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# Cognitive ability and cognitive ageing

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Cognitive ability (and why it matters)
Age-related cognitive decline (and how to avoid it)

# 1. Cognitive ability and why it matters

# Vocabulary

- Inchoate
- Desultory
- Cynosure
- Nugatory
- Parvenu
- Numinous

# Reasoning



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### Memory

# **Processing Speed**





### Education



Deary et al. (2007) Intelligence 19(6), 339-345

# Job performance



Kuncel & Hezlett (2010) Curr Direct Psych Sci 19(6), 339-345

# Mental health



Gale et al. (2010) *Epidemiology 21*(1), 70-77

## Cognitive ability at 16 and schizophrenia

Study

Albee et al. (1964) Offord (1974) Watt & Lubensky (1976) Jones et al. (1994) Crow et al. (1995) Ott et al. (1998) Amminger et al. (2000) Cannon et al. (2000) Cannon et al. (2002) Seidman et al. (2006) Osler et al. (2007) Welham et al. (2009) Sorensen et al. (2010) Overall

|                   |                   | Effect size<br>(95% CI) | % Weight |
|-------------------|-------------------|-------------------------|----------|
| 1964)             |                   | 0.64 (0.48 to 0.80)     | 12.8     |
| )                 |                   | 0.69 (0.42 to 0.95)     | 9.7      |
| nsky (1976)       | <b>⊢</b> ∎        | 0.49 (0.02 to 0.96)     | 5.3      |
| 1994)             | ┼╋┼               | 0.30 (-0.05 to 0.65)    | 7.5      |
| 995)              |                   | 0.62 (0.27 to 0.97)     | 7.5      |
| 98)               | │ -∔ॖॖॖॖॖॖ        | 0.78 (0.29 to 1.27)     | 5.1      |
| t al. (2000)      |                   | —— 1.85 (0.79 to 2.91)  | 1.4      |
| . (2000)          | │ -∰              | 0.53 (0.27 to 0.79)     | 9.8      |
| . (2002)          | │■                | 0.44 (0.08 to 0.80)     | 7.4      |
| al. (2006)        |                   | 0.65 (0.20 to 1.09)     | 5.8      |
| :007)             |                   | 0.14 (-0.07 to 0.36)    | 11.3     |
| <i>l</i> . (2009) |                   | 0.35 (0.08 to 0.62)     | 9.5      |
| al. (2010)        |                   | 0.45 (0.06 to 0.83)     | 6.8      |
|                   | ♦                 | 0.51 (0.38 to 0.65)     | 100.0    |
| 1 1 1             |                   |                         |          |
| -1.5 -1.0 -0.5    | 0 0.5 1.0 1.5 2.0 |                         |          |

Effect size

1.0 1.5

Dickson et al. (2012) *Psychol Med*, 42, 743-755



Batty et al. (2009), Epidemiology, 20(1), 100-109

| Cause of death              | No of peopl | e Hazard ratio<br>(95% CI) | Hazard ratio<br>(95% CI) |
|-----------------------------|-------------|----------------------------|--------------------------|
| All causes                  | 25 143      | -                          | 0.80 (0.78 to 0.81)      |
| Cardiovascular disease      | 9619        | -                          | 0.76 (0.75 to 0.77)      |
| Coronary heart disease      | 5855        | <b></b>                    | 0.75 (0.73 to 0.77)      |
| Stroke                      | 2053        |                            | 0.76 (0.73 to 0.79)      |
| Cancer                      | 8906        |                            | 0.86 (0.84 to 0.88)      |
| Smoking related cancer      | 6211        |                            | 0.82 (0.80 to 0.84)      |
| Cancer not related to smoki | ng 2695     |                            | 0.96 (0.93 to 1.00)      |
| Respiratory disease         | 5313        |                            | 0.72 (0.70 to 0.74)      |
| Digestive disease           | 1868        |                            | 0.82 (0.79 to 0.86)      |
| External cause              | 1480        |                            | 0.82 (0.78 to 0.87)      |
| Injury                      | 783         | <b>_</b>                   | 0.81 (0.75 to 0.86)      |
| Selfharm                    | 144         |                            | 0.87 (0.74 to 1.02)      |
| Dementia                    | 786         |                            | 0.84 (0.78 to 0.90)      |
|                             | 0.          | .7 0.8 0.9 1               | .0 1.1                   |

Calvin et al. (2017) BMJ, 357, j2708

# 2. Age-related cognitive decline



Salthouse (2004) Curr Direct Psych Sci, 13(4), 140-



Tucker-Drob (2009) Dev Psychol, 45(4), 1097-1118.

#### **Scottish Mental Survey 1932**



87,498 11 year old Children

#### **Scottish Mental Survey 1947**



11 year old Children





### Stability of cognitive ability across life (LBC1921)



Deary et al. (2015) Psychol Sci, 24(12), 2361-2368



Change in Cognitive Ability Within Older Age (LBC1936)



Change in Cognitive Ability Within Older Age (LBC1936)

- Alcohol
- Caffeine
- Other dietary intakes
- Body Mass Index
- Smoking
- Social activities/engagement
- Job complexity
- Bilingualism
- Education

- Alcohol
- Caffeine
- Other dietary intakes
- Body Mass Index
- (Not) smoking
- Social activities/engagement
- Job complexity
- Bilingualism
- Education





Ritchie et al. (under review)



# Summary

- 1. Measures of cognitive ability can predict educational & occupational success, and physical and mental health
- 2. Cognitive ability declines (in some important aspects) from the mid-20s onwards
- 3. Some promising leads for factors helping to maintain cognitive ability (and brain health) in older age:
  - Education
  - Physical fitness
  - Occupational complexity
  - & others...

# Thanks



Centre for Cognitive Ageing and Cognitive Epidemiology

- LBC1936 participants
- LBC1936 team
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