codecademy

Usage Funnels with Warby Parker

Learn SQL from Scratch

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1. The Quiz Funnel

1.1 The survey table

What columns does the survey table have?

- The survey table has three columns: question, user id and response.
- Each row of the table contains the an individual user's answer to one of the questions.

```
-- Look at database top 10
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

1.2 Number of responses to each question

How many users move from each question?

- There are fewer and fewer reponses the further you get in the survey.
- More users seem to give up at question 3 and question 5.

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

```
-- Find number of responses to each question
SELECT question, COUNT(response) AS num_responses
FROM survey
GROUP BY question;
```

1.3 Completion rates

Calculate the percentage of users who complete each question.

- I calculated the completion rates in SQL.
- Questions 2 and 4 have high completion rates, while questions 3 and 5 have relatively low completion rates.

question	num_ responses	pct
1. What are you looking for?	500	
2. What's your fit?	475	95%
3. Which shapes do you like?	380	80%
4. Which colors do you like?	361	95%
5. When was your last eye exam?	270	74.8%

```
-- Create a lagged column with the number of responses and join on number
of responses to calculate completion rates

WITH num_rep AS (
              SELECT question,
                     SUBSTR(question, 1, 1)+1 AS q_num,
                     COUNT(response)*1.0 AS num_responses
              FROM survey
              GROUP BY question
  ORDER BY question
),
lags AS(
              SELECT 1 AS 'q_num',
                     NULL AS 'lag'
              UNION
              SELECT q_num,
                      num_responses
              FROM num_rep
              GROUP BY question
              LIMIT 5),
qs AS (
              SELECT SUBSTR(question, 1, 1)*1 AS q_num,
                     question,
                     COUNT(response) AS num_responses
              FROM survey
              GROUP BY question
)
SELECT question,
       num_responses,
       num_responses/lag as pct
FROM qs
JOIN lags ON qs.q_num = lags.q_num;
```

2. The Home Try-On Funnel

2.1 The quiz, home try on and purchase tables

The top five rows of each table is displayed below.

- The quiz table has the following columns: user_id, style, fit, shape , and color.
- The home try on table has the columns user_id, number_of_pairs, address.
- The purchase table has the columns user id, product_id, style, model_name, color, price.

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

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

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

2.2 Overview of at home try on funnel

- The table is based on data in all three tables.
- For each individual user, the table shows whether or not the user tried on glasses at home, how many glasses were tried on and whether or not the user purchased glasses in the end.

```
SELECT SUBSTR(q.user_id, 1, 8) AS user_id,
       CASE
          WHEN h.number_of_pairs IS NULL THEN 'False'
          ELSE 'True'
        END AS is_home_try_on,
        SUBSTR(h.number_of_pairs, 1, 1) AS number_of_pairs,
        CASE
           WHEN p.product_id IS NULL then 'False'
           ELSE 'True'
        END 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 q.user_id = p.user_id
LIMIT 10;
```

user_id	is_home_try_on	number_of_pairs	Is_purchase
4e8118dc	True	3	False
291f1cca	True	3	True
75122300	False		False
75bc6ebd	True	5	False
ce965c4d	True	3	True
28867d12	True	5	True
5a7a7e13	False		False
0143cb8b	False		False
a4ccc1b3	True	5	False

2.3 Overall conversion rates at each stage of the funnel

What are the conversion rates at each stage of the funnel?

- 75 % of customers who browse end up trying on glasses at home.
- 66 % of customers who try on glasses at home end up buying glasses.
- In total, 49.5 % of customers who browse end up actually purchasing glasses.

```
-- 6.Calculating conversion rates
WITH funnel as (
        SELECT SUBSTR(q.user_id, 1, 8) AS user_id,
        CASE
             WHEN h.number_of_pairs IS NULL THEN 0
             ELSE 1
        END AS is_home_try_on,
        SUBSTR(h.number_of_pairs, 1, 1)*1.0 AS number_of_pairs,
        CASE
             WHEN p.product_id IS NULL then 0
             ELSE 1
        END 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 q.user_id = p.user_id
)
SELECT  COUNT(user_id) AS num_browse,
        SUM(is_home_try_on) AS num_try,
        SUM(is_purchase) AS num_buy,
        SUM(is_home_try_on)*1.0/COUNT(user_id) home_conv,
        SUM(is_purchase)*1.0/SUM(is_home_try_on) AS htobuy_conv,
        SUM(is_purchase)*1.0/COUNT(user_id) AS buy_conv
FROM funnel;
```

num_browse	num_try	num_buy	home_conv	htobuy_conv	buy_conv
1000	750	495	0.75	0.66	0.495

2.4 Number of pairs tried on

The number of pairs delivered to the customer seems to affect the purchase rate.

- 53 % of customers who try on three pairs of glasses at home end up purchasing a pair.
- 80 % of customers who try on five pairs of glasses at home end up purchasing a pair.
- There is little difference between the total number of users who tried on three and five glasses.

```
WITH funnel AS(
SELECT SUBSTR(q.user_id, 1, 8) AS user_id,
       CASE
          WHEN h.number_of_pairs IS NULL THEN 0
          ELSE 1
        END AS is_home_try_on,
        SUBSTR(h.number_of_pairs, 1, 1)*1.0 AS number_of_pairs,
        CASE
          WHEN p.product_id IS NULL then 0
          ELSE 1
        END 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 q.user_id = p.user_id
)
SELECT  number_of_pairs,
        COUNT(user_id) AS num_try_on,
        SUM(is_purchase) AS num_purchased,
        SUM(is_purchase)*1.0/COUNT(user_id) AS purchase_rate
FROM funnel
WHERE number_of_pairs IS NOT NULL
GROUP BY number_of_pairs;
```

number_of_pairs	num_try	num_purchased	purchase_rate
3.0	379	201	0.53
5.0	371	294	0.80

2.5 The most common results of the style quiz and purchases made

- The three most common style quiz results are all narrow, rectangular and I muted colors.
- The most common purchases have been purchased 50-63 times, while users have gotten the most common style quiz results 18-23 times.
- This means that users with different style quiz results can still end up purchasing the same model.

```
-- Calculating most common results in style quiz
SELECT style, fit, shape, color, count(*) AS
num_answers
FROM quiz
GROUP BY 1, 2, 3, 4
ORDER BY 5 DESC
LIMIT 5;

-- Calculating the most common type of purchase
SELECT product_id, style, model_name, color, count
(*) AS num_purchases
FROM purchase
GROUP BY product_id, style, model_name, color
ORDER BY num_purchases DESC
LIMIT 5;
```

Most common quiz results:

style	fit	shape	color	num_ answers
Men's Styles	Narrow	Rectangular	Tortoise	23
Women's Styles	Narrow	Rectangular	Black	20
Women's Styles	Narrow	Rectangular	Tortoise	20
Men's Styles	Medium	Rectangular	Tortoise	19
Men's Styles	Narrow	Rectangular	Black	18

Most common purchases:

produc t_id	style	model_ name	color	num_ purchases
3	Men's Styles	Dawes	Driftwood Fade	63
10	Women's Styles	Eugene Narrow	Rosewood Tortoise	62
9	Women's Styles	Eugene Narrow	Rose Crystal	54
1	Men's Styles	Brady	Layered Tortoise Matte	52
6	Women's Styles	Olive	Pearled Tortoise	50

2.6 What price point generates the highest income?

- Glasses that are priced at $95 have been purchased more than glasses priced at both $150 and $50.
- However, glasses priced at $150 have generated the highest gross revenue today.
- Glasses priced at $50 sell significantly fewer times and genereate far less revenue than the other two price points. However, there is only one model at this price point that has been sold.

price	Num_purchases	Total_income	Num_models
95	261	24795	5
150	193	28950	4
50	41	2050	1

```
-- What price point generates the highest gross
income?
SELECT price, COUNT(price) AS num_purchases,
sum(price) AS total_income,
COUNT(DISTINCT(product_id)) AS num_models
FROM purchase
GROUP BY price
ORDER BY num_purchases DESC
LIMIT 10;
```

3. Summary – actionable insights

1.1 Actionable insights

Survey:
Since questions 3 and 5 have lower completion rates than the other questions, Warby Parker could try to simplify them to generate more answers.

At home try on:
Given that customer 80 % of customers who try on 5 pairs of glasses end up purchasing glasses, but only 53 percent of customers who try on 3 pairs buy glasses, Warby Parker could try to send all customers 5 pairs. However, before a decision is made, Warby Parker should research whether or not customers who try on 5 pairs purchase more glasses because they have more options or whether customers who choose to try on 3 pairs of glasses do so because they like fewer of their models.

Price points:
Since the $50 price point generates fewer purchases and lower revenues than the other price points, Warby Parker may want to either change the number of models or the quality of the model at this price point. However, this decision really should be based on the total profit generated by each model, not just revenue, so further research is needed.