

Optimizing Product Assortment with Total Unduplicated Reach and Frequency Analysis in SAS/OR®

ABSTRACT

Within the market research industry, Total Unduplicated Reach and Frequency (TURF) analysis has become an increasingly popular technique used to determine which combination of products will appeal to the greatest number of consumers. For companies that rely on optimal product assortment to help drive profitability, the output from a well-designed TURF analysis is critical for understanding product cannibalization and for evaluating the tradeoffs associated with adding or removing specific varieties from a product line. Conventional approaches for TURF analyses have involved calculating all possible product combinations, only to then recommend the one optimal, or few near-optimal solutions. This exhaustive approach is computationally inefficient and does not scale to commercial sized problems, which can often involve dozens of products, thousands of surveyed consumers, and tens of millions of product combinations. Other approaches using the Greedy heuristic fail to guarantee an optimal solution.

A more accurate and commercially viable approach to TURF analysis can instead be constructed as a mixed-integer linear programming problem using SAS/OR®. This paper details the modeling approach, data requirements, desired output, scenario analysis, and stationarity considerations. A detailed example along with sample code using SAS/IML®, SAS/OR®, and SAS/STAT® is provided.

If it's true that variety is the spice of life, then why not optimize it? This paper shows how to do just that by introducing both the problem and the analytical solution, so anyone with a background in retail analytics or market research can utilize this approach.