Examining Changes in Intellectual Abilities in Adulthood
K. Warner Schaie’s Seattle Longitudinal Study (e.g., 1983, 1994) (Weinstock, 2010)

Aim: Understand individual variations in the life course of adult intellectual abilities

Method
Sample: 5,000 + participants
Main Data Collected: 5 Primary Mental Abilities (Verbal Meaning, Spatial Orientation, Inductive Reasoning, Numeric Ability, Word Fluency)

CORE QUESTIONS
1) Does intelligence change in some predictable pattern through adulthood?
   ▪ No uniform pattern of age-related changes across all intellectual abilities
2) At what age can we reliably detect declines in intellectual abilities?

For Single Measures
▪ Not before age 60
  ▪ Except: word fluency shows significant decline by 53
  ▪ Reliable average decrements for all abilities by age 67
  ▪ But modest until 80s
  ▪ “Even at age 81, fewer than one half of all observed individuals showed reliable decrements over the preceding seven years” (Schaie, 1984, in Schaie, 1994, p. 308).

For Latent Ability Constructs (multiple measures)
▪ Linear age-related decline in
  ▪ Perceptual speed from young adulthood on
  ▪ Numeric ability from 60s on
  ▪ Modest decline in other four abilities from ~53 on

3) Demographic shifts?
   ▪ Dramatic cohort differences in intellectual abilities
   ▪ Most—but not all—reflect increased abilities with later cohorts
   ▪ Why? Increased formal education

4) What accounts for individual differences in age-related changes in intellectual abilities in adulthood?

Variables Associated w/ Reduced Risk of Cognitive Decline in Old Age
▪ Absence of cardiovascular and other chronic diseases
  ▪ Lifestyle issues?
▪ Favorable environmental circumstances
  ▪ Above average education
  ▪ Occupational histories of high complexity/low routine
  ▪ Above average income
  ▪ Maintenance of families of creation
▪ Substantial involvement in complex and intellectually stimulating activities
  ▪ Reading, travel, cultural activities, continuing ed.
▪ Flexibility
  ▪ Self-report of flexible personality style at midlife
  ▪ Objective demonstration of flexible performance on motor-cognitive perseveration tasks
 ▪ Partnered to a spouse with a high cognitive status
Lower functioning spouse tends to maintain or increase level
- Maintain high levels of perceptual processing speed
- Affects time needed to process tasks used to measure cognitive abilities
- Self-report of satisfaction with one’s life at midlife or early old age

5) Can intellectual decline with increasing age be reversed?
- Interventions aimed at inductive reasoning and spatial orientation abilities
- Five 1-hour sessions of individual strategy training to 65+
  - Initial training of 228 participants (1983-84)
    - Matched controls: no training
    - Some participants had showed significant decline between 1970 and 1983-84
- ~2/3 of experimental participants showed significant improvement
- ~40% of participants who had declined significantly between 1970 and 1983-84 were returned to their previous level of functioning
- ANSWER: Yes, with observed declines in ability probably due to lack of use of these abilities

Conclusions

Methodological Issues:
- Longitudinal Designs are Essential in HD research
  - Track individuals over time
  - Identify antecedent variables that may account for individual differences
  - Can better control for cohort differences
  - Distinguish age differences (cross-sectional data) from age changes (longitudinal data)

Cognitive Abilities:
- Great individual variability
- Old age not “typically” marked by extensive cognitive decline
- Few decline in all five primary mental abilities
- Some observed declines due to decline in other areas
  - Processing Speed, Reaction Time, Sensory and Perceptual Abilities
- Some due to lack of use/practice
- When decline does occur, starts ~60 and is gradual until ~80s
- Many decrements can be compensated for
  - Training to maintain/regain abilities
  - Drawing on other capacities & skills (“maximizing one’s remaining potential”)

Classic Aging Pattern Based on Wechsler Adult Intelligence Scale (WAIS)
- Fluid Intelligence: biologically determined skills (versus skills gained through learning & experience
- Crystallized Intelligence: knowledge and skills acquired through learning & experience
- Observable declines in fluid intelligence
- No observable declines in crystallized intelligence
  - CAUTION: Performance on WAIS may be affected by other (non-cognitive) areas

Memory: SAME PATTERNS
- Extensive memory loss is not a part of normal aging
- Memory aids can help us compensate

“Use-it-or-Lose it” Hypothesis: For now, act as if a positive relationship between cognitive stimulation and cognitive functioning exists; no harm in doing so…