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70 really is the new 60: Longitudinal analysis of cohort trends in intrinsic capacity in England and China

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Team & Funding

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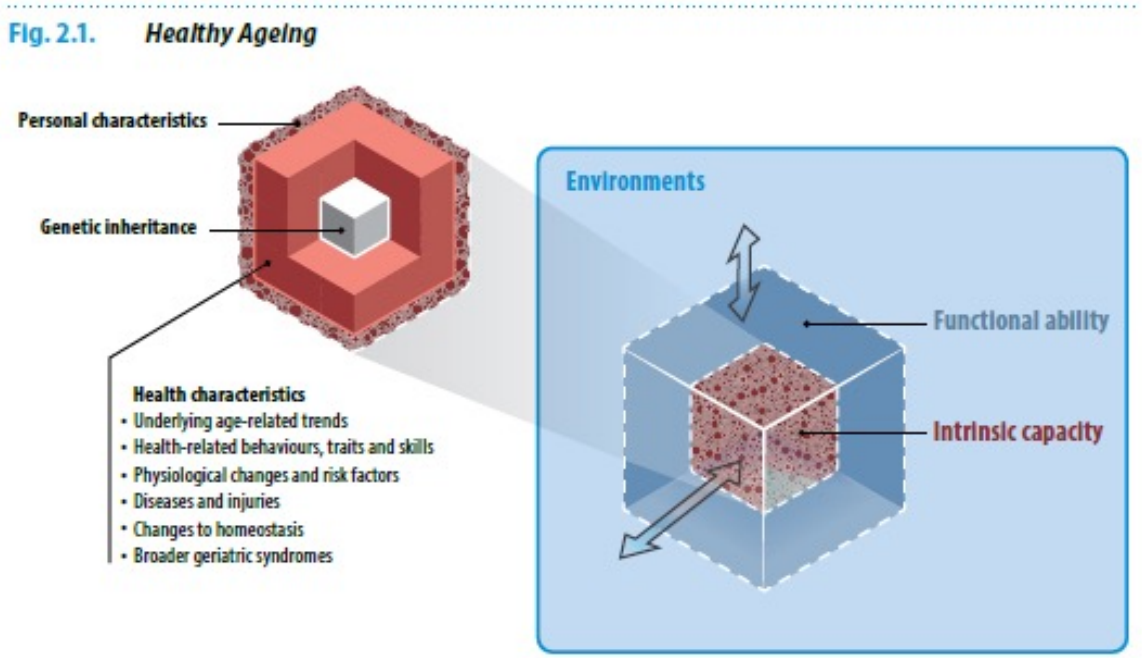
Introduction

- **WHO (2015) World report on ageing and health**
  - Frames healthy ageing from the perspective of a person's functioning
  - An individual's functional ability to be and do the things they value is determined by their **intrinsic capacity** and the **environment** they inhabit

- **Intrinsic capacity**
  - Essentially the converse of disability
  - Describes a continuum that can be applied across the second half of life.
  - Describes individual-level attributes independent of the environment, this construct can potentially be used to monitor cohort trends in functioning over time



Source: WHO (2015) World report on ageing and health

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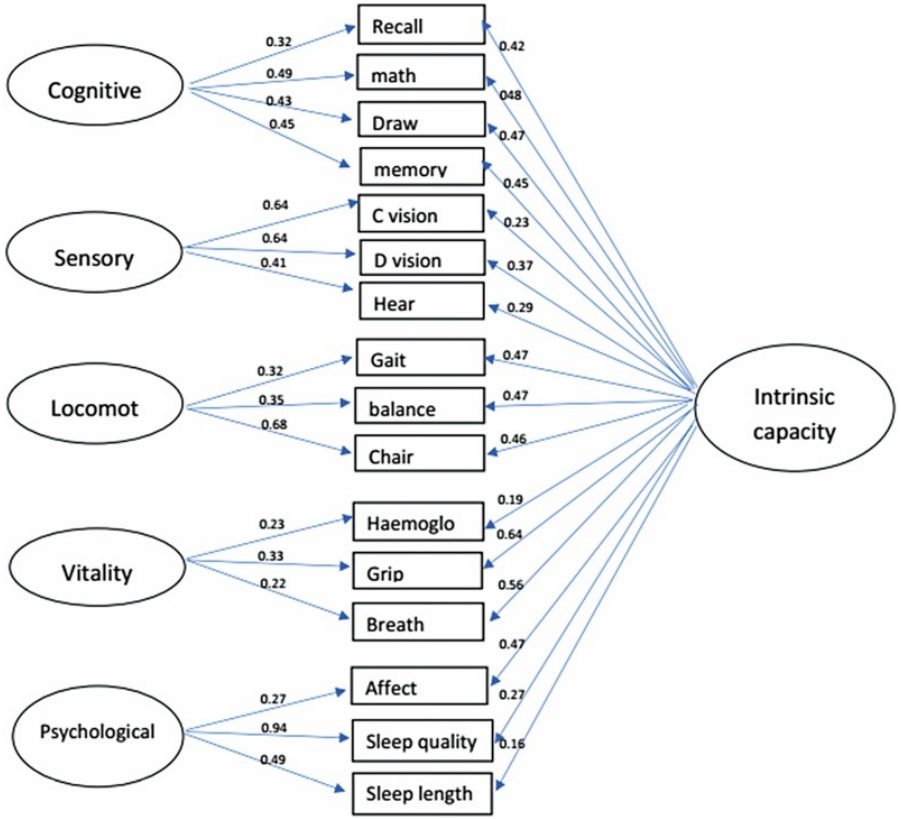

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JOURNAL ARTICLE

Intrinsic Capacity: Validation of a New WHO Concept for Healthy Aging in a Longitudinal Chinese Study

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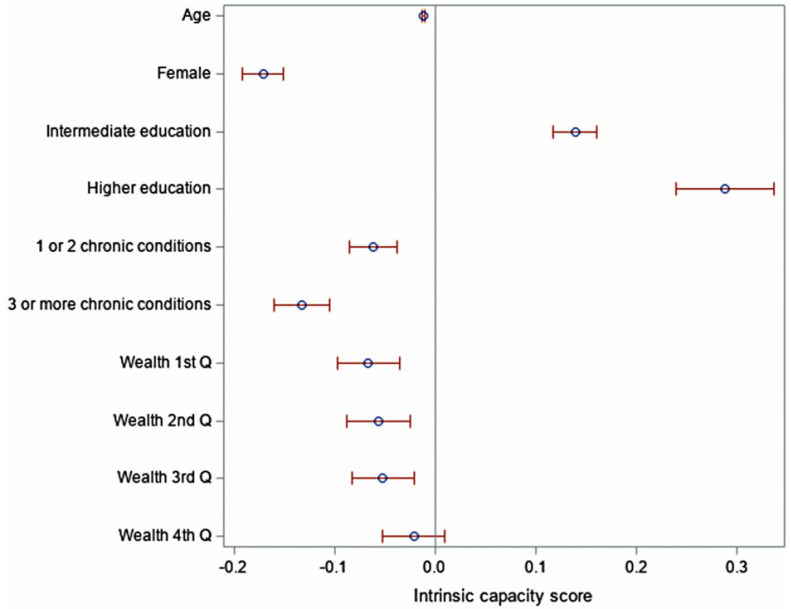

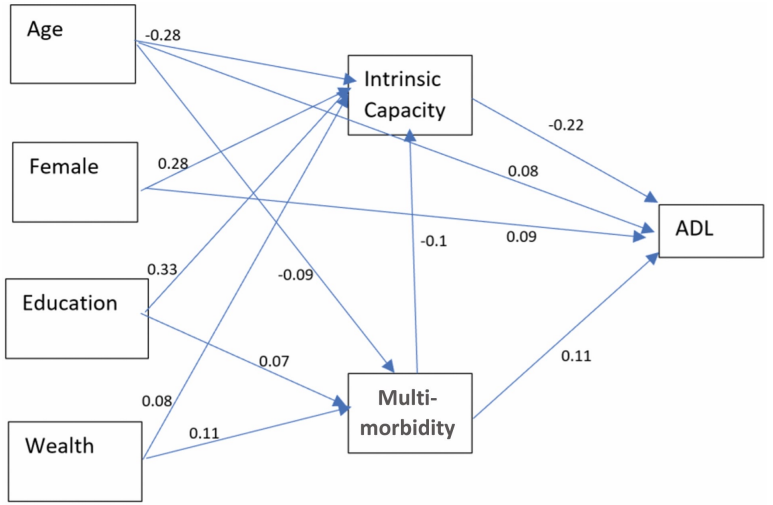

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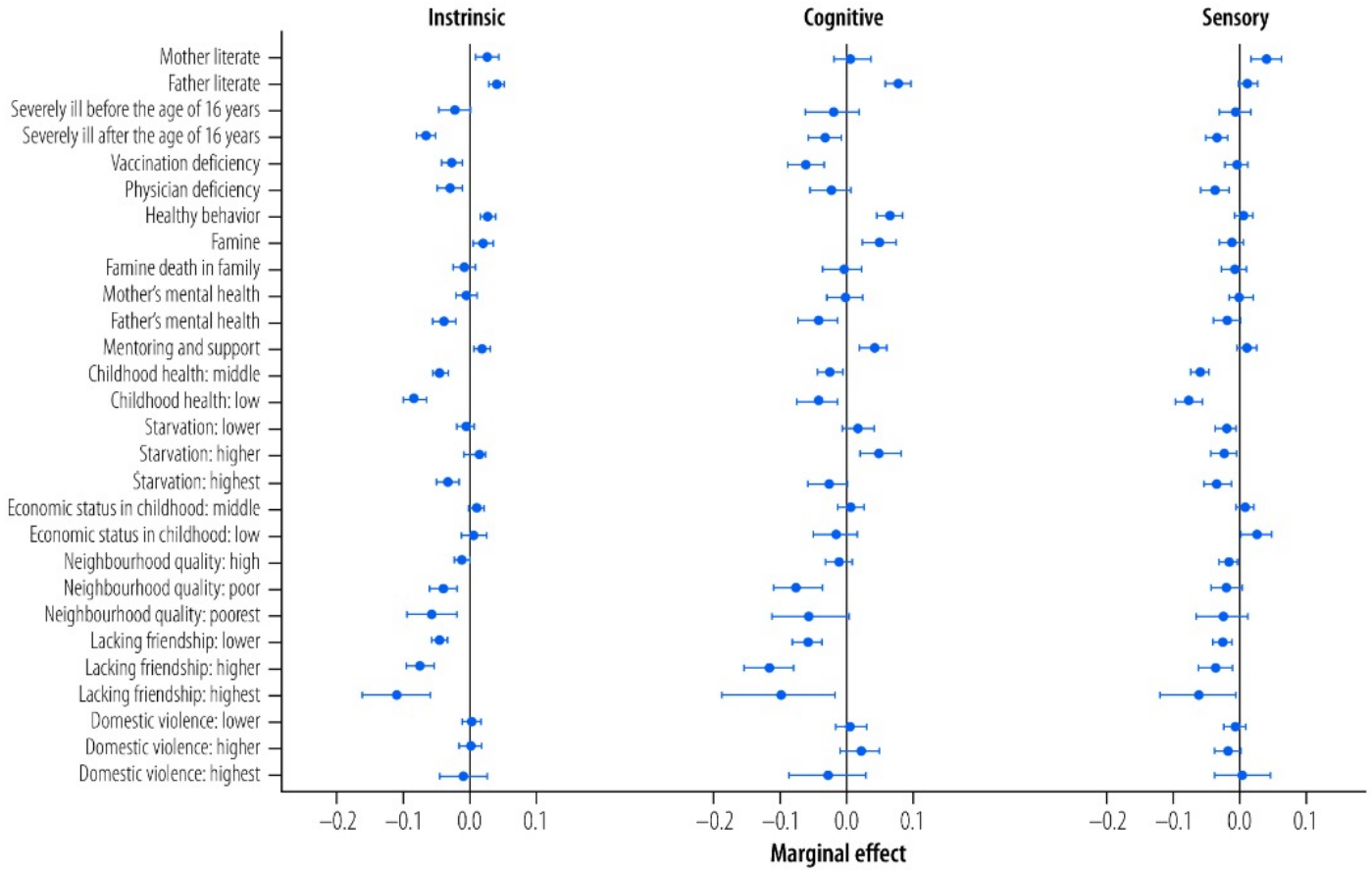

Linking early-life factors with late-life intrinsic, cognitive and sensory capacities, China, 2011–2013

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Life-course inequalities in intrinsic capacity and healthy ageing, China

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This study

Research question:

- Are older adults in England and China experiencing the same, better or worse health than people of similar ages in the past?

→ Estimate IC and its subdomains based on **longitudinal data**, include time and cohort effects

Data

Main analysis: English Longitudinal Study of Ageing (ELSA)

- Nationally representative sample of people aged 50 and over, living in private households in England
- We use Waves 1 (2002) to 9 (2019)
- n=14,710

Comparative analysis: China Health and Retirement Longitudinal Study (CHARLS)

- Nationally representative sample of people aged 45 and over, living in private households in China
- We use Waves 1 (2011) to 3 (2015)
- n=11,411

- Inclusion criteria: aged 60+ with valid information in at least one of the indicators used to measure IC in at least one wave

Intrinsic capacity factors

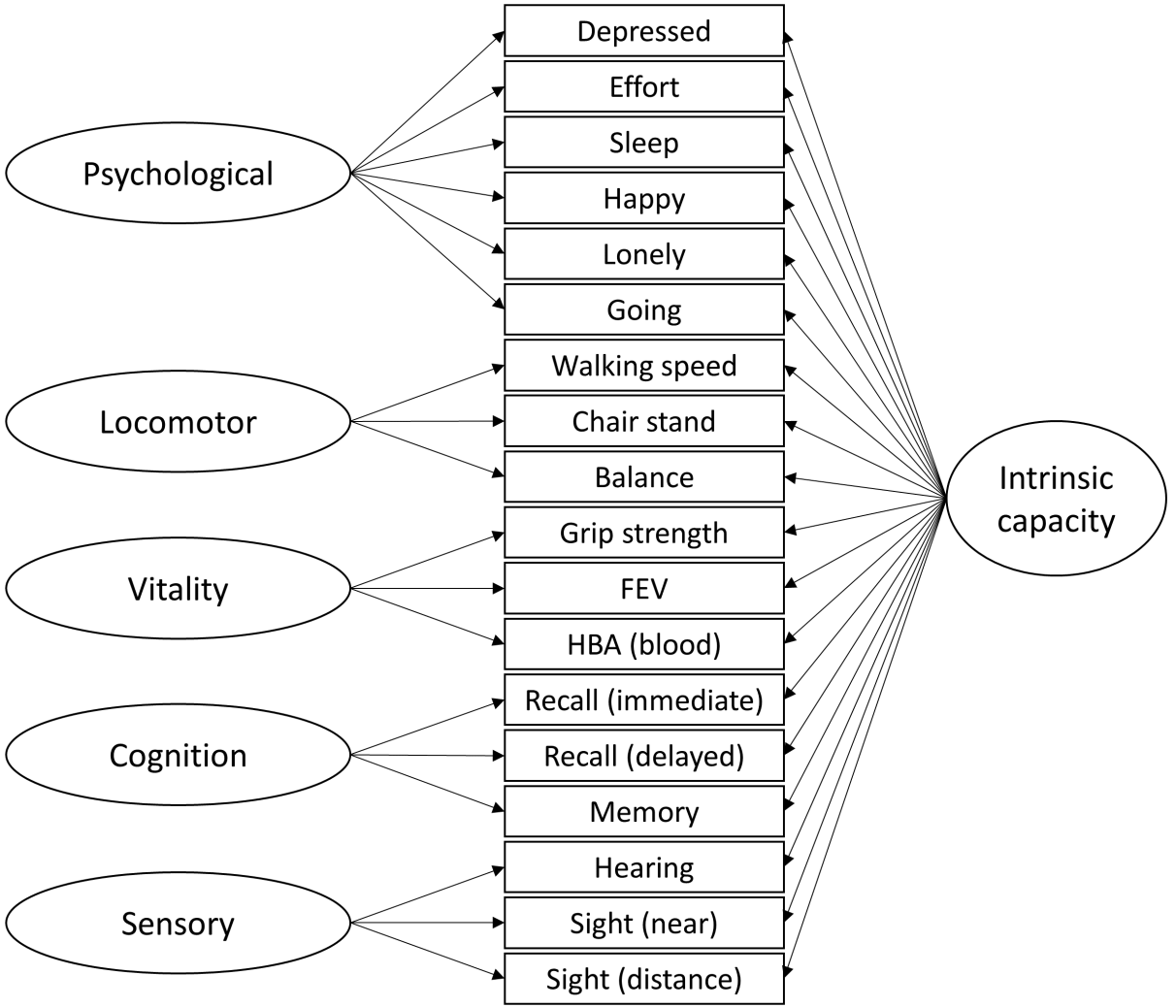
- Beard et al. (2019): measures that might provide objective estimates of intrinsic capacity
  - Prior evidence supporting an association with at least one aspect of capacity
  - Ability to distinguish between high and low capacity at older ages and sensitivity to detect change within and between individuals over time

- Choose measures available in ELSA and CHARLS:
  - **Locomotor:** walking speed, chair-stand test, balance
  - **Vitality:** grip strength, forced expiratory volume, Hemoglobin
  - **Sensory:** hearing, distant eyesight, near eyesight
  - **Cognition:** immediate recall, delayed recall, time orientation/memory
  - **Psychological:** affect and sleep (CES-D)

Statistical methods

- Step 1: Confirmatory factor analysis (CFA) to operationalise IC

- Step 2: Measurement invariance testing
  - To ensure that the constructs (IC, subdomains) were equivalently measured over time
  - Tested for **configural invariance**
  - Tested for **scalar invariance**



Statistical methods

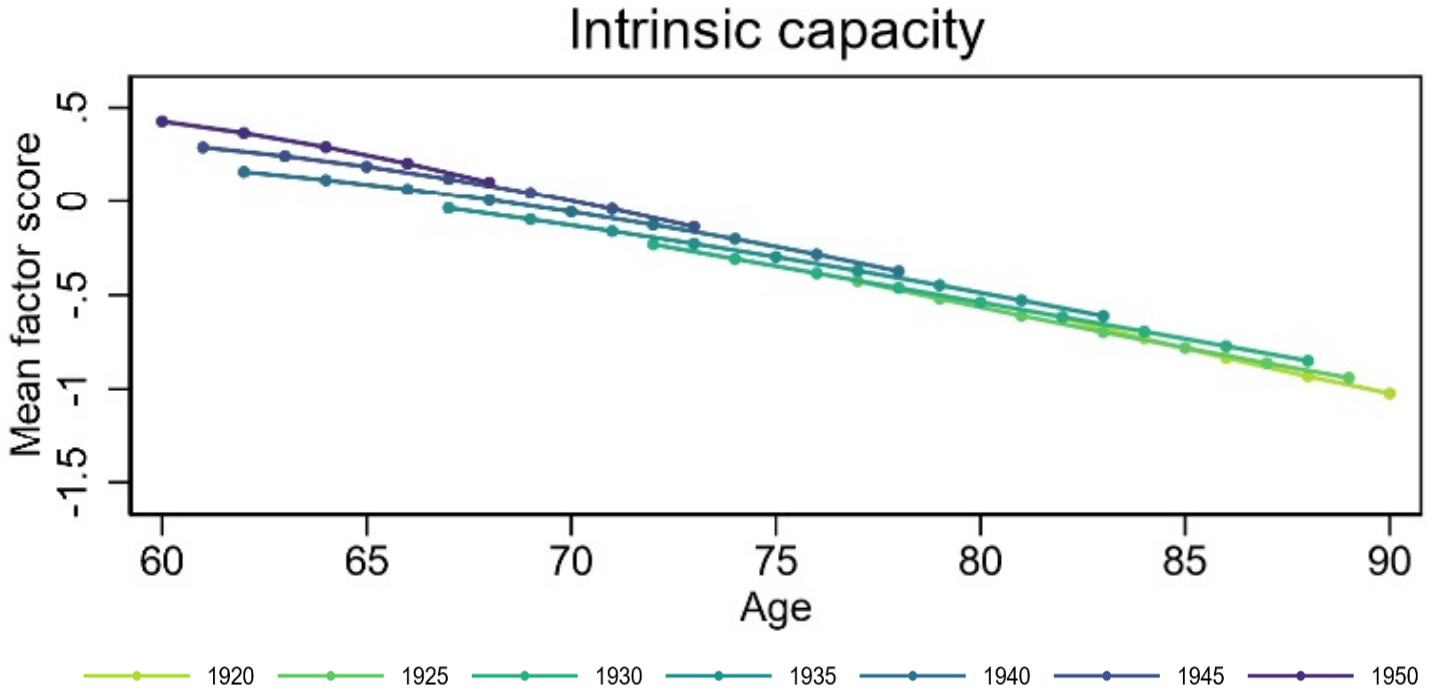
- Step 3: Extend measurement models to include waves where only partial information was available by design

- Step 4: Derive IC scores and subdomain scores

- Step 5: Estimated **multilevel growth curve models** to model the change over time in the derived scores for each of the factors
  - Time trends: ELSA: linear, quadratic; CHARLS: linear
  - Cohort effect based on birth year
  - Interaction terms between birth year and the growth parameters (i.e., linear and quadratic) to account for potential differences in the rates of change across cohorts

Results

Figure 1. Intrinsic capacity scores by birth cohort and age

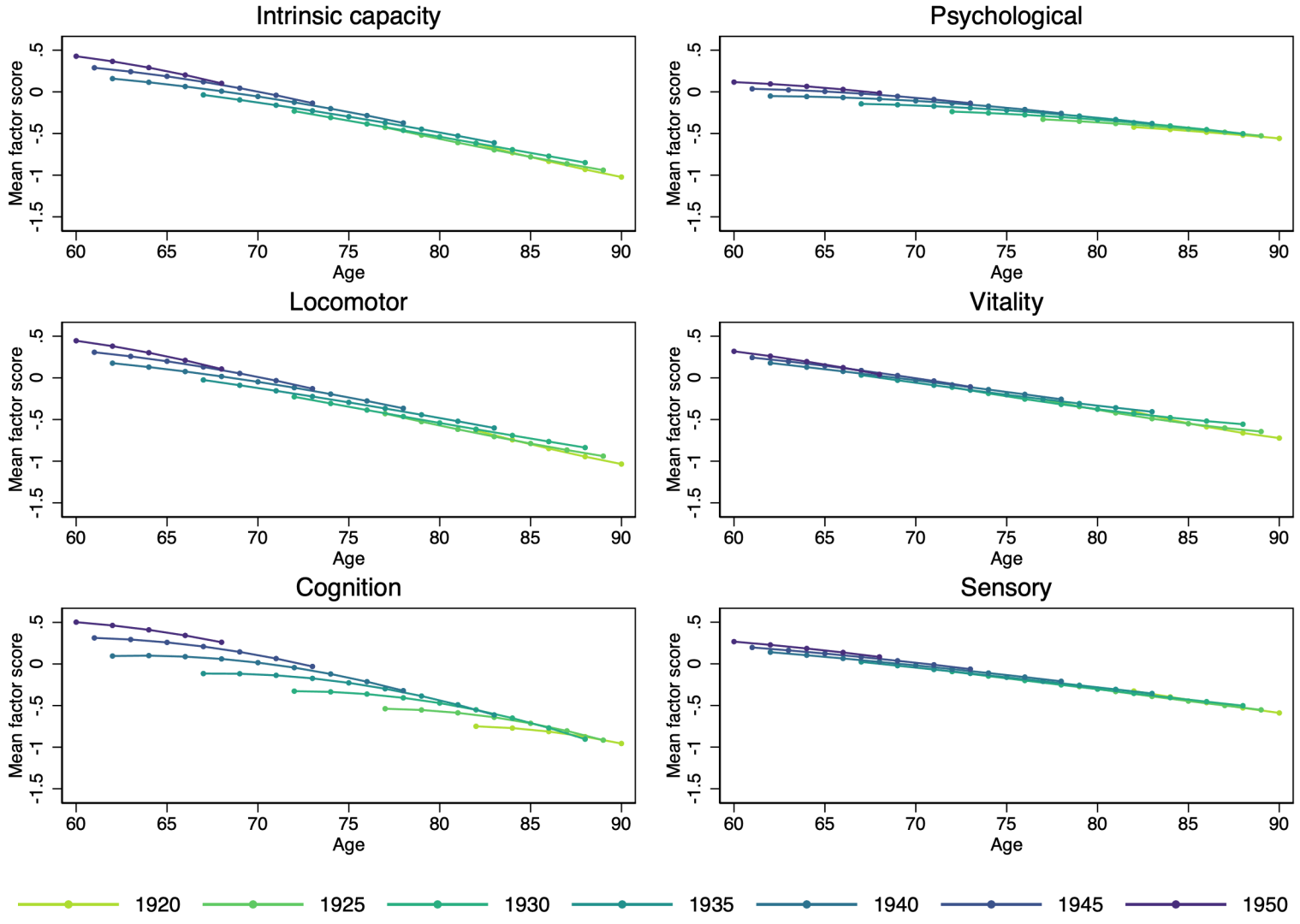


- Younger cohorts entered older ages with significantly **higher levels** of capacity
- IC levels declined with age across all cohorts
  - Declines were initially **less steep** for more recent cohorts than for earlier cohorts
  - Declines in more recent cohorts accelerated over time

Results

Figure 2. Intrinsic capacity and subdomains mean factor scores by birth cohort and age

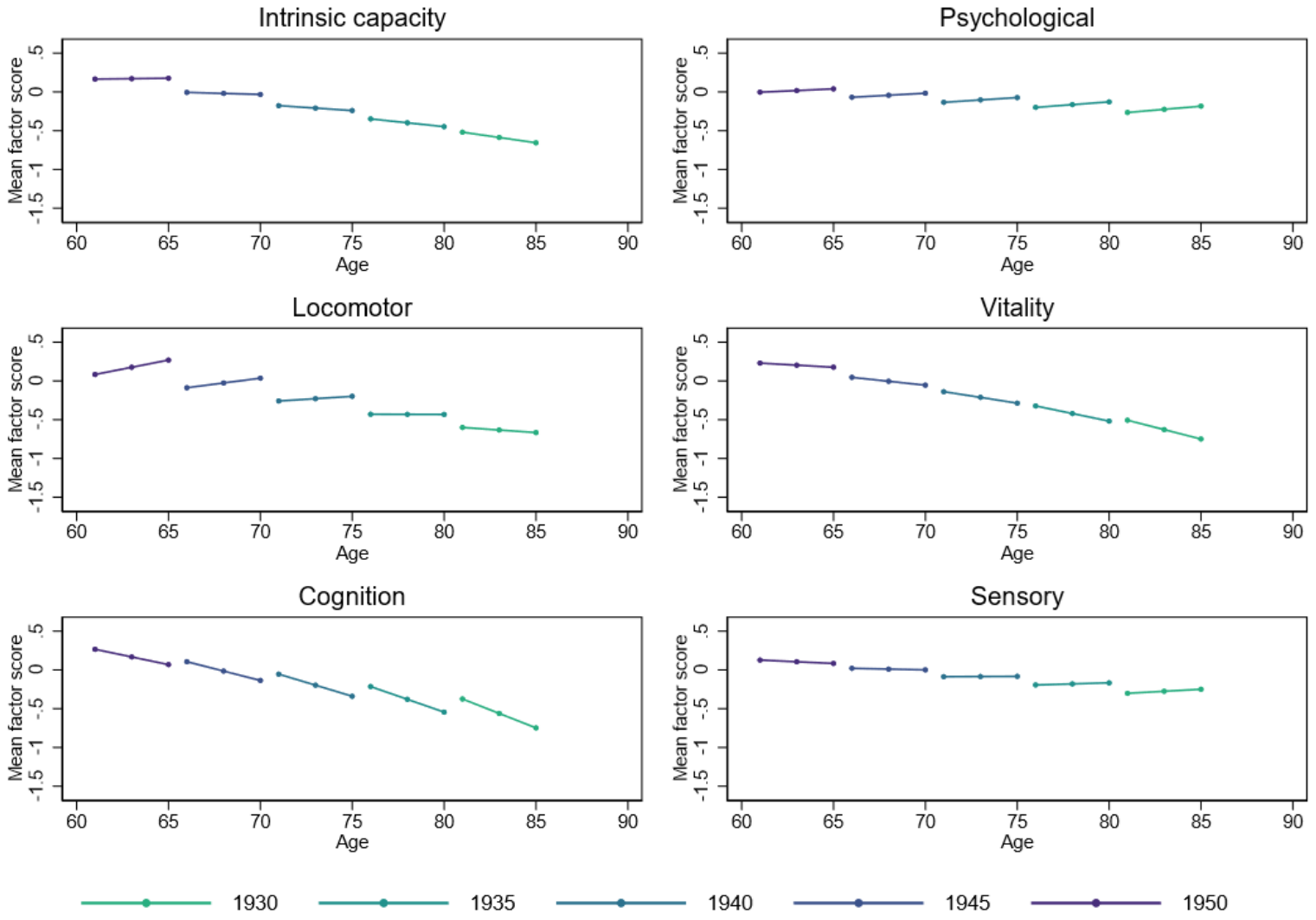
- Younger cohorts entered older ages with **significantly higher** initial levels for each IC subdomain
  - Largest improvements in locomotor, vitality and cognition subdomains
- All subdomains: declines with age, with initial declines being less steep among more recent cohorts
- Rate of decline in more recent cohorts subsequently accelerated
  - Less marked for cognitive capacity.



Results

Figure 3. Intrinsic capacity and subdomains mean factor scores by birth cohort and age

- Similar results to ELSA
- Younger cohorts entered older ages with higher levels of IC
- Largest improvements in vitality, followed by locomotor cognition

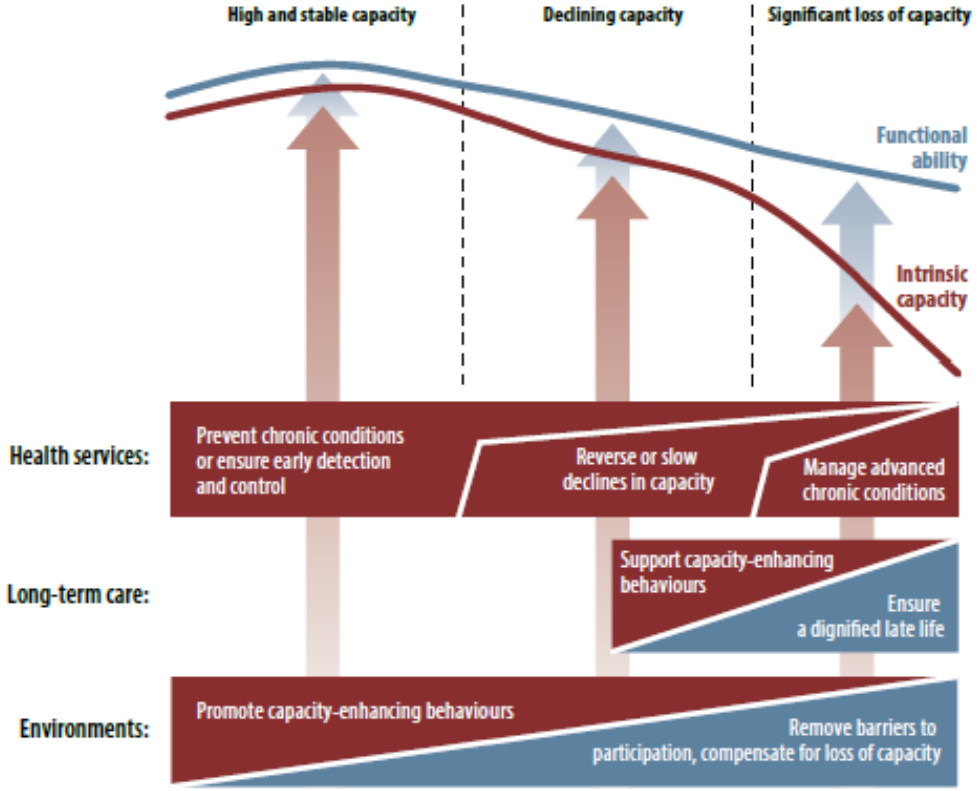


Summary and conclusion

- Main results:
  - **Significant improvements in intrinsic capacity** in more recent cohorts of older people in both the UK and China
  - More recent cohorts entered older ages with higher levels of capacity, and subsequent declines were less steep than for earlier cohorts, although the rate of decline accelerated with age.
  - The greatest improvements were seen in **locomotor, cognitive and vitality domains**.
  - The trends were similar for both males and females and, while limited by the lesser availability of data waves in CHARLS, were largely consistent across both groups.

- Next steps:
  - Explore intra-cohort heterogeneity (esp. socioeconomic) and causal drives (health behaviours, health care?)
  - Develop interventions

Fig. 2.4. A public-health framework for *Healthy Ageing:* opportunities for public-health action across the life course



Source: WHO (2015) World report on ageing and health

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