In order to determine the relative importance of responses that drove participants to rate the modes of transportation, namely personal vehicle or public transit, the way they did as opposed to their otherwise stated reasons, a Dominance Analysis was used. Dominance Analysis is a method first proposed by Azen and Budescu in 2003. The purpose of determining predictor importance in the context of Dominance Analysis is not model selection but rather uncovering the individual contributions of the predictors. In the case when the target variable is continuous (as in this case), the package determines the dominance of one predictor over another by comparing their incremental R-squared contribution across all subset models.

Dominance Analysis, according to Azen and Budescu, meets three important criteria for measuring relative importance. First, the technique should be defined in terms of its ability to reduce error in predicting the outcome variable. Next, it should permit direct comparison of measures within a model (that is, X1 is twice as important as X2). Finally, the technique should permit inferences concerning an attribute’s direct effect (that is, when considered by itself), total effect (that is, when considered with other attributes) and partial effect (that is, when considered with various combinations of other predictors). Hence, Dominance Analysis is both robust and intuitive and its interpretation is also very straightforward.

Dominance Analysis is unique as it measures relative importance in a pairwise fashion, and the two predictors are compared in the context of all 2(p−2) models that contain some subset of the other predictors. So, if we have a total of ‘p’ predictors, we will build 2p-1 models (all possible subset models) and compute the incremental R2 contribution of each predictor to the subset model of all other predictors. The additional contribution of a given predictor is measured by the increase in R2 that results from adding that predictor to the regression model.

A relative importance measure should be able to describe a predictor’s direct, total and partial effect, therefore in the Dominance Statistics, we have come up with four different types of Dominance measures. These measures have been conceptualized, defined and formulated by us and are unique to this library. We decided to use the Total Dominance measure, which summarizes the additional contributions of each predictor to all subset models by averaging all the conditional values

Ten thousand random observations were generated for both public transit responses and for personal vehicle responses. After running the Dominance Analysis using the given Python library, the total dominance statistics were combined for each attribute followed by a comparison of the <aspect> for both public transit and personal vehicles. This resulted in the ability to compare the overall importance of each attribute for both modes of transit, as well as the importance of each attribute to each mode of transit; for example, how important cleanliness is for both public transit and personal vehicles combined, and how important cleanliness is for each mode of transit independently.