**Kohli, Krishnamurti (1987) – A Heuristic Approach to Product Design**

Preference-based methods for new product design:

* Multidimensional scaling approach
  + For each attribute, individuals have some ideal-point. Consumers choose product that minimizes the distance between ideal-point and the product
  + Identifying a point location in an attribute space that optimizes the share of choices via minimizing the distance to each individual’s ideal points is computationally expensive
* Conjoint analysis
  + Consumers choose between product profiles with varying levels of attributes
  + Estimates of part-worths are “obtained by scaling individual preferences and then used to evaluate new product concepts.”
  + But, “identifying a product profile that maximizes share-of-choices when individuals have different preferences over a set of multi-attribute alternatives and all attributes have discrete levels” remained unaddressed until this paper
    - **Goal**: identify a set (cardinality defined by user) of independent feasible product profiles that with highest predicted share-of-choices
      * Then, firm evaluates product profiles in terms of technological viability, cost of production, and congruence with the firm’s market position (and future market position)
  + Model addresses cannibalization by only considering (maximizing over) individuals whose status quo is not offered by the firm in question
    - Firm assigns different weights to individuals’ utilities; heterogeneity in weights arises from heterogeneity in an individual’s importance to the seller (frequent buyer, heavy user, strong word-of-mouth presence, etc.)
    - Essence of heuristic: for each level of an attribute only a level of a preceding attribute is selected
      * What does this imply about the underlying mental process? Is it a purely analytical contribution, or is there a theoretical one, too? What does this limit?

Results:

* Compared to Lagrangian-relaxation heuristic and an enumeration of all product profiles, the dynamic-programming heuristic outperforms in terms of accuracy of the approximation of the optimal solution and in terms of computational cost (74-100x faster)
  + But, dynamic programming heuristic is not always better (pg. 1532); it is sensitive to disparities in population segments if segments differ strongly in their utility assessment of a particular level of attribute