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Capstone Project: Usage Funnel with Warby Parker

Learn SQL from Scratch

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To help users find their perfect frame, Warby Parker has a Style Quiz that asks potential customers five questions:

1. "What are you looking for?"
2. "What's your fit?"
3. "Which shapes do you like?"
4. "Which colors do you like?"
5. "When was your last eye exam?".

The table *survey* contains three columns:

1. question: one of the five style quiz questions
2. user_id: the user ID of the quiz respondent
3. response: user's response to the question from the question column

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

Query Results

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. WARBY PARKER QUIZ FUNNEL

What is the number of responses for each question?

Question	Count	Completion % vs. Question 1	Completion % vs. Prior Question
1. What are you looking for?	500	100%	N/A
2. What is your fit?	475	95%	95%
3. What shapes do you like?	380	76%	80%
4. Which colors do you like?	361	72%	95%
5. When was your last eye exam?	270	54%	75%

```
SELECT question, count(*)
FROM survey
GROUP BY 1;
```

Query Results

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

- *Not surprisingly, the last question in the quiz has the lowest completion rate at 54% of users who begin the survey*
- *Completion rate for each successive question decreases vs. number of users who begin the survey:*
  - *Users may be abandoning the survey when they are unsure of an answer*
  - *Questions 2-4 asks for user preferences. Compared to number of users from the question immediately prior, between 80-95% of users are submitting responses and moving onto the next question in the survey*
- *The completion rate vs. prior question is the lowest at question 5, "When was your last eye exam?".*
  - *Only 75% of respondents who completed Question 4 completed Question 5*
  - *Question shifts from subjective style preferences in Question 2 to Question 4 to objective question about medical exam history in Question 5*
  - *The low completion rate for Question 5 vs. prior question is likely due to user not having the information on hand and abandoning the quiz*

2. Home Try On Funnel

2. WARBY PARKER HOME TRY ON 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, Warby Parker conducted an A/B testing where:

- 50% of the users will get 3 pairs to try on
- 50% of the users will get 5 pairs to try on

- User quiz, home try on and purchase data are available in tables named 'quiz', 'home_try_on', and 'purchase', respectively.
  - Table 'quiz' contains user id, style, fit, shape and color for quizes completed
  - Table 'home_try_on" includes user id, number of pairs for home try-on, and address for home try ons
  - Table 'purchase' includes user id, product id, style, model name, color and price for purchases made
- The key between the three table is user_id, which will be used to build a joined table for analysis of purchases (conversion rates)

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

2. WARBY PARKER HOME TRY ON FUNNEL

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

Query Results

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

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

Query Results

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

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

Query Results

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. WARBY PARKER HOME TRY ON FUNNEL

The common key between the three tables user_id is used to join tables quiz, home_try_on and purchase.

The query below is used to create a new table:

Column 1 = User_id from table quiz
Column 2 'is_home_try_on' = using *user_id* as key, populate 1 if *user_id* from quiz is also found in table *home_try_on*, i.e. "is not null", else 0
Column 3 'number_of_pairs' = using *user_id* as key, populate the number of pairs from table *home_try_on,* else NULL
Column 4 'is_purchase' = using *user_id* as key, populate 1 if *user_id* from *quiz* is also found in table *purchase*, i.e. "is not null", else 0

Output is limited to first 10 rows to verify result is populated as intended. We can now build on this newly created table to analyze Warby Parker's Home Try Funnel.

```
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;
```

Query Results

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

2. WARBY PARKER HOME TRY ON FUNNEL

What is the conversion rate at various parts of the funnel?

- 75% of users who completed the quiz (750 out of 1000) requested a home try-on
- 66% of users who received a home try-on made a purchased (495 out of 750)
- Overall, 49.5% of users who completed the quiz made a purchase (495 out of 1000)

Query Results

num_user_id	num_home_try_on	num_purchase	Quiz to Try On	Try On to Purchase	Quiz to Purchase
1000	750	495	0.75	0.66	0.495

Methodology:

- Name the previous query as *funnel*
- Create a table that summarizes the table *funnel* as follows:
  - Column 1 'num_user_id' = count the number of user_ids from the table funnel
  - Column 2 'num_home_try_on' = count number of rows where is_home_try_on is = 1 from table funnel
  - Column 3 'num_purchase' = count number of rows where is_purchase = 1 from table funnel
  - Column 4 'Quiz to Try on' is defined as Sum of 'is_home_try_on' divided by total number of user_ids
  - Column 5 'Try On to Purchase' is defined as Sum of 'is_purchase' divided by sum of 'is_home_try_on'
  - Column 6 'Quiz to Purchase' is defined as Sum of 'is_purchase' divided by total of number of user_ids from funnel

```
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 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(user_id) AS 'num_user_id',

count(
CASE
  WHEN is_home_try_on = 1
  THEN user_id
  ELSE NULL
END) AS 'num_home_try_on',

count(
CASE
WHEN is_purchase = 1
  THEN user_id
  ELSE NULL
  END) AS 'num_purchase',

  1.0 * SUM(is_home_try_on) /
count(user_id) AS 'Quiz to Try On',
  1.0 * SUM(is_purchase) /
sum(is_home_try_on) AS 'Try On to
Purchase',
    1.0 * SUM(is_purchase) /
count(user_id) AS 'Quiz to Purchase'

FROM funnel;
```

2. WARBY PARKER HOME TRY ON FUNNEL

Is there a difference in purchase rates between customers who received 3 pairs to try on vs. 5 pairs to try on?

- Of the 1000 users who completed the quiz, 750 users moved onto the next stage of the funnel and received home try ons
- The A/B test randomly assigned roughly the same number of customers receiving 3 vs 5 pairs to try on (379 and 371, respectively)
- 53% of customers (201 out of 379) who received 3 pairs of try-on completed the purchase
- The conversion rate increases to 79.2% (294 out of 371) when customers received 5 pairs to try on

Customers who received 5 pairs to try on purchased glasses at a much higher rate than customers who received 3 pairs to try on

Query Results

number_of_pairs	num_user_id	num_home_try_on	num_purchase	Quiz to Try On	Try On to Purchase	Quiz to Purchase
Ø	250	0	0	0.0	Ø	0.0
3 pairs	379	379	201	1.0	0.53	0.53
5 pairs	371	371	294	1.0	0.792	0.792

Methodology:

- Building on the previous query:
  - Added a first column, “number_of_pairs” from number of pairs from home try on
  - Grouping the previous results by number of pairs

```
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 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 number_of_pairs,
count(user_id) AS 'num_user_id',

count(
CASE
  WHEN is_home_try_on = 1
  THEN user_id
  ELSE NULL
END) AS 'num_home_try_on',

count(
CASE
WHEN is_purchase = 1
  THEN user_id
  ELSE NULL
  END) AS 'num_purchase',

  1.0 * SUM(is_home_try_on) /
count(user_id) AS 'Quiz to Try On',
  1.0 * SUM(is_purchase) /
sum(is_home_try_on) AS 'Try On to
Purchase',
    1.0 * SUM(is_purchase) /
count(user_id) AS 'Quiz to Purchase'

FROM funnel
GROUP BY number_of_pairs;
```

2. WARBY PARKER HOME TRY ON FUNNEL

Recommendations for Warby Parker

- Based on the results of this A/B testing, Warby Parker can significantly increase their conversion rate by 49% (from 53% to 79.2%) simply by offering potential customers 5 pairs to try on vs. 3 pairs
- It may be worthwhile to periodically run the same A/B test to validate whether this pattern continues to hold true in the future

Would customers purchase at an even higher rate if they received more than 5 pairs to try-on?

- There's likely a point where customers have too many choices and could be paralyzed and no action,
- Additional A/B tests can be conducted to find the ideal number of try ons to offer with the highest conversion rate
- The decision whether or not to ship additional pairs for try-on, if it results in higher conversion rate, must be evaluated against the additional cost of sending more pairs of try on, such as capital tied up on try ons and incremental shipping costs

2. WARBY PARKER HOME TRY ON FUNNEL

Do customers' purchase behavior differ between those who received 3 try on pairs vs. 5 try on pairs?

While customers receiving 5 pairs of try-on purchase at a much higher rate (79.2%) than customers who received 3 pairs (53%), is there a difference between the average order size between these two samples?

Or, to put it another way, is one group purchasing more expensive glasses than the other?

Query Results			
number_of_pairs	num_purchase	Total Orders Value	Average Order Size
Ø	0	Ø	Ø
3 pairs	201	22765	113.0
5 pairs	294	33030	112.0

Based on the result of the available data set, customers who tried on 3 pairs on average ordered $113 of glasses vs. $112 for those with 5 pairs of try on. It does not appears there's a difference between purchasing behavior between the two groups.

```
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',
p.price
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 number_of_pairs,

count(
CASE
WHEN is_purchase = 1
  THEN user_id
  ELSE NULL
  END) AS 'num_purchase',

  SUM(price) AS 'Total Orders Value',

1.0 * ROUND(SUM(price) /   count(
CASE
WHEN is_purchase = 1
  THEN user_id
  ELSE NULL
  END) ,2) AS 'Average Order Size'

FROM funnel
GROUP BY number_of_pairs;
```