A Dominance Analysis was used to determine the relative importance of attributes in responses that drove participants to rate the modes of transportation (personal vehicle or public transit) the way they did as opposed to their otherwise stated reasons. Dominance Analysis is a method first proposed by Azen and Budescu in 2003 because it invokes a general and intuitive definition of “relative importance” that is based on the additional contribution of a predictor in all subset models. 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 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, the authors of the python library 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 each attribute 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.