Warby Parker Usage Funnels Analysis

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About

For this project, I will be analyzing two of Warby Parker's marketing funnels – the Survey Funnel and the Home Try-on Purchase Funnel – in order to calculate their conversion rates. I will be utilizing my SQL skills and analytical abilities to work with the data provided by Codecademy and Warby Parker's data science team.

See database schema here.

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Database Schema

home_try_on	
name	**type**
user_id	TEXT
number_of_pairs	TEXT
address	TEXT
Rows: 750	

purchase	
name	**type**
user_id	TEXT
product_id	INTEGER
style	TEXT
model_name	TEXT
color	TEXT
price	INTEGER
Rows: 495	

survey	
name	**type**
question	TEXT
user_id	TEXT
response	TEXT
Rows: 1986	

quiz	
name	**type**
user_id	TEXT
style	TEXT
fit	TEXT
shape	TEXT
color	TEXT
Rows: 495	

Survey Funnel

Survey Funnel

- Warby Parker has a Style Quiz for users to find their perfect frame.

- The questions are as follows:

    1. What are you looking for?

    2. What's your fit?

    3. What shapes do you like?

    4. Which colors do you like?

    5. When was your last eye exam?

- Questions and response are stored in the table `survey`.

- I will write a query to find each question's current completion rate and analyze how WP can improve the survey funnel's completion rate.

Survey Funnel: Query & Result

```
SELECT question, COUNT(user_id) AS 'respond count'
FROM survey
WHERE response IS NOT NULL
GROUP BY question
ORDER BY question ASC;
```

QUERY RESULT	
question	**response 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

To create a survey funnel, I used the GROUP BY command in conjunction with an aggregation function – COUNT() to group the rows in the survey table by the question column and count the number of responses indicated by the user_id column for each unique question. Additionally, I used the WHERE clause to filter the rows in the table to only include those with a value. Finally I used the ORDER BY clause to order the question column in ascending order. This query returns a list of each question with a count of the number of responses for that question.

Survey Funnel: Completion Rate

I calculated the completion rate by dividing the number of people completing each step by the number of people completing the previous step.

question	response count	Completion rate
1. What are you looking for?	500	100%
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	75%

Survey Funnel: Analysis & Recommendations

question	response count	Completion rate
1. What are you looking for?	500	100%
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	75%

The completion rate for the survey decreases as the questions become more specific and possibly more difficult for users to answer. Since the completion rate is not in a steady decline, reordering the questions in descending order can help improve the completion rate.

Another recommendation is to provide additional information for the questions with lower completion rates. For example, showing users a variety of face shapes and example frames that might be suitable for each shape; or educating users on finding out when their last eye exam was and letting them know the importance of an eye exam can also help users feel confident in their answers and encourage them to complete the survey.

An A/B test can be performed by having the survey in different question orders or additional context to see which version results in a higher completion rate.

Purchase Funnel

Purchase Funnel

- **Warby Parker's Home Try-on purchase funnel is:**

Complete Style Quiz
Home Try-on
Purchase the perfect pair of glasses
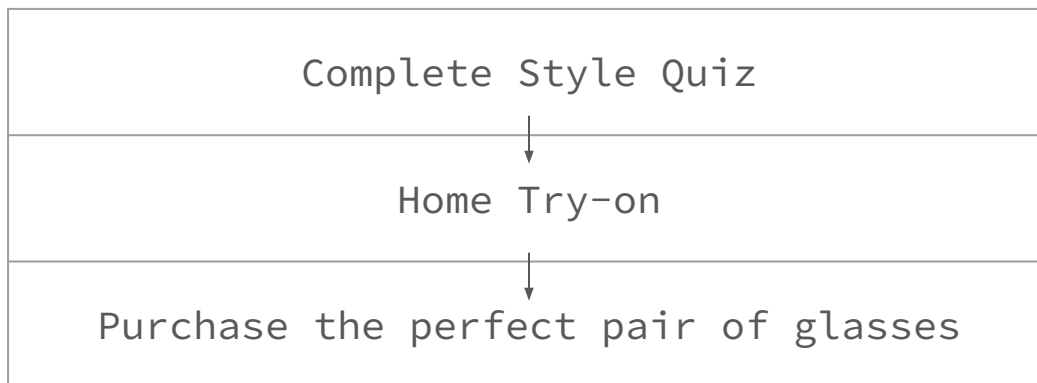
- **The data is distributed in three tables – quiz, home_try_on, and purchase table. See schema here.**

Purchase Funnel (2)

- To create a new table combining data from tables `quiz`, `home_try_on`, and purchase, I will use `LEFT JOIN`s.

- Each row in the results represents a *unique* user.

- The resulting table will have the following columns (in order):
  - user_id
  - is_home_try_on
  - number_of_pairs
  - is_purchase

- If the user has any entries in `home_try_on`, then `is_home_try_on` will be 1 (True), otherwise, 0 (False).

- If the user has any entries in `purchase`, then `is_purchase` will be 1 (True), otherwise, 0 (False).

Purchase Funnel: Query

By using LEFT JOIN each row will represent a user regardless if they completed the quiz, requested a home try-on, or made a purchase.
In case there are duplicated user_ids, I used the DISTINCT statement to remove any duplicated rows. The result of this query will show the user IDs of users who have interacted with WP's website in any of the three ways, along with whether they have completed the quiz, requested a home try-on, and made a purchase.

```
SELECT DISTINCT q.user_id
    , q.user_id IS NOT NULL AS quiz_complete
    , 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 p.user_id = q.user_id;
```

Purchase Funnel: Result Table

user_id	quiz_complete	is_home_try_on	number_of_pairs	is_purchase
4e8118dc-bb3d-4 9bf-85fc-cca8d8 3232ac	1	1	3 pairs	0
291f1cca-e507-4 8be-b063-002b14 906468	1	1	3 pairs	1
75122300-0736-4 087-b6d8-c0c537 3a1a04	1	0	(∅)	0
75bc6ebd-40cd-4 e1d-a301-27ddd9 3b12e2	1	1	5 pairs	0
ce965c4d-7a2b-4 db6-9847-601747 fa7812	1	1	3 pairs	1
28867d12-27a6-4 e6a-a5fb-8bb544 0117ae	1	1	5 pairs	1
5a7a7e13-fbcf-4 6e4-9093-797996 49d6c5	1	0	(∅)	0
0143cb8b-bb81-4 916-9750-ce956c 9f9bd9	1	0	(∅)	0

rows continues

With this table, I can analyze the conversion rate from **quiz → home_try_on** and **home_try_on → purchase**. I can further investigate the purchase rate of the users who got 3 pairs of glasses and users who got 5 pairs to try on to see which group drives a higher purchase rate. This is an A/B test WP implemented in the purchase funnel.

Conversion Rate: Quiz → home_try_on

To find the conversion rate from **quiz → home_try_on** I used the WITH clause to create a temporary table from the previous query. And using aggregate function – SUM() to find the total number of users who completed the quiz and total number of users who requested a home try-on kit. The 1.0 * expression is used to force the division to be done with decimal (floating point) arithmetic, rather than integer arithmetic.

quiz_to_hto_conversion_rate
0.75

```
WITH quiz_to_hto AS (
    SELECT DISTINCT q.user_id
        , q.user_id IS NOT NULL AS quiz_complete
        , 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 p.user_id = q.user_id
)
SELECT (1.0 * SUM(is_home_try_on) /
    SUM(quiz_complete)) AS
    quiz_to_hto_conversion_rate
FROM quiz_to_hto;
```

Conversion Rate: Quiz → home_try_on Analysis

- 75% of the users who completed the quiz moved on to home_try_on.

- Since users who complete the quiz are likely to go forward in the quiz funnel. The WP team should ensure the quiz is as user-friendly as possible. This could be identifying potential barriers for users to move forward in the quiz, the difficulty of the questions, or the user interface to determine whether any improvements could be made.

- Creating a quiz funnel to find the completion rate of each question using the same method as the survey funnel can also help improve the completion rate.

- Another approach is to give some incentive or rewards, such as a discount code for users who completes the quiz. That way, users are encouraged to complete the quiz and move forward to requesting a home try-on kit.

Conversion Rate: home_try_on → purchase

With the same method using WITH to make a temporary table and aggregate function SUM() in the SELECT statement, I found the **home_try_on (HTO) → purchase** conversion rate (66%). Since the rate isn't excellent, I will further analyze to see which group from the A/B test drove more sales.

HTO_to_purchase_rate
0.66

```
WITH ab_test AS (
      SELECT DISTINCT q.user_id
       , q.user_id IS NOT NULL AS quiz_complete
       , 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 p.user_id = q.user_id
)
SELECT (1.0 * SUM(is_purchase) / SUM(is_home_try_on))
      AS HTO_to_purchase_rate
FROM ab_test;
```

Purchase Funnel: A/B Test

- **We can analyze the purchase rate for each group (A or B) by calculating the conversion rate for both groups and finding the difference between them.**

- **The A/B Test is conducted in the <u>Home Try-on</u> stage of the funnel:**
  - group_a: 50% of the users will get 3 pairs to try on
  - group_b: 50% of the users will get 5 pairs to try on

- **A/B Testing objective:**
  - Find out which group of users is more likely to make a purchase
    - By comparing **conversion rates** between group_a and group_b

A/B Test Purchase Rate

- **With <u>purchase funnel result table</u> (below) as a temporary table, I will create a new table with 4 columns: 'group_name', 'purchased_users', 'home_try_on_users', and 'conversion_rate'**

user_id	quiz_complete	is_home_try_on	number_of_pairs	is_purchase
4e8118dc-bb3d-49bf-85fc-cca8d83232ac	1	1	3 pairs	0
291f1cca-e507-48be-b063-002b14906468	1	1	3 pairs	1
75122300-0736-4087-b6d8-c0c5373a1a04	1	0	(∅)	0
75bc6ebd-40cd-4e1d-a301-27ddd93b12e2	1	1	5 pairs	0

rows continues

- Step 1: In the new table, create a column that separates group_a and group_b from **number_of_pairs** as **group_name**.
- Step 2: Create a column **purchased_users** that calculates the sum of users who made a purchase.
- Step 3: Create a column **home_try_on_users** that calculates the sum of users who requested home try-on.
- Step 4: Create a column that divides **purchased_users** by **home_try_on_users**, round it to 2 decimals as **purchase_rate**.
- Step 5: Use `GROUP BY` to return values for each **group_name**.
- Step 6: use `HAVING` to return rows that has no `NULL` values.

A/B Test Purchase Rate (2)

```
WITH ab_test AS (
  SELECT DISTINCT q.user_id
    , h.number_of_pairs
    , q.user_id IS NOT NULL AS quiz_complete
    , h.user_id IS NOT NULL AS is_home_try_on
    , 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 p.user_id = q.user_id
)
SELECT
  CASE WHEN number_of_pairs = '3 pairs' THEN 'group_a'
       WHEN number_of_pairs = '5 pairs' THEN 'group_b' END AS
group_name
  , SUM(is_purchase) as purchased_users
  , SUM(is_home_try_on) as home_try_on_users
  , CASE WHEN SUM(is_home_try_on) = 0 THEN 0 ELSE
ROUND((CAST(SUM(is_purchase) AS FLOAT) /
 CAST(SUM(is_home_try_on) AS FLOAT)), 2) END AS purchase_rate
FROM ab_test
GROUP BY group_name
HAVING group_name IS NOT NULL;
```

- **Instead of using 1.0* expression to force the division to be done with decimal (floating point) arithmetic, rather than an integer, I used CAST() on SUM(is_purchase) and SUM(is_home_try_on) to ensure the result returns a decimal value.**
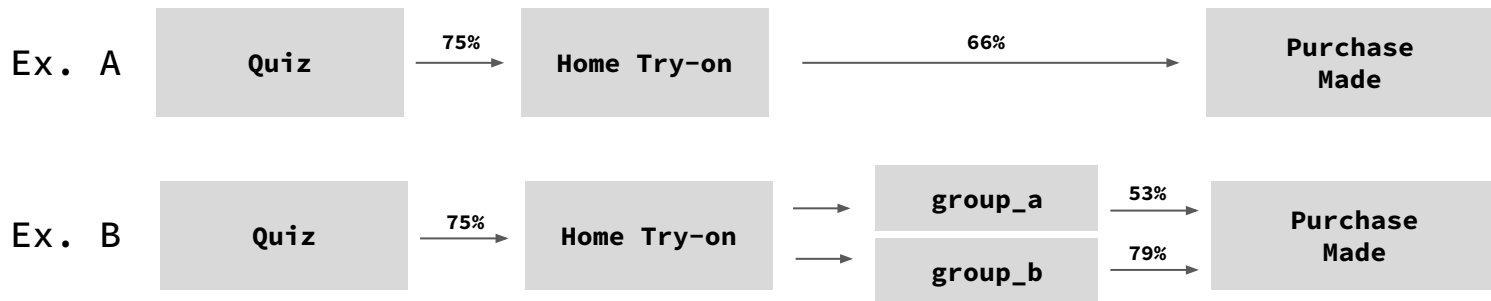
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A/B Test Analysis

- The Purchase Rate result table shows group_b who received 5 pairs of sample glasses to choose from has a higher purchase_rate by 26%. Since the sample size of the A/B test is balanced (50/50), it seems obvious for WP to move forward with group_b. But it is important to consider other factors that might have influenced the purchase rate. One factor could be the type of frame users received, such as the quality of the frames or the season and style. Additionally, we can dig deeper and find the average number of glasses purchased in each group, or the average check-out price in each group.

group_name	purchased_users	home_try_on_users	purchase_rate
group_a	201	379	0.53
group_b	294	371	0.79

Purchase Funnel Analysis

- 75% of users who completed the quiz moved forward to Home Try-on process (Ex. A & Ex. B)
- 66% of users who completed the Home Try-on process make a purchase. (Ex. A)
- When broken into A/B groups, users in group_b had a higher purchase rate than group_a by 26%. (Ex. B)
- Given the limited information, WP team should increase quiz completion rate by reviewing their quiz format and questions in efforts for users to proceed to the Home Try-on stage. WP should use group_b in the Home Try-on process to increase the purchase rate in order to generate more revenue.

Ex. A | Quiz | →75%→ | Home Try-on | →66%→ | Purchase Made |

Ex. B | Quiz | →75%→ | Home Try-on | → group_a →53%→ / → group_b →79%→ | Purchase Made |

END