Effect of Life Stress on Overall and Central Obesity Patterns in School Employees

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The Facts

- Epidemic:
  - 2/3 of Americans overweight/obese (BMI ≥ 25 kg/m^2)
  - 1/3 obese (BMI ≥ 30 kg/m^2)

- Factors implicated in epidemic:
  - Behavioral: diet, physical inactivity
  - Psychosocial: socioeconomic status (SES)
  - Genetic

Situation

- Community-based participatory research model

- Rural community

- Public school employees

- Community reported:
  - CVD deaths
  - Obesity
  - Stress

Aim

To explore the relationship between obesity patterns and perceived stress levels

Methods

Sample

- N= 99

- 56 % teachers

- 86 % Caucasian

- 88 % women

- Age: 20-72 yrs (Mean = 44 ± 1.0)

Questionnaires

- Perceived stress scale: 10-item global measure of life stress

- Hollingshead: SES assessment (occupation & years of education)

- International Physical Activity Questionnaire (IPAQ): physical activity levels in METS

Perceived Stress Scale- 10 Item

In the last month, how often have you felt nervous and "stressed"?
___0=never ___1=almost never ___2=sometimes
___3=fairly often ___4=very often

Anthropometric Assessments

- **BMI categories:**
  - Normal weight: 18.5 – 24.9 kg/m^2
  - Overweight: 25-29.9 kg/m^2
  - Obese ≥ 30 kg/m^2
- **Waist circumference categories:**
  - Clinical action level 1 (Lean et al.):
    - Women: waist ≥ 80 cm
    - Men: waist ≥ 94 cm
  - Clinical action level 2 (NIH/WHO):
    - Women: waist ≥ 88 cm
    - Men: waist ≥ 102 cm

Lean MEJ et al. BMJ 1995;311:158-161

Sample Characteristics

- **BMI :**
  - 37% overweight
  - 26% obese

- **Waist circumference:**
  - Clinical action level 1: 70% high risk
  - Clinical action level 2 (NIH/WHO): 38% high risk
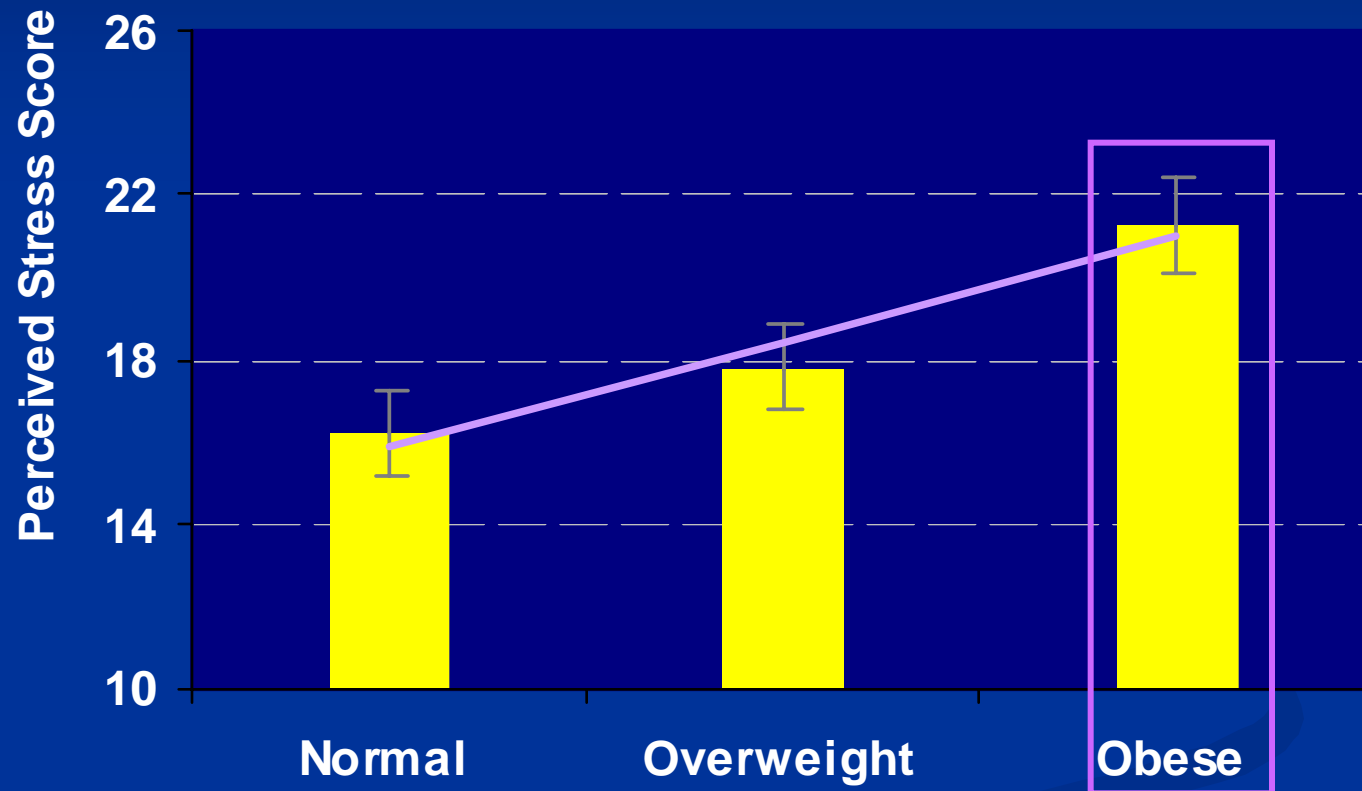
Statistical Analysis

- Univariate ANOVA: Stress by BMI and waist circumference categories

- Possible confounders: sex, age, physical activity & SES

Results

Correlations

- Perceived stress correlated with:
  - BMI: $r = 0.23$, $p = .02$
  - Waist: $r = .22$, $p = .04$
  - Age: $r = -0.20$, $p = .05$

- No correlation of stress, BMI, and waist with METS or SES
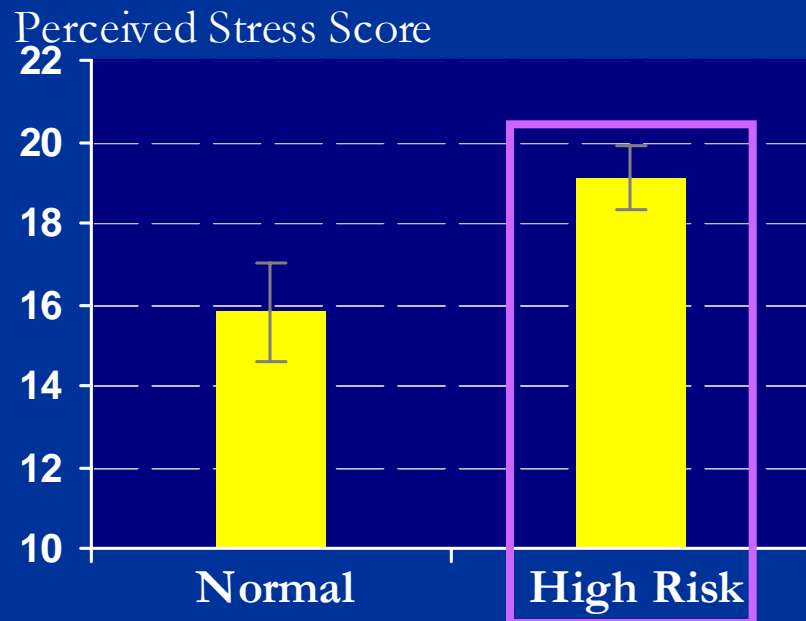
Perceived Stress by BMI Category

Univariate ANOVA p-values: BMI = 0.003, age = 0.02, METS = 0.05

Linear trend = 0.002

Perceived Stress by Waist Category
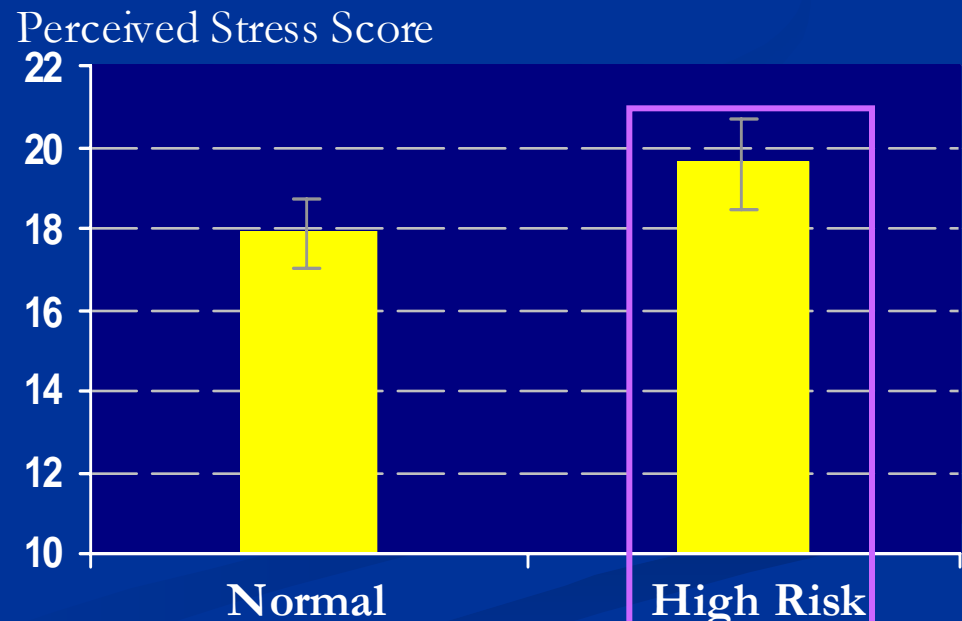
■ **Clinical action level 1:**
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Perceived Stress Score

Univariate ANOVA p-values: waist = 0.03, age = 0.05
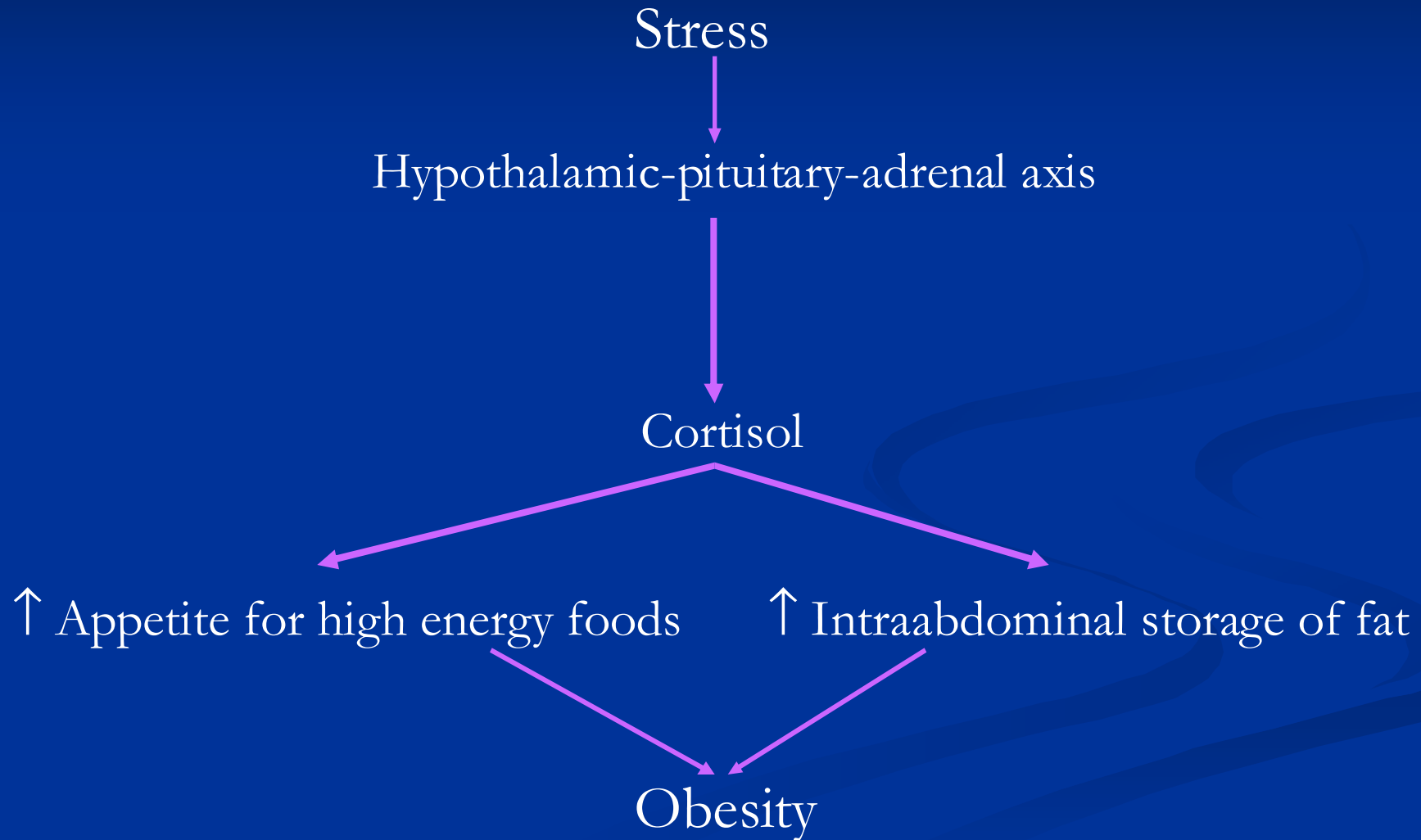
Perceived Stress Score

Univariate ANOVA p-values: waist = 0.09, age = 0.06

Conclusion

- Relationship between psychological stress and increased overall and central obesity

- Relationship stronger for lower waist cutoffs

- Extends beyond the effects of potential known confounders

- Psychological component associated with staggering rise in obesity prevalence

A Pathway

Stress

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Hypothalamic-pituitary-adrenal axis

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Cortisol

↓ ↓

↑ Appetite for high energy foods   ↑ Intraabdominal storage of fat

↓ ↓

Obesity