



Career Paths



in Data Visualization

Portraits of different career areas,
and profiles of people who work in data viz



A publication of the Education Committee for the
Data Visualization Society, Dec 2022

Introduction

Why Career Paths?

Data vis is a wide and constantly growing field, and it can be hard to orient yourself within it. New vizzers are always asking how to get started, how to build a portfolio, and how to develop themselves as professionals. We built this collection to create a better picture of different roles and careers available within data viz. We began with data from our annual DVS SOTI survey to give a general overview of the field, and then sought out people working in the different roles to remind us all of how much room for variation there is in each and every data point.

Career Portraits

Our annual State of the Industry Survey forms the core of the career portraits. A portrait is an artistic representation, defined from a particular angle at a particular moment in time. It is not neutral: it has a perspective, and it is always an incomplete picture of the whole person. These portraits are descriptive, not complete or authoritative.

Our dataset does reach a large number of professionals practicing within and outside of the DVS, but we know that representation is not even across different careers, countries, cultures, or social designations. There may be large variations in how individual people interpreted and responded to the specific survey questions. Our margin of error is around 10% overall, which means that differences of 10% or more are likely to be statistically relevant between groups, but smaller changes may not be.

No aggregate information can ever capture all of the diversity and richness of each individual role and experience. Use these portraits as a heuristic to guide your exploration, but not as a final statement about what is and is not required for a particular career. We encourage you to check out the data for yourself, or review our many wonderful survey challenge entries to get additional insights from this dataset.

How Were Careers Assigned?

These portraits rely on a survey question that allows people to select their own career area from a list: Analyst, Scientist, Engineer, Designer, Teacher, Developer, Journalist, Cartographer, Leadership, and None of the Above. It asks this question for a person's freelance work and their position in an organization, if they indicated that they work in both capacities. This analysis rests on a consolidation of those two branches: a person's response as an employee was used when available; otherwise, we used their role as a freelancer to identify their job description. Both respondents are counted. This is an imperfect way to measure, but simplified the analysis for this first initiative where we are focusing mostly on careers within organizations. This approach keeps us from double-counting people, but it does prevent us from making certain comparisons between employee and freelance roles. These are worth revisiting in more detail in a future endeavor.

We also noted during the analysis that many people listed titles outside of the primary career area that they selected: a person who listed "Senior Developer" as their title often selected Analyst as their career. This may reflect inconsistency in job titles, a mismatch between how someone thinks of themselves and how their role is defined, or confusion about what the career categories mean. This is an area that is also rich for exploration, and one that we have begun to explore in more depth. For now, we chose to work with the categorical input as the most clear-cut representation of a respondent's preference regarding their career classification.

Why these careers?

Of the ten career options listed in the survey question, we chose to focus on just four for the first part of this initiative. This decision was based on many factors, but was largely driven by data coverage and the need to further define some populations.

Analysts are our largest career area, comprising just over a quarter of our response population. The other roles vary greatly in size. Cartographers and Journalists were excluded from this analysis due to low counts; we weren't sure that we had enough responses to make a meaningful comparison. Cartographers were the smallest group, with only 11 respondents in 2021. It's important to note that this reflects the reach of our survey more than it does the true ratio between career areas.

People who indicated only roles as students, hobbyists, passive income or who did not provide career information were removed from this analysis to avoid distorting the salary information. Academic and teacher roles deserve their own, more detailed analysis due to the complex mix of freelance and employee positions in that area, and they also received a different branch of survey questions than the employee group, which made comparison more complicated.

The Scientist and Leadership roles were large enough to include, but we saw significant conflation between these roles and the other careers. For Scientists, there was a lot of overlap with academic roles, and frequent confusion between data science and analyst roles vs. the physical sciences. Leadership is a level that applies across all careers, and often represented more senior positions within a role rather than a wholly separate category. Again, we felt that more detailed analysis would be helpful to tease out some of these variations.

Based on these observations, we chose to focus on the Analyst, Designer, Developer, and Engineering roles first, realizing that the survey and its analyses are ongoing initiatives that will continue to grow over the years. We hope that these will provide insights into a few of the more common visualization careers, while we continue to develop additional analyses.



Erica Gunn is Director of Education for the Data Visualization Society. In her day job, she is Director of Product Design at one of the largest clinical trial data companies in the world. Erica received an MFA in information design from Northeastern University in 2017. In her previous career, she was a research scientist and college chemistry professor.



Jenn Schilling is the founder of Schilling Data Studio. She has a decade of experience applying data science and data visualization in a variety of industries. Jenn loves telling compelling stories with data and teaching others how to create impactful visualizations.

Many thanks to Elijah Meeks, Jill Brown, Josephine Dru, and Amanda Makulec for supporting this project, and to all interview and survey participants for sharing their information.



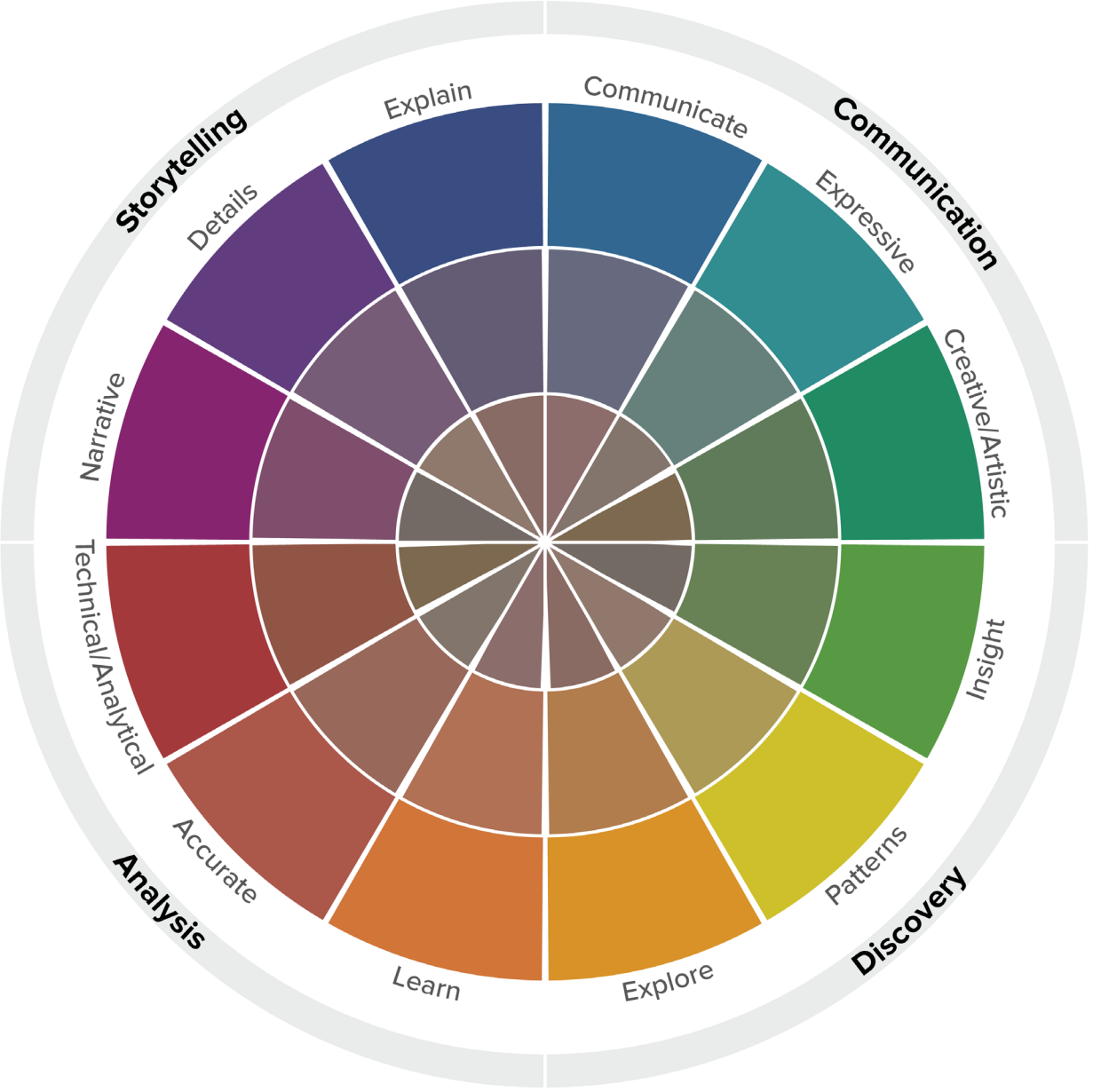
Career Profiles

One of the best ways to learn about a career is to talk to people who are already doing it. In this section, we interviewed a number of people working in data viz to learn more about what their jobs look like and what paths their careers have taken. Many of these interviews were conducted by DVS founder Elijah Meeks, and are available to watch on the [DVS YouTube channel](#). Others were private conversations, but are summarized below. Our intent here was to put a human face to the survey data, and to include a sense of the qualitative richness of a career that simply can't be captured in a single survey. In some cases, we invited people to participate directly; others responded to one of several open calls for participation in the research initiatives leading up to this project.

With a small team and limited resources we cannot ensure exhaustive representation across all groups, but we did our best to include a variety of participants whose experiences cut across many different aspects of a career. We looked for variety in the area of data viz and the type of work that they do, organization type and size, previous experience, educational background and years of experience, alongside a variety of other factors that make us who we are. We hope that you will find some aspect of your experience reflected here, and that this effort will initiate deeper conversations about groups that may not be as well represented here.

We sent a short survey to each of the participants that we profiled, asking a variety of questions about their experience working in data viz. Their answers are included in each profile, to give a more structured picture of how their personal stories might tie back to the general experience within that career. One of these questions was a series of scales, asking the participants to rank where their visualization fell on a spectrum between two extremes. These “opposites” were grouped into different purposes for a visualization, and the values are presented along the circle radius. If a person placed themselves in the middle of the spectrum, they fall in the center of the circle; more strongly-weighted answers fell to the outsides. We realize that the extremes we chose may not actually be opposites, and that it is impossible to narrow down the complexity of an individual's experience into a set of simplistic binary comparisons. Our intent is to emphasize the complex range of possibilities for how people approach their data visualization, and not to constrain, pigeonhole, or draw false comparisons.

There are certainly patterns in how groups tend to approach their visualization, but there is also heterogeneity and individual variation across both people and careers. No two visualizers are exactly alike, and no one person ended up focused within a single domain. We hope that these aggregate views emphasize the nuances in how people use and think about data visualization, and how personal each visualizer's approach really is.



Sarah Young

Current professional area: Leadership
Title: Director, Institutional Assessment

Previous career areas: Analyst, Editor
Professional Experience: 6–10 years
Data Viz Experience: 5 years
Sector: Public sector (government)
Size of org: Don't know

Data viz is: An important secondary part of my job, but not the primary focus
I focus on: It all depends on the project
I make visualizations for: Educators & college leadership
I use data visualization to: Communicate research findings

I work most closely with: Mostly no one. Sometimes my Senior Director. We are hiring an analyst to work with me. Sometimes I assist colleagues and help professors and college leadership construct surveys to answer institutional questions.
Top 3 tasks and responsibilities: Reporting, analysis, data collection/prep
Tools (from the survey list): Excel, PowerBI, Powerpoint
Which tools do you use most often, and why? SPSS, Excel. The reporting for my college has previously used SPSS/Excel but we are transitioning some reporting to Power BI.

Communication methods: Dashboard, Document or report, Presentations
Charts used in the past 6 months: Line chart, Bar chart, Histogram, Hexbin/heatmap

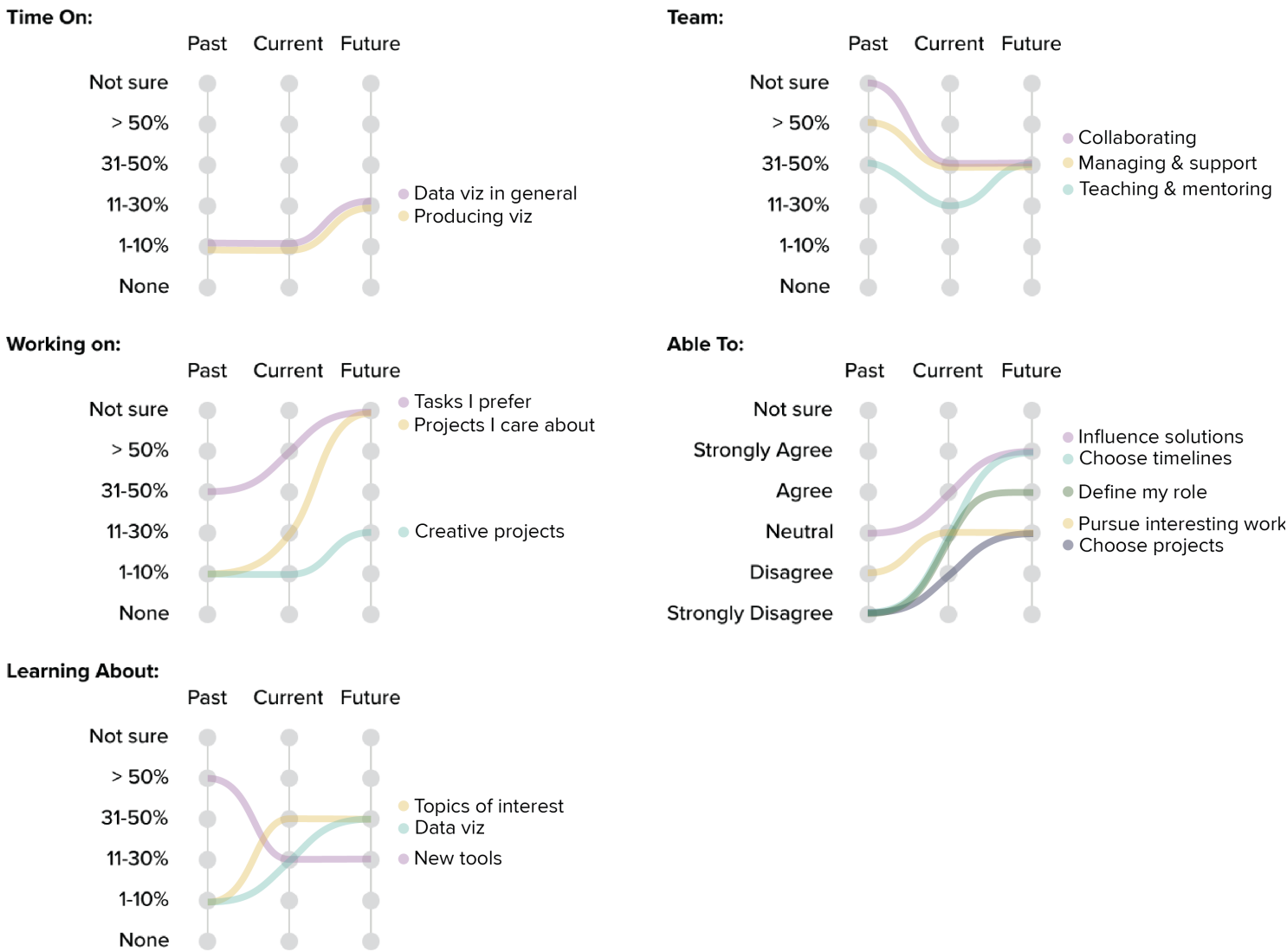
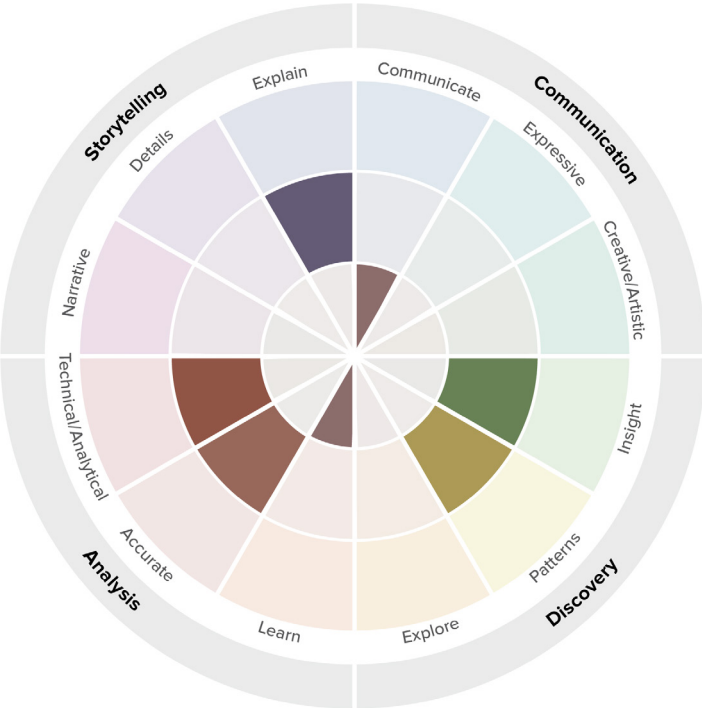
Total Time on Data Vis: 15% of work time		Over time:	
Data prep and cleaning	6-10 h	Interesting collaborations	↗
Data analysis	6-10 h	Work on fun projects	~
Ideating and storyboarding	0-5 h	Meet new people	↗
Producing viz	0-5 h	Devote time to data viz	~
Other viz-related tasks	0-5 h	Make time for side projects	~
		Learning and prof. development	↗
		Keep up with the field	~

Improved/Worsened	
Life-work balance	+
Sense of security (job, career, financial)	+
General stress level	+
Exhaustion	-
Freedom	+
Responsibilities	+

Summary
After completing a research Ph.D. in educational psychology, Sarah transitioned to an editorial position in the Michigan Department of Education, and then into a job with a government contractor evaluating research and finding what works for post-secondary education.

Sarah’s interest in data visualization began while coordinating the systematic review of over 30k abstracts. Using simple visualizations, Sarah was able to quickly screen the data and proactively identify & fix problems that could impact the project.

Sarah has recently moved into a position as Director of Institutional Assessment, where she and an analyst track student satisfaction and success within degree programs for a community college. Her day to day work includes developing survey instruments and studies for the college, as well as producing comprehensive reports on a variety of success metrics for college leadership and faculty. These reports help to inform college leadership about the success of various programs, including diversity and student retention programs. The skills that Sarah developed as a researcher and editor continue to play a major part in her day-to-day work. Being able to think through the nuances of a quantitative problem, and to organize & present information for multiple audiences are key skills for her role.



Dr. Lori Palen

Current professional area: Designer
Title: Owner and Principal Consultant, Data Soapbox

Previous career areas: Analyst, Scientist, Designer, Teacher, Leadership

Professional Experience: 21–25 years
Data Viz Experience: 11–15 years
Sector: Consultant (multiple areas)
Size of org: < 20 employees

Data viz is: An important secondary part of my job, but not the primary focus
I focus on: One specific piece or stage of the DV process
I make visualizations for: Researchers



I use data visualization to: Communicate research findings
I work most closely with: Clients (mostly behavioral health researchers)
Top 3 tasks and responsibilities: Create communication products, business development, management

Tools (from the survey list): Excel, Illustrator, Pen and Paper, Powerpoint
Which tools do you use most often, and why? PowerPoint, Word, Excel—because they’re easy to use, inexpensive, widely available, meet my needs.
Communication methods: Static webpage, Document or report, Presentations, Social media
Charts used in the past 6 months: Line chart, Bar chart, Pie chart/donut chart, Scatterplot, Histogram, Infographic, Pictorial visualization, Choropleth map, Flow chart (Sankey, DAGRE, Alluvial)

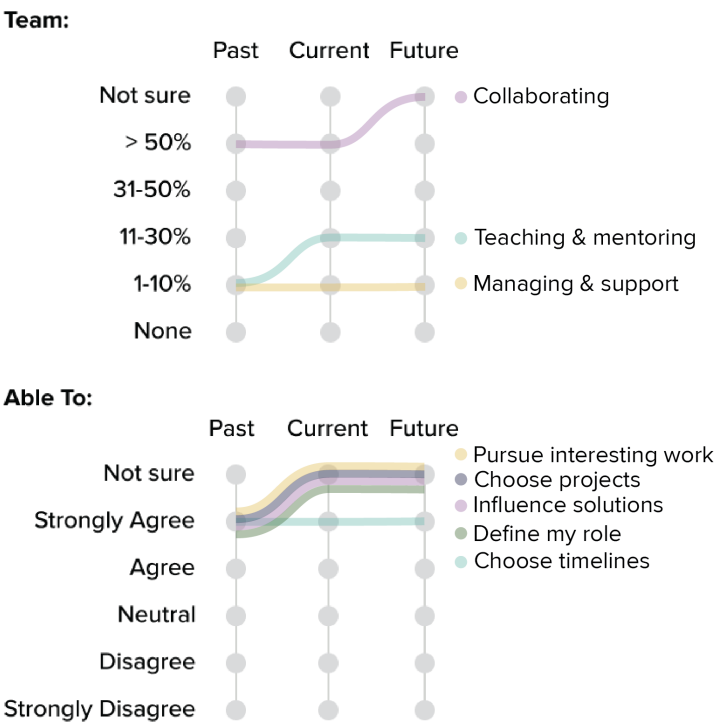
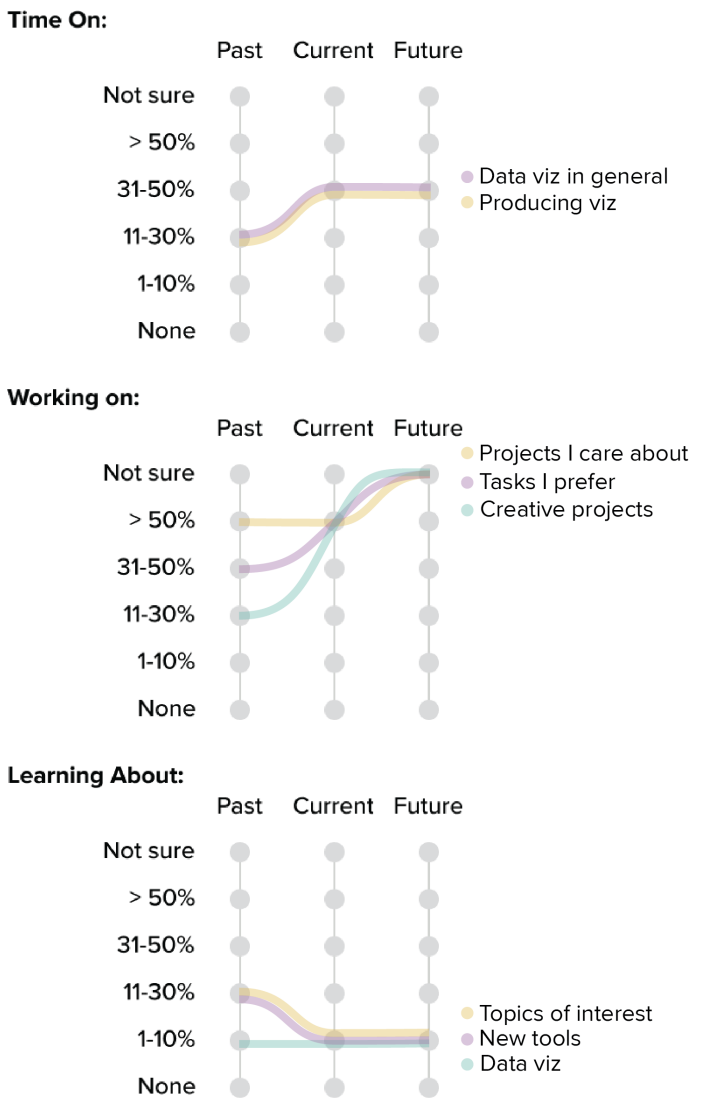
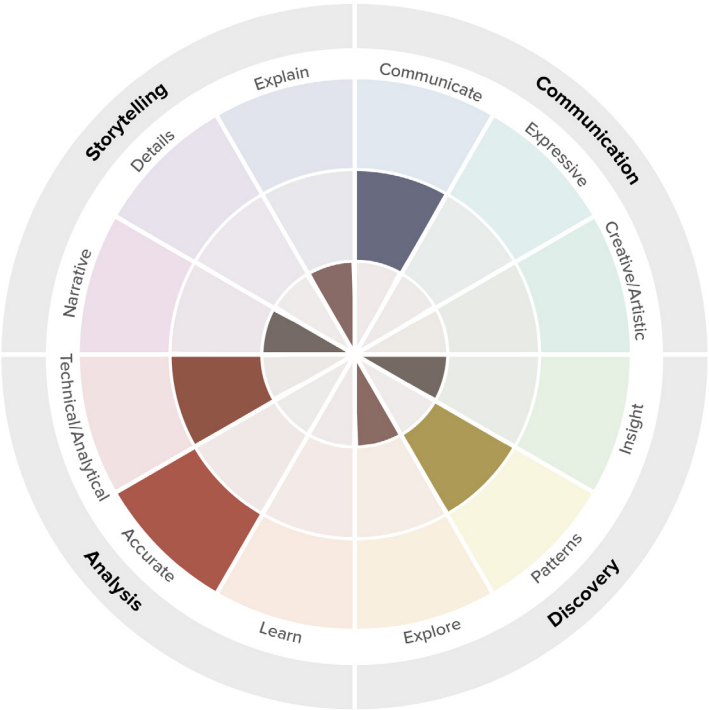
Total Time on Data Vis: 33% of work time	
Data prep and cleaning	0-5 h
Data analysis	0-5 h
Ideating and storyboarding	6-10 h
Producing viz	6-10 h
Other viz-related tasks	6-10 h

Over time:		Improved/Worsened	
Interesting collaborations	↗	Life-work balance	+
Work on fun projects	↗	Sense of security (job, career, financial)	~
Meet new people	↗	General stress level	+
Devote time to data viz	↗	Exhaustion	+
Make time for side projects	~	Freedom	+
Learning and prof. development	~	Responsibilities	+
Keep up with the field	~		

Summary
Dr. Palen is a small business owner with a background in human development and family studies. Her graduate work focused on preventing risk behavior, including substance use. As a program evaluator at a research institute, Dr. Palen specialized in reporting and soon realized that she stood out for her ability to communicate.
Over time, Dr. Palen decided that she wanted to focus more on research communication, including data visualization. She tried to pivot within her existing role, creating a research visibility toolkit and hosting workshops on poster design and development. Eventually, she “realized that I needed to create my own opportunities if I was going to do what I wanted to do,” and decided to pursue freelance work in research communication.

Dr. Palen’s contract prevented her from building her business as a side hustle, so she did as much as possible to prepare while still employed: she beefed up her skillset and built a portfolio, a business plan and a website on the side. Her local small business organization and community college provided critical resources to support her transition, including mentorship, affordable classes, and business advice.
Losing a 6-figure income was a big risk for Dr. Palen’s family, but she wasn’t betting on something that she knew nothing about. After careful financial assessment, they created a plan to re-evaluate in 2 years.
Dr. Palen has been in business for 1 y now, and is very happy she took the plunge. Today, a lot of her time goes into the administrative aspects of running the business: “the actual work is not as big a part of the job as you’d think.” She spends a lot of time giving workshops on data visualization, but has many fewer meetings and spends more time working on her own. This requires her to be self-motivated, organized,

and independent. “All of the things that people did for me in a large organization, I now have to do for myself.” This includes things like project management, writing and editing skills, as well as legal and other expenses. “As a small business owner, you can’t just hand those things off or consult with someone for free. If you need advice, you need to pay a specialist.” She still doesn’t know how to use Tableau or PowerBI. In her experience “most clients don’t need that. They want what they’re used to seeing. It’s not technically complex.”
Most often, the real work is about getting clients to simplify, and to focus in on the audience and purpose for their visualizations. Dr. Palen finds that they often need help conceptualizing the message, purpose and outcome. She likes to ask: “What’s the single action that a user would take as an outcome of reading this work? What’s your fantasy reaction?”



Craig Nilson

Current professional area: Analyst
Title: Operations Research Analyst

Previous career areas: Analyst, Leadership, Information Technologist

Professional Experience: 11–15 years
Data Viz Experience: 4 years
Sector: Public sector (government)
Size of org: 1000+ employees



Data viz is: One of several things I do in my job, but not a primary or a secondary focus of my role
I focus on: I own the entire DV process, from beginning to end
I make visualizations for: Policy makers

I use data visualization to: Communicate research findings
I work most closely with: Data engineers and stakeholders on both the data we use to produce our analysis and in the analysis products we produce.
Top 3 tasks and responsibilities: Manages forecasting and analysis for a 48,000-person Active Duty and Reserve military workforce. Leads office Development Team in front & back-end implementation of complex mathematical, machine-learning models to support decisions for all recruiting/retention plans & billet movement. Academic liaison to the Coast Guard Academy and graduate programs for capstone projects & internships

Tools (from the survey list): Excel, Pen and Paper, Power-BI, Powerpoint, Python

Which tools do you use most often, and why? Python is the top tool I use because of its versatility as a programming language. I use it to complete my work from the lowest levels

Total Time on Data Vis: 15% of work time	
Data prep and cleaning	11-20 h
Data analysis	11-20 h
Ideating and storyboarding	0-5 h
Producing viz	0-5 h
Other viz-related tasks	0-5 h

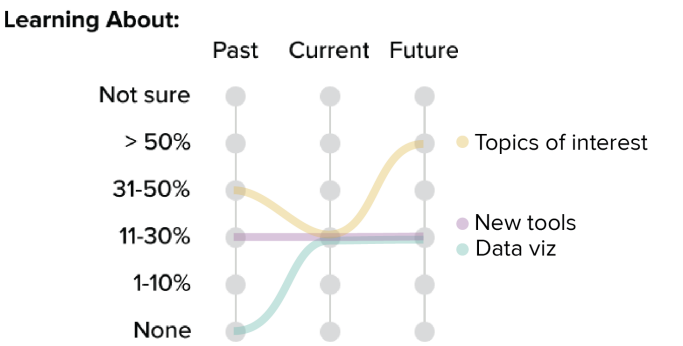
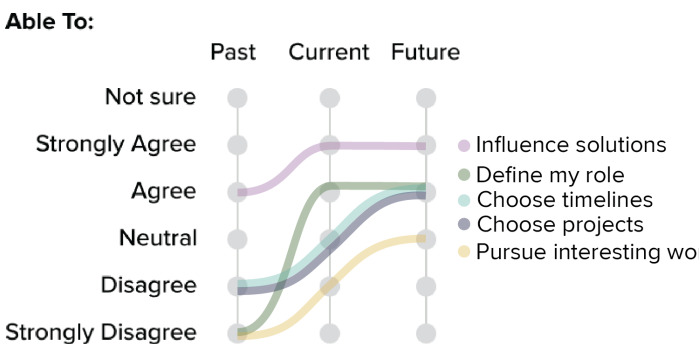
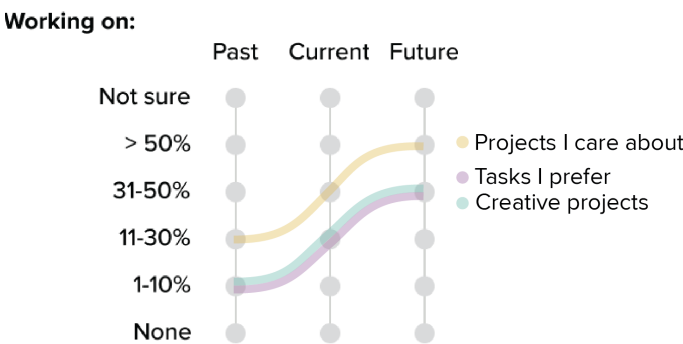
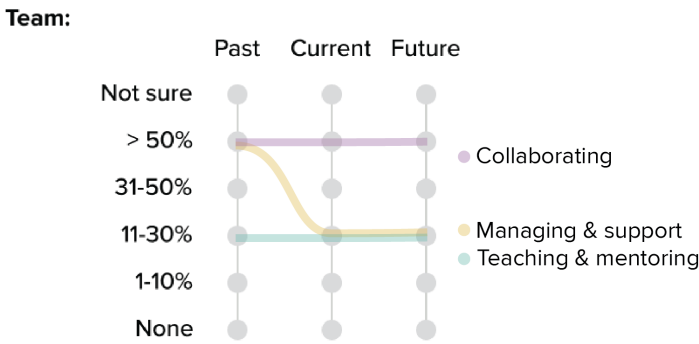
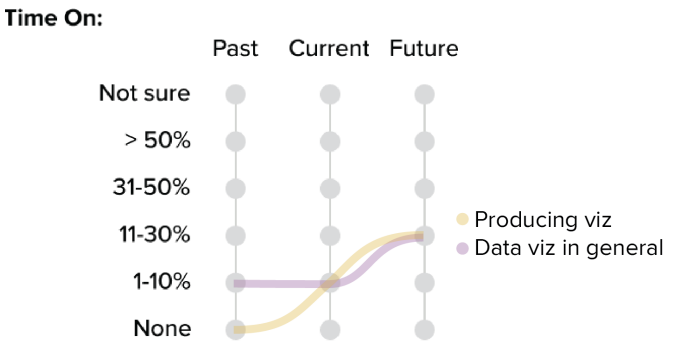
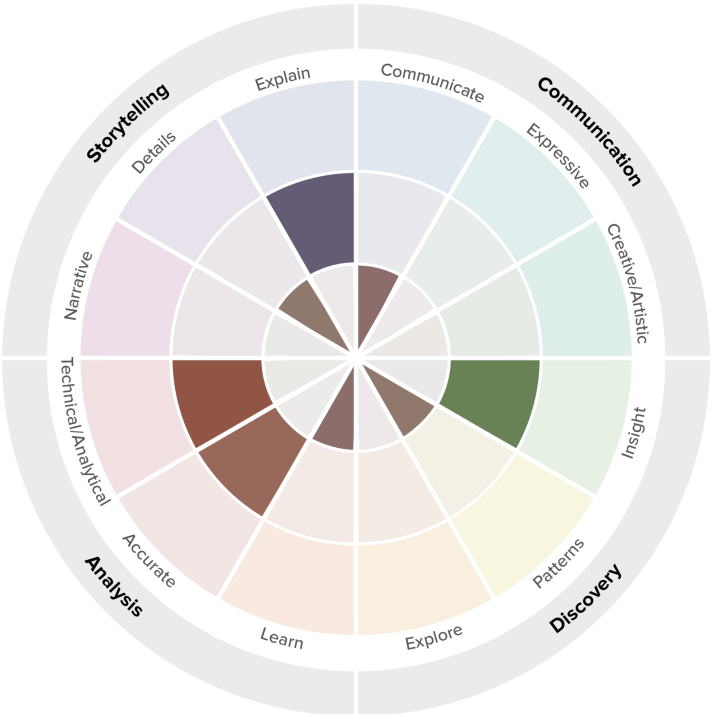
Over time:	
Interesting collaborations	↗
Work on fun projects	↗
Meet new people	↗
Devote time to data viz	↗
Make time for side projects	↘
Learning and prof. development	↘
Keep up with the field	~

Improved/Worsened	
Life-work balance	-
Sense of security (job, career, financial)	~
General stress level	-
Exhaustion	~
Freedom	~
Responsibilities	-

of data engineering, to running database queries, to my analytics models, and finally to create some of the output media for products I produce.
Communication methods: Dashboard, Interactive notebook, Document or report, Presentations, Email, Physical handout or printed on paper
Charts used in the past 6 months: Line chart, Bar chart, Scatterplot, Histogram, Infographic, Network diagram, Force-directed graph

Summary
Craig has a background in data engineering and operations research. He found data visualization through his hobbies and a longstanding interest in digital art. He also has a strong interest in communication and visual design. Craig uses visualization in his current position with the US Coast Guard as a way to articulate the complexity of the work that his team does, and to discuss technical topics with leadership.
Craig programs in Python/Matplotlib, R, SQL, and even Visual Basic to build data to assess recruiting, bonuses, and to develop strategies for increasing representation of underrepresented minority groups. His retention curves have been used to brief Congress, in the State of the Coast Guard Address, and, most importantly, to shape policy in the org. Craig says that these curves are effective because they help leaders to understand the size and the scope of the problem. He has also created visualizations to explain the team’s work, including a network graph that documents how complicated

their database structure is. “Senior leaders will just stand there and look at it, and try to understand the pieces. They call it the death star, and it’s a powerful starting point for a conversation.”
Craig loves the art of producing effective visualizations, and prefers to use his skills to tell the story of a person who has gotten to a specific place. For him, that human element is key: “we are visual creatures, and social. We’re not computers by nature.” He’s always looking to see what the questions of tomorrow will be, and how his team can build the data to get there, and is currently excited about the possibilities for machine learning to supplement and advance his analyses.



Matt Makofske

https://www.linkedin.com/in/mattmakofske/

Current professional

area: Analyst
Title: Sr. Healthcare Analyst

Previous career areas:

Analyst, Leadership

Professional Experience:

11–15 years

Data Viz Experience:

5 years

Sector: Private sector

Size of org: 20–99 employees

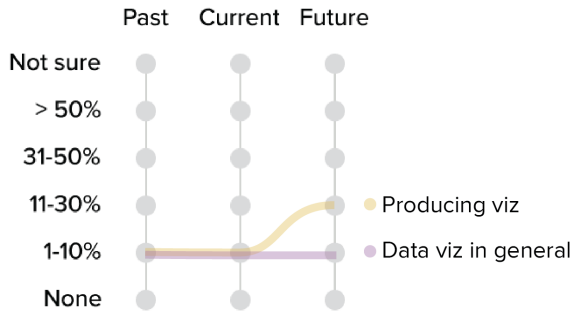


Data viz is: One of several things I do in my job, but not a primary or a secondary focus of my role.

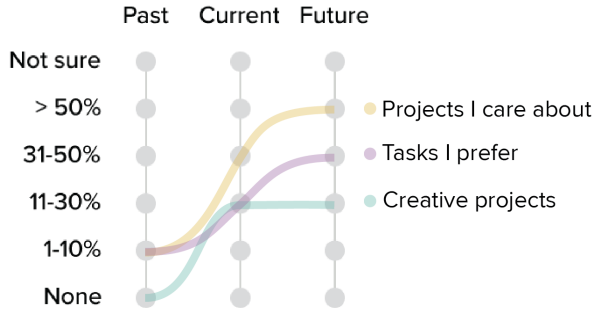
I focus on: Depends on the project; most frequently pin-pointing the story to tell, and working with a team to build the visuals/products

I make visualizations for: Medical Professionals, Executives, Researchers, Policy makers

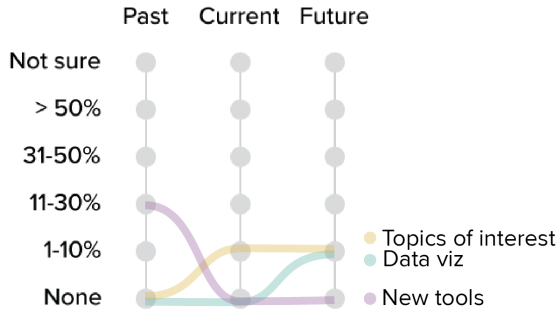
Time On:



Working on:



Learning About:



I use data visualization to: Support consulting projects or other customized offerings

I work most closely with: Other specialists/functionals who are in our company (UX/UI, Project Management, Development, Data Engineering, Data Science, Business Development)

Top 3 tasks and responsibilities: Work with specialists (UX, Dev, Engineers) to create product solutions for customers, conduct analyses, synthesize user insights to plan requirements.

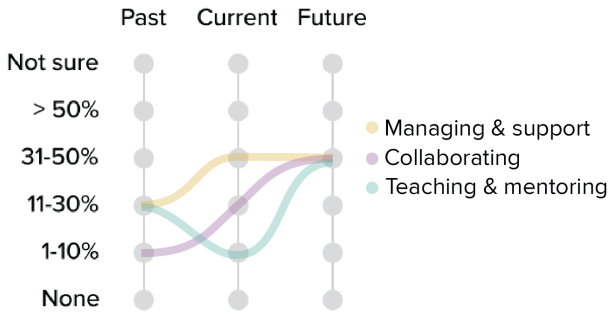
Tools (from the survey list): Excel, PowerBI, Powerpoint, Tableau

Which tools do you use most often, and why? Tableau for data analysis and viz, SQL SSMS for data prep.

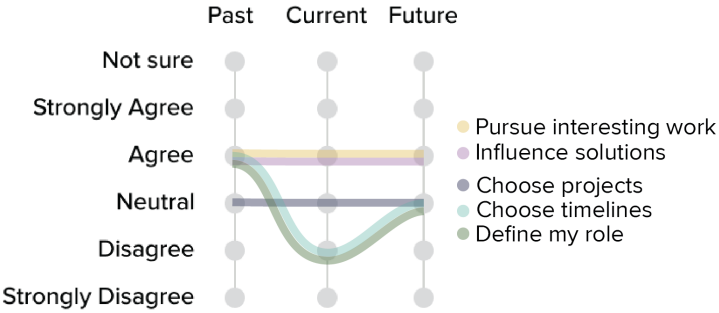
Communication methods: Embedded in a tool, Dashboard, Document or report, Presentations, Email, App

Charts used in the past 6 months: Line chart, Bar chart, Pie chart/donut chart, Histogram, Hexbin/heatmap, Tree-map, Network diagram, Choropleth map, Flow chart (Sankey, DAGRE, Alluvial)

Team:



Able To:



Total Time on Data Vis: 25% of work time

Data prep and cleaning	0-5 h
Data analysis	6-10 h
Ideating and storyboarding	0-5 h
Producing viz	6-10 h
Other viz-related tasks	0-5 h

Over time:

Interesting collaborations	↗
Work on fun projects	↗
Meet new people	~
Devote time to data viz	↘
Make time for side projects	~
Learning and prof. development	↘
Keep up with the field	~

Improved/Worsened

Life-work balance	+
Sense of security (job, career, financial)	~
General stress level	+
Exhaustion	+
Freedom	+
Responsibilities	+

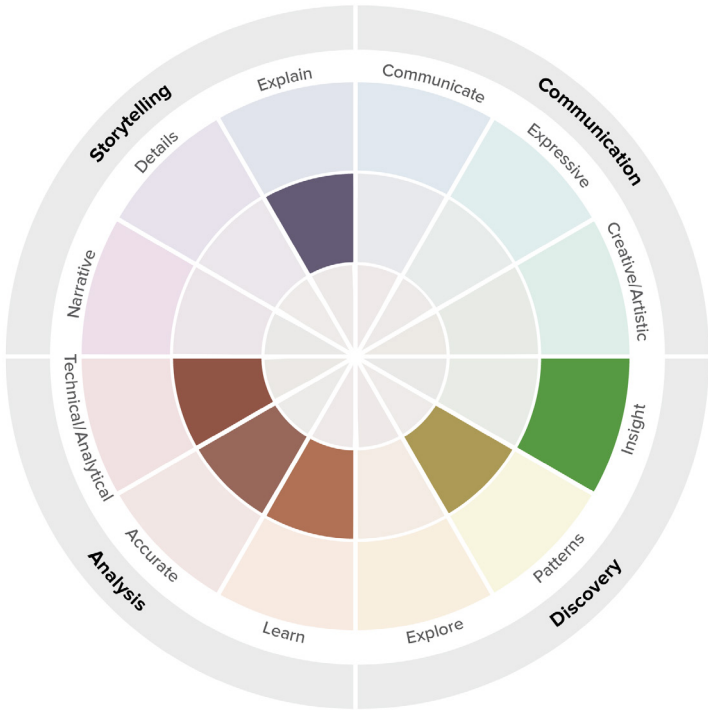
Summary

Matt started out as a history and political science major, and then got an MA in educational leadership, studying how people learn and make good decisions. He is fascinated by trying to understand the context and dynamics of a situation, and began playing with data while working in an admin role at his university. Since then, he has worked in many kinds of organization, and is currently working as an analyst in a small consulting firm.

Matt considers himself an analyst first, but has been a jack of all trades in many roles, and sees data viz as a key part of the communication toolbox that any analyst should have. He is always looking to make a bigger impact and to bring purpose and strategy to his work. Recently, he has focused on helping people to make decisions around healthcare. He got hooked by the use case and the impact that you can have with the dataset, and decided to specialize in health care data.

Matt found universities and larger orgs to be slow-moving and bureaucratic, with a lot of internal politics and stakeholder management. Still, he appreciated that those roles allowed him lots of time to tinker and learn. His current consulting work is very deadline-driven and involves a lot of direct interaction with clients, which gives good visibility into the impacts of his work. Much of his work involves translating between specialized teams of data scientists, project managers, engineers, accounts managers, UX designers, health care professionals, clients, and others.

His current job is focused on discovery and use case analysis, synthesizing client data and understanding what is possible with the data. This relies on key skills for understanding the data context and constructing meaning. Matt acts as the subject matter expert guiding the analysis, and splits his time evenly between early discovery research, working directly with the data, business development and proposal writing, and general staffing tasks related to company initiatives. He works on a handful of projects at once, which forces him to stay disciplined about allocating his time for focused work, and helps to avoid perfectionism. He finds the pace energizing, and finds that it helps him to stay focused on providing value and getting things done.



Robert Crocker

Current professional area: Developer
Title: Data Visualization Engineer

Previous career areas: Analyst, Engineer, Developer, Designer, Teacher, Leadership
Professional Experience: 11–15 years
Data Viz Experience: 6–10 years

Sector: Healthcare/medical
Size of org: 100–499 employees



Data viz is: the primary focus of my job
I focus on: I own the entire DV process, from beginning to end
I make visualizations for: Several audiences: General Public, Scientists, Medical Professionals, Analysts, Executives, Policy makers, and probably more.
I use data visualization to: Communicate research findings, As a topic of academic research, As part of a product or standard commercial offerings, To inform internal decision making in my company
I work most closely with: The bioinformatics team
Top 3 tasks and responsibilities: Coding, Design, Learning

Total Time on Data Vis: 80% of work time

Data prep and cleaning	0-5 h
Data analysis	0-5 h
Ideating and storyboarding	0-5 h
Producing viz	11-20 h
Other viz-related tasks	6-10 h

Over time:

Interesting collaborations	↗
Work on fun projects	↗
Meet new people	↗
Devote time to data viz	~
Make time for side projects	~
Learning and prof. development	↗
Keep up with the field	~

Improved/Worsened

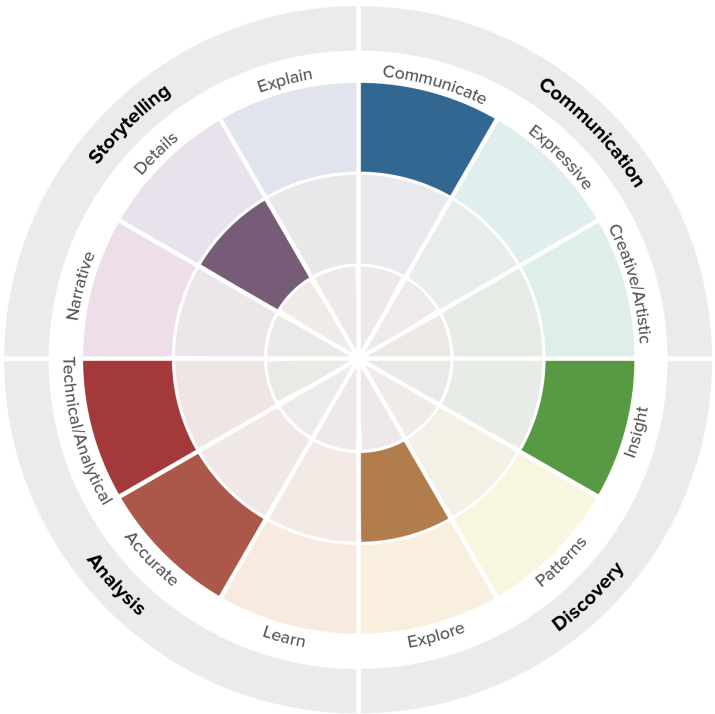
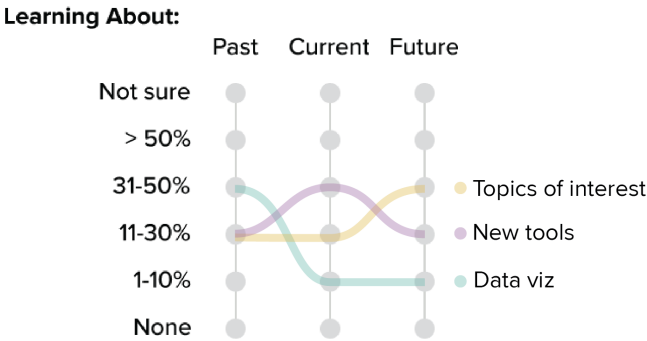
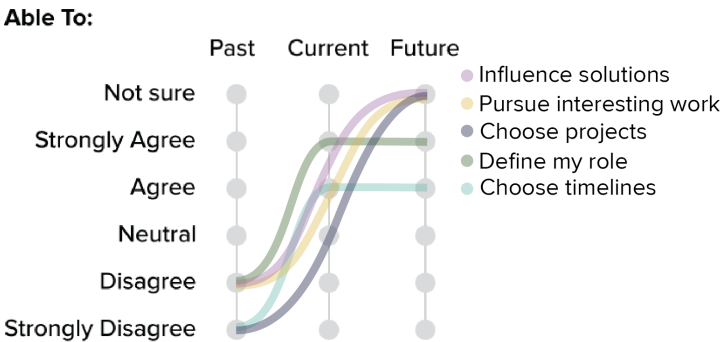
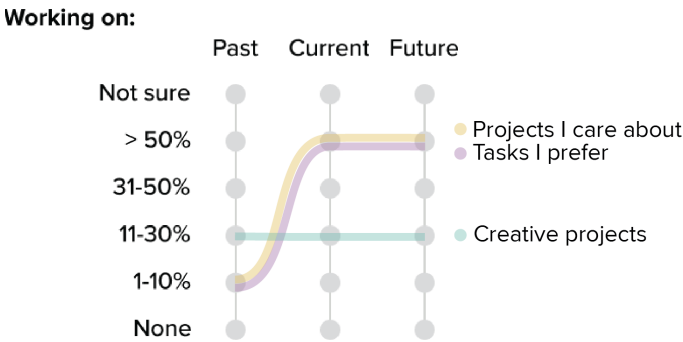
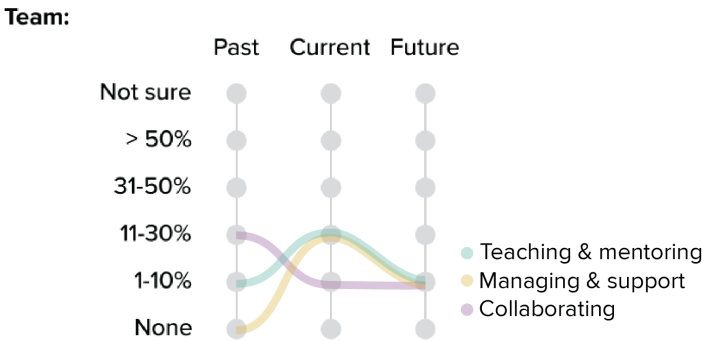
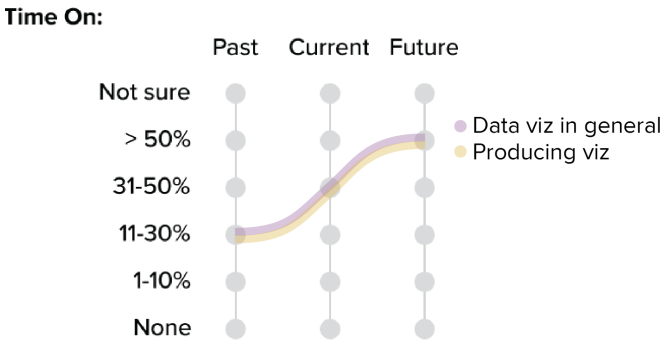
Life-work balance	~
Sense of security (job, career, financial)	+
General stress level	-
Exhaustion	+
Freedom	+
Responsibilities	+

Tools (from the survey list): D3, Observable, Pen and Paper, React, Tableau
Which tools do you use most often, and why? React, because it’s the framework our code base employs to create the application where my charts live.
Communication methods: Dashboard, Static webpage, Interactive notebook
Charts used in the past 6 months: Line chart, Choropleth map, Area

Summary
Robert is a data visualization engineer who creates charts for production in an application context. He currently works in a startup that leverages population genomics research to improve patient outcomes.
Robert began his career in supply chain optimization, spent 10+ years working as a freelancer and consultant using a combination of Tableau and other tools, and recently switched into front end engineering. His interest in data visualization began when he realized that a lot of his data output was just not compelling until visualized—and then it changed the conversation entirely. He taught himself visualization through reading, and then learned through consulting. He quickly became known as a freelancer who produced well-designed dashboards quickly, and with a robust data pipeline.

Robert eventually moved into front-end development by participating in an intensive 9-month Codesmith boot camp. He has always had a deep interest in health and personal wellness, and wanted to use his skills to improve patient’s

lives. He specifically looked for a position in healthcare data, and recently began a new position where he is developing visualizations for a brand new software product.
When building charts to go within an application, Robert finds that the work is less about a novel encoding or a special visualization, and more about visualizing for production: the chart exists in the context of a changing application state, and needs to be flexible enough to handle whatever data comes back in a given situation. He is currently developing a charting library in React/Typescript/D3, and is building out reusable web components to support growing product needs. He believes that success as a data vis developer is about taking the time to get into the details, no matter what you’re working on. Data vis has lots of elements that are literally hidden, but they all need to be done right to work. He enjoys working with that complexity, and using his skills to add value and amplify the work of the scientists on his team.



Varun Goenka

https://www.linkedin.com/in/varun-goenka/

Current professional

area: Analyst
Title: Data Visualization Analyst IV

Previous career areas: Analyst, Developer, Designer
Professional Experience: 2 years
Data Viz Experience: 4 years



Sector: Finance
Size of org: 1000+ employees

Data viz is: The primary focus of my job
I focus on: There is no general; it all depends on the project
I make visualizations for: Analysts

I use data visualization to: Inform internal decision-making in my company
I work most closely with: Analysts, Customers, Consultants
Top 3 tasks and responsibilities: Producing visuals, data analysis, gathering requirements and presenting analysis to the customer

Tools (from the survey list): Excel, PowerBI, Powerpoint, Tableau
Which tools do you use most often, and why? Currently I am using PowerBI the most to create visuals. I also use Alteryx and Snowflake.
Communication methods: Dashboard, Presentations, Email
Charts used in the past 6 months: Line chart, Bar chart, Pie chart/donut chart, Scatterplot, Histogram, Hexbin/heatmap, Infographic, Treemap, Dendrogram, Choropleth map, Waffle chart, Flow chart (Sankey, DAGRE, Alluvial)

Total Time on Data Vis: -- of work time		Over time:	
Data prep and cleaning	0-5 h	Interesting collaborations	↗
Data analysis	6-10 h	Work on fun projects	↘
Ideating and storyboarding	0-5 h	Meet new people	~
Producing viz	11-20 h	Devote time to data viz	↘
Other viz-related tasks	6-10 h	Make time for side projects	↘
		Learning and prof. development	↗
		Keep up with the field	↘

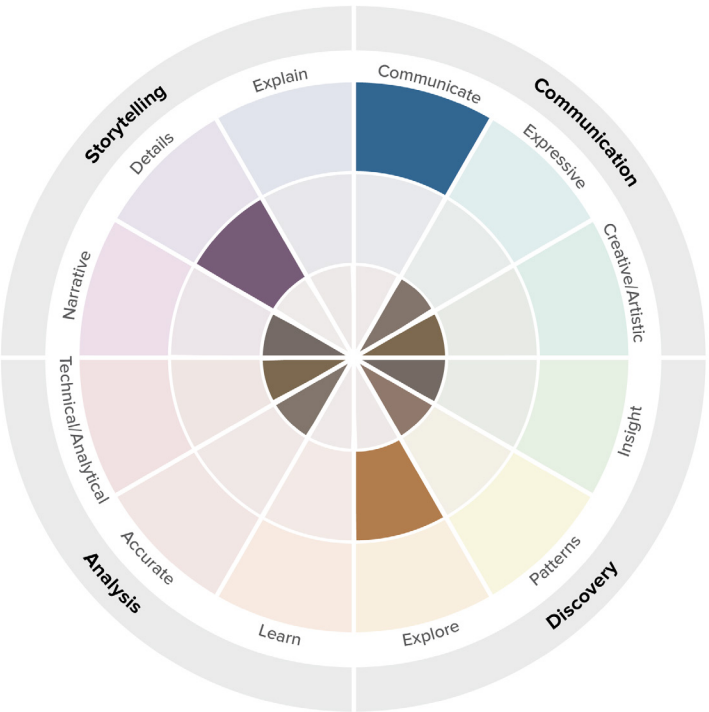
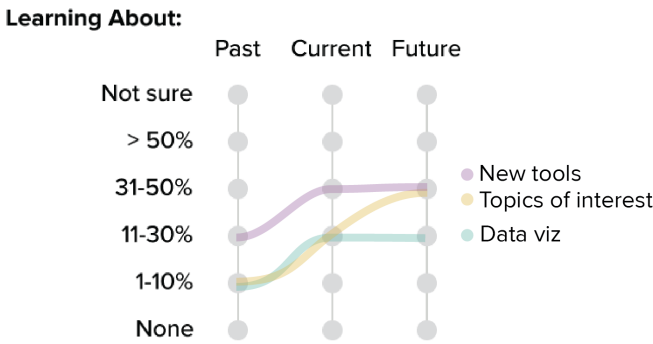
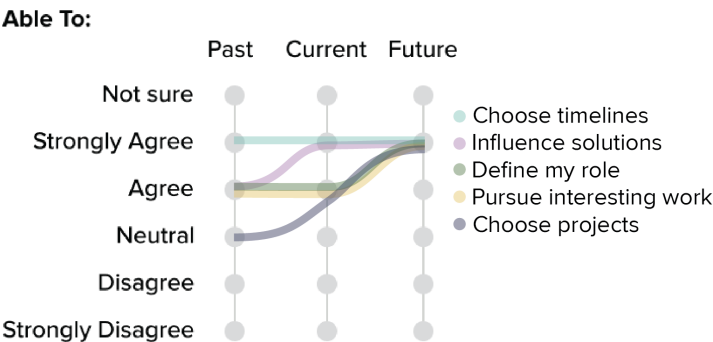
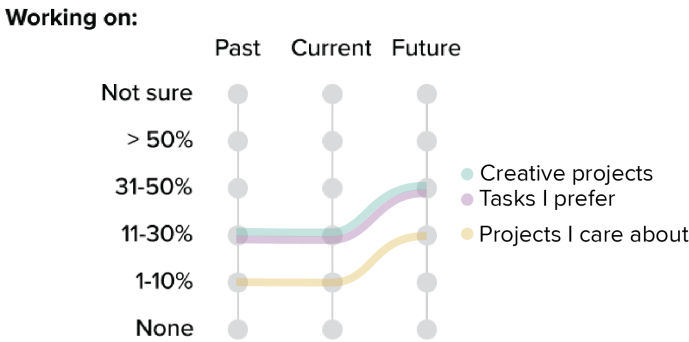
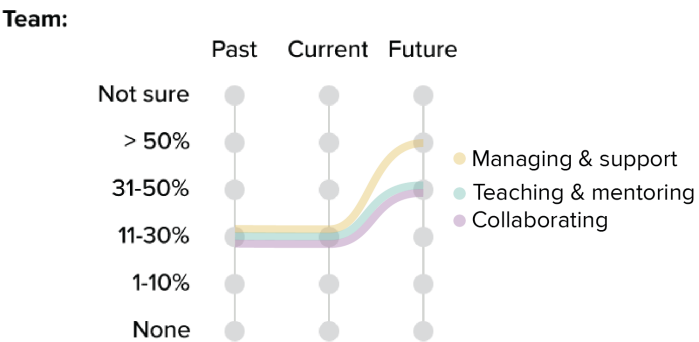
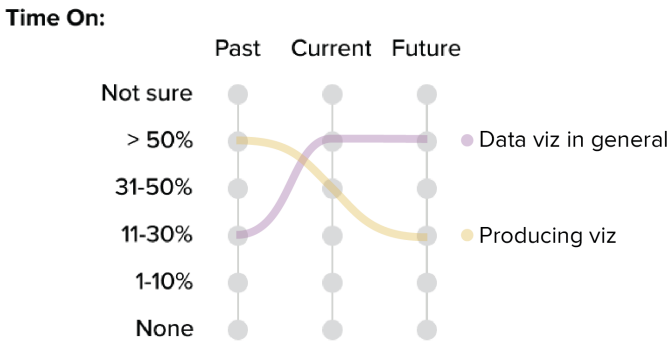
Improved/Worsened	
Life-work balance	~
Sense of security (job, career, financial)	+
General stress level	~
Exhaustion	~
Freedom	+
Responsibilities	+

Summary
Varun was introduced to data visualization during an internship while pursuing his undergraduate degree in electrical engineering in India. He decided to pursue a Master’s degree in Information Systems, where another internship introduced him to Tableau. He played around with Tableau a lot in his free time, eventually participating in Makeover Mondays and building personal dashboards. Eventually, he switched to producing visualizations professionally.

Today, Varun works at a large insurance company. He’s officially in a data analyst role, but his work leans more toward development, and includes some visual design aspects as well. Varun sees his job as presenting information in a way that allows stakeholders to make decisions, and making sure that the data is understandable. Ultimately, all of his projects are focused on finding the overlap between two questions: “what can we analyze with the data that we have?” and “what is the user trying to do/understand?”

Key skills for his position include the ability to represent data well and to understand the data through the eyes of a customer, exploratory data skills, the ability to test hypotheses and solutions, and a sense of color and spacing. He thinks it’s very important to be able to reduce clutter and cognitive load, and enjoys the artistic aspect of making

dashboards appealing. It’s also important to be comfortable talking with clients, and to be able to lead a conversation to understand their requirements. He finds that clients often don’t understand the tech side, and feels that helping to translate technical requirements for the business side is a key part of an analyst’s job.
Varun likes the fact that he’s working with data, but the work also brings out his creative side. He’s not a big coder, and prefers to focus on other aspects of the job, especially the visual and style components of optimizing a visualization. He uses a variety of tools, but currently spends most of his time in PowerBI.
Varun is happiest when he is creating something useful, and he really enjoys working with clients and getting to hear their success stories. He spends a lot of time working with different stakeholders, but his favorite part is creating the visuals—and the fact that there is so much to learn.



Dr. Meg Pirrung

megalodonatron.com

Current professional

area: Designer

Title: Lead Product Designer

Previous career areas:

Scientist, Developer

Professional Experience:

11–15 years

Data Viz Experience:

6–10 years



Data viz is: One of several things I do in my job, but not a primary or a secondary focus of my role.

Time spent exclusively on data viz (per week): <1%

Hours spent on data viz: 5 hours or less per week

I focus on: It all depends on the project

I make visualizations for: Analysts

I use data visualization to: Communicate data (not necessarily from research)

How do you communicate your data visualizations?:

Embedded in a tool, Dashboard, Presentations

Charts used in the past 6 months: Line chart, Bar chart, Pie chart/donut chart, Hexbin/heatmap, Infographic, Network diagram

Over time:

Interesting collaborations



Work on fun projects



Meet new people



Devote time to data viz



Make time for side projects



Learning and prof. development



Keep up with the field



Improved/Worsened

Life-work balance

+

Sense of security (job, career, financial)

+

General stress level

-

Exhaustion

-

Freedom

+

Responsibilities

+

Summary

Dr. Pirrung comes from an academic background, with a BS in computer science and a Ph.D. in computational bioscience. Her dissertation focused on optimizing visualizations for different audiences. From there, she did some of her formative work in human-in-the-loop machine learning at a national lab, and now works at a startup.

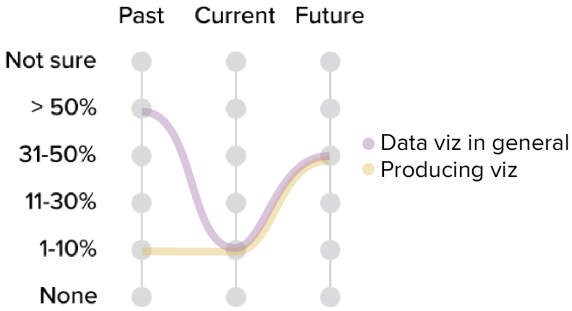
Her official title is product designer, but Dr. Pirrung considers herself to be a design scientist, leveraging her scientific training to make and test hypotheses while creating better charts. She has worked in a variety of companies and roles, but always gravitates toward complicated, gnarly problems where her diverse set of experiences and tools is a distinct advantage. Dr. Pirrung has always liked to take things apart to see how they work, and finds that to be the best way to get a lot of tools in your toolbox so that you can solve the really interesting problems.

Dr. Pirrung is a first-generation college student whose education was funded partially through scholarships and federal grants. As such, she feels strongly that it is part of her responsibility to make information understandable to all stakeholders. There are loads of really complicated scientific

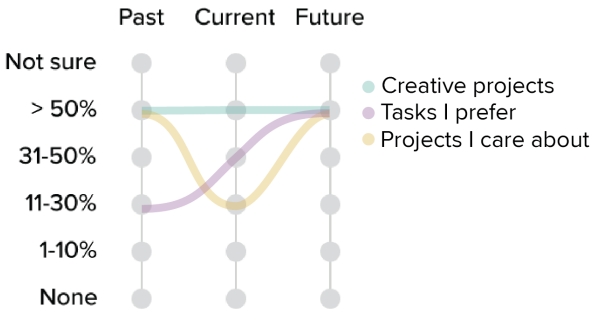
diagrams out there that are trying to make a database look flashy for the cover of Nature, but she doesn't think that really communicates science to people. The subjective artistic element is important, but that's part of the presentation piece. Before that, you have to do the core work to make sure that what you're doing really solves the problem and generates insight into the data.

Throughout her career, Dr. Pirrung has focused on chasing the things that bring her joy. She follows her curiosity, and avoids being overly risk-averse. To her, the key to being a good designer is to change your perspective on everyday things, and the best resource for design is really just looking at the world and thinking about how you might be able to make it better for other people.

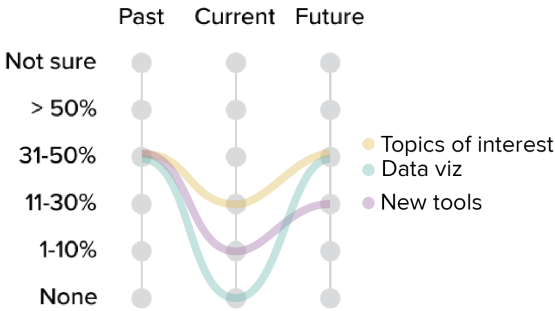
Time On:



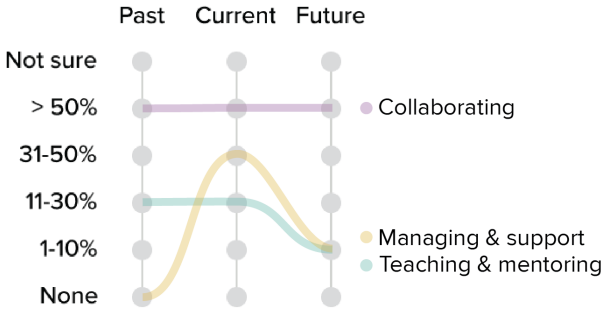
Working on:



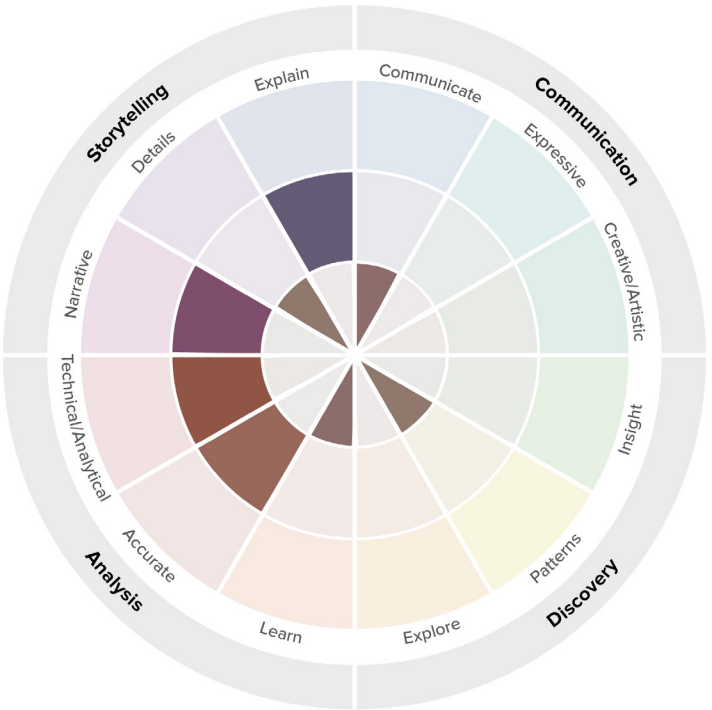
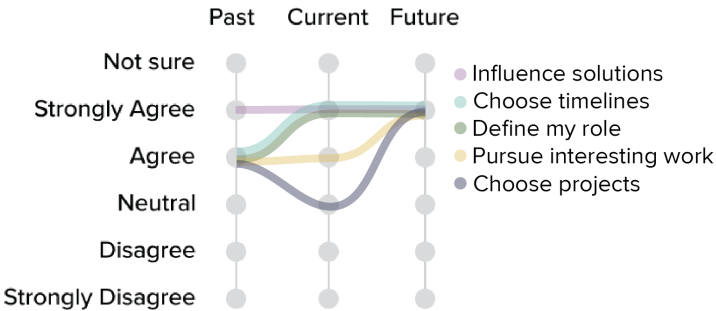
Learning About:



Team:



Able To:



Lisa Mahapatra

Current professional area: Designer
Title: Principal Product Designer

Previous career areas: Journalist, Designer
Professional Experience: 11–15 years
Data Viz Experience: 6–10 years

Sector: Information Technology
Size of org: 20–99 employees

Data viz is: One of several things I do in my job, but not a primary or a secondary focus of my role.
Time spent exclusively on data viz (per week): Data visualization is a skill, and not necessarily an appropriate description for the deliverable output for the work I do employ-

ing this skill. I design data experiences, the output of which could only very loosely be called a data visualization.
Hours spent on data viz: 6–10 hours/week

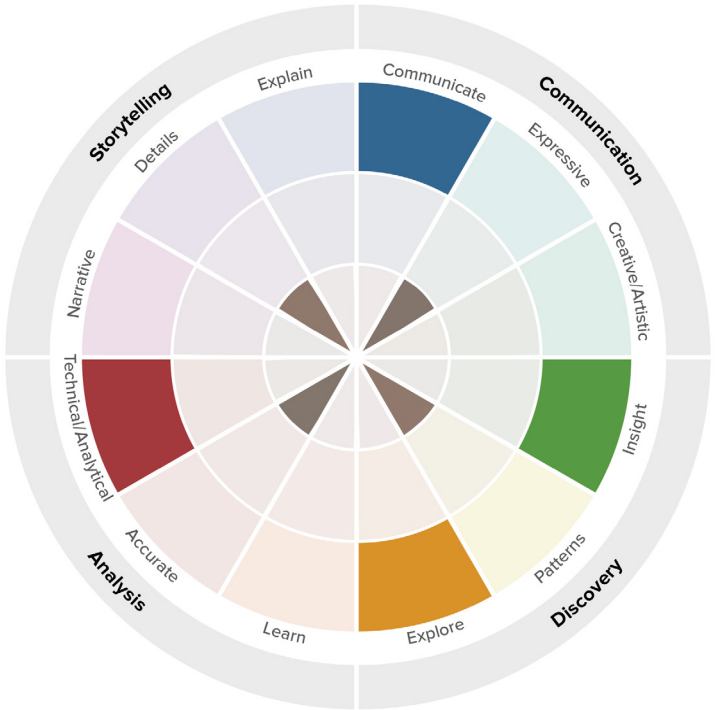
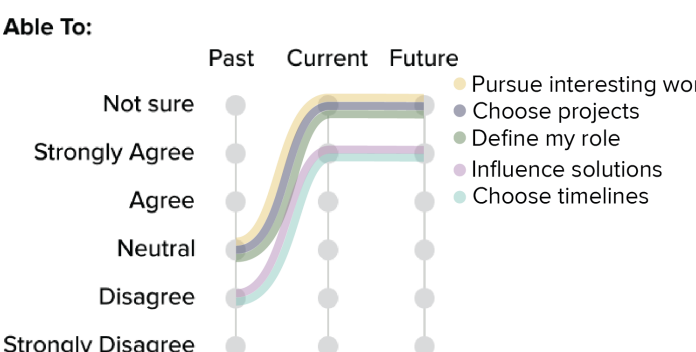
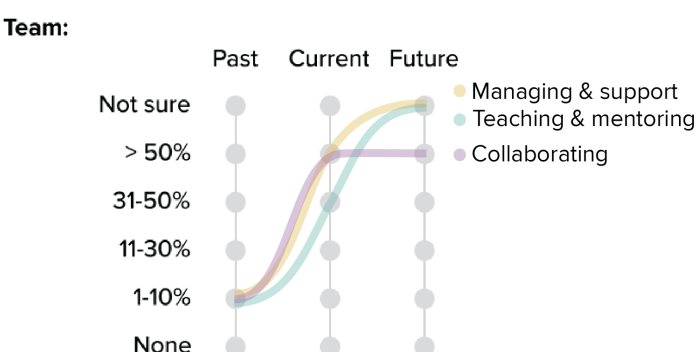
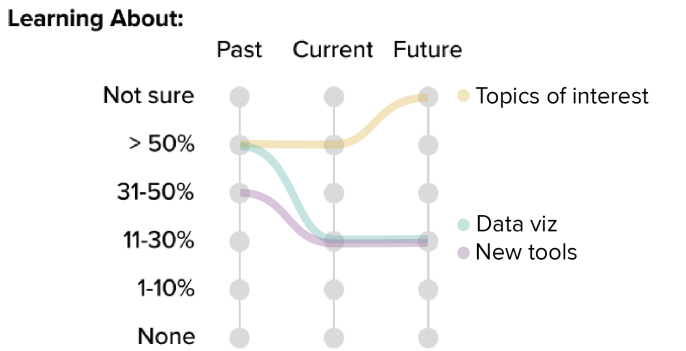
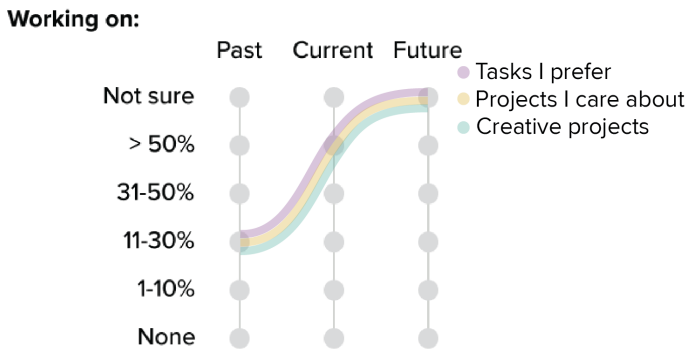
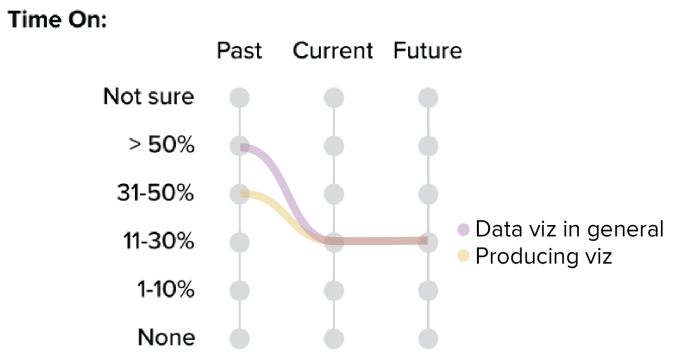
I focus on: There is no general; it all depends on the project
I make visualizations for: Flatfile’s customers, internal stakeholders
I use data visualization to: Communicate research findings

How do you communicate your data visualizations?:
Document or report, specs in Figma
Charts used in the past 6 months: Line chart, Bar chart, Data Table

Over time:		Improved/Worsened	
Interesting collaborations	↗	Life-work balance	~
Work on fun projects	~	Sense of security (job, career, financial)	+
Meet new people	↗	General stress level	-
Devote time to data viz	↘	Exhaustion	~
Make time for side projects	↘	Freedom	+
Learning and prof. development	↘	Responsibilities	+
Keep up with the field	↘		

Summary
Lisa moved to the US from India in 2011 to go to journalism school. She quickly realized that she was much more drawn to math than her colleagues, and this drew her into data reporting and visualization. She developed her visual skills further in a job as infographics editor at the International Business Times, where she learned to turn projects around on a tight timeline. Over time, she grew tired of the short shelf life of her journalism work, and moved into other areas, including financial research, media, and tech.
Lisa’s path has certainly not been linear, but her career advice is to find where you can add value, and to focus on that. To her, data visualization in itself is not the value add. The real value comes from being able to take the skill of data visualization and do something powerful with it. Over time, she has come to see beauty in simpler work. Her priority is always to make sure that the visualization is clear to the people that she wants to understand it, before creating something that is cool.

Lisa is currently a designer at a startup called Flatfile. She has spent the past several years making tables to support heavy data wrangling. To her, tables are the number one data visualization for data exploration. Data visualization for storytelling leans extremely heavily on annotation, but in exploration you cannot guide the person who is using the format to those insights, because you don’t know yet what they will be. If you’re not sure yet what story you’re trying to tell, Lisa believes that a table is a fantastic place to start, because you can interrogate it using filters, advanced functions and well-designed displays to tease out the information. Lisa’s current work focuses on helping people to interrogate the data for themselves, and on creating a data interface that is optimized to surface errors in data and then clean that data.



Peter Beshai

https://peterbeshai.com

Current professional

area: Engineer
Title: Senior Data Visualization Engineer

Previous career areas:

Engineer, Developer, Designer

Professional Experience:

11–15 years
Data Viz Experience: 6–10 years

Sector: Information technology
Size of org: 1000+ employees
Data viz is: The primary focus of my job



Time spent exclusively on data viz (per week): 80%
Hours spent on data viz: --

I focus on: I own the entire DV process, from beginning to end
I make visualizations for: Analysts
I use data visualization to: Communicate research findings

How do you communicate your data visualizations?: Dashboard, Interactive notebook, Document or report, Presentations, Email
Charts used in the past 6 months: Line chart, Bar chart, Pie chart/donut chart, Scatterplot, Histogram, Hexbin/heat-map, Dendrogram, Choropleth map, Bee swarm chart

Over time:		Improved/Worsened	
Interesting collaborations	↗	Life-work balance	+
Work on fun projects	↗	Sense of security (job, career, financial)	+
Meet new people	↗	General stress level	~
Devote time to data viz	↗	Exhaustion	~
Make time for side projects	↘	Freedom	+
Learning and prof. development	↘	Responsibilities	+
Keep up with the field	↘		

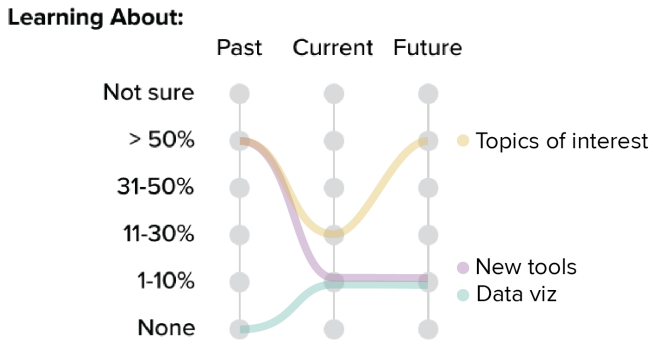
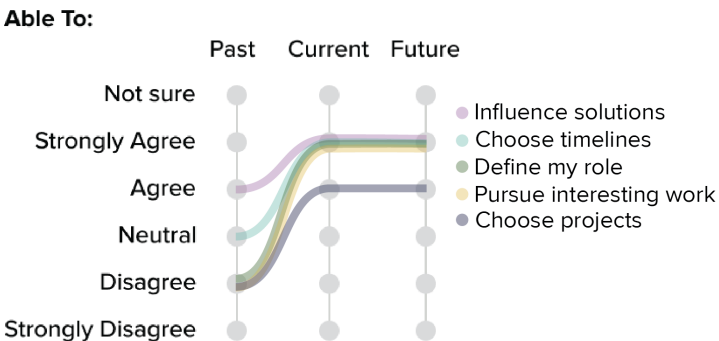
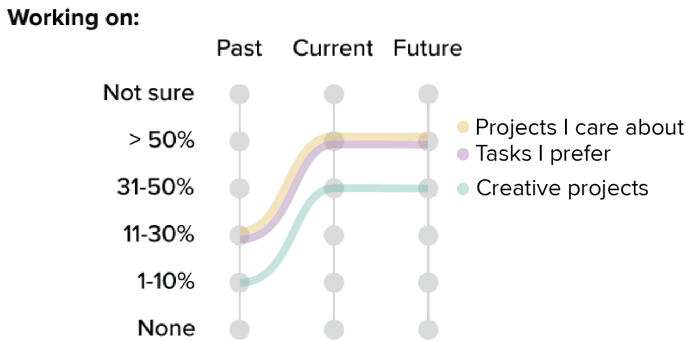
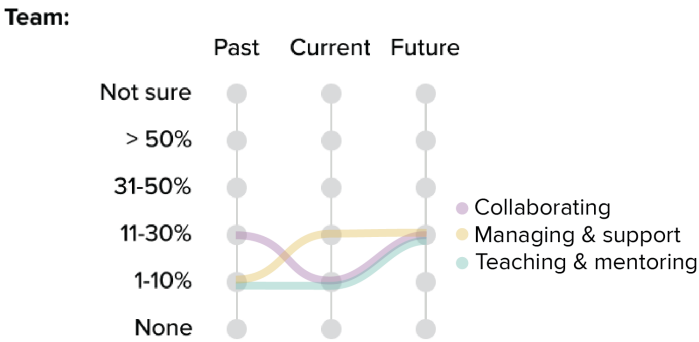
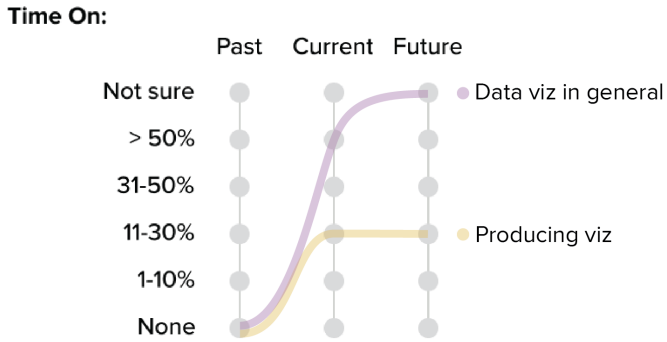
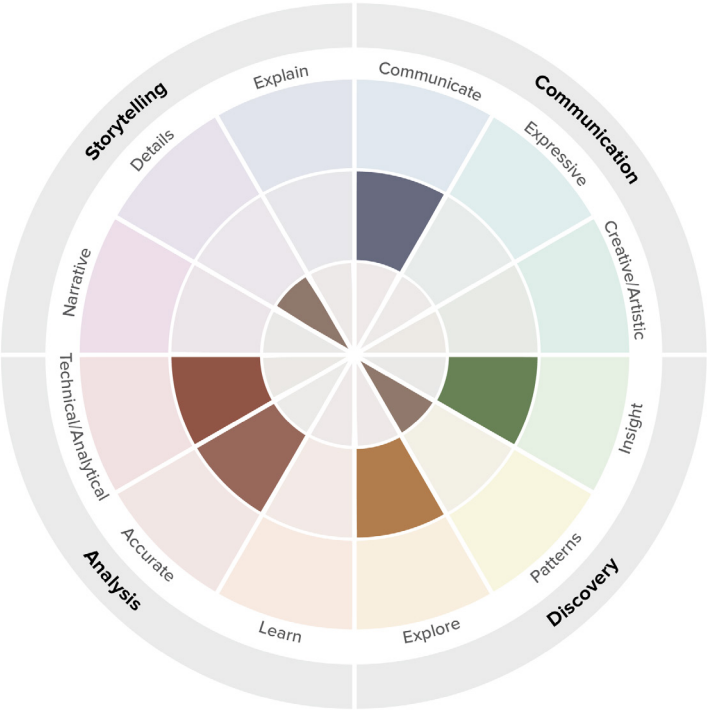
Summary
Peter’s work with computers began in first or second grade, when his mom got him a typing device called a TypeWrite2. He began programming when he was quite young and learned web development so that he could put animated gifs on websites. Eventually, he found his way into data visualization through UX.

In graduate school, Peter learned D3 and developed a basketball visualization as part of his Ph.D. course work. He shared the visualization online, hoping to include public feedback in his term paper. It received a lot of attention in different online communities, and Peter was contacted by several basketball teams. He ended up leaving graduate school to take a position doing data visualization for the Boston Celtics. It was a risky move, but the opportunity was rare and exciting enough to justify the risk.

Peter is frank about the role of luck in this story: “my life changed just because I worked really hard and then shared something online, and it happened to be what people liked in that moment.” Reflecting on how things have changed in the data visualization world since then, Peter says that it’s now a larger and more mature community, and there is a lot more work out there to learn from. There’s also a lot more noise, and a lot more to catch up on before you begin to stand out as a leading voice in the field.

Eventually, Peter left his position at the Celtics in search of a stronger community: he was the lone programmer on the team, and he didn’t have a strong group of peers to talk to about data viz. He has held several different positions since then, and currently works as a staff data visualization engineer at Netflix, where he builds tools that analysts can use to extract insights from large datasets. Peter finds Netflix to be a very interesting company to work for, because his work encompasses many different roles: it spans the entire data visualization process, from data scraping and writing ETLs through to analysis, back- and front-end APIs & database design, all the way to the UX and graphic design of a chart.

To Peter, everything he does is data viz: ultimately, all of these tasks are building toward an analytical application for a database that people can use to make inferences based on the data.
Peter always approaches data visualization through the lens of user experience: “we’re not building for a machine with perceptual ratings. This is a person who has an emotional reaction, and that’s going to impact their interpretation of things. We need to bring some delight and some joy, because that will keep people open. If you make the most accurate representation you can and no one wants to look at it, it’s not really valuable.” He also thinks that it’s important to keep things fun: “data viz is couched in this idea of serious analytics, but there is this space of fun, and you can still do data viz with a light heart and engage in a different way, and that’s not wrong.”



Alan Wilson

Current professional area: Designer
Title: Principal Designer

Previous career areas:
Designer, Leadership
Professional Experience:
16–20 years
Data Viz Experience:
11–15 years



Sector: Information Technology
Size of org: 1000+ employees

Data viz is: One of several things I do in my job, but not a primary or a secondary focus of my role
Time spent exclusively on data viz (per week): 8%
Hours spent on data viz: 5 or less

I focus on: It all depends on the project
I make visualizations for: Almost all of the above
I use data visualization to: I use data visualization for a lot of things, such as data vis guidelines for use by product designers
How do you communicate your data visualizations?: Dashboard, Static webpage, Document or report, Presentations, Email, App
Charts used in the past 6 months: Line chart, Bar chart, Pie chart/donut chart, Scatterplot, Histogram, Hexbin/heatmap, Treemap, Network diagram, Connected scatterplot, Ternary plot, Workflow Diagram, Color picker, etc.

Over time:		Improved/Worsened	
Interesting collaborations	↗	Life-work balance	+
Work on fun projects	~	Sense of security (job, career, financial)	+
Meet new people	~	General stress level	+
Devote time to data viz	↗	Exhaustion	+
Make time for side projects	↗	Freedom	+
Learning and prof. development	↗	Responsibilities	~
Keep up with the field	↗		

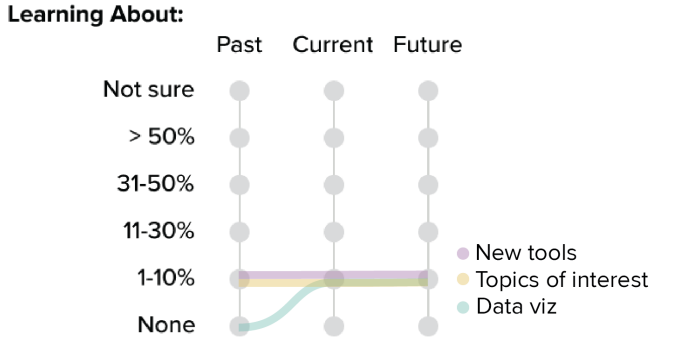
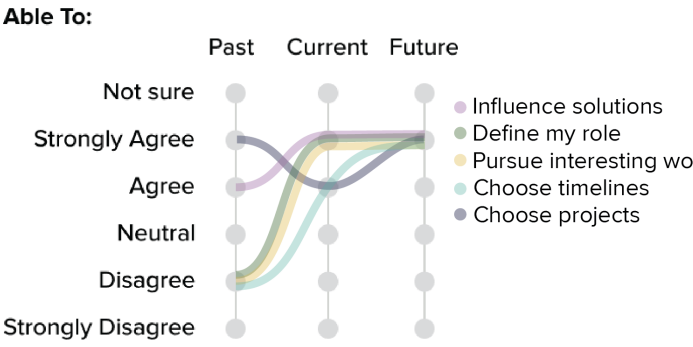
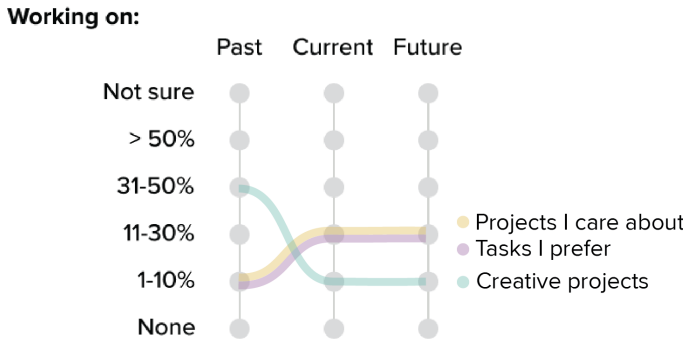
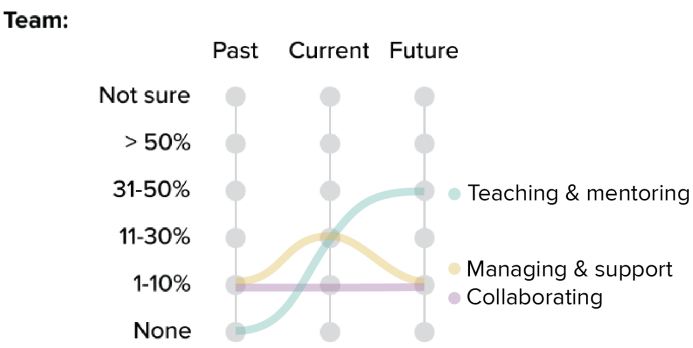
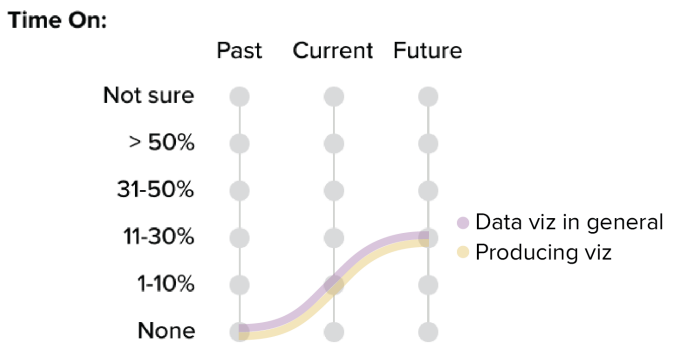
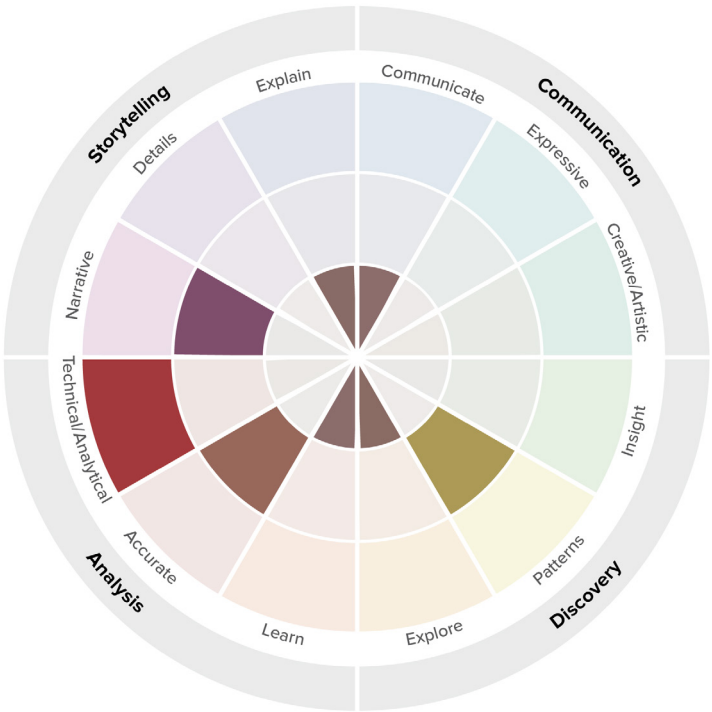
Summary
Alan Wilson is a principal designer at Adobe, where he works on enterprise software. His work focuses on helping customers to understand their user base. He works closely with product managers, engineers, and researchers to find ways to make the product better and to improve the user experience. Alan has spent a lot of time developing design systems for visualization and design patterns to encourage consistency across products. These systems help to solve the easy problems quickly, so that the team can spend more time on the complex things.

Alan has always loved numbers and spreadsheets, and used them to create his own board games as a kid. His quantitative interests were relegated to hobbies while he was in design school, but when he started working at Adobe, Alan found himself particularly drawn to working on icon design and data visualizations. He started reading widely about data visualization and has now been practicing it for over 12 years. He learned a lot from examples, and from taking visualizations apart to understand why they are good.

In speaking about rules and guidelines, Alan says: “I think guidelines are really useful, especially for people that are new to the field and need somewhere to start. But as people gain experience and grow, they start to understand where the subjectivity is—where rules help, where they hinder, and when it’s ok to break them.”

His biggest advice for someone looking to become a data visualization designer is not to lose sight of what data visualization is for. “When you’re reading a book...think through the lens of ‘is this rule or guideline useful in the setting for which I need it?’ If it is, take advantage of it. If not, don’t feel too bad about just ignoring it.”

When hiring in data visualization, Alan is looking for basic qualities like critical thinking, dependability and work ethic, as well as the ability to step back and work smarter rather than harder.
When interviewing as a candidate, he thinks that “one of the best things you can do is to be genuine, open, and enthusiastic about sharing who you actually are...If you can do that effectively, then you’re going to find a job that fits you right. The jobs that you don’t get are going to be because it’s a mismatch. It doesn’t align with what that person’s looking for, what that organization is looking for and in need of.” He believes that diversity is a key ingredient in any team. “We can’t allow ourselves to reduce people to just a cog in a machine... [there is] so much more that isn’t being shown...[t]he same is true of any candidate you’re interviewing. You’re only getting a tiny slice of their life, and so you need to try to make that slice as rich and useful as possible for both parties.”



Rachel Binx

Current professional area: Engineer
Title: Design Technologist

Previous career areas: Designer
Professional Experience: 11–15 years
Data Viz Experience: 11–15 years



Sector: Information technology
Size of org: 200 employees

Data viz is: The primary focus of my job
Time spent exclusively on data viz (per week): 20%
Hours spent on data viz: 6–10 hours

I focus on: I own the entire DV process, from beginning to end
I make visualizations for: Analysts, Engineers, and Scientists

I use data visualization to: Make business decisions
How do you communicate your data visualizations?: Embedded in a tool, Dashboard, Email, Augmented or virtual reality
Charts used in the past 6 months: Line chart, Bar chart, Scatterplot, Histogram

Over time:		Improved/Worsened	
Interesting collaborations	↗	Life-work balance	+
Work on fun projects	↗	Sense of security (job, career, financial)	+
Meet new people	↗	General stress level	+
Devote time to data viz	↘	Exhaustion	+
Make time for side projects	↗	Freedom	+
Learning and prof. development	↗	Responsibilities	+
Keep up with the field	~		

Summary

Rachel has been working in data visualization since 2010. She started her career at a design firm, followed by freelancing and founding product companies. In recent years, she has taken full-time positions, stemming from a desire to work on projects with longer timelines.

When Rachel first encountered the field of data visualization in college, and it appealed to her because it required both a technical and an artistic skill set. Rachel spent a year studying Tufte, learning Processing, and building out a portfolio of example projects. She used this portfolio to apply for work, both freelance gigs and full-time positions. Eventually, this landed her a job at a design studio called Stamen.

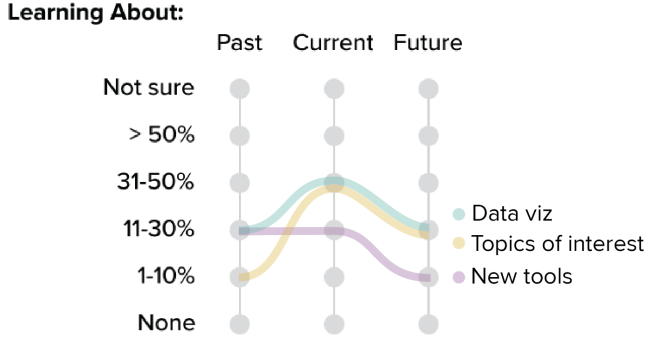
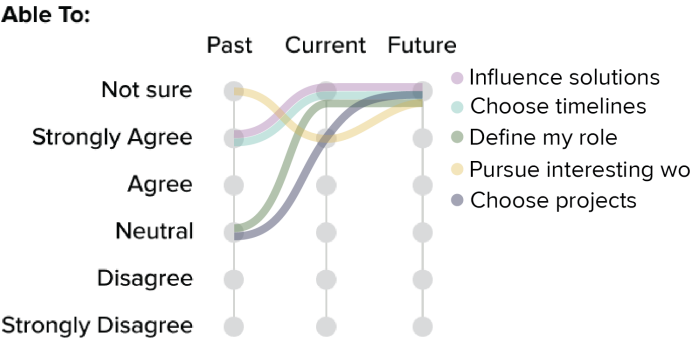
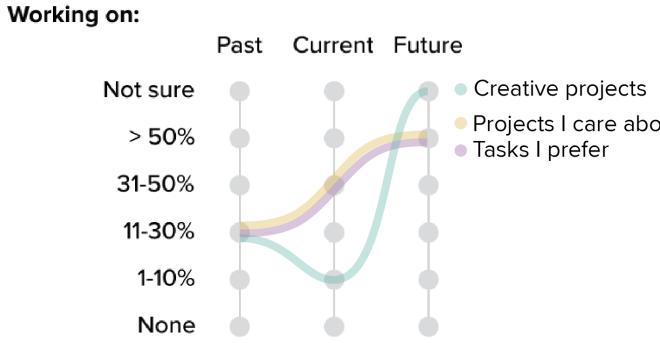
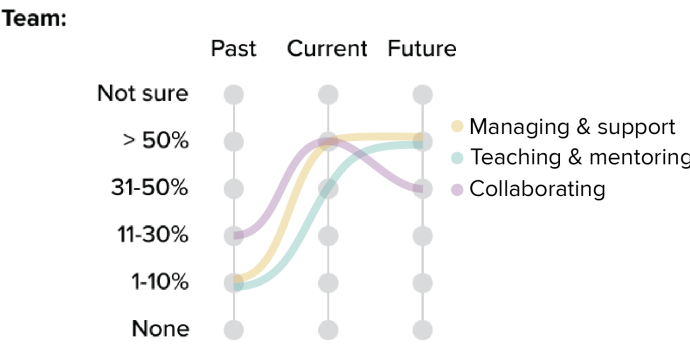
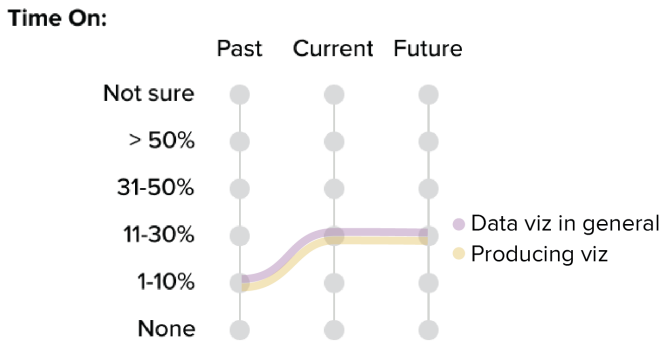
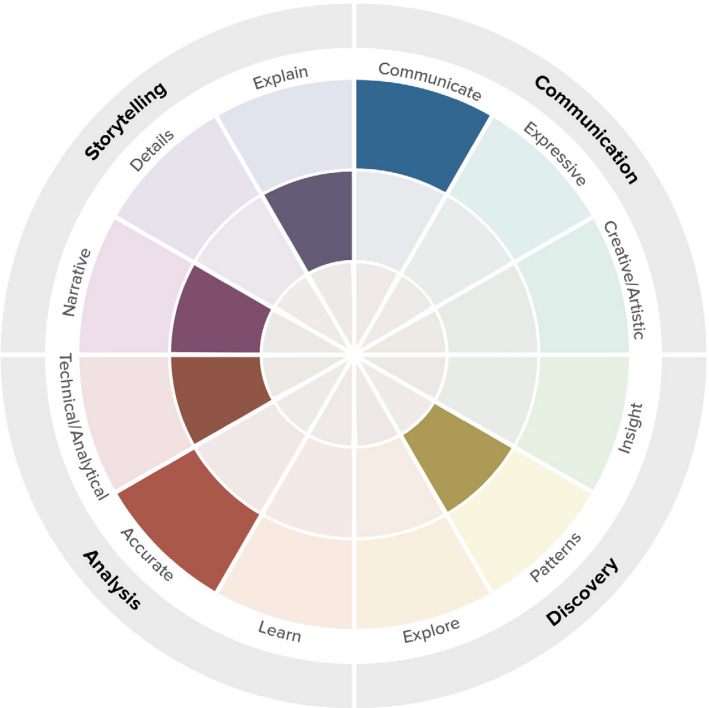
At Stamen, Rachel had the opportunity to work with a wide range of clients, spanning TV media, art museums, and a variety of tech companies. Data visualization in that era was largely exploratory, allowing users to draw their own conclusions from a dataset. Style was just as important as substance, which meant that Rachel had many opportunities to learn different visual styles and create custom visualizations.

After working at the studio, Rachel transitioned to freelance visualization work, while also building out her own companies. The first of these, Meshu, empowered customers to create their own jewelry designs from data, creating deeply personalized laser-cut or 3D printed pieces. On the freelance side, she had the opportunity to work with a variety of clients across education, health, and media. The scale of the projects, however, was always constrained by the limits of freelancing, and she started looking into full-time work as a way to go deeper on projects.

She took a job at NASA’s Jet Propulsion Laboratory, building telemetry visualization software for spacecraft. This was the first time she had worked on a project for more than a handful of months, and it was satisfying to build out a

fully-fledged web application with multiple design iterations. Working on internal tools (as opposed to public-facing visualizations) also had the benefit of direct user feedback, covering the entire set of users.

Since working at JPL, Rachel has pivoted to full-time work on data analytics teams. Her current role supports decarbonizing companies to combat climate change. At its heart, data visualization is a communication medium, translating masses of data or technical metrics into something understandable and actionable. The human race has a lot of work to do in the coming years if we are going to make a dent in the carbon crisis, and that work will always begin with education and outreach. Data visualization practitioners will play a key role here in the coming years, communicating the scale and scope of the work at hand.



Brit Cava Follett

Current professional area: Analyst
(Most recent) Title: Analytics Lead

Previous career areas: Analyst
Professional Experience: 6–10 years
Data Viz Experience: 6–10 years

Sector: Information technology
Size of org: 1000+ employees

Data viz is: One of several things I do in my job, but not a primary or a secondary focus of my role
Time spent exclusively on data viz (per week): 15%
Hours spent on data viz: 5 or less

I focus on: There is no general; it all depends on the project
I make visualizations for: Executives, Mid-Level Management, Product Managers, Partner Managers

I use data visualization to: Communicate research findings
How do you communicate your data visualizations?: Dashboard, Document or report, Presentations
Charts used in the past 6 months: Line chart, Bar chart, Scatterplot, Histogram, Pictorial visualization

Summary
Brit started her studies in political science. She is drawn to communication and likes to use her work to persuade people to take action. Data visualization also reflects passions for discovery, archaeology, and teaching that form common threads across multiple areas of her life.
Brit was first introduced to visualization while creating reports for volunteer management during a year of service with AmeriCorps. This is where she first needed to demonstrate impact with data. After graduating, Brit decided that she didn’t want to go into politics directly, and took a job in

Improved/Worsened	
Life-work balance	-
Sense of security (job, career, financial)	+
General stress level	-
Exhaustion	-
Freedom	~
Responsibilities	+

recruiting to cover the bills. From there, she interviewed for multiple positions and was eventually hired as an analyst on a business intelligence team at a health insurance company. In that position, she began building out dashboards to show trends in healthcare costs.
In her spare time, Brit explored topics like unreported police homicides and gun violence and built tools to inform people about what was happening in the world and how they could make a difference. She published many of these projects through Tableau Public, and built a social media following along the way.

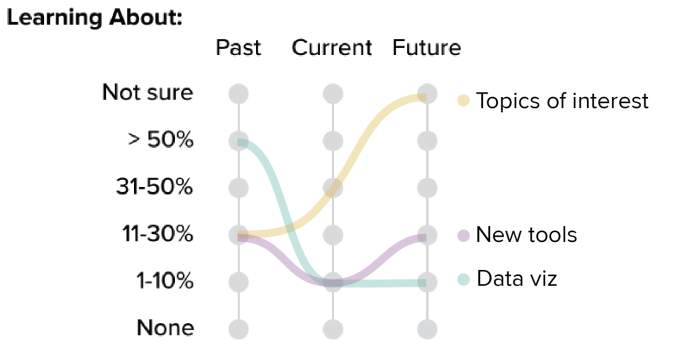
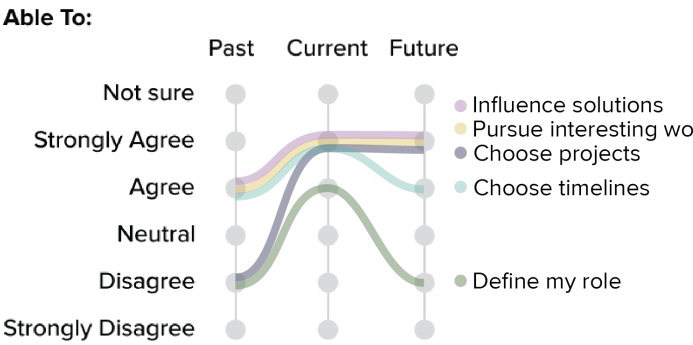
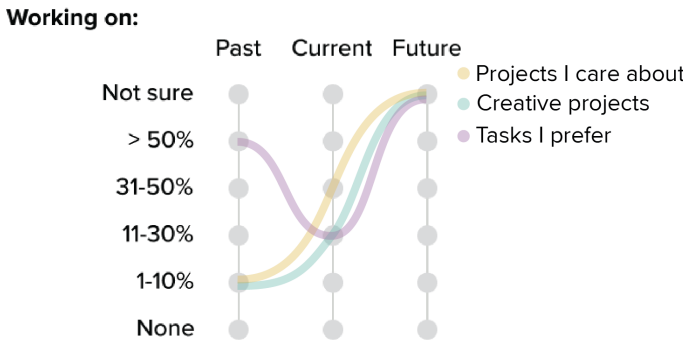
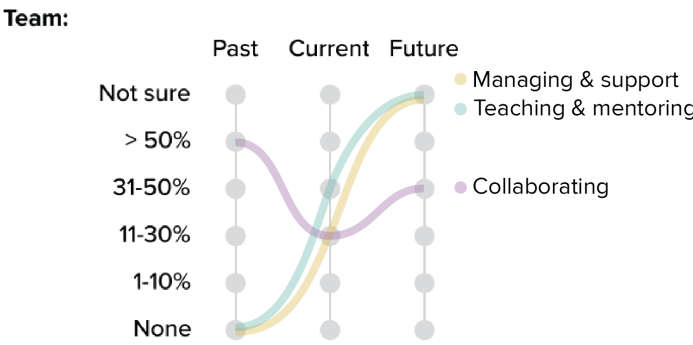
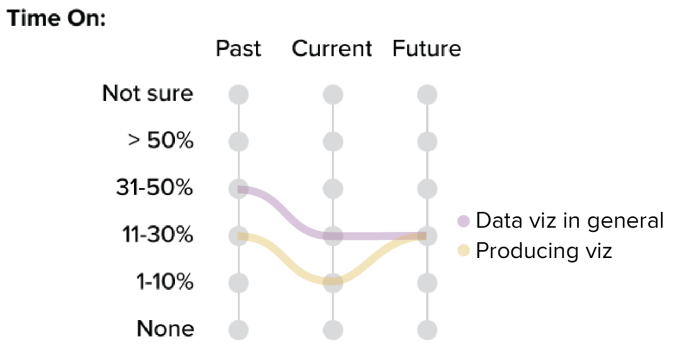
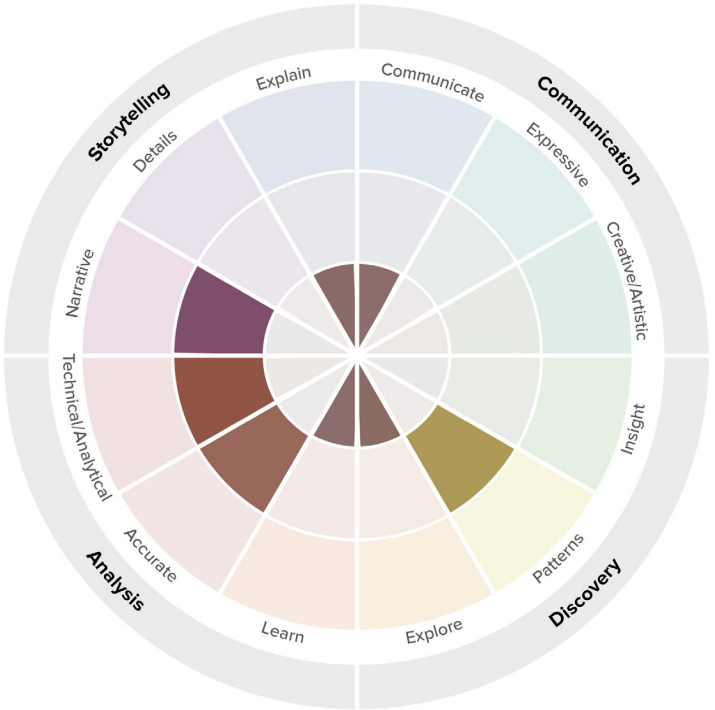
After moving to a new location, Brit moved into a local consulting company as a way to build connections in the area. She worked on a lot of different projects with them, spanning a wide variety of topics. It was fun to use more innovative graphics to push the edges and get to the core message, but her final deliverable was often focused on simpler, more traditional charts based on her audience’s data literacy and how they were used to looking at information.

Brit was recruited to join the Social Impact team at Facebook, working on nonprofit partnerships. While there, she moved deeper into analysis and used a wider variety of methods to convince her audience: it’s great if visualization is part of that, but the key thing is that the choices should be driven by data. She also shifted toward a more active stance in her data narratives, saying “hey, we need to pay attention to this, and here’s why.”

Brit’s career was well-aligned with her values and connected to real, direct impact in the world. That often made it difficult to find balance in her job. Over time, that started to

impact her personally: a lot of her friends said that her spark was gone. Speaking about career change, Brit says: “Ultimately you end up realizing that your external world no longer matches your internal world...I think those crises happen all the time. Life is always a series of things coming together and falling apart. When you no longer find joy in the work it’s time to take a step back and assess...That’s best for you and for those around you.”

Eventually, Brit decided to leave the dream job that she loved. It was one of the hardest decisions she’s ever made. A year and a half later, life really is different: in a good way. She’s starting to feel interested and excited about other opportunities again, and she feels like she’s taken a leap forward. Taking the time away from work really allowed her to build up parts of her life that she had deprioritized, and she’ll be going into her next position with a much better understanding of herself, her boundaries, and her priorities.



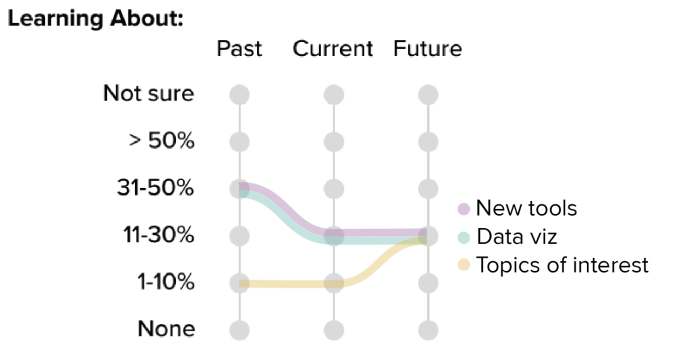
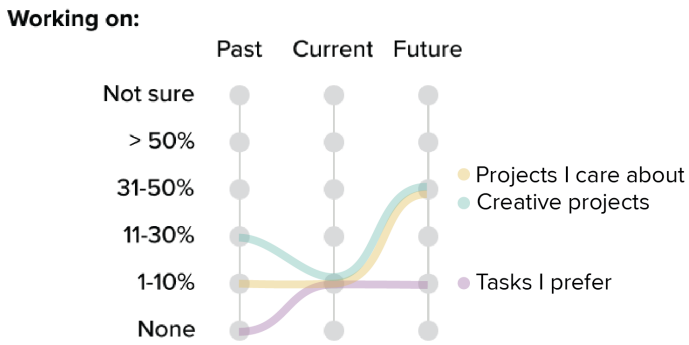
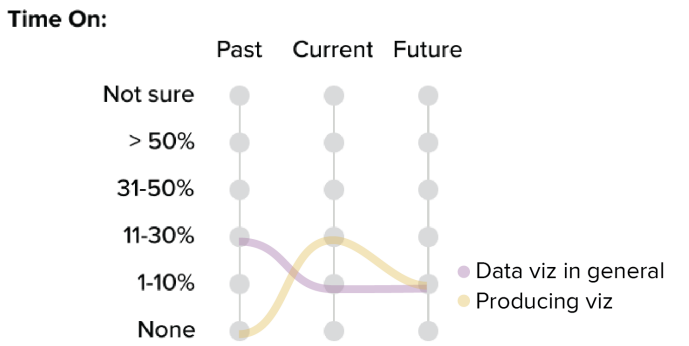
Anatoly Bondarenko

Current professional area: Leadership
Title: Editor, Data Journalism
Previous career areas: Analyst, Scientist, Journalist
Professional Experience: 26–30 years
Data Viz Experience: 11–15 years

Sector: Journalism
Size of org: Fewer than 20 employees

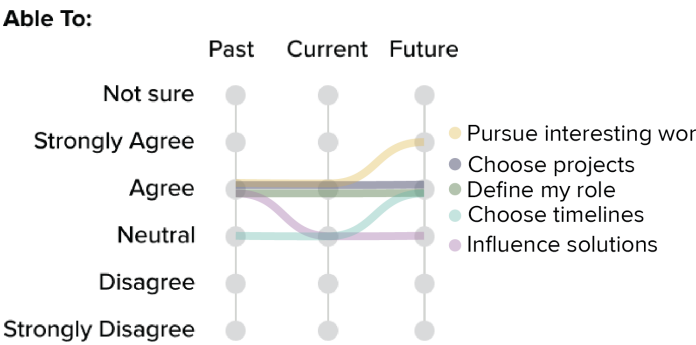
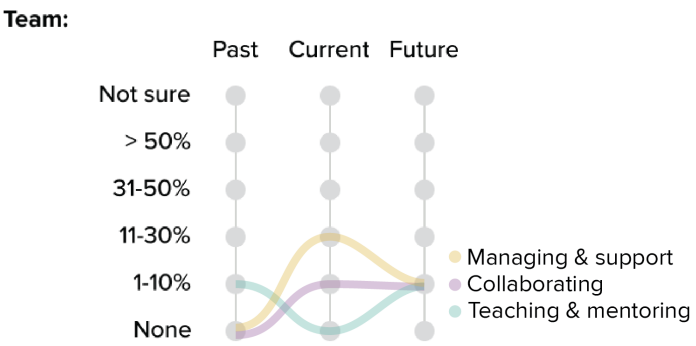
Data viz is: An important secondary part of my job, but not the primary focus
Time spent exclusively on data viz (per week): 20%
Hours spent on data viz: 5 or less

I focus on: It all depends on the project
I make visualizations for: General public



I use data visualization to: Communicate research findings
1-3 biggest frustrations with doing data visualization: Lack of time, Accessing data, Information overload

How do you communicate your data visualizations?: Embedded in a tool, Dashboard, Scrollytelling, Static web-page, Interactive notebook, Physical handout or printed on paper
Charts used in the past 6 months: Line chart, Bar chart, Scatterplot, Histogram, Treemap, Network diagram, Raster map



Over time:		Improved/Worsened	
Interesting collaborations	↗	Life-work balance	~
Work on fun projects	~	Sense of security (job, career, financial)	~
Meet new people	↗	General stress level	~
Devote time to data viz	↘	Exhaustion	~
Make time for side projects	↘	Freedom	~
Learning and prof. development	↘	Responsibilities	~
Keep up with the field	↘		

Summary
Anatoly Bondarenko is the head of data journalism at Texty, though he is currently on hiatus as an officer in the armed forces for Ukraine. He has a technical background in engineering physics, but has spent much of his career at the interface of journalism and politics. Anatoly’s first foray into data visualization was creating a visual tool for a website for an investment company way back in 1999, drawing red or green triangles depending on the situation of world markets. While working as a political activist, he created a website to highlight specific words to help people understand where different parties stood on political issues and to compare candidates. After creating infographics for a print magazine for a couple of years, he co-founded an organization called Texty in 2010.

Ukraine has been in a cold war with Russia since 2014, even before Anatoly opened his first office. He has been working to improve the data visualization literacy of regular citizens so that they can understand and communicate about more complex and sophisticated social and political topics. He hopes that improving data visualization literacy will make it harder to convince people with disinformation or propaganda. It’s important for children especially to learn about this early, because if you don’t start young it is very, very hard to teach them to think carefully as adults.

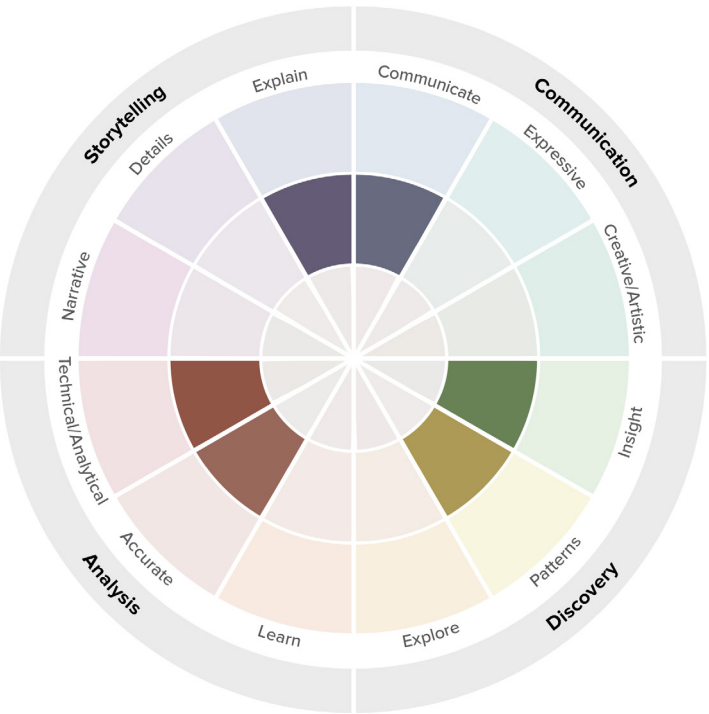
Anatoly thinks that it’s even more important to have a critical thinking mindset and to know how to differentiate between real and fake information when dealing with visualizations, because of the amount of information and the ease with which it can be distorted. In some ways, a stronger, “sexier” visualization can be more dangerous as a piece of propaganda, because it looks more authoritative and therefore more real.

The field of data journalism requires constant learning. There are new topics and new technologies every year, which is both a gift and a curse. Anatoly’s team has orga-

nized a process to teach new members and help old ones not to stop learning, and he considers this one of their best achievements.

When hiring, Anatoly is especially looking for a candidate’s desire to work in the field, their critical thinking skills, and their desire to learn more about how the world works. A strong portfolio helps during an interview, but the main test is really in the first project, because that’s where the team learns whether that person is really going to work hard.

Anatoly’s team works in D3, but most have a background in the fine arts rather than a technical area. About 70–90% of their data journalism work is in cleaning the data and preparing it for visualization. In most cases, the same person cleans the data and builds the chart, because it’s important to have in-depth knowledge of the data structure to understand how to visualize it well.



Words of Wisdom

There were so many insights and bits of advice that came up in the profile interviews. These are just a few of the things we heard. Recordings for the public interviews are available on the [DVS YouTube channel](#).

Sparks: Paths into Data Viz

My father is an accountant, and growing up our allowance was given on a statement. So early on, I was familiar with numbers and spreadsheets, and I had fairly early exposure to computers. But my biggest foray into this was video games and board games. I've always been a bit of a gamer and I found that spreadsheets were some of the best ways to play around in that space and make my own games, and make modifications to games. I spent a lot of time doing that. I guess another aspect is graphic calculators. In high school it was really cool when I got my TI83 and I could type in a simple equation and see a parabola or the shape of an equation. And I thought that was super cool and interesting.

Alan Wilson

I was introduced to data visualization by a Tufte workshop in graduate school. I had often felt that there was something wrong with me; articles and presentations felt boring, and I wasn't seeing what I was supposed to see. After that workshop, I realized that it was ok that I was bored: scientists don't communicate according to what we know about the human brain."

Lori Palen

During my undergraduate co-op term, one of my mentors sent me an article from Brett Victor on user interfaces. It had a lot of real world examples and was very relatable for me. At that time, I had never heard the words user experience or interface design, and I realized that this was a thing. Everyone has some moment in their career where they learn that there's a name for that thing that they care about: if Hugo hadn't sent me that article, I don't know what would have happened in my life.

Peter Beshai

Maps were a big part of what drew me into data viz: I played a lot of video games as a kid, and it was so cool to be able to create maps like the ones in my games, and then to do it with real data. We need to find things that spark people's curiosity and bring them in. I would like to get more people talking about how we nurture curiosity and exploration in data, and how to make it fun.

Matt Makofske

I was given a graphing calculator sometime in middle school in a free STEM program for inner city kids. My mom found it for me, and I hated it because I wanted to watch Saturday morning cartoons instead, but when they gave me the graphing calculator and you could stick in numbers and see the trajectory, it just kind of made sense to me. I taught myself how to program, and wrote a fortune teller "cootie catcher" program, and that's how I got introduced to programming and computer science. I just loved the logic of it. Some of the mathematical concepts were very challenging to me, and I didn't have the investment when I was in school, but suddenly I cared about arc tangents and spherical geometry because I needed to make an arrow pointing out of a circle. I wrote some code, and the thing that interested me was the visual output. I found that was what brought me joy.

Dr. Meg Pirrung

[Using Tableau], I just fell further into being enamored with the world of analytics and data visualization, because I've always been a very creative person myself. It was a way for me to start becoming a little bit more technical without it feeling like a lot of work. It felt like fun, and I think just that excitement I had when I initially picked up my first data visualization tool was really like the spark that then my career for the past eight years has grown.

Brit Cava Follett

Work & Identity

I like being useful, helping people learn, helping students succeed (directly or indirectly), learning new things, and figuring out solutions to problems. My job allows me to do all of these things and feeds into my skills as a educator/trainer and problem solver.

Sarah Young

I'm an LGBT, white, male, in my 30s. I'm old enough to know what it feels like to be an excluded from conversations, professional spaces, and pop culture because of being gay, but also fortunate enough to have privileges that let me bypass some of it, and also be young enough to be working in a time where LGBT topics are mostly accepted, mainstream, and no longer an issue in the office. I say all of that because data and the stories we use it to tell should reflect all aspects of our community—I don't see how you do quality + meaningful data storytelling without that inclusive perspective.

Matt Makofske

[My work is] only part of my identity, and I generally don't think anyone should base their identity on their productive output in our capitalistic society. When I was early on in my career I spent a lot more time networking and building a professional identity for myself online—once that was established, the effort to maintain has been considerably lower.

Rachel Binx

I used to try to fit within an identity defined by the community, but over time I've realized I'm happier when I fit my identity to the things about me that I like and are already true, even if that resultant identity doesn't have much overlap with existing identity groups that are familiar to those involved in either data viz or tech.

Lisa Mahapatra

In the beginning, work and identity were inextricably the same for me, but feeling that way was detrimental to my mental health when certain jobs didn't value my particular job family, or my specific work. I've worked hard to extricate my personal identity from what I happen to be good at for a "job".

Dr. Meg Pirrung

I have found that when I associate my identify with "work" or "productivity" I feel unsatisfied in life. I tend to think of my personality, values, and beliefs as what makes me, "me." Those things influence the work I choose to do and the work I choose not to do.

Brit Cava Follett

How I Learned

Mostly, I learned through experience, and desire: we like what we see, and then we want to learn more, to take it apart, and to know what works.

Craig Nilson

I'm very easily irritated, so when I use something that's annoying, I just redesign it to be less annoying for me. And that process has led me. It's my very center. It all comes from UX first for me: how do I make this as easy to use and as easy to understand as possible? And then you bring in the dataviz stuff about human perception and the analytical constraints: it's all so tightly related. We're just people trying to interpret and interact with something that's quite complex, and I can't even separate user-centered design from that. Data vis is just a specialty on top of it, in my mind.

Peter Beshai

Career Paths & Experience

I think that you need to figure out where you can add value, and that is going to be a different answer for every single visualization person. Data visualization in itself is not the value add. The value add is being able to take the skill of data visualization and being able to do something powerful with it. The path for individual data visualization practitioners is going to depend on their core skills.

Lisa Mahapatra

Early on I had a lot of uncertainty. I worried about being successful, about making it on my own. My aspirations were modest. As I've matured in my career (and life in general) I don't think nearly as much about this. My aspirations have grown and I feel much more certain of myself and what I hope to accomplish in life.

Alan Wilson

Data vis is a tool that I use, and at the same time I consider a lot more things to be data viz than the general person probably thinks. I don't get to spend that much time on hard data viz, but I use it in a lot of things that I do, even if it's just color coding different tags for some text classification in a database, and I'm doing that basically all the time. It's a tool in my toolbox, and I use it as a design scientist to solve problems for people.

Dr. Meg Pirrung

Data Literacy

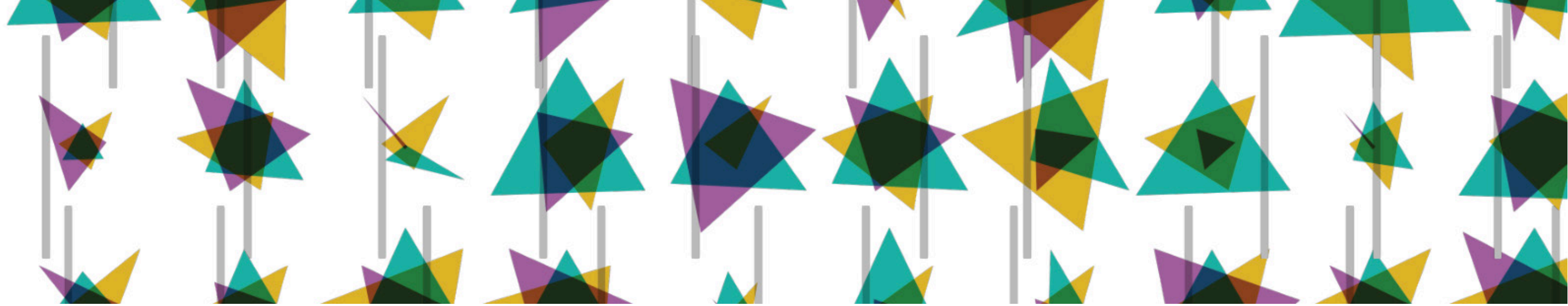
Lack of data literacy is code for not designing good viz for your intended audience. Data literacy is not about being able to read visualizations; it's about whether you can coherently ask a question of the data.

Lisa Mahapatra

I don't see data literacy as a problem to solve, I see my role as communicating insight about the data in such a way that my audience understands. The onus is on me to create an understandable visualization, not on them to become "more data literate." My role is to use feedback sessions until we are all on the same page regarding how they interpret the visualizations.

Rachel Binx

Career Portraits



In addition to hearing personal anecdotes, it is also helpful to have quantitative information when choosing a career. Our annual State of the Industry Survey captures data from a wide range of practitioners working within data visualization and adjacent fields. The Career Portraits section of this report focuses on extracting core information about each career area to facilitate comparison between roles.

It's important that these portraits convey some aspect of how nuanced and varied a career in data visualization can be. The first section of the report focuses on an overview of all careers in the field (including those excluded from the more detailed portraits). We looked at people's backgrounds and how they got into data viz, compared years of experience vs. years in a data visualization-specific area, looked at how salary breaks down across organization size, sector, and years of experience. People come from a variety of backgrounds, with a larger representation from science and technology. Many people are new to data viz, but some have been working in this area for 20 or 30 years. For some people, their data visualization experience is larger than their work experience, suggesting that hobbies and other routes of entry might play a strong role in building skills and a portfolio. Data viz roles are distributed across many kinds of companies, with corresponding differences in salary, time spent on data viz tasks, and other factors.

Next, we looked at the quality of the role: how much time are people spending on data viz, and what are they doing with their time? How specialized is their role: is data visualization the only thing that they do, or one of many responsibilities in that role? We also compared who people work with and for by looking at the primary audience and communication methods for each career. The latter also hints at the type of work that people do, which we paired with an analysis of the frequently-reported tools for each career area to give a better sense of skills that people might need in each role.

Overall, most data viz professionals work across the whole data viz process, but how much time people spend on any one task does vary based on career. Data viz is often one of many roles that a person performs in their job function, and is often neither a primary or a secondary focus of their work. This may represent opportunities for people to gain on the job experience in other positions when they are looking to switch into a data visualization role. Still, data visualization can be a highly specialized role. For roughly 60–80% of respondents, data visualization is either the primary focus of their job or an important secondary role.

The individual career portraits take a slightly deeper, more granular look at work within a specific career. These include common job titles, a comparison of the freelance and employee roles, as well as a more detailed view of educational backgrounds and tools used within the field. Each career has a different toolkit, though a few industry standards consistently top the list. Other tools reflect the tasks of an individual role: designers tend to work more in illustration software and with pen and paper, while analysts focus on BI tools and engineers and developers dive deeper into code.

The last section comes back to the question of how people get into a career, and what growth paths look like within that area. Here, we looked at barriers to entry for early career respondents, common issues and frustrations, preferred methods of learning, and what's next to learn for people working in these areas. Time, mentorship, skills, and adequate compensation were common concerns across areas, but were felt more acutely in some careers than others. Figuring out how to enter the field and knowing where to start were also common barriers. For people already working in the field, lack of time was the chief frustration. Low data literacy and not understanding the importance of data viz were commonly-seen issues facing the field. When thinking about what's next to learn, people indicated design skills and new tools as common responses, followed by improving with current tools and enhancing their data skills.

Though there certainly are patterns that emerge from the data, there is also quite a lot of variation and room for individual experiences to deviate from the norm. We hope that these portraits illustrate the richness of this career area, and the many different paths and opportunities within data visualization as a field.



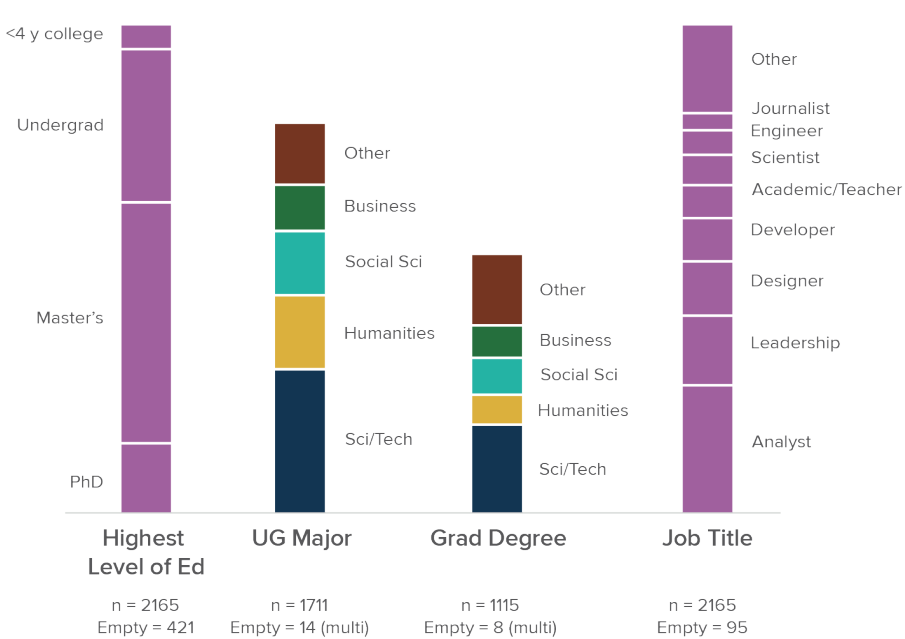
All Careers—Background and Context

2165 responses

Background and Education

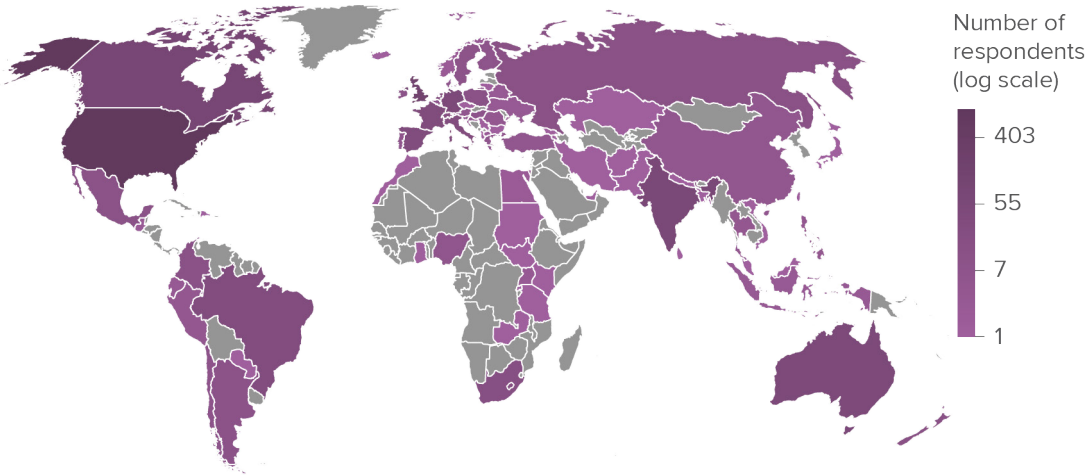
People enter data visualization from many educational backgrounds. The majority have some form of graduate or advanced degree, but some enter the field with less than 4 years of college. Both undergraduate and graduate studies show a high proportion of people working in science or technology, but the majority actually come from a distribution of other fields. With the variety of methods currently available to develop data skills, this education profile may shift toward less conventional paths in coming years.

People working within visualization hold a variety of titles, and many are in leadership positions within their organizations. Analysts are by far the largest population represented, with just over 25% of respondents identifying with that one career area.



Geographic Location

Our survey respondents come from around the world, though our population is heavily focused in the US (43%). The UK, Canada, India, and Australia make up the rest of the top 5 countries, with Brazil and several countries in Europe represented in the top 10—most at about 2% of the total population. This means that results presented here may not fully represent conditions outside of the US, and should be interpreted carefully for other areas.



Role & Organization

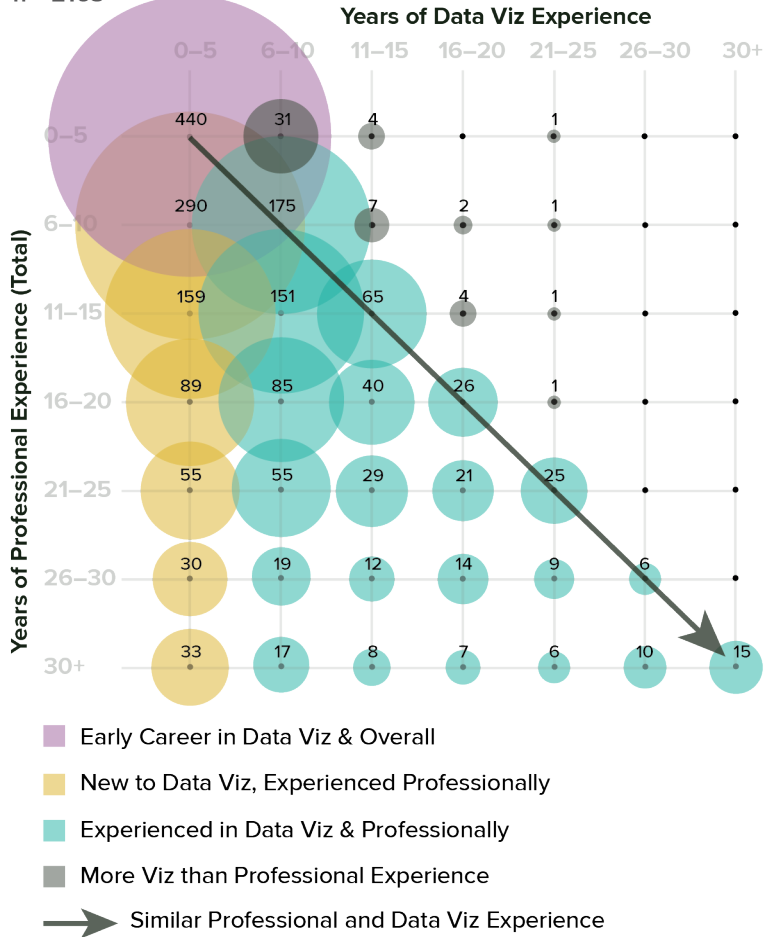
Most data visualization professionals identified themselves as working in an organization (72%). About a fifth were working in a freelance role, and around 8% indicated that they work in both employee and freelance positions. Just over a third of our respondents indicated some other kind of engagement (hobbyist, student, teacher, passive income) as well—this is a multi-response question, so people could be employed in an organization and also list a hobbyist role. Combinations for these other roles (e.g. employed and academic, freelance and student) were not included in the counts for this analysis.

Many people did not know or chose not to report their organization size; for employees working in data visualization, the majority who did respond to the question reported work in large organizations with over 1000 employees.

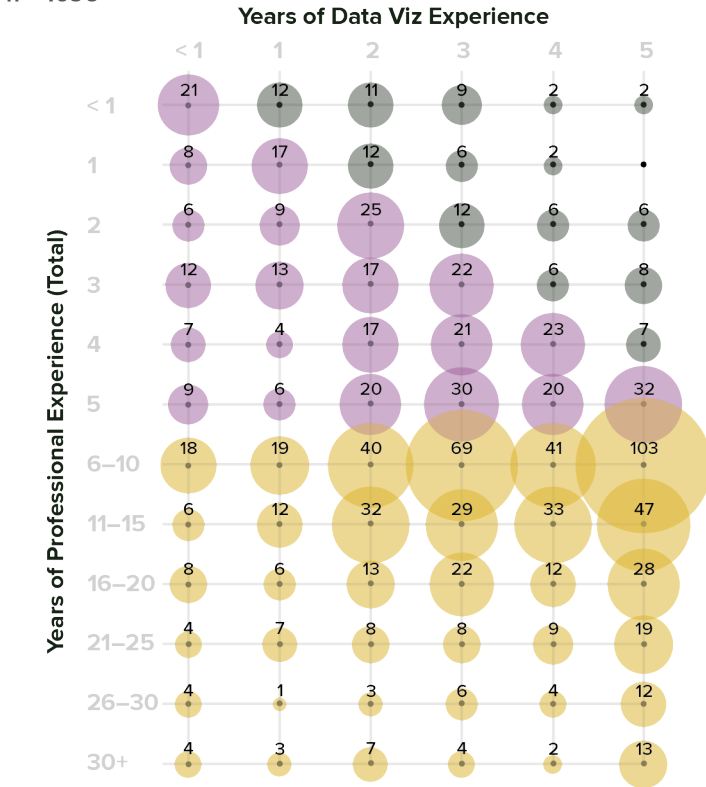
Data visualization professionals are fairly evenly distributed across sectors, with roughly 15% working in each kind of organization. Again, a large number of respondents did not answer this question. This is also a multi-select question, but shows smaller overlap than most, likely because organizations tend to operate in only one sector.

Years of Professional Experience

All Experience Levels
n = 2165



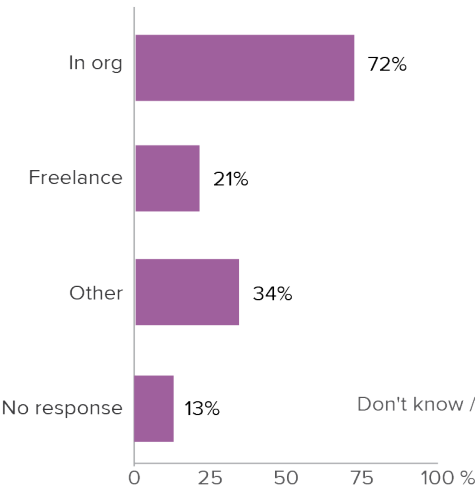
Less than 5 Years of Experience
n = 1096



About half of our survey population is new to data viz, though many people have significant professional experience elsewhere as well. Some early-career respondents have more data viz than professional experience.

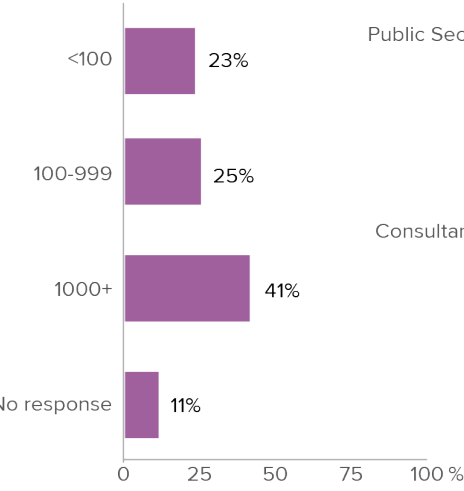
Type of Role

n = 2165, Empty = 13



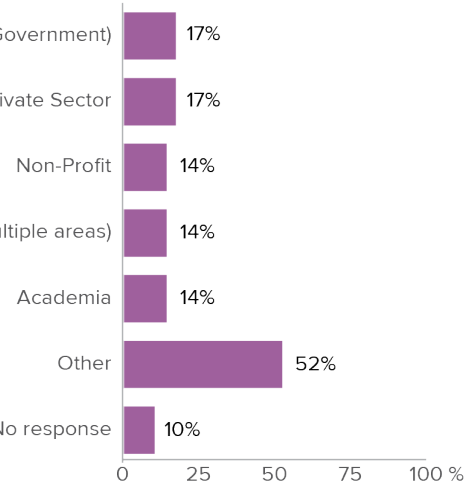
Size of Organization

n = 1556, Empty = 176



Organization Sector

n = 1556, Empty = 150



All Careers—Salary

2165 responses

Salaries are widely distributed, but fewer than half of respondents indicated a salary above 100k (USD) for most groups. Engineering is an exception, where only a third of respondents identified salaries below 100k, and more than 50% reported earnings above that. (Note the significant representation of empty responses in all categories—the chart totals do not add to 100%.)

Looking at salary data by sector, size of org, and years of total professional experience gives a more textured view. People working in private companies and “other” sectors populate the highest pay band, while most people working in public, non-profit, and academic institutions are in a lower band.

Within our survey population, large companies employ the largest number of data viz professionals, at 41%, but the pay distribution is fairly similar for organizations above 100 people. Smaller organizations appear to pay slightly less, though this may be influenced by the size & distribution of the data.

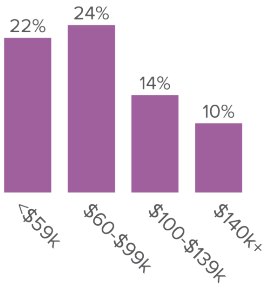
Salary also varies with years of experience. As one might expect, early career professionals fall into the lowest salary bin, while more experienced practitioners tend to make higher salaries. This distribution is not uniform, however, and it’s worth looking closely at the variations between careers.

Overall

n = 2165

Salary

n = 2165, Empty = 626



by Sector

n = 1556, Empty = 150

	Public (Gov't)	Private	Non-Profit	Consulting	Academia	Other
count	262	261	217	212	211	810
%	17%	17%	14%	14%	14%	52%
<\$59k	27%	24%	21%	27%	27%	24%
\$60-\$99k	37%	27%	42%	28%	40%	29%
\$100-\$139k	16%	21%	14%	19%	14%	21%
\$140k+	12%	18%	10%	10%	9%	16%

by Size of Org

n = 1556, Empty = 176

	<100	100-999	1,000+
count	362	386	632
%	23%	25%	41%
<\$59k	33%	24%	19%
\$60-\$99k	31%	35%	32%
\$100-\$139k	15%	20%	22%
\$140k+	7%	10%	18%

by Years of (Total) Professional Experience

n = 2165, Empty = 221

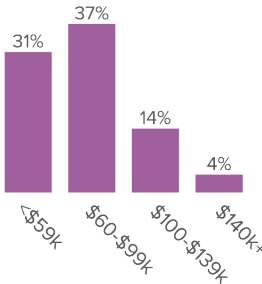
	≤ 5	6–10	11-20	21-30	30+
count	477	475	621	275	96
%	22%	22%	29%	13%	4%
<\$59k	45%	23%	20%	11%	9%
\$60-\$99k	24%	35%	28%	22%	15%
\$100-\$139k	6%	16%	20%	22%	18%
\$140k+	3%	9%	14%	18%	28%

Analyst

n = 557

Salary

n = 557, Empty = 81



by Sector

n = 511, Empty = 2

	Public (Gov't)	Private	Non-Profit	Consulting	Academia	Other
count	111	75	80	73	87	255
%	22%	15%	16%	14%	17%	50%
<\$59k	31%	29%	30%	38%	31%	30%
\$60-\$99k	41%	36%	48%	32%	47%	36%
\$100-\$139k	13%	17%	5%	8%	14%	18%
\$140k+	5%	7%	4%	5%	2%	4%

by Size of Org

n = 511, Empty = 10

	<100	100-999	1,000+
count	114	134	253
%	22%	26%	50%
<\$59k	44%	27%	27%
\$60-\$99k	33%	43%	40%
\$100-\$139k	4%	17%	19%
\$140k+		1%	6%

by Years of (Total) Professional Experience

n = 557, Empty = 0

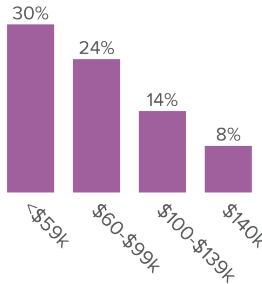
	≤ 5	6–10	11-20	21-30	30+
count	154	151	174	59	19
%	28%	27%	31%	11%	3%
<\$59k	49%	28%	25%	12%	11%
\$60-\$99k	30%	44%	42%	22%	32%
\$100-\$139k	5%	14%	15%	31%	26%
\$140k+	1%	3%	3%	10%	21%

Designer

n = 229

Salary

n = 229, Empty = 55



by Sector

n = 148, Empty = 0

	Public (Gov't)	Private	Non-Profit	Consulting	Academia	Other
count	30	43	29	25	13	93
%	20%	29%	20%	17%	9%	63%
<\$59k	37%	37%	38%	28%	38%	30%
\$60-\$99k	40%	28%	41%	40%	38%	23%
\$100-\$139k	17%	19%	14%	12%		25%
\$140k+	7%	12%	3%	4%		17%

by Size of Org

n = 148, Empty = 2

	<100	100-999	1,000+
count	54	37	55
%	36%	25%	37%
<\$59k	44%	38%	15%
\$60-\$99k	22%	32%	35%
\$100-\$139k	13%	22%	27%
\$140k+	7%	5%	22%

by Years of (Total) Professional Experience

n = 229, Empty = 1

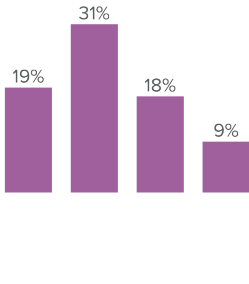
	≤ 5	6–10	11-20	21-30	30+
count	52	66	71	32	7
%	23%	29%	31%	14%	3%
<\$59k	52%	26%	24%	19%	14%
\$60-\$99k	21%	23%	24%	34%	
\$100-\$139k	10%	11%	20%	16%	14%
\$140k+	2%	8%	10%	16%	

Developer

n = 180

Salary

n = 180, Empty = 40



by Sector

n = 137, Empty = 0

	Public (Gov't)	Private	Non-Profit	Consulting	Academia	Other
count	24	28	19	25	18	84
%	18%	20%	14%	18%	13%	61%
<\$59k	29%	32%	21%	20%	11%	24%
\$60-\$99k	42%	36%	53%	28%	50%	32%
\$100-\$139k	21%	21%	21%	36%	22%	23%
\$140k+	7%		12%	12%	11%	11%

by Size of Org

n = 137, Empty = 1

	<100	100-999	1,000+
count	36	37	63
%	26%	27%	46%
<\$59k	25%	19%	19%
\$60-\$99k	42%	46%	27%
\$100-\$139k	17%	19%	29%
\$140k+	3%	8%	14%

by Years of (Total) Professional Experience

n = 180, Empty = 2

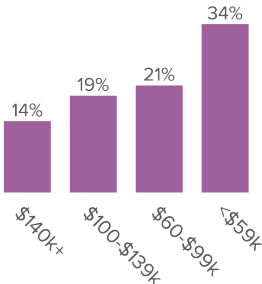
	≤ 5	6–10	11-20	21-30	30+
count	45	39	55	29	10
%	25%	22%	31%	16%	6%
<\$59k	42%	15%	15%	3%	
\$60-\$99k	33%	38%	33%	28%	
\$100-\$139k	4%	18%	24%	17%	50%
\$140k+	2%	13%	9%	17%	10%

Engineer

n = 98

Salary

n = 98, Empty = 11



by Sector

n = 88, Empty = 0

	Public (Gov't)	Private	Non-Profit	Consulting	Academia	Other
count	9	25	4	7	3	63
%	10%	28%	5%	8%	3%	72%
<\$59k	11%	12%		29%	33%	14%
\$60-\$99k	22%	4%		14%	67%	21%
\$100-\$139k	33%	20%	50%	43%		24%
\$140k+	22%	60%	25%			37%

by Size of Org

n = 88, Empty = 3

	<100	100-999	1,000+
count	15	22	48
%	17%	25%	55%
<\$59k	33%	23%	6%
\$60-\$99k	7%	32%	19%
\$100-\$139k	27%	32%	19%
\$140k+	13%	14%	50%

by Years of (Total) Professional Experience

n = 98, Empty = 1

	≤ 5	6–10	11-20	21-30	30+
count	23	29	29	9	7
%	23%	30%	30%	9%	7%
<\$59k	22%	10%	17%	11%	
\$60-\$99k	26%	17%	17%		43%
\$100-\$139k	13%	14%	31%	56%	
\$140k+	22%	48%	28%	22%	57%



All Careers—Amount of Data Viz in Role

2165 responses

Time Spent on Data Viz

The quality of time that we spend at work and the proportion spent on tasks that we enjoy is possibly even more important than salary in terms of career satisfaction. Here, we compare the time reported for different tasks across each career, and the importance of data visualization within their roles. In general, most professions spend some time on each of the data visualization tasks, though the proportion varies greatly by role. Note that these values are given as counts instead of percentages, to give a clearer picture of how many responses actually informed these views.

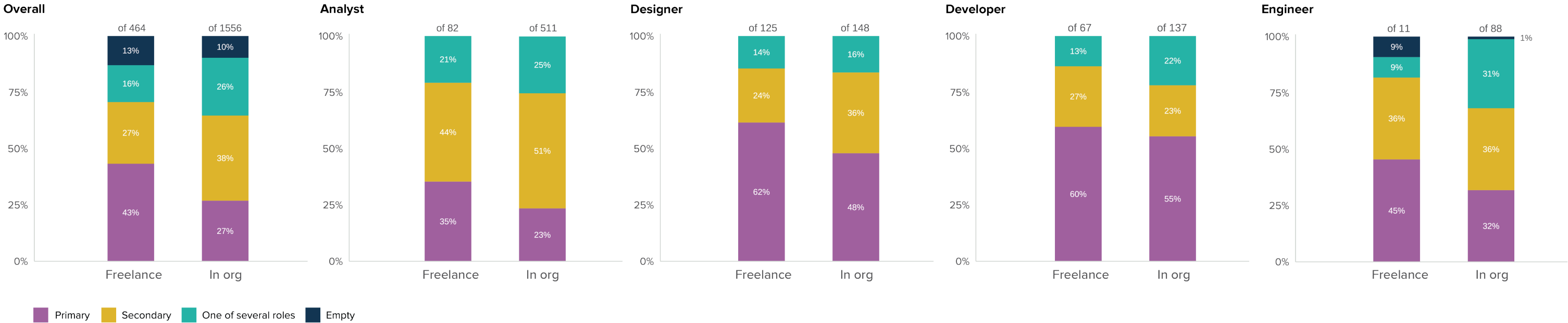
Analysts work across all data visualization tasks, but fewer people report spending time on storyboarding than in other roles. Many report 11–30 hours on a specific task, which may indicate a more specialized role. Designers spend more time storyboarding, producing visualizations, and on other tasks, though many report at least some time on data prep and analysis as well. Developers focus on data prep and cleaning as well as viz production, but show strong secondary coverage across all prep and planning tasks. Like developers, engineers are largely focused on production and data prep.

Overall n = 2165								Analyst n = 557								Designer n = 229								Developer n = 180								Engineer n = 98							

Role of Data Viz

Across all careers, most roles are a mix of data visualization and other tasks, especially within an organization. Designers and developers have the best chance of a data viz-focused role, at around 50% for employees working in an org. The chances of specialized data visualization positions increases

for freelance roles, but still remains below 50% in many careers. Across all careers, 15–20% of all survey respondents indicated that data viz was just one of many job roles for their position; within this subset of careers, that was most common for engineers.



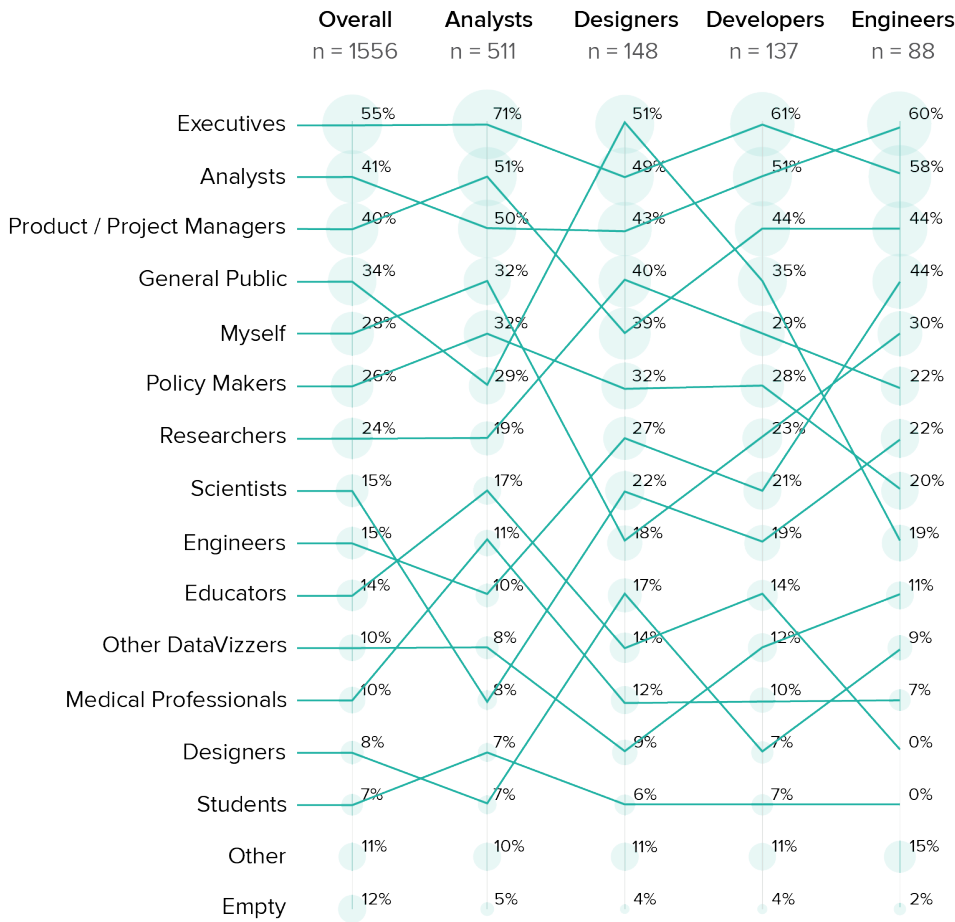
All Careers—Communication

2165 responses

Audience

One way to understand what data viz professionals do and who they work with is to look at who they create visualizations for. This question was asked separately for employee and freelance roles; only employee responses are shown below.

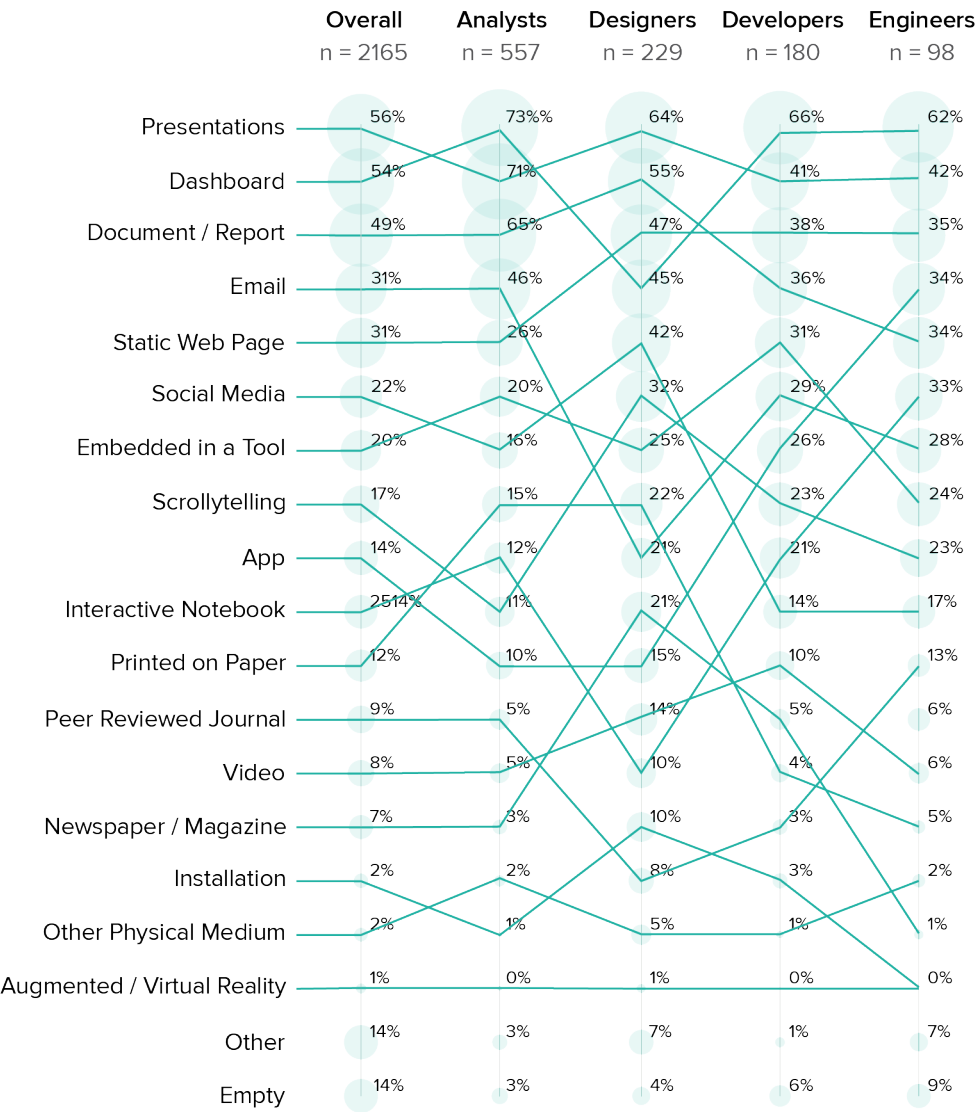
Analysts, developers and engineers tend to focus on internal roles, while the general public is the highest-ranked audience for designers. Analysts are less likely than other roles to work with scientists, and engineers list the general public much less often than other roles. Designers indicate that they work with researchers more often than other roles.



Communication Method

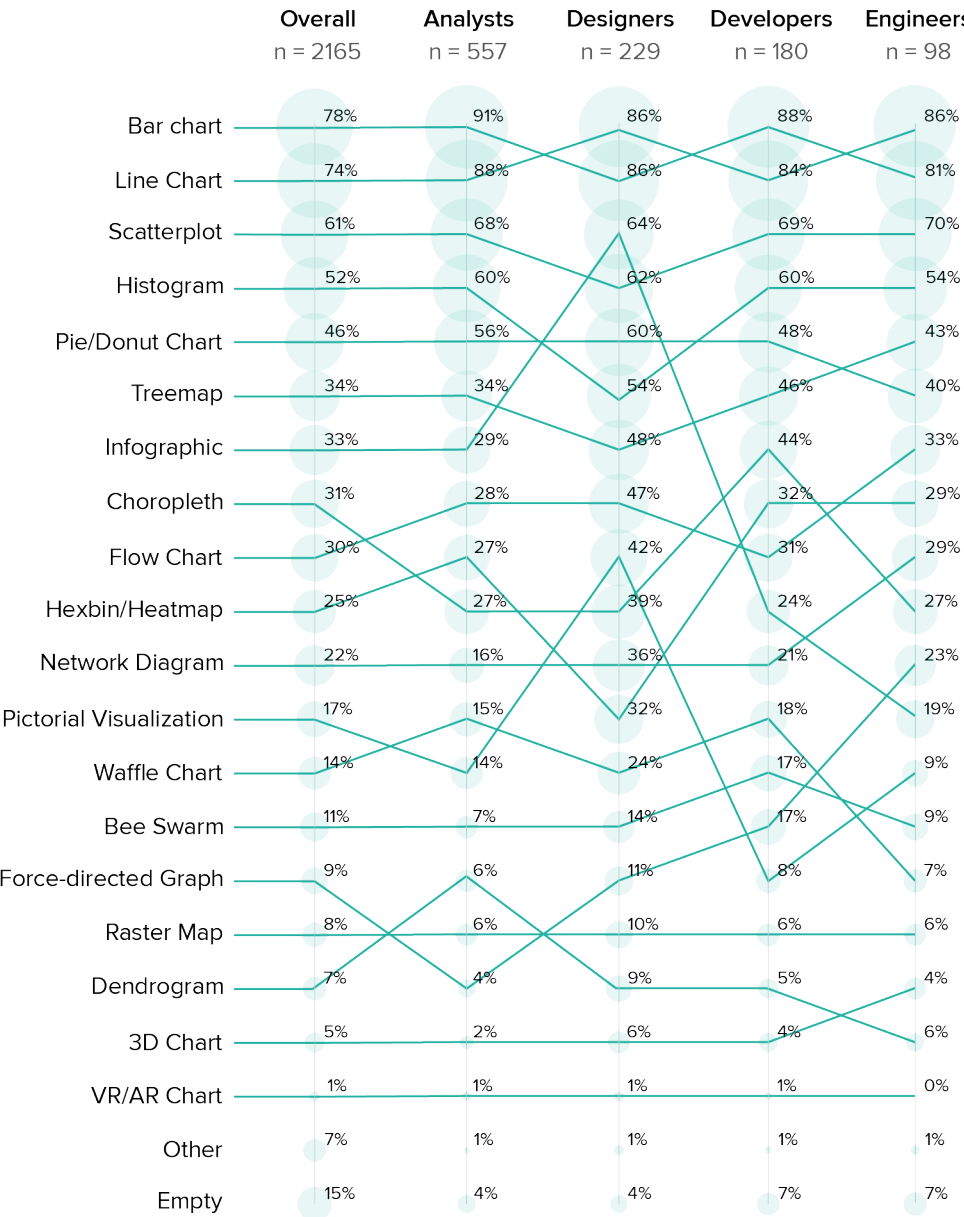
Another key factor in job satisfaction is whether the role you want matches with the kind of work you want to do. Looking at how different careers communicate their visualizations gives insight into the specific tasks they do, and perhaps some of the skills that they need. This data includes both employee and freelance roles.

Presentations and dashboards are common across all careers, though the latter is less so for designers. Many people work in documents or reports, though this is less common for Analysts than other roles. Print newspapers or magazines are more common for designers, as are print methods overall. Developers and Engineers report less distribution via social media than other groups, and Designers and Developers are less likely to produce for peer review. Scrollytelling is somewhat more popular among Analysts and Designers.



Charts Used

Our audience and communication methods often influence the charts that we use. Comparing across the different careers (both audience and freelance), we can see some perennial favorites and some charts that are more area-specific. Bar and line charts are most frequently reported across all groups, while infographics and pictorial visualizations are much more common for designers than other roles. Dendrograms rank slightly higher among Analysts than other groups, though a higher percentage of Designers reported using that chart type. Choropleths are slightly more common among Developers, while force-directed graphs are rare for Analysts and more common among Engineers.



All charts on this page represent multi-select questions, and report the frequency of selection rather than ranked preference or commonality of use.

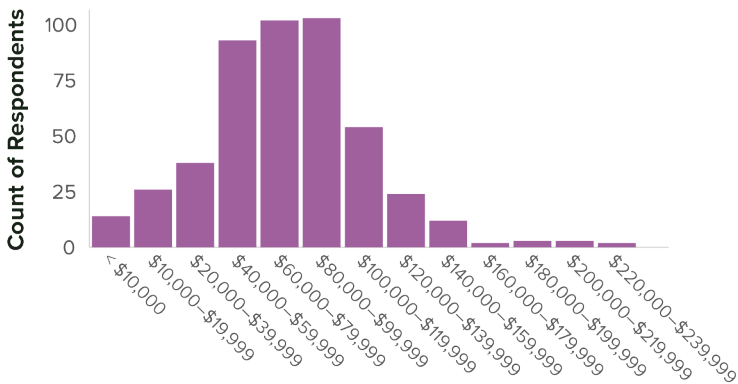
Analyst Careers

557 responses

Top 10 titles: (Data) Analyst, Business or Business Intelligence Analyst, Consultant or Data Consultant, Data Scientist, Research Analyst, Epidemiologist, Evaluation Specialist, Statistician

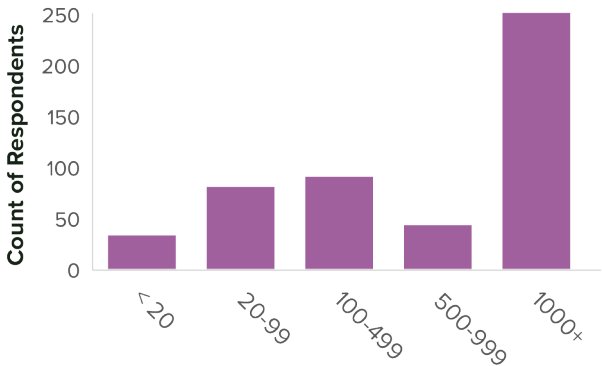
Salary Distribution

n = 557, Empty = 81



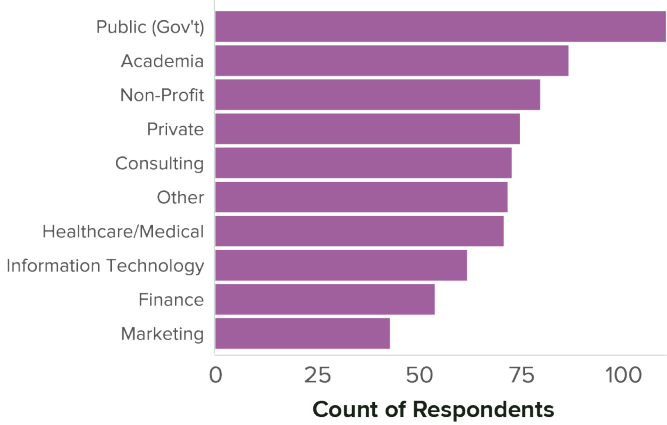
Size of Org

n = 511, Empty = 10



Org Sector

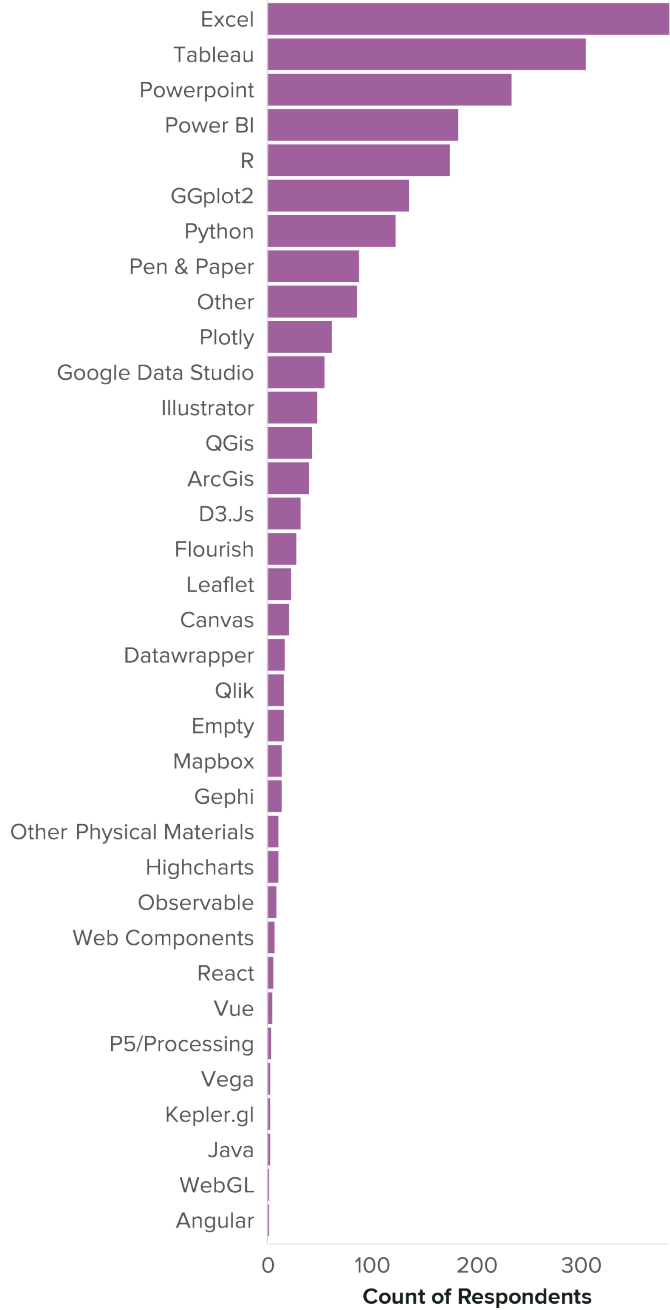
n = 511, Empty = 2



The most frequent salary bin for Analysts is 80–99k, with 50% of responses below that bin. Most Analysts work in larger orgs, and many in the public sector. Analysts report using BI tools and some coding tools.

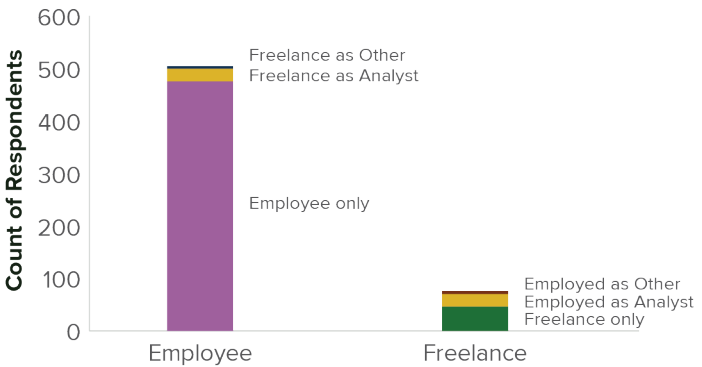
Tools Used

n = 557, Empty = 15



Type of Role

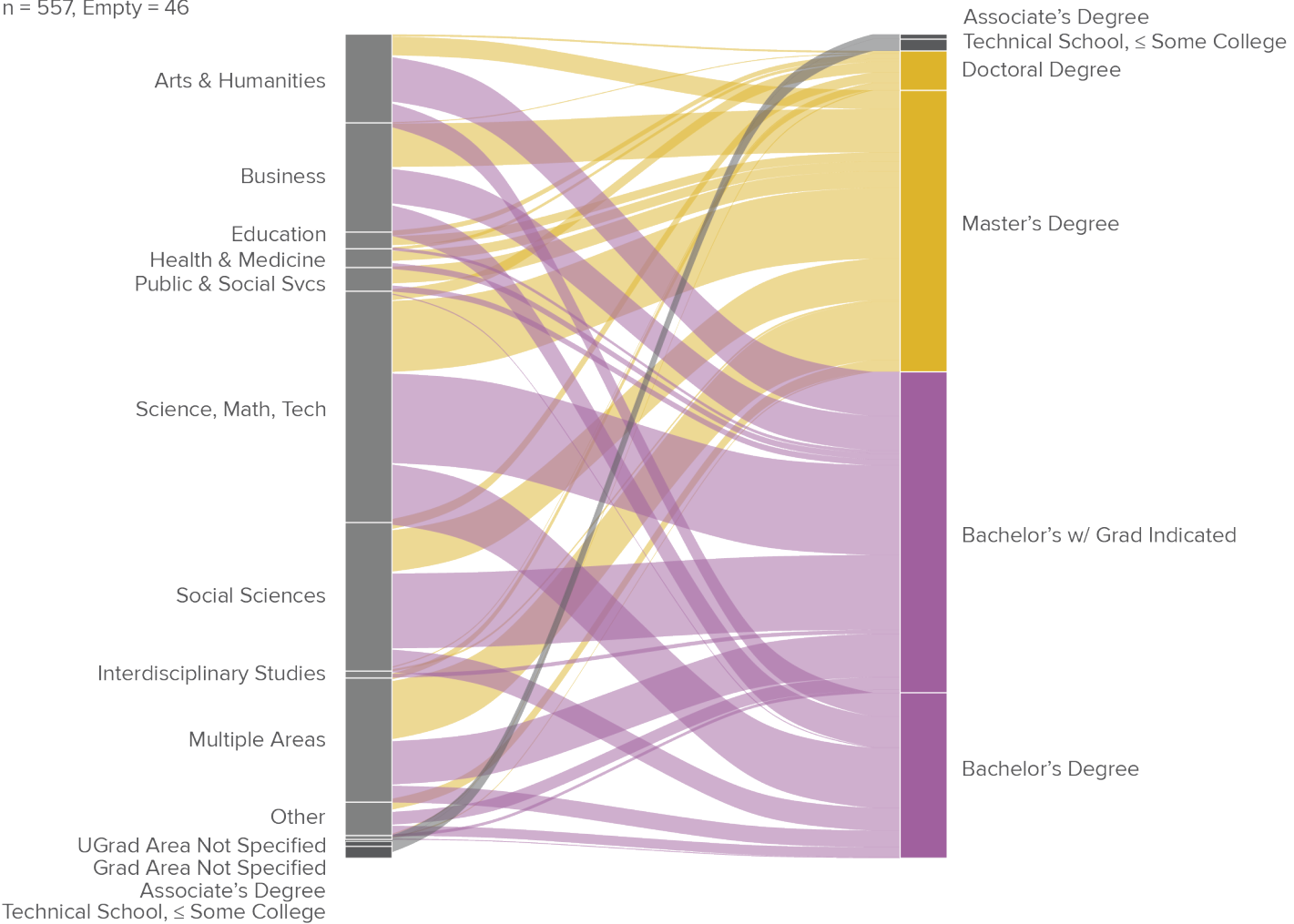
The majority of Analysts report that they are employees working in an organization, but some do freelance work as well. Some employees do freelance work in addition to their primary role, and most of these freelance as analysts as well. A smaller number of Analysts do only freelance work.



Educational Background

This chart shows degree areas for both graduate and undergraduate roles. If someone has multiple degrees, they are counted twice: once for each degree. Analysts come from many different fields of study, with a slight emphasis on science and technology. The majority of respondents completed a Master's or other graduate degree.

n = 557, Empty = 46



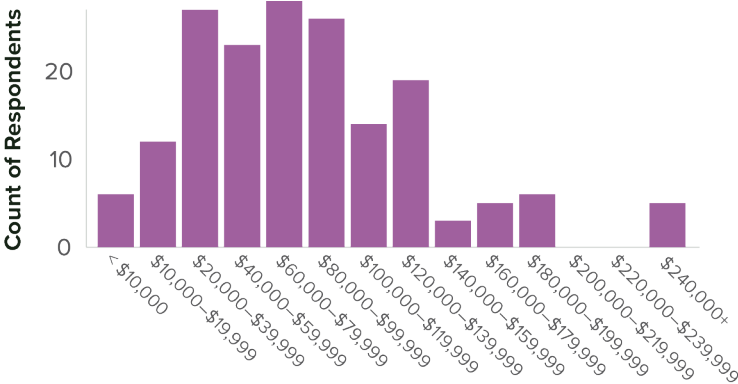
Designer Careers

229 responses

Top 10 titles: Data Visualization, UI, UX, Graphic, Product, Visual, Infographic or Information Designer, Data Visualization Specialist, Consultant.

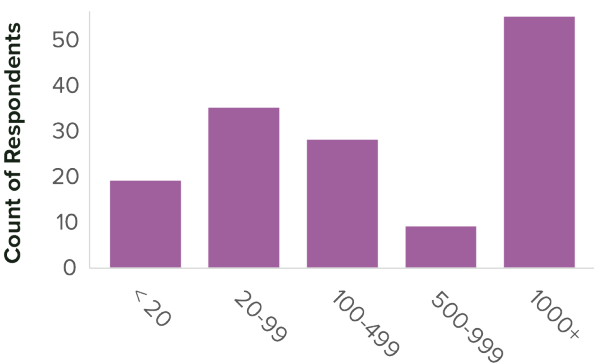
Salary Distribution

n = 229, Empty = 55



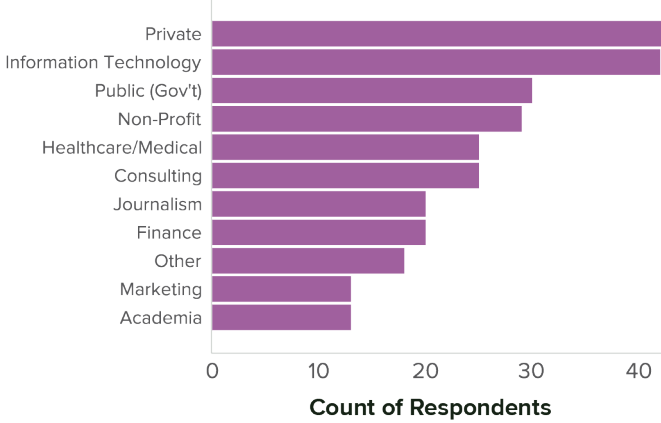
Size of Org

n = 148, Empty = 2



Org Sector

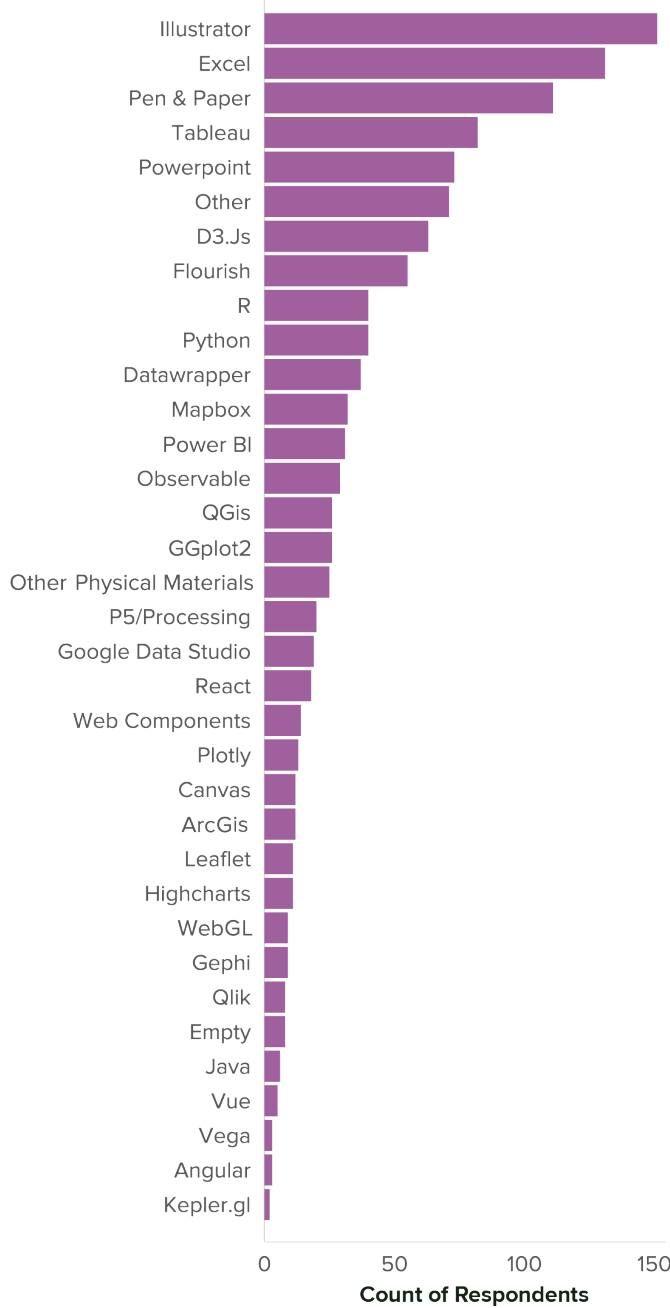
n = 148, Empty = 0



The most frequent salary bin for Designers is 60–79k, with 50% of responses below the 80–99k bin. Most Designers work in larger orgs, and many in the private sector or IT. Designers report using Illustrator, Excel, Pen & Paper and Tableau as common tools.

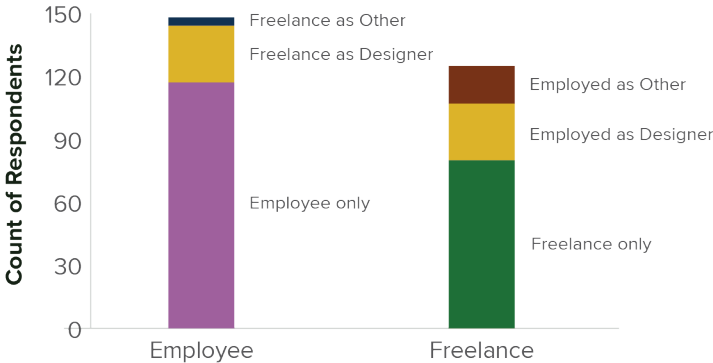
Tools Used

n = 229, Empty = 8



Type of Role

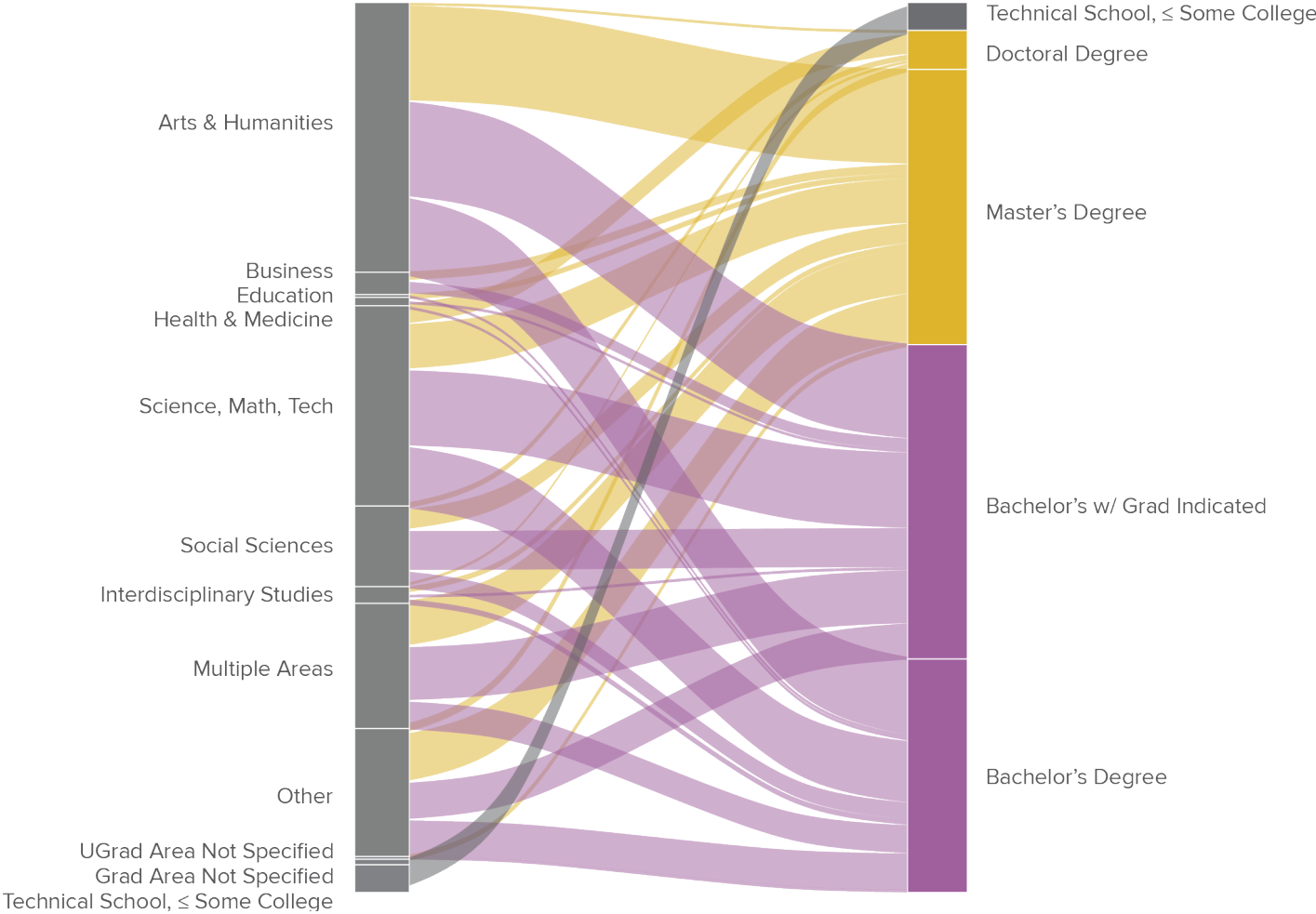
Many designers work as freelancers, though a larger number are employees. Most employees who freelance do so within design. A larger proportion of people who freelance are employed in other roles. This may indicate that people use freelancing as a way to develop their design portfolio, or that they simply choose to use their design skills outside of their employer relationship.



Educational Background

This chart shows degree areas for both graduate and undergraduate roles. If someone has multiple degrees, they are counted twice: once for each degree. Designers come from many different fields of study, with a slight emphasis on Arts and Humanities. A majority have a graduate degree, but this is a smaller proportion compared to Analyst roles.

n = 229, Empty = 22



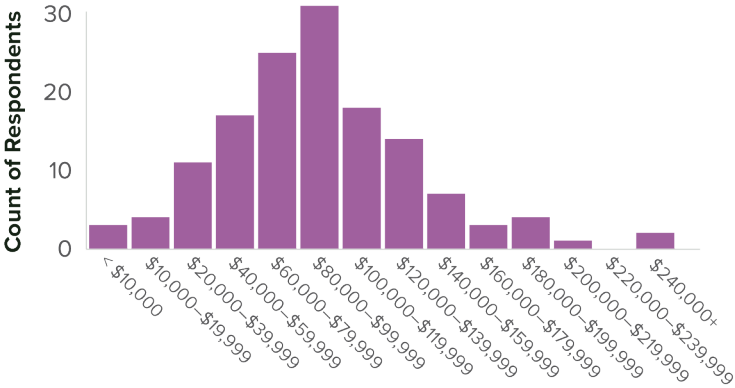
Developer Careers

180 responses

Top 10 titles: Data Scientist, Data Visualization or BI Developer, Data Visualization Consultant, Specialist, or Engineer, Frontend Developer, Software Developer, Analytic Consultant, Business Intelligence Analyst.

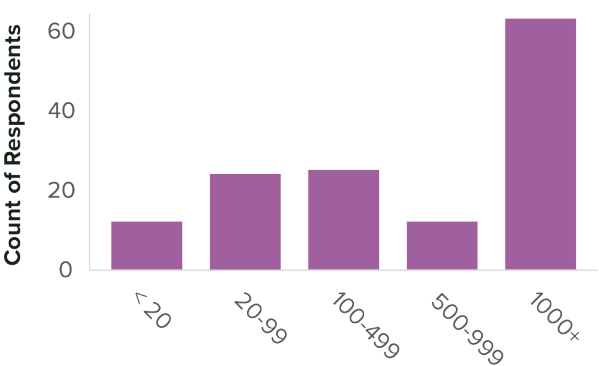
Salary Distribution

n = 180, Empty = 40



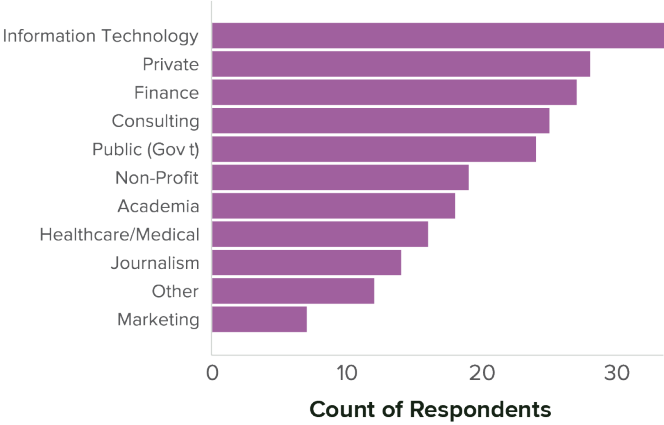
Size of Org

n = 137, Empty = 1



Org Sector

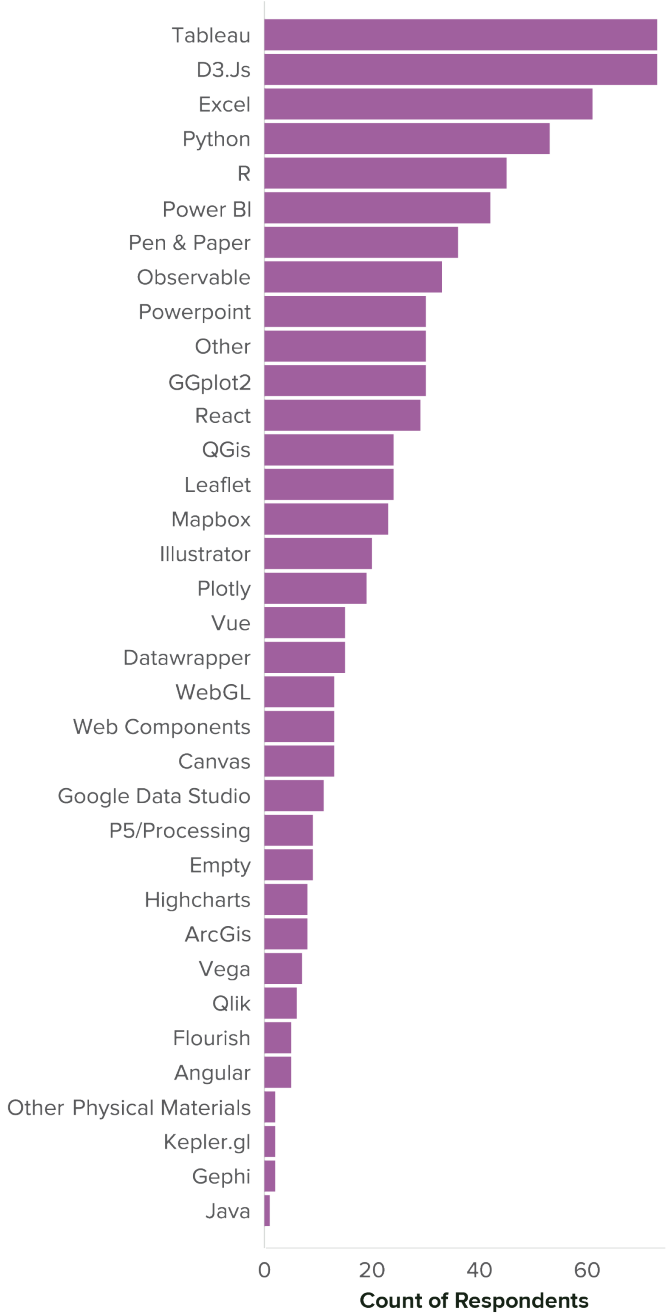
n = 137, Empty = 0



The most frequent salary bin for Developers is 80–99k, with 50% of responses below that bin. Most Developers work in larger orgs, and many in IT. Developers report using Tableau, D3.js, Excel, Python and R as common tools.

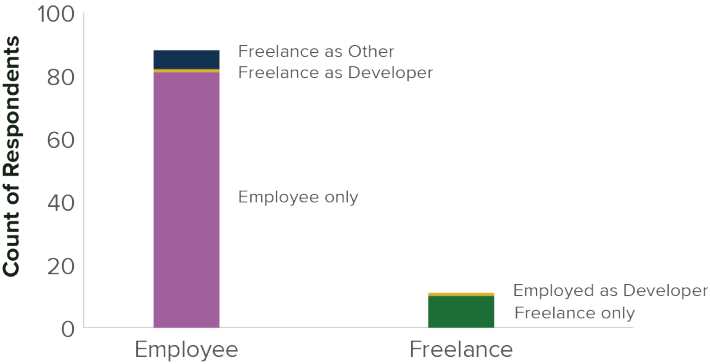
Tools Used

n = 180, Empty = 9



Type of Role

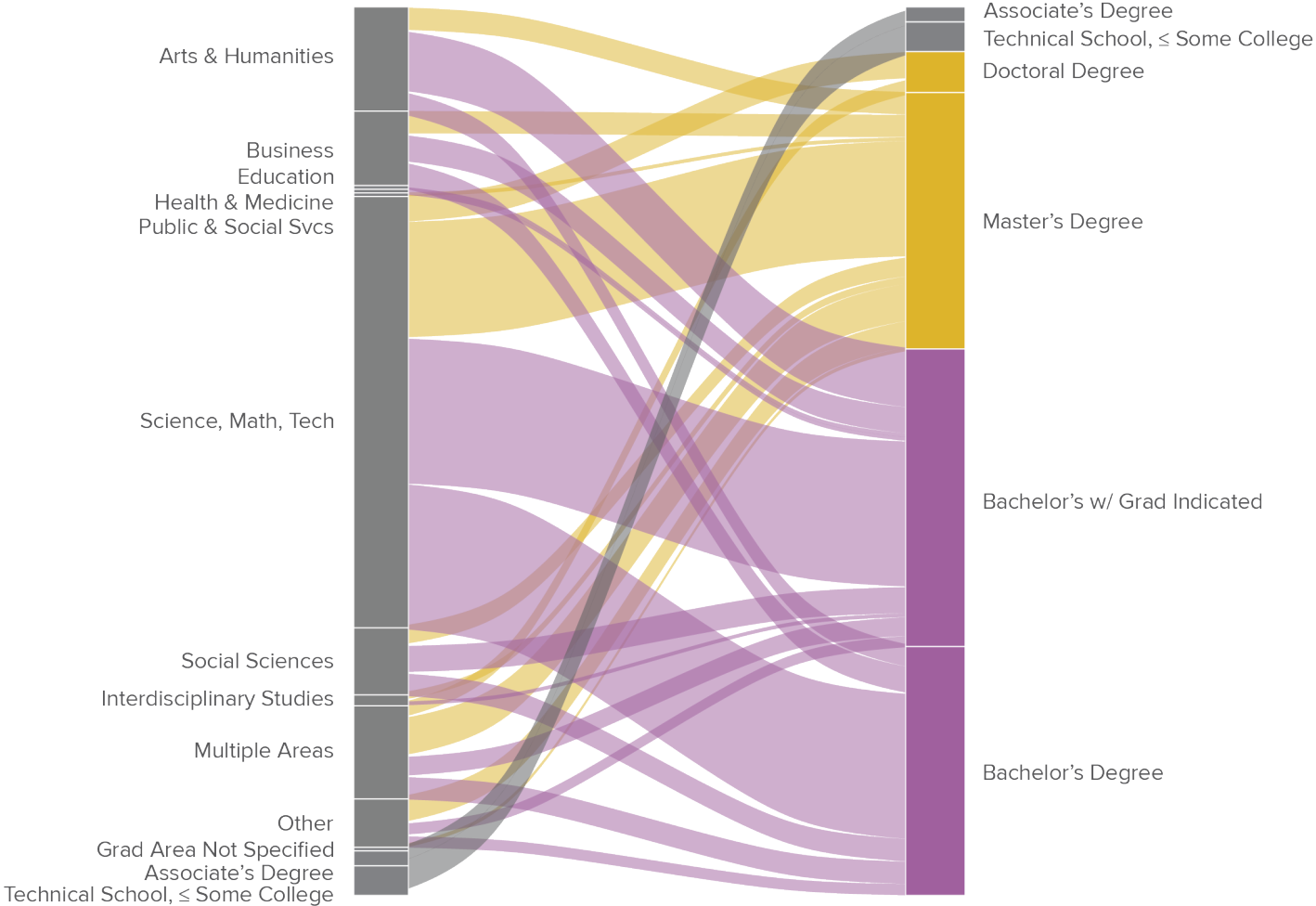
Most Developers work as employees in an organization, though a few focus on freelance roles. Few people do both in this career, and those employees who do freelance usually do so in another role.



Educational Background

This chart shows degree areas for both graduate and undergraduate roles. If someone has multiple degrees, they are counted twice: once for each degree. Developers come from many different fields of study, but have a strong emphasis on Science and Technology. A slight majority have a graduate degree, but many work with a Bachelor's.

n = 180, Empty = 21



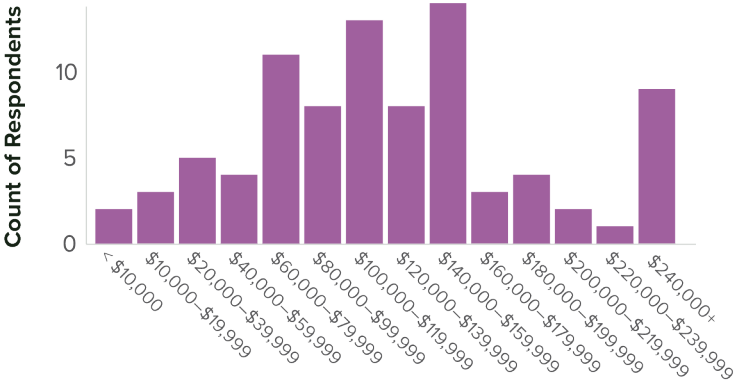
Engineer Careers

98 responses

Top 10 titles: Software, Data, Data Visualization or Business Intelligence Engineer, Consultant, Front End or BI Developer, Business Analyst, Analytics Engineer, Business Intelligence Specialist.

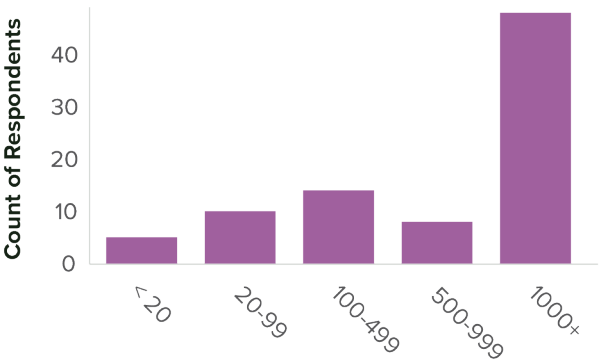
Salary Distribution

n = 98, Empty = 11



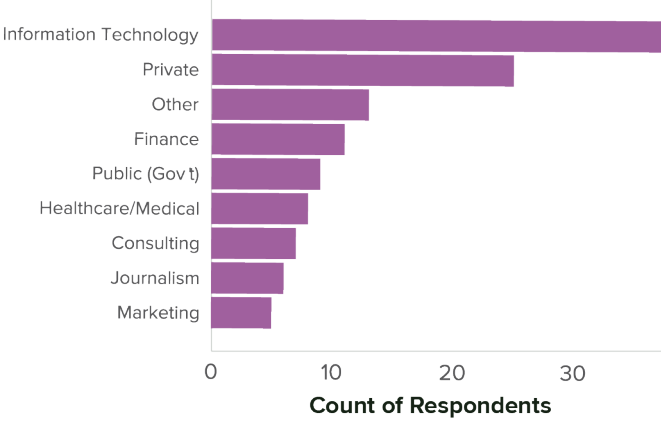
Size of Org

n = 88, Empty = 3



Org Sector

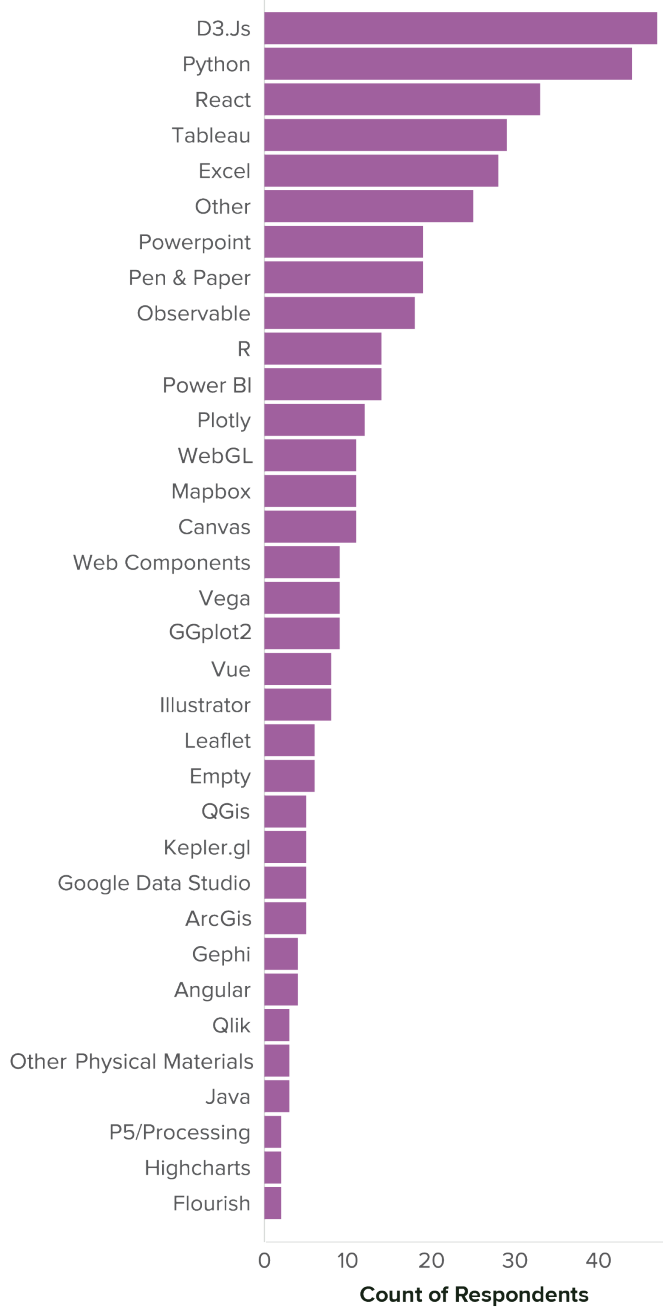
n = 88, Empty = 0



The most frequent salary bin for Engineers is 140–159k, but 50% of responses fall below the 120–139k bin. Most Engineers work in larger orgs, and many in the private sector or IT. Engineers report D3.js, Python, React, Tableau and Excel as common tools.

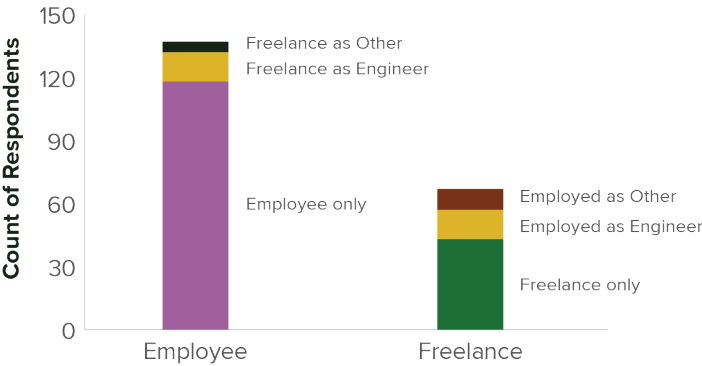
Tools Used

n = 98, Empty = 6



Type of Role

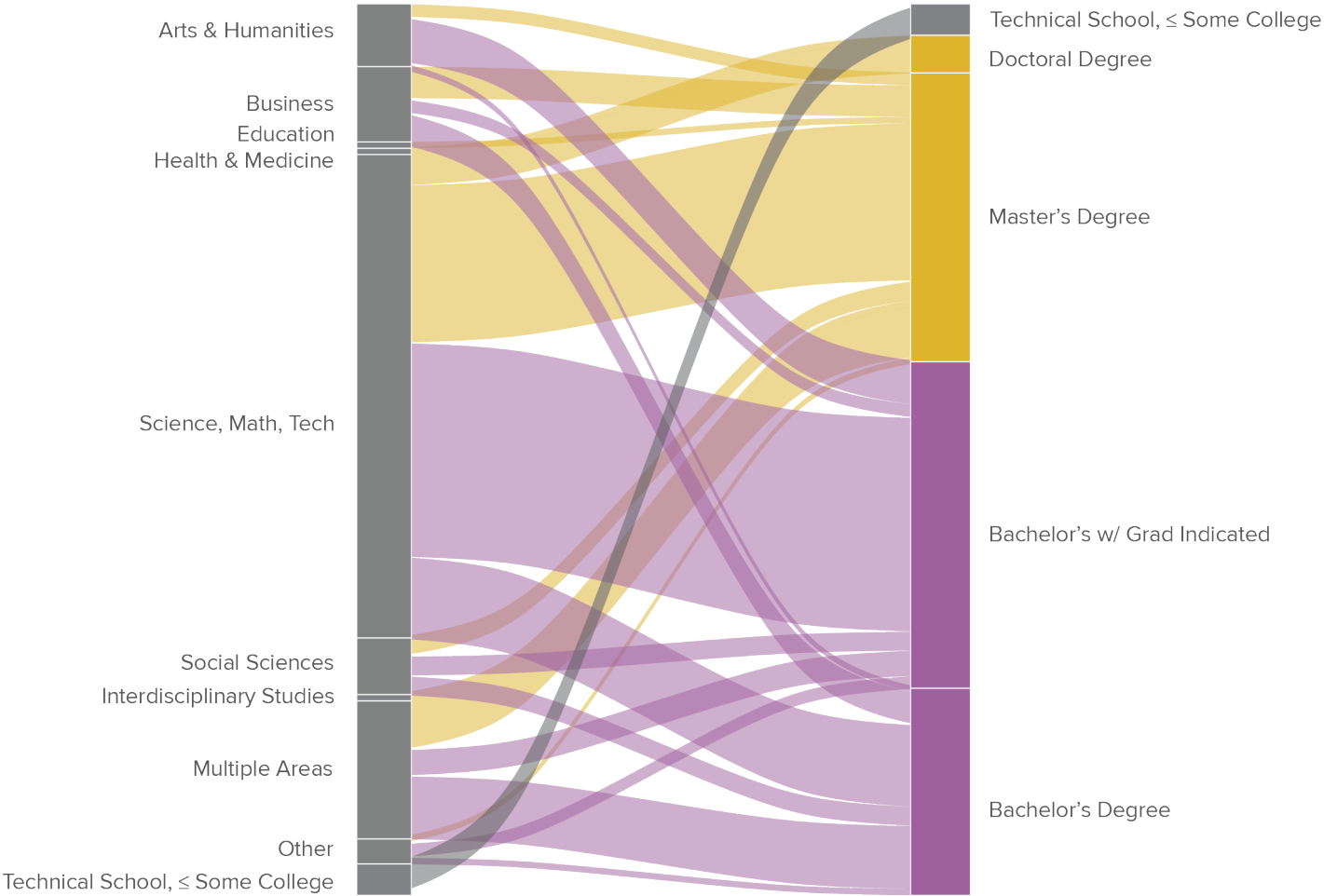
Most Engineers work as employees within an organization, but a significant number work as freelancers. Of those who do both, most are employed as Engineers in both roles. Freelance engineers are slightly more likely to be employed in other roles than employees working as freelancers.



Educational Background

This chart shows degree areas for both graduate and undergraduate roles. If someone has multiple degrees, they are counted twice: once for each degree. Engineers come mostly from a science and technology background, though there is representation from other fields. A majority have a graduate degree in addition to their Bachelor's.

n = 98, Empty = 8



All Careers—Getting into Data Viz

2165 responses

Barriers to Entry

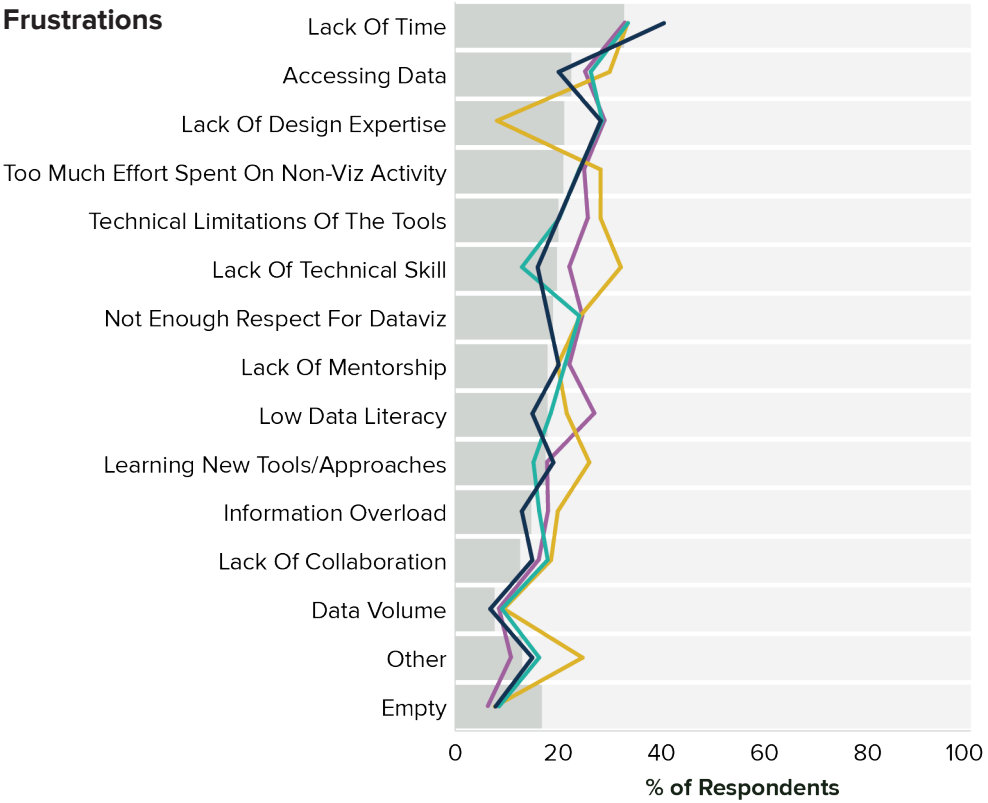
This chart presents hand-tagged categories compiled from a free response question that asked early career professionals to describe barriers that they had faced getting into the field. It was only asked of respondents with fewer than 5 years of experience. Time, support, and skills were the most-frequently cited items, and finding a job with adequate pay was particularly high for designers and engineers. The latter is particularly interesting, since engineers were the highest-paid career group. This may reflect greater skills barrier to entry, consistent with more concerns about technical skills. Developers were slightly higher than other groups in concerns about a portfolio, and Analysts and Designers were more focused on specific tools.

	Overall n = 510	Analysts n = 149	Designers n = 70	Developers n = 47	Engineers n = 24
Time / Balance	18%	20%	11%	15%	13%
Support (Mentor, etc.)	18%	16%	21%	17%	21%
Skills / Training	17%	18%	9%	15%	13%
Finding job / Pay	15%	11%	26%	9%	25%
Tools	8%	13%	13%	6%	0%
Coding, tech skills	6%	6%	10%	2%	17%
Experience / Portfolio	5%	4%	0%	9%	4%
Match to other roles	5%	2%	3%	2%	8%
Access to data	4%	6%	3%	0%	4%
Too many options	4%	7%	3%	0%	4%
Prioritizing Viz	4%	3%	4%	2%	0%
No formal education	3%	5%	3%	0%	0%
Confidence	3%	3%	1%	0%	0%
Demographics	3%	3%	4%	2%	0%
Cost	2%	2%	3%	4%	0%
Standing out	1%	0%	0%	2%	4%
Domain knowledge	1%	1%	4%	0%	0%
Statistics / Math	1%	1%	0%	2%	0%
Other	17%	3%	1%	11%	0%
None Listed	35%	3%	4%	17%	8%
Response unclear	6%	1%	1%	0%	0%

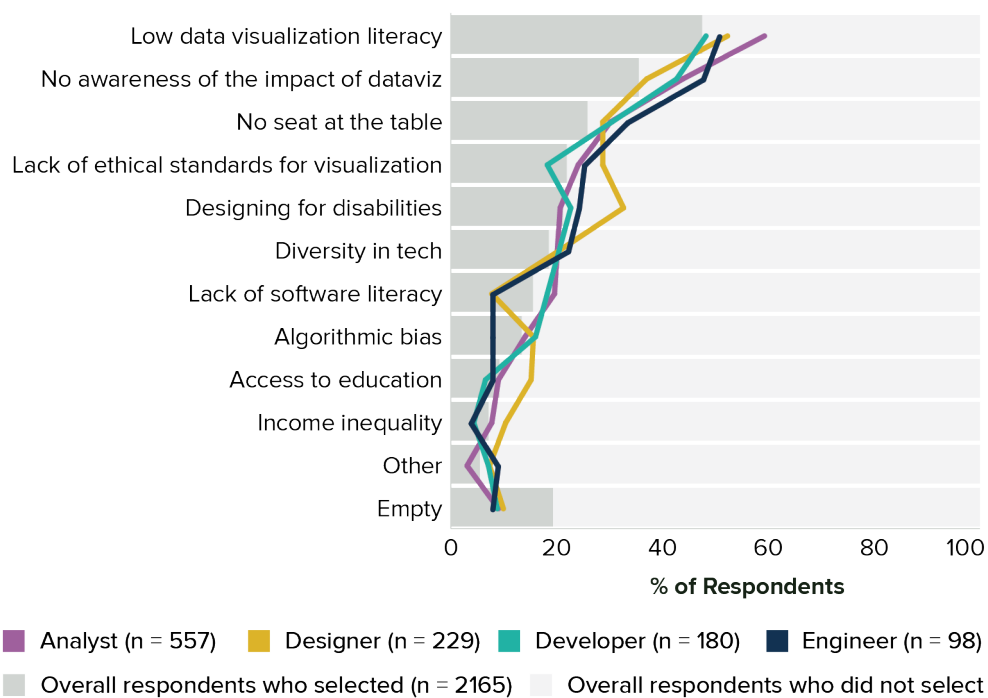
Common Frustrations & Issues Facing Data Viz

Frustrations and issues were fairly consistent across career groups, with lack of time and low data visualization literacy topping their respective lists. Designers perhaps diverge more from the rest, with less need for design expertise, more focus on technical skill and limitations of the tools, and a higher focus on designing for disability as a major issue. Analysts had slightly higher concerns about data literacy, in both contexts.

Frustrations



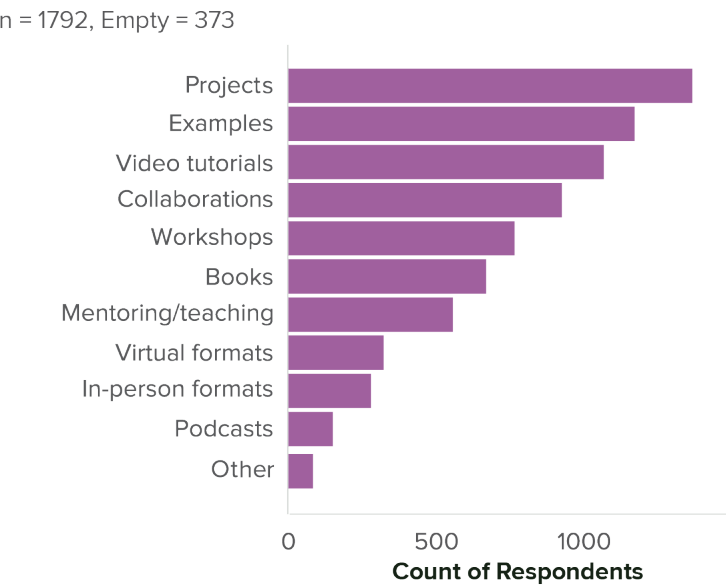
Issues Facing Data Viz



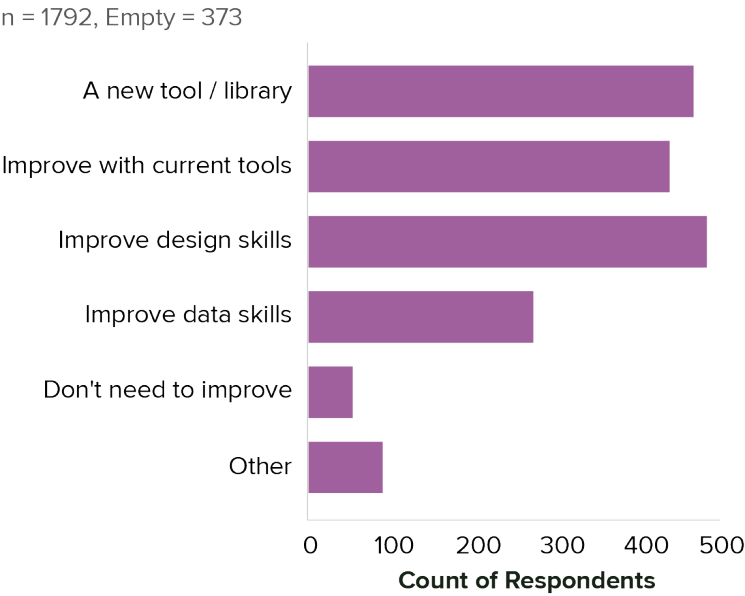
Methods for Learning & Next to Learn

Projects and examples were cited as the best way to learn, followed by video tutorials and collaboration. In the “Other” category, the most common write-in option was for written tutorials and blogs. When asked what was next to learn, most people indicated a new tool or library, improving their design skills, or improving with a current library. A smaller proportion of people felt that they needed to improve their data skills, and only a few respondents felt that their current skills were adequate for now.

Methods for Learning



Next to Learn



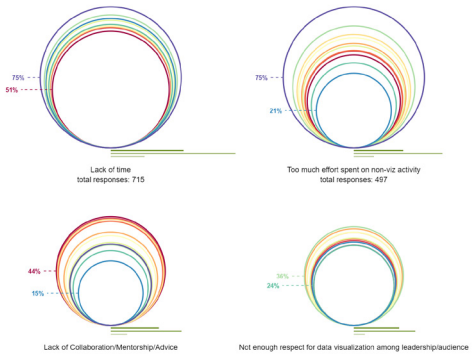
Challenge Entries

Interested in learning more about what's in the survey dataset? Check out the many wonderful challenge entries on our website from previous years' data, or team up with a partner and contribute your own in 2023!

Does This Job Ever Get Easier?

Sarah Hodges, 2020

[Link](#)



A Matter of Time

Martina Dossi, 2021

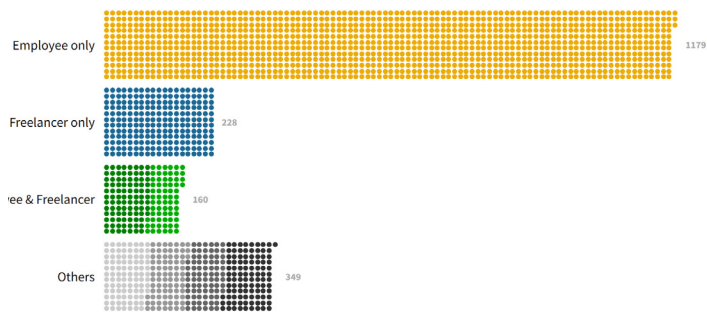
[Link](#)



Freelancers and Employees

Kristin Baymann 2021

[Link](#)

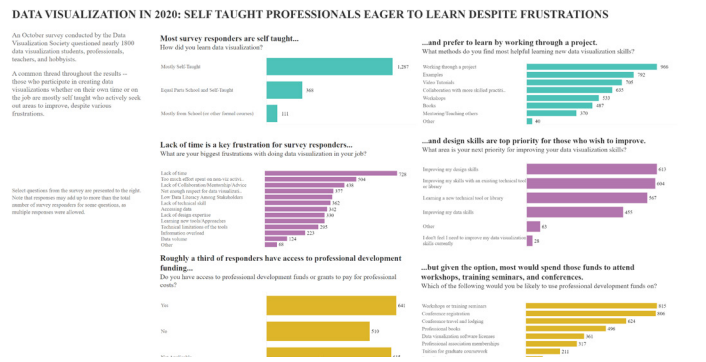


uestion 1, multi select
answers: Freelance/Consultant/Independent contractor, Position in an organization with some dataviz job responsibilities, Non-compensat
tion hobbyist, Student in a degree program at a college or university, Academic/Teacher, Passive income from data visualization related pro

Self Taught Professionals Eager to Learn

Brittany Rousseau

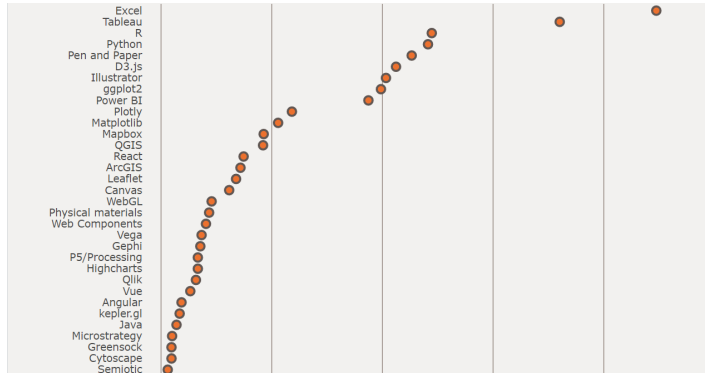
[Link](#)



DVS Community Comparisons

NORC 2020

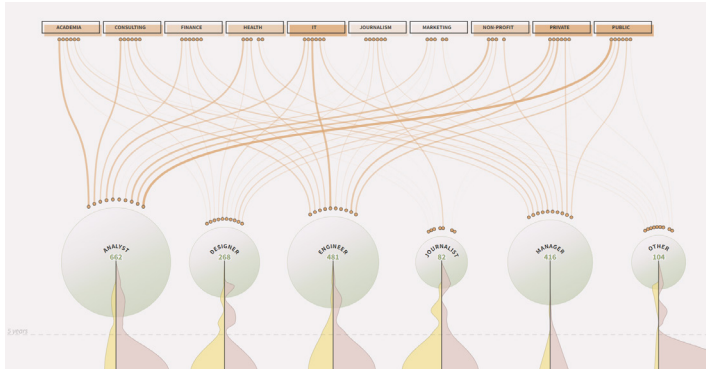
[Link](#)



Are There Coworkers Like Me?

Sarina Chen, 2021

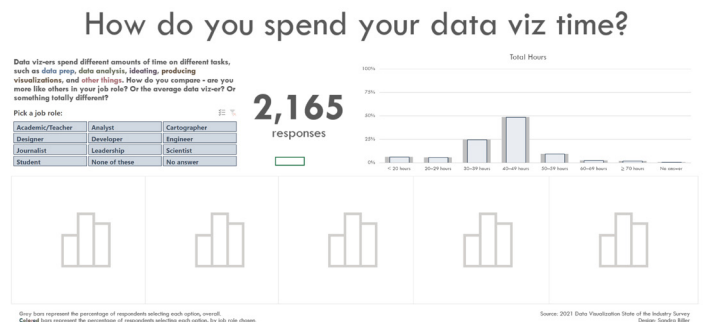
[Link](#)



How Do You Spend your Data Viz Time?

Sandra Biller, 2021

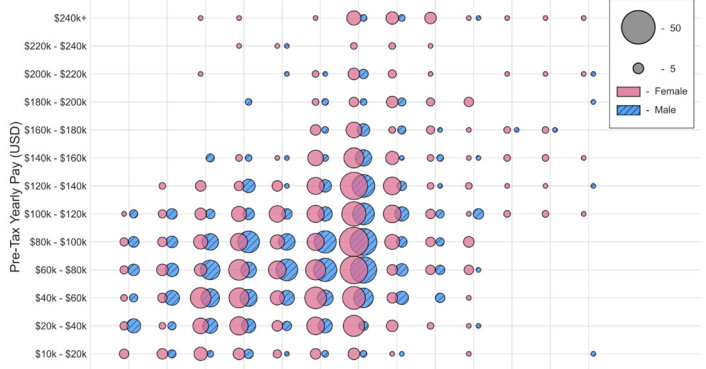
[Link](#)



Show Me the Money

Matthew Osborne, 2021

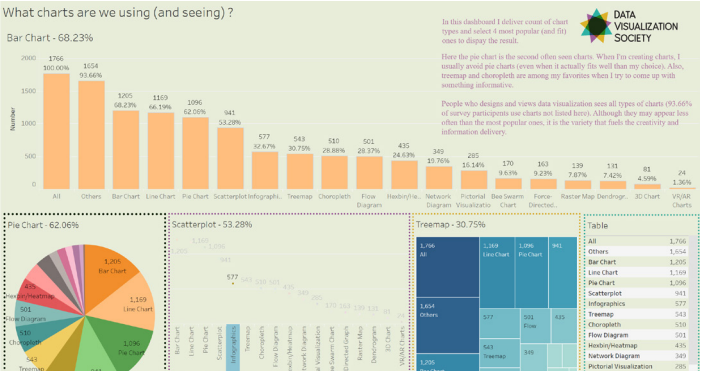
[Link](#)



What Charts Are We Using?

Runge Yan, 2020

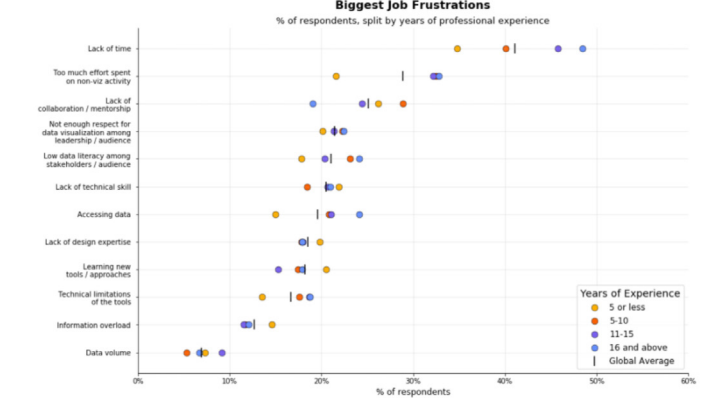
[Link](#)



Preferences, Pain Points, Priorities

Edric Ramos 2020

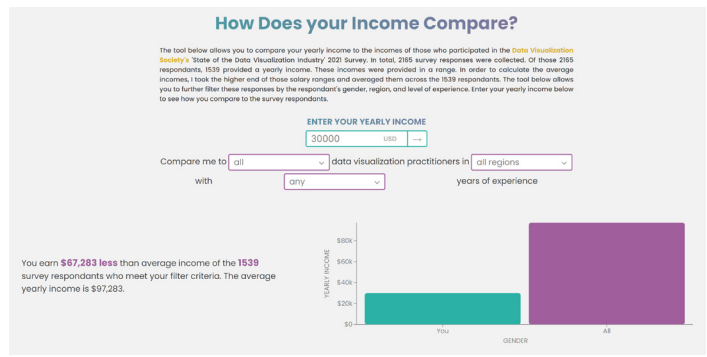
[Link](#)



How Does Your Income Compare?

Mia Szarvas, 2021

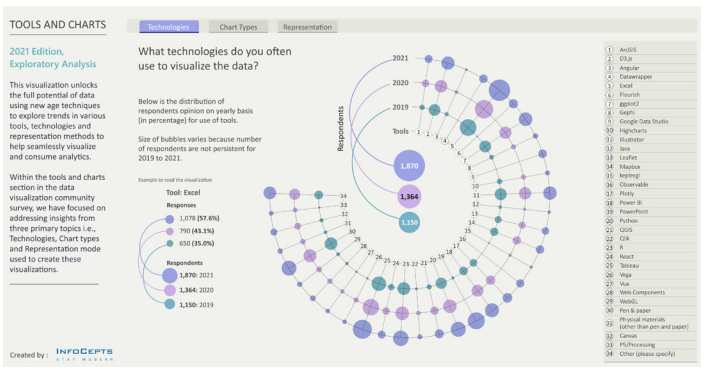
[Link](#)



Tools and Charts

Sanjay Nishant, 2021

[Link](#)



About the DVS

The Data Visualization Society is a non-profit professional association for data visualization creators around the world. We welcome practitioners at all levels, from hobbyists to full time data visualization practitioners and have a vibrant global community.

We focus on serving our community in three ways:

- **Nurture the data visualization community**, building connections across practitioners working in different countries, tech stacks, and subject areas.
- **Celebrate amazing data visualizations** through initiatives like our annual Outlier conference, Nightingale Magazine, and the Information is Beautiful Awards.
- **Advance the data visualization industry** by sparking conversations about standards, learning pathways, ethics, and careers—including initiatives like developing these Career Portraits!

While the discipline and practice of creating data visualizations dates back thousands of years, the modern era of computer graphics sparked more dedicated career paths around creating charts and more complex data experiences. Clarifying the opaque pathways to becoming a data visualization professional was one of the core motivations for founding the DVS in the first place. DVS is committed to continuing to build educational and career-oriented programming to demystify those paths.

The DVS is a place to continue conversations around how these career paths evolve with time and technological advancement. Becoming a DVS member can open doors to learn from developers, designers, engineers, and data artists who are creating visualizations in every medium you can imagine. You can also use our free resources, like our Jobs Board, to explore new opportunities for data visualization professionals.

Whether you're new to the field and just exploring what career paths are available in data visualization so you can plot your own learning journey, or exploring these Career Portraits as someone building a data team, we'd love to have you join the community as a member. You can learn more at datavisualizationsociety.org and find us across social media [@DataVizSociety](https://twitter.com/DataVizSociety).

Want to get involved?

- **Become a member** (free or paid) to receive our newsletter, access to Slack and other community resources, and partner discounts.
- If you are *already* a member, don't forget to **check out your member benefits** on our [member portal](#).
- **Visit the community Slack** or follow along in one of our many social media channels to join in on the conversation.
- **Nightingale** is our online and print publication dedicated solely to data viz. Follow along on the [Nightingale website](#), [subscribe](#) to the print version, and/or [write for us](#).
- Join one of our [interest or local affiliated groups](#)
- Looking for something new in 2023? Whether you're hiring or looking for a new role, our [jobs board](#) might have just the thing you're looking for.
- **Keep up with what's happening** on our [This Week in Data Viz](#) page, and post your own events on the [Data Viz Events Calendar](#)
- Consider **joining a committee**
- Researchers looking to recruit participants for a research study about data viz can submit a request to [send research opportunities](#) to our mailing list. If you're a member with an interest in research, you can opt in to receive notices when you sign up.
- Stay in touch for **upcoming announcements** about the 2023 Survey Challenge, Mentorship program, and our [Outlier conference](#) (May 3-5 2023, in Porto, Portugal)
- Are you from an organization that loves what we do? Reach out to partnerships@datavisualizationsociety.org to discuss potential **collaborations or sponsorships** for our events. Nightingale has several advertising and [sponsorship](#) opportunities as well.