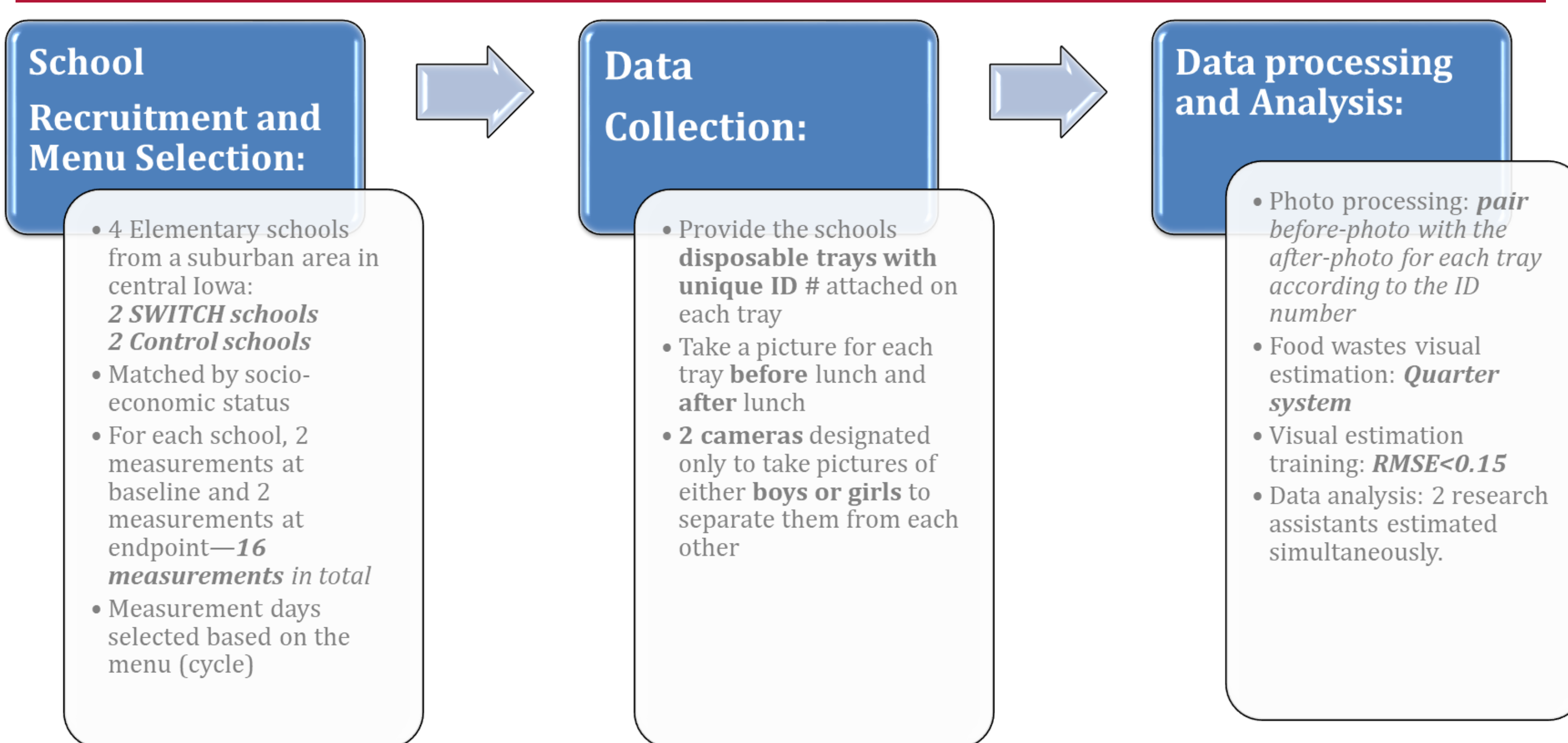


# The SWITCH<sup>®</sup> Implementation Process on School Lunch Consumption Patterns and Plate Waste

## Abstract

**Background:** Schools provide an ideal setting to promote positive lifestyle behaviors in youth. The SWITCH<sup>®</sup> (School Wellness Integration Targeting Child Health) implementation process is designed to help schools operationalize and improve school wellness initiatives, including nutrition behaviors. **Objective:** This study examined the influence of the SWITCH<sup>®</sup> implementation process on school lunch consumption and waste, especially fruits and vegetables. **Study Design, Setting, and Participants:** Four schools from a suburban school district in Iowa were included in the evaluation: two were participating in SWITCH<sup>®</sup> and two were not. Before- and after-lunch photos of food trays were taken for every 5th grade student participating in school lunch in both SWITCH<sup>®</sup> and control schools before SWITCH<sup>®</sup> started (baseline, 02/2017) and after SWITCH<sup>®</sup> finished (endpoint, 05/2017). **Outcomes:** Trained research assistants used the 'Quarter System' to compare the before- and after-lunch photos for each person to estimate waste percentage for individual food items on each tray. Based on the initial portion size, fruit and vegetable consumption was calculated. Linear mixed models were applied to analyze the effects of SWITCH<sup>®</sup>, gender, and food types on the waste and consumption patterns. **Results:** There was no significant decrease in overall school lunch waste (average percentage wasted across all food types) in both SWITCH<sup>®</sup> and control schools. And the school lunch waste was not significantly different between SWITCH<sup>®</sup> and control schools at either baseline or endpoint. However, students in SWITCH<sup>®</sup> schools significantly increased their fruit consumption (p=0.02) by increasing their initial portion size. Contrarily, the fruit consumption from baseline to endpoint decreased in control schools, although this decrease was not statistically significant. Boys consumed fewer vegetables than girls did (p<0.0001). Although boys wasted fewer vegetables (p<0.0001), they selected much less to start (p<0.0001). **Conclusions:** By increasing the selection portion size, SWITCH<sup>®</sup> implementations may have a positive influence on the fruits and vegetable consumption in children.

## Methods and Study Design



“Switch What they Do, View, and Chew!”

## Results

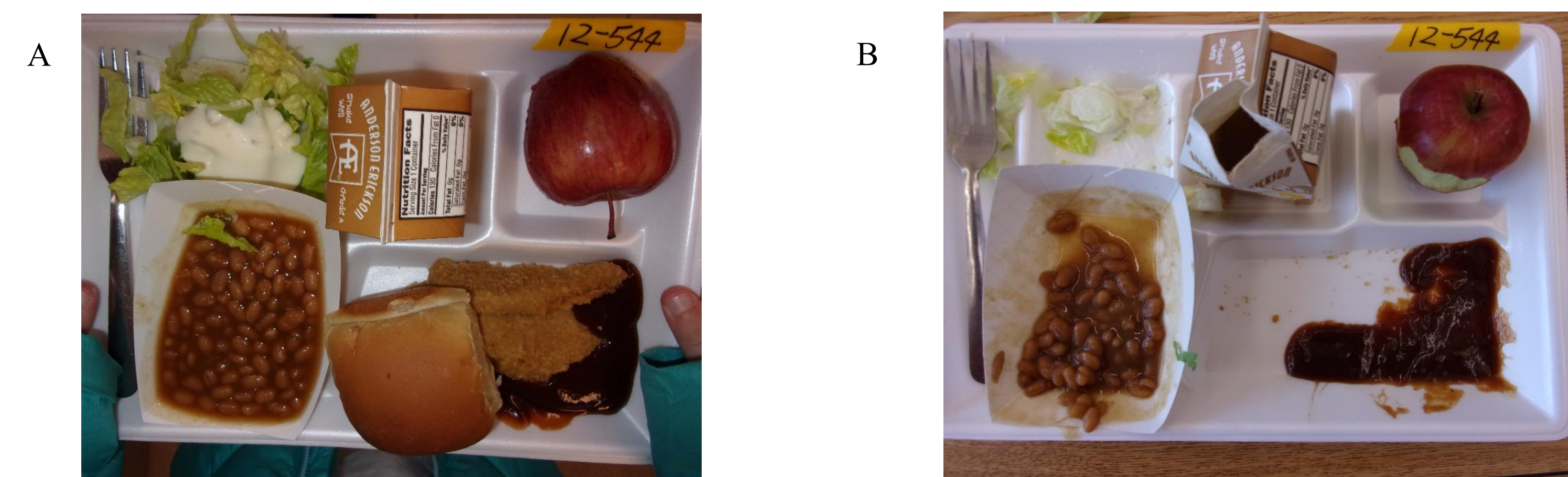


Figure 1: An example of paired before- and after-lunch photo for a tray. A. Before lunch B. After lunch

## Food Waste Analysis

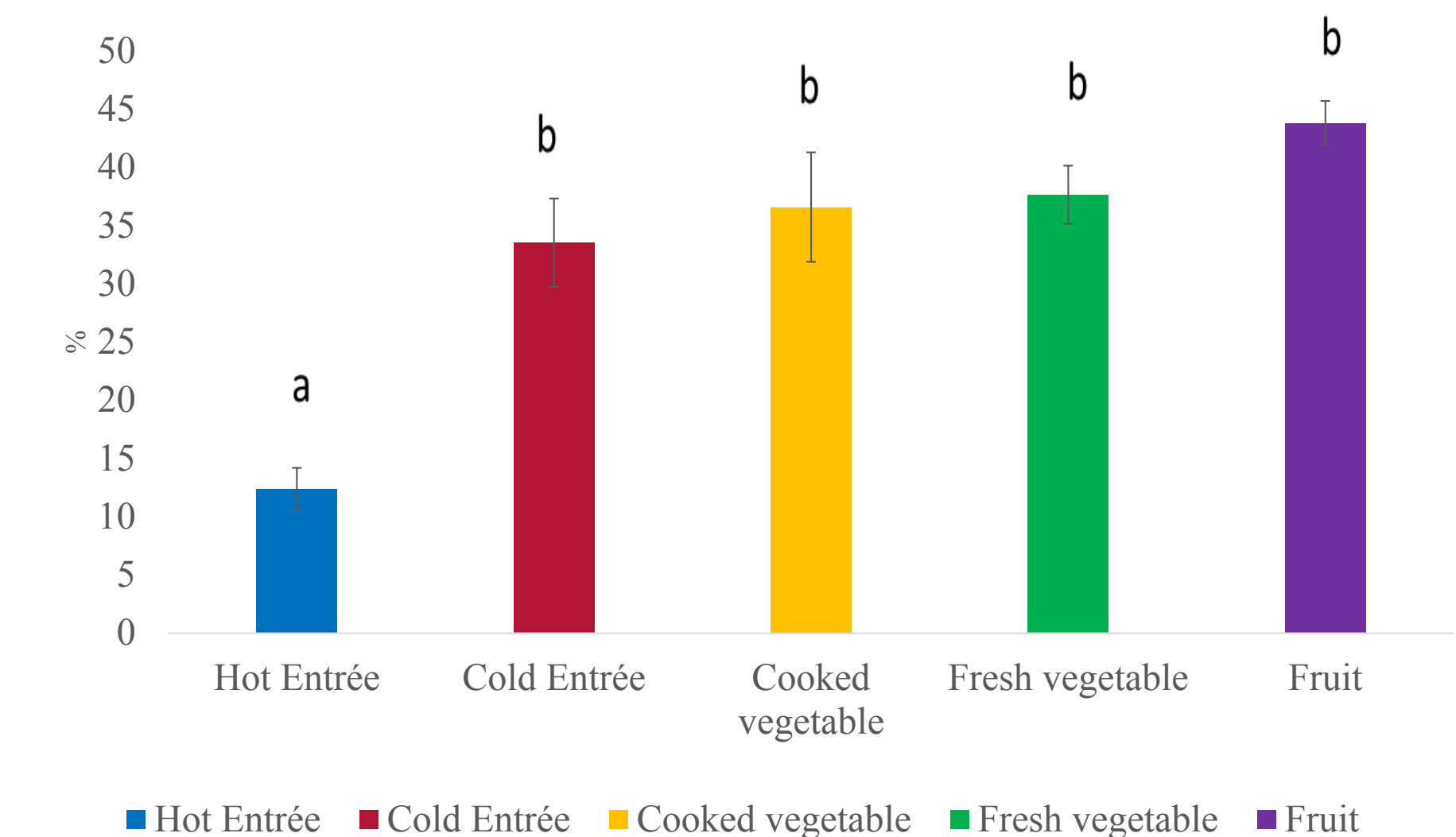


Figure 2. Comparison of wasted percentages among different food categories (different letters represent significant difference, p<0.05)

Average **28.71%** of total food is wasted (95% CI = 27.18 % to 30.24%).

- No significant difference between baseline and endpoint in either SWITCH<sup>®</sup> schools or control schools
- No significant difference between SWITCH<sup>®</sup> schools and control schools, either at baseline or endpoint.
- Significant difference in wasted percentages among the **different food types** (P<0.0001) shown in Figure 2.

## Fruit Selection, Waste and Consumption

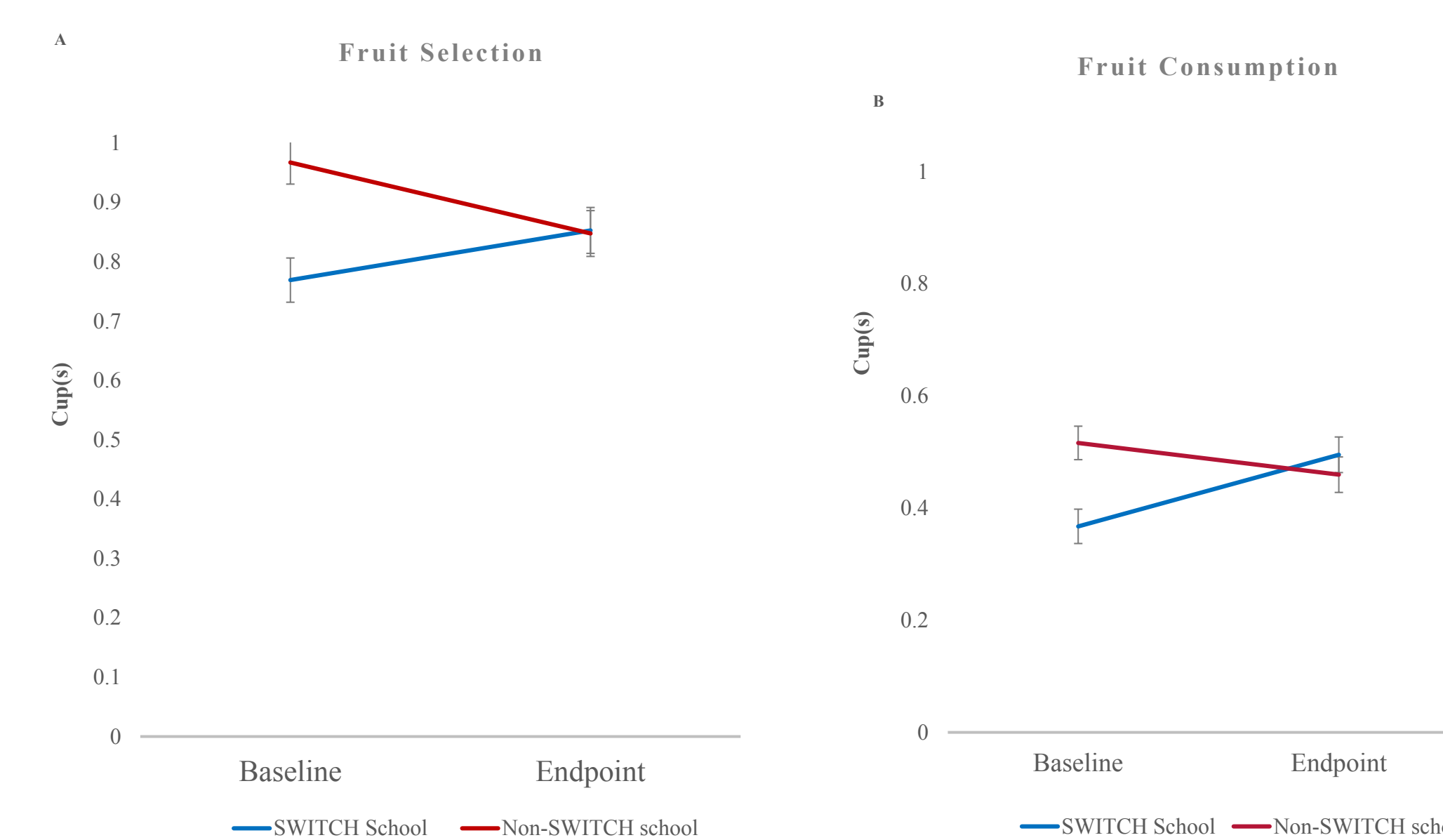


Figure 3. Fruit selection and consumption pattern in SWITCH<sup>®</sup> and control schools A: The selection of fruit at baseline and endpoint in SWITCH<sup>®</sup> and control schools. B: The consumption of fruit at baseline and endpoint in SWITCH<sup>®</sup> and control schools

- Selection:** At baseline, fruit selection is significantly lower in SWITCH<sup>®</sup> schools compared to control schools. At endpoint, there is no significant difference between SWITCH<sup>®</sup> and control schools. Fruit selection in SWITCH<sup>®</sup> schools was increased (p=0.40); it decreased in control schools (p=0.11).
- Waste:** No significant difference between baseline and endpoint either in SWITCH<sup>®</sup> schools or control schools.
- Consumption:** **Fruit consumption in SWITCH<sup>®</sup> schools was significantly increased** (p=0.004), and at endpoint **SWITCH<sup>®</sup> schools met the minimum daily fruit consumption requirement** for school lunch made by IOM, being 0.5 cups per day

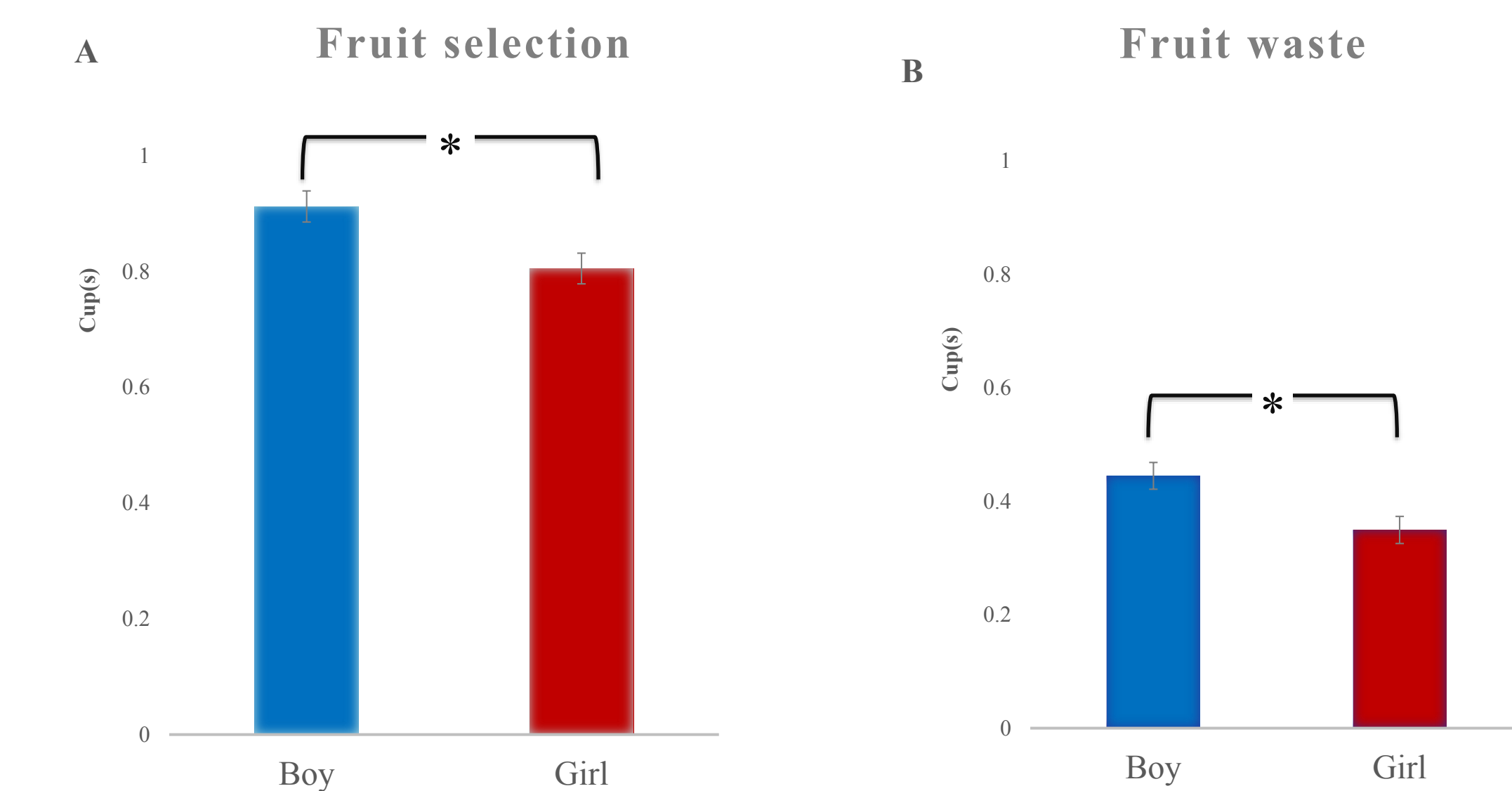


Figure 4: Comparisons of fruit selection and waste between boys and girls (pooled SWITCH<sup>®</sup> and control schools data, \* represents significant difference, p<0.05). A: Selection B: Waste

## Vegetable Selection, Waste and Consumption

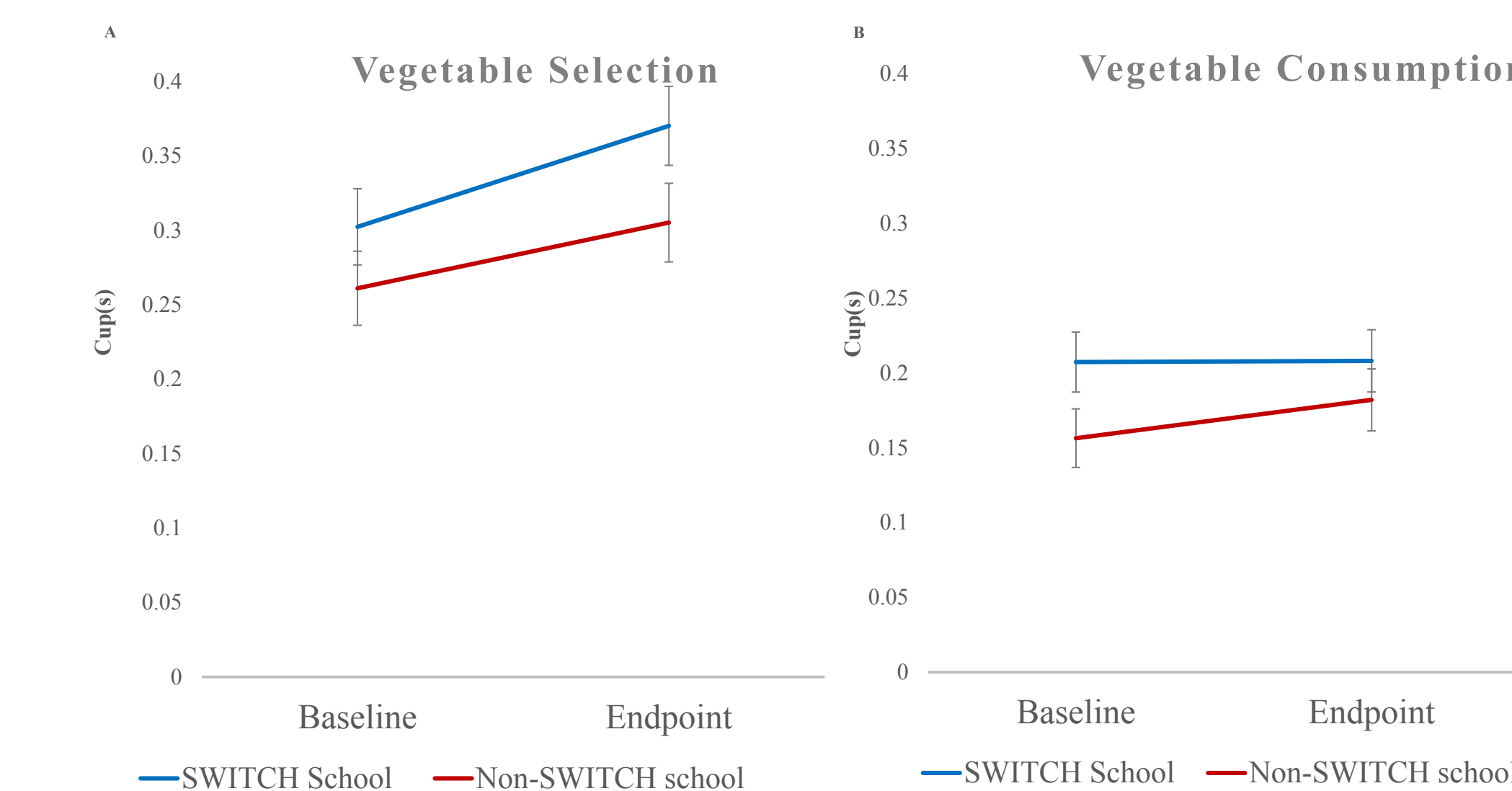


Figure 5. Vegetable selection and consumption patterns in SWITCH<sup>®</sup> and control schools A: The selection of vegetable at baseline and endpoint in SWITCH<sup>®</sup> and control schools. B: The consumptions of vegetable at baseline and endpoint in SWITCH<sup>®</sup> and control schools

- Selection:** A slight increase of vegetable selection observed in both SWITCH<sup>®</sup> and control schools from baseline to endpoint
- Waste:** No significant difference between baseline and endpoint either in SWITCH<sup>®</sup> schools or control schools.
- Consumption:** Remained almost the same from baseline to endpoints either in SWITCH<sup>®</sup> schools or control schools.

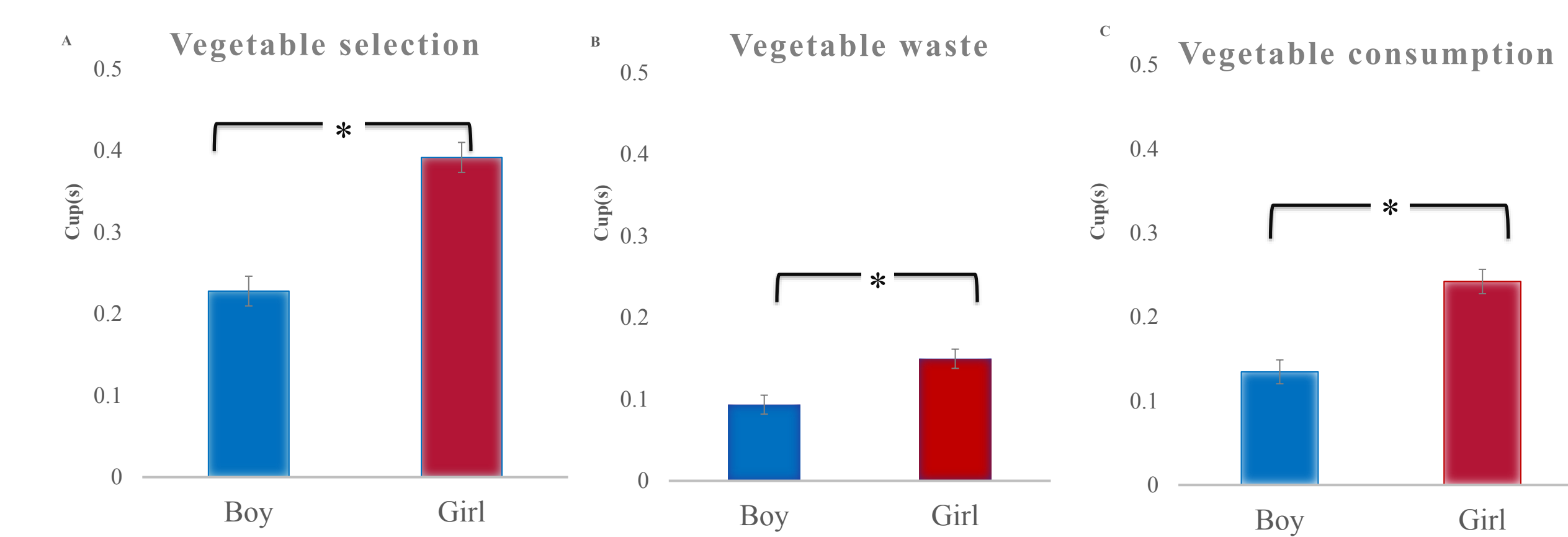


Figure 6: Comparisons of vegetable selection, waste, and consumption between boys and girls (pooled SWITCH<sup>®</sup> and control schools data, \* represents significant difference, p<0.05). A: Selection B: Waste C: Consumption

## Conclusion

SWITCH<sup>®</sup> implementations may have a positive influence on fruit consumption in children by increasing selection portion size.