

Haerang's Product Analytics Interview Prep Guide

I put this together for some friends. If you're new to the world of product *and* data science, I was in the same boat as you. Companies want to hire people who can hit the ground running. When you have no experience, your MIDS degree or the ability to learn quickly can still be a hard sell, especially when the competition is tough. Many product analytics questions are easy to answer for people who are primed to the kind of thinking that the interviewers are looking for, but hard for newbies. I put this doc together to help you.

Now that I have been working in product analytics for some time, I finally see what I was missing as a candidate: the ability to visualize real-life problems. I didn't know, for instance, that I could look at all sorts of dashboards and run queries to get the data *outside* of what was measured specifically for the experiment, then form a judgment on what is happening and what the team should do. I also didn't know that the whole team, from PMs to engineers, from strategy to senior leadership, was relying on me to advise them on the best course of action based on data analysis. And to do an insightful analysis, I had to cut through *so much* data. As you go through the interview process, I want you to have this context in mind and try to think: If the team's strategy analyst/PM/executive/engineer was asking this question or the operations team in a remote city was trying to decide whether to greenlight our launch, what data you would want to present to them and what course of action you would recommend.

Anyway, that was a lengthy way of saying, You got this. Good luck. Reach out/search inside #careers #tech-screen-practice #product-management on Slack or DM me if you have any questions.

-Haerang

*P.s. I'm happy to connect on LinkedIn ([linkedin.com/in/haeranglee](https://www.linkedin.com/in/haeranglee)). Please send me an invitation with a **short intro message**. Thanks!*

[Product Analytics](#)

[Recruiting Process](#)

[Tech Screen Prep](#)

[The single best resource I got!](#)

[PRODUCT ANALYST](#)

[1. Experiments](#)

[2. SQL](#)

[3. Product sense/intuition](#)
[DATA SCIENTIST](#)
[OTHER THOUGHTS](#)
[Critical thinking.](#)
[Communication skills.](#)
[Miscellaneous](#)

Product Analytics

What is Product Analytics/Data Science?

My take: It's the type of Data Science that indexes much more highly on business intuitions and decision-making rather than research or modeling.

Some companies call this job Product Analyst (Uber, Google, etc.), others call it Data Scientist, Analytics (Facebook, Doordash, etc.). Whatever it is called, I found the candidate evaluation process to be quite similar across the tech industry in the SF Bay Area.

Read this for more info:

<https://towardsdatascience.com/the-product-data-science-interview-guide-3bc25fd97a8d>

Sample work you'll do in Product Analytics

- Opportunity sizing
- Root cause analysis
- Experimentation

Recruiting Process

The *typical* hiring process in the tech industry goes like this:

1. Recruiter screen
 - 1.5 Take-home test
2. Hiring manager screen
3. Tech phone screen (SQL, algorithms, stats, etc.)
4. "On site": A series of 30-60 minute interviews, a mix of case studies, technical screens, and behavioral questions.

But if you have any other questions about the recruiting process (e.g., what technical skills/programming language will I be tested on?), you should be comfortable asking your recruiter.

Tech Screen Prep

The single best resource I got!

I found this new YouTube channel called [Data Interview Pro](#) by Emma Ding (DS, AirBnB) and thought it was really clear and well-structured. Would recommend. Topics include:

- Strategies and tips to help you land your first data science job efficiently
- What are real data science interviews and how to crack them to land an offer
- Real Data Science Interview Questions and Answers at Top Tech Companies

Start here:

- ☐ [Interviewing for Your First Data Scientist job: What to Expect and How to Prepare](#)
 - Overview of types of DS jobs and interview process
- ☐ [How I Got 4 Data Science Offers and Doubled my Income 2 Months after being Laid Off](#)
 - Emma Ding's personal experience
- ☐ Emma Ding's YouTube channel [Data Interview Pro](#)
 - Mock interviews, frameworks, and others!

PRODUCT ANALYST ("Data Scientist - Analytics")

1. Experiments

- ☐ - AB testing <https://www.udacity.com/course/ab-testing--ud257>
- ☐ - Data sci W241 summary I put together [Experiment Cheat Sheet](#)

Be familiar with the statistical concepts. More importantly, the business intuition. Think about how you'd actually conduct a test in real life with the goal of, "Did the treatment work?" How do you know it worked?

For the experiment design, think about things that could go wrong. What could affect your measurement, randomization, or subject behaviors? What results would look normal and what would you *not* expect to see? If you see something weird, what other data would you leverage to investigate whether it's a statistical anomaly, a product/engineering problem, or an unexpected behavior?

Be expected to be tested on:

- Estimation and logical reasoning in the context of a real-world product
- Elements of descriptive statistics (mean, median, percentiles)

- What does real-world data typically look like? Normally distributed? Skewed? High variance?
- How long to run an experiment for? What does it depend on? (Hint: statistical power)
- What will you do if you see something that's close to stat sig but not really?
- What if you see guardrail metrics leaning the wrong way? What are you gonna do?
- How generalizable are your results?

2. SQL

- <https://mode.com/sql-tutorial/> You should be familiar with most (if not all) concepts in this tutorial. The more advanced SQL interview questions will include knowing when to use self-joins and window functions, then leveraging them accurately.

But it's more than knowing the functions, but more about understanding the nature of the data based on the information the interviewers give you. E.g., can you tell what each row represents? Is it a single customer or a single transaction? What keys can you join on to pull the necessary info from across various tables?

3. Product sense/intuition

- ☐ - Exponent PM interview prep - https://www.youtube.com/channel/UCjm_qVkcPjOVDz9BWjNqO9A
 - (Check out their PM mock interviews, especially related to analytics. The video should do a mock interview and feedback. Also read the comments.)
- ☐ - <https://stellarpeers.com/blog/>
- ☐ - Cracking the PM interview: <http://www.crackingthepminterview.com/>
- ☐ - Basics: <https://chartio.com/learn/product-analytics/top-product-metrics/>
- ☐ - Product funnel: <https://www.activecampaign.com/blog/product-funnel>

In product, being able to find the right metrics is really important. Keep using the app, navigate through various pages, and try to write down what kind of events may be logged. Then, try to come up with some metrics that may inform the product decisions. Those could include, is this feature (search box, map, product type, could be anything) successful? How do we know? What are some real data you might use to measure success. Look up product metrics online to see examples and try to come up with as realistic ones as possible for uber as a practice.

In short, they're going to ask, "What should we do?" in various situations. E.g., We just launched a product and it's not performing well. What should we do? The answer is to analyze and take action, such as target a specific market, fix a bug, or change the product slightly.

Sample interview flow would be:

- Understanding hypotheses for launching new features: "How can I improve a product?"
- Considering and quantifying tradeoffs of a feature in terms of metrics
- Designing experiments to test these hypotheses
- Interpreting results of experiments
- Communicating decision-making via metrics

4. Statistics

Review everything from probabilities to hypothesis testing.

Depending on the company, they may ask you some straight-up probability questions involving coin tosses and a deck of cards. So reviewing binomials etc can be helpful.

You need to demonstrate

1. Foundational mathematical/probabilistic/statistical concepts and how you may come across those in real life
2. How to approach real-world data or estimation problems

Topics you should know

- Estimation and logical reasoning in the context of a real-world product
- Elements of descriptive statistics (mean/expected value, median, mode, percentiles,)
- Common distributions such as binomial or normal distributions
- What does real-world data typically look like?
- Law of Large Numbers, Central Limit Theorem, Linear Regression
- Conditional probabilities, including Bayes' Theorem

- ☐ Khan academy
- ☐ [40 Statistics Interview Problems and Answers for Data Scientists](#)
- ☐ [50+ Statistics Interview Questions and Answers for Data Scientists for 2021](#)
- ☐ Google: statistical or quantitative interview questions for data scientists

DATA SCIENTIST

At Uber, specifically, a Data Scientist is a different job family from Product Analyst. A DS at Uber requires all of the above plus some more skills.

1. Algorithms & data structure - Prepare for a technical screen in Python or R.

- ☐ [Leetcode.com](https://leetcode.com): Software engineers use this site to interview prep. For DS, you probably won't need to know the advanced algorithms or data structures. So be selective about which questions are most likely to come up in an interview

2. Machine learning. The most practical application of it is in product recommendations and customer segmentations.

Everyone can name the algorithms, but it's a lot harder to name features from real data you might have access to and expected behaviors of those features. This is where people with an experience will shine--they've seen and done various things and learned. If you are new to the world of product or ML, you just have to use your imagination to demonstrate your intuition.

Try to be creative. Don't be stuck on the role of DS, but think in terms of, if you could do anything to make this product successful, what data would you want to leverage? E.g., if you're predicting the spending habits of the customer, what data do you wish you had? Their demographics? Wealth? Among those data points, what data do you have access to? If you do not have the exact data, are there any proxies you can use as the feature?

3. Optimization. Uber has a lot of matching problems, and we do things like supply and demand simulations. Any experience in optimization goes a long way.

4. Forms of causal inference other than AB testing (e.g., synthetic control)

Behavioral

Sample questions

Depending on the role, you may be asked to speak with a cross-functional partner or a senior member of the team to demonstrate your soft skills. Some thoughts on how to prep

- ☐ Look up "behavioral interview questions" on Google. Pretend you're the interviewer and you're asking these questions. Then, find the resources that tell you what to look out for in a candidate.
- ☐ Look up company name + "interview" in Glassdoor, Medium, Blind, or Google. See what the company or industry typically ask about and what the roles and responsibilities are.
- ☐ Use the [STAR format](#) for forming your responses
- ☐ Practice with friends. Get feedback and see how other people form their responses. It really helps.
- ☐ Time your responses when you practice. Make it as pithy as possible. Aim for 2 minutes for each response.

- ☐ Prepare a few examples that can be fitted to various questions. E.g., that one time you barely made the deadline could be an example for how well you perform under pressure, how well you manage up or manage your stakeholders, and how you approach decision making.
- ☐ Prepare good questions to ask at the end of the interview. Demonstrate thoughtfulness by going deeper into what the interviewer says, instead of asking generic questions

Critical thinking

My take: this is about having a practical approach to solving real-life problems. Everything I've done in this team so far has led to a real-life action. Sometimes it was about a product launch decision, and sometimes it was about making a compelling argument about the value of certain product features to influence the leadership. Can you ask the right questions to figure out what action we need to take? If you come across something weird or there's lack of data or something goes wrong, how will you diagnose the problem and search for the answer? If someone asks you for something, will you just turn that thing around or will you pause and think a little harder about the intention and provide a more strategic insight?

- ☐ - Case study prep - 5 ways to MECE by Crafting Cases : <https://www.youtube.com/watch?v=n-yVA56L2Jg&list=PLhiawxuiLN5jQGjLGAFL6QRCR8gd87GZG> (Also check out Crafting Cases's website for a free course. It's designed for management consultants interviews, where frameworks and structured communication goes a long way.)

Communication skills.

My take: The non-DS folks (PMs, Engineers, Designers, executives) might not be statistics masters, but they have their expertise. Can you give them actionable insight? Can you back up your recommendations with not just some numbers but with business implications? And can you explain your thorough analysis in plain English?

So many candidates fail the interviews when they lack communication skills. Practice structured communications using some of the consulting interview frameworks.

Other important resources

- ☐ **Salary expectations:** <https://www.levels.fyi> for salary comparisons across the industry/levels/experience.
- ☐ **Google, Glassdoor, or Medium:**

- Search something like "ML engineer [company] interview". Or "data scientist tech screen". You'll be surprised at the number of resources out there such as interview experiences.
- Look up latest product developments.
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- ☐ Product School (has a bunch of free e-books)
- ☐ **LinkedIn Learning**. Great for any topic, really. Product, behavioral questions, interviewing, etc.
- ☐ **Employer's websites**
 - **Company website**, news, and reviews should tell you what they're working on
 - **Engineering blogs specific to each company** - Written for the technical audience, the blog posts will help you get familiar with the problems each company solves and the solutions they offer. E.g., eng.uber.com or <https://engineering.fb.com/>