Food Waste, Impulsivity and Risk: Heterogeneous Behavioral Responses

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Driven to Discover℠

Motivation

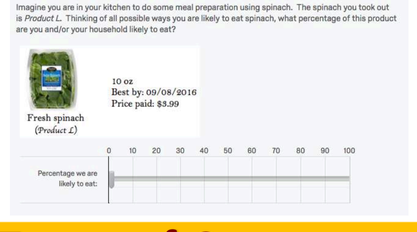
- Consumers are the largest contributors of food waste.
- Consumer education campaigns (e.g. imperfect food acceptance) and standardized date labeling have been recognized as key solutions to reduce food waste.
- Food safety concerns and impulse purchases are anecdotally linked to food waste.
- Research Questions:

1. *How much do people reject foods with cosmetic deterioration such as shrinkage or wilting even though they are perfectly fit to consume?*
2. *How do they react to different presentations of expiration dates?*
3. *Are risk preferences and time inconsistencies relevant in food waste propensities?*

Food Appearance

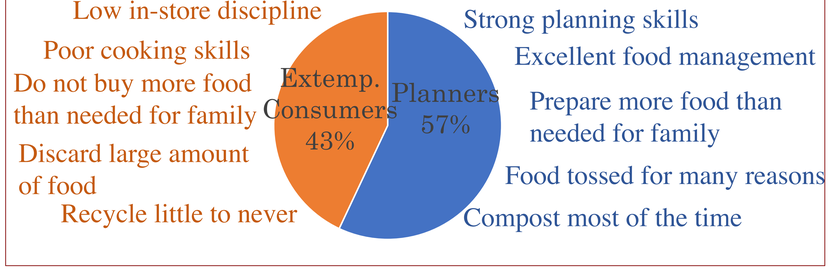
- Product profiles of ground beef and bagged spinach varied by: *price purchased, expiration date* (Best by, Use by & Best if Used by), *days to expiration, package size, & appearance* (3 levels).
- Perception on whether a product is fit to eat elicited by asking subjects to report the percentage of product they would consume (eating none to eating all) shown through 24 product profiles handouts.

Illustrated: survey interface for questions



Types of Consumers

From latent class analysis, respondent fell into two, somewhat clichéd, classes: ***Planners*** *and* ***Extemporaneous Consumers***



Data and Methods

- Interactive survey administered at the 2016 Minnesota State Fair (N = 333)

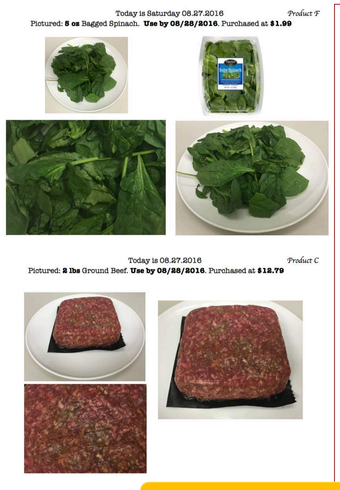
Conceptual Framework

Assume individuals purchase fruits, vegetables and other food products with the intent of making healthy nutritious *meals at home*, x_t. Come time to commit and cook the meals, there may be impulses to consume *alternative food* items (a_t) in the form of unhealthier or faster meals at home such as snacks, take-out, ready-to-eat foods, and deli items. Consumption $c_t = a_t + x_t$.

- Three-period ***separable model of hyperbolic discounting assuming constant relative risk aversion risk preferences***.
- ***Reduced form regressions***. Model 1: $Y = X\phi + Z\psi + \epsilon$ ‖ Model 2: $Y = X\phi + Z\psi + \emptyset\, rr + \gamma\, tp + \epsilon$

Y: Percentage of product respondent is willing to eat; X: Vector of individual characteristics; Z: Vector of product attributes; rr: coefficient of risk aversion; tp: Categorical variables for time preference (present-bias, time consistent, future-biased)

Hypothesis 1: More risk averse individuals report being less likely to eat products overall.
Hypothesis 2: Present-biased individuals prefer consuming more "alternative" food rather than proposed "meals at home." Future-biased individuals will consume more of "meals at home." Time-consistent individuals fall in between.



Time Inconsistencies

- Time inconsistencies elicited through double price list rewards (Olea & Strzalecki, 2014).
- $\mathbb{U}(c) = V(a_1) + \beta\delta V(a_2) + \beta\delta^2 V(a_3) + \boldsymbol{\beta} U(x_1) + \beta\delta V(x_2) + \beta\delta^2 V(x_3)$
- β: Short run discount factor ‖ δ: Long-run discount factor

Illustrated: One of 16 decisions in the price list

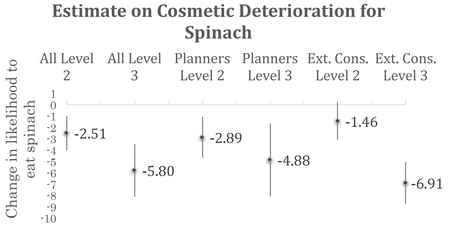
Risk Preferences

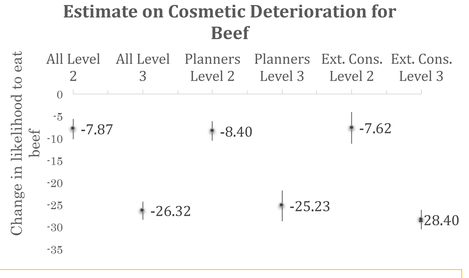
- Risk preferences collected through context-less lottery (Holt & Laury, 2002).
- $V(a_t) = \zeta \frac{a^{1-rr}}{1-rr}$; $U(x_t) = \frac{x^{1-rr}}{1-rr}$

Illustrated: One of 10 decisions in the lottery

Main Results I

Model 1 highlights:





1. As appearance deteriorates people were likely to eat less spinach and substantially less of ground beef (up to 28 percentage point less).
2. "*Use by*" terminology motivate more rejection.
3. Bigger the size, larger the wastage propensities.
4. Further expiration dates yielded higher waste tendencies.

Main Results II

Model 2 highlights:

Impulsivity:

- Future-biased ***Planners*** were 14 percentage point ***more*** likely to eat proposed products. As predicted, they potentially delay gratification from alternative meals and consume more than time-consistent individuals.
- Present-biased people in the full sample were less likely to eat the products, potentially favoring alternatives.

Risk:

- ***Planners*** who are risk averse ($rr>0$) rejected more of the product. Same results held for the entire sample but not the ***Extemporaneous Consumers*** group.
- Other results were not statistically significant at the 5% level but in hypothesized directions and magnitudes.