Impact of Plate Shape and Size on Individual Food Waste in a University Dining Hall

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Research Team

- Rachel Richardson, MS (thesis research topic)

- Melissa Pflugh Prescott, Assistant Professor in Food Science & Human Nutrition

- Approximately 15 Undergrad/Grad Research Assistants

- BIG THANK YOU to: University of Illinois Dining Services Administration and Staff

History of Collaboration with Dining Services

▶ Shared interest in reducing food waste

▶ 1st study: Impact of educational campaign

  ▶ Results in right direction, but impact was modest
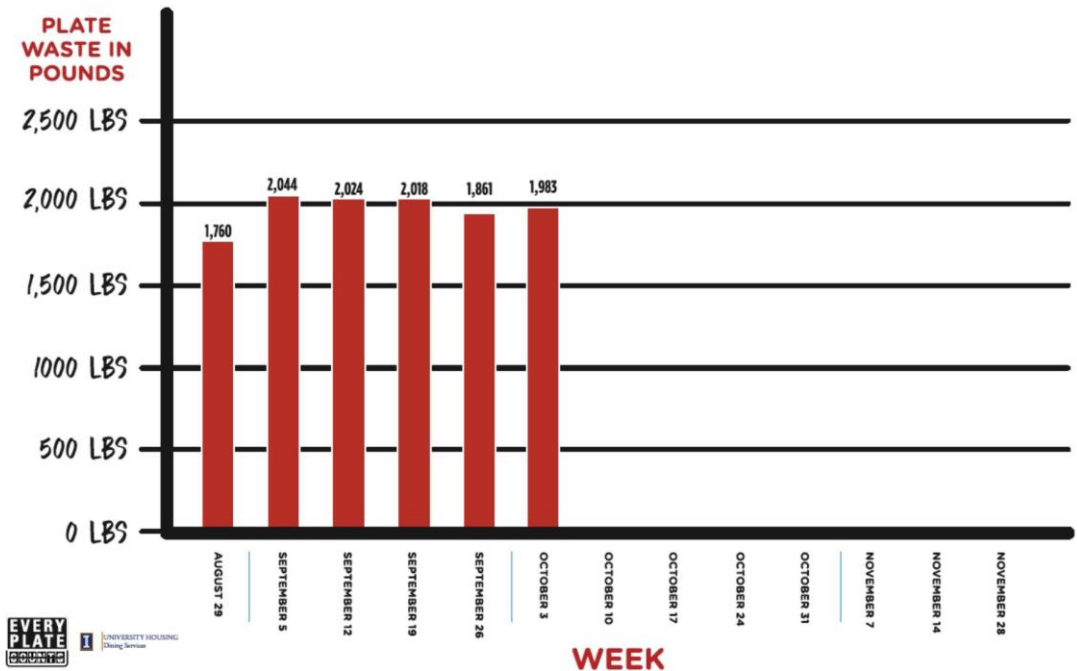
If education did not work, what are our options?

- Change the message
  - Suggestion: Help students visualize the amount of waste
  - Suggestion: Peer-to-peer education

- Change the dining environment
  - Option: Move to a la carte pricing
  - Option: Reduce amount of self-service options
  - **Option: Change dishware/servingware**

Latest Study: Changing Plate Size/Shape to Reduce Waste

▶ Traditional Round Plates vs. Smaller Oval Platters

▶ Intuition: Smaller surface area reduces the amount of foods students take and waste

▶ Research supports this intuition, but no work in university AYCTE setting

Round
9" x 9"

Oval
9.75" x 7.75"

How did we study this?

- Worked with two dining halls in Fall, 2018
  - Ikenberry (IKE)
  - Pennsylvania Avenue (PAR)

- Used a crossover design where we tested both round plates and oval platters in each dining facility

- 1 week of data collection for each dish type in each facility (4 weeks total)

- Collected data in same week of 4-week menu cycle (lunch)

Crossover Design
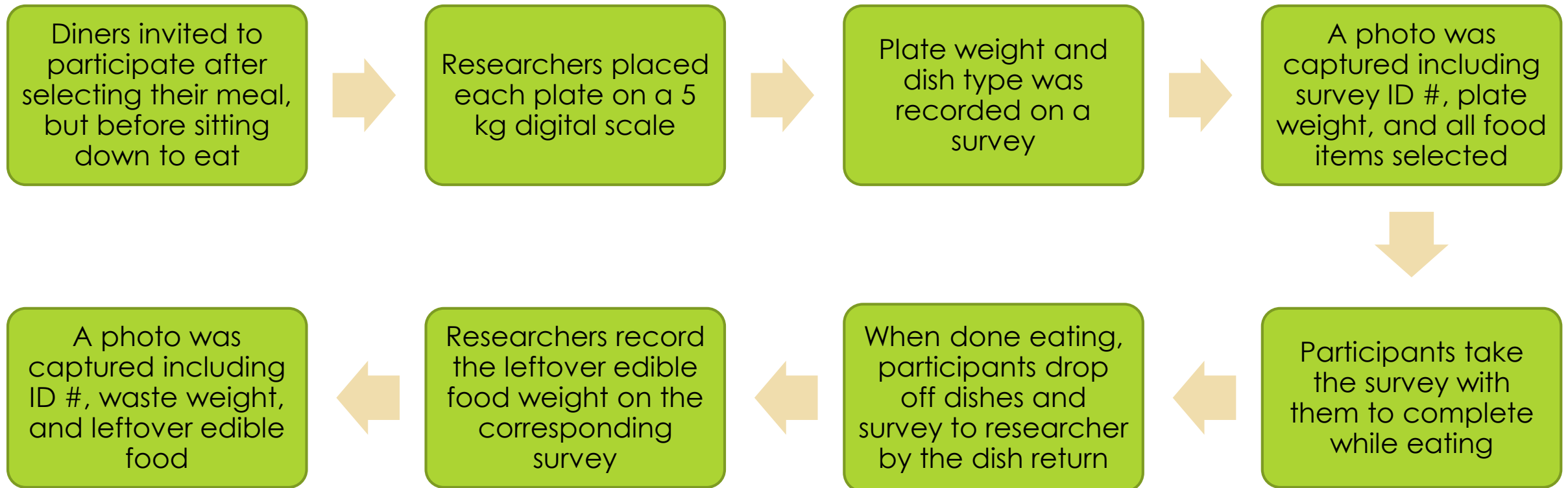
PAR **Oval Platters** **Sept. 17-21**	**IKE** **Round Plates** **Sept. 24-28**
PAR **Round Plates** **Oct. 15-19**	**IKE** **Oval Platters** **Oct. 22-26**

Data Collection Procedure

Diners invited to participate after selecting their meal, but before sitting down to eat

Researchers placed each plate on a 5 kg digital scale

Plate weight and dish type was recorded on a survey

A photo was captured including survey ID #, plate weight, and all food items selected

Participants take the survey with them to complete while eating

When done eating, participants drop off dishes and survey to researcher by the dish return

Researchers record the leftover edible food weight on the corresponding survey

A photo was captured including ID #, waste weight, and leftover edible food

Results: Observations & Data Input

1,825 total observations

1,285 observations kept

- Excluded if diner did not return their plate, incomplete survey, returned plate with different food, was missing a pre- or post-photo, or only selected food using non-standard dishware

Data input

- Students with multiple plates were combined into one weight
- Consumption Weight = Selection Weight – Waste Weight
- % Waste = Waste Weight / Selection Weight
- All weights adjusted by subtracting out average dish weight

Results: Averages by Dish Type
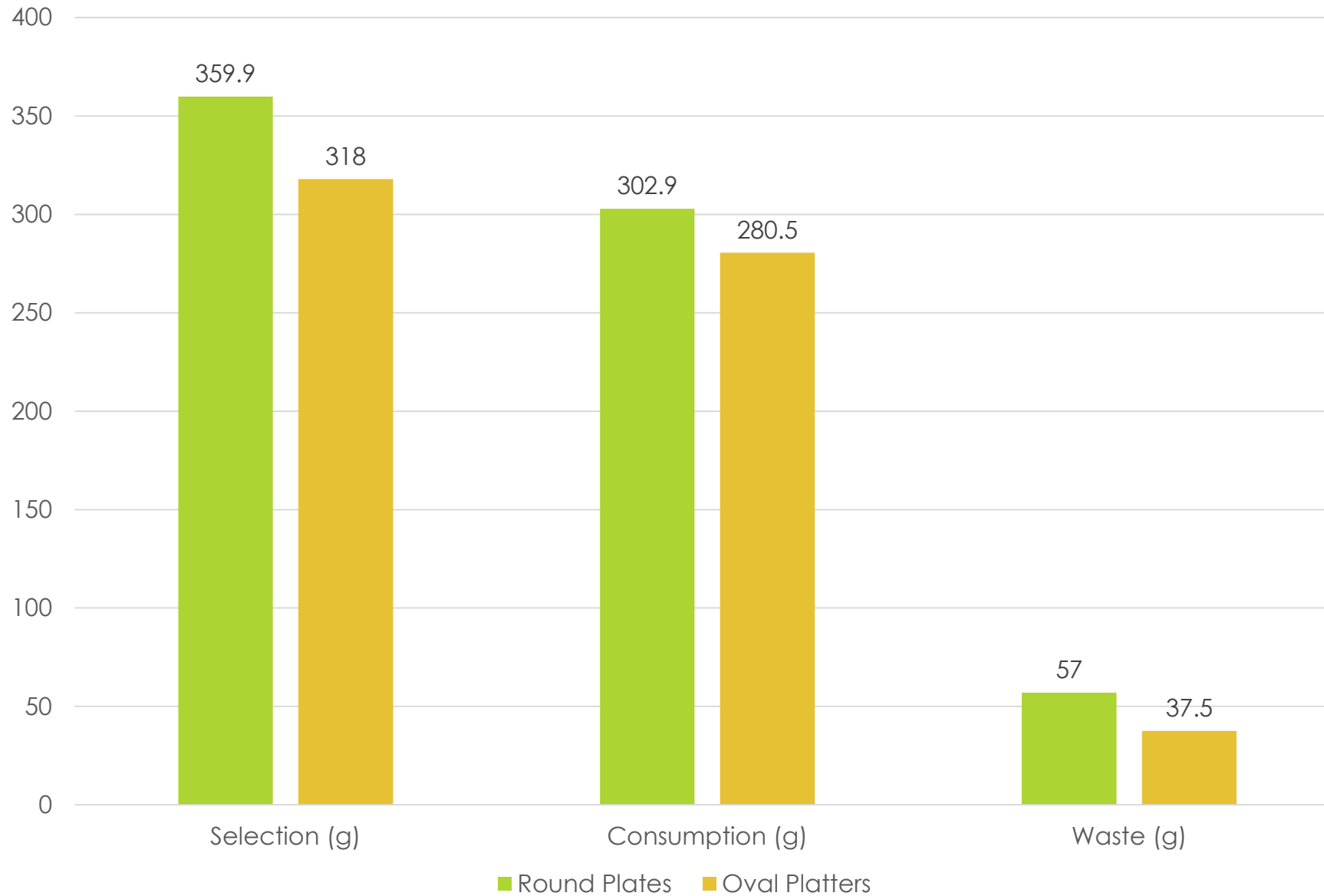
All differences statistically significant

When we control for survey variables…

▶ Oval platters still significantly reduce selection, consumption, and waste

▶ Females select and consume less, waste more

▶ Meal satisfaction increases selection and consumption, decreases waste

Do smaller plates increase students going back for seconds?

▶ Short answer: YES

▶ 29.0% of students with oval platters indicated going back for seconds vs. 20.6% of students with round plates

▶ How does this impact conclusion about waste?

  ▶ Unclear, since we did not directly track seconds, BUT

  ▶ Simulation suggests the increased seconds does not offset waste reduction benefits

Seconds Simulation

▶ Step 1: Calculate avg waste for first servings of round and oval plates ((57 g * 681 round) + (37.5 g *604 oval))

▶ Step 2: Multiply number of people who went back for seconds with each dish type by avg waste ((57 g * 140 round) + (37.5 g * 175 oval))

▶ Add results from Step 1 and Step 2 for each dish type; divide by # of diners in each dish type

▶ **End Result: Oval platters still result in 20.3 g less waste per person compared to round plates**

Study Limitations & What We're Still Working On

▶ Were not able to directly observe second servings

▶ Low coverage rates, especially in IKE

▶ Did not analyze shifts in meal components (but could in the future)

Where do we go from here?

- Things to consider moving forward:
  - When to change plates?
  - Unintended consequences of plate change?
  - Will effects last in the long term?

Thank You!

Questions?
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