Assignment 3 (A3): Choice-Based Conjoint Analysis with Hierarchical Bayes for Mobile Service Providers

Objective: In this assignment, you'll use Hierarchical Bayes (HB) estimation to analyze consumer preferences for mobile service providers. The goal is to understand how attributes like brand, internet capacity, support level, and price impact customer choices, which will guide marketing and product strategy.

Importance: Hierarchical Bayes (HB) estimation offers substantial advantages in Choice-Based Conjoint (CBC) experiments, particularly when capturing individual-level preferences. By leveraging both respondent-level and population-level data, HB estimation enables more precise part-worth estimates for each attribute, even when sample sizes are limited. This multi-level approach also accommodates individual variation while reducing noise, resulting in robust predictions that better reflect true consumer preferences. Additionally, HB's iterative process improves the accuracy of utility estimates, making it especially valuable in contexts where attribute interactions are complex, as with multi-attribute products like mobile service plans. This precision supports actionable insights for targeted marketing and strategic product positioning, allowing companies to predict preference shifts and optimize offerings effectively.

Attributes and Levels in Choice-Based Conjoint

The mobile service providers in this study are evaluated based on the following attributes:

- **Brand**: AT&T, T-Mobile, Verizon
- **Internet Capacity**: 7 GB, 12 GB, 20 GB
- **Support Level**: Basic, Regular, Premium
- **Price per Line**: $40, $50, $60

Data: Access **Mobile service providers survey - Fall 2024** via Discover and analyze the experiment.

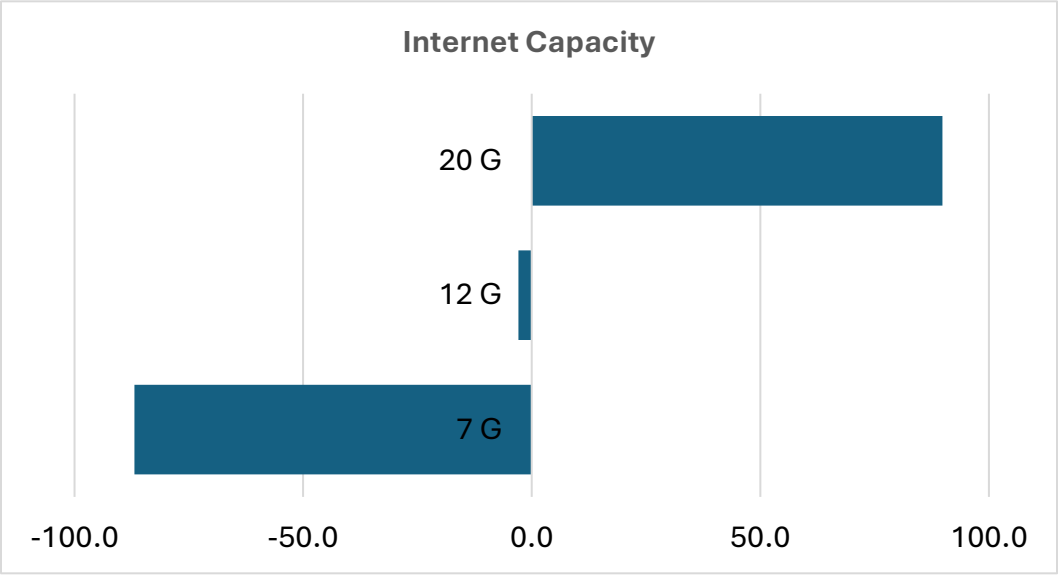
Instructions

1. **Run Hierarchical Bayes Estimation**
    - Run the HB estimation process to generate individual-level part-worth utilities for each attribute and level.
    - **Output Interpretation**: After the estimation process, review the part-worth utility scores, which will reveal the utility each respondent assigns to each level of the attributes.

2. **Analyze the Results**
    - **Calculate Average RLH:** Aggregate the RLH across respondents to determine the average fit of the model. Higher RLH indicates a better fit to the model.
    - **Calculate Average Utilities**: Aggregate the part-worths across respondents to determine the average utility for each level. Higher utilities indicate stronger preferences.
    - **Calculate the relative importances assign to each attribute/ feature**:

$$Importance\ attribute_f = \frac{Max(PWU_f) - Min(PWU_f)}{\sum_{f=1}^{f=F} Max(PWU_f) - Min(PWU_f)}$$

    - **Interpret Findings**: First indicate the model fit. Then describe the importances assigned to the attributes and discuss which ones you wish to focus on as a marketer. Compare the utility scores to identify trends. For example, you might find that "Premium Support" has a higher utility across most respondents, indicating its importance in decision-making.
3. **Present Your Findings**
    - **Summary Tables**: Create tables for each attribute showing the average part-worth utilities for each level.
    - **Data visualization**: Create bar charts for the average utilities of each attribute by levels, and for the importances assign to each one (see example below).
    - **Strategic Recommendations**: Provide actionable insights for marketing strategy, suggesting ways each brand might leverage their strengths or address weaknesses based on the analysis.



4. **Review the experiment design and offer the advantages and disadvantages of the current design**: consider the number of attributes, the number of levels, and the number of alternatives in each task. Convey how the changes you suggest will influence the experiment and its results.
5. **Report Submission**
    - **Format**: Submit a report with all tables, charts, and a summary of findings in a single Word/PDF file. Make sure to interpret each attribute's influence on choice and to provide strategic implications for the service providers.

Good luck, and leverage HB analysis to uncover valuable insights for mobile service provider preferences!