

Healthy and Sustainable Diets: Ultra-Processed Food Consumption and Greenhouse Gas Emissions in the US

Rhea Jayaswal, Sarah Frank, Lindsey Smith Taillie

Gillings School of Global Public Health, The University of North Carolina at Chapel Hill

Background

- Food systems drive poor health & climate change.
 - Increase in ultra-processed food (UPF) consumption is a major food system shift over the last 50 years.
- UPFs are food products made with industrial ingredients and additives, according to NOVA.
 - Ex: soft drinks, candies, packaged snacks, sausages
- High UPF consumption is linked to poor health:
 - Poor dietary quality
 - Type 2 diabetes
 - Overweight and obesity
 - Certain cancers
 - Cardiovascular disease
- Environmental impacts of UPFs are less explored:
 - Greenhouse gas emissions (GHGEs) are a climate change indicator – climate change is projected to worsen human health and nutrition.
 - Work in other countries (France, Brazil, Australia, Netherlands, etc.) suggests a potential relationship between higher UPF intake and higher dietary GHGE.
- **There is a need to examine the influence of UPF intake on dietary GHGE in the US context.**

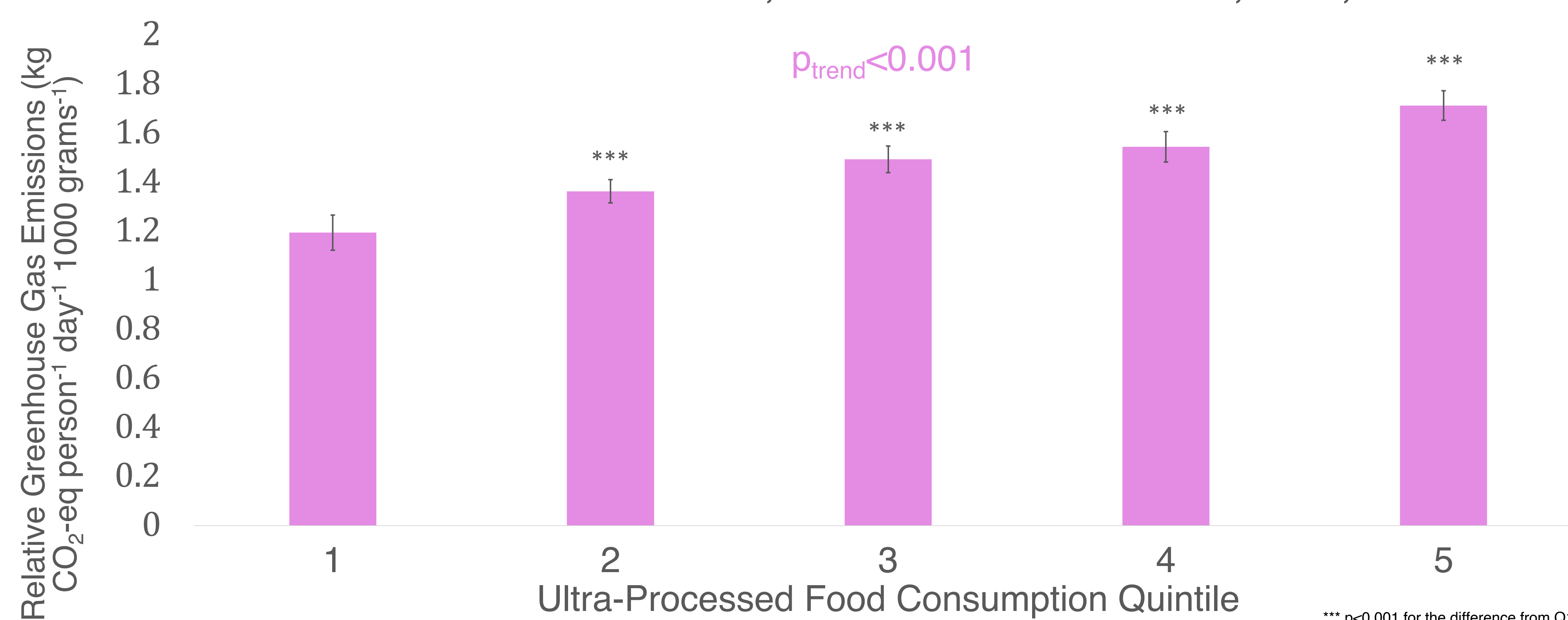
Research Questions

1. How is ultra-processed food consumption associated with greenhouse gas emissions among US adults?
2. What sociodemographic factors are associated with greater UPF intake and greater dietary GHGEs?

Conclusions

- **Diets with a greater proportion of UPFs tend to be higher in GHGEs.**
 - Why? Researchers suggest:
 - Greater UPF consumption is associated with greater total energy intake, which then increases GHGEs.
 - UPF ingredients come from intensive agriculture.
 - UPFs undergo extensive processing, often have single-use packaging, and travel long distances from farm to factory to fork.
- **Policies to reduce UPF consumption could have health and environmental co-benefits.**

Quintile of Ultra-Processed Food Intake and Relative Greenhouse Gas Emissions, NHANES 2007-2010, n=9,611



Future Directions

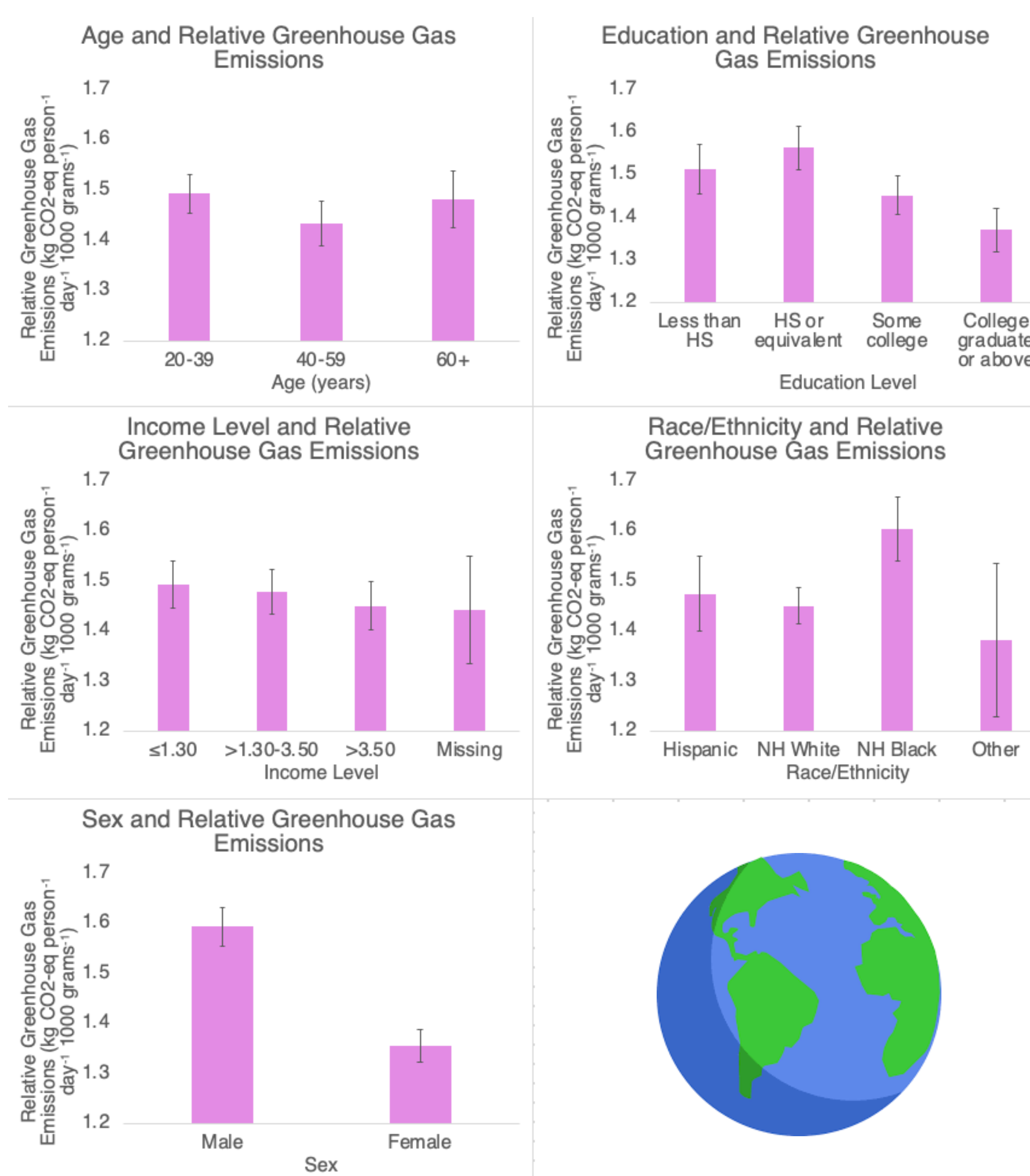
- **More research needed to understand the mechanisms driving the UPF ↔ GHGE relationship,** and to assess the relationship in other contexts.
 - Evaluate GHGEs from farm to fork.
 - Assess other negative environmental impacts of UPFs.
- **Remove structural barriers that lead to greater UPF consumption and greater dietary GHGEs.**
- **Potential policy levers to reduce UPFs include:**
 - Dietary Guidelines for Americans
 - Sugar-sweetened beverage taxes
 - Front-of-package labeling laws
 - Unhealthy food marketing restrictions
 - Promoting healthy foods, e.g. through fiscal incentives

Methods

- **Study Population:** NHANES 2007-2010
 - 9,611 non-pregnant or lactating adults aged 20 years or older, with valid dietary intake data.
- **Exposure:** UPF consumption
 - Used mean of 2 days of 24-hour dietary recall.
 - Participants divided into quintiles based on share of diet (g/day) from UPFs, defined as NOVA level 4.
- **Outcome:** Relative greenhouse gas emissions
 - Database of Food Recall Impacts on the Environment for Nutrition and Dietary Studies (dataFRIENDS) matches NHANES foods to GHGEs via a commodities linkage and data from Life Cycle Assessment (LCA) studies.
 - GHGEs in kilograms of carbon dioxide equivalents per person per day per 1000 grams of food consumed.
- **Primary Analyses:**
 - Linear regression of relative dietary GHGE on quintile of UPF consumption.
- **Secondary Analyses:**
 - Distribution of age, sex, income, education, and race/ethnicity by quintile of UPF consumption and GHGE.

Results

- **Greater UPF intake was associated with greater relative GHGEs.**
- **Adjusted regression model:**
 - Lowest quintile of UPF intake: 1.19 kg CO₂-eq person⁻¹ day⁻¹ 1000 grams⁻¹
 - Highest quintile of UPF intake: 1.71 kg CO₂-eq person⁻¹ day⁻¹ 1000 grams⁻¹
 - **43% increase in GHGEs from lowest to highest quintile**
- **Sociodemographic differences:**
- **By UPF intake:**
 - Adults who were younger, had lower incomes, had less education, and who were non-Hispanic Black were more likely to be in the highest quintile of UPF intake.
- **By relative GHGEs:**
 - Adults who were male, had lower incomes, had less education, and who were non-Hispanic Black were more likely to be in the highest quintile of relative GHGEs.



Acknowledgements

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