

Investigations of Adverse Occupational Exposome Linkage To Lewy Body Neuropathology

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BACKGROUND

Occupational exposome: totality of all working conditions and contexts over the life-course

- High job strain=high job demand and low job control
 - Hallmark indicator of work-related stress
 - Linked to dementia and clinical Alzheimer's Disease

Lewy Body Dementia (LBD):

- Few known risk factors: older age, sex, family history
- Access to deeply characterized occupational histories linked to brain tissue is rare

Knowledge Gap: Link between high job strain and LBD neuropathology

METHODS

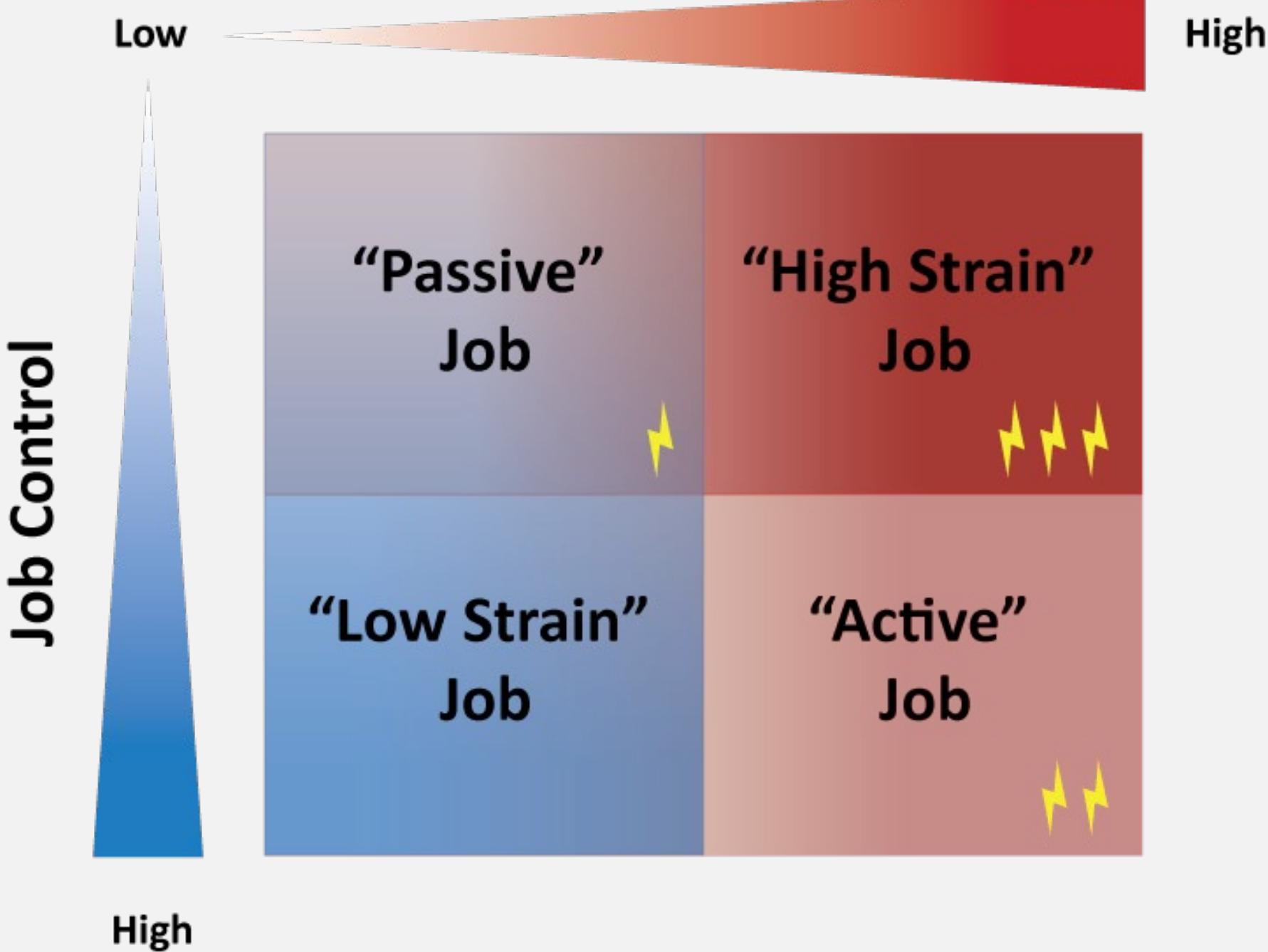
Study Sample: Brain donors from two brain banks with occupational histories (n=999; donations: 1985-2018)

Occupational Exposome Determination:

- Fully characterized donor occupational histories using standardized public data tracing procedures
- Linked to standard occupational codes then Occupational Information Network indicators
- Karasek's stress-management model for job strain:

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$$\text{Job Strain} = \frac{\text{Job Demand}}{\text{Job Control}}$$

Job Demand



- Life-course Job Strain Indicator:
 - **ever** had **high strain** jobs
 - **never** had high strain job, **only passive/active**
 - **never** had high strain job, **only low strain**

Outcome: Presence of Lewy body neuropathology

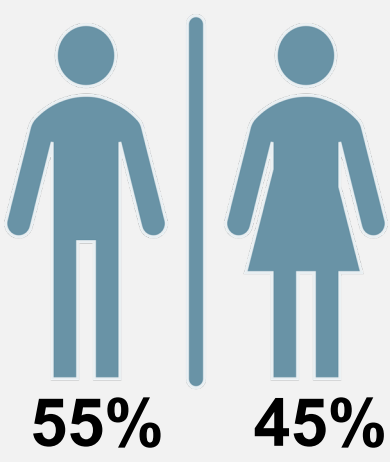
Covariates: Age, Sex

Statistical Analyses: Multivariate logistic regression models

RESULTS

Brain Donor Characteristics

Sex

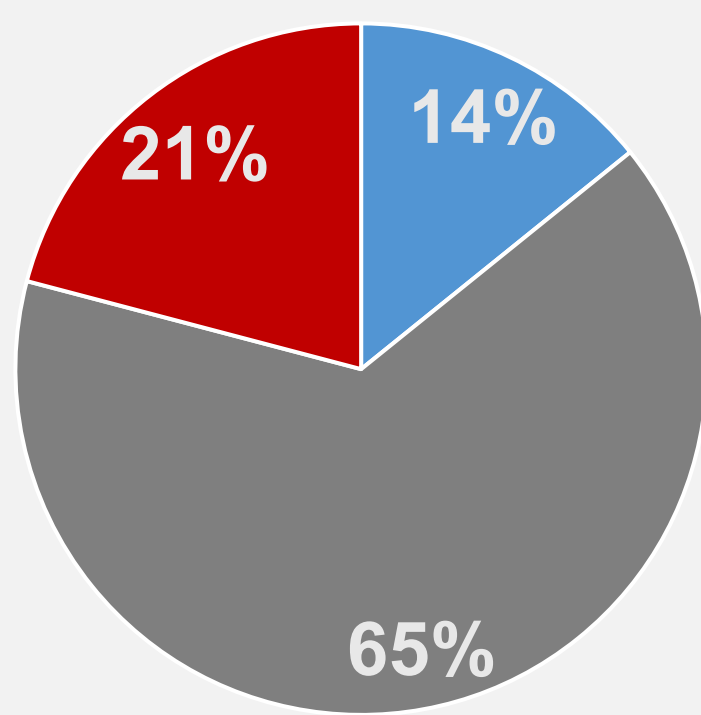


55% 45%

Mean Age at Death
81.2 years old

Lewy Body Neuropathology
27.7%

Life-course Job Strain Exposure



■ Low Strain
■ Passive/Active
■ High Strain

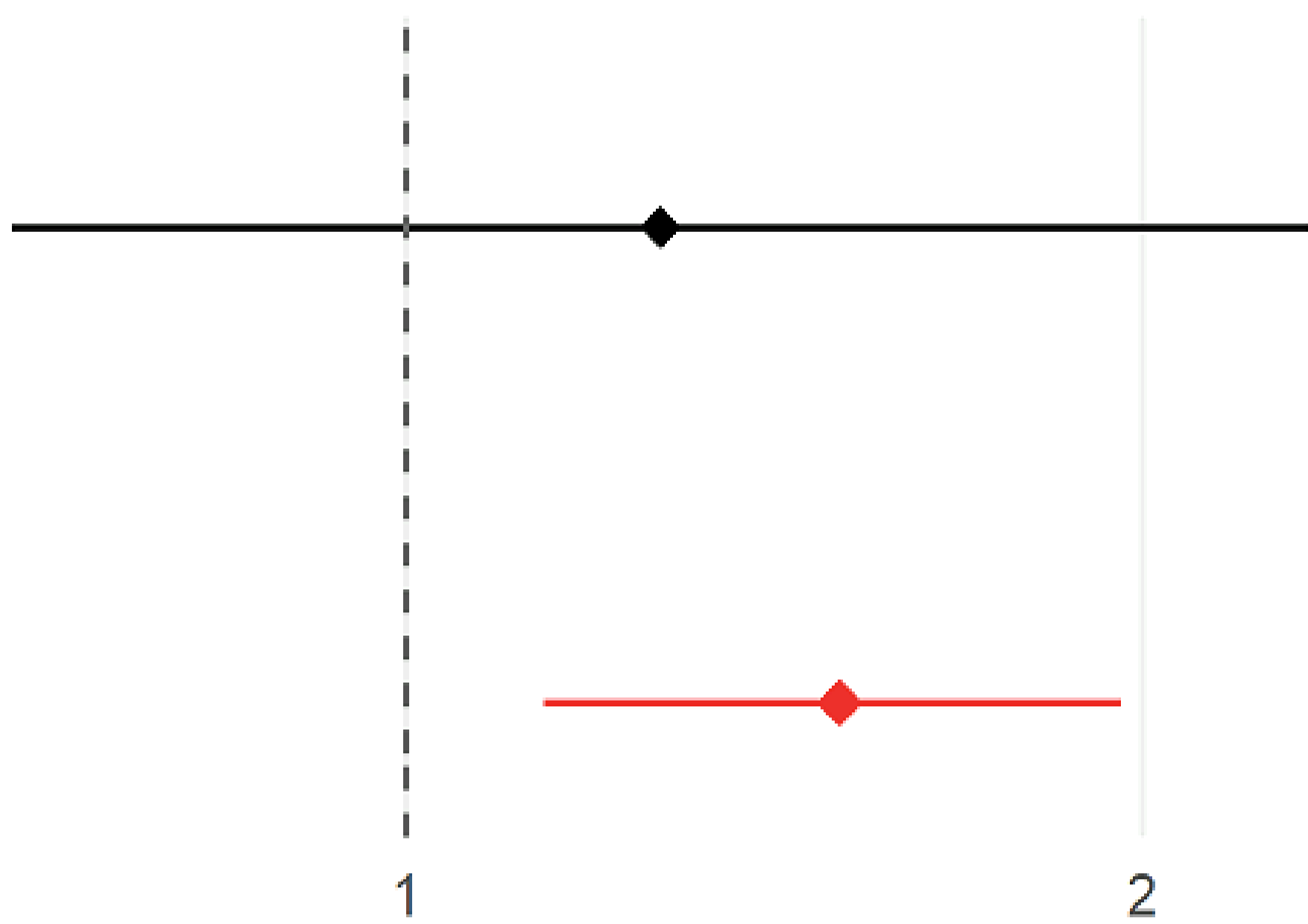
Brain Donor Characteristics by Level of Life-course Job Strain Exposure

	Low Strain	Active/Passive	High Strain
Characteristic	n (%)	n (%)	n (%)
Sex			
Female	94 (66.2)	309 (47.7)	44 (21.1)
Male	48 (33.8)	339 (52.3)	165 (78.9)
Age at Death			
Mean (SD)	81.5 (10.2)	81.5 (9.1)	80.2 (9.4)
Lewy body neuropathology			
Present	31 (21.8)	176 (27.2)	70 (33.4)
Not Present	111 (78.2)	472 (72.8)	139 (66.5)

Results from Adjusted Logistic Regression Model

Passive/active
vs. Low strain

High Strain
vs. Low strain



Adjusted OR (95% CI)

1.27 (0.69-2.34)

1.50 (1.14-1.96)

DISCUSSION

The adverse occupational exposome via high job strain linked to greater odds of Lewy body neuropathology

- High job strain—directly (via inflammatory stress response) and/or indirectly (via stress-related health behaviors)—contributes to risk of Lewy body neuropathology.

Demonstrated novel approach for linking occupational histories and exposures to brain bank cohorts is feasible

Limitations: Biased representation of U.S. population

Impact: Leveraging the **modifiable** occupational exposome via high job strain to target vulnerable individuals and communities with risk reduction strategies at structural/policy- or individual-level

Next Steps: Replicate study in larger, more diverse brain bank and greater characterization (timing and dose) of high job strain exposure.

CONCLUSIONS

The fundamentally modifiable occupational exposome is linked to Lewy body neuropathology providing **tremendous opportunity to reduce or mitigate risk** for Lewy body neuropathology earlier in the life-course.

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