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A latent class analysis of health (risk) behaviours in the UK Police Service and associations with mental health and job strain

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Conflict of interest statement:

All authors declare no conflicts of interest.

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Health (Risk) Behaviours

Health behaviours → actions to maintain, attain, or regain good health

Health risk behaviours → major causes of chronic disease and premature mortality

Evidence suggests health risk behaviours co-occur:

- E.g., hazardous/harmful drinking and smoking (Noble et al., 2015)
- Co-occurring health risk behaviours lead to more adverse outcomes

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Mental Health & Job Strain

Poor mental health (e.g., depression, anxiety, PTSD):

- Associated with co-occurring health risk behaviours (Vermeulen-Smit et al., 2015)

High job strain (high demands, low control):

- Associated with health risk behaviours (Lallukka et al., 2008)
  - BUT health behaviours (e.g., exercise) are sometimes used through pro-active coping

Policing can be a highly stressful occupation (Papazoglou & Andersen, 2014):

- Over one third (36%) of UK police employees drink hazardously/harmfully (Irizar et al., 2021)
  - Those with poor mental health were twice as likely to drink harmfully
  - BUT those reporting high strain were less likely to drink hazardously

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Aims

This study aims:

1. To use Latent Class Analysis (LCA) to determine classes of health (risk) behaviours in UK police employees (in men and women, separately)
2. To determine the associations between the identified classes and poor mental health (depression, anxiety, PTSD)
3. To determine the associations between the identified classes and job strain (high, low, active, passive)

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Study Sample

Airwave Health Monitoring Study (Elliott et al., 2014)

- Data collected June 2006 – March 2015
- 28 participating forces (out of 54)
- Final N = 40,986
- Response rate averaged 50% across forces

Data collection

- Participants completed an enrolment questionnaire and a health screen conducted by trained nurses
- Collected data on:
  - Sociodemographic variables
  - Occupational variables
  - Alcohol use
  - Smoking
  - Diet
  - Physical health
  - Mental health

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Measures

Health (risk) Behaviours

Alcohol use: UK CMO guidelines (DHSC, 2016)

- Non-drinkers, low risk (0-14 units), hazardous (14-35/50 units for women/men), harmful (+35/50 units for women/men)

Binge drinking

- Never, monthly or less, 2-4 times a month, 2-3 times a week, daily/almost daily

Smoking status

- Non-smokers, light-moderate (0-10 per day), heavy (+10 per day)

Physical activity: IPAQ-SF (Craig et al., 2003)

- High physical activity (min 1500 met minutes), moderate physical activity (min 600 MET minutes), low physical activity

Fruit & vegetable intake

- <2 per day, 3-4 per day, +5 per day

Red meat consumption

- Never, less than once a week, once a week, 2 or more times a week

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Measures

Mental Health & Job Strain

Probable depression: 9-item PHQ (Kroenke et al., 2001)

- Case score ≥10 (range 0-27)

Probable anxiety: 7-item HADS-A (Zigmond & Snaith, 1983)

- Case score ≥9 (range 0-21)

Probable PTSD: 10-item TSQ (Brewin et al., 2002)

- Case score ≥6 (range 0-10)

Job strain: 10 items from JCQ (Karasek et al., 1998)

- Quadrant approach: high (+demands, -control), low(-demands, +control), passive (-demands, -control), active (+demands, +control)

Sociodemographic variables

- Age, gender, country, marital status, education, ethnicity, N children under 18

Occupational variables

- Job role (police officer, police staff, other), income, years in service, N days of sickness absence in the past year

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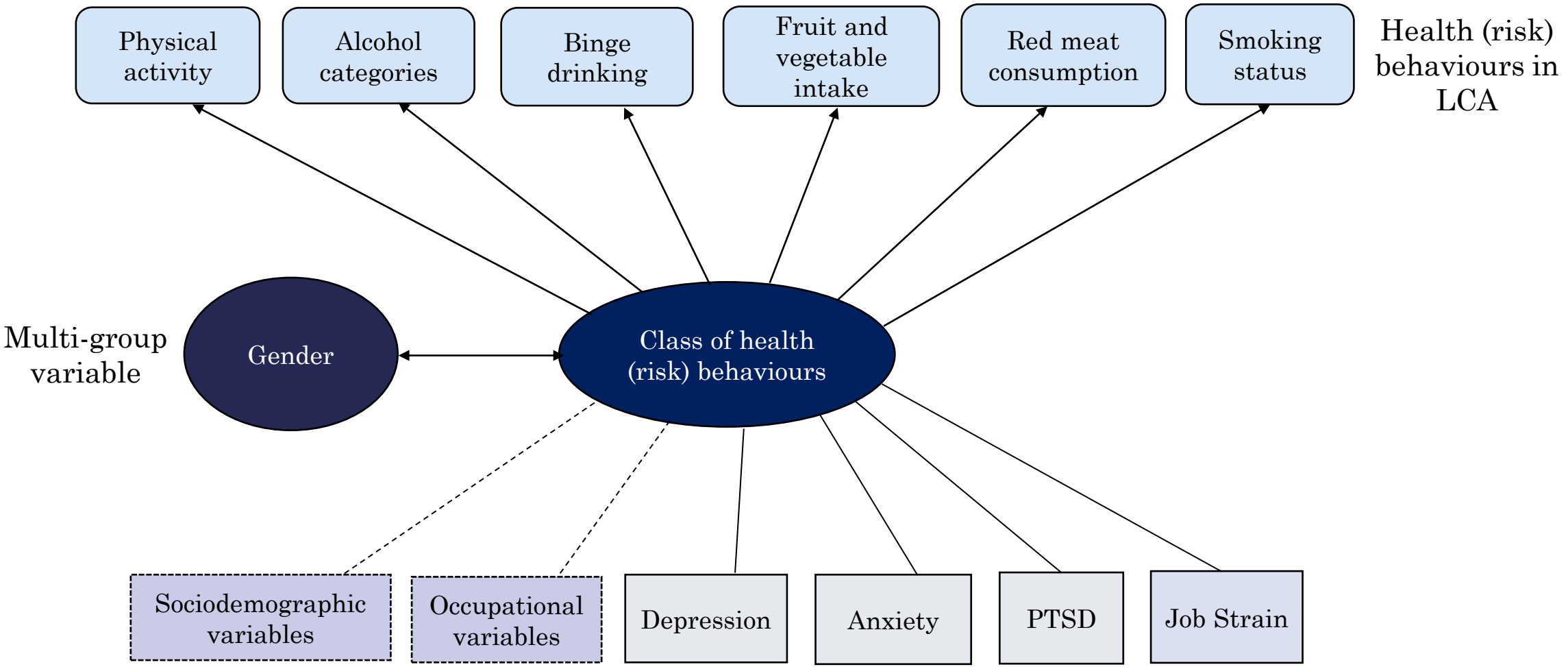
Multi-group LCA model



Explanatory variables analysed in regressions

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Data Analysis

Latent Class Analysis (LCA) (MPLUS)

- Estimate and evaluate a series of models, starting with 2 classes
- Evaluate with model fit criteria:
  - Lower AIC / BIC / sample size adjusted BIC
  - Entropy values (>0.70)
  - Fewer significant bivariate residuals (BVR)
  - Response probabilities → informative classes

Multinomial Logistic Regressions (STATA)

- Class membership & conditional probability of class assignment imported to STATA
  - Created a probability weight
- Step 1 – weighted unadjusted regressions to explore sociodemographic and occupational associations with the classes
- Step 2 – weighted adjusted regressions to examine mental health and job strain associations with the classes

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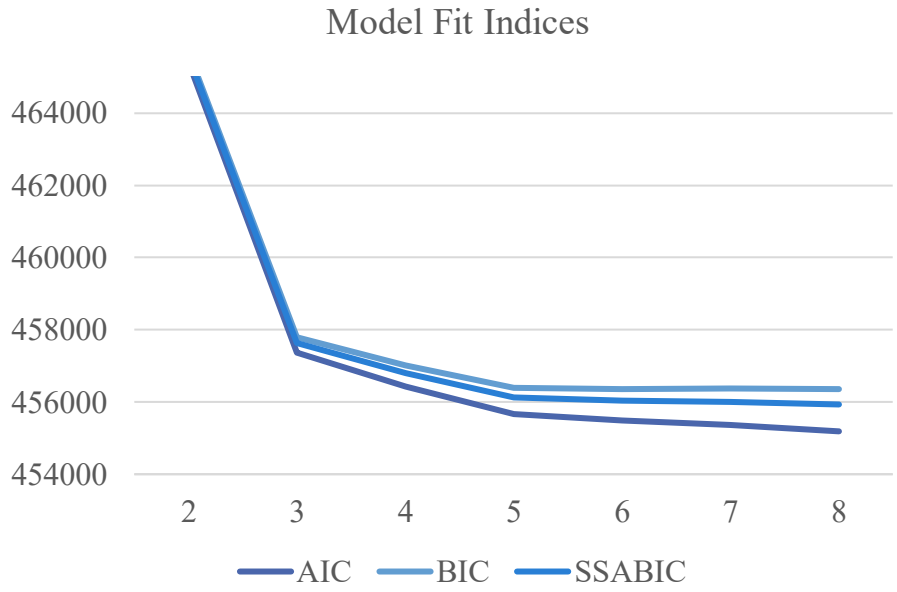
LCA: 5-Class Model



Number of classes	Entropy	AIC	BIC	SSABIC	VLMR-LRT (p-value)	BVR	Range of class probabilities
Full sample							
4	0.85	456432.73	457010.34	456797.41	957.04 (0.000)	20	0.60 to 0.99
5	**0.71**	**455663.65**	**456387.81**	**456120.86**	**798.66 (0.000)**	**7**	**0.60 to 0.86**
6	0.71	455486.82	456357.54	456036.56	209.67 (0.000)	5	0.31 to 0.90
Multigroup							
5	0.77	505344.14	506766.60	506242.23	-	4	-

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LCA: Class Descriptions

Men			Women		
Class 1 (18%)	Healthiest	Low risk drinkers Highest fruit & veg intake Lowest red meat intake Non-smokers High physical activity	Class 1 (29%)	Healthiest	Low risk drinkers Highest fruit & veg intake Low red meat intake Non-smokers High physical activity
Class 2 (14%)	Healthy abstainers	Mostly abstainers High fruit & veg intake Low red meat intake Non-smokers High physical activity	Class 2 (16%)	Healthy abstainers	Mostly abstainers High fruit & veg intake Lowest red meat intake Non-smokers Moderate physical activity
Class 3 (29%)	Some health risk behaviours but active	Hazardous drinkers Average fruit & veg intake High red meat intake Light-moderate smokers High physical activity	Class 3 (12%)	Moderate health risk behaviours	Hazardous drinkers Average fruit & veg intake Average red meat intake Light-moderate smokers High physical activity
Class 4 (36%)	Low risk drinkers but other health risk behaviours	Low risk drinkers Lowest fruit & veg intake High red meat intake Light-moderate-smokers Lowest physical activity	Class 4 (39%)	Low risk drinkers but other health risk behaviours	Low risk drinkers Lowest fruit & veg intake High red meat intake Light-moderate smokers Lowest physical activity
Class 5 (4%)	High health risk behaviours	Hazardous/harmful drinkers Low fruit & veg intake High red meat intake Most smokers Low physical activity	Class 5 (4%)	High health risk behaviours	Hazardous/harmful drinkers Low fruit & veg intake Highest red meat intake Most smokers Low physical activity

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Sociodemographic & Occupational Associations

- **Aged 40-49** (vs <29) increased odds → "high health risk behaviours"
- **Aged <29** (vs older age groups) increased odds → "low risk drinkers but other health risk behaviours"
- **GCSE education** (vs higher education) increased odds → "high health risk behaviours"
- **Black & Asian ethnicity** (vs White) increased odds → "healthy abstainers"
- **Served for >10 years** (vs <5) increased odds → "high health risk behaviours" AND reduced odds → "low risk drinkers but other health risk behaviours"
- **>10 days of sickness** absence in past year → "high health risk behaviours" AND "healthy abstainers"

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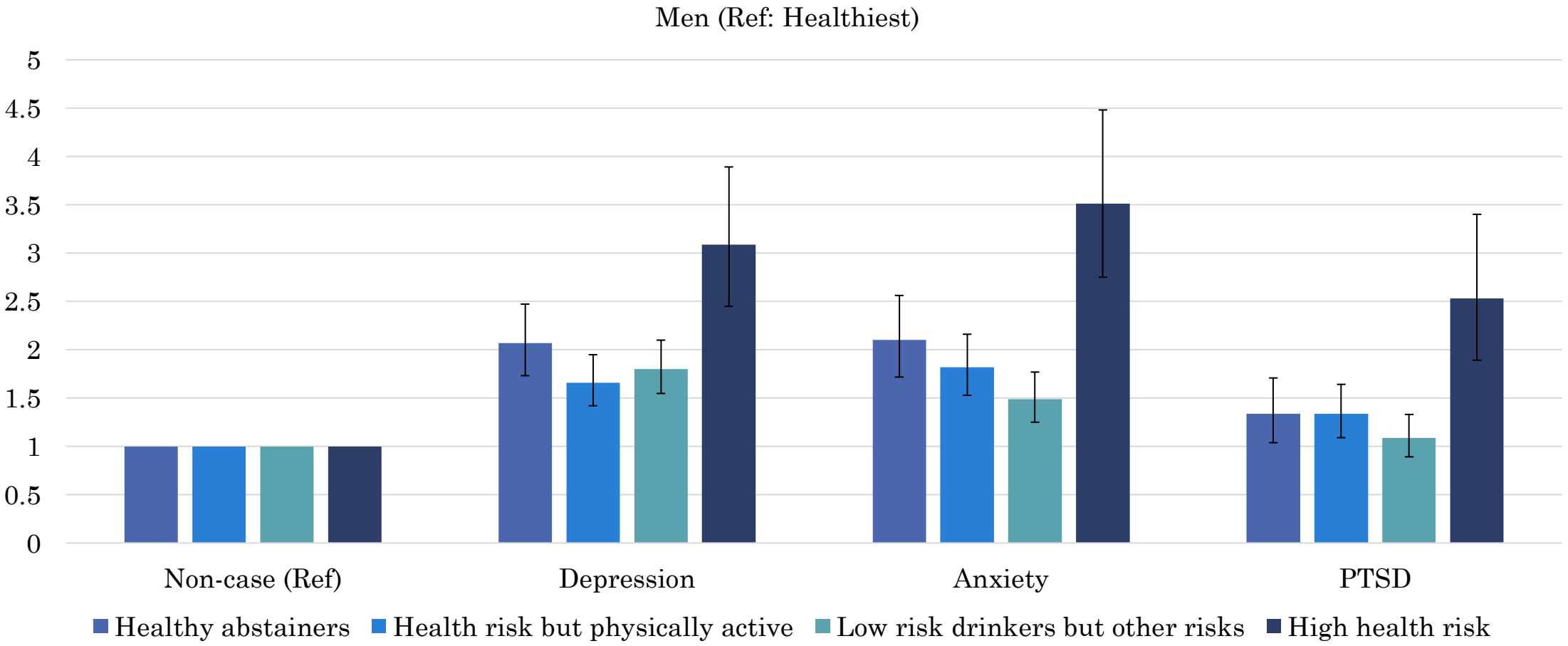
Mental Health Associations



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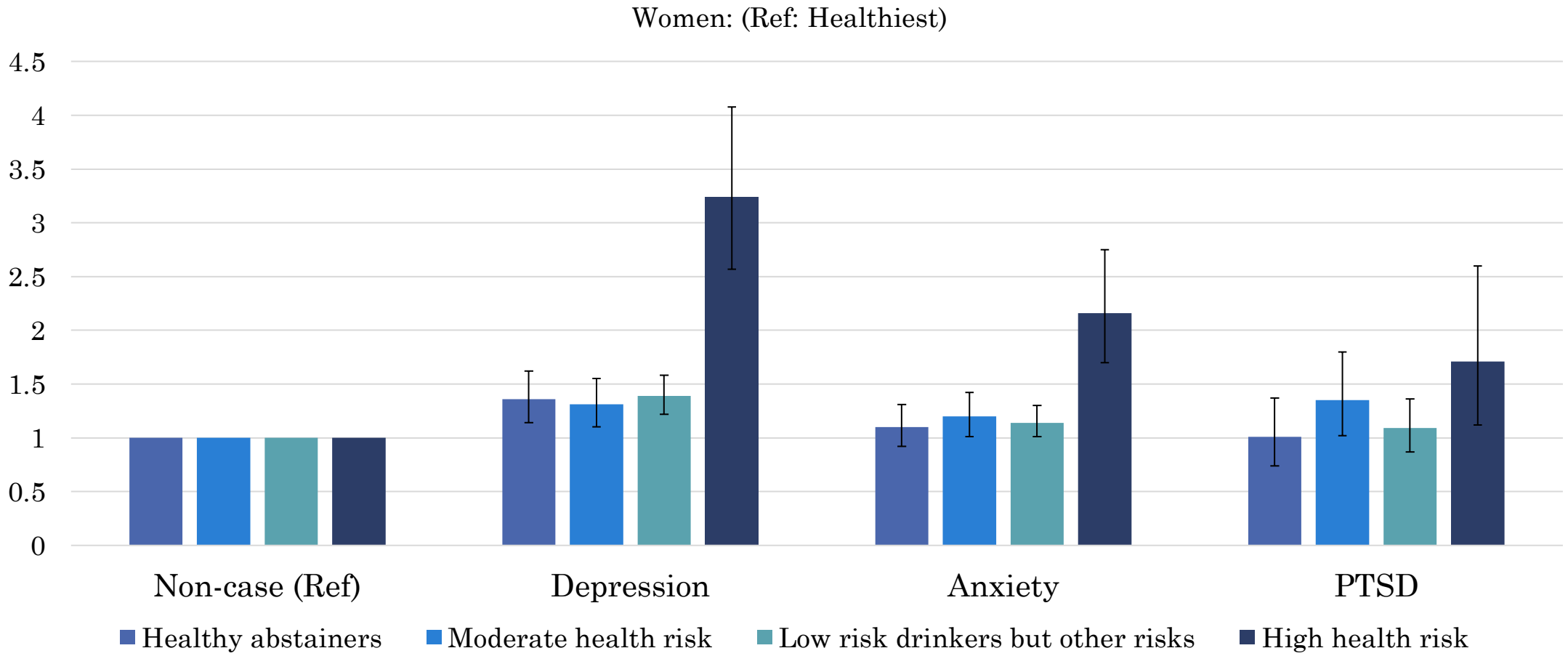
Mental Health Associations



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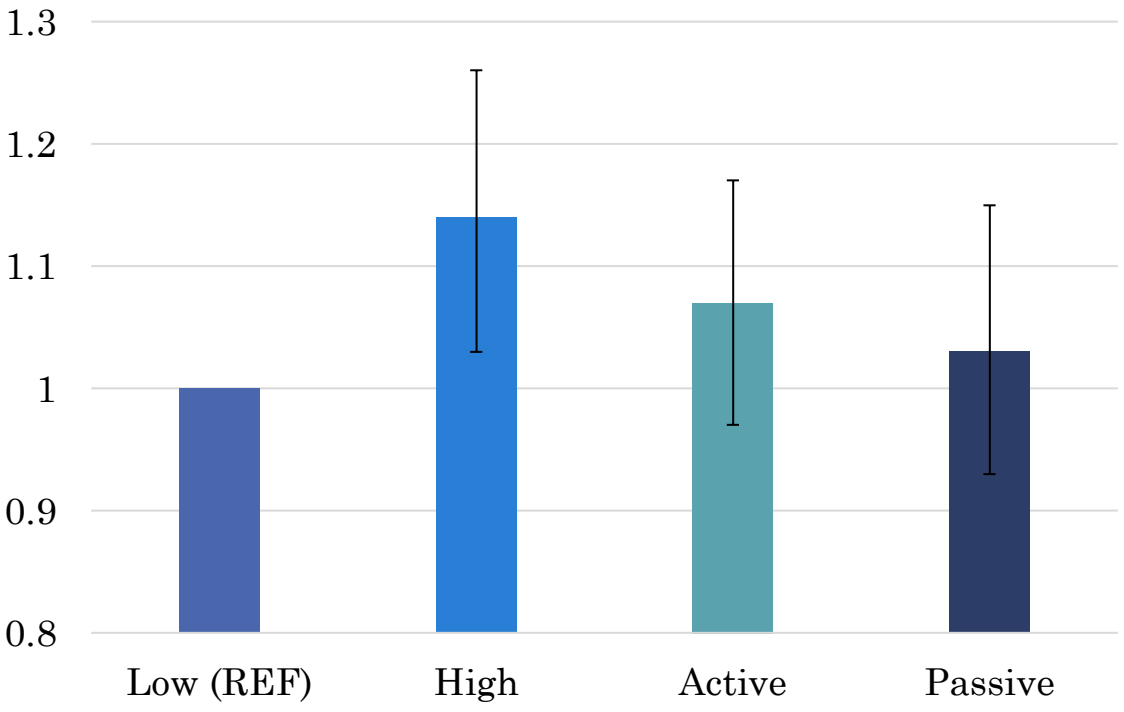
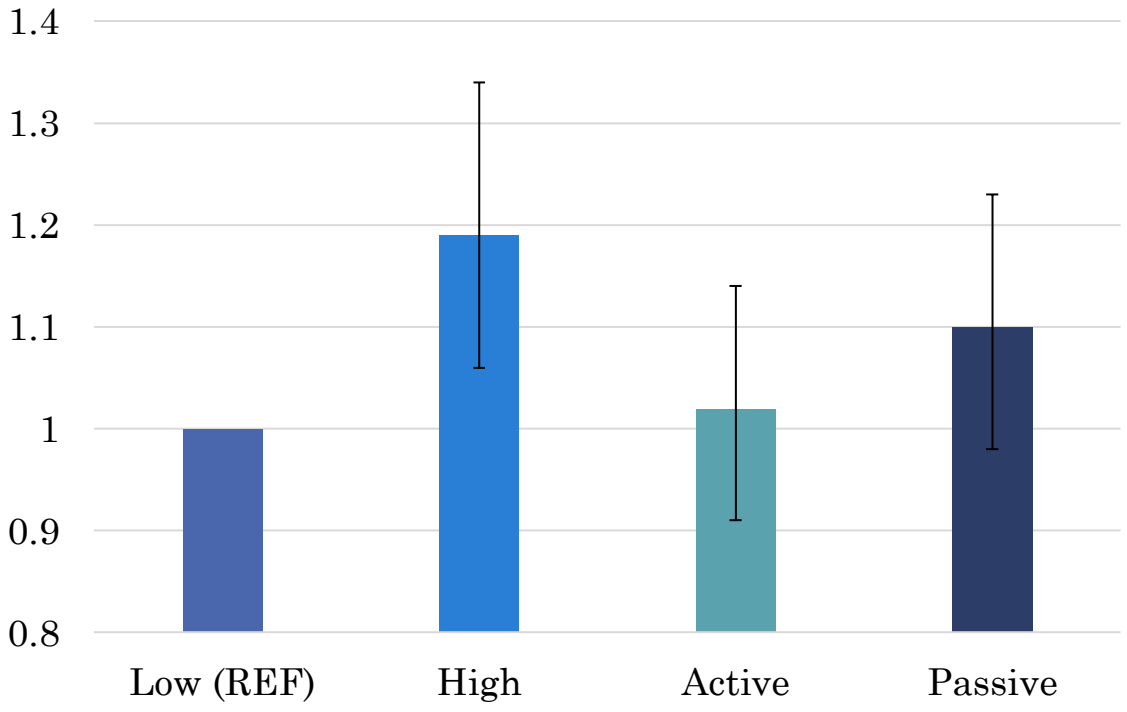
Job Strain Associations

Men: "Low Risk Drinkers But Other Health Risks“
(Ref: Healthiest)



Women: "Low Risk Drinkers But Other Health Risks"
(Ref: Healthiest)



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Key Findings

Police with probable depression, anxiety, or PTSD (compared to no mental health problem) showed much greater odds of "high health risk behaviours" (vs "healthiest")

- Police employees reporting poor mental health had increased odds of harmful drinking & abstinence (Irizar et al., 2021)
- Links with findings from general populations (Oftedal et al., 2019; Vermeulen-Smit et al., 2015)
  - Those with poor mental health are more likely to engage in multiple health risk behaviours → greater adverse consequences

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Key Findings

Police reporting high strain (compared to low strain) had increased odds of being in the "low risk drinkers with other health risk behaviours" class

- Police employees reporting high strain had reduced odds of hazardous drinking (Irizar et al., 2021)
- BUT more likely to engage in other health risk behaviours (e.g., poor diet, inactivity) → high strain may reduce free time for health behaviours

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Implications

1. Importance of developing interventions which target co-occurring health risk behaviours

- Combined adverse consequences of multiple health risk behaviours are greater

2. The workplace offers an advantageous environment for interventions

- Individual level – identified those more likely to engage in health risk behaviours (targeted interventions)
- Organisational level – health promotion campaigns to encourage healthy eating, smoking cessation, physical activity

3. Future research should examine the temporal associations between poor mental health and health risk behaviours

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Thank you!

Any questions?

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