Cross-sectional data

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Cross-sectional data

- UK – HSE
- US – BRFSS (or NHANES)
- Denmark – National Health Survey
- Sweden – Survey of Living Conditions

- Smaller samples in the Danish and Swedish studies are followed up - giving time series cross-sectional, i.e. panel, data

Advantages of cross-sectional data

- Can give a representative sample of nation
  - Less problems with drop-out
- Age-related investigations (separate age and cohort effects)
  - Can investigate differences between age groups at a particular time
  - Can compare groups of same age at different times
- More widely available

Limitations with cross-sectional data

- Data usually not as rich as with cohort data
  - Increased chance of missing key information
- Only know that a condition was present by the date of the survey
  - Cannot tell when it began
  - Cannot tell whether other symptoms present began prior to or after this condition

Studies (NHANES)

- Prevalence: e.g., trends in obesity prevalence since 1999
  - Flegal et al. (2010) *JAMA; 303(3): 235-241*
- Associations: e.g., changes in association between overweight and income 1971-2002
  - Wang and Zhang (2006) *American Journal of Clinical Nutrition; 84(4): 707-716*
- Forecasting: e.g., predicting the prevalence and cost of obesity to 2030
  - Wang et al. (2008) *Obesity; 16(10): 2323–2330*

Panel vs cross-sectional

- Panel: may have some, albeit often limited, timing information
- Panel: more informative (more variability, more degrees of freedom), estimates are more efficient
- Panel: allows us to control for individual unobserved heterogeneity

Panel data and obesity

- NHANES Epidemiological Follow-up Studies
  - From NHANES I (1971-1975), 25-74 year olds
  - 1982-1984, 1987, 1992
- Percent energy intake from fat with subsequent weight change: Kant et al. (1995)
  American Journal of Clinical Nutrition; 61: 11-17
- How long-term patterns of weight change affect the risk for diabetes: Ford et al. (1997)
  American Journal of Epidemiology; 146(3): 214-222

Possible methods

- Discriminant analysis
  - Predicts category membership
- Multilevel modelling
- Regression analyses
  - OLS
  - Logistic
    - Ordered – non-obese, overweight, obese
- Time series analysis

Panel data regression

- Pooled panels
  - Treats all the observations for all of the time periods as a single sample
- Fixed effects
  - Individual specific effect is correlated with the independent variables
  - Assumes time independent effects
- Random effects
  - Individual specific effects are uncorrelated with the independent variables
- Mixed effects

Pseudo-panels

- UK and US data are solely cross-sectional, only smaller samples (and time period) for Denmark and Sweden are panel data
- Create pseudo-panel
- Combine across time-invariant characteristics
  - E.g., birth year, gender
- Take means or % prevalence for group for other variables
- Follow groups over time (% obese in group)

Pseudo panel construction

- Cohorts determined by gender, birth yr and education
- Education = relative educational level, participants divided into top, middle and bottom thirds

TABLE: BIRTH YR COHORTS		**Year of survey**		
		1995	2000	2005
Year of birth	1975-1980			*Aged 25-29*
	1970-1975		*Aged 25-29*	*Aged 30-34*
	1965-1970	*Aged 25-29*	*Aged 30-34*	*Aged 35-39*
	1960-1965	*Aged 30-34*	*Aged 35-39*	*Aged 40-44*
	1955-1960	*Aged 35-39*	*Aged 40-44*	*Aged 45-49*
	1950-1955	*Aged 40-44*	*Aged 45-49*	*Aged 50-54*
	1945-1950	*Aged 45-49*	*Aged 50-54*	*Aged 55-59*
	1940-1945	*Aged 50-54*	*Aged 55-59*	*Aged 60-64*
	1935-1940	*Aged 55-59*	*Aged 60-64*	
	1930-1935	*Aged 60-64*		

Analysis

- Regressions (cross-sectional and panel):
  - Stressors
    - Financial difficulties/insecurity
      - Unemployment
    - Socioeconomic status
    - Health insurance (US)
    - Single parenthood
    - Social support
    - Junk food consumption?

Analysis

- Stresses
  - Anxiety
  - Depression
  - Sleep?

- Pattern of results
- Relative importance of different factors

Mental Health Data

England: 1997-2006

- Includes *General Health Questionnaire (GHQ)*: 12 items relating to mental health

- Participants are asked whether they have been experiencing each of the following items more or less than usual:

Been feeling unhappy and depressed
Felt constantly under strain
Felt couldn't overcome difficulties
Lost sleep over worry
Been losing confidence in self
Been thinking of self as worthless
Felt capable of making decisions
Felt playing useful part in things
Been able to face problems
Able to concentrate
Able to enjoy day-to-day activities
Been feeling reasonably happy

Denmark: 1994-2005

- Includes the *SF-36* questionnaire: 9 items relating to mental health

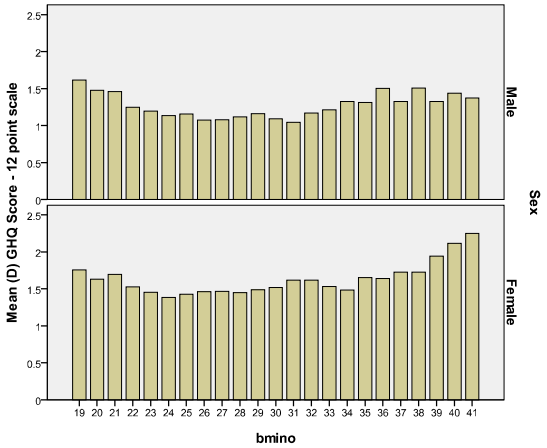
- Participants are asked how often they have been experiencing each of the following items:

Tired
Worn out
Lot of energy
Full of pep
Happy person
Calm and peaceful
Down in the dumps
Very nervous
Downhearted and blue

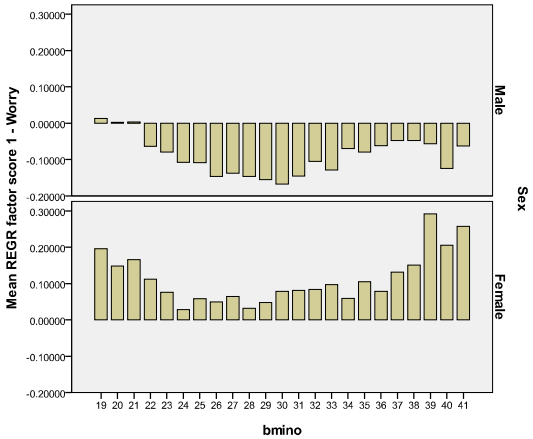
GRAPHS OF MENTAL HEALTH SCORES AGAINST BMI

ENGLAND

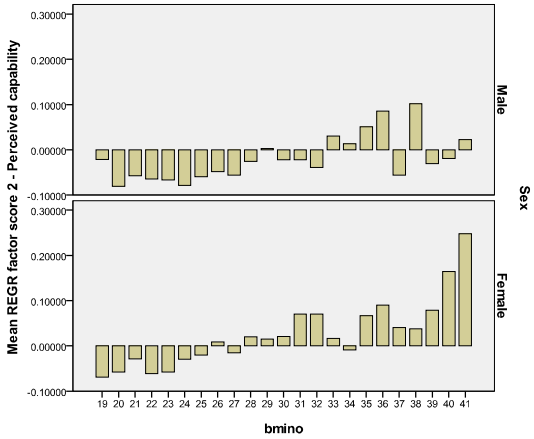
GHQ score



Factor 1 - Worry



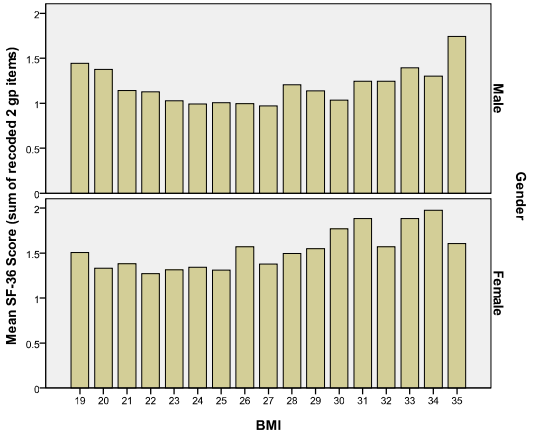
Factor 2 - Perceived capability



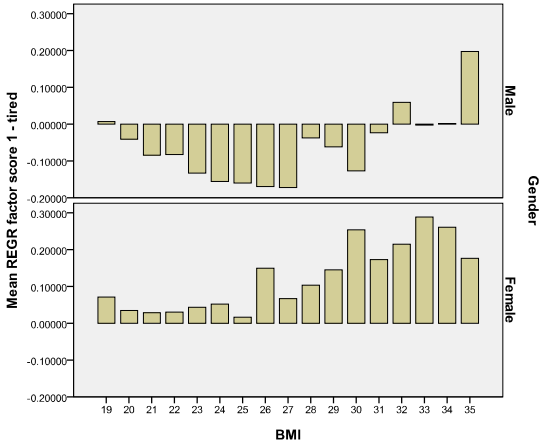
N.B. In every case, higher scores = worse mental health

DENMARK

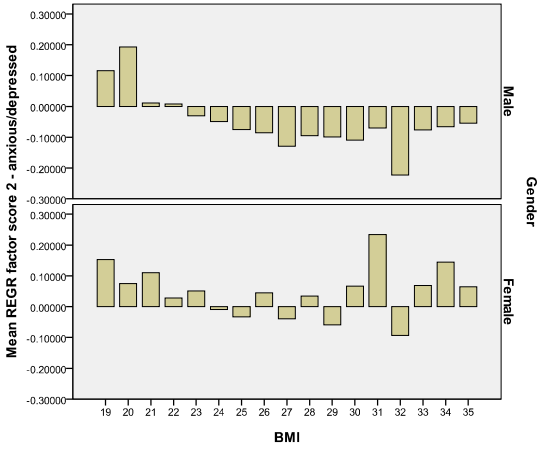
SF-36 score



Factor 1 - Tiredness



Factor 2 - Anxiety/ depression



Mental health and obesity

- Multinomial logistic regression: non-obese (BMI 18.5-24.9), overweight (BMI 25-29.9) and obese (BMI 30+) individuals
- Each of the mental health scores was separately entered into a regression analysis, along with age, gender and survey year

		B	Exp(B)	Sig
Denmark	Factor 1 - Tiredness	.173	1.189	.000
	Factor 2 – Anxiety/depression	-.020	.980	.393
	SF-36 score	.079	1.082	.000
England	Factor 1 - Worry	.076	1.079	.000
	Factor 2 – Perceived capability	.057	1.058	.000
	GHQ12 score	.025	1.025	.000
	Presence of mental disorder	.323	1.382	.000

- Significant results: as mental health scores increased (i.e., as mental health worsened), the odds of being in the obese rather than non-obese group increased
- For the Danish Factor 1, each unit increase in score for Tiredness would increase the odds of obesity by a factor of 1.19

Mental health and overweight

- Summary of significant differences found between the overweight (BMI 25-29.9) group and other groups

		18-25	**30+**
Denmark	Factor 1 - Tiredness	No	Yes
	Factor 2 – Anxiety/depression	Yes	No
	SF-36 score	No	Yes
England	Factor 1 - Worry	No	Yes
	Factor 2 – Perceived capability	No	Yes
	GHQ12 score	No	Yes
	Presence of mental disorder	No	Yes

Next steps

- Expand comparison to Sweden and US
- Examine pattern solely with obese group
- Examine pattern over time
  - Time lags
- Examine stressors
  - Compare to stresses