What is the impact of Your Local Pantry membership on food insecurity, dietary quality and well-being? A natural experiment evaluation

Quantitative Analysis Plan

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Quantitative analysis plan

Anticipated sample size and power calculations

As above, we obtained data from YLP's central database over March to May 2024 to gain an understanding of expected number of applications for YLP membership across the network in England. There were n=2483 membership applications across 101 food pantries in England in these three months. Excluding applications missing information about the timing of membership and time spent on waitlists, we analysed the distribution of applications that went immediately into membership and the time spent on a waiting list before membership. These data are summarised in table 1 above.

For a potential effect size of membership on food insecurity, we looked at data from a YLP members' survey from 2023. Participants were asked if being a member had improved the quantity of food they acquired, with about 50% indicating this was the case. They were also asked if it had increased the quantity of fruit and vegetables they eat, with 63% indicating this was the case. Whilst neither of these are validated measures of food insecurity, validated measures such as the Food Insecurity Experience Scale ask respondents to indicate if they've been unable to eat nutritious foods and also if they've had experiences of going without food. We would anticipate that these experiences will become less common with food pantry membership, and therefore expect a reduction of food insecurity of 15 percentage points, where participants move from having experiences of going without food, not being to eat enough, skipping meals and not being able to access nutritious foods to no longer experiencing these; marginal experiences of food insecurity (i.e. worry about not having enough food to eat) may not be eliminated, however.

We used a simulation approach to calculate the sample size that would be required for detecting an effect size of membership on food insecurity of -15 percentage points from baseline at 5% significance with 80% power. The simulations suggest that about 62 participants would be needed for the natural experiment, for which we would need to screen about 300 applicants. If we also include 10% of screened participants with a wait-time of zero in the study, then the before-after study should be comfortably powered as well.

If we expect about 50% of people applying for memberships to express an interest in the study (and then to be screened for participation), we need a minimum of 600 people to apply for memberships over the fieldwork period. Based on the applicant numbers in spring 2024, a fieldwork period of 5-6 months should be of sufficient duration for recruitment to meet these targets.

We will aim to maximise invitations to participate in the study over the fieldwork period up to a total of n=300 people initially being recruited into the study. This is to allow for the possibility of high study attrition.

Data Analysis Plan

We will examine how YLP membership relates to the change in food insecurity:

$\text{Food insecurity}_{ipwt} = \beta^* \text{ YLP membership}_{ipwt}$ + control variables and fixed effects + error term

Where subscript i indicates an individual participant, p is a pantry, w the number of weeks since an application for membership was made, and t is the calendar week.

We will explore different specifications depending on the measure of food insecurity, including linear probability and probit models for food insecurity (3+ affirmatives on the FIES scale) and severe food insecurity (7+ affirmatives on the FIES scale), an OLS regression treating the 8-point FIES score as a continuous variable, and an ordered probit of the number of affirmatives on the FIES scale YLP membership.

We will explore two ways to measure YLP membership: an indicator for being a member at data collection time point, and the number of days of membership up to the date of the interview. Which of these measures is more appropriate depends on the speed at which any benefits from membership are realised. If food insecurity reduces almost immediately upon receiving YLP membership, then the relevant treatment variable is current membership; if benefits accrue gradually over time, then (a possibly non-linear function of) days of membership is more appropriate.

All specifications will include pantry and time fixed effects (appropriately dealing with incidental parameter problems in the non-linear specifications). We will also include either person fixed effects, which corresponds to the before-after study design, or week-in-trial fixed effects, which corresponds to the natural experiment design. In specifications without person fixed effects, we will include personal characteristics as control variables. Standard errors will be clustered at the person level to allow for serial correlation, and if sample size allows, we will also consider clustering at the pantry level to allow for correlation across individuals within pantries, i.e., members of the same pantry being more similar to each other than members of different pantries.

Our secondary analyses will follow the same specifications outlined above, but the preferred specification may differ across outcomes, depending on whether these are best measured as continuous variables, scores, or indicators, and on the dynamics of the effect of membership on the outcome.

For our primary and secondary outcomes, we will also aim to explore whether outcomes differ by baseline socio-demographic and hardship data collected in the questionnaire. We will report the power we have for to detect these interaction effects. Variables of interest include:

- Gender, age, ethnicity, or immigration status of the study participant;
- Presence of children in the household;
- Disability status of the participant or household members;
- Baseline report of difficulties in accessing food for non-financial reasons (e.g. disability, distance to shops);
- Baseline report of financial hardship; and
- Baseline report of food bank use in the past 12 months.

Lastly, we will also consider how frequency of food pantry usage interacts with membership. It is possible that more frequent use maximises the benefits of food pantry membership, but frequent use may also indicate more difficult circumstances.