Title:
Optimizing group-level food policy interventions

Abstract:
The federal government currently spends over $100 billion per year on interventions aimed at increasing fruit and vegetable consumption among low income households. These include interventions related to price, nutrition education, and access. Currently, funds are allocated to each type of intervention in a siloed fashion, in some cases resulting in surprisingly disappointing outcomes. The goal of this work is to increase the efficacy of food policy interventions through optimization and increased personalization. This work introduces a novel consumer behavioral model for grocery shopping dynamics, which is nested into a bi-level model for optimizing the government’s investments. In this model, the government’s goal is to increase fruit and vegetable (FV) consumption among low income households by utilizing strategic portfolios of interventions (referred to as intervention bundles). However, complete personalization may be undesirable or infeasible. Therefore, group-level personalization—where individuals are assigned to groups that receive unique intervention bundles—is considered. This work develops a new framework that allows us to quantify the level of personalization (i.e., the number of groups) needed to achieve a certain outcome level. We also show how this framework is generalizable to many settings beyond food policy.