Using relative BMI distributions to explore differences within and between gender, race/ethnic, and education subgroups, United States, 1999-2006

Brian Houle, University of Washington, Seattle, WA

intro

Obesity disparities are not well understood. BMI distributions contain a wealth of info, but traditional analyses rely on capturing differences in averages between groups.

Limitations of other approaches include:
- Regression-based approaches model the conditional mean
- Lorenz curves compare attributes within a single population

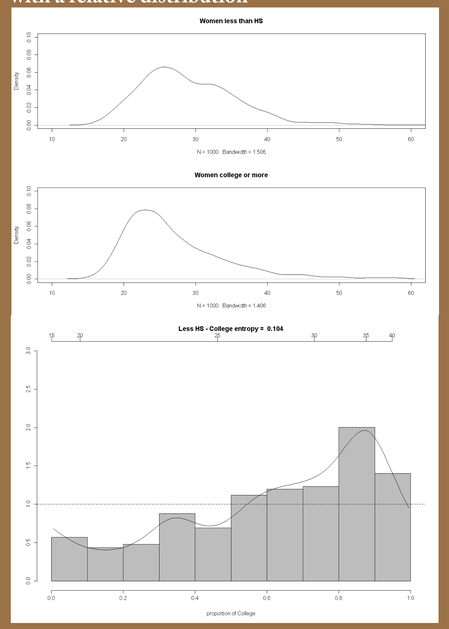
This study uses a novel statistical approach, relative distribution methods, to explore inequalities and disparities in BMI within and between gender, race/ ethnic, and eudcation subgroups.

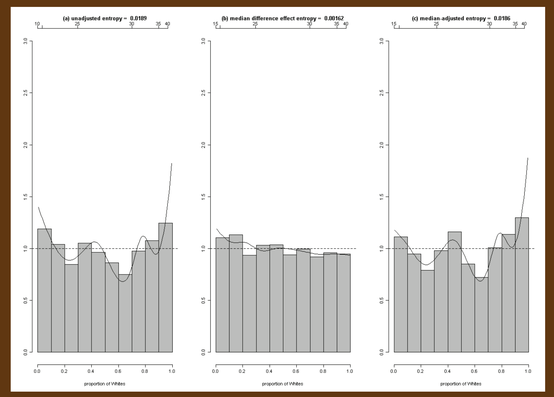
method

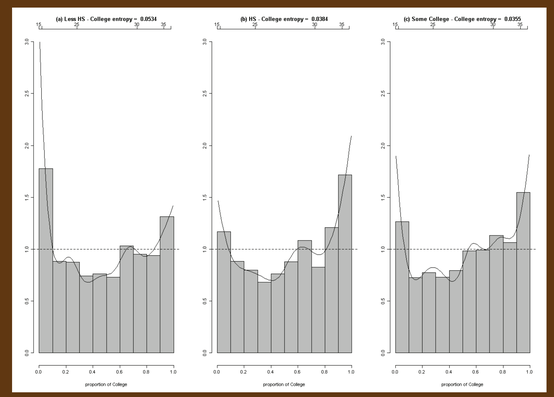
The relative distribution is effectively a transformation of two distributions into one distribution that facilitates comparison. It is the set of percentile ranks that cases from one distribution would have if they were placed in another distribution.

- Data: 1999-2006 National Health and Nutrition Examination Survey
- Sample: Non/Hispanic Blacks and Whites over age 20
- Analyses: BMI distributions compared using R and reldist package.

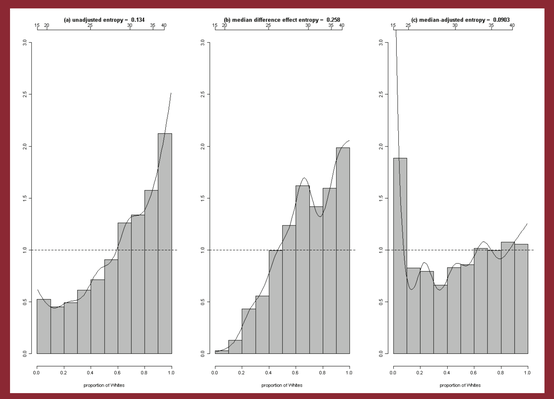
Example - Comparing two probability densities with a relative distribution



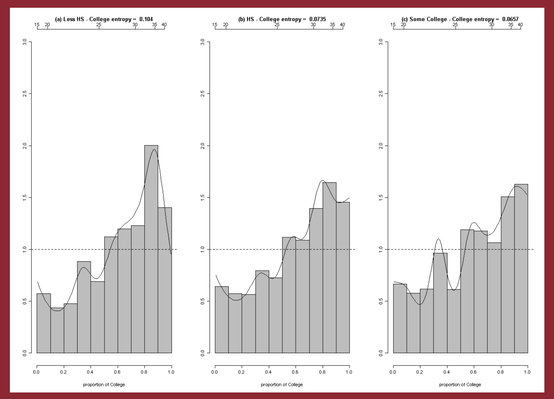




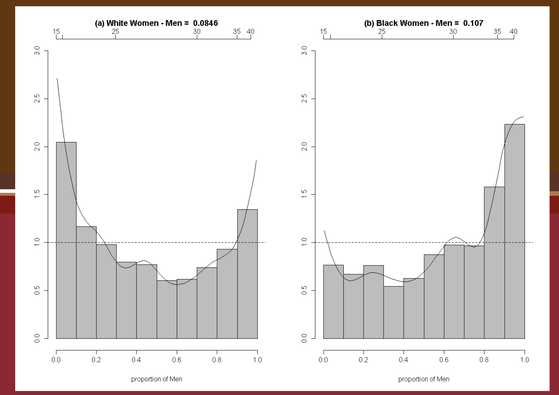
by race



by education



by gender and race



summary

Relative distribution methods have several advantages for studying obesity disparities:

- Can accomodate changes in BMI over time (negative values)
- Makes factors such as relative social status explicit
- Also captures absolute BMI differences
- Robust handling of outliers
- Simple summary measures such as entropy
- Able to decompose distributional differences into shape and location
- Ability to include potential covariates and confounding variables