# Impacts of Warning Labels on Ultra-Processed Foods

## Hypotheses and Analytic Plan

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## Hypotheses

The overall purpose of this study is to identify the impacts of an ultraprocessed (UPF) health warning label and UPF identity warning label compared to a control label (i.e., a barcode). The UPF health warning will include a text statement about the health harms associated with UPF intake. The UPF identity warning will include a text statement that the food or drink is ultraprocessed.

*Primary Outcomes*

The primary outcome of this study is correct identification of a product as ultraprocessed.

We hypothesize that:

1. Compared to the control (barcode label), the UPF health warning label and the UPF identity warning label will lead to increased ability to identify a product as ultraprocessed.
2. Compared to the UPF health warning label, the UPF identity warning label will lead to increased ability to identify a product as ultraprocessed.

*Secondary Outcomes*

The secondary outcomes are perceived healthfulness of ultraprocessed products, intentions to purchase ultraprocessed products, and perceived message effectiveness of the randomly assigned label.

We hypothesize that, compared to the control label, the UPF health warning and UPF identity warning label will lead to:

1. Lower perceptions of healthfulness of an ultraprocessed product.
2. Lower intentions to purchase an ultraprocessed product.
3. Greater perceived message effectiveness

We also hypothesize that the UPF health warning label will lead to lower perceptions of healthfulness, lower intentions to purchase, and greater perceived message effectiveness compared to the UPF identity warning.

## Analytic Plan

We will use a two-sided critical alpha of 0.05 to conduct all statistical tests. We will use complete case analysis to handle any missing data. We will descriptively report unadjusted means (and standard deviations) or percentages for the primary and secondary outcomes. For all outcomes assessed between-subjects only, we will assess whether the outcomes vary by study arm using regression models (linear for continuous outcomes and logistic for dichotomous outcomes). For outcomes with multiple measurements for each person (e.g. the task in which participants viewed a series of products), we will fit mixed effects linear regression models for continuous outcomes (e.g., perceptions of healthfulness) and a mixed effects logistic regression model for binary outcomes (i.e., identification of products as ultraprocessed), treating the intercept as random to account for repeated measures. These models will include indicator variables for the labeling arm (excluding the barcode as the referent) and for product category. For each outcome, we will conduct pairwise comparisons between each label type. We also plan to report the impact of label type on the primary and secondary outcomes in stratified models by product type (exploratory).

We will also explore whether there is moderation by socio-demographic characteristics, including educational attainment and English proficiency. To assess whether the effect of the label type on the primary outcome differs by education or English proficiency, we will test for an interaction of label type with education level and English proficiency (specified as binary variables in separate models) and use a Wald chunk test to determine the statistical significance of the joint interaction. We will use postestimation commands to predict and compare means by label type and each potential moderator.

**Outliers and exclusions**

We will exclude participants who complete the survey implausibly quickly (defined as <1/3 of the median completion time). We will exclude participants who complete less than 90% of the survey.

We will also look for straight-lining behavior (responding to all the questions the same way, not truthfully but to complete the survey more quickly), but we expect most straight-liners, if there are any, to be excluded as fast responders. Finally, we will exclude participants with responses (sessions) overlapping in time and drop all but the first response for the remaining participants if they attempted or submitted multiple responses.