Summaries and Key Takeaways

I show my work in the rest of the report and my R scripts, but here are the key takeaways so you don't glaze over. The biggest thing I saw impacting the increased CPA from Q3 to Q4 was our Quiz->S1 Conversion rate.

Between Q3 and Q4, Quiz to S1 Conversion % dropped drastically (~6%). Mathematically, this supports the increased CPA from Q3 to Q4. What I wanted to do was see if there were any patterns in the quiz responses of which groups were converting less. I looked at age, gender, fitness goals, weight loss goals, anxiety, timeframe for weight loss, ad placement, and sleep. My initial theory here is that this is due primarily to Brand/Ad Fatigue, as we start high in Q2 and then carry a general trend down across the board, across all groups. That being said, I still did a deep dive into said demographics, to see if I could pull anything else actionable.

Recommendations:

- New ads/techniques for fatigued groups that made up high-performance in previous quarters that had the biggest drops in Q4.
    - 55+ people
    - Women
    - Interested in Weight loss
    - Occasionally Anxious
    - Need large weight loss (lose 50+ lbs)
    - Want to lose weight over 4-6 months
- Continue and recycle ads in groups that are not as fatigued that had a smaller drop in S1 Conversion % Q to Q.
    - Men
    - Instagram Reels
    - People with no weight loss goal
- Adjust Retargeting campaign to recapture Quiz Conversion %

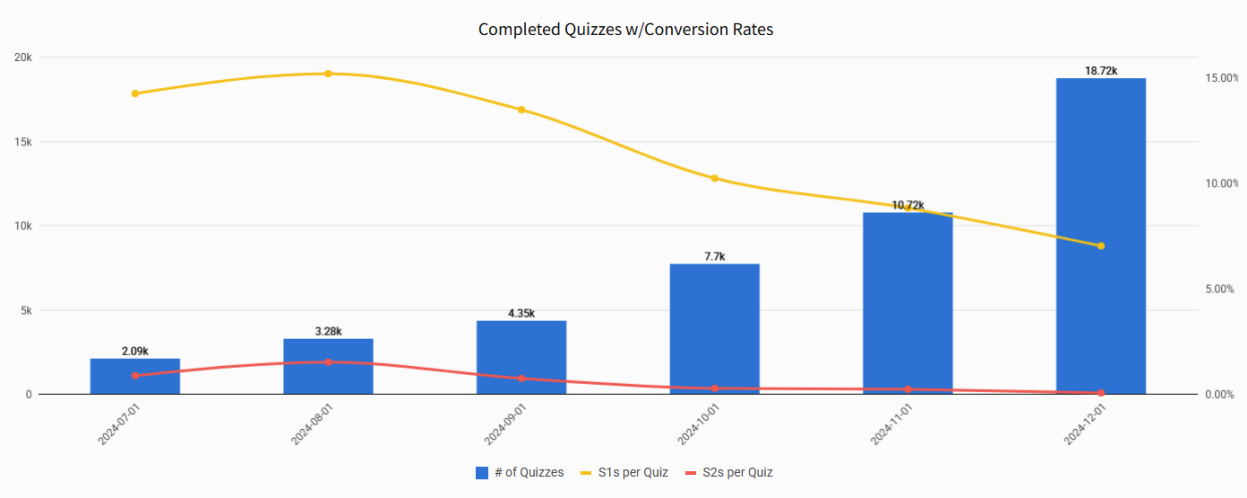
Other Takeaways:

- Facebook converts Quiz Leads to S1s and S2s better than Instagram
- Men who take the quiz are more likely to buy an S1 than women who take the quiz
- Women who take the quiz are more likely to buy an S2 than men who take the quiz.
- People aged 18-25 convert at less than 2% overall to S1 and less than 0.2% to S2. Not worth targeting.

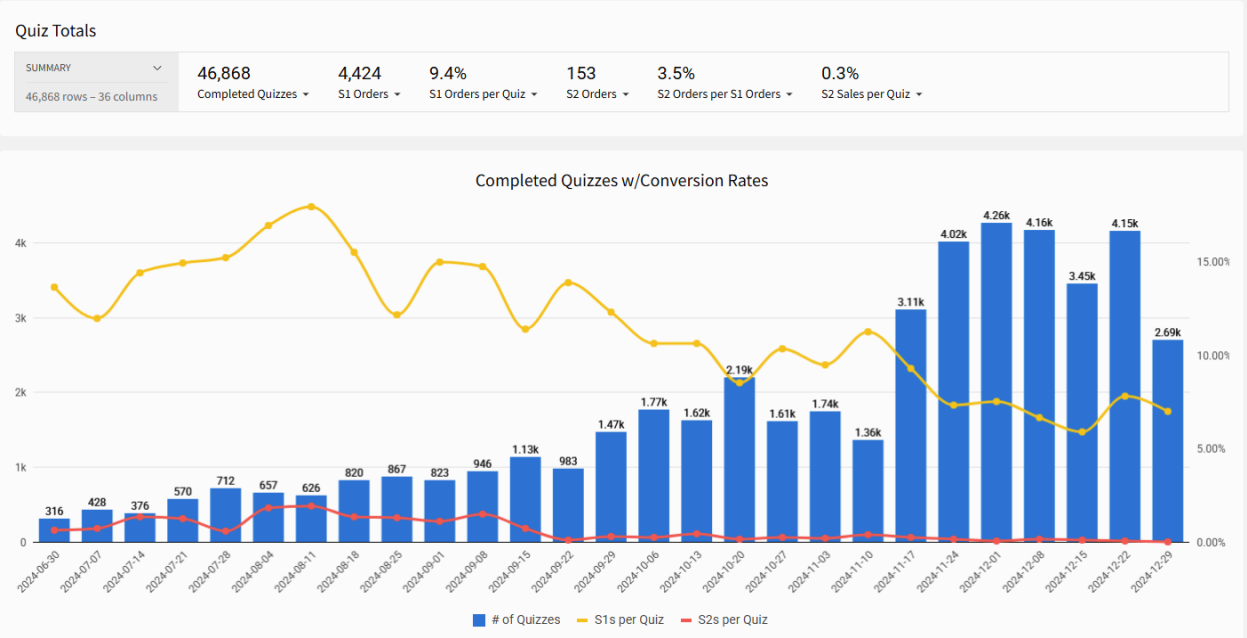
- People aged 26-35 also convert below average.
- People who are more patient with their weight loss goals (7+ months) are less likely to buy an S1 off of their quiz (expected, more desperate=more willing to purchase S1)
- **Ideal S2 Profile:**
    - 46-55 years old
    - Wants to lose weight
    - Woman
    - Scrolling Facebook on her desktop
    - Frequently Anxious
    - Wants to lose the weight in 4-6 months
    - Sleeps 8+ hours per night

Ad-Hoc requests:

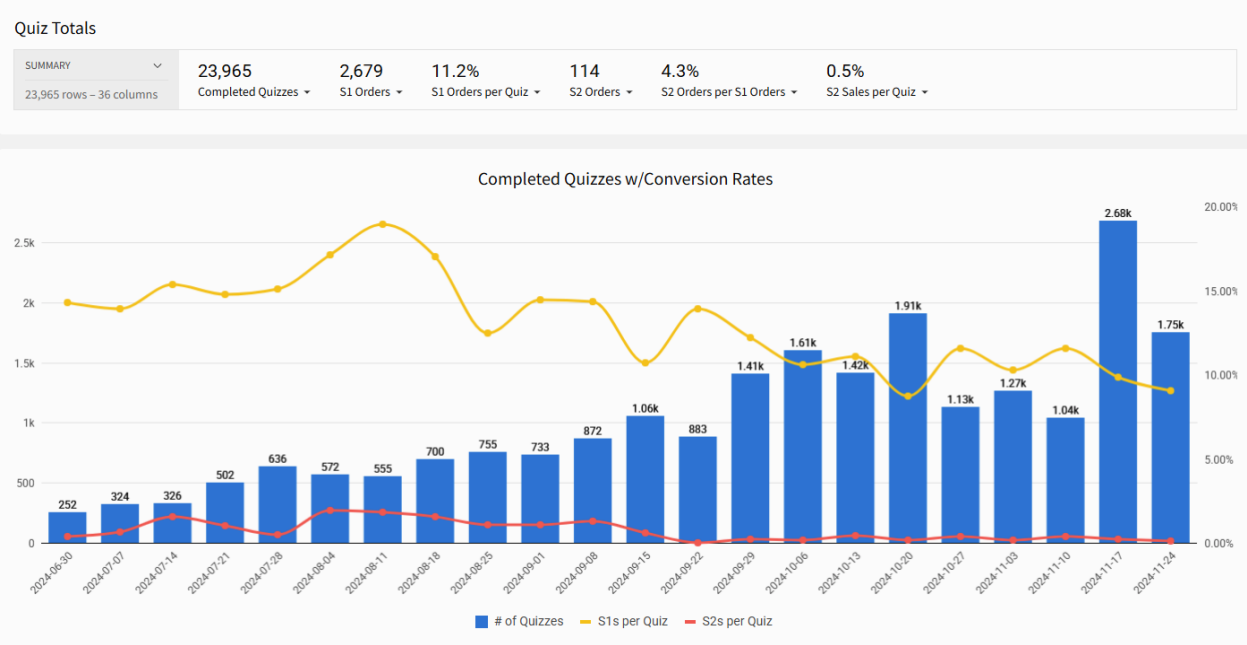
Graph of Q3-Q4 by Month, all sources



Graph of Q3-Q4 by Week, all sources



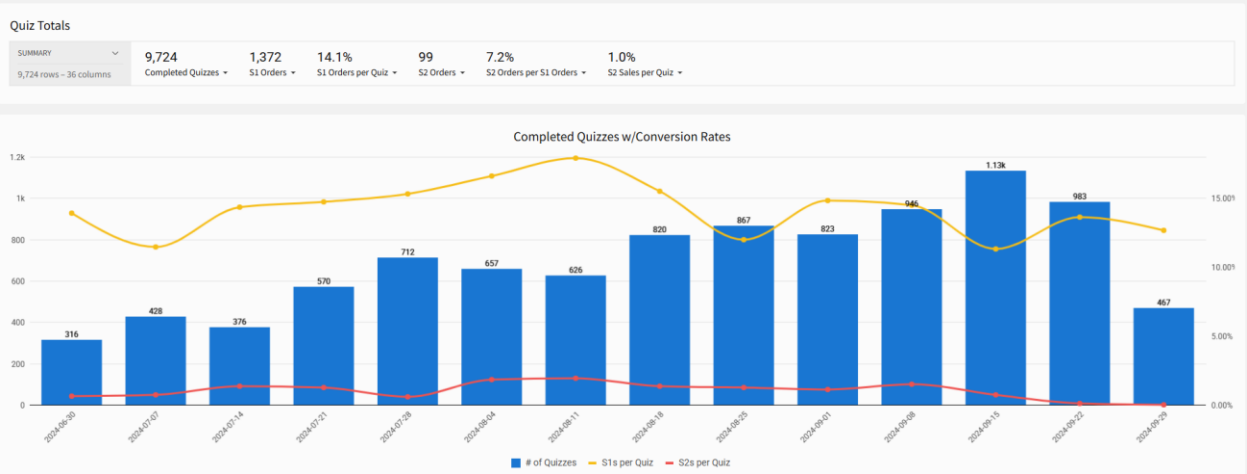
Conversion % by Week excluding TikTok and all failed quiz attributions:



Peak in August, steady downward regardless of filters.

Key Comparison:

Q3



Q4

S1 Orders Q3 vs Q4

Welch Two Sample t-test

data: CPA by Quarter
t = -32.662, df = 10571, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 -86.69435 -76.87782
sample estimates:
mean in group Q3 mean in group Q4
       117.2507   199.0368

Key differences:

Quiz completions up from 9724->37144 (282% Increase)

S1 Orders up from 1372 -> 3020 (120% Increase)

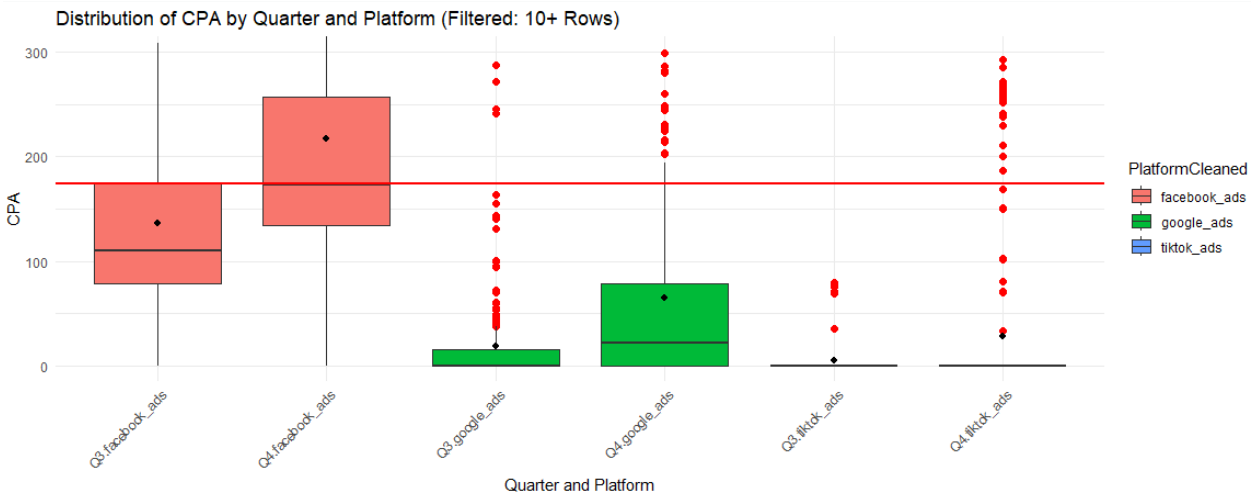
Quiz conversion % down from 14.1%->8.1%

With same quiz conversion rate of 14%, S1 orders would be at 5200, with the same Q3-Q4 increase of 280%.

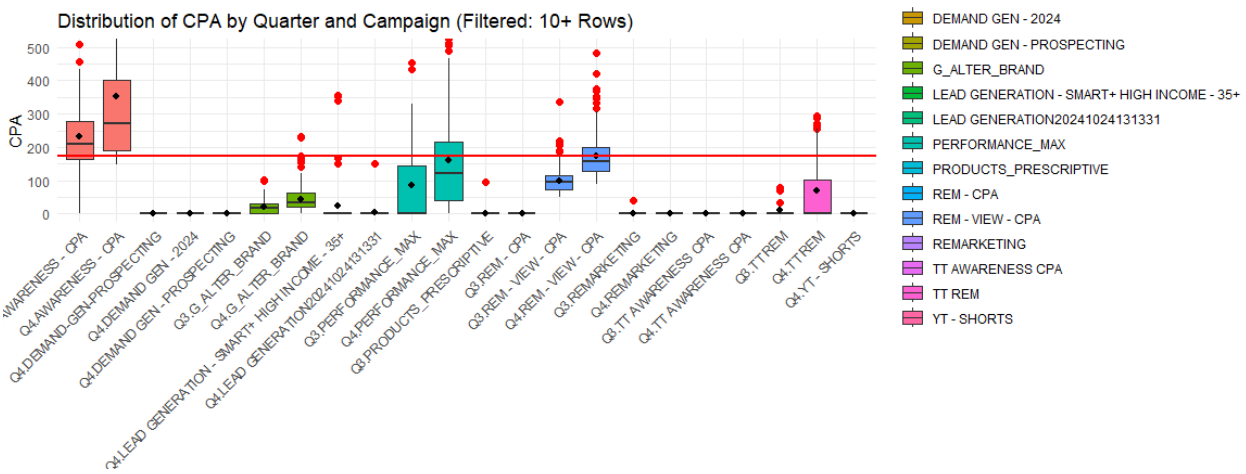
This is a big deal. With the same quiz conversion rate (and those extra 2200 S1 orders resulting from same conversion rate), Q4 CPA goes to ~$139, down from Q4's actual CPA of ~$172

CPA up from $117.25 -> $171.9

This is consistent across platforms



And Campaigns:

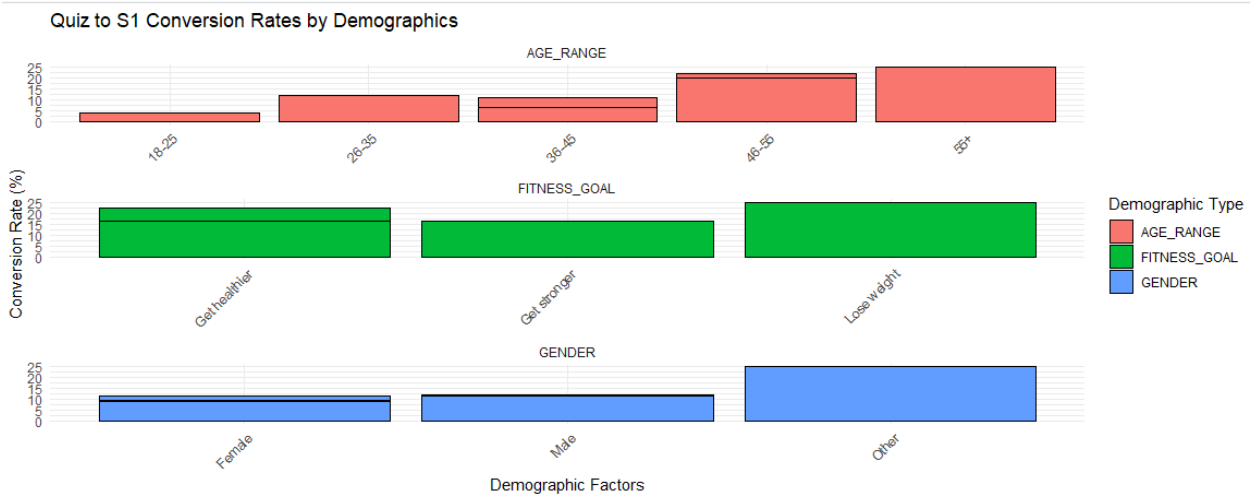


Big thing to take notice of here:

Awareness is the big campaign that is underperforming and bringing CPAs up. This is due mainly to that decreased Quiz conversion %. The Awareness campaign focuses primarily on Quiz Completions, and if those are underperforming in Q4, it does explain the rise in CPA across the board for S1 orders attributed to each of those campaigns.

Section 1: Quiz Data Deep Dive for S1 Conversion

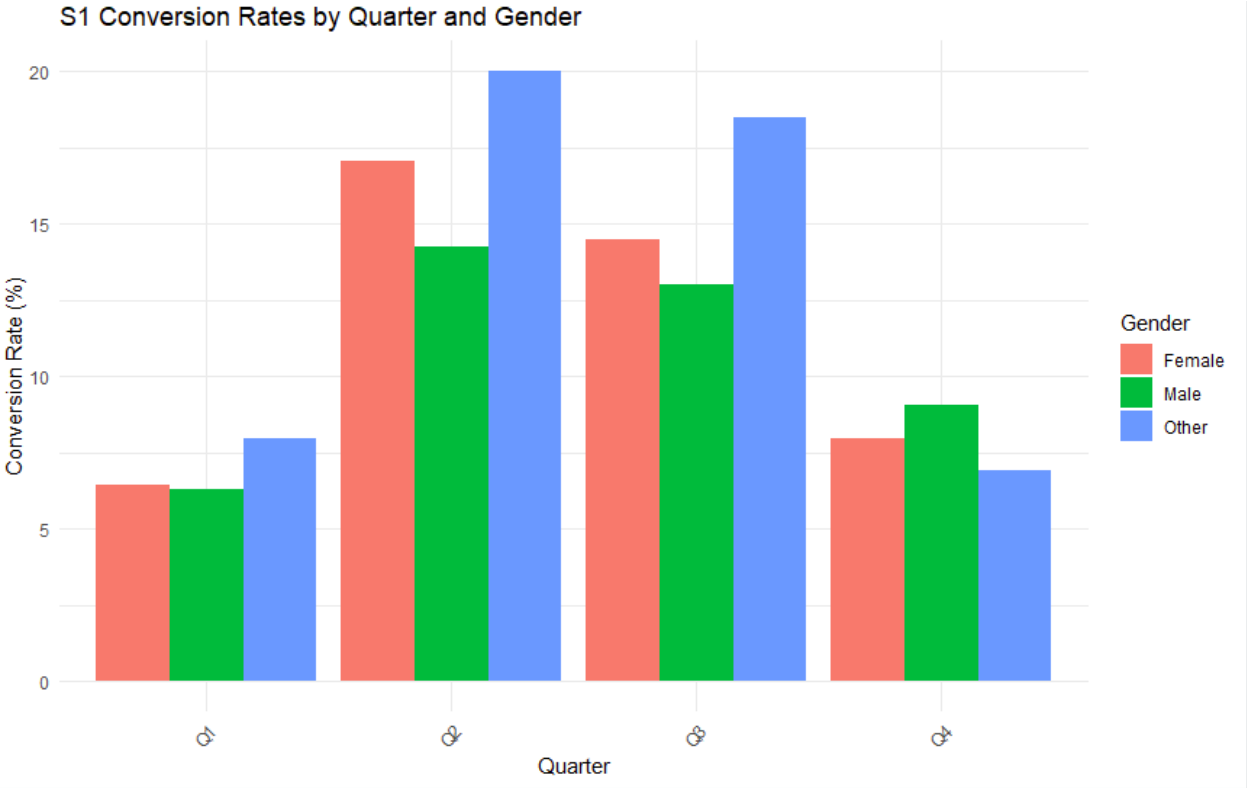
In order to figure out why the quiz is underperforming, I did some data snooping to see if I can identify some demographics changes that could account for the drop in Quiz-S1 Conversion %. For a baseline, here is the overall conversion % data using our quiz data:



Obviously I wanted to look at this compared between Q3 and Q4 to see if there were any differences. For context, the overall conversion % from Quiz Leads to S1 orders is 9.2%. When groups are converting higher than that, they warrant specific targeting.

Gender:

First, I wanted to see if there was a drop in conversion % by gender. So I made this graph to compare gender conversion % across quarters:



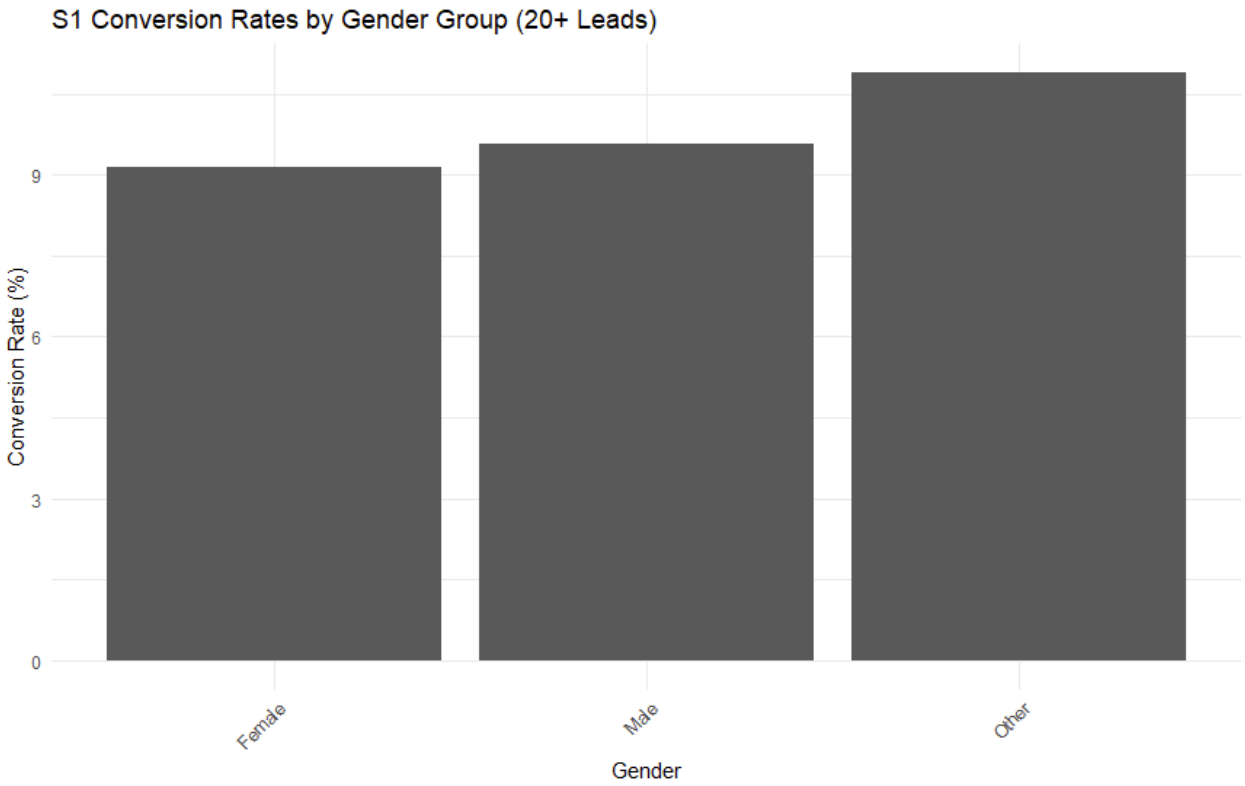
Ignoring the ”Other” group (<100 quizzes), there was a significant drop in Quiz->S1 Conversion % for both male and female demographics. The Female demographic had a very significant drop, from 14.4% conversion to 7.9%. S1 Conversion rate also dropped with men, from 13% to 9%.

These are pretty substantial drops, so I ran a T-test to verify if this was a statistically significant change or not.

Two Sample t-test for Female demographic between Q3 and Q4

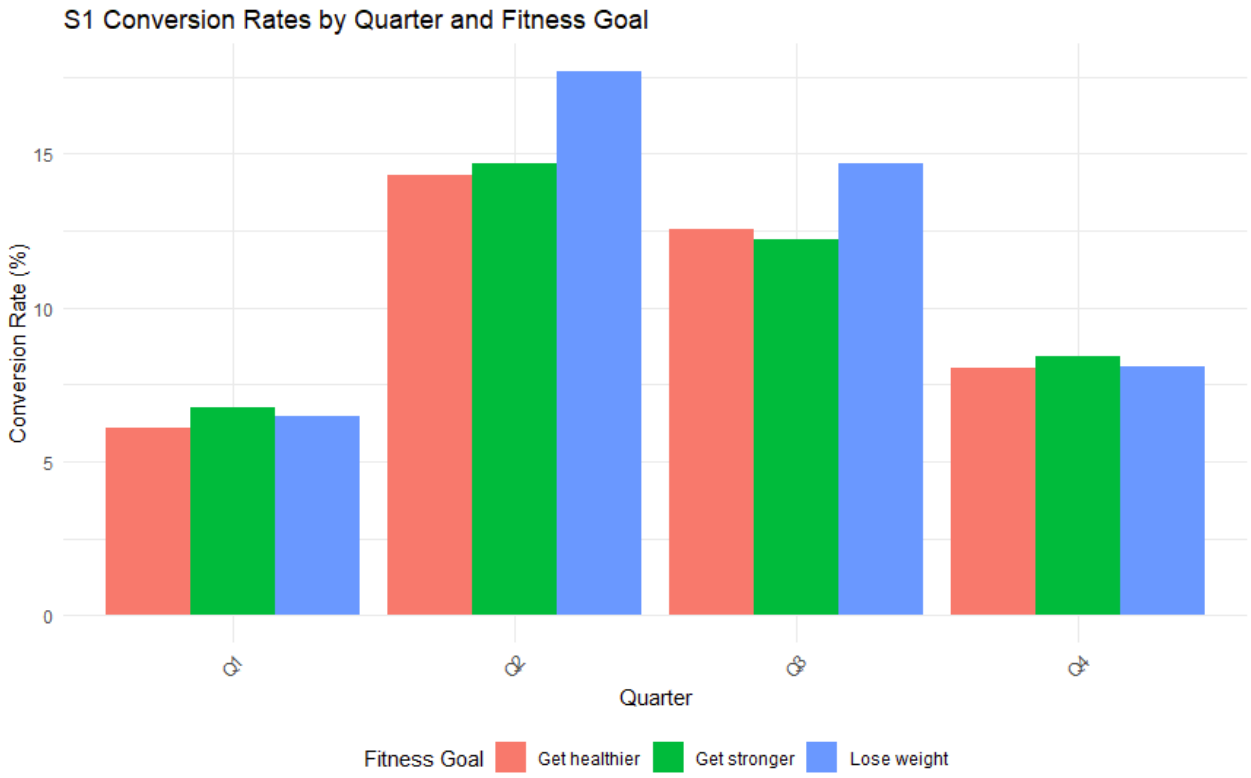
data: Converted by Quarter
t = 17.218, df = 38040, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.05769630 0.07251934
sample estimates:
mean in group Q3 mean in group Q4
0.14458679 0.07947897

Basically, yes, there is not a notable difference in conversion % from Q3 to Q4 for men and women.



Overall, Men purchase S1s off of quiz leads slightly more than Women.

Fitness Goals:



Once again just looking at Q3 and Q4, conversion % is down across the board. The one that is the most drastic (and also the most alarming) is the drop in conversion % for those who want to lose weight, from 14.7% to 8.1%.

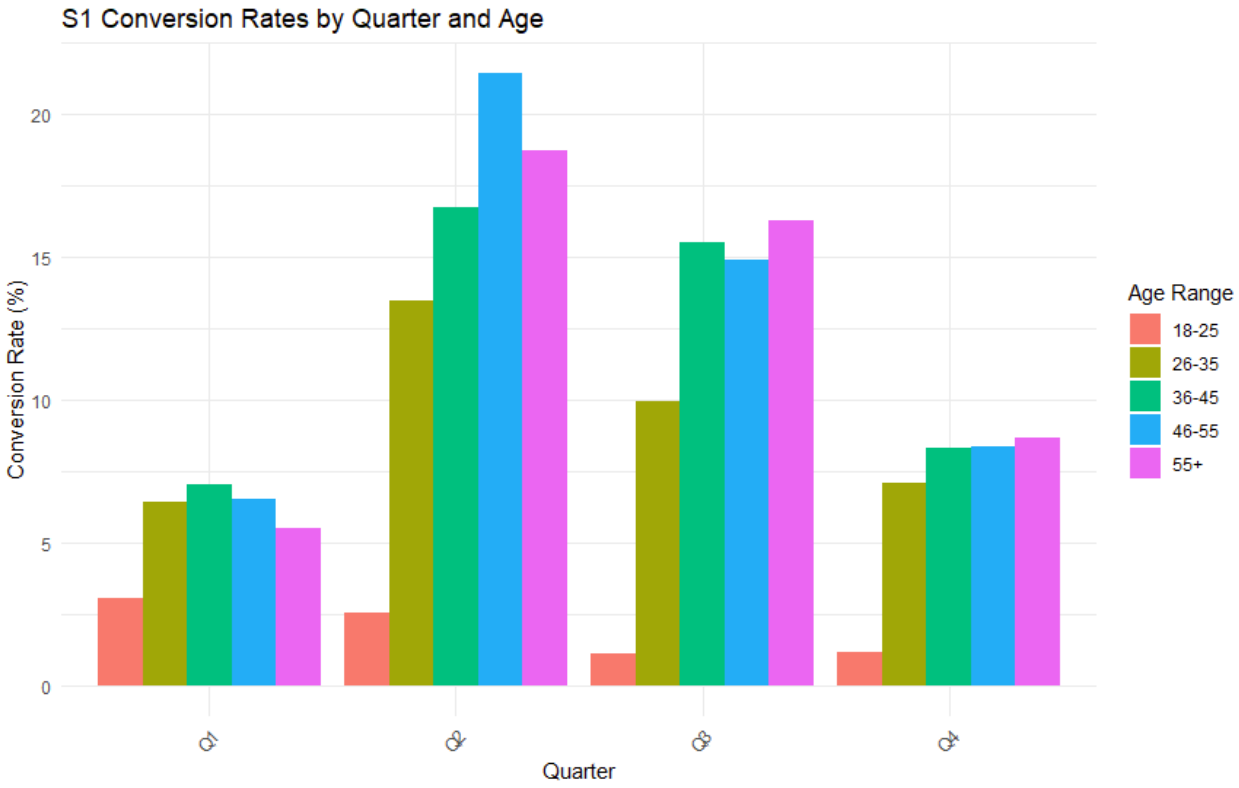
Here is the t-test to verify that statement:

Two Sample t-test

data: Converted by Quarter
t = 17.267, df = 36839, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.05819823 0.07310276
sample estimates:
mean in group Q3 mean in group Q4
0.14673615 0.08108565

This is our most popular quiz answer, and our most important demographic targeted with our S2 objectives. They have always been overperforming in relation to the other quiz responses, but now they are right in line, even a little below others.

Age Range:



This graph gives us some quick takeaways. First, 18-25s are not worth targeting as they convert under 3%, even with the uptick. Next we want to look at Q3 and Q4 again, to see if one of our age ranges is converting worse from our quizzes.

In order:

18-25: No Change, verified

Two Sample t-test

data: Converted by Quarter
t = -0.092091, df = 1399, p-value = 0.9266
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
-0.01198326 0.01090859
sample estimates:
mean in group Q3 mean in group Q4
0.01109057 0.01162791

26-35: Down from 9.9% to 7.1%. verified. Smallest change.

Two Sample t-test

data: Converted by Quarter
t = 3.1358, df = 5685, p-value = 0.001723
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.01070102 0.04639626
sample estimates:
mean in group Q3 mean in group Q4
     0.09980806   0.07125942

36-45: Down from 15.5% to 8.3%, verified.

Two Sample t-test

data: Converted by Quarter
t = 11.332, df = 13381, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.05953772 0.08444270
sample estimates:
mean in group Q3 mean in group Q4
     0.15542522   0.08343501

46-55: Down from 14.9% to 8.3%, verified.

Two Sample t-test

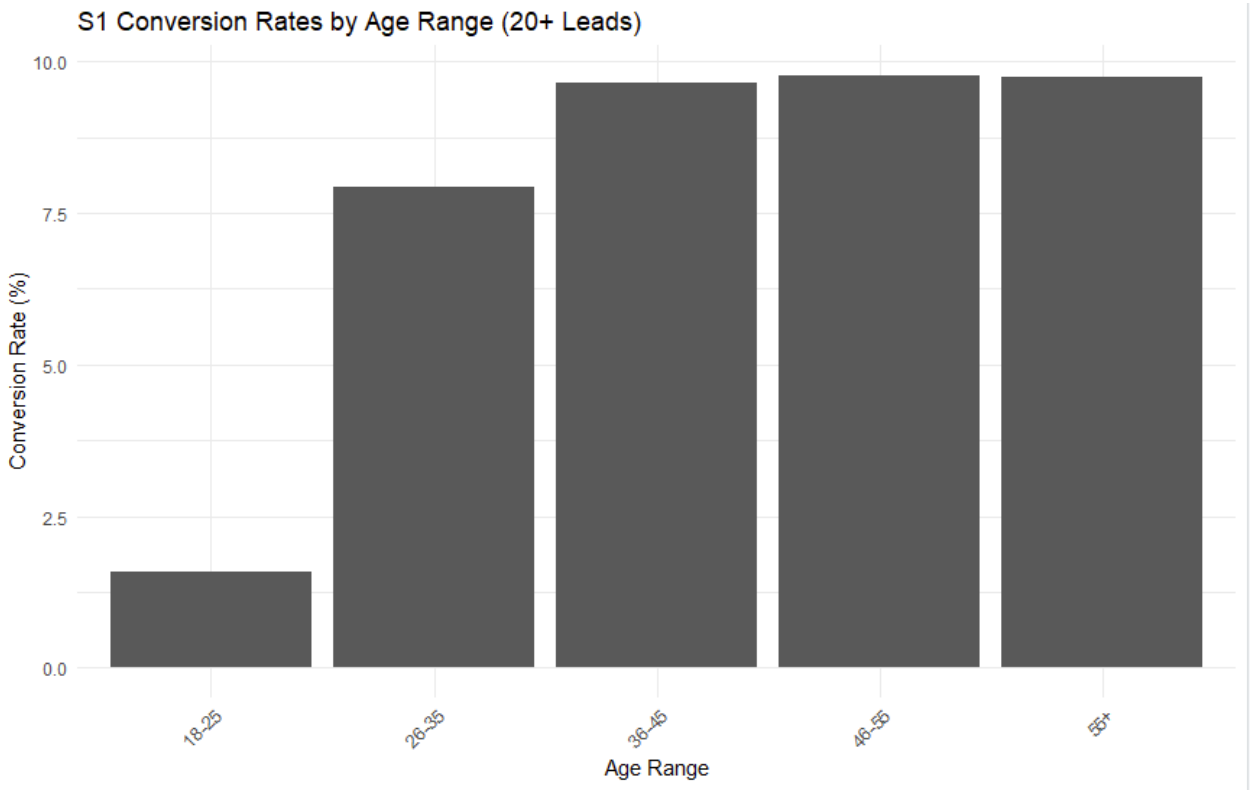
data: Converted by Quarter
t = 11.177, df = 14889, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.05415146 0.07718303
sample estimates:
mean in group Q3 mean in group Q4
     0.14932266   0.08365542

55+: Biggest Drop. Down from 16.3% to 8.7%, verified.

Two Sample t-test

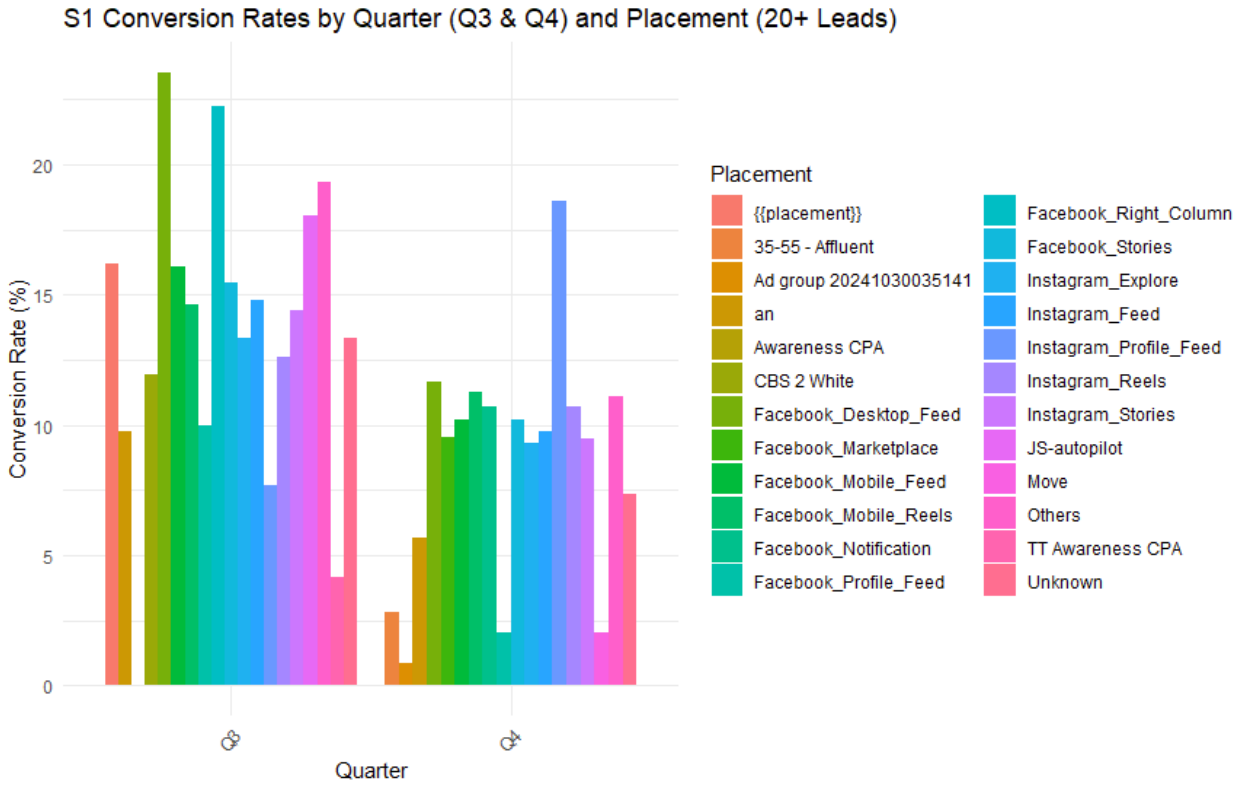
data: Converted by Quarter
t = 10.611, df = 11504, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.06197054 0.09005516
sample estimates:
mean in group Q3 mean in group Q4
     0.16304850   0.08703565

From this analysis, we can conclude that there is a drop off in conversion % among older demographics (36+). The most drastic change was among all 55+ quiz takers, who converted significantly worse in Q4.



Overall, S1 Conversion rate is steadily high from 36+. Demographics under 36 are much less likely to purchase an S1.

Ad Placement:



The next big section. Drops across the board. Only notable exception is in the Instagram Profile Feed placement group, which I checked and found that its sample size was not high enough to base any judgment on (10 S1 orders across 69 Quiz Leads). Here's that test:

Two Sample t-test

data: Converted by Quarter
t = -1.2437, df = 67, p-value = 0.218
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
-0.28425890 0.06601203
sample estimates:
mean in group Q3 mean in group Q4
0.07692308 0.18604651

Damning drops:

Instagram Feed Down from 14.8% to 9.7%

Two Sample t-test

data: Converted by Quarter

t = 5.8328, df = 6271, p-value = 5.721e-09
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.03370531 0.06783008
sample estimates:
mean in group Q3 mean in group Q4
     0.14806867   0.09730098

Facebook Mobile Feed down from 16% to 10%. Biggest drop.

Two Sample t-test

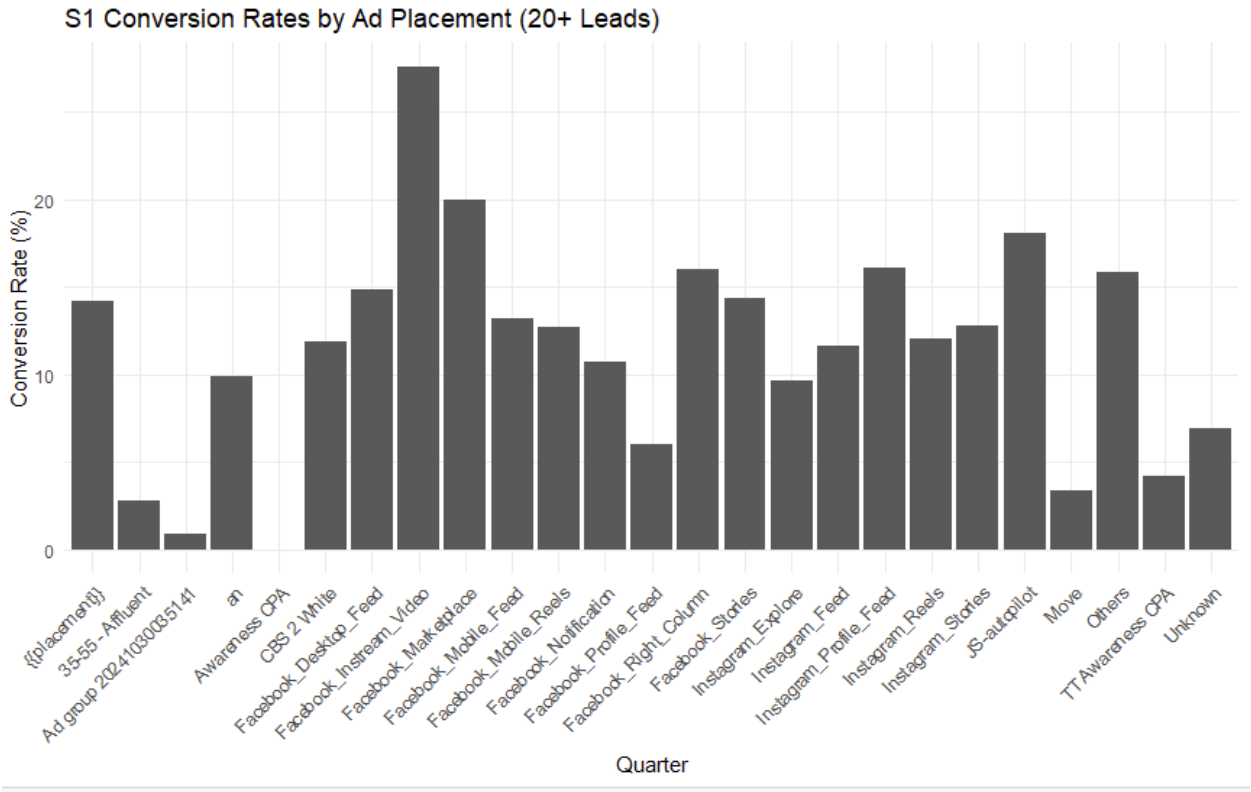
data: Converted by Quarter
t = 5.5798, df = 4441, p-value = 2.55e-08
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.03806400 0.07930034
sample estimates:
mean in group Q3 mean in group Q4
      0.1608696   0.1021874

Unknown Source down from 13.4% to 7.3%

Two Sample t-test

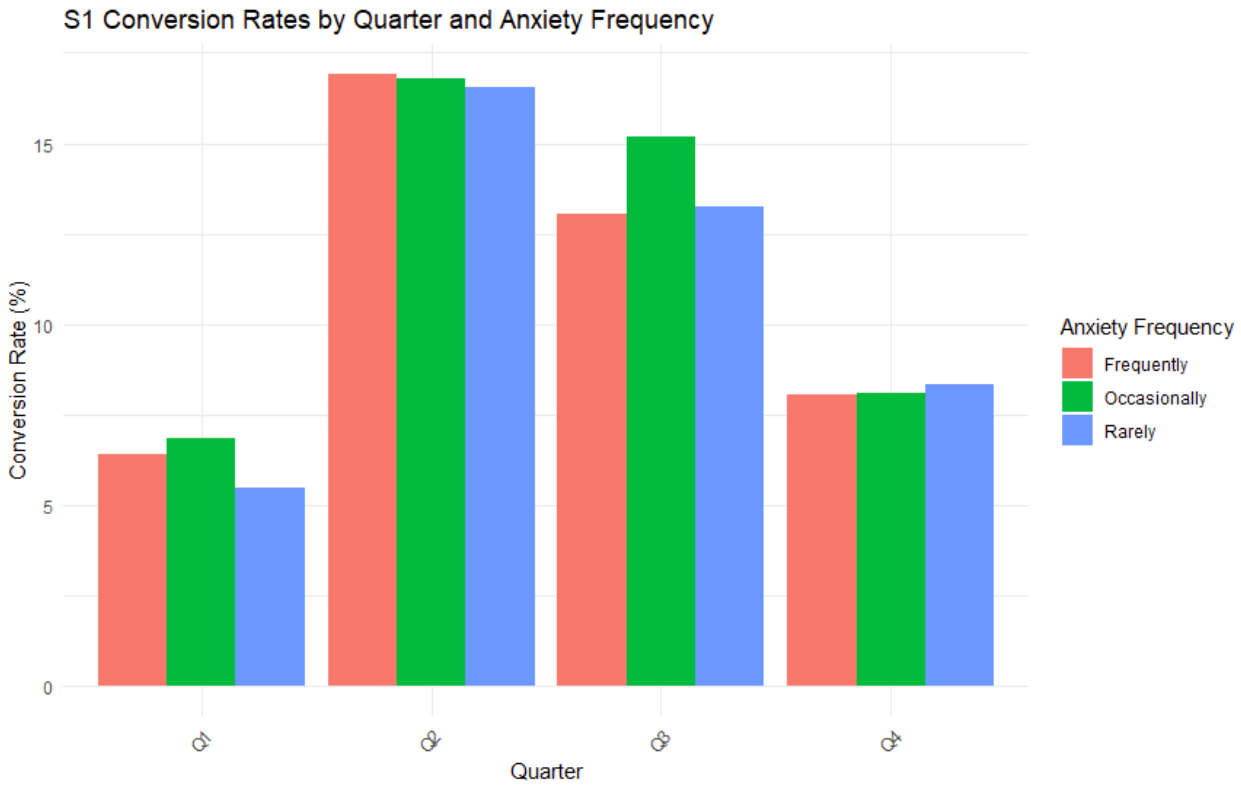
data: Converted by Quarter
t = 7.1774, df = 22901, p-value = 7.323e-13
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.04372310 0.07657533
sample estimates:
mean in group Q3 mean in group Q4
     0.13358779   0.07343857

These drops make up some of our worst hits, as they account for a huge portion of our ad placements.



Overall, Facebook ads convert slightly higher than Instagram ads. Facebook Instream video is the highest performing placement.

Anxiety Frequency:



Same pattern visible here. Highest in Q2, then a drop over time. Consistent across answer, though those who rarely experience anxiety dropped the least quarter to quarter. Consistent across all groups (tests below).

Anxious Frequently Down from 13% to 8%

Two Sample t-test

data: Converted by Quarter
t = 8.0613, df = 14073, p-value = 8.154e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.03793592 0.06231141
sample estimates:
mean in group Q3 mean in group Q4
      0.13050253   0.08037887

Anxious Occasionally down from 15.1% to 8.1%

Two Sample t-test

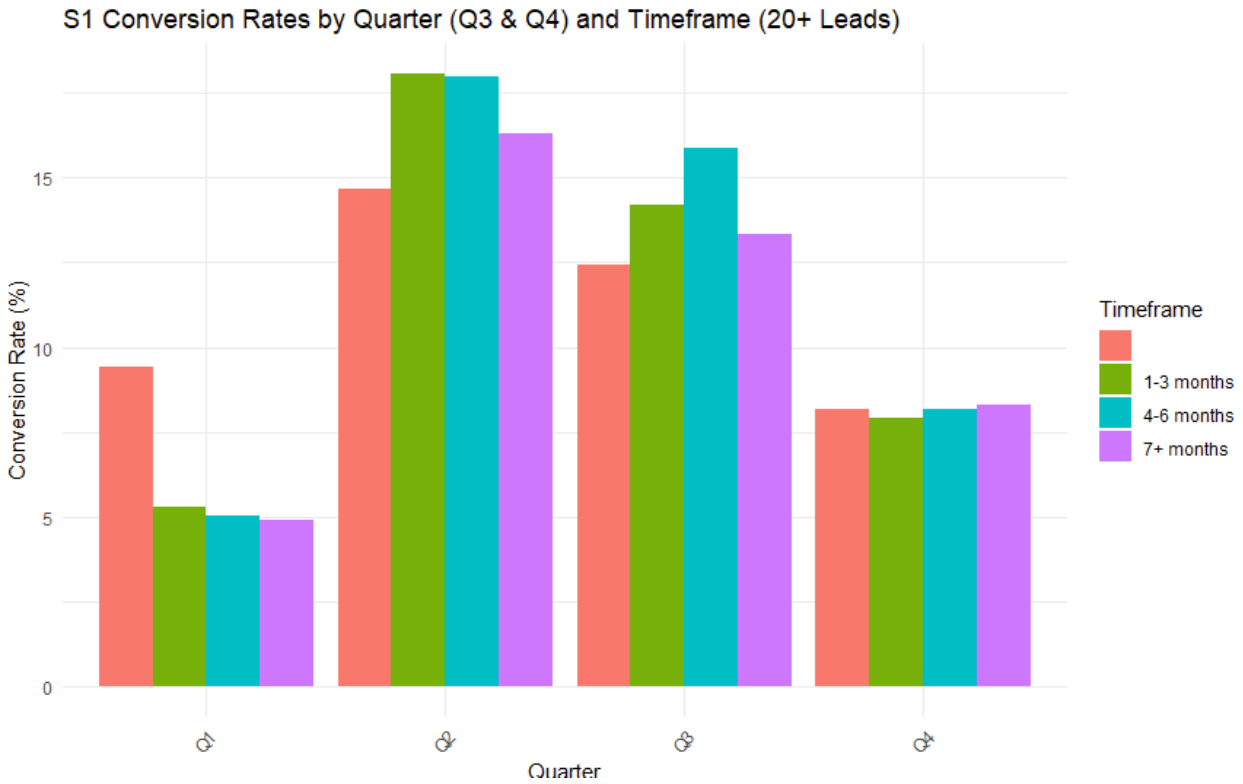
data: Converted by Quarter
t = 14.727, df = 22525, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.06143616 0.08030004
sample estimates:
mean in group Q3 mean in group Q4
     0.15166488   0.08079678

Anxious Rarely down from 13.2% to 8.3%

Two Sample t-test

data: Converted by Quarter
t = 7.2499, df = 10264, p-value = 4.473e-13
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
 0.03562897 0.06203509
sample estimates:
mean in group Q3 mean in group Q4
     0.13229416   0.08346213

Timeline of Weight Loss Goal:



Same Pattern. Spike in Q2 followed by a decrease over time. Consistent across groups. Those with the timeframe of 4-6 months performed the worst. Groups below:

No Timeframe down the least, from 12.4% to 8.2%

Two Sample t-test

data: Converted by Quarter
t = 6.3112, df = 10042, p-value = 2.885e-10
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.02921814 0.05554441
sample estimates:
mean in group Q3 mean in group Q4
0.12418033 0.08179905

1-3 Months down from 14.2% to 7.9%

Two Sample t-test

data: Converted by Quarter
t = 11.142, df = 15120, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:

0.05171824 0.07379944
sample estimates:
mean in group Q3 mean in group Q4
0.14214972 0.07939088

4-6 Months down the most, from 15.9% to 8.2%

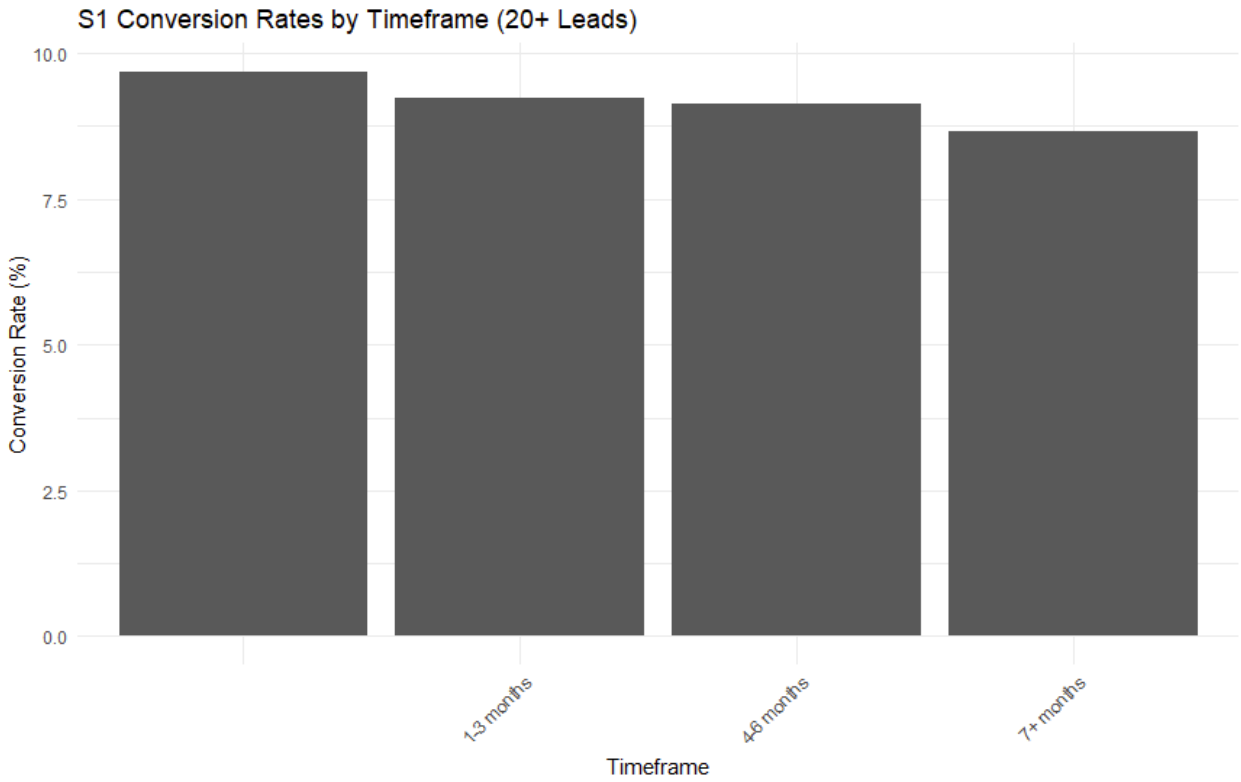
Two Sample t-test

data: Converted by Quarter
t = 12.274, df = 14729, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.06465891 0.08923477
sample estimates:
mean in group Q3 mean in group Q4
0.15870628 0.08175944

7+ Months down from 13.3% to 8.3%

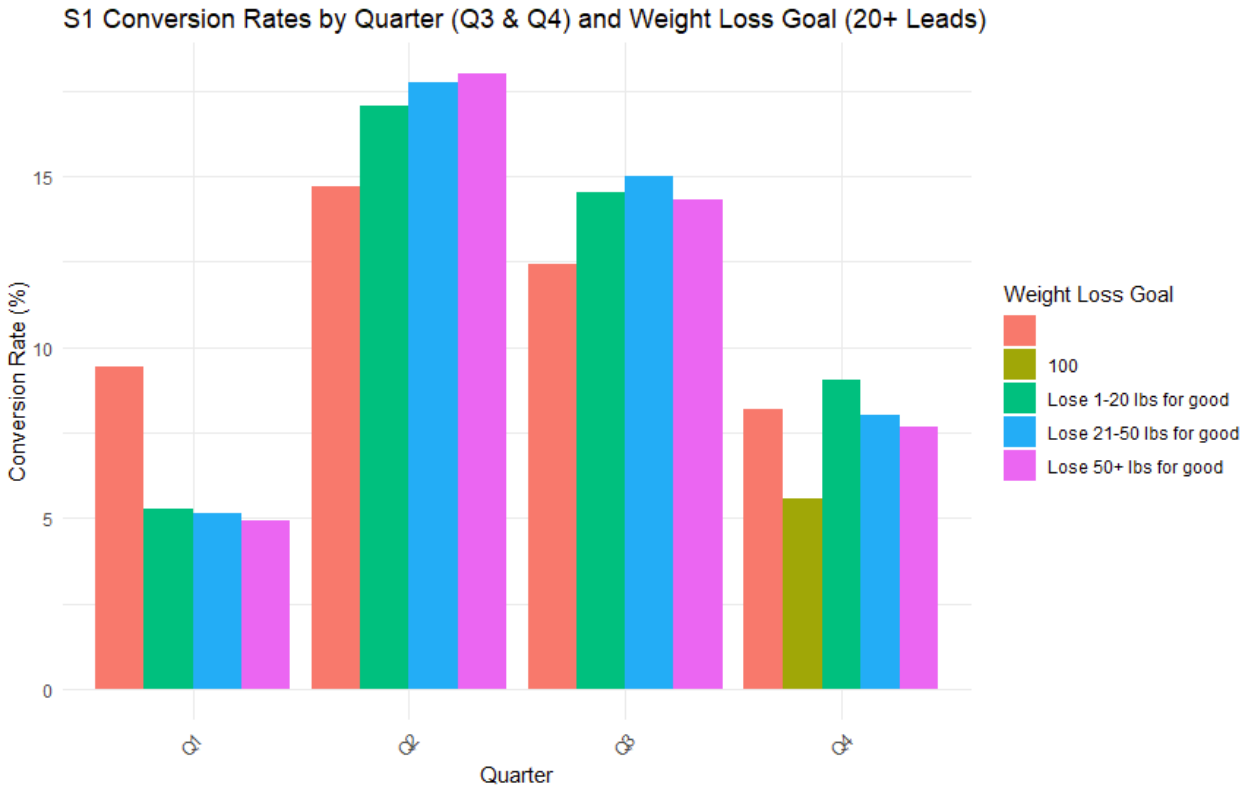
Two Sample t-test

data: Converted by Quarter
t = 5.4941, df = 6969, p-value = 4.067e-08
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.03237198 0.06828784
sample estimates:
mean in group Q3 mean in group Q4
0.13338926 0.08305935



Overall, people who are less patient with their goals have a higher S1 Conversion rate, and are more likely to purchase an S1.

Weight Loss Goal:



Same visible pattern. Spike in Q2, then slow decay across the board, consistent across all groups. Those with no weight loss goal had slower decay and conversion drop. Could warrant continued exposure with them. Here are the comparisons for each group:

No Goal down from 12.4% to 8.1% (smallest change)

Two Sample t-test

data: Converted by Quarter
t = 6.3098, df = 10037, p-value = 2.913e-10
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.02923541 0.05558626
sample estimates:
mean in group Q3 mean in group Q4
0.12417763 0.08176679

Lose 1-20 lbs down from 14.5% to 9.1%

Two Sample t-test

data: Converted by Quarter
t = 7.4546, df = 8782, p-value = 9.868e-14
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0

95 percent confidence interval:
0.04043900 0.06929385
sample estimates:
mean in group Q3 mean in group Q4
0.14539307 0.09052664

Lose 21-50 lbs down from 15% to 8%

Two Sample t-test

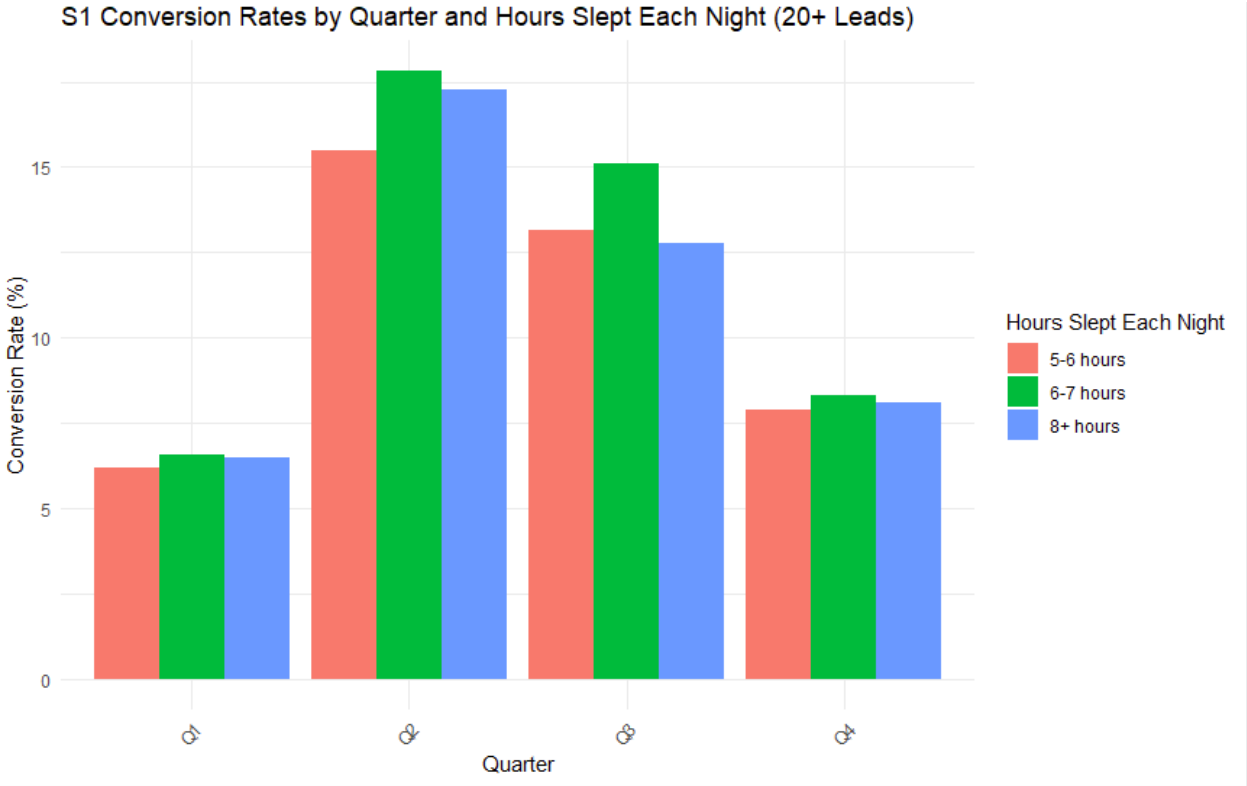
data: Converted by Quarter
t = 11.617, df = 14931, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.05786633 0.08135830
sample estimates:
mean in group Q3 mean in group Q4
0.14994865 0.08033633

Lose 50+ lbs down from 14.3% to 7.7%

Two Sample t-test

data: Converted by Quarter
t = 9.6348, df = 12764, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.05298024 0.08004318
sample estimates:
mean in group Q3 mean in group Q4
0.14315033 0.07663862

Sleep Hours Per Night



Same trend, High in Q2, drops over time. Consistent across groups. The 8+ hour group had the smallest drop Q to Q, and also has the best S2 conversion rate.

5-6 hours down from 13.1% to 7.9%

Two Sample t-test

data: Converted by Quarter
t = 9.9986, df = 18461, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.04224709 0.06284987
sample estimates:
mean in group Q3 mean in group Q4
0.13137685 0.07882837

6-7 hours biggest drop, from 15.1% to 8.3%.

Two Sample t-test

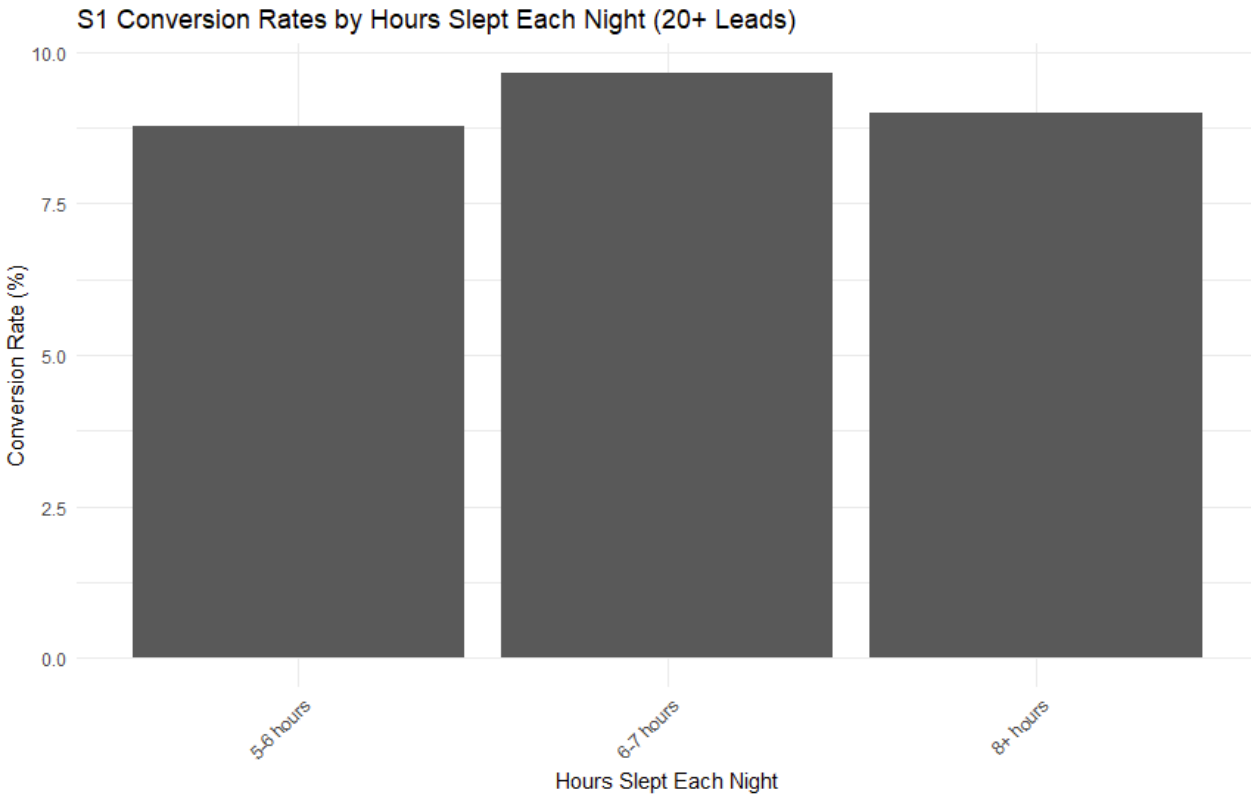
data: Converted by Quarter
t = 14.332, df = 23002, p-value < 2.2e-16
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0

95 percent confidence interval:
0.05858701 0.07715008
sample estimates:
mean in group Q3 mean in group Q4
0.15113249 0.08326395

8+ hours smallest drop, from 12.7% to 8.1%

Two Sample t-test

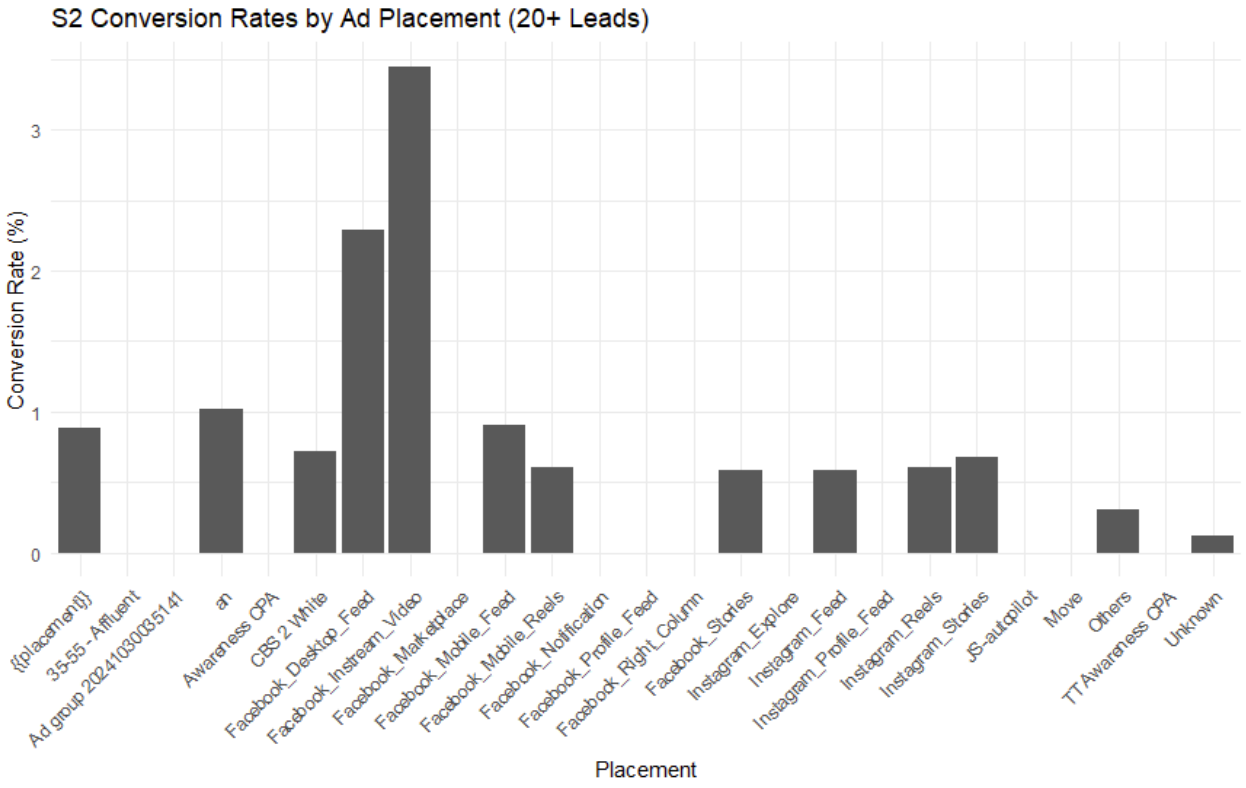
data: Converted by Quarter
t = 4.8128, df = 5399, p-value = 1.528e-06
alternative hypothesis: true difference in means between group Q3 and group Q4 is not equal to 0
95 percent confidence interval:
0.02767967 0.06572656
sample estimates:
mean in group Q3 mean in group Q4
0.12764004 0.08093692



Interestingly, the group with the best S1 conversion is the 6-7 hour group, while the group with the best S2 conversion is the 8+ hour group.

Section 2: S2 Conversion Analysis

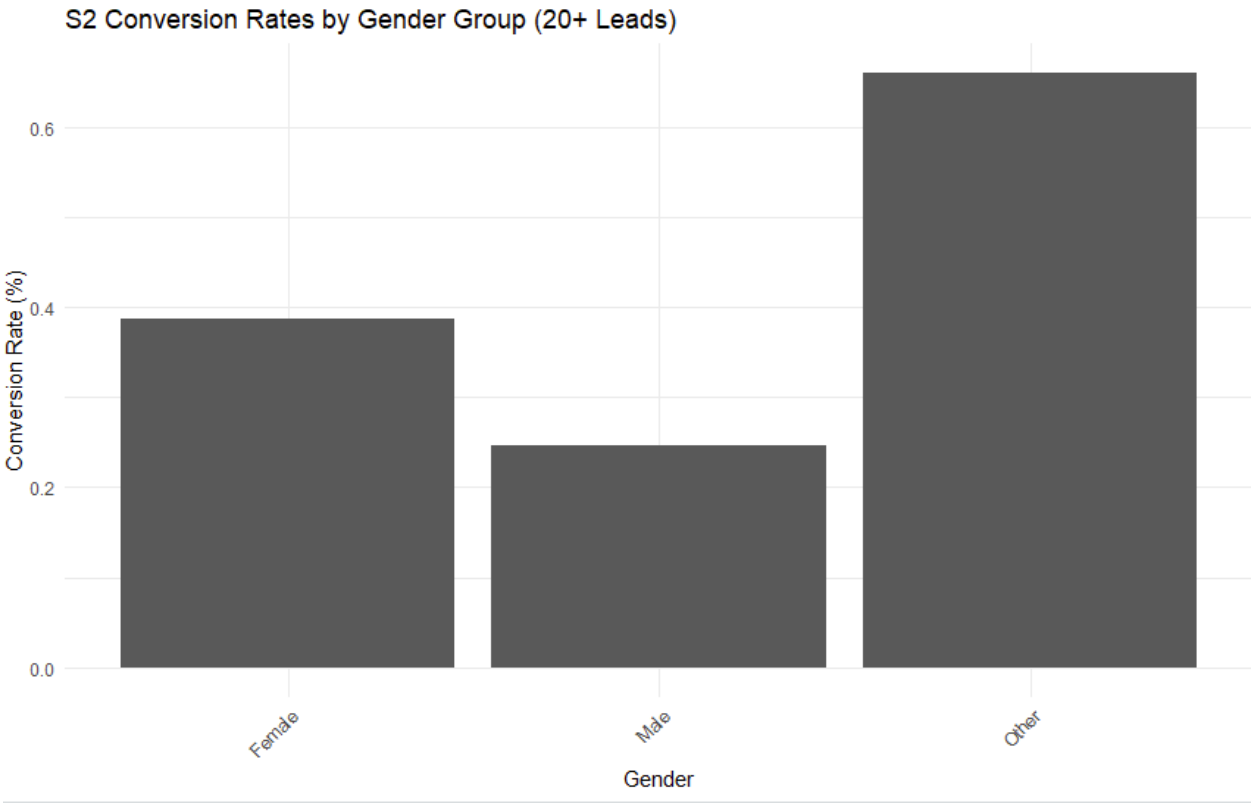
Ad Placement



Of groups with enough data (10+ S2 Orders), “an” and “Facebook Mobile” have the best S2 Conversion rate. Unknown placements are by far the worst, with an S2 Conversion rate of 0.12%.

	PLACEMENT	Total_Leads	S2_Orders	Conversion_Rate
	<chr>	<int>	<dbl>	<dbl>
1	Facebook_Instream_Video	29	1	3.45
2	Facebook_Desktop_Feed	175	4	2.29
3	an	977	10	1.02
4	Facebook_Mobile_Feed	5433	49	0.902
5	{{placement}}	113	1	0.885
6	CBS 2 White	277	2	0.722
7	Instagram_Stories	5266	36	0.684
8	Instagram_Reels	3132	19	0.607
9	Facebook_Mobile_Reels	2811	17	0.605
10	Instagram_Feed	7008	41	0.585
11	Facebook_Stories	1376	8	0.581
12	Others	329	1	0.304
13	Unknown	33930	40	0.118
14	35-55 - Affluent	499	0	0
15	Ad group 20241030035141	935	0	0
16	Awareness CPA	24	0	0
17	Facebook_Marketplace	50	0	0
18	Facebook_Notification	28	0	0
19	Facebook_Profile_Feed	100	0	0
20	Facebook_Right_Column	50	0	0
21	Instagram_Explore	93	0	0
22	Instagram_Profile_Feed	81	0	0
23	JS-autopilot	72	0	0
24	Move	120	0	0
25	TT Awareness CPA	24	0	0

Gender



GENDER Total_Leads S2_Orders Conversion_Rate

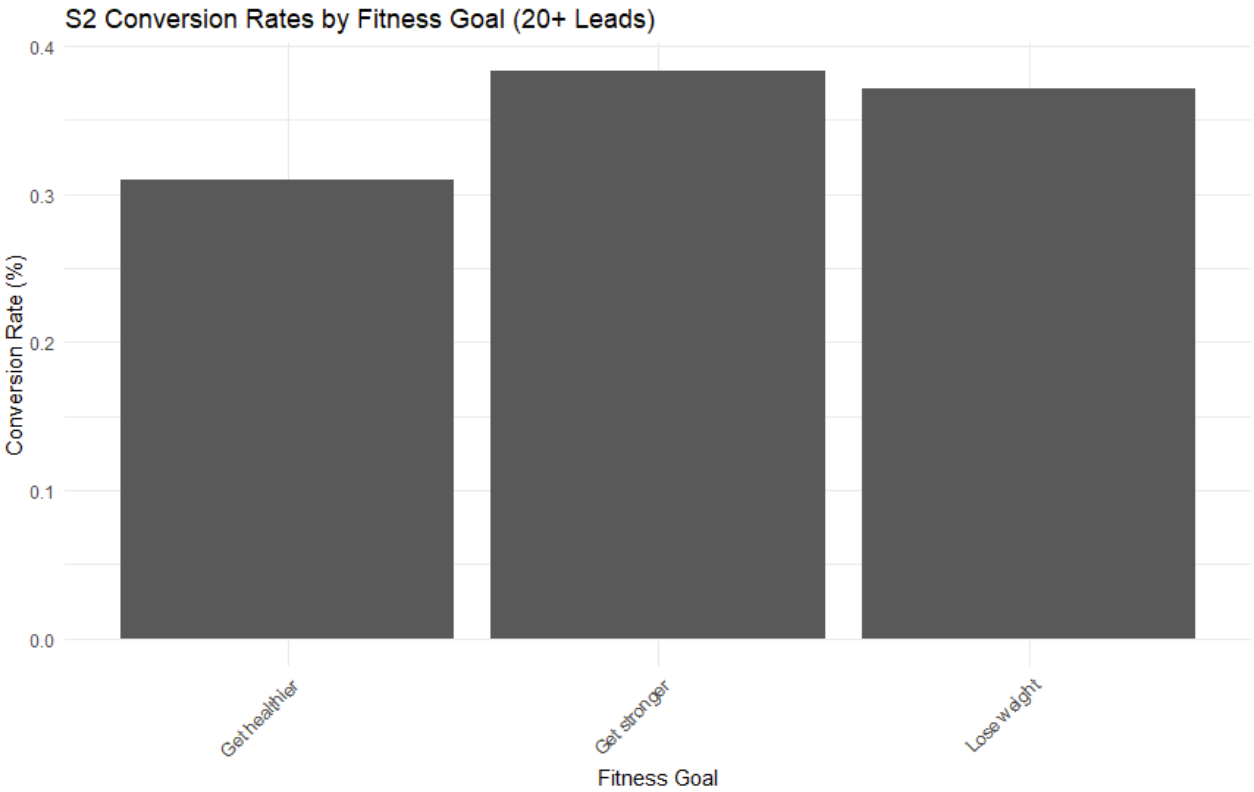
	<chr>	<int>	<dbl>	<dbl>
1	Other	303	2	0.660
2	Female	51330	199	0.388
3	Male	11351	28	0.247

As expected, women convert from lead to S2 at a much higher rate than men. Confirmed statistically. Continuity correction not needed due to large sample size.

2-sample test for equality of proportions without continuity correction

data: c(female_s2_orders, male_s2_orders) out of c(female_total_leads, male_total_leads)
X-squared = 5.1224, df = 1, p-value = 0.02362
alternative hypothesis: two.sided
95 percent confidence interval:
0.0003509994 0.0024692648
sample estimates:
prop 1 prop 2
0.003876875 0.002466743

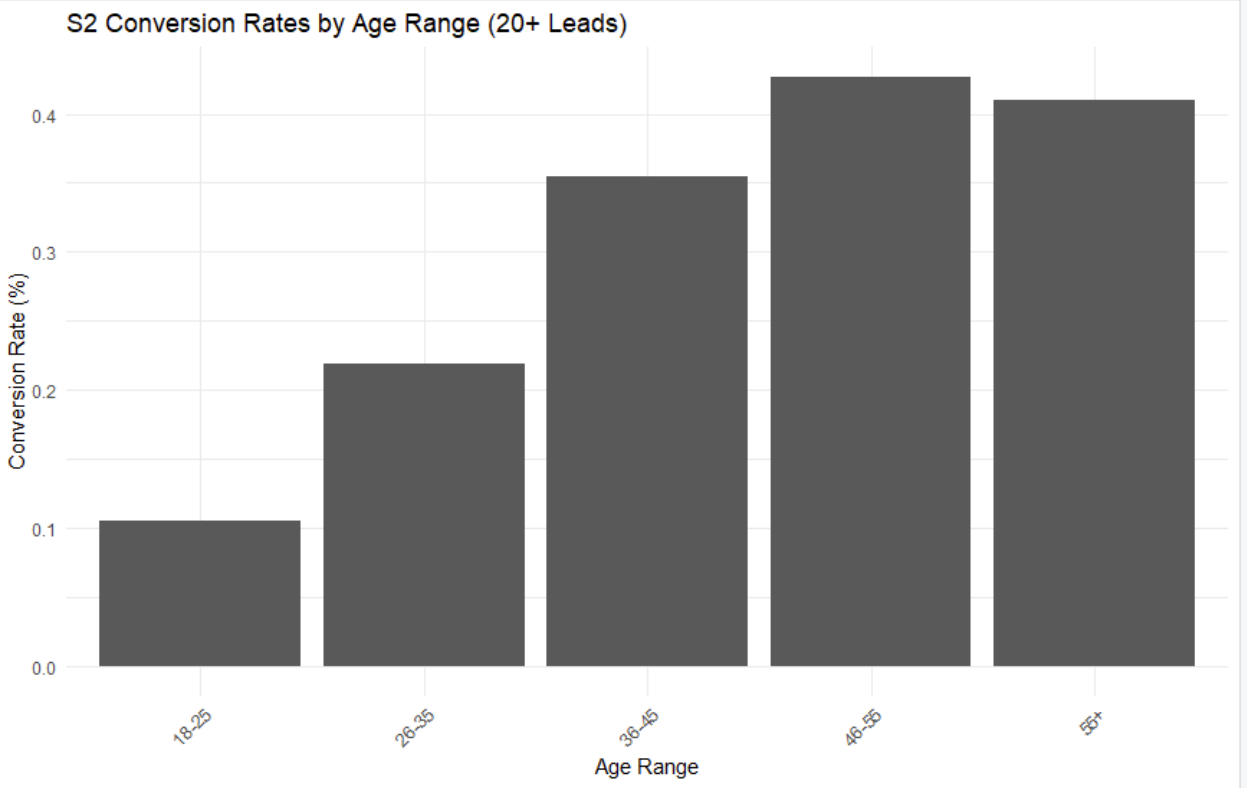
Fitness Goal



Despite being our biggest group of S2's by far, people who want to lose weight convert slightly worse from Quiz to S2 than those who want to get stronger.

	FITNESS_GOAL	Total_Leads	S2_Orders	Conversion_Rate
	<chr>	<int>	<dbl>	<dbl>
1	Get stronger	4964	19	0.383
2	Lose weight	49292	183	0.371
3	Get healthier	8728	27	0.309

Age Range

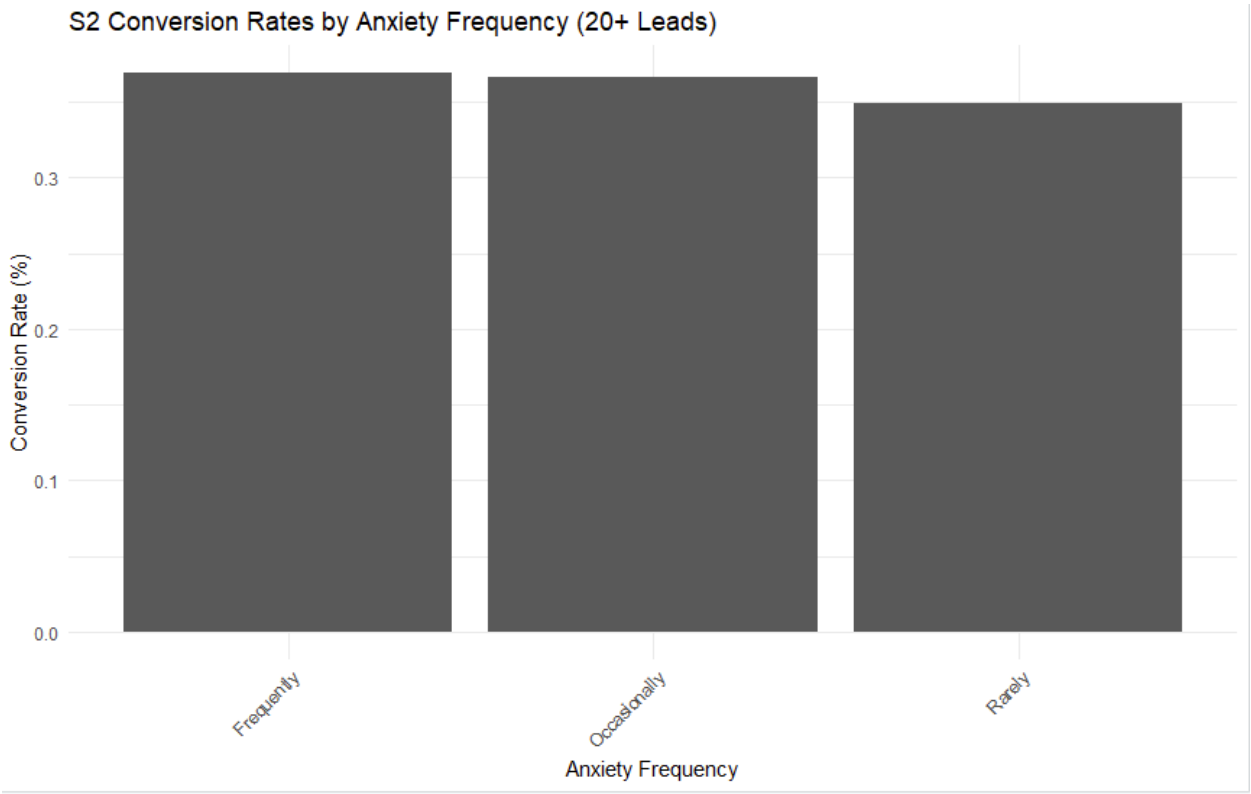


AGE_RANGE Total_Leads S2_Orders Conversion_Rate

	<chr>	<int>	<dbl>	<dbl>
1	46-55	19438	83	0.427
2	55+	14395	59	0.410
3	36-45	18616	66	0.355
4	26-35	8647	19	0.220
5	18-25	1888	2	0.106

18-25s convert so poorly to both S1 and S2 that they should not be taking the quiz at all. 46-55 is the ideal for S2 Conversion.

Anxiety Frequency

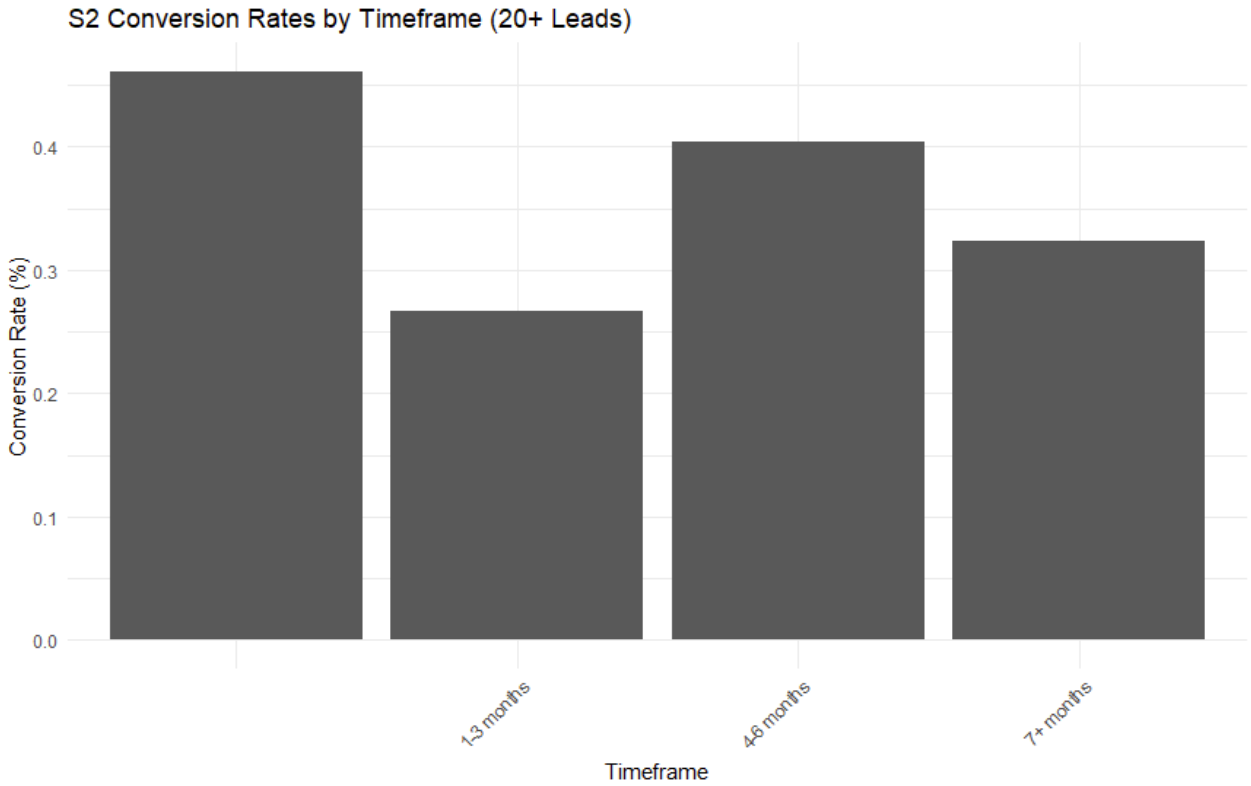


ANXIETY_FREQUENCY Total_Leads S2_Orders Conversion_Rate

	<chr>	<int>	<dbl>	<dbl>
1	Frequently	19242	71	0.369
2	Occasionally	30297	111	0.366
3	Rarely	13445	47	0.350

Not a lot of difference here. Very slight edge for frequently anxious people, but not very significant when compared.

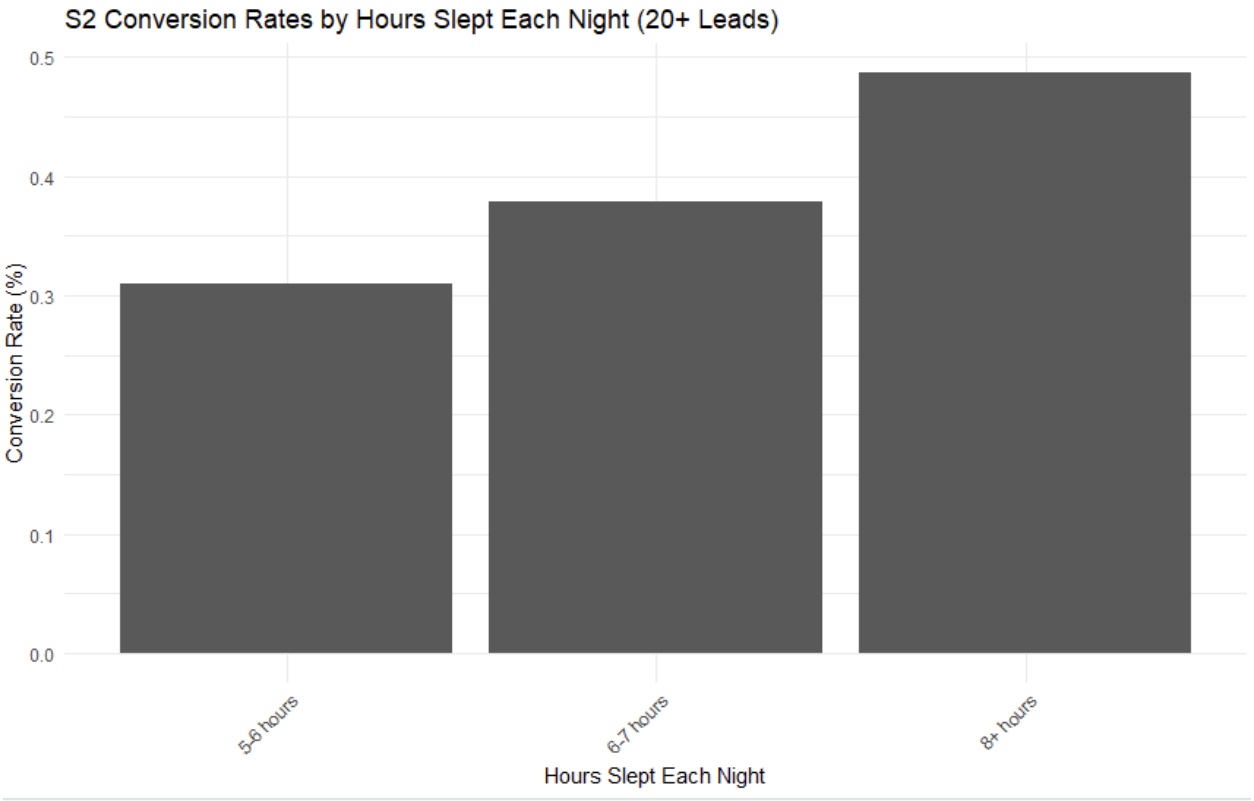
Weight Loss Timeframe



TIMEFRAME	Total_Leads	S2_Orders	Conversion_Rate
<chr>	<int>	<dbl>	<dbl>
1 ""	14958	69	0.461
2 "4-6 months"	19295	78	0.404
3 "7+ months"	9264	30	0.324
4 "1-3 months"	19467	52	0.267

Ignoring nulls here (from people who didn't mark the timeline, or had other goals than weight loss), the ideal timeframe is actually 4-6 months. Right in the middle.

Sleep/Night



HOURS_SLEPT_EACH_NIGHT	Total_Leads	S2_Orders	Conversion_Rate
<chr>	*<int>*	*<dbl>*	*<dbl>*
1 8+ hours	7188	35	0.487
2 6-7 hours	30620	116	0.379
3 5-6 hours	25176	78	0.310

Ideal sleep for S2 conversion is actually 8+ hours. This is different from our S1 conversion ideal of 6-7 hours.