EXPERIMENTAL DESIGN

Assignment 2A

RESEARCH QUESTION: Provided that two containers hold an equal number of M&M's, does the increased size of a container, increase the accuracy of estimates on the number of M&M's within it?

DATA COLLECTION: The data will be collected from an *Experiment* where subjects are asked to provide an estimation on the number of M&M's within a container.

POPULATION: 20 estimations in total, provided by the subjects.

SAMPLE: Estimations given for each container size, Small Container and Large Container.

SAMPLE SIZE: 10 cases for each group

VARIABLES TO BE MEASURED: The total number of variables is 6, details on which are provided in Table A. below:

VARIABLES TABLE A.

Variable	*Type*	*Sub-Type*
Subject ID	Categorical	Nominal
Container Size	Categorical	Ordinal
Gender	Categorical	Nominal
Age Group	Categorical	Ordinal
Estimate	Quantitative	Discrete
Accuracy	Quantitative	Continuous

TREATMENTS: The subjects are divided into two groups, and 'treated' with different container sizes to measure the difference in estimation accuracy.

INTERVENTIONS: There are no interventions in this experiment, reason for which is that the experiment samples are already grouped by the Container Size, and an intervention is not required in order to measure a possible difference in the accuracy of estimates.

GROUPING STRUCTURE: Grouped by container size to show the difference in accuracy of estimations for the subjects, 'treated' by the Small Container and the Large Container.

PROCEDURES TO REDUCE SAMPLING ERROR: Estimates will be performed in the same lighting conditions, and distance away from the containers. The same brand of container will be used, only the size will vary. *Balance* will also be implemented, where an equal number of subjects in each group is selected, by taking a *Simple Random Sample*, every member will have an equal chance of being selected. The *blocking* of variables includes; 'Age' into groups of 20-39, 40-69, 70+. This grouping structure is then applied to both Container Size's. The reason for which, is that age may or may not have an effect on the accuracy of estimates, taking into consideration eye-sight and previous estimation experience, which may be dependent on Age.

PROCEDURES TO REDUCE SAMPLING BIAS: A *Randomized Block Design* will be used to randomize the experiment. By first dividing the subjects into homogenous blocks of 'Age Group', and then randomly assigning individuals to a 'treatment' group of either the Small Container or Large Container.