



# Capstone Usage Funnels

Learn SQL from Scratch

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# 1. Quiz Funnel Analysis

## 1.1: Style Quiz – Table structure

**Task:** Create a query that returns the quiz responses. What columns does the table have?

**Answer:** see table below

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
...	...	...

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

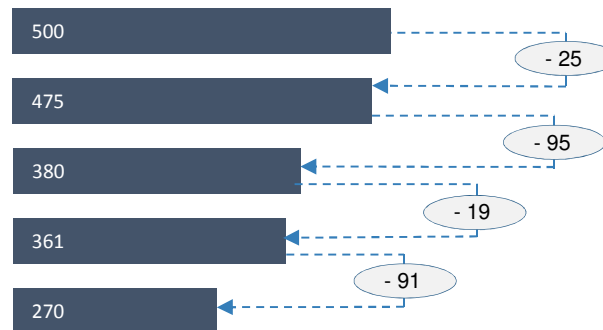
## 1.2: Style Quiz – Number of Responses

**Task:** Create a query that returns the number of responses for each question. Analyze how many users move from Question 1 to Question 2, etc.

**Answer:** See the table below with the user drop off in absolute numbers from step to step.

```
SELECT question, COUNT(user_id) AS 'count'  
FROM survey  
GROUP BY 1;
```

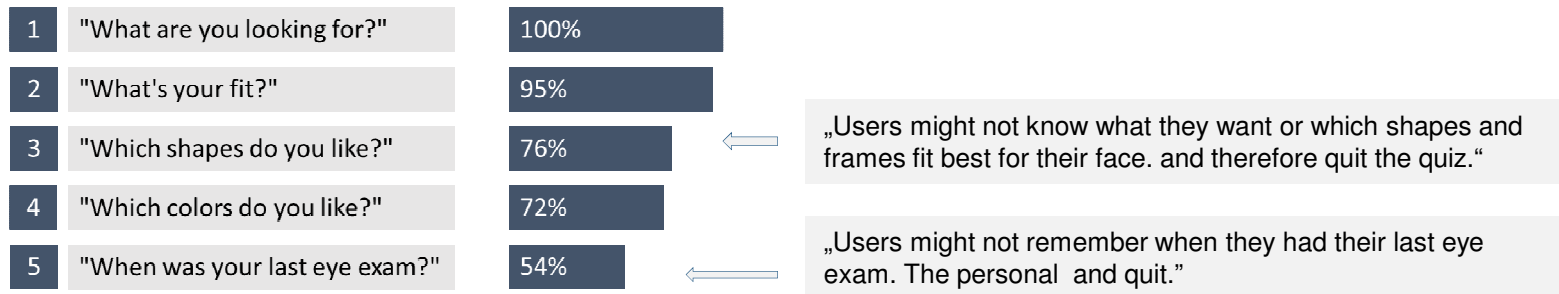
question	count
1. What are you looking for?	500
2. What's your fit?	475
3. Which shapes do you like?	380
4. Which colors do you like?	361
5. When was your last eye exam?	270



## 1.3: Style Quiz – Completion Rate

**Task:** Calculate the completion rate for each question using a spreadsheet program and what do you think are the reasons for lower rates?

**Answer:** 54 percent of users who start the Warby Parker quiz finish it. Two questions (Q3 and Q5) show relatively high survey drop outs. See below.



## **2. Purchase Funnel Analysis**

## 2.1: Purchase Funnel - Table structures

**Task:** Examine the first five rows of each table in the purchase funnel. What are the column names?

**Answer:** See the column names in the purchase funnel as shown below.

Quiz Table

user_id	style	fit	shape	color
---------	-------	-----	-------	-------

Home Try-On Table

user_id	number_of_pairs	adress
---------	-----------------	--------

Purchase Table

user_id	product_id	style	model_name	color	price
---------	------------	-------	------------	-------	-------

```
SELECT *  
FROM quiz  
LIMIT 10;
```

```
SELECT *  
FROM home_try_on  
LIMIT 10;
```

```
SELECT *  
FROM purchase  
LIMIT 10;
```



## 2.2: Purchase Funnel – Create new table using Left Joins

**Task:** Create a create a new table with the following layout:

user_id	is_home_try_on	number_of_pairs	is_purchase
4e8118dc	True	3	False
291f1cca	True	5	False
75122300	False	NULL	False

**Answer:** See the screenshot from the table created by left joins on the user-ID's followed by a query to select the table columns as required.

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

```
WITH funnel AS (  
  SELECT q.user_id, h.user_id AS 'home_try_on',  
         h.number_of_pairs, p.user_id AS '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  
)  
SELECT user_id,  
CASE  
  WHEN funnel.home_try_on IS NULL THEN 'False'  
  ELSE 'True'  
END AS 'is_home_try_on',  
number_of_pairs,  
CASE  
  WHEN funnel.purchase IS NULL THEN 'False'  
  ELSE 'True'  
END AS 'is_purchase'  
FROM funnel;
```

## 2.3.1: Purchase Funnel – Overall Conversion

**Task:** Calculate the overall conversion rate by aggregating against all rows.

**Answer:** On the base of the left joined user-ID's I and the required table structure in the first step, the overall conversion rate is calculated based on the counted true values for is purchase divided by the total count of users.

total_users	total_purchases	overall_conversion_rate
10	3	0.3

```
WITH overall_conversion AS (
  WITH funnel AS (
    SELECT q.user_id, h.user_id AS 'home_try_on', h.number_of_pairs, p.user_id AS '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
  )
  SELECT user_id,
         CASE
           WHEN funnel.home_try_on IS NULL THEN 'False'
         ELSE 'True'
        END AS 'is_home_try_on',
         number_of_pairs,
         CASE
           WHEN funnel.purchase IS NULL THEN 'False'
         ELSE 'True'
        END AS 'is_purchase'
  FROM funnel
)
SELECT COUNT(user_id) AS 'total_users',
       SUM(CASE
         WHEN is_purchase LIKE 'True' THEN 1
       ELSE 0
       END) AS 'total_purchases',
       ROUND((1.0 * SUM(CASE
         WHEN is_purchase LIKE 'True' THEN 1
       ELSE 0
       END)) / COUNT(user_id), 2) AS 'overall_conversion_rate'
FROM overall_conversion;
```

## 2.3.2: Purchase Funnel – Conversion Rates to the next gate

**Task:** Calculate the conversion rate on the funnel gate from quiz to home\_try\_on and on the gate from home\_try\_on to purchase.

**Answer:** On the base of the left joined user-ID's and the required table structure in the first step the conversion rate for the funnel-step *conversion from quiz to home try on* is calculated based on the counted true values for is home try on divided by the total count of users. The conversion rate for the funnel-step *conversion from home try on to purchase* is calculated based on the counted true values for is purchase divided by the count of users trying glasses at home.

total_users	total_home_trials	total_purchases	conversion_rate_to_home_trial	conversion_rate_to_purchase
10	7	3	0.7	0.43

```
WITH stepwise_conversion AS(
WITH funnel AS (
SELECT q.user_id, h.user_id AS 'home_try_on', h.number_of_pairs, p.user_id AS '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
)
SELECT user_id,
CASE
WHEN funnel.home_try_on IS NULL THEN 'False'
ELSE 'True'
END AS 'is_home_try_on',
number_of_pairs,
CASE
WHEN funnel.purchase IS NULL THEN 'False'
ELSE 'True'
END AS 'is_purchase'
FROM funnel
)
SELECT COUNT(user_id) AS 'total_users',
SUM(CASE
WHEN is_home_try_on LIKE 'True' THEN 1
ELSE 0
END) AS 'total_home_trials',
SUM(CASE
WHEN is_purchase LIKE 'True' THEN 1
ELSE 0
END) AS 'total_purchases',
ROUND(1.0 * SUM(CASE
WHEN is_home_try_on LIKE 'True' THEN 1
ELSE 0
END), 2) / COUNT(user_id) AS 'conversion_rate_to_home_trial',
ROUND((1.0 * SUM(CASE
WHEN is_purchase LIKE 'True' THEN 1
ELSE 0
END)) / ROUND(1.0 * SUM(CASE
WHEN is_home_try_on LIKE 'True' THEN 1
ELSE 0
END)), 2) AS 'conversion_rate_to_purchase'
FROM stepwise_conversion;
```

## 2.3.3: Purchase Funnel – A/B-Test related Conversion Rates

**Task:** Calculate the difference in purchase rates between customers who had 3 number\_of\_pairs with ones who had 5 number\_of\_pairs.

**Answer:** Create a query to report the results specific for each group of the A/B-Testing-Approach. The difference in the purchase rate between package A and package B is 0.2. The 3 pairs package shows a conversion\_rate of 0.5 from home\_try\_on to purchase and the 5 pairs package shows only a conversion\_rate of 0.3.

home_try_on_package	home_trials	purchases	conversion_rate
3 pairs	4	2	0.5
5 pairs	3	1	0.3

```
WITH conversion AS(
WITH funnel_analysis AS(
SELECT
    q.user_id,
    h.user_id IS NOT NULL AS 'is_home_try_on',
    p.user_id IS NOT NULL AS 'is_purchase',
    h.number_of_pairs
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
)
SELECT COUNT(user_id) AS 'num_quiz_takers', SUM(is_home_try_on) AS 'num_home_trials',
SUM(is_purchase) AS 'num_purchases', number_of_pairs AS 'home_try_on_package'
FROM funnel_analysis
GROUP BY 4
ORDER BY 3 DESC
)
SELECT home_try_on_package, SUM(num_home_trials) AS 'home_trials', SUM(num_purchases) AS
'purchases',
ROUND(1.0 * SUM(num_purchases) / SUM(num_home_trials),1) AS 'conversion_rate'
FROM conversion
WHERE home_try_on_package IS NOT NULL
GROUP BY 1
ORDER BY 4 DESC;
```

## 2.3.4: Purchase Funnel – Most common results of the quiz

**Task:** What are the most common results of the style quiz?

**Answer:** The most common result in the style quiz is Men's style. A query with `MAX(column_name)` would deliver only the largest value in the column with the counted responses.

response	num_of_responses
Men's Styles	242
Women's Styles	209
Narrow	208
<1 Year	141
Rectangular	141
Medium	132
Square	119
Tortoise	117
Black	112
I'm not sure. Let's skip it.	96
Round	91
Wide	88
Crystal	69
1-3 Years	56
3+ Years	37
Neutral	36
Not Sure. Let's Skip It	36
No Preference	29
Two-Tone	27

```
SELECT response,
       COUNT(response) AS 'num_of_responses'
FROM survey
GROUP BY 1
ORDER BY 2 DESC
LIMIT 50;
```

## 2.3.4: Purchase Funnel – Sales Analysis

**Task:** What are the most common articles?

**Answer:** The most common articles is the product with the ID 3. Several further queries report on customer preferences such as the the color preferences, the style preferences, .... The absolute count of the specific preference could be divided by the total amount of customers to get a ratio.

```
SELECT COUNT(product_id) AS 'num_of_sales', style
FROM purchase
GROUP BY 2
ORDER BY 1 DESC;
```

```
SELECT COUNT(style) AS 'style_preference', style
FROM purchase
GROUP BY 2
ORDER BY 1 DESC;
```

```
SELECT COUNT(color) AS 'color_pref', color
FROM purchase
GROUP BY 2
ORDER BY 1 DESC;
```

```
SELECT COUNT(price) AS 'price_pref', price
FROM purchase
GROUP BY 2
ORDER BY 1 DESC;
```

### Best-Selling Products

num_of_sales	product_id
63	3
62	10
54	9

### Best-Selling-Styles

style_preference	style
252	Women's Styles
243	Men's Styles

### Best-Selling-Colors

color_pref	color
86	Jet Black
63	Driftwood Fade
62	Rosewood Tortoise

### Best-Selling-Price

price_pref	price
261	95
193	150
41	50

# **3. Insights and Recommendations**

## 3.1 Actionable Insights

### Insights:

- The conversion steps from the quiz to the purchase show that many users drop at the quiz at question 3 and 5.  
**Recommendation:** Make passing the quiz as easy as possible and engage the prospect to make the next step in the funnel.
- Testing different home try-on package sizes shows that customers are not more likely to make a purchase if they get more pairs to try on. **Recommendation:** Focus on a well structured home try-on package to avoid too much variety and making decisions too complicated.
- The overall purchase trend are glasses in the mid range price category with black color. Nevertheless the best selling model in the men's category is "Dawes" with a price of 150 in the premium segment and with color Driftwood Fade. The best selling model in the women's category is "Eugene Narrow" with a price of 95 in the mid range segment and with color Rosewood Tortoise.