



Warby Parker Funnel Analysis

Learn SQL from Scratch

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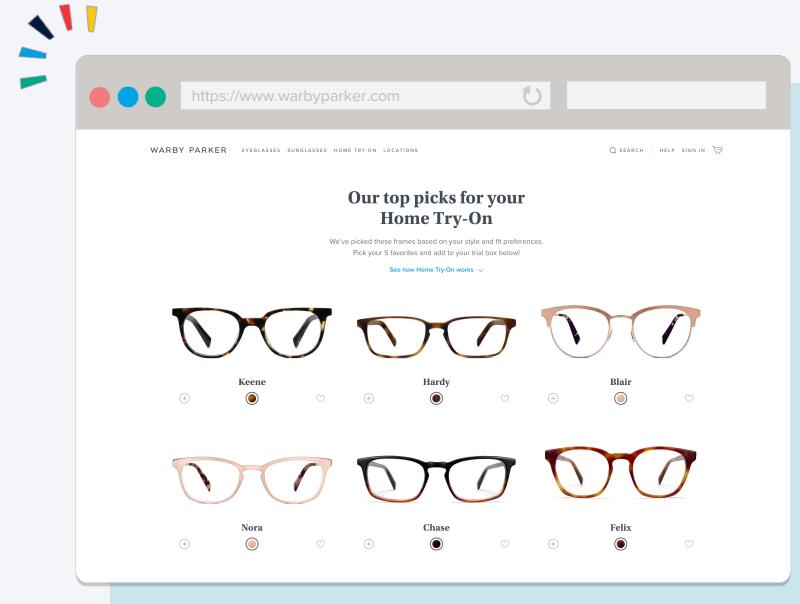


About Warby Parker

Background on Warby Parker

Warby Parker is an online retailer that sells prescription glasses at much lower prices than its traditional brick and mortar competitors.

To keep ahead of the competition, the customer shopping experience needs to be evaluated and optimized. This is best accomplished through data analysis.



Warby Parker's Purchase Funnel

The purchase funnel is broken down into 3 stages

- 1 First, users are taken to a Style Quiz to help them find their perfect frame.
- 2 After completing the quiz, they can select several frames to try on at home.
- 3 If customers are happy with their choices, they may keep them to buy, or send them back.



Style Quiz

The Style Quiz

Let's take a closer look at the first stage of the **purchase funnel**, the Style Quiz.



HOW IT WORKS

- Users answer questions **one at a time**.
- When completed, they are able to browse through a customized selection of glasses.

#1

1. "What are you looking for?"

CHOICES:

Men's Styles • Women's Styles • I'm not sure. Let's skip it.

-- next page --

#2

2. "What's your fit?"

CHOICES:

Narrow • Medium • Wide

-- next page --

#3

3. "Which shapes do you like?"

CHOICES:

Rectangular • Square • Round • No Preference

-- next page --

#4

4. "Which colors do you like?"

CHOICES:

Tortoise • Black • Crystal • Neutral • Two-Tone

-- next page --

#5

5. "When was your last eye exam?"

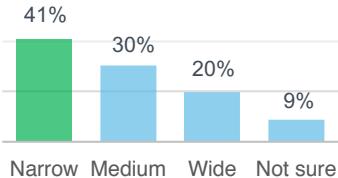
CHOICES:

<1 Year • 1-3 Years • 3+ Years • Not Sure. Let's Skip It.

Style Quiz Findings

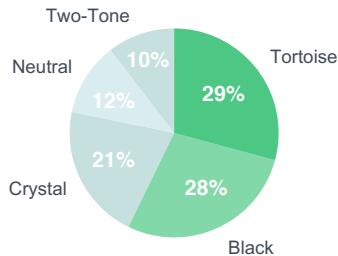
MOST POPULAR FIT

NARROW



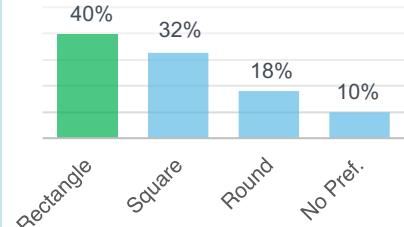
MOST POPULAR COLORS

TORTOISE & BLACK



MOST POPULAR SHAPE

RECTANGULAR



Additionally, in the 1st question on Men's vs. Women's styles, about 10% of users chose the "skip" option.

Quiz Funnel Analysis

For this section, a subset of 500 records in the table ‘survey’ was analyzed.

Out of the **500** users that started the survey, only **270** completed the quiz.

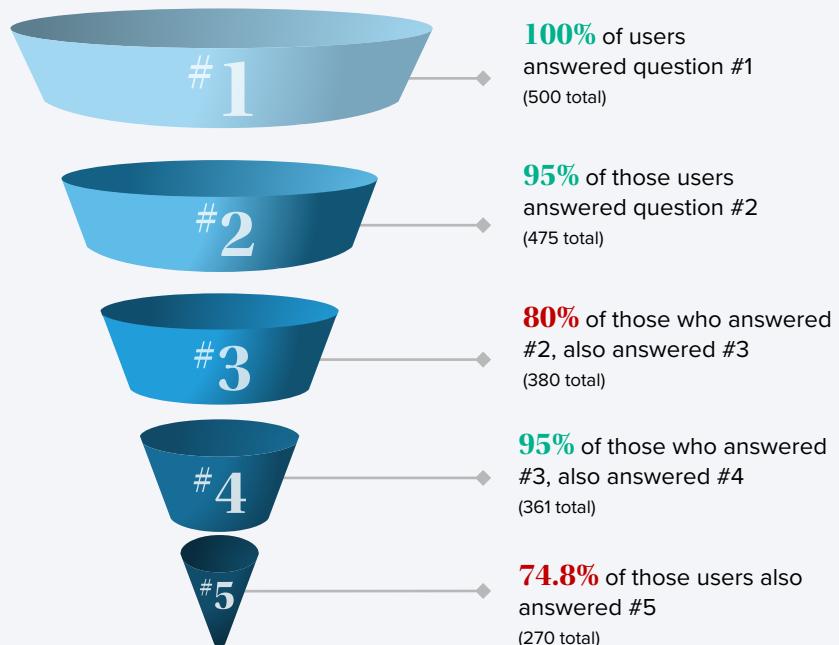
That's only **54%**!

As the users moved through the quiz, they "gave up" and dropped out on different questions.

To determine which questions need to be improved, we analyze how many users move from Question 1 to 2, from 2 to 3, etc.

Which questions have lower completion rates?

This is best discovered by finding the percentage of users who answered a question compared to the previous one.



Home Try-On



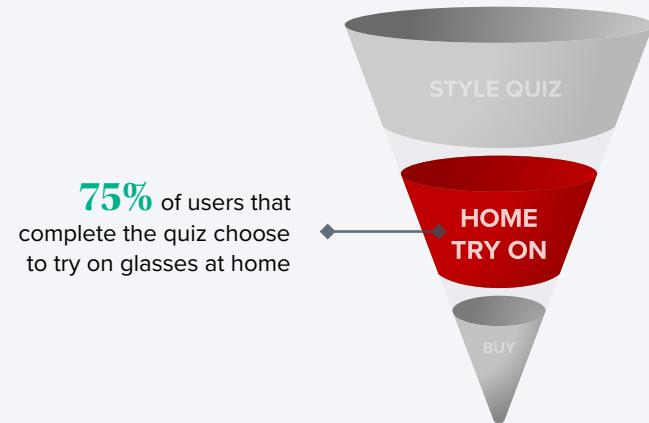
Home Try-On Background

The second step of the **purchase** funnel is the Home Try-On stage.

After users complete the quiz, they are invited to have several pairs of glasses shipped to them to try on at home.

Funnel Check

- It's important to check how many users complete each step
- About 75% of users that complete the quiz choose to try on glasses at home



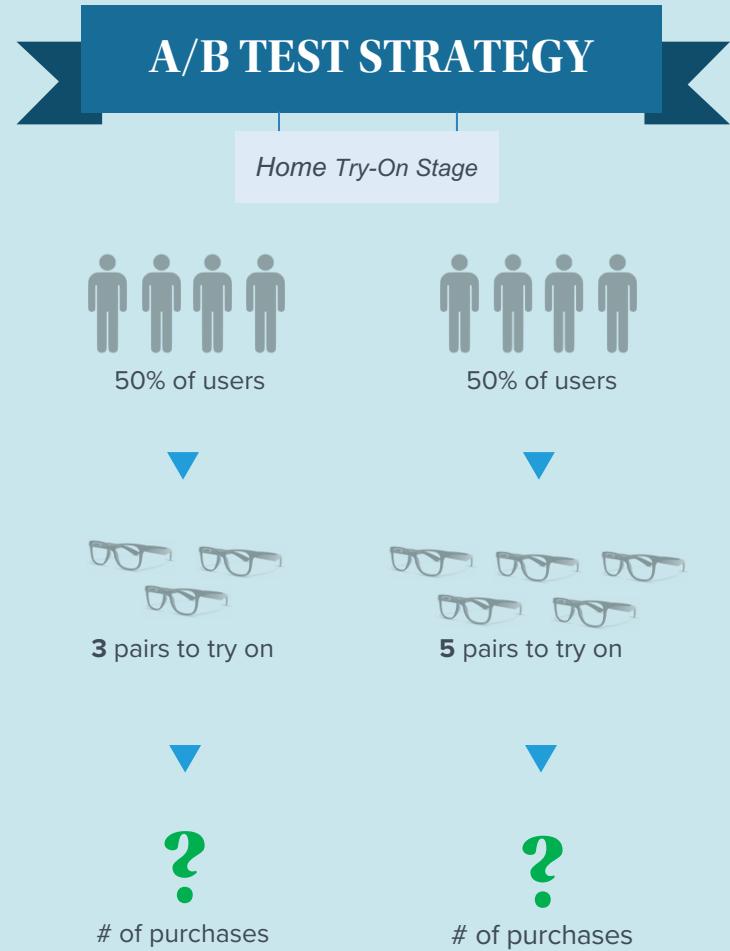
Source: Appendix #6A

Home Try-On Experiment

During the Home Try-On stage, an A/B Test was conducted to find out whether or not users who received **more pairs** would be more likely to **make a purchase**.

Test Criteria:

- 50% of users got **3** pairs to try on
- 50% of users got **5** pairs to try on



Home Try-On Results

Test results found that users who tried on **5 pairs** are more likely to purchase a pair of glasses.



Additional analysis was performed on the **average sale amount** of each test group, however both groups resulted a similar \$112 - \$113, making “5 pairs” the clear winner.



5 Pairs!

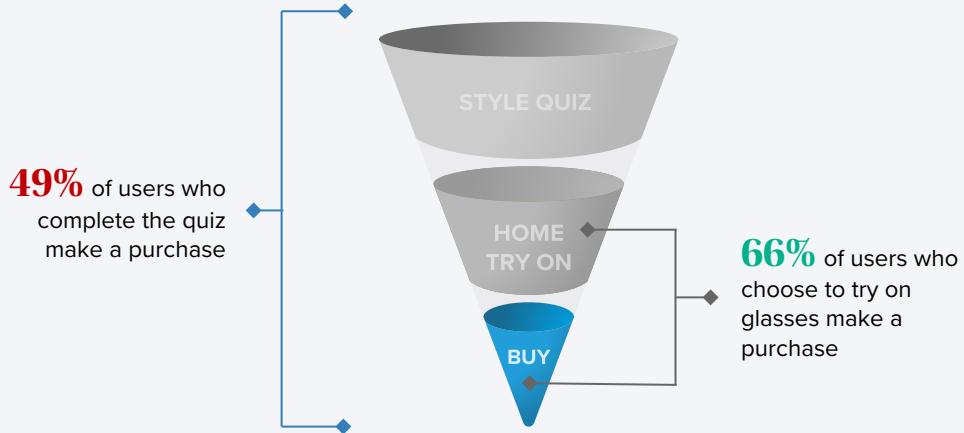


Users who try-on **5 pairs** of glasses are more likely to make a purchase

Purchase Results

Purchase Results

The last step in the **purchase funnel** is the buy stage. After users try-on glasses at home, they can choose to make a purchase, or send them all back.



MOST POPULAR PURCHASES

Purchased Models:

Women's Model: **Eugene Narrow**

Men's Model: **Dawes**

Purchased Colors:

Women's Color: **Tortoise**

Men's Color: **Two-Tone**

Full Funnel Analysis



With the last step of the purchase funnel complete, we can analyze all 3 steps together for further insights.

Does the user's choice of style in quiz affect the overall purchase rate?

Quiz Response - Style Choices

Men's	Women's	Not Sure
432	469	99

320
Tried on glasses



243
Made a purchase

76%

Purchase Rate

361
Tried on glasses



252
Made a purchase

70%

Purchase Rate

69
Tried on glasses



0
Made a purchase

0%

Purchase Rate

Does the user's quiz color choice match the final purchase color?

Quiz Color to Purchase Color Match?

Yes

100

users' quiz color matched their purchase color

No

395

users' quiz color **didn't** match purchase color

20%

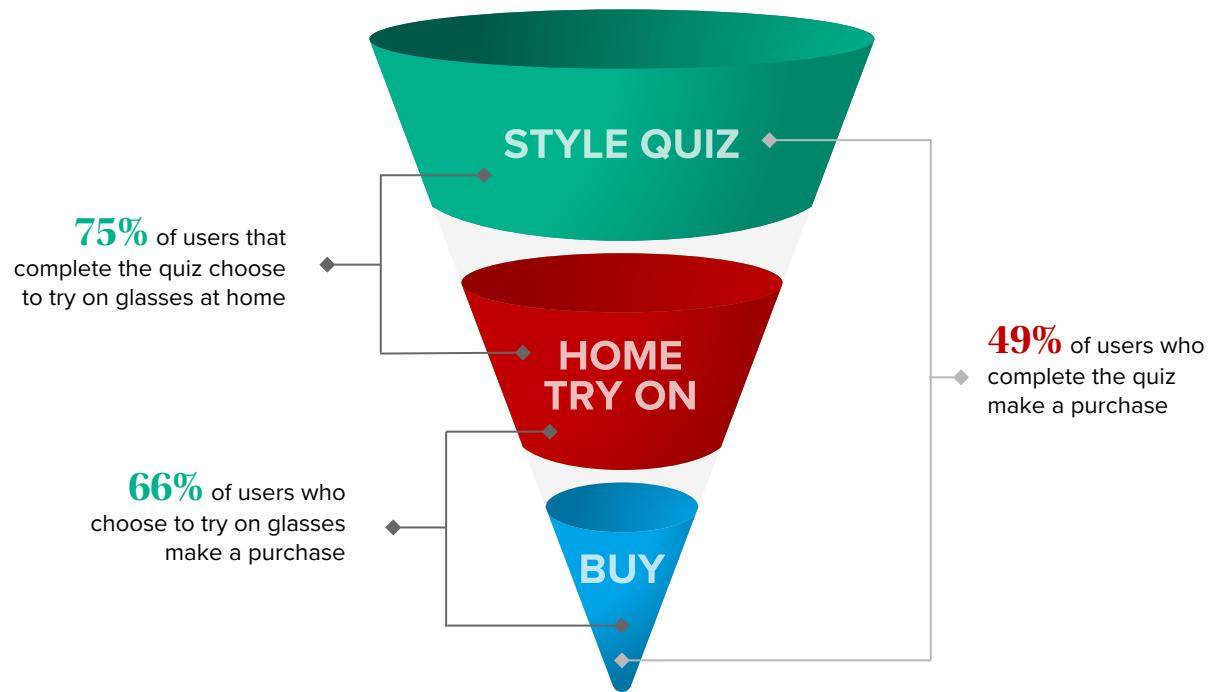
Matched

80%

Didn't Match

WARBY PARKER

Purchase Funnel Conversion Rates



Recommendations

Style Quiz Recommendations



Recommendations to optimize **completion of the quiz funnel**

In Question #3

Test more options of shapes in the choices

Rationale:

- Very few users said they had no shape preference. All other responses were relatively even. This indicates that the lower completion rate could be due to the users' actual shape preference not being listed in the options.
- For example some users may favor cat-eye glasses, which aren't listed.

In Question #5

Test different ranges of times in the choices

Rationale:

- Analysis of the responses saw the majority of users selecting "<1 year"
- This indicates many users may prefer to select a range in months instead of years.

Style Quiz Recommendations



Recommendations to optimize Style Quiz for **purchase completion**

In Question #1

Remove “Not sure. Just Skip it” choice

Rationale:

- All users who selected this option did not make a purchase (0% conversion rate).
- Comparatively, the other two choices (Men’s Styles and Women’s Styles) both had conversion rates above 70%.

Rework Question #4 (color) - further testing is needed to optimize

Rationale:

- Quiz color preference in quiz isn’t indicative of purchase color.
- Challenge your marketing, data and design teams to research and come up with new testing ideas to make this question useful.

Home Try-On Recommendations



Recommendations to **optimize purchases** in the try-on stage

Send all users 5 pairs of glasses in Home Try-On stage

Rationale:

- An A/B test has proven that if users are sent more pairs of glasses, they are more likely to make a purchase.

Appendix

#1 - Find column names in survey table

Background: To help users find their perfect frame, Warby Parker has a Style Quiz. The users' responses are stored in a table called "survey".

SQL tasks: Select all columns from the first 10 rows. What columns does the table have?

Answer: The table "survey" has the following columns: **question**, **user_id**, **response**

question	user_id	response
1. What are you looking for?	005e7f99-d48c-4fce-b605-10506c85aaaf7	Women's Styles
2. What's your fit?	005e7f99-d48c-4fce-b605-10506c85aaaf7	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

```
SELECT *
FROM survey
LIMIT 10;
```

#2 - Identify # of responses per question

Background: Users will "give up" at different points in the survey. Analyze how many users move from Question 1 to Question 2, etc.

SQL tasks: Create a quiz funnel using the GROUP BY command. What is the number of responses for each question?

Answers:

- Question 1 - 500
- Question 2 - 475
- Question 3 - 380
- Question 4 - 361
- Question 5 - 270

question	num_responses
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 question,  
       COUNT(DISTINCT user_id) AS num_responses  
  FROM survey  
 GROUP BY question  
 ORDER BY question;
```

#3 - Calculate question completion rate

Background: Calculate the percentage of users who answer each question.

Excel tasks: Which question(s) of the quiz have a lower completion rates?

What do you think is the reason?

Answers:

- Questions #3 and #5 have the lowest completion rates.**
- The notable finding of #3's responses was that very few users said they had no shape preference. All other responses were relatively even. This indicates that the lower completion rate could be due to the users' actual shape preference not being listed in the options. For example some users may favor cat-eye glasses, which aren't listed, and an "other" option isn't available either.
- #5's responses saw the majority of users selecting "<1 year", which indicates many users may prefer to select a range in months instead of years.

question	#_responses	% moved to next question
1. What are you looking for?	500	100.0%
2. What's your fit?	475	95.0%
3. Which shapes do you like?	380	80.0%
4. Which colors do you like?	361	95.0%
5. When was your last eye exam?	270	74.8%

project.sqlite

```
-- COMPLETION RATE TABLE (left) WAS CALCULATED IN EXCEL.  
-- QUERY BELOW CREATES A RESULTS LIST USED TO FIND INSIGHTS  
-- INTO *WHY* SOME QUESTIONS HAVE LOWER COMPLETION RATES*.  
  
SELECT question, response,  
       COUNT(response) AS num_response  
FROM survey  
WHERE question = '3. Which shapes do you like?'  
GROUP BY response  
UNION  
SELECT question, response,  
       COUNT(response) AS num_response  
FROM survey  
WHERE question = '5. When was your last eye exam?'  
GROUP BY response  
ORDER BY question, num_response DESC;
```

#4 - Find column names of purchase funnel tables

Background: Warby Parker's purchase funnel is: Take the Style Quiz → Home Try-On → Purchase the Perfect Pair of Glasses.

SQL tasks: Examine the first five rows of each table. What are the column names?

Answers:

- “quiz” has the following columns; **user_id, style, fit, shape, and color**
- “home_try_on” has **user_id, number_of_pairs, and address**
- “purchase” has **user_id, product_id, style, model_name, color, and price**

user_id	number_of_pairs	address
d8add87-3217-4429-9a01-d56d68111da7	5 pairs	145 New York 9a
f52b07c8-abe4-4f4a-9d39-ba9fc9a184cc	5 pairs	383 Madison Ave
8ba0d2d5-1a31-403e-9fa5-79540f8477f9	5 pairs	287 Pell St
4e71850e-8bbf-4e6b-accc-49a7bb46c586	3 pairs	347 Madison Square N
3bc8f97f-2336-4dab-bd86-e391609dab97	5 pairs	182 Cornelia St

user_id	style	fit	shape	color
4e8118dc-bb3d-49bf-85fc-cca8d83232ac	Women's Styles	Medium	Rectangular	Tortoise
291f1cca-e507-48be-b063-002b14906468	Women's Styles	Narrow	Round	Black
75122300-0736-4087-b6d8-c0c5373a1a04	Women's Styles	Wide	Rectangular	Two-Tone
75bc6ebd-40cd-4e1d-a301-27dd93b12e2	Women's Styles	Narrow	Square	Two-Tone
ce965c4d-7a2b-4db6-9847-601747fa7812	Women's Styles	Wide	Rectangular	Black

user_id	product_id	style	model_name	color	price
00a9dd17-36c8-430c-9d76-df49d4197dcf	8	Women's Styles	Lucy	Jet Black	150
00e15fe0-c86f-4818-9c63-3422211baa97	7	Women's Styles	Lucy	Elderflower Crystal	150
017506f7-aba1-4b9d-8b7b-f4426e71b8ca	4	Men's Styles	Dawes	Jet Black	150
0176bf3-9c51-4b1c-b593-87edab3c54cb	10	Women's Styles	Eugene Narrow	Rosewood Tortoise	95
01fdf106-f73c-4d3f-a036-2f3e2ab1ce06	8	Women's Styles	Lucy	Jet Black	150

project.sqlite

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

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

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

#5 - Get list of try-ons and purchases per user

Background: Combine data from the previous 3 tables to prepare for analysis.

SQL tasks: List the # of pairs for each user, if they have tried them on, and if they have purchased. Use a LEFT JOIN to combine the three tables.

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

project.sqlite

```
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 p.user_id = q.user_id
LIMIT 10;
```

#6A – Insights on Overall Conversion

Background: After all three purchase funnel tables are combined, now we can analyze the data.

SQL tasks: Calculate overall conversion rates by aggregating across all rows.

# quiz	# try on	# purchase	try on %	purchase %	overall %
1000	750	495	75.0%	66.0%	49.5%

project.sqlite

```
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 p.user_id = q.user_id)
SELECT
    COUNT(*) AS num_quiz,
    SUM(is_home_try_on) AS num_try_on,
    SUM(is_purchase) AS num_purchase,
    1.0 * SUM(is_home_try_on) / COUNT(user_id) * 100 AS 'try_on_%',
    1.0 * SUM(is_purchase) / SUM(is_home_try_on) * 100 AS 'purchase_%',
    1.0 * SUM(is_purchase) / COUNT(user_id) * 100 AS 'overall_%'
FROM funnel;
```

#6B - # Pairs vs # Purchase

Background: During the Home Try-On stage, we will be conducting an A/B Test where 50% of the users get 3 pairs, and the other half gets 5 pairs.

SQL tasks: Calculate the difference in **purchase rates** between customers who had 3 number of pairs with ones who had 5.

number_of_pairs	num_try_on	num_purchase	conversion_%
3 pairs	379	201	53.03
5 pairs	371	294	79.25

project.sqlite

```
WITH funnel AS (
    SELECT 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 h.user_id = p.user_id
    WHERE h.number_of_pairs IS NOT NULL)
SELECT number_of_pairs,
    SUM(is_home_try_on) AS 'num_try_on',
    SUM(is_purchase) AS 'num_purchase',
    ROUND(1.0 * SUM(is_purchase) / SUM(is_home_try_on) * 100, 2) AS 'conversion_%'
FROM funnel
GROUP BY number_of_pairs;
```

#6C - # Pairs vs \$ Purchased

Background: During the Home Try-On stage, we will be conducting an A/B Test where 50% of the users get 3 pairs, and the other half gets 5 pairs.

SQL tasks: Calculate the difference in average purchase amounts and total sales between customers who had 3 number of pairs with ones who had 5.

test_group	num_purchase	Total Sales	Avg Spend
3 pairs	201	22765.0	113.26
5 pairs	294	33030.0	112.35

project.sqlite

```
WITH funnel AS (
    SELECT q.user_id,
    h.number_of_pairs,
    p.user_id IS NOT NULL AS 'is_purchase',
    p.price
FROM quiz q
LEFT JOIN home_try_on h
    ON q.user_id = h.user_id
LEFT JOIN purchase p
    ON h.user_id = p.user_id
WHERE h.number_of_pairs IS NOT NULL)
SELECT number_of_pairs AS 'test_group',
    SUM(is_purchase) AS 'num_purchase',
    ROUND(1.0 * SUM(price), 2) AS 'total_sales',
    ROUND(1.0 * AVG(price), 2) AS 'avg_spend'
FROM funnel
GROUP BY test_group;
```

#6D - Style Quiz Findings

Background: To help users find their perfect frame, Warby Parker has a Style Quiz.

SQL tasks: Find the most common results of the style quiz.

style	num_response
Women's Styles	469
Men's Styles	432
I'm not sure. Let's skip it.	99

fit	num_response
Narrow	408
Medium	305
Wide	198
I'm not sure. Let's skip it.	89

shape	num_response
Rectangular	397
Square	326
Round	180
No Preference	97

color	num_response
Tortoise	292
Black	280
Crystal	210
Neutral	114
Two-Tone	104

```
SELECT style,
       COUNT(style) AS num_response
  FROM quiz
 GROUP BY 1
 ORDER BY 2 DESC;
```

```
SELECT fit,
       COUNT(fit) AS num_response
  FROM quiz
 GROUP BY 1
 ORDER BY 2 DESC;
```

```
SELECT shape,
       COUNT(shape) AS num_response
  FROM quiz
 GROUP BY 1
 ORDER BY 2 DESC;
```

```
SELECT color,
       COUNT(color) AS num_response
  FROM quiz
 GROUP BY 1
 ORDER BY 2 DESC;
```

#6E - Purchase Style Findings

Background: Users purchases are logged in the purchase table.

SQL tasks: The most common types of purchase made.

style	model_name	num_purchased
Women's Styles	Eugene Narrow	116
Men's Styles	Dawes	107
Men's Styles	Brady	95
Women's Styles	Lucy	86
Women's Styles	Olive	50
Men's Styles	Monocle	41

style	color_class	num_purchased
Men's Styles	Two-Tone	63
Women's Styles	Tortoise	62
Women's Styles	Crystal	54
Men's Styles	Tortoise	52
Women's Styles	Tortoise	50
Men's Styles	Black	44

project.sqlite

```
SELECT style, model_name,
       COUNT(model_name) AS num_purchased
  FROM purchase
 GROUP BY model_name
 ORDER BY 3 DESC;

WITH unicolors AS (
  SELECT color, style, product_id,
         COUNT(user_id) AS num_purchased
    FROM purchase
   GROUP BY product_id)
  SELECT DISTINCT style, CASE
      WHEN color LIKE '%Tortoise%' THEN 'Tortoise'
      WHEN color LIKE '%Black%' THEN 'Black'
      WHEN color LIKE '%Fade%' THEN 'Two-Tone'
      WHEN color LIKE '%Crystal%' THEN 'Crystal'
      WHEN color LIKE '%Gray%' THEN 'Neutral'
      ELSE color
    END AS short_color, num_purchased
  FROM unicolors
 ORDER BY num_purchased DESC;
```

#6F - Style Conversions

Background: Users take a style quiz prior to trying on and buying. Does their initial selection affect conversion rate?

SQL tasks: Find the conversion rate based on initial quiz selection

original_quiz_style	num_try_on	num_purchase	conversion_%
Men's Styles	320	243	75.94
Women's Styles	361	252	69.81
I'm not sure. Let's skip it.	69	0	0.0

project.sqlite

```
WITH funnel AS (
    SELECT 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 h.user_id = p.user_id
    WHERE h.number_of_pairs IS NOT NULL)
SELECT DISTINCT q.style AS 'original_quiz_style',
    SUM(is_home_try_on) AS 'num_try_on',
    SUM(is_purchase) AS 'num_purchase',
    ROUND(1.0 * SUM(is_purchase) / SUM(is_home_try_on) * 100, 2) AS 'conversion_%'
FROM funnel f
LEFT JOIN quiz q
    ON f.user_id = q.user_id
GROUP BY 1
ORDER BY 4 DESC;
```

#6G – Quiz to Buy color conversions

Background: Users take a style quiz prior to trying on and buying. Is their initial color selection indicative of the color they actual purchase?

SQL tasks: Find if the user's initial quiz color is indicative of their final purchase

quiz_to_buy_match	num_matched	%_matched
no	395	80.0
yes	100	20.0

project.sqlite

```
WITH colorgroup AS (
    SELECT q.user_id, q.style AS quiz_style, p.style AS buy_style, q.color AS
        quiz_color, CASE
            WHEN p.color LIKE '%Tortoise%' THEN 'Tortoise'
            WHEN p.color LIKE '%Black%' THEN 'Black'
            WHEN p.color LIKE '%Fade%' THEN 'Two-Tone'
            WHEN p.color LIKE '%Crystal%' THEN 'Crystal'
            WHEN p.color LIKE '%Gray%' THEN 'Neutral'
            ELSE p.color
        END AS buy_color
    FROM quiz q
    LEFT JOIN home_try_on h
        ON q.user_id = h.user_id
    LEFT JOIN purchase p
        ON p.user_id = h.user_id
    WHERE buy_color IS NOT NULL)
SELECT CASE
    WHEN c.quiz_color != c.buy_color THEN 'no'
    WHEN c.quiz_color = c.buy_color THEN 'yes'
END AS quiz_to_buy_match,
COUNT(c.user_id) AS num_matched,
ROUND(1.0 * COUNT(c.user_id) / 495, 2) * 100 AS '%_matched'
FROM colorgroup c
GROUP BY quiz_to_buy_match;
```