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Funnels with Warby Parker

Learn SQL from Scratch

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25.07.2018

Example Table of Contents

1. Get familiar with the Warby Parker

1. Get familiar with Warby Parker

Warby Parker is a transformative lifestyle brand with a lofty objective: to offer designer eyewear at a revolutionary price while leading the way for socially conscious businesses. Founded in 2010 and named after two characters in an early Jack Kerouac journal, Warby Parker believes in creative thinking, smart design, and doing good in the world — for every pair of eyeglasses and sunglasses sold, a pair is distributed to someone in need.

In this Capstone Project, I analyze two different Warby Parker's marketing funnels in order to calculate conversion rates.

Quiz Funnel

and

Home Try-On Funnel

2. What is the Quiz Funnel

2.1 What is the Quiz Funnel

To help users find their perfect frame, Warby Parker has a Style Quiz that has the following questions:

- What are you looking for?
- What's your fit?
- Which shapes do you like?
- Which colors do you like?
- When was your last eye exam?

The users' responses are stored in a table called survey.

The **survey** table has the columns **question, user_id** and **response**

```
--Quiz funnel
SELECT *
FROM survey
LIMIT 10;
```

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

2.2 Questions and number of answers

Users will "give up" at different points in the survey.
To analyze how many users move from Question 1 to Question 2, etc. I created a quiz funnel using the GROUP BY command.

In the table we see the number of responses for each question.

```sql
SELECT question AS 'question',
       COUNT (DISTINCT user_id) AS 'num_answers'
FROM survey
GROUP BY question;
```

question	num_answers
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

2.3 Completion rates

I calculated the percentage of users who answered each question.:
Question 1, 2 and 4 have a high completion rate.
Question 3 and 5 have low completion rates.

Question 3 has 80%. The reason could be, that the drawings are not optimized to decide.
Question 5 has a completion percentage of only 75%. The reason could be that people don't know when their last eye exam was.

question	Num_answers
1. What are you looking for?	100%
2. What's your fit?	95%
3. Which shapes do you like?	80%
4. Which colors do you like?	95%
5. When was your last eye exam?	75%

3. What is the Home Funnel

3.1 What is the Home Funnel

Warby Parker's purchase funnel is:

Take the Style Quiz ? Home Try-On ? Purchase the Perfect Pair of Glasses

During the Home Try-On stage, we will be conducting an A/B Test:

50% of the users will get 3 pairs to try on

50% of the users will get 5 pairs to try on

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.

The data will be distributed across three tables:

quiz

home_try_on

purchase

3.2 Column names of tables of the Home Funnel

home_try_on
The column names of the table home_try_on are

user_id	TEXT
number_of_pairs	TEXT
address	TEXT

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

user_id	number_of_pairs	address
d8addd87-3217-4429-9a01-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

purchase
The column names of the table purchase are

user_id	TEXT
product_id	INTEGER
style	TEXT
model_name	TEXT
color	TEXT
price	INTEGER

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

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
0176bfb3-9c51-4b1c-b593-87edab3c54cb	10	Women's Styles	Eugene Narrow	Rosewood Tortoise	95
01fdf106-f73c-4d3f-a036-2f3e2ab1ce06	8	Women's Styles	Lucy	Jet Black	150

quiz
The column names of the table quiz are

user_id	TEXT
style	TEXT
fit	TEXT
shape	TEXT
color	TEXT

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

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-a301-27ddd93b12e2	Women's Styles	Narrow	Square	Two-Tone
ce965c4d-7a2b-4db6-9847-601747fa7812	Women's Styles	Wide	Rectangular	Black

3.3 Creating a new table

I created a new table.
Each row represents a single user from the quiz table:
If the user has any entries in home_try_on, then is_home_try_on will be 'True'.
number_of_pairs comes from home_try_on table
If the user has any entries in purchase, then is_purchase will be 'True'.

I used a LEFT JOIN to combine the three tables, starting with the top of the funnel (quiz) and ending with the bottom of the funnel (purchase).

I selected only the first 10 rows from this table (otherwise, the query would run really slowly).

```sql
-- Creating a new table
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 h.user_id = p.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-cbb6-449c-b7a5-03af42c97433	1	5 pairs	0
b1dded76-cd60-4222-82cb-f6d464104298	1	3 pairs	0

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

4.1 Compare Funnels for A/B Test

Compare Funnels For A/B Test:
With this select it's possible to compare the number of users who got 3 pairs and 5 pairs.

```sql
SELECT number_of_pairs,
       COUNT (DISTINCT CASE
         WHEN number_of_pairs = '3 pairs' THEN
         user_id
        END) AS 'three',
       COUNT (DISTINCT CASE
         WHEN number_of_pairs = '5 pairs' THEN
         user_id
        END) AS 'five'
 FROM home_try_on
 GROUP BY 1
 ORDER BY 1;
```

number_of_pairs	three	five
3 pairs	379	0
5 pairs	0	371

4.2 Compare conversion from quiz to home_try_on and home_try_on to purchase

Comparison of the conversions from quiz to home_try_on and from home_try_on to purchase.
I used a SELECT of the new table using the WITH clause.

As proof of correctness I calculated with Excel.

The results are the same.

Over all conversion rate from quiz to home try on is 75% (750 / 1000)
Over all conversion rate from home try on to purchase is 66% (495 / 750)

```sql
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 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
)
SELECT COUNT (*) AS 'num_users',
       SUM (is_home_try_on) AS 'num_home_try_on',
       SUM (is_purchase) AS 'num_is_purchase',
       ROUND (1.0 * SUM (is_home_try_on) / COUNT (*), 2) AS
'quiz_to_hto',
       ROUND (1.0 * SUM (is_purchase) / SUM (is_home_try_on), 2) AS
'hto_to_purchase'
 FROM funnels;
```

num_users	num_home_try_on	num_is_purchase	quiz_to_hto	hto_to_purchase
1000	750	495	0.75	0.66

4.3 Difference in purchase rates A/B test version 1

Calculation of the difference in purchase rates between customers who had 3 number_of_pairs with ones who had 5:

1000 users took part at the quiz

750 users went further to home try on. This corresponds to 75%

379 of them got 3 pairs that corresponds to 51%

371 got 5 pairs that corresponds to 49%

53% of the users with 3 pairs went further to purchase

79% of the users with 5 pairs went further to purchase

number_of_pairs	num_users	num_home_try_on	num_is_purchase	quiz_to_hto	hto_to_purchase
Ø	250	0	0	0.0	Ø
3 pairs	379	379	201	1.0	0.53
5 pairs	371	371	294	1.0	0.79

```
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 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
)
SELECT number_of_pairs,
       COUNT (*) AS 'num_users',
       SUM (is_home_try_on) AS 'num_home_try_on',
       SUM (is_purchase) AS 'num_is_purchase',
       ROUND (1.0 * SUM (is_home_try_on) / COUNT (*), 2) AS
'quiz_to_hto',
       ROUND (1.0 * SUM (is_purchase) / SUM (is_home_try_on), 2) AS
'hto_to_purchase'
 FROM funnels
 GROUP BY 1;
```

4.3 Difference in purchase rates A/B test version 2

Version 2 is the same calculation but with a WHERE clause that gives us only the number of users who took part at the home try on.

number_of_pairs	num_users	num_home_try_on	num_is_purchase	quiz_to_hto	hto_to_purchase
3 pairs	379	379	201	1.0	0.53
5 pairs	371	371	294	1.0	0.79

```
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 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
)
SELECT number_of_pairs,
       COUNT (*) AS 'num_users',
       SUM (is_home_try_on) AS 'num_home_try_on',
       SUM (is_purchase) AS 'num_is_purchase',
       ROUND (1.0 * SUM (is_home_try_on) / COUNT (*), 2) AS
'quiz_to_hto',
       ROUND (1.0 * SUM (is_purchase) / SUM (is_home_try_on), 2) AS
'hto_to_purchase'
 FROM funnels
 WHERE number_of_pairs IS NOT NULL
 GROUP BY 1;
```

4.4 What are the most common results of the style quiz

To get the most common results of the style quiz it's necessary to make single selects for each column, because with GROUP BY only rows can be grouped.

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

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

shape	num_shapes
Rectangular	397
Square	326
Round	180
No Preference	97

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

```
SELECT style,
       COUNT (*) AS'num_styles'
 FROM quiz
 GROUP BY style
 ORDER BY 2 DESC;

SELECT fit,
       COUNT (*) AS'num_fits'
 FROM quiz
 GROUP BY fit
 ORDER BY 2 DESC;

SELECT shape,
       COUNT (*) AS'num_shapes'
 FROM quiz
 GROUP BY shape
 ORDER BY 2 DESC;

SELECT color,
       COUNT (*) AS'num_colors'
 FROM quiz
 GROUP BY color
 ORDER BY 2 DESC;
```

4.5 What are the most common types of purchase made

Select of the most common styles of purchase

product_id	model_name	style	color	num_purchase
3	Dawes	Men's Styles	Driftwood Fade	63
10	Eugene Narrow	Women's Styles	Rosewood Tortoise	62
9	Eugene Narrow	Women's Styles	Rose Crystal	54
1	Brady	Men's Styles	Layered Tortoise Matte	52
6	Olive	Women's Styles	Pearled Tortoise	50
4	Dawes	Men's Styles	Jet Black	44
7	Lucy	Women's Styles	Elderflower Crystal	44
2	Brady	Men's Styles	Sea Glass Gray	43
8	Lucy	Women's Styles	Jet Black	42
5	Monocle	Men's Styles	Endangered Tortoise	41

```sql
SELECT product_id,
       model_name,
       style,
       color,
       COUNT (product_id) AS 'num_purchase'
FROM purchase
GROUP BY 1
ORDER BY 5 DESC;
```

5. Actionable Insights for Warby Parker

5. Actionable Insights for Warby Parker

Quiz funnel:
The completion rate from question 3 „Which shapes do you like“ is only 80%. Warby Parker should investigate what‘s the reason for. For example they could improve the drawings of the shapes.
Question 5 „When was your last eye exam“ has a completion rate of only 75%. Warby Parker should investigate if this question is necessary or if they can change it.

Home funnel:
The result of the A/B Test during th Home Try-On stage is, thate 79% of the users with 5 pairs went further to purchase and only from the users with 3 pairs only 53% went further to purchase. Thus, it is clearly recommended to provide users 5 pairs.
Warby parker should consider doing another test with 5 and 6 or 7 pairs.