

# Testing the Validity of a Natural Spoken Language Application for the Self-Monitoring of Daily Dietary Intake

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## BACKGROUND

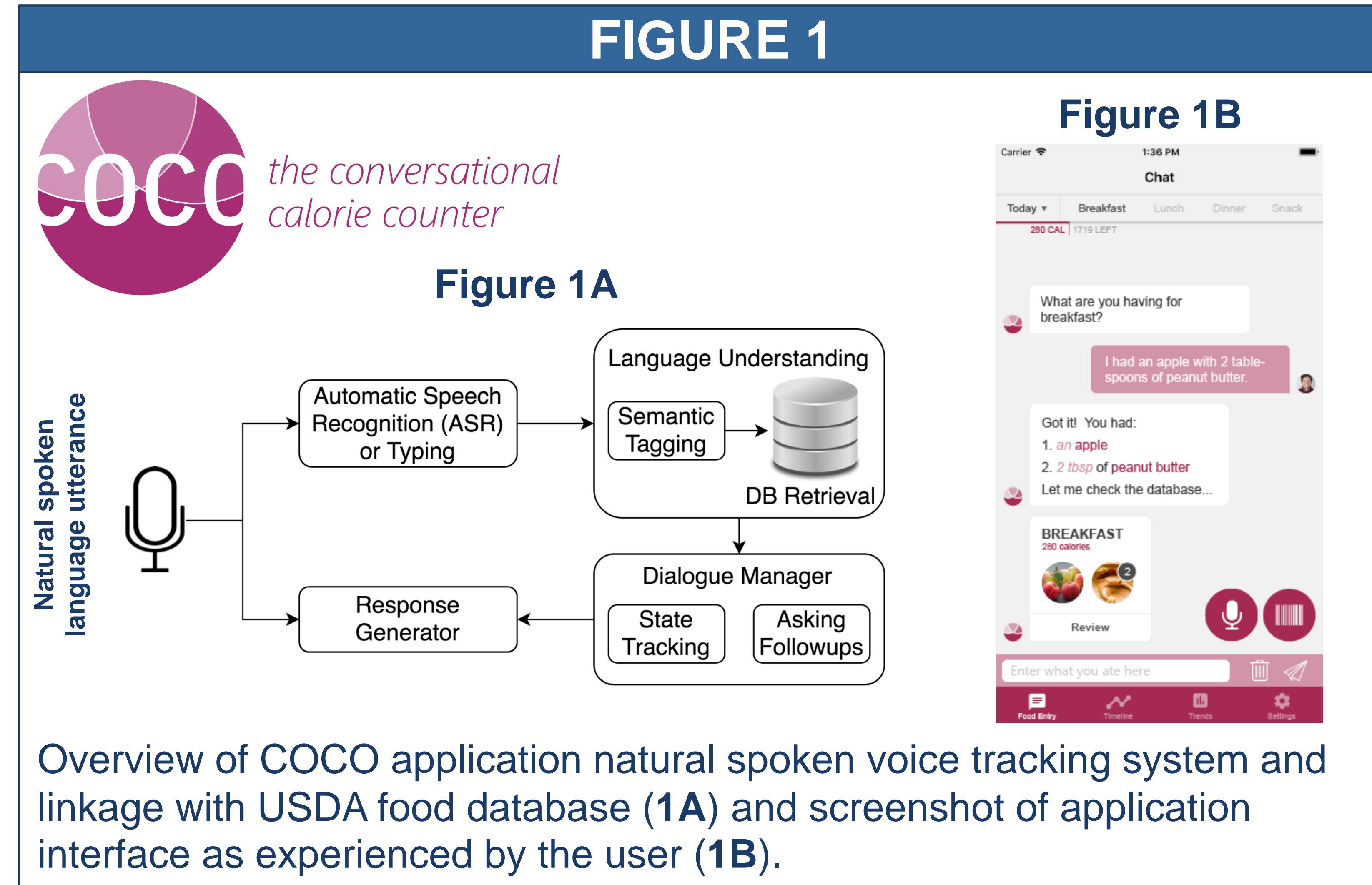
Self-monitoring daily dietary intake is recommended for weight loss, weight maintenance, and healthy eating. However, current tracking methods, including web platforms and mobile applications, are often burdensome and result in short-term use. **The Conversational Calorie Counter (COCO)** is a cutting-edge application using natural spoken language technology to streamline food logging. Users simply describe consumed foods by speech or text (e.g. "I had an apple with 2 tablespoons of peanut butter"). From this description, the appropriate food item and quantity are parsed to yield a nutritional profile using the United States Department of Agriculture food database. An overview of COCO is presented in **Figure 1**.

We conducted a pilot study to evaluate the accuracy of the new COCO application designed to self-monitor dietary intake using natural spoken language by voice recognition or text.

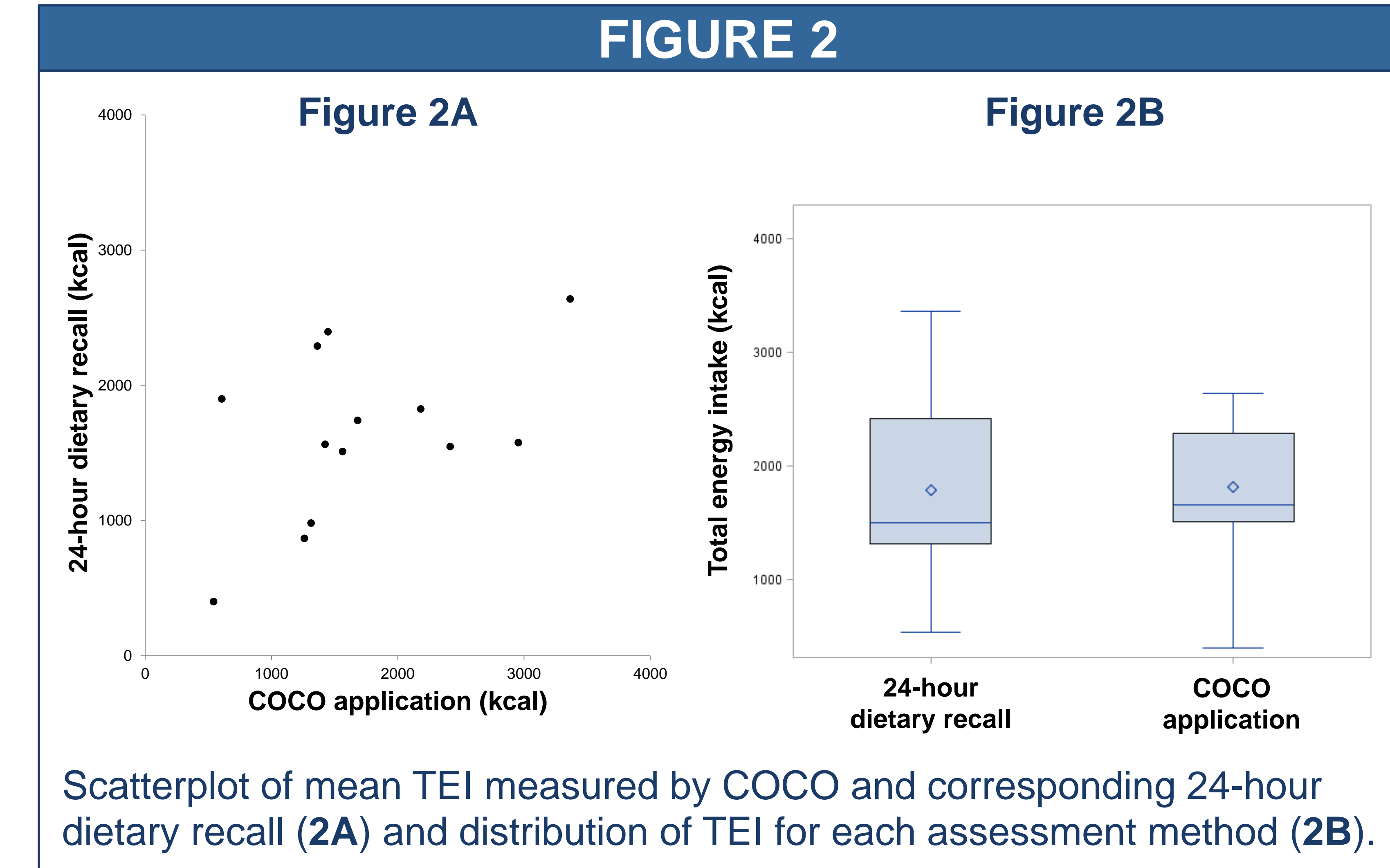
## METHODS

- A total of 14 participants were recruited for the pilot study.
- Participants were instructed to record daily dietary intake using COCO for at least five consecutive days.
- Two unscheduled 24-hour dietary recalls were conducted between day 3 and day 5 as the reference method for evaluating total energy intake (TEI).
- The two-day energy estimates were averaged separately for the 24-hour recalls and COCO.
- Pearson's correlation coefficient was used to assess the accuracy of COCO compared to the reference assessment method.
- Estimates of TEI from COCO were compared to the 24-hour dietary recall by a paired samples t-test.
- A *P* value < 0.05 was considered statistically significant.

## FIGURE 1



## FIGURE 2



## RESULTS

- Demographic data:**
- The average age in this pilot study was 23.2 ± 2.5 years.
  - Participants were primarily female (86%).
  - The average body mass index (BMI) was 22.2 ± 1.8 kg/m<sup>2</sup>.
  - On average, participants consumed three meals daily.
- TEI data from COCO:**
- Participants recorded dietary intake using COCO for an average of six days (range: 4 to 10 days).
  - The average TEI was 1782 ± 773 kilocalories (kcal) for all days.
- Comparing COCO and 24-hour recall:**
- The average TEI measured by 24-hour recall was 1791 ± 862 kcal vs. 1818 ± 916 kcal for COCO.
  - There was a significant correlation between the assessment methods (**Figure 2A**; *r* = 0.58; *P* = 0.03).
  - There was no significant difference in the TEI estimates from COCO and the 24-hour recall (**Figure 2B**; *P* = 0.90).

## CONCLUSIONS

These results suggest that natural spoken language technology can be employed by applications that facilitate the self-monitoring of food intake to support weight loss, weight loss maintenance, and the prevention of non-communicable diseases. The significant correlation between estimates of TEI from COCO and the 24-hour dietary recalls indicates the potential validity of this novel approach for capturing dietary data and assessing energy intake. A fully-scaled study is currently underway. Future studies should validate TEI estimates from COCO using the objective doubly-labeled water method.

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