



Usage Funnels with Warby Parker

Learn SQL from Scratch

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August 11, 2018

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- Let’s find out whether or not users who get more pairs to try on at home will be more likely to make a purchase.
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Usage Funnels with Warby Parker

1. What is the Quiz Funnel

1. What is the Quiz Funnel

What columns does the survey table have?

A simple SELECT query answers this question quickly.

The survey table has the following columns:

- question
- user_id
- response

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
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

```
1 --1. Select all columns from the first 10 rows.  
2 SELECT *  
3 FROM survey  
4 LIMIT 10;
```

1. What is the Quiz Funnel, Cont'd

Users will “give up” at different points in the survey. Let’s analyze how many users move from Question 1 to Question 2, etc. What is the number of responses for each question?

- Creating a quiz funnel using the GROUP BY command answers this question quickly.

What question(s) of the quiz have a lower completion rate? What do you think is the reason?

- We could use SQL to calculate the percent change between each question, but it is just as easy to analyze these manually with a calculator or in a spreadsheet, like Excel or Google Sheets. If we divide the number of people completing each step by the number of people completing the previous step, we determine the percentages.
- Question 3 and Question 5 have lower completion rates of 80% and 74%, respectively. This suggests that customers may not know which shapes they like until they try on the glasses at home, and they may not recall when they last had, if ever, an eye exam.

```
6 --2. Create a quiz funnel using the GROUP BY  
command.  
7 SELECT question,  
8 COUNT(DISTINCT user_id)  
9 FROM survey  
10 GROUP BY question;
```

question	COUNT(DISTINCT user_id)
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

Question	Percentage Completing Question
1	100%
2	95%
3	80%
4	95%
5	74%

2. A/B Testing with Home Try-On Funnel

2. A/B Testing with Home Try-On Funnel

Eventually we will answer the question of whether or not users who get more pairs to try on at home will be more likely to make a purchase.* Examine the first 5 rows of the quiz table, home_try_on table, and purchase table. What are the column names?

- A simple SELECT query answers this question quickly

*answered on Slide 14

quiz	home_try_on	purchase
user_id	user_id	user_id
style	number_of_pairs	product_id
fit	address	style
shape		model_name
color		color
		price

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

2. A/B Testing with Home Try-On Funnel, Cont'd

Use a LEFT JOIN to combine the 3 tables. Select only the first 10 rows from this table.

- We want to combine the information from the 3 tables (quiz, home_try_on and purchase) into 1 table with the following schema (user_id, is_home_try_on, number_of_pairs and is_purchase).
- Each row will represent a single user. Therefore, we want to use a LEFT JOIN to combine the 3 tables, starting at the top of the funnel (quiz) and ending with the bottom of the funnel (purchase).
- Quiz will LEFT JOIN to home_try_on on q.user_id = h.user_id
- Home_try_on will LEFT JOIN purchase on p.user_id = q.user_id

```
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 AS 'q'
LEFT JOIN home_try_on AS 'h'
    ON q.user_id = h.user_id
LEFT JOIN purchase AS 'p'
    ON p.user_id = q.user_id
LIMIT 10;
```

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	Ø	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	Ø	0
0143cb8b-bb81-4916-9750-ce956c9f9bd9	0	Ø	0
a4ccc1b3-cb6-449c-b7a5-03af42c97433	1	5 pairs	0
b1dded76-cd60-4222-82cb-f6d464104298	1	3 pairs	0

2. A/B Testing with Home Try-On Funnel, Cont'd

Calculate the overall conversion rate. Compare conversion from Quiz → Home Try-On and Home Try-On to Purchase.

- We've created a new table that combined all of our data. Once we have the data in this format, we can analyze it in several ways.
- Let's put the whole thing in a WITH statement so that we can continue building on our query. We will give the temporary table the name funnels and query from this funnels table to calculate the overall conversion rate and compare conversion from Quiz → Home Try-On and Home Try-On to Purchase.
- First, add a column that counts the total number of rows in funnels. Alias this table as 'num_quiz.' This is the number of users in the quiz step of the funnel.
- There are 1000 users in the quiz step of the funnel.

num_quiz
1000

```
WITH funnels 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 AS 'q'
    LEFT JOIN home_try_on AS 'h'
        ON q.user_id = h.user_id
    LEFT JOIN purchase AS 'p'
        ON p.user_id = q.user_id)
SELECT COUNT(*) AS num_quiz
FROM funnels;
```

2. A/B Testing with Home Try-On Funnel, Cont'd

Calculate the overall conversion rate. Compare conversion from Quiz → Home Try-On and Home Try-On to Purchase.

- Second, add another column that sums the `is_home_try_on` column in `funnels`. Alias this column as '`num_home`.' This is the number of users in the Home Try-On step of the funnel. Add this to the previous WITH query. There are 750 users in the Home Try-On step of the funnel.

<code>num_quiz</code>	<code>num_home</code>
1000	750

- Third, add another column that sums the `is_purchase` column in `funnels`. Alias this column as '`num_purchase`.' This is the number of users in the purchase step of the funnel. Add this to the previous WITH query. There are 495 users in the purchase step of the funnel.

<code>num_quiz</code>	<code>num_home</code>	<code>num_purchase</code>
1000	750	495

```
WITH funnels 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 AS 'q'
    LEFT JOIN home_try_on AS 'h'
        ON q.user_id = h.user_id
    LEFT JOIN purchase AS 'p'
        ON p.user_id = q.user_id)
SELECT COUNT(*) AS 'num_quiz',
    SUM(is_home_try_on) AS 'num_home'
FROM funnels;
```

```
WITH funnels 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 AS 'q'
    LEFT JOIN home_try_on AS 'h'
        ON q.user_id = h.user_id
    LEFT JOIN purchase AS 'p'
        ON p.user_id = q.user_id)
SELECT COUNT(*) AS 'num_quiz',
    SUM(is_home_try_on) AS 'num_home',
    SUM(is_purchase) AS 'num_purchase'
FROM funnels;
```

2. A/B Testing with Home Try-On Funnel, Cont'd

Calculate the overall conversion rate. Compare conversion from Quiz → Home Try-On and Home Try-On to Purchase.

- Finally, let's add some more calculations to make the results more in depth. We are dividing the SUM of is_home_try_on by the COUNT of user_id. Then, we are multiplying this answer by 1.0. We are also dividing the SUM of is_purchase by the SUM of is_home_try_on and multiplying this answer by 1.0. Doing this will result in a decimal number rather than an integer.
- Here, we are getting the percentage of users moving from Quiz to Home Try-On and Home Try-On to Purchase. The percentage of users moving from Quiz to Home Try-On is 75% and the percentage of users moving from Home Try-On to Purchase is 66%. This suggests that there is a decline in users moving from Quiz to Home Try-On and Home Try-On to Purchase.
- The overall conversion rate is the number of purchasers divided by the number of customers completing the quiz: $495/1000 = 49\%$. The overall conversion rate is 49%.

```
percentage of users moving from quiz to purchase  
WITH funnels 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 AS 'q'  
    LEFT JOIN home_try_on AS 'h'  
        ON q.user_id = h.user_id  
    LEFT JOIN purchase AS 'p'  
        ON p.user_id = q.user_id)  
SELECT COUNT(*) AS 'num_quiz',  
    SUM(is_home_try_on) AS 'num_home',  
    SUM(is_purchase) AS 'num_purchase',  
    1.0 * SUM(is_home_try_on)  
    / COUNT(user_id) AS 'quiz_to_home',  
    1.0 * SUM(is_purchase)  
    / SUM(is_home_try_on) AS 'home_to_purchase'  
FROM funnels;
```

num_quiz	num_home	num_purchase	quiz_to_home	home_to_purchase
1000	750	495	0.75	0.66

2. A/B Testing with Home Try-On Funnel, Cont'd

Calculate the difference in purchase rates between customers who had 3 number_of_pairs with ones who had 5.

- We can query from the funnels table to analyze this question. Let's start with customers who had 3 pairs.
- First, we need to add a column that counts the number of unique rows with a CASE statement: if the number_of_pairs = 3 pairs then user_id. Alias this column as 'home_try_on_3_pairs.' Also include a WHERE clause to filter the result set to only include rows where is_home_try_on is true. This is the total number of customers who tried on 3 pairs at home. The total number of customers who tried on 3 pairs at home is 379.

```
9    WITH funnels AS (
1        SELECT DISTINCT q.user_id,
2            h.user_id IS NOT NULL AS
3                'is_home_try_on',
4                h.number_of_pairs,
5                p.user_id IS NOT NULL
6                    AS 'is_purchase'
7        FROM quiz AS 'q'
8        LEFT JOIN home_try_on AS 'h'
9            ON q.user_id = h.user_id
10       LEFT JOIN purchase AS 'p'
11           ON p.user_id = q.user_id)
12   SELECT COUNT(DISTINCT CASE
13       WHEN number_of_pairs = '3 pairs' THEN
14           user_id
15       END) AS 'home_try_on_3_pairs'
16   FROM funnels
17   WHERE is_home_try_on = 1;
```

home_try_on_3_pairs

379

2. A/B Testing with Home Try-On Funnel, Cont'd

Calculate the difference in purchase rates between customers who had 3 number_of_pairs with ones who had 5.

- Next, we need to calculate the number of people who tried on 3 pairs and purchased. Add a column to a new query from the funnels table that counts the number of unique rows with a CASE statement: if the number_of_pairs = 3 pairs then user_id. Alias this column as '3 pairs.' Also include a WHERE clause to filter the result set to include only rows where is_purchase is true. This is the total number of customers who tried on 3 pairs at home and purchased. The total number of customers who tried on 3 pairs at home and purchased is 201.
- To calculate the purchase rate for customers who had 3 number_of_pairs, we will divide the number of people who tried on 3 pairs and purchased by the total number of people who tried on 3 pairs. The purchase rate for customers who had 3 number_of_pairs is 53%.

$$201/379 = 53\%$$

```
WITH funnels 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 AS 'q'
    LEFT JOIN home_try_on AS 'h'
    ON q.user_id = h.user_id
    LEFT JOIN purchase AS 'p'
    ON p.user_id = q.user_id)
SELECT COUNT(DISTINCT CASE
    WHEN number_of_pairs = '3 pairs' THEN
        user_id
    END) AS '3 pairs'
FROM funnels
WHERE is_purchase = 1;
```

3 pairs

201

2. A/B Testing with Home Try-On Funnel, Cont'd

Calculate the difference in purchase rates between customers who had 3 number_of_pairs with ones who had 5.

- Similarly, we can apply the same 2 queries from the funnels table to calculate the purchase rate of customers who had 5 number_of_pairs by replacing '3' with '5'.
- To calculate the purchase rate for customers who had 5 number_of_pairs, we will divide the number of people who tried on 5 pairs and purchased by the total number of people who tried on 5 pairs. The purchase rate for customers who had 5 number_of_pairs is 79%.

$$294/371 = 79\%$$

- This suggests that users who get more pairs to try on at home will be more likely to make a purchase.

```
1 WITH funnels AS (
2     SELECT DISTINCT q.user_id,
3         h.user_id IS NOT NULL AS
4             'is_home_try_on',
5             h.number_of_pairs,
6             p.user_id IS NOT NULL
7                 AS 'is_purchase'
8             FROM quiz AS 'q'
9             LEFT JOIN home_try_on AS 'h'
10                ON q.user_id = h.user_id
11             LEFT JOIN purchase AS 'p'
12                ON p.user_id = q.user_id)
13     SELECT COUNT(DISTINCT CASE
14         WHEN number_of_pairs = '5 pairs' THEN
15             user_id
16         END) AS 'home_try_on_5_pairs'
17     FROM funnels
18     WHERE is_home_try_on = 1;
```

```
1 WITH funnels AS (
2     SELECT DISTINCT q.user_id,
3         h.user_id IS NOT NULL AS
4             'is_home_try_on',
5             h.number_of_pairs,
6             p.user_id IS NOT NULL
7                 AS 'is_purchase'
8             FROM quiz AS 'q'
9             LEFT JOIN home_try_on AS 'h'
10                ON q.user_id = h.user_id
11             LEFT JOIN purchase AS 'p'
12                ON p.user_id = q.user_id)
13     SELECT COUNT(DISTINCT CASE
14         WHEN number_of_pairs = '5 pairs' THEN
15             user_id
16         END) AS '5 pairs'
17     FROM funnels
18     WHERE is_purchase = 1;
```

home_try_on_5_pairs

371

5 pairs

294

2. A/B Testing with Home Try-On Funnel, Cont'd

The most common types of purchase made.

- Use a LEFT JOIN to combine the quiz, home_try_on and purchase tables. Select only the first 10 rows from this table.
- We want to combine the information from the 3 tables into 1 table with the following schema (user_id, is_home_try_on, number_of_pairs, model_name, and is_purchase).
- Each row will represent a single user. Therefore, we want to use a LEFT JOIN to combine the 3 tables, starting at the top of the funnel (quiz) and ending with the bottom of the funnel (purchase).

```
--Use a LEFT JOIN to combine the three tables and
--include model_name
SELECT DISTINCT q.user_id,
    h.user_id IS NOT NULL AS
        'is_home_try_on',
    h.number_of_pairs,
    p.model_name,
    p.user_id IS NOT NULL AS 'is_purchase'
FROM quiz AS 'q'
LEFT JOIN home_try_on AS 'h'
    ON q.user_id = h.user_id
LEFT JOIN purchase AS 'p'
    ON p.user_id = q.user_id
LIMIT 10;
```

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

2. A/B Testing with Home Try-On Funnel, Cont'd

The most common types of purchase made.

- This will allow us to analyze the data to find out the most common types of purchase made. We will again put the whole thing in a WITH statement so that we can continue building on our query. We will give the temporary table the name funnels and query from this funnels table to analyze the most common types of purchase made.
- Add a column that selects the model_name and counts the total number of rows in funnels. Alias COUNT as 'purchased.' Add a WHERE clause to filter the result set to include only rows where is_purchase is true. GROUP BY model_name. This is the number of purchases per model_name.
- The most common types of purchase made are the Eugene Narrow model (116 pairs purchased) and the Dawes model (107 pairs purchased).

```
WITH funnels AS (
    SELECT DISTINCT q.user_id,
        h.user_id IS NOT NULL AS
            'is_home_try_on',
        h.number_of_pairs,
        p.model_name,
        p.user_id IS NOT NULL AS 'is_purchase'
    FROM quiz AS 'q'
    LEFT JOIN home_try_on AS 'h'
        ON q.user_id = h.user_id
    LEFT JOIN purchase AS 'p'
        ON p.user_id = q.user_id)
SELECT model_name,
    COUNT(*) AS 'purchased'
FROM funnels
WHERE is_purchase = 1
GROUP BY model_name;
```

model_name	purchased
Brady	95
Dawes	107
Eugene Narrow	116
Lucy	86
Monocle	41
Olive	50