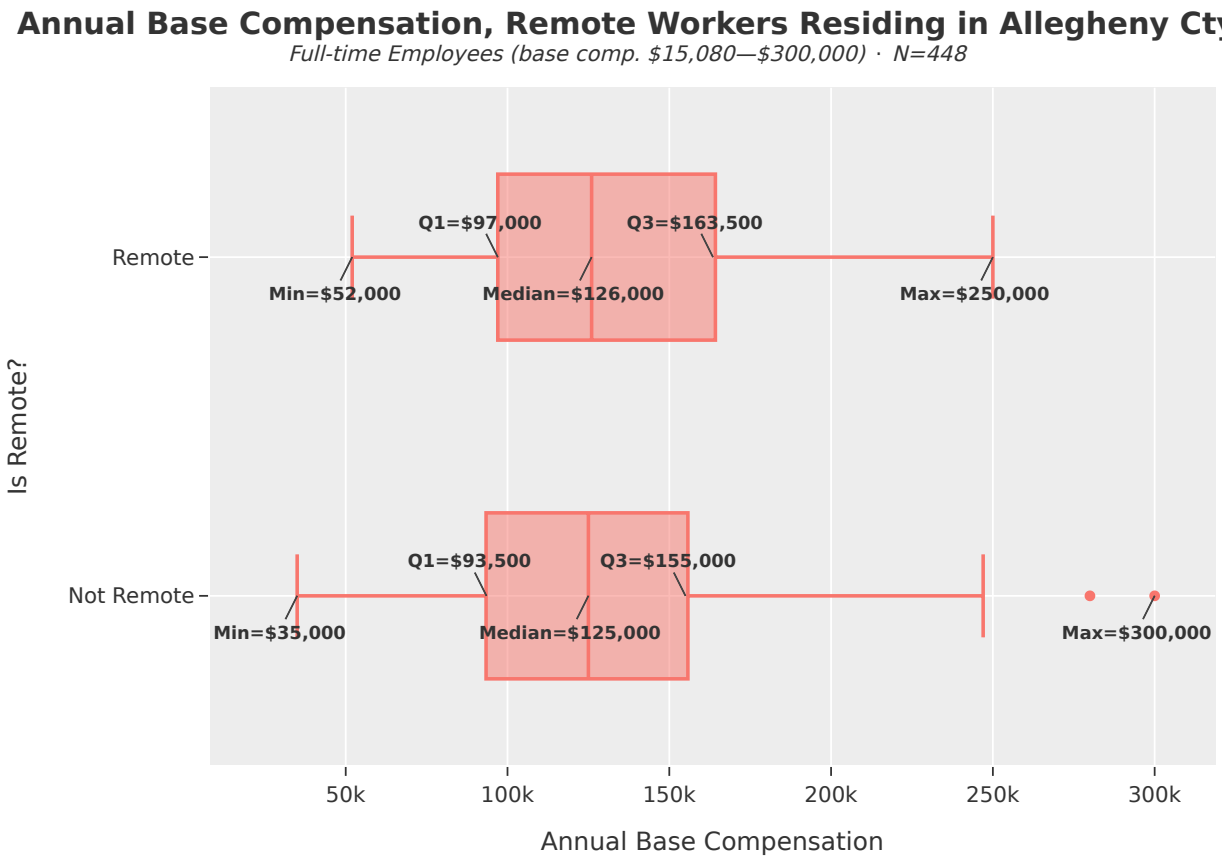


Figure 15.3: Annual Base Compensation for Remote Workers Residing in Allegheny County

15.4 More Coming Soon

We'll be sharing more location-based analyses in a future release of this document.

Chapter 16

How Respondents Learn

How technology workers learn is essential in understanding the common methods as well as the effects that these methods have on outcomes such as compensation and satisfaction.

We asked: **How did you learn your skills?** and provided many options which we drew from our own experiences and past survey responses.

All education methods we analyzed are lined up in fig. 16.1, with breakdowns for methods having more than 30% affirmation in fig. 16.2, those with between 20% and 30% of respondents affirming in fig. 16.3, and those less than 20% of respondents confirming in fig. 16.4.

Unsurprisingly, on-the-job training, self-education as an adult, and undergraduate education topped the responses at approximately 72%, 67%, and 63%, respectively. These were also the top three in the same order, with similar percentages of respondents in 2020.

A notable change in education methods from 2020 to 2022 was that *open-source* overtook *forums* in popularity. More than one-third of 2022 respondents learned their skills from working on open-source projects, increasing from 26.8% to 36.5%. In the definition of "open-source" as an education method, we include activities such as contributing code or other efforts which benefit an open-source software community. In the definition of "forums" as an education method, we include websites such as the Stack Overflow network, Dev.to, and social media sites commonly used for discussion, like Reddit.

Another notable change is the increased number of respondents who learned from a *bootcamp*. In 2020, approximately 9% of respondents learned from a bootcamp. By 2022, it's 13%. While not meteoric growth, it shows a welcome rise in the population of tech workers entering the industry successfully after a bootcamp program.

Rises in the percentages of respondents indicating they learn through user groups and Meetups (from 17% to 28%) and non-degree programs like massive open online course (MOOC) (from 15% to 22%) also reflect changes worth considering further:

1. We must acknowledge that the 2020 survey data were collected during the earliest part of the pandemic in the United States, so some respondents may have indicated their *present* activity in learning from Meetups: this could have led to a firm "No" from the majority of our respondents if the respondent understood the question literally instead of "in general."
2. Based on anecdotes from C&S members, we speculate that those who were not working in tech before the pandemic had picked up at least a start of their knowledge from websites like Coursera, Khan Academy, and Pluralsight during the pandemic as a side effect of trends in professional growth and newly found free time.

As we gather data across future surveys, the trends in these specific educational methods may provide insight into how tech workers view or engage in these skill-building channels. We may see Meetups climb

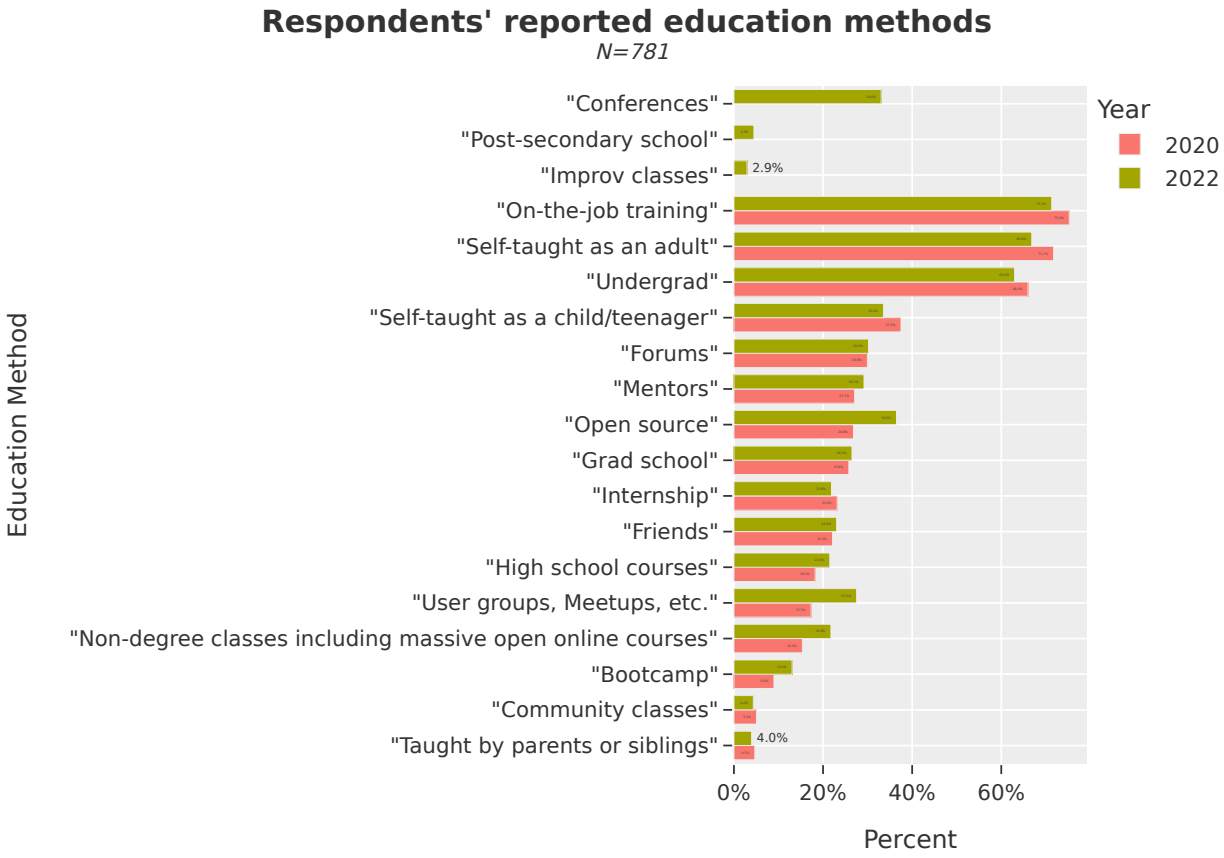


Figure 16.1: Education methods, all

higher as social norms allow for more in-person events. Tech workers may be more open to online learning, contributing to open-source projects, or engaging in forums as a result of their experiences across the pandemic. Professionals who are actively working to increase their abilities and compensation will pursue sources which are most available given the circumstances.

We noted that nearly one-third of respondents learned their skills at *conferences*. This method is near and dear to C&S' heart as a small company that has organized conferences for the last decade. We would like to see this source of skills increase over time now that we are tracking it separately from other methods.

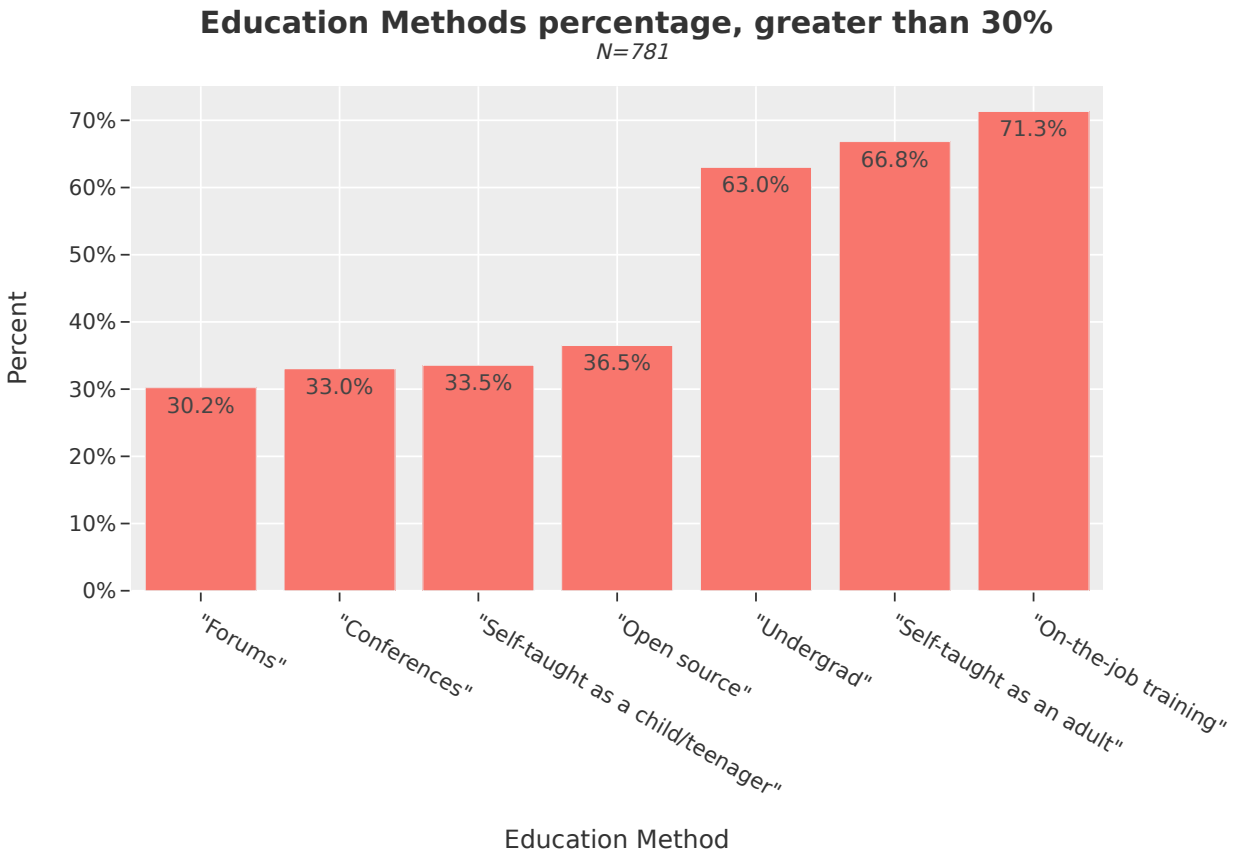


Figure 16.2: Education methods, with more than 30% of respondents affirming

Another new method we added explicitly to the survey for 2022 is *improv classes*. We expected this response to be small, but more than 20 respondents indicated experience with improv according to fig. 16.4. Members of the C&S community told us that improvisational comedy was a great way to improve group communication and speech fluidity skills. We do not expect improv classes to teach *technical* skills like how to code in a language or how to evaluate a multi-click workflow, but there could be some influence on managerial skills to explore.

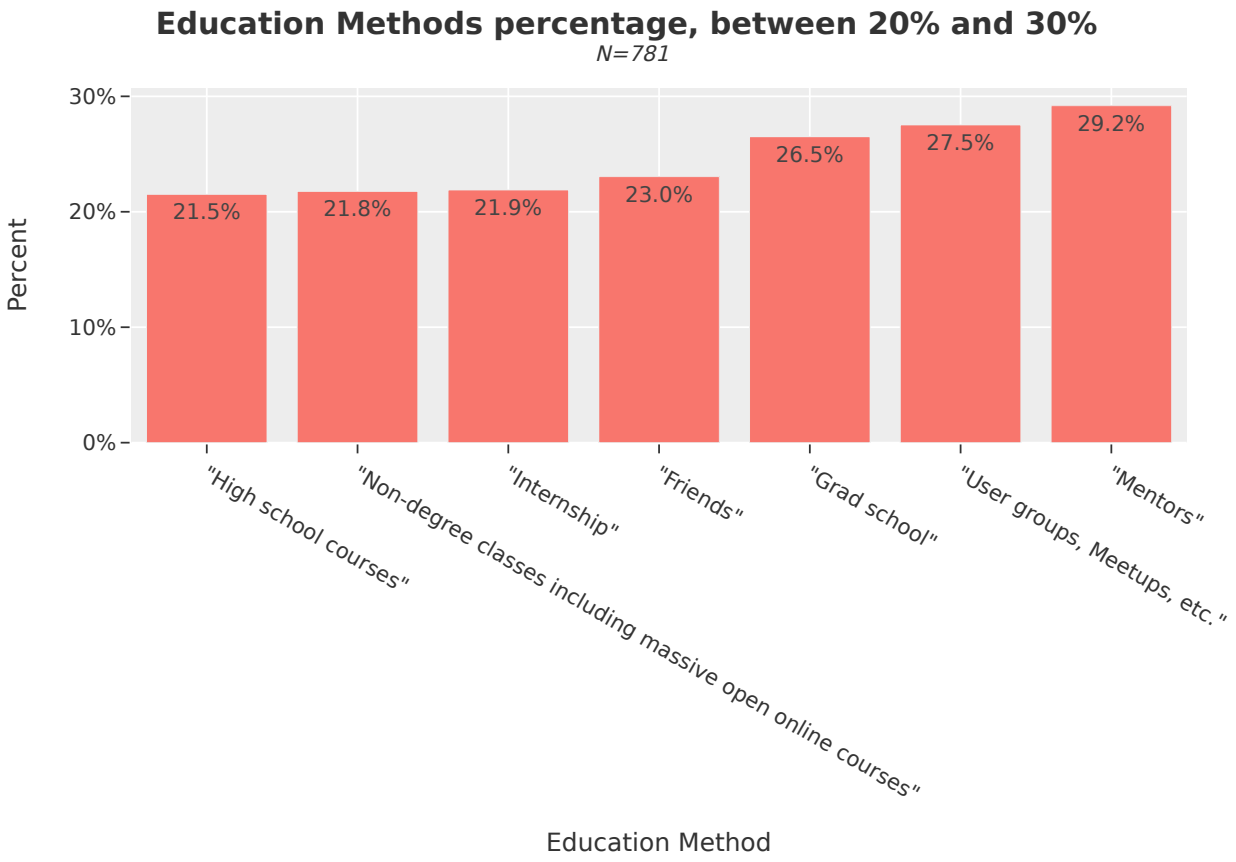


Figure 16.3: Education methods, with between 20% and 30% of respondents affirming

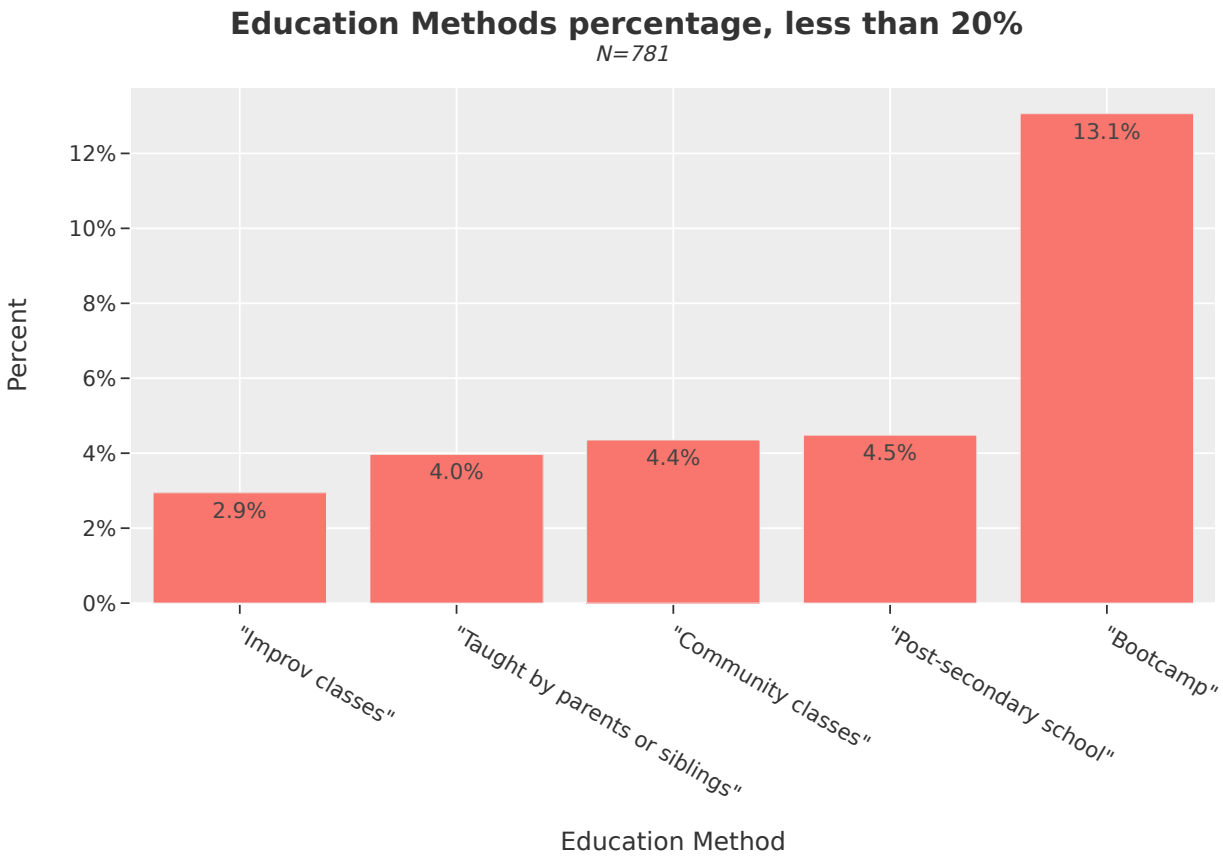


Figure 16.4: Education methods, with less than 20% of respondents affirming

Chapter 17

Colophon

This report could not have bene built without a variety of software, most of it free and open source.

For the visualizations, we built the codebase in Python using Jupyter notebooks. The notebook code used Polars for data manipulation and Plotly for graphs, charts, and maps. Papermill executed the notebooks in a convenient pipeline invoked via Make.

For the report text, we wrote prose in Markdown format in various text editors. Our Make-based build system passed the Markdown to pandoc, which converts this input to LaTeX and emits a PDF.

We used GitLab for collaboration and build automation. Our GitLab CI deploys builds of the report PDF to AWS.

Brigette Lefever of BRARE Graphic Design[1] produced the front cover of the report using Vectornator and Adobe Illustrator. We produced the rear cover using Inkscape.

We used the following tools in the production of this report:

- GitLab[2]
- Jupyter (Kluyver et al. (2016))
- Homebrew[3]
- Inkscape[4]
- GNU Make[5]
- pandas (The pandas development team (2020))
- pandoc[6]
- pandocker[7]
- GNU Parallel (Tange (2023))
- papermill[8]
- Peru[9]
- pipenv[10]
- plotly (Plotly Technologies Inc. (2015))
- Polars[11]

[1] https://www.brare.me
[2] https://gitlab.com
[3] https://brew.sh
[4] https://inkscape.org
[5] https://www.gnu.org/software/make/
[6] https://pandoc.org/
[7] https://github.com/dalibo/pandocker
[8] https://github.com/nteract/papermill
[9] https://github.com/buildinspace/peru
[10] https://pipenv.pypa.io
[11] https://github.com/pola-rs/polars

- SumatraPDF[12]
- uszipcode[13]
- Vectornator[14]
- Visual Studio Code[15]
- VSCodium[16]

We also used many others, including those that are dependencies of these.

[12] https://www.sumatrapdfreader.org
[13] https://github.com/MacHu-GWU/uszipcode-project
[14] https://www.vectornator.io/
[15] https://code.visualstudio.com/
[16] https://vscodium.com/

Chapter 18

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Chapter 19

Appendices and Miscellanea

Table 19.1: A list of titles associated with programming

Titles
DevOps/Infrastructure/Cloud Engineer
Lead or Principal Engineer
Web Developer
Site Reliability Engineer
Software Engineer
Senior Software Engineer
QA/Test Engineer
Security Engineer
Machine learning engineer
Founding Engineer
Staff Software Engineer
Cyber Security Engineer
Senior Test Engineer
Applications Engineer
Production Support Engineer
Data Scientist or analyst

Table 19.2: A list of high-level titles

Titles
Director
VP-level
C-Suite Executive

Glossary

bootcamp A rapid training program generally geared toward introducing second-career seekers to software development, design, marketing, jobseeking, and more in a 10–16 week course 100

Rust Belt An area of the United States formally dominated by manufacturing but stereotypically in industrial decline. It is generally regarded as stretching from New York into the midwestern states. See Rust Belt on Wikipedia[1] for more information 9

[1] https://en.wikipedia.org/wiki/Rust_Belt

Abbreviations

Additional Compensation (AC) Any compensation promised in addition to Salary, also known as Base Compensation *see also* BC, 28

Base Compensation (BC) Any compensation paid regularly and guaranteed, e.g. salary 24, 25, 28, 42, 55, 97

Cost of Living (CoL) The cost to purchase a variety of goods commonly associated with a standard quality of life. This report sources this data from Numbeo. See Methodology and motivation for Numbeo.com[2] 25, 26

Estimated Total Compensation (ETC) Total Compensation in a particular scenario, generally best-case if all company goals are achieved *see also* TC, 31, 35, 48, 55, 66

inter-quartile range (IQR) The range between the first quartile and third quartile, generally including half of the responses 40, 48

Locally Weighted Scatterplot Smoothing (LOWESS) A form of local regression[3] generally used on scatterplots 18

massive open online course (MOOC) An online course with generally open and unlimited participation with an experience closer to a classroom than a self-directed study 100

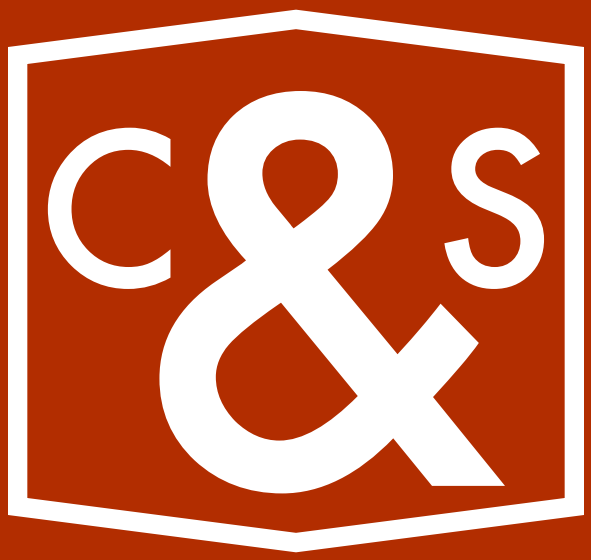
Ordinary Least Squares (OLS) A linear regression method. See Ordinary Least Squares[4] on Wikipedia 18

Restricted Stock Unit (RSU) A form of compensation that represents shares of company stock, but has no tangible value until a vesting period has passed. See Restricted Stock on Wikipedia[5] for more information 28

Total Compensation (TC) The combination of Base Compensation and Additional Compensation, generally an actual number in the most recent year 24

Years of Experience (YoE) The number of years one has worked in an area or with a technology 24, 35, 48

[2] https://www.numbeo.com/common/motivation_and_methodology.jsp
[3] https://en.wikipedia.org/wiki/Local_regression
[4] https://en.wikipedia.org/wiki/Ordinary_least_squares
[5] https://en.wikipedia.org/wiki/Restricted_stock



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