From Survey to Purchase

Analysis of Warby Parker's Marketing Funnels

Learn SQL From Scratch | Mike Langley | August 11, 2018

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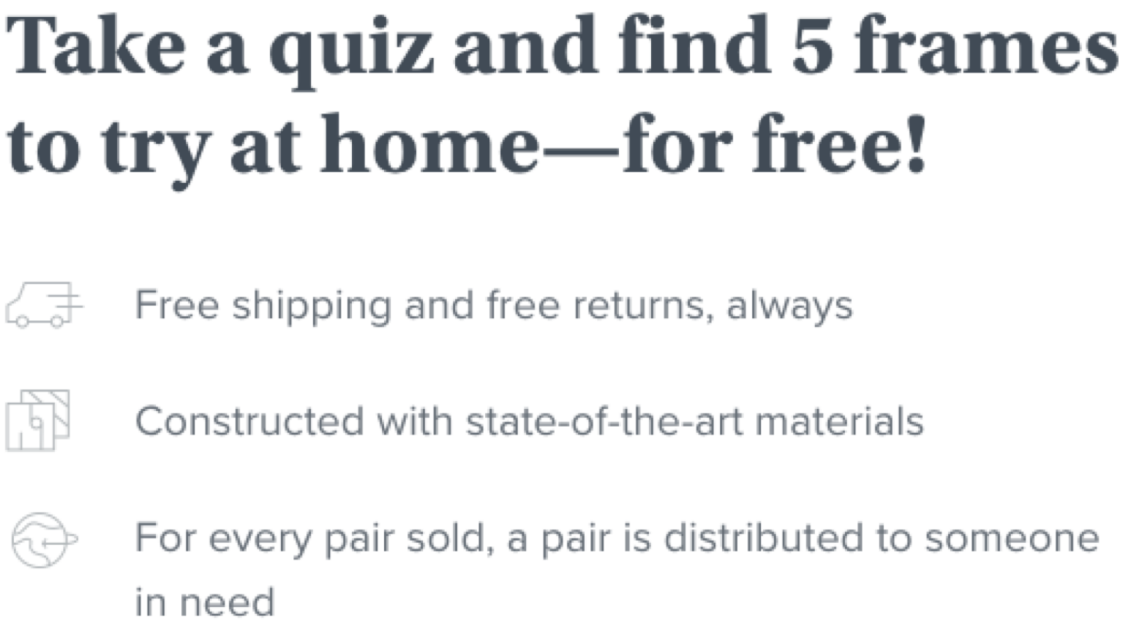
What is Warby Parker?

“To make glasses more affordable, the students would need to topple a giant. Having recently watched Zappos transform footwear by selling shoes online, they wondered if they could do the same with eyewear.”
- Adam Grant, *Originals*

”The Company’s approach—selling stylish specs at affordable prices—seems obvious, but, in an industry where brand-name glasses cost two or three hundred dollars a pair, it counts as revolutionary.”
- *The New Yorker*

Funnel 1: The Quiz

Warby Parker invites prospective customers to take a 5 question online quiz to find which glasses would work best.



Funnel 1: The Quiz – Task 1

The data from this quiz is collected into a table with three columns, capturing the following information: (a) the question, (b) the user's ID, and (c) their response.

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

```sql
/* Warby Parker Funnels Project
Mike Langley
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-- Task 1: What columns does the table have?
SELECT *
FROM survey
LIMIT 10;
```

Funnel 1: The Quiz – Task 2

The image of the funnel represents the customer's journey in answering the questions of the quiz; it's normal for the number of users who complete each step to decrease. We can see below how many users answered each question.

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

```
10  -- Task 2: What is the number of responses for
    each question?
11  SELECT question AS 'Question', COUNT(DISTINCT
    user_id) AS 'Count'
12  FROM survey
13  GROUP BY 1;
14
15
16
17
18
19
20
21
```

Funnel 1: The Quiz – Task 3

Conversion measures the percentage of users that make it from one step to the next. From the chart to the left, we can see that questions 2 and 4 have very high conversion at 95%, whereas questions 3 and 5 have comparatively lower conversion at 80% and 75% respectively.

Question	Count	Conversion
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%

Why high conversion?

- Question 2 asks for face shape (Narrow, Medium, or Wide); it provides descriptions to help the user understand the options, and recommends an option (Medium) if the user is not sure. Because of these helpful signposts, it makes sense that conversion would be high on this question.
- Question 4 asks the user to select from six different color options, which are clearly represented by circular swatches. The colors are easy to grasp from the swatches, and the user can select however many they like.

Why low conversion?

- Question 3 offers monochromatic sketches of the options and the illustrations are flatter than for the other questions. Additionally, it doesn't have any description or recommendation on which option to pick.
- Question 5 asks the user to recall their last eye exam; while the other questions ask the user's opinion/judgment, this question asks them to recall a fact, which they may have to look up.

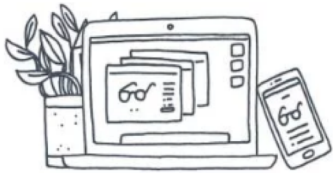
Funnel 2: The Home Try-On

After prospective customers take the style quiz, they're shipped 3 or 5 frames to try on. The top of the funnel contains the users who take the quiz, the middle contains those who receive try-on frames, and the bottom contains those who go on to purchase.

How it works

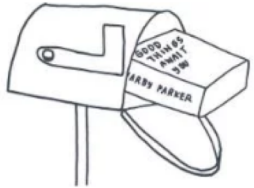
Pick 5 frames

We'll mail them to you for free. Try them out for 5 days and see which ones you like.



Buy at any time

Make it your own by purchasing online and we'll send you a fresh new pair.



Return your frames

Once your 5 days are up, place your box in the mail with the prepaid return label. Done!

Funnel 2: The Home Try-On – Task 4

We collect three data sets: the responses from the style quiz, the addresses and # of glasses from the home try-ons, and the information about what customers eventually purchase. This data lives in three tables:

- The **Quiz** table tells us: (a) User ID, (b) Style, (c) Fit, (d) Shape, and (e) Color
- The **Home Try-On** table tells us: (a) User ID, (b) Number of Pairs, and (c) Address
- The **Purchase** table tells us: (a) User ID, (b) Product ID, (c) Style, (d) Model Name, (e) Color, and (f) Price

See the following slide for the first five rows of each table.

```
22  --Task 4: What are the column names?
23  SELECT *
24  FROM quiz
25  LIMIT 5;
26
27  SELECT *
28  FROM home_try_on
29  LIMIT 5;
30
31  SELECT *
32  FROM purchase
33  LIMIT 5;
34
35
36
37
38
```

Funnel 2: The Home Try-On – Task 4

Quiz Table

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

Home Try-On Table

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 Table

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

Funnel 2: The Home Try-On - Task 5

We can combine the three tables to help analyze the overall conversion of the Home Try-On program, as well as how conversion differs among customers who tried 3 pairs vs. those who tried 5 pairs. See below for the first ten rows of the combined table.

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	∅	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	∅	0
0143cb8b-bb81-4916-9750-ce956c9f9bd9	0	∅	0
a4ccc1b3-cbb6-449c-b7a5-03af42c97433	1	5 pairs	0
b1dded76-cd60-4222-82cb-f6d464104298	1	3 pairs	0

```
35  --Task 5: Combine tables in Home Try-On Funnel
36
37  SELECT DISTINCT q.user_id AS 'User ID',
38    h.user_id IS NOT NULL AS 'Is Home Try-On',
39    h.number_of_pairs AS 'Number of Pairs',
40    p.user_id IS NOT NULL AS 'Is Purchase'
41  FROM quiz q
42  LEFT JOIN home_try_on h
43  ON q.user_id = h.user_id
44  LEFT JOIN purchase p
45  ON p.user_id = q.user_id
46  LIMIT 10;
47
48
49
50
```

Funnel 2: The Home Try-On - Task 6

Using the new table we've just created, we can determine a variety of important metrics which can then be used to help guide business decisions. For example, we can again calculate conversion: the % of users who take the Quiz who eventually purchase. And we can further break that down by calculating the % of users who take the Quiz who opt to do the Home Try-On, as well as which of those go on to purchase.

Overall Conversion
.49

From this query, we learn that 49% of users who take the Quiz go on to purchase.

```
47
48  --Task 6: Calculate overall conversion rates
49
50  WITH funnel AS (SELECT DISTINCT q.user_id AS 'User ID',
51    h.user_id IS NOT NULL AS 'Is Home Try-On',
52    h.number_of_pairs AS 'Number of Pairs',
53    p.user_id IS NOT NULL AS 'Is Purchase'
54  FROM quiz q
55  LEFT JOIN home_try_on h
56  ON q.user_id = h.user_id
57  LEFT JOIN purchase p
58  ON p.user_id = q.user_id)
59  SELECT ROUND(1.0 * SUM(funnel.'Is Purchase')/COUNT(funnel.'User ID'),2)
60  AS 'Overall Conversion'
61  FROM funnel;
62
```

Funnel 2: The Home Try-On - Task 6

Breaking down the previous slide, we can calculate the conversion of each step in the funnel as well. from this query, it's clear that a higher percentage of users convert from the Quiz to the Home Try-On than the percentage of those who go convert from Home Try-On to Purchase.

This could simply be due to the fact that customers are more likely to do the Home Try-On because it doesn't cost them anything.

However, we are also running an A/B test between users who receive 3 pairs and those who receive 5 pairs, so we can further analyze the data and see if one of those groups converts at a higher rate.

Quiz to Home Try-On Conversion	Home Try-On to Purchase Conversion
.75	.66

```sql
--Task 6: Compare Conversion from Quiz > Home Try-On and Home Try-On to Purchase

WITH funnel AS (SELECT DISTINCT q.user_id AS 'User ID',
  h.user_id IS NOT NULL AS 'Is Home Try-On',
  h.number_of_pairs AS '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(funnel.'Is Home Try-On')/COUNT(funnel.'User ID')
    AS 'Quiz to Home Try-On Conversion',
  1.0 * SUM(funnel.'Is Purchase')/SUM(funnel.'Is Home Try-On')
    AS 'Home Try-On to Purchase Conversion'
FROM funnel;

```

Funnel 2: The Home Try-On - Task 6

When we analyze the purchase rates between users who received 3 pairs and those who received 5 pairs, we see that the 5-pair Home Try-On set far outperforms the 3-pair set: 79% purchase rate vs 53%.

From this data, it's reasonable to conclude that Warby Parker should make 5 pairs the standard for its Home Try-On sets.

It's also reasonable to consider whether an even higher number of try-on glasses would lift purchase conversion higher – presumably there's a number where customers would begin to see the number of options as a burden rather than an exciting exercise, but we don't have any reason to think that 5 is that limit.

Of course, at some point the added conversion lift may not be great enough to offset the additional cost of having extra try-on units circulating with users.

Home-Try On to Purchase Conversion: 3 Pairs	Home-Try On to Purchase Conversion: 5 Pairs
.53	.79

```
81  --Task 6: Calculating differences between 5 pairs and 3 pairs conversion rates
82
83  WITH funnel AS (SELECT DISTINCT q.user_id AS 'User ID',
84    h.user_id IS NOT NULL AS 'Is Home Try-On',
85    h.number_of_pairs AS 'Number of Pairs',
86    p.user_id IS NOT NULL AS 'Is Purchase'
87  FROM quiz q
88  LEFT JOIN home_try_on h
89  ON q.user_id = h.user_id
90  LEFT JOIN purchase p
91  ON p.user_id = q.user_id)
92  SELECT ROUND(1.0 * SUM(CASE WHEN funnel.'Number of Pairs' = '3 pairs' THEN
    funnel.'Is Purchase' ELSE 0 END)/SUM(CASE WHEN funnel.'Number of Pairs' = '3 pairs'
    THEN funnel.'Is Home Try-On' ELSE 0 END),2) AS 'Home-Try On to Purchase Conversion:
    3 Pairs',
93  ROUND(1.0 * SUM(CASE WHEN funnel.'Number of Pairs' = '5 pairs' THEN funnel.'Is
    Purchase' ELSE 0 END)/SUM(CASE WHEN funnel.'Number of Pairs' = '5 pairs' THEN
    funnel.'Is Home Try-On' ELSE 0 END),2) AS 'Home-Try On to Purchase Conversion: 5
    Pairs'
94  FROM funnel;
95
```

Funnel 2: The Home Try-On - Task 6

To further explore customer behavior, we can explore the purchase table and see if we can determine anything about what users eventually purchase. From the 10 products customers selected, we can see that 4 out of the top 5 selling items were at the $95 price point.

Model	Color	Price	Total Purchased
Dawes	Driftwood Fade	150	63
Eugene Narrow	Rosewood Tortoise	95	62
Eugene Narrow	Rose Crystal	95	54
Brady	Layered Tortoise Matte	95	52
Olive	Pearled Tortoise	95	50
Dawes	Jet Black	150	44
Lucy	Elderflower Crystal	150	44
Brady	Sea Glass Gray	95	43
Lucy	Jet Black	150	42
Monocle	Endangered Tortoise	50	41

```
97  -- Task 6: Most common types of purchases made
98
99  SELECT model_name AS Model, color AS Color,
    price AS Price, COUNT(*) AS 'Total Purchased'
100 FROM purchase
101 GROUP BY model_name, color
102 ORDER BY 4 DESC;
```

Funnel 2: The Home Try-On - Task 6

Looking at customer purchase behavior based on price point further, we can see that the $95 price point is the most popular. While this information is not enough to influence a decision, if we were able to get data on each product's contribution margin (CM), we'd be able to determine the average CM by price point and help decide which tier is most profitable to focus on. For example, the fact that only 8% of our customers purchased the $50 Monocle doesn't necessarily mean we want to cut it out – we can't make that decision without knowing its CM.

% of Purchases: 150	% of Purchases: 95	% of Purchases: 50
0.39	0.53	0.08

```
104  -- Task 6: % of purchases by price point
105
106  WITH purchases AS (SELECT model_name AS Model, color AS Color, price AS Price, COUNT(*) AS 'Total Purchased'
107  FROM purchase
108  GROUP BY model_name, color
109  ORDER BY 4 DESC)
110  SELECT ROUND(1.0 * SUM(CASE WHEN purchases.price = 150 THEN purchases.'Total Purchased' ELSE 0 END)/SUM(purchases.'Total Purchased'),2)
111            AS '% of Purchases: 150',
112         ROUND(1.0 * SUM(CASE WHEN purchases.price = 95 THEN purchases.'Total Purchased' ELSE 0 END)/SUM(purchases.'Total Purchased'),2)
113            AS '% of Purchases: 95',
114         ROUND(1.0 * SUM(CASE WHEN purchases.price = 50 THEN purchases.'Total Purchased' ELSE 0 END)/SUM(purchases.'Total Purchased'),2)
115            AS '% of Purchases: 50'
116  FROM purchases;
117
```

Recommendations

- **Quiz funnel**: Consider eliminating the final question: “When was your last eye exam?” It has the lowest conversion of all the questions and so presents the biggest hurdle to users making it to the Home Try-On step. Users *will* need to know their prescription in order to actually purchase glasses, but let them first receive, try on, and interact with the product – being able to handle it in person should provide greater motivation to track down the prescription info than they felt in filling out the quiz.

- **A/B test higher numbers of Home Try-On pairs**: The difference in conversion between 3 and 5 pairs is significant; customers who receive 5 pairs are around 1.5 times more likely to purchase. While it’s likely that at some point the costs (higher inventory costs associated with extra try-ons in circulation, likelihood of inducing choice paralysis in prospective customers) would outweigh the benefits (increased conversion), we don’t know for certain that 5 is the best number.

- **Determine contribution margin of each price point**: Customers are more likely to purchase glasses at the $95 price point. However, do glasses at that tier have the best margin for the business? If the pairs at the $150 price point are making far higher margins, it could be worth shifting focus towards that tier even if the absolute volume decreases.

- **Consider shaving $5 off price of rounder price points:** Interestingly, this is the only price point which undercuts the standard anchor numbers (customers would likely tend to perceive $95 as “less than $100,” whereas the other price points are right at $150 and $50). Would the other two sell better at $145 and $45?