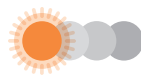# TOTAL UNDUPLICATED REACH & FREQUENCY ANALYSIS

IDENTIFYING AN EFFICIENT PRODUCT PORTFOLIO

Total Unduplicated Reach and Frequency (TURF) analysis is a technique used in marketing research to maximize the unduplicated reach of a product line while minimizing that product line's depth. It was a technique originally used by media planners attempting to build 'reach' for an advertisement across vehicles (print, broadcast, etc.) while also considering the duplication of those vehicles' audiences. Now, it is often used to choose the product lines, flavor bundles, colors, scents, package sizes to offer to potential consumers. The purpose of this document is to show how TURF analysis can be used to guide product mix.

OBJECTIVES

The objective of TURF analysis is to identify an efficient product portfolio. Specifically, TURF:

Maximizes the number of unduplicated consumers who will find an acceptably good item in the product line.

Minimizes the product line mix while maximizing the number of consumers reached.

Finds the incremental unduplicated reach to the full line contributed by each additional possible product.

DESIGN

The data input for TURF analysis is most often a set of product preference questions asked of respondents. The format varies, but some common types are:

Purchase Intent Likelihood Scale:
For each of the following products would you 'definitely buy,' 'probably buy,' 'might or might not buy,' 'probably not buy,' or 'definitely not buy?'

Desirability Scale:
Rate the following 6 items on a scale from 1 to 6, with 1 being your most preferred product and 6 being the least preferred.

Ordered List:
If you were limited to picking out at most 3 extra product options, which ones would they be?

The key to designing a study that will include TURF analysis is that all respondents must evaluate all products. That is, this is a full block, within-subject experiment. In addition, the survey should collect basic demographics and purchase frequency and amount. The reasons for this are discussed in the Limitations section of the paper.

TABLE 1 : RESULTS

Product	Initial Reach	Increment 1	Increment 2	Increment 3
Product 1	62%[1]	–	–	–
Product 3	20%	19%[3]	–	–
Product 4	38%	13%	81%[5]	–
Product 2	51%	9%	3%	1%
Cumulative Reach	62%[2]	81%[4]	85%	86%[4]

NOTE: All data are hypothetical and for illustrative purposes only.

EXAMPLE

Outlined above, we show the steps to execute TURF analysis. Suppose 300 respondents rate their likelihood to purchase four different products. 'Definitely would buy' responses are used for this TURF analysis and the results yield the following table.

We can interpret results from the table above as follows:

1 Product 1 reaches 62% of respondents; that is, 62% of respondents say they definitely would purchase it. Summing all four products' initial reaches together results in a total over 100%. This is because it is possible that people claiming that they definitely would buy Product 1 also claimed that they definitely would buy Products 2 and 3. In other words, those reached by one of the products may have been reached by any number of others.

2 Since Product 1 has the highest initial reach we will assume here that it is our best option for the first product in the line. Thus, our cumulative reach with one product in the line is 62%. It is not necessary for the product with the highest reach be included as the first product in the line. Entry to the line can be specified according to what is currently available, distribution, cost, etc.

3 After removing the 62% of respondents reached by Product 1, Product 3 reaches an additional 19% of respondents (Increment 1). Although Product 3's initial reach is lower than Products 2 and 4, once people who said that they definitely would buy Product 1 are removed, its reach is greater than the reach of Products 2 and 4.

4 Products 1 and 3 together reach (62%+19%)=81% of respondents.

5 If we were to add a third product to the line, Product 4 would be our best choice. However, it only reaches an additional 4% of respondents not already reached by Products 1 and 3.

6 The maximum reach we can attain with these four products is 86% of respondents.

HOW DID WE ARRIVE AT THESE RESULTS?

The first step is to find the best product among all respondents. 'Definitely would buy' responses are summarized in Table 2, below. Note that although a combination of 'Definitely would buy' and 'Probably would buy' responses could be used as inputs for the TURF, 'Definitely would buy' responses are more reliable. Thus, typically only 'Definitely would buy' responses are used.

TABLE 2
Base: Total respondents (n=300)

	Product 1	Product 2	Product 3	Product 4
Total	300	300	300	300
Definitely would buy	186	153	60	114
	62%	51%	20%	38%

The best product is Product 1, with 186 respondents (62%) indicating that they definitely would purchase it. Looking at Table 2, it would appear that Product 2 would be our second best product. Keep in mind, however, that it is possible that all 153 respondents who said they definitely would buy Product 2 are also part of the group who said they definitely would buy Product 1. If this were the case, adding Product 2 to the mix would not have any effect on increasing the *unduplicated* reach.

To find the unduplicated reach, we examine the respondents who aren't reached by Product 1. To do this, we remove the 186 respondents who definitely would purchase Product 1 from the base and rerun the data table. The results are shown in Table 3.

TABLE 3
Base: Those respondents who did not indicate that they definitely would buy Product 1 (n=114)

	Product 1	Product 2	Product 3	Product 4
Total	114	114	114	114
Definitely would buy	0	26	58	39
	0%	23%	51%	34%

The best product for the reduced base of unreached respondents is Product 3, with 58 respondents (51%) indicating that they definitely would purchase it. By adding Product 3 to our line we find an incremental reach of (58/300) = 19%. By choosing Products 1 and 3 we reach (186+58)/300=81% of respondents.

The next step is to examine the respondents who aren't reached by Product 1 or Product 3. To do this, we remove the 186 respondents who definitely would purchase Product 1 and the 58 respondents who definitely would purchase Product 3 from the base and rerun the data table. The results are shown in Table 4 below.

TABLE 4
Base: Those respondents who did not indicate that they definitely would buy Product 1 or Product 3 (n=56)

	Product 1	Product 2	Product 3	Product 4
Total	56	56	56	56
Definitely would buy	0	8	0	12
	0%	14%	0%	21%

The best product for the reduced base of unreached respondents is Product 4, with 12 respondents (21%) indicating that they definitely would purchase it. By choosing Products 1, 3, and 4 we reach 186+58+12=256 respondents (85%).

Finally, we examine the respondents who aren't reached by Product 1, Product 3, or Product 4. To do this, we remove the 186 respondents who definitely would purchase Product 1, the 58 respondents who definitely would purchase Product 3, and the 12 respondents who definitely would purchase Product 4 from the base and rerun the data table. The results are shown in the following table, Table 5.

TABLE 5

Base: Those respondents who did not indicate that they definitely would buy Product 1, Product 3, or Product 4 (n=44)

	Product 1	Product 2	Product 3	Product 4
Total	44	44	44	44
Definitely would buy	0	2	0	0
	0%	5%	0%	0%

Since Product 2 is the only product left, it is the best remaining product with 2 respondents (5%) indicating that they definitely would purchase it. By including all 4 products, then, we reach 186+58+12+2=258 respondents (86%). There is no combination of these four products that will produce a higher reach than 86%.

If our goal is to select two products so that we maximize reach, we would choose Products 1 and 3. If our goal is to select three products so that we maximize reach, we would choose Products 1, 3, and 4.

In practice, when there are many products, the differences between the 'optimal' solution and the next best solution might be very small. Therefore, we typically run through the same process several times, each time assuming that one of the other products is the 'best.' This allows a sensitivity analysis of the results.

LIMITATIONS AND EXTENSIONS

While TURF is a useful and commonly used tool, a few points should be kept in mind when using or interpreting results from TURF analysis. TURF makes the assumption that once consumers are satisfied with a specific product they will no longer seek variety in that product category. This assumption is probably limiting for some product categories where there is substantial variety seeking. Also TURF makes no assumptions about frequency or amount of use. It does not distinguish between the person who will 'definitely buy' the product twice a week and the person who will 'definitely buy' the product once a month. This is why the 'frequency of use' questions mentioned earlier can be valuable. However, most implementations of TURF analysis do not include a frequency component, so the analysis is really a Total Unduplicated Reach, or TUR analysis.

One way to examine frequency of use is to ask a follow-up question including the products a given respondent says she definitely/probably would buy. For example,

If the following varieties were all available, how many of each would you probably buy over the course of a year?

Product 1 _____
Product 2 _____
Product 3 _____
Product 4 _____
TOTAL _____

Ideally, a general price and size (if applicable) would be noted in this type of question.

The table below shows a summary of both initial reach (definitely would buy) and predicted purchase frequency for our

hypothetical example. Of the 186 respondents who definitely would buy Product 1, they estimate they would purchase 200 units, while the 153 who definitely would buy Product 2 estimate they would purchase 450 units.

TABLE 6

Initial Reach & Predicted Purchase Frequency

n	Product 1	Product 2	Product 3	Product 4
	300	300	300	300
Definitely would buy	186	153	60	114
Predicted Purchase (units)	200	450	120	250

Using the additional frequency information allows for a better estimation of the volumetric potential of the line than using reach alone. It is also possible to weight respondents by their category purchase volume.

Also note that since the TURF methodology typically does not include competitive products, the estimated volume potential is not reflective of the entire market. The table below shows a summary of reach and predicted purchase frequency for various 2-product lines.

TABLE 7

Summary Initial Reach & Predicted Purchase Frequency

	Product 1 & Product 3	Product 1 & Product 4	Product 1 & Product 2
Reach	81%	75%	71%
Predicted Purchase (units)	320	450	650

Although more people are reached with a line that includes Products 1 and 3, they would buy relatively less. Assuming that all four products are comparable (similar size/price), this finding might lead to a recommendation of a line with a smaller reach, but greater volume potential. In instances where products are not comparable, different considerations would need to be addressed.

ALTERNATIVES

If an objective of the research is to understand how changes to a product line impact the market as a whole, including their effect on competition and cannibalization of a current brand, a discrete choice methodology that forces respondents to make trade-offs between various product options is a better alternative than TURF analysis. However, if the research objective is focused on building a new product line or changing an existing line, TURF analysis is an efficient method.

Overall, TURF results are relatively simple to understand and interpret. TURF is a useful technique for analyzing existing product lines and developing product portfolios.