Matching the research question to the appropriate diet assessment method and statistical analyses

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Focus on conceptual and analytical frontiers in nutritional epidemiology: Multi-dimensionality

- Dimensions of diet include nutrients, foods, and other constituents

- Each food, each nutrient could be considered a dimension

Considering food groups and nutrients jointly in epidemiologic studies

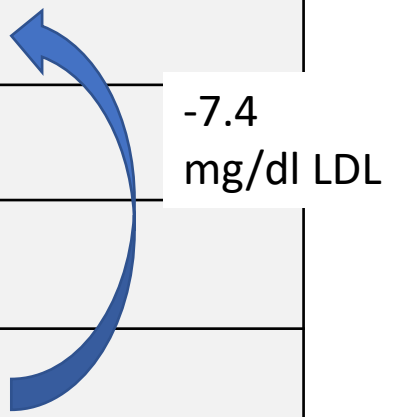
- How do different nutrients or foods interact in their impact on health outcomes?
- Does the food source of a nutrient impact the nutrient's effect on health?
- What can dietary quality indices tell us about multidimensionality?

Postmenopausal breast cancer odds by lifetime intake of grilled, barbecued, and smoked meats, stratified by fruit and vegetable intake in last year

Total # times over lifetime	Low fruit and vegetable intake	High fruit and vegetable intake
	OR (95% CI)	OR (95% CI)
0-2553	1.00	1.00
2574-6514	**1.84 (1.27-2.67)**	1.15 (0.76-1.73)
6533-51652	**1.74 (1.20-2.0)**	1.15 (0.76-1.74)
p for trend	0.07	0.23

Food Group-Based Sources of PUFAs and Associations with LDL Cholesterol in Youth with Type 1 Diabetes

Parameter	Mean kcal/d	Estimate	SE	p-value	Substitute 30 kcal/d
PUFA from non-solid fats	38.0	-0.0038	0.0037	0.3069	
PUFA from nuts	18.3	-0.0075	0.0034	**0.0293**	
PUFA from refined grains	15.3	0.0197	0.0100	**0.0495**	
PUFA from red + processed meats	11.7	-0.0185	0.0158	0.2400	
PUFA from high fat chicken	10.0	0.0182	0.0065	**0.0053**	
Estimate is adjusted for age, race, gender, duration of diabetes. Estimate is for a 10 kcal (49.1 kJ) change.					



South Carolina

Dietary patterns and dietary quality indices

nutrients

MDPI

Commentary

Extending Methods in Dietary Patterns Research

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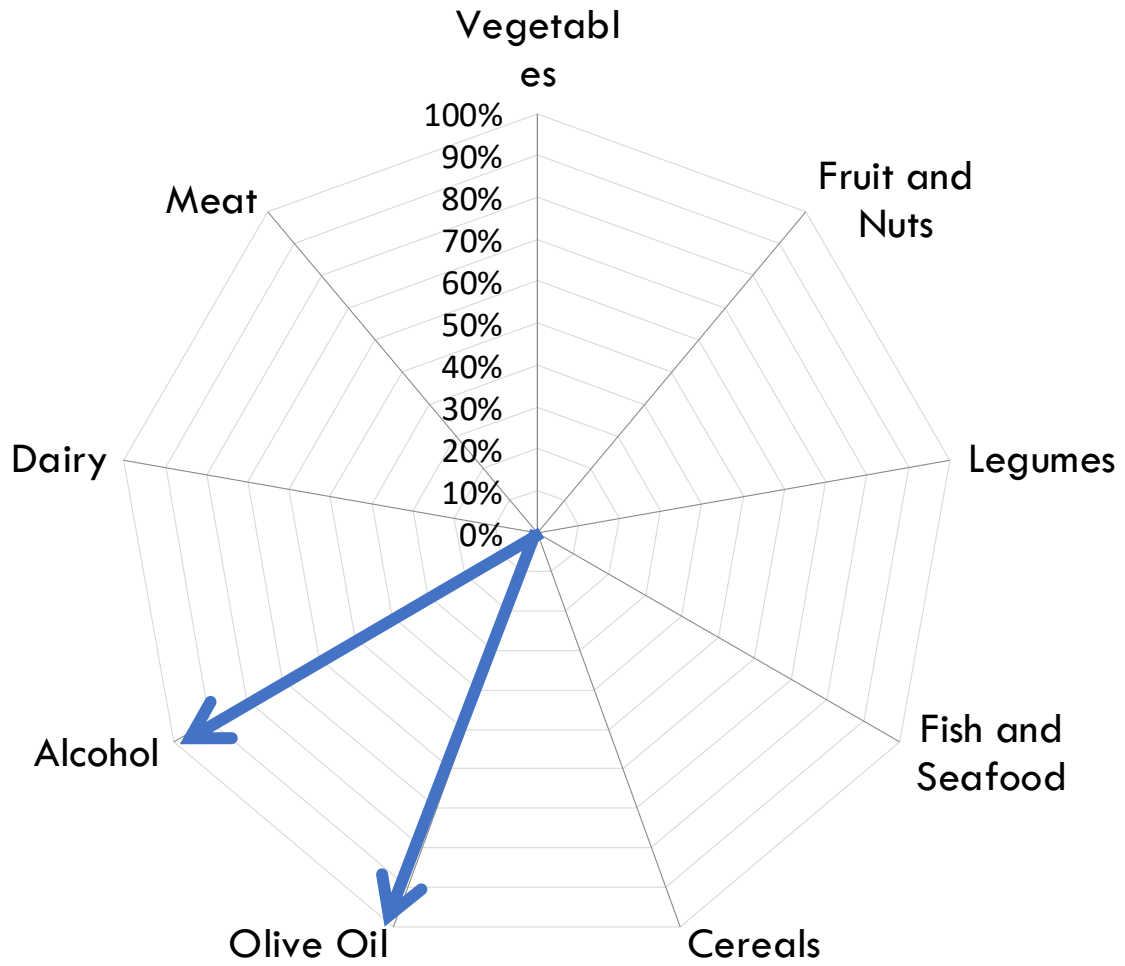
Abstract: The National Cancer Institute (NCI) and the National Institutes of Health (NIH) Office of Disease Prevention held a workshop titled, "Extending Methods in Dietary Patterns Research", in May of 2016. The workshop's goal was to articulate, refine, and prioritize methodological questions to advance the science of dietary patterns in epidemiological research. Although the focus was on

Traditional Multi-Variable Analysis of all Mediterranean Diet Index Components Simultaneously, Predicting Mortality

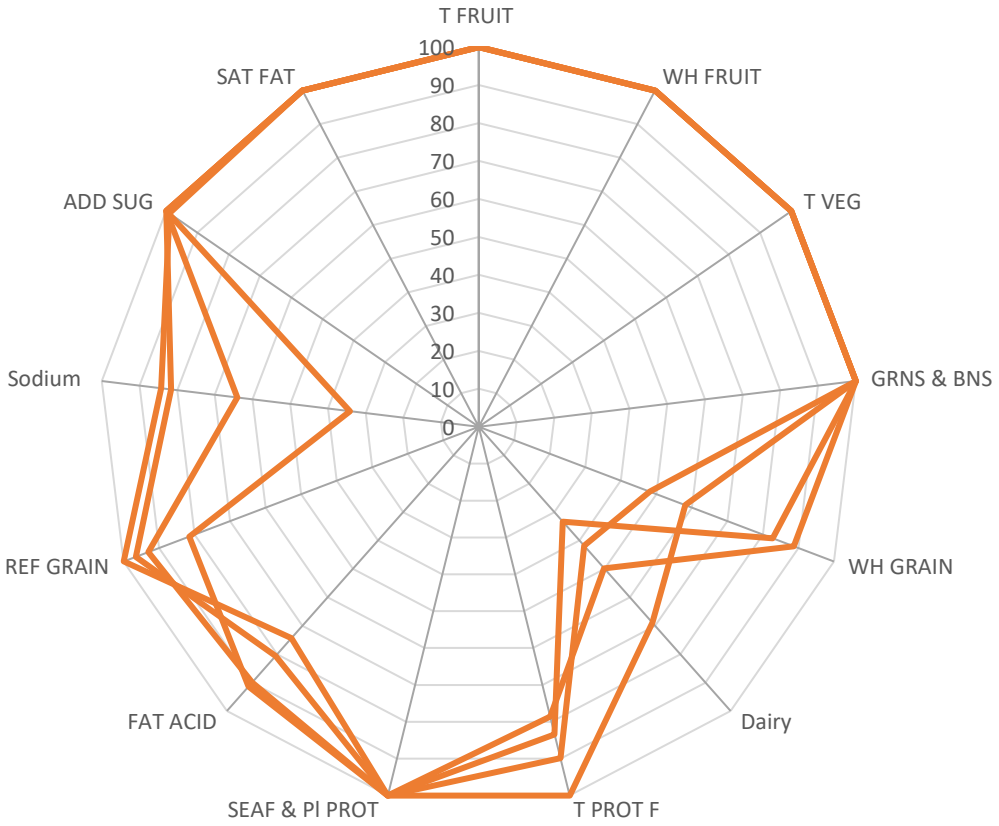
(Controlling for total calories + confounders)



- Buckland et al. found only olive oil and alcohol intake to be predictive of mortality

- Challenge: If all MeD components are in one model, what dietary change can happen when olive oil is increased?
  - Isocaloric components not in MeD, such as potatoes, added sugars?

Using shape analyses to identify commonalities and differences in meeting HEI 2015 recommendations



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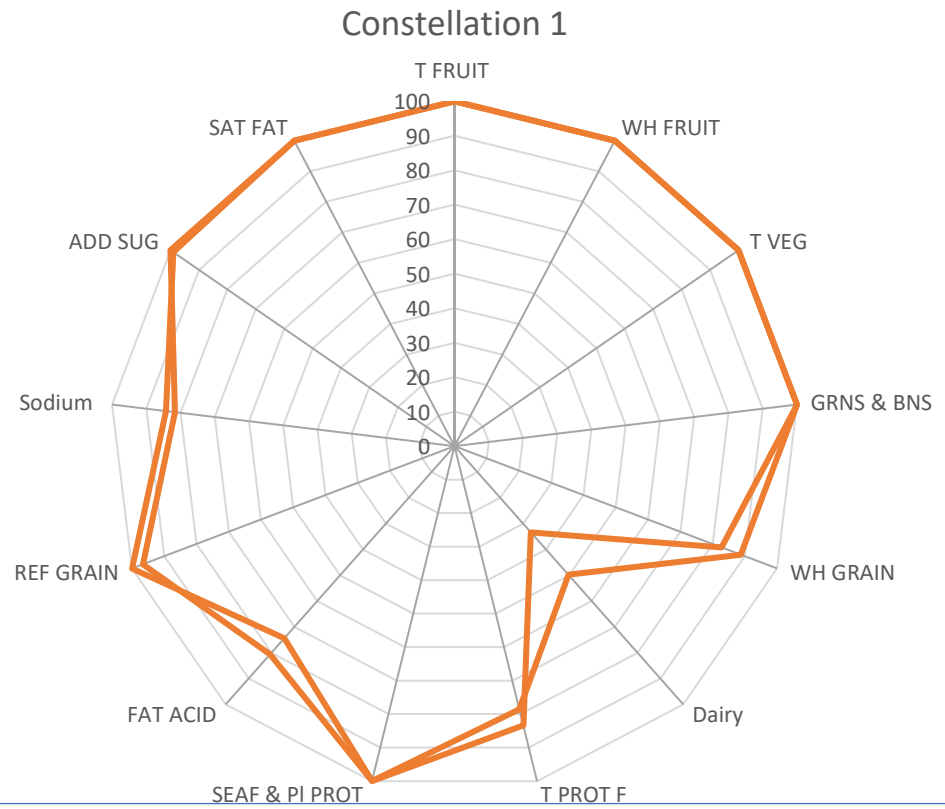
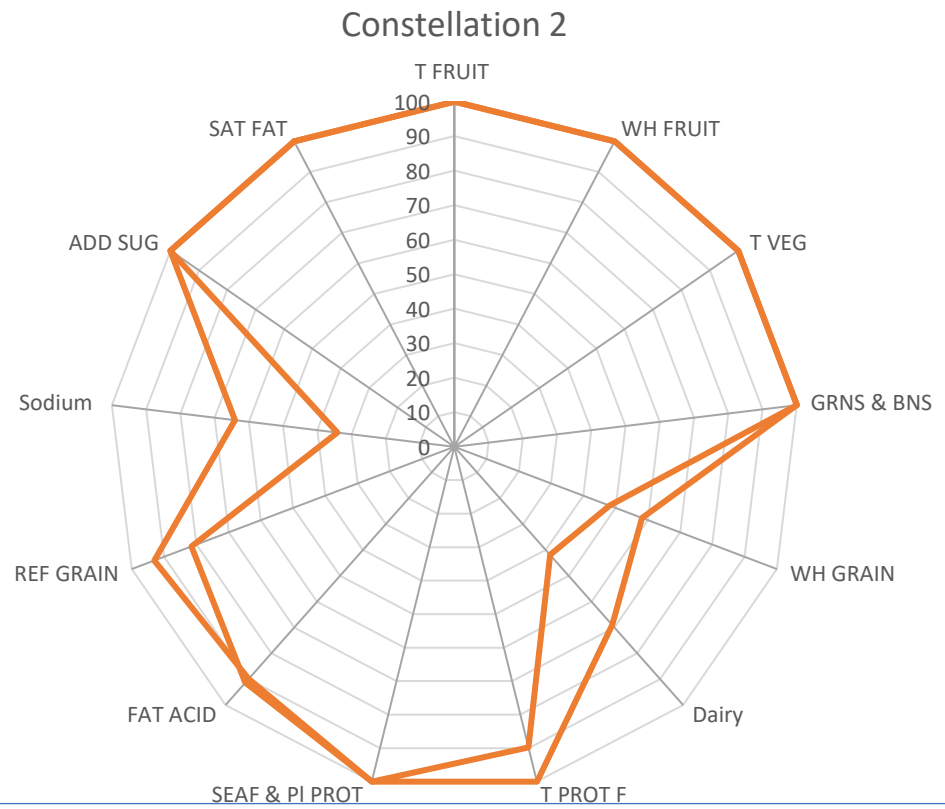




Integrating measurement error correction into design and analysis of observational epidemiologic studies

Why is measurement error correction important in nutritional epidemiology?

"…, in nutritional epidemiology studies that use self-report instruments, the measured exposure (i.e. the estimated intake) has an error that is often substantial and probably larger than that for most other exposures of common epidemiological interest."

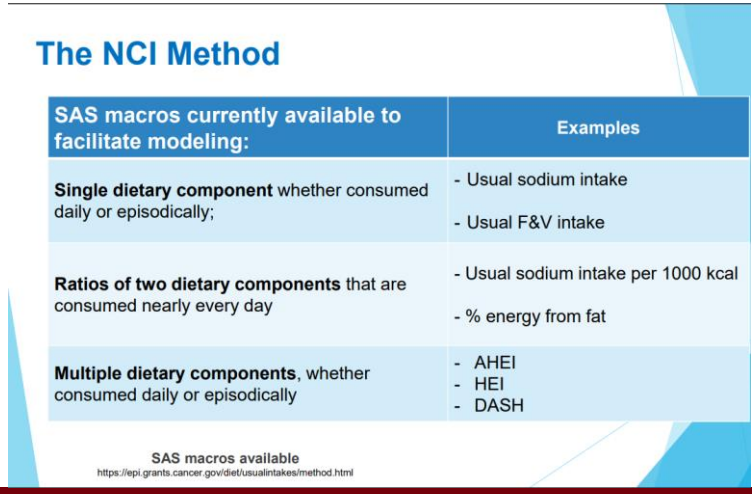
--Freedman et al. 2011 J Natl Cancer Inst, 103 (14): 1086-1092

Self-reported intake is error-prone because:

- Diet varies from day-to-day
- Memory is not perfect, recall difficult
- Psychological factors (e.g. social desirability)
- Imperfect translation of consumption frequencies and portion sizes of food group

Study design to enable measurement error (ME) correction methods

- Full sample data collection: Youth and young adults with diabetes completed a Food Frequency Questionnaire (FFQ) and were assessed for outcomes and covariates
- Diet assessment sub-study (DAS): FFQ 1; 3 x 24 HR by phone
- Application to association of sugar-sweetened beverage intake and lipid levels in youth with diabetes, using regression calibration (NCI Method)



Impact of regression calibration on estimated mean difference in lipids: 0.07 vs. 0.50 servings/day of sugar sweetened beverages

	Naïve model- no ME adjustment				Model after ME adjustment			
Outcomes (back-transformed)	p-value	Estimated Outcome at 0.07 servings/day	Estimated Outcome at 0.5 servings/day	**Difference in Estimated Outcome**	p-value	Estimated Outcome at 0.07 servings/day	Estimated Outcome at 0.5 servings/day	**Difference in Estimated Outcome**
Triglycerides (mg/dL)	0.03	70.7	72.1	**1.4**	0.07	69.2	72.9	**3.7**
Total cholesterol (mg/dL)	0.04	165.1	166.4	**1.3**	0.03	163.4	167.4	**4.0**
LDL cholesterol (mg/dL)	0.01	94.6	95.9	**1.3**	0.01	93.0	97.0	**4.0**

Conclusions

- Joint consideration of multiple nutrients or food groups or combinations thereof is underutilized in nutritional epidemiology.
- Increased focus on multidimensionality of diet and innovative approaches to quantification is a promising area of research.
- Widespread integration of measurement error correction methods into the design of dietary assessment studies and subsequent analyses is needed to advance the field.

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