



Learn SQL from Scratch

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Warby Parker was founded with a rebellious spirit and a lofty objective: to offer designer eyewear at a revolutionary price, while leading the way for socially conscious businesses.

1. Getting Familiar with Warby Parker

Warby Parker's industry disrupting business model begins with a style quiz with the following questions:

1. What are you looking for?"
2. "What's your fit?"
3. "Which shapes do you like?"
4. "Which colors do you like?"
5. "When was your last eye exam?"

Users responses are stored in table called survey; the first 10 rows of survey are shown right with columns (data) as follows:

- Question (text)
- User_id (text)
- Response (text)

*The table was checked for Null values and none were found

question	user_id	response
1. What are you looking for?	005e7f99-d48c-4fce-b605-10506c85aaf7	Women's Styles
2. What's your fit?	005e7f99-d48c-4fce-b605-10506c85aaf7	Medium
3. Which shapes do you like?	00a556ed-f13e-4c67-8704-27e3573684cd	Round
4. Which colors do you like?	00a556ed-f13e-4c67-8704-27e3573684cd	Two-Tone
1. What are you looking for?	00a556ed-f13e-4c67-8704-27e3573684cd	I'm not sure. Let's skip it.
2. What's your fit?	00a556ed-f13e-4c67-8704-27e3573684cd	Narrow
5. When was your last eye exam?	00a556ed-f13e-4c67-8704-27e3573684cd	<1 Year
3. Which shapes do you like?	00bf9d63-0999-43a3-9e5b-9c372e6890d2	Square
5. When was your last eye exam?	00bf9d63-0999-43a3-9e5b-9c372e6890d2	<1 Year
2. What's your fit?	00bf9d63-0999-43a3-9e5b-9c372e6890d2	Medium



Survey Quiz Funnel

2.1 The Survey Quiz Funnel

500 unique users entered the Survey Quiz and answered the first question. As users progress through the quiz, more and more of them quit until finally we are left with 270 answers to the 5th and final question.

question	answered
1. What are you looking for?	500
2. What's your fit?	475
3. Which shapes do you like?	380
4. Which colors do you like?	361
5. When was your last eye exam?	270

```
SELECT COUNT(DISTINCT user_id)
FROM survey;
```

```
SELECT question,
       COUNT(response) as 'answered'
FROM survey
GROUP BY 1;
```

2.2 The Survey Quiz Funnel - Percent Answered

To calculate the percent of users that answered each question in the funnel, I could use a spreadsheet program like Excel or Google Sheets as instructed in the task, but where is the fun in that? Instead I've opted to create a temporary table 'temp' using WITH to find the MAX value to use as a denominator, and the answered value as a numerator. Then added that as a column to the same query as the previous task. I could have also used 500 for the denominator, but now this query will work in the future if more users take the quiz and I want to run the same analysis.

question	answered	percent
1. What are you looking for?	500	100.0
2. What's your fit?	475	95.0
3. Which shapes do you like?	380	76.0
4. Which colors do you like?	361	72.2
5. When was your last eye exam?	270	54.0

```
WITH temp AS(  
    SELECT MAX(x.total) AS 'max'  
    FROM (SELECT question,COUNT(response) AS total  
          FROM survey  
          GROUP BY question) x)  
SELECT question,  
    COUNT(response) AS answered,  
    (COUNT(response) * 100.0)/temp.max AS percent  
FROM survey,temp  
GROUP BY question;
```

2.3 The Survey Quiz Funnel - Analysis

- As expected with a funnel, the lowest completion rate is the final question at only 54%, but what is more interesting are the points at which most people left the funnel.
- 95% of users answered Question 2, but only 76% answered Question 3. The most likely reason being that at Question 1, users have a general interest in eyewear, but by Question 3 they realize they are not committed to new eyewear and do not answer any further questions.
- Most users that answered Question 3 also answered Question 4 but only 54% of the original 500 users answered Question 5.
- Question 5 is unlike the other questions in that it asks the user for a fact, rather than a preference or opinion. Users that may have felt committed to new eyewear but that realize they haven't had an eye exam recently probably fall out here, waiting to get frames until they know their current prescription needs.

question	answered	percent
1. What are you looking for?	500	100.0
2. What's your fit?	475	95.0
3. Which shapes do you like?	380	76.0
4. Which colors do you like?	361	72.2
5. When was your last eye exam?	270	54.0



Home Try-On Funnel

3.1 The Home Try-On Funnel

Data for the Home Try-On funnel is distributed across three tables:

- **quiz** has user id & answers to questions 1-4 (style, fit, shape, & color) in each row of the table. All columns are text data.
- **home_try_on** captures the user id, number of pairs of eyewear, and address of users that are trying on frames at home. All columns have text data.
- **purchase** has the user id and data for each pair of purchased frames (product id, style, model, color, price) . Product id and price are both Integer data types, whereas the other columns are text type.

```
SELECT *  
FROM quiz  
LIMIT 5;
```

```
SELECT *  
FROM home_try_on  
LIMIT 5;
```

```
SELECT *  
FROM purchase  
LIMIT 5;
```

3.2 The Home Try-On Funnel - Combination Table

Below is a combination of the three tables (*quiz*, *home_try_on*, & *purchase*). Each row represents a single user where *is_home_try_on* is TRUE if the user completed the quiz and tried on eyewear at home, number of pairs shows how many pairs they tried on, and the last column is TRUE if they made a purchase.

user_id	is_home_try_on	number_of_pairs	is_purchase
4e8118dc-bb3d-49bf-85fc-cca8d83232ac	1	3 pairs	0
291f1cca-e507-48be-b063-002b14906468	1	3 pairs	1
75122300-0736-4087-b6d8-c0c5373a1a04	0		0
75bc6ebd-40cd-4e1d-a301-27ddd93b12e2	1	5 pairs	0
ce965c4d-7a2b-4db6-9847-601747fa7812	1	3 pairs	1
28867d12-27a6-4e6a-a5fb-8bb5440117ae	1	5 pairs	1
5a7a7e13-fbcf-46e4-9093-79799649d6c5	0		0
0143cb8b-bb81-4916-9750-ce956c9f9bd9	0		0
a4ccc1b3-cbb6-449c-b7a5-03af42c97433	1	5 pairs	0
b1dded76-cd60-4222-82cb-f6d464104298	1	3 pairs	0

```
SELECT DISTINCT q.user_id,
    h.user_id IS NOT NULL AS 'is_home_try_on',
    h.number_of_pairs,
    p.user_id IS NOT NULL AS 'is_purchase'
FROM quiz q
LEFT JOIN home_try_on h
    ON q.user_id = h.user_id
LEFT JOIN purchase p
    ON q.user_id = p.user_id
LIMIT 10;
```

3.3 The Home Try-On Funnel - Analysis

For this high level analysis I've aggregated across all rows to show how many users went through each stage of the funnel.

- 1000 users took the style quiz and 75% of them tried on some eyewear at home.
- 66% of users who tried on eyewear ended up making a purchase.

This is insightful and can help the company derive information such as ROI in the home try on business model, but there are other insights to be found in the data...

Quiz	Home Try On	Purchase	Quiz to Home	Home to Purchase
1000	750	495	0.75	0.66

```
WITH funnel AS(
  SELECT DISTINCT q.user_id,
    h.user_id IS NOT NULL AS
    'is_home_try_on',
    h.number_of_pairs,
    p.user_id IS NOT NULL AS 'is_purchase'
  FROM quiz q
  LEFT JOIN home_try_on h
    ON q.user_id = h.user_id
  LEFT JOIN purchase p
    ON q.user_id = p.user_id)
SELECT COUNT(*) AS 'Quiz',
  COUNT(CASE
    WHEN is_home_try_on = 1 THEN user_id
    ELSE NULL
  END) AS 'Home Try On',
  COUNT(CASE
    WHEN is_purchase = 1 THEN user_id
    ELSE NULL
  END) AS 'Purchase',
  SUM(is_home_try_on)*1.0/COUNT(user_id) AS
  'Quiz to Home',
  SUM(is_purchase)*1.0/SUM(is_home_try_on) AS
  'Home to Purchase'
FROM funnel;
```

3.4 The Home Try-On Funnel - 3 or 5 Pairs

Below I've calculated the difference in purchase rates between customers who had 3 pairs of eyewear with those who had 5 for their home try on.

The difference is clear, those who had 5 options made a purchase 79% of the time, whereas those with 3 options were closer to a coin flip. WP should suggest users select 5 pairs to drive conversion rates!

Pairs	Home Try On	Purchase	Conversion %
3 pairs	379	201	53.0
5 pairs	371	294	79.2

```
WITH funnel AS(
  SELECT DISTINCT q.user_id,
    h.user_id IS NOT NULL AS 'is_home_try_on',
    h.number_of_pairs,
    p.user_id IS NOT NULL AS 'is_purchase'
  FROM quiz q
  LEFT JOIN home_try_on h
    ON q.user_id = h.user_id
  LEFT JOIN purchase p
    ON q.user_id = p.user_id)
SELECT number_of_pairs AS "Pairs",
  COUNT(CASE
    WHEN is_home_try_on = 1 THEN user_id
    ELSE NULL
  END) AS 'Home Try On',
  COUNT(CASE
    WHEN is_purchase = 1 THEN user_id
    ELSE NULL
  END) AS 'Purchase',
  ROUND(SUM(is_purchase)*100.0/SUM(is_home_try_on),1) AS
  'Conversion %'
FROM funnel
WHERE number_of_pairs IS NOT NULL
GROUP BY 1
ORDER BY 1;
```



Actionable Insights

4.1 Actionable Insights - Tortoise..So Hot Right Now

Color	Quiz Results
Tortoise	292
Black	280
Crystal	210
Neutral	114
Two-Tone	104

- Tortoise is the #1 most popular color on both the **quiz (top)** and **purchase (bottom)** results.
- There are more colors in **purchase** than **quiz** so some have been grouped.
- Two-Tone is last in **quiz** results and doesn't appear in the **purchase** results. Recommend discontinuing Two-Tone option.

Color Group	Purchases
Tortoise	205
Crystal	98
Black	86
Driftwood Fade	63
Sea Glass Gray	43

```
--Most common color results of style quiz
SELECT color as 'Color',
       COUNT(user_id) as 'Quiz Results'
FROM quiz
GROUP BY 1
ORDER BY 2 DESC;

--What is the best selling color
SELECT
  CASE
    WHEN color LIKE '%Tortoise%' THEN 'Tortoise'
    WHEN color LIKE '%Crystal%' THEN 'Crystal'
    WHEN color LIKE '%Black%' THEN 'Black'
    ELSE color
  END AS 'Color Group',
  COUNT(*) AS 'Purchases'
FROM purchase
GROUP BY 1
ORDER BY 2 DESC;
```


4.2 Actionable Insights - Sales By Product

- Driftwood Fade Dawes frames are the highest grossing product in this data set
- Product ID 10, Eugene Narrow in Rosewood Tortoise sold almost the same amount of units as the highest grossing product, but is significantly underpriced by comparison.
- Given the popularity of the Tortoise colors and that model, I recommend raising the price of Product ID 10 to 150.

Product	Model	Color	Price/ea	Qty	Total Sales
3	Dawes	Driftwood Fade	150	63	9450
4	Dawes	Jet Black	150	44	6600
7	Lucy	Elderflower Crystal	150	44	6600
8	Lucy	Jet Black	150	42	6300
10	Eugene Narrow	Rosewood Tortoise	95	62	5890
9	Eugene Narrow	Rose Crystal	95	54	5130
1	Brady	Layered Tortoise Matte	95	52	4940
6	Olive	Pearled Tortoise	95	50	4750
2	Brady	Sea Glass Gray	95	43	4085
5	Monocle	Endangered Tortoise	50	41	2050

```
SELECT product_id AS 'Product',  
       model_name as 'Model',  
       color as 'Color',  
       price as "Price/ea",  
       COUNT(*) as "Qty",  
       SUM(price) AS 'Total Sales'  
FROM purchase  
GROUP BY 1  
ORDER BY 6 DESC;
```


4.3 Actionable Insights - Summary

- There is a significant lack of participation in the Style Quiz on question 5. Given that the results to this question weren't used in the quiz table, I would recommend removing this question from the Style Quiz or trying an A/B test with that question placed higher up in the quiz funnel.
- The conversion rate for users who tried on 5 pairs vs 3 pairs in the A/B test was significant. Warby Parker should continue allowing users to try on more pairs at home to drive conversion.
- Tortoise color frames are in demand, and two-tone frames are so last year. Warby Parker should discontinue the two-tone color and try different Tortoise color varieties to increase sales.
- Product ID 10, Eugene Narrow in Rosewood Tortoise seems underpriced, recommend raising price.
- With the data provided, it is not possible to analyze trends over time. In the future, performing this analysis with dates may shed more light on trends.



Images courtesy of
www.warbyparker.com