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Cognitive Aging in the Work Context

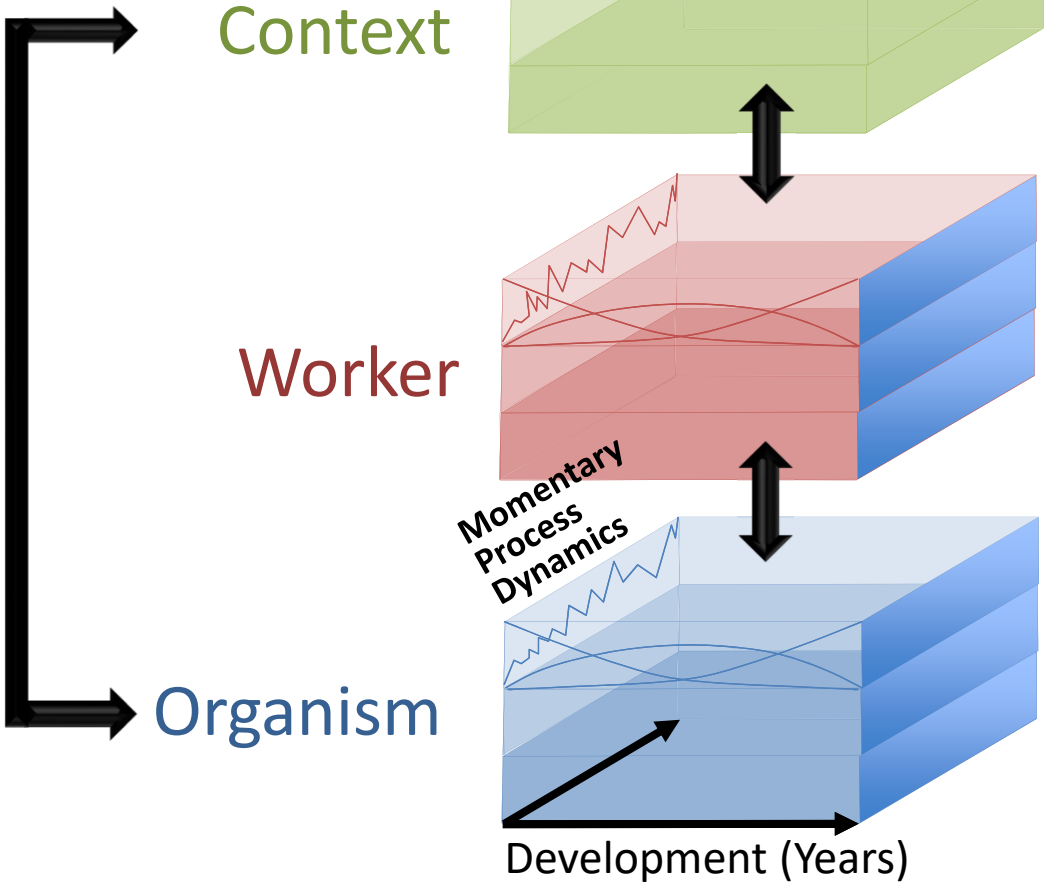
Don‘t Lose Your Brain and Wellbeing at Work

Ursula M. Staudinger

Public Zoom Workshop
Committee „Understanding the Aging Workforce and Employment at Older Ages
National Academy of Sciences
June 9, 2020

Columbia University in the City of New York

Aging in the Workplace
A Multilevel Dynamic System Across Time



Labor Laws, Educational System, …
Company Culture, Work Organization,
HR Practices, …
Colleagues, Supervisor
Physical Work Environment

Behavior, Habits
Attitudes, Decisions
Cognition, Emotion, Motivation

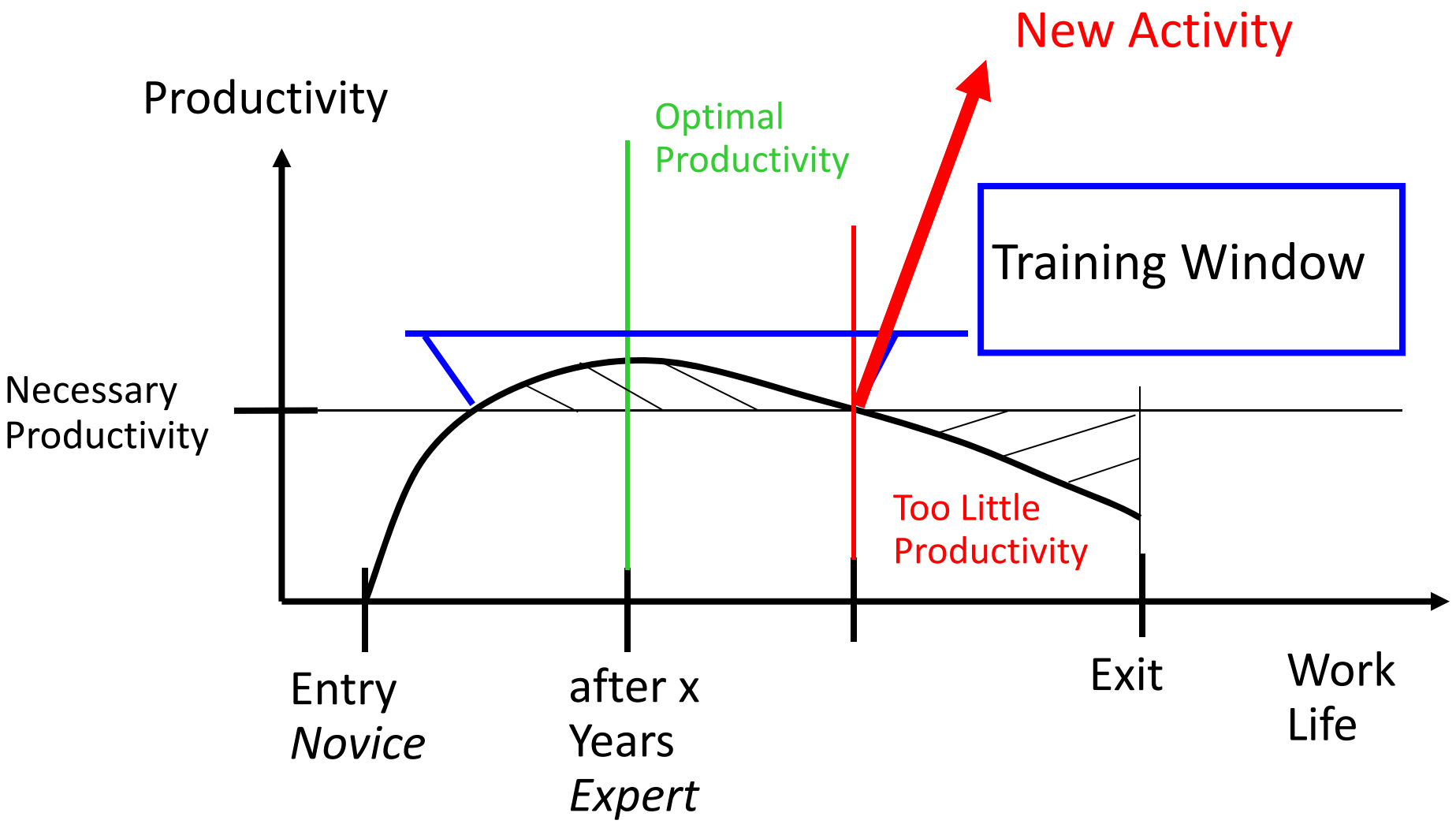
Organs, Organ Systems
Cells, Tissue
Molecules

Adapted from Staudinger, 2020
American Psychologist

Consequences of this Model

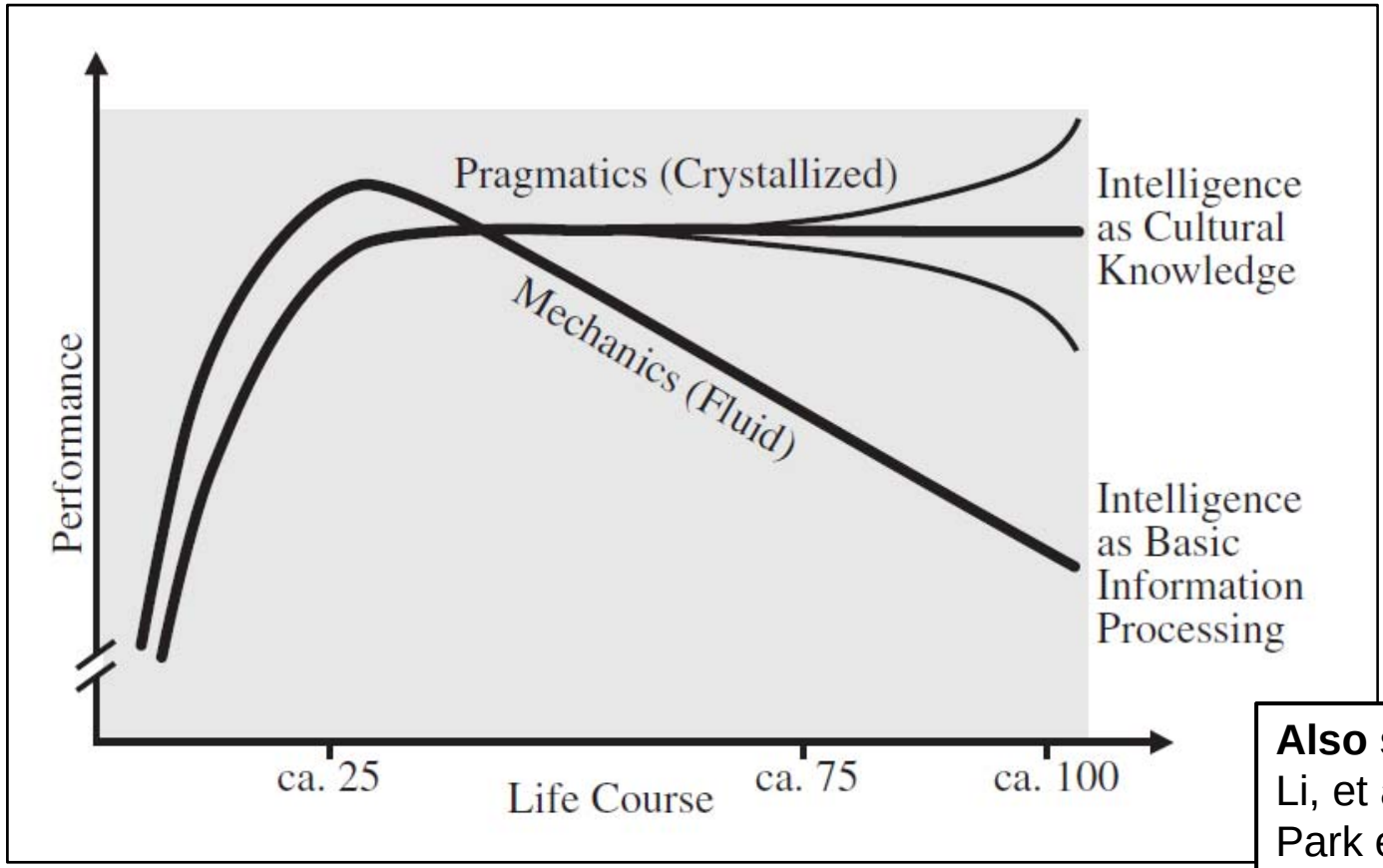
- It is NOT about THE older worker‘s cognitive function, but the older worker in context
- It is NOT about THE older worker, i.e. older than 45 or 50 yrs., but it is about the lifecourse/lifespan perspective
- It is NOT about THE older worker‘ cognitive function in the here and now, but about the positive plasticity of the older worker

Let‘s not Confuse Age with Job Tenure



Lifespan Cognitive Development

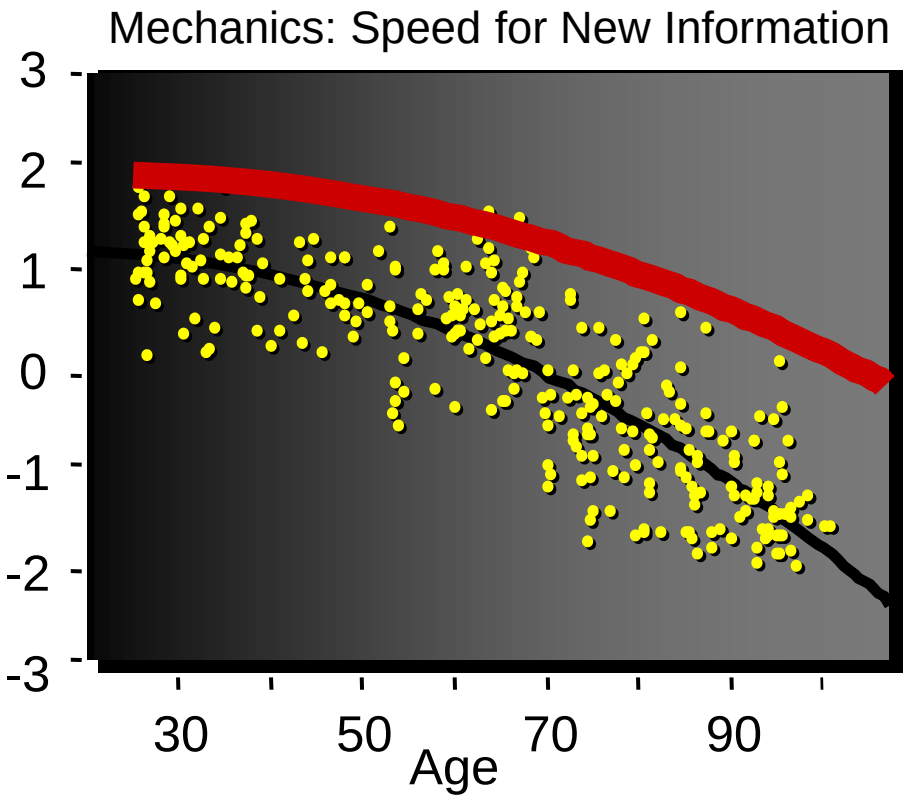
Mechanic abilities decline with age



Baltes, Lindenberger & Staudinger, 2006

Also see:
Li, et al., 2004
Park et al., 2002
Salthouse, 1991,1996
Schaie & Willis, 1993

Decline in Cognitive Mechanics
Evidence for Modifiability, i.e. Positive Plasticity



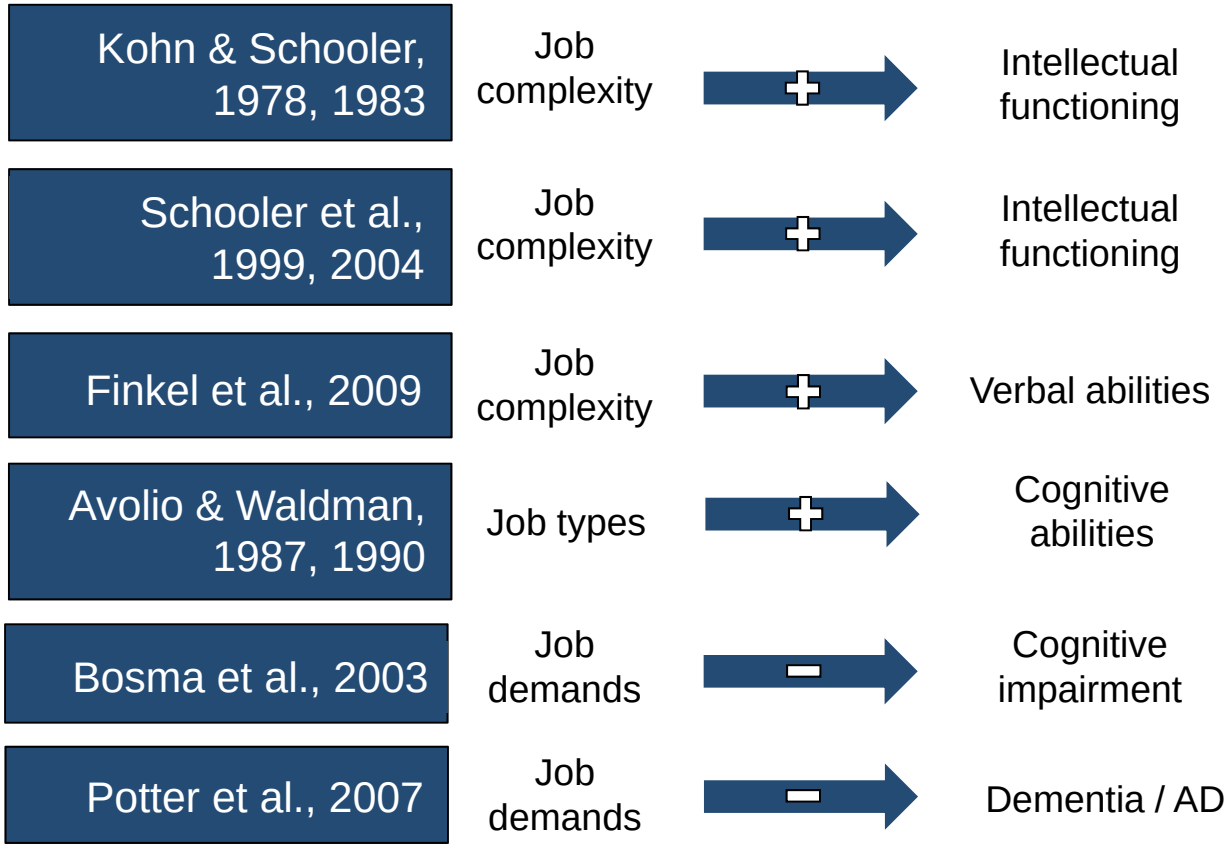
Staudinger, 2020
American Psychologist

The Quality of Work Makes the Difference

- **Mental Stimulation**
- Appreciation and Autonomy

Contextual Influences on Cognitive Aging

Work as Buffer



Contextual Influences

The driving force of cognitive plasticity?

*"…it is particularly the encountering of **novel situations** (at different levels of complexity) – at work and in general – that supports the maintenance of fluid abilities across adulthood."*

Bowen, Noack & Staudinger, 2011

*"A key proposition in our framework is that such **changes induce plastic alterations only to the extent that they result in a mismatch** between supply in the form of the functional capacity of the system and the environmental demands.*

(...)

*…, cognitive training needs to engage the participant in a state of **mental activity as far away as possible from the routine demand** for which the participant's functional supply is optimized, …"*

Lövdèn, Bäckman, Lindenberger, Schaefer & Schmiedek, 2010

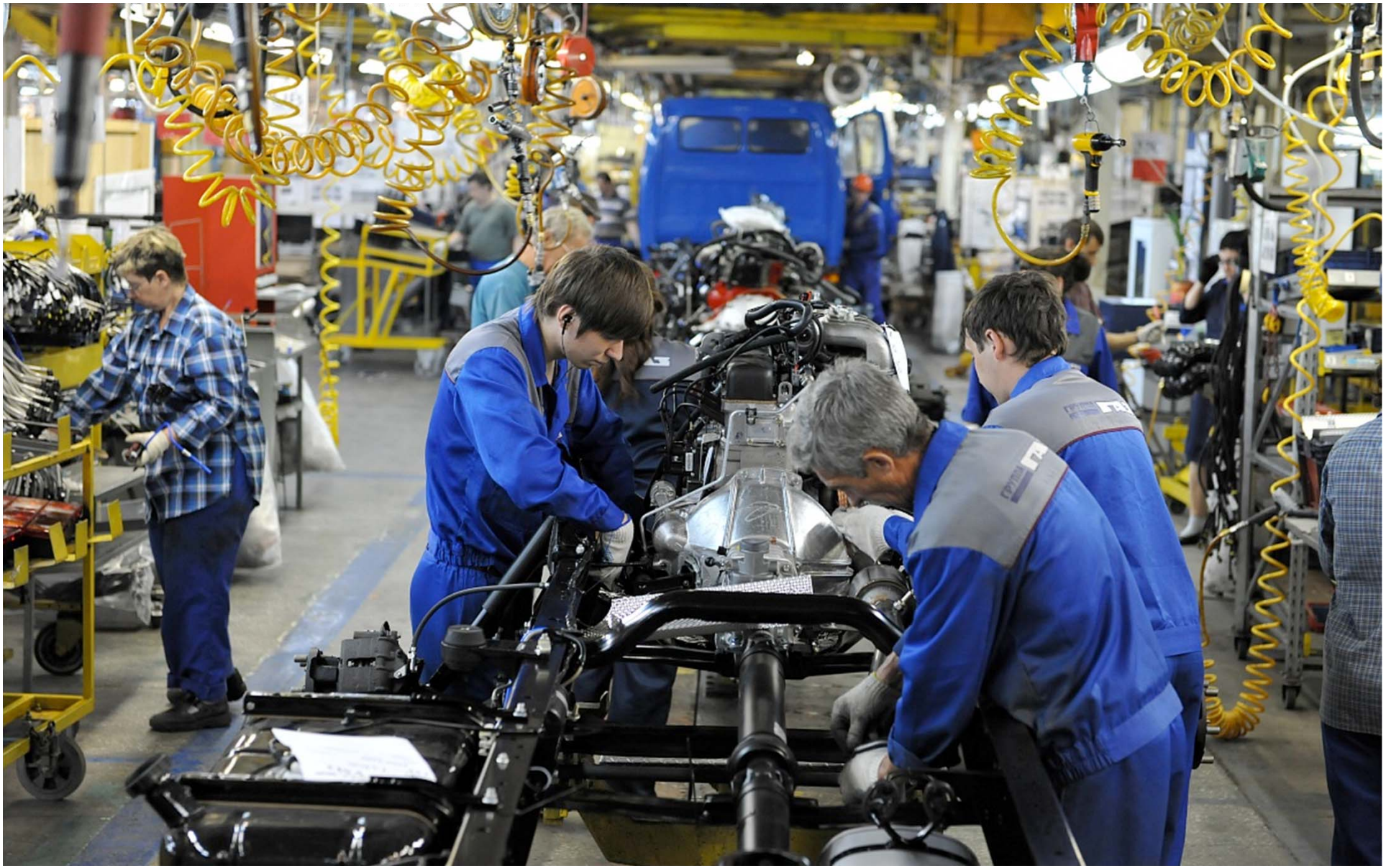
*"In many studies**, learning or skill acquisition, rather than the mere use** seem to be required to produce significant changes in patterns of neural connectivity."*

Kleim & Jones, 2008

Novel Information Processing at Work (NPW)

…refers to **recurrent changes in work tasks**, that is, intra-organizational changes of the work task (without upward or downward movement) in which each change implicates the **learning of new movement, skill, person, or material**.

Work Life May Accelerate or Slow Cognitive Aging

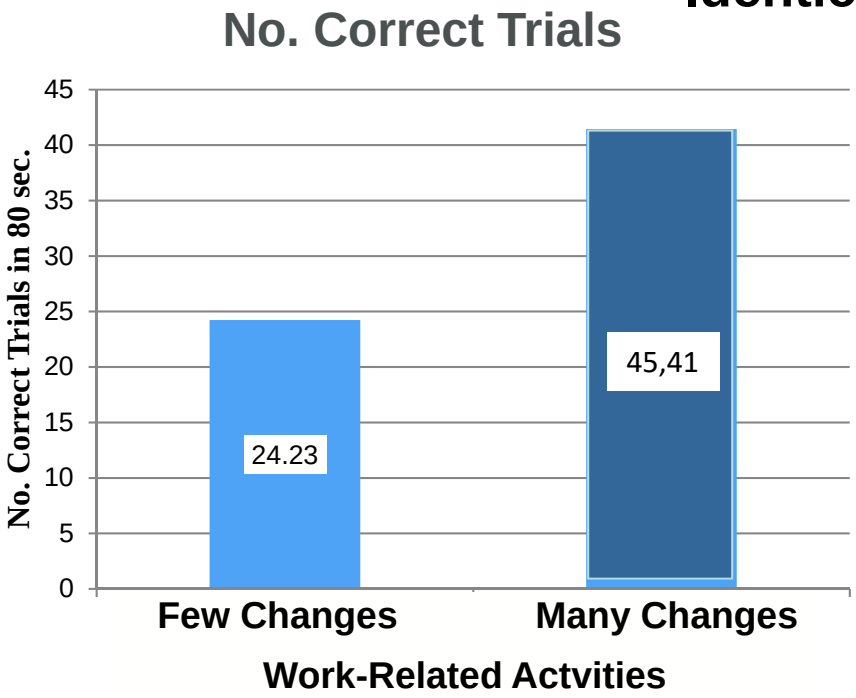


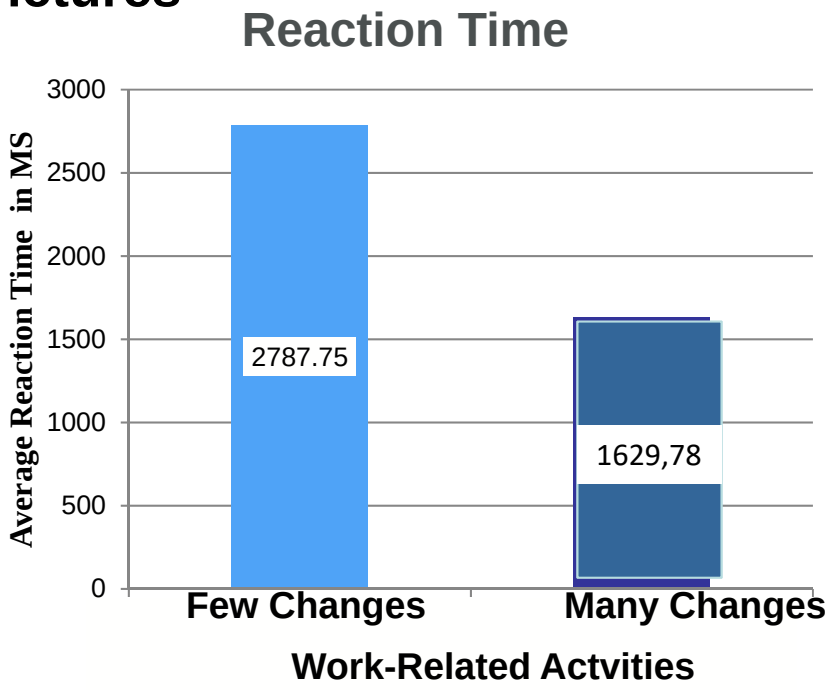
More Work-Task Changes Associated with Higher Levels of Cognitive Functioning

Sample: Assembly Line Workers, 16 yrs. Treatment, N=38 (Matched out of 176)

Controlled for: Baseline Cognition & Openness, Leisuretime Activities, Voluntariness of Change

Identical Pictures





Oltmanns, ..., Godde, & Staudinger, 2017

Frontiers in Psychology

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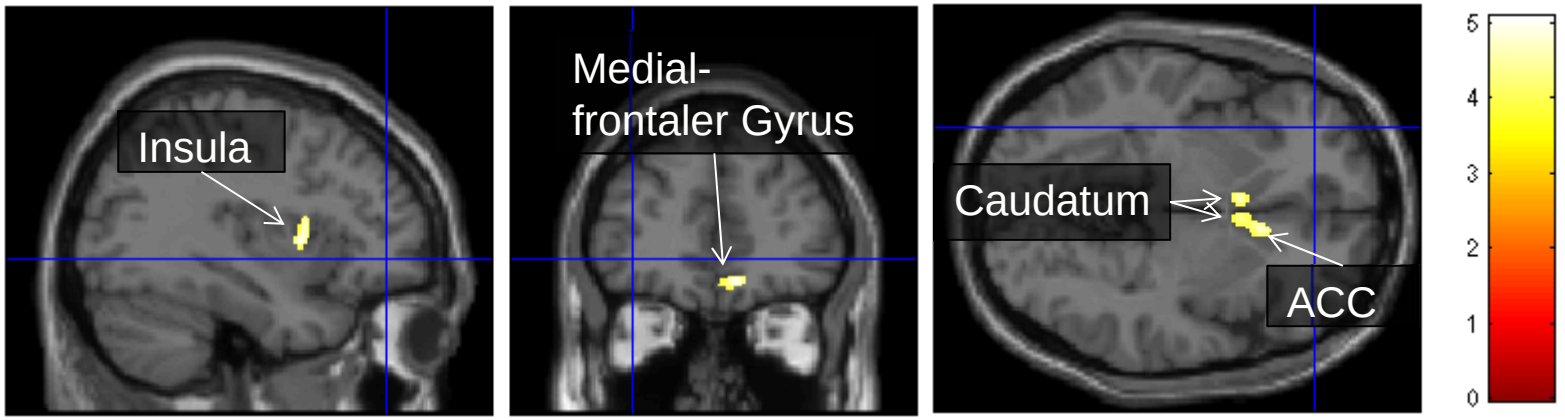
More Work-Task Changes (as compared to few changes):
More Gray Matter in Regions Relevant for Learning and Attention



Same areas that show most age-related decline in volume

Oltmanns, ..., Godde, & Staudinger, 2017
Fron*tiers in Psychology*

HRS Replication: Different NPW Measure

American Psychological Association

Psychology and Aging

ISSN: 0882-7974

http://dx.doi.org/10.1037/pag0000468

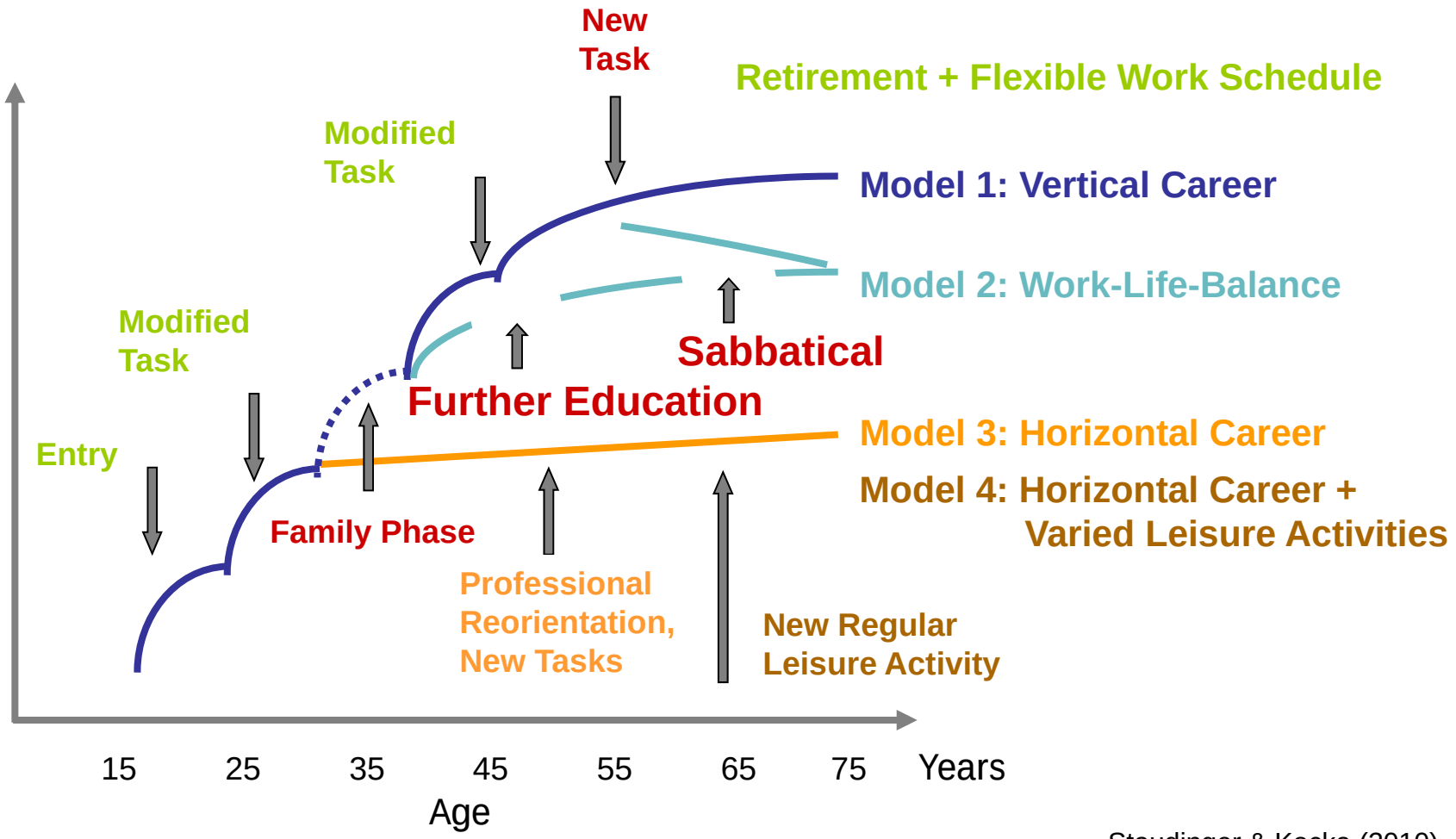
Novel Information Processing at Work Across Time Is Associated With Cognitive Change in Later Life: A 14-Year Longitudinal Study

Ursula M. Staudinger, Yan-Liang Yu, and Bin Cheng
Columbia University

This study examined whether the degree of novel information processing at work (NPW) attenuates cognitive aging across 14 years for adults 50+ in the United States and how NPW links with job complexity. To answer these questions, we used data (N = 4,252) from the Health and Retirement Study. Detailed information on occupational characteristics from O*Net between 2000 and 2014 was used to assess NPW and matched with participants' occupational codes across time. Multilevel transition models were employed to estimate the relationship between NPW and cognitive functioning across time and to explore the moderating effect of cognitive level. Our results showed that exposure to more NPW across time attenuates cognitive decline as indicated by immediate word recall and serial 7s performance, while adjusting for baseline age, leisure, volunteering activities, cognition at previous wave, and other covariates. This buffering effect of NPW is reduced but sustained when controlling for change in job complexity, indicating that, as expected, NPW and job complexity are linked. We also found that particularly for workers with lower levels of cognitive performance, exposure to NPW across 14 years was linked with less decline in serial 7s performance (controlling for job complexity). This, however, was not the case for immediate word recall performance, which asks for further study. Overall, our findings suggest that mental stimulation through NPW is one mechanism (in the work context) that

Cognitive Training through Varied Activity Biographies

"Use it or Lose it" ➡ **"Challenge it or Lose it"**



Staudinger & Kocka (2010).
More Years, More Life

The Quality of Work Makes the Difference

- Mental Stimulation
- **Appreciation and Autonomy**

Facilitative Motivation

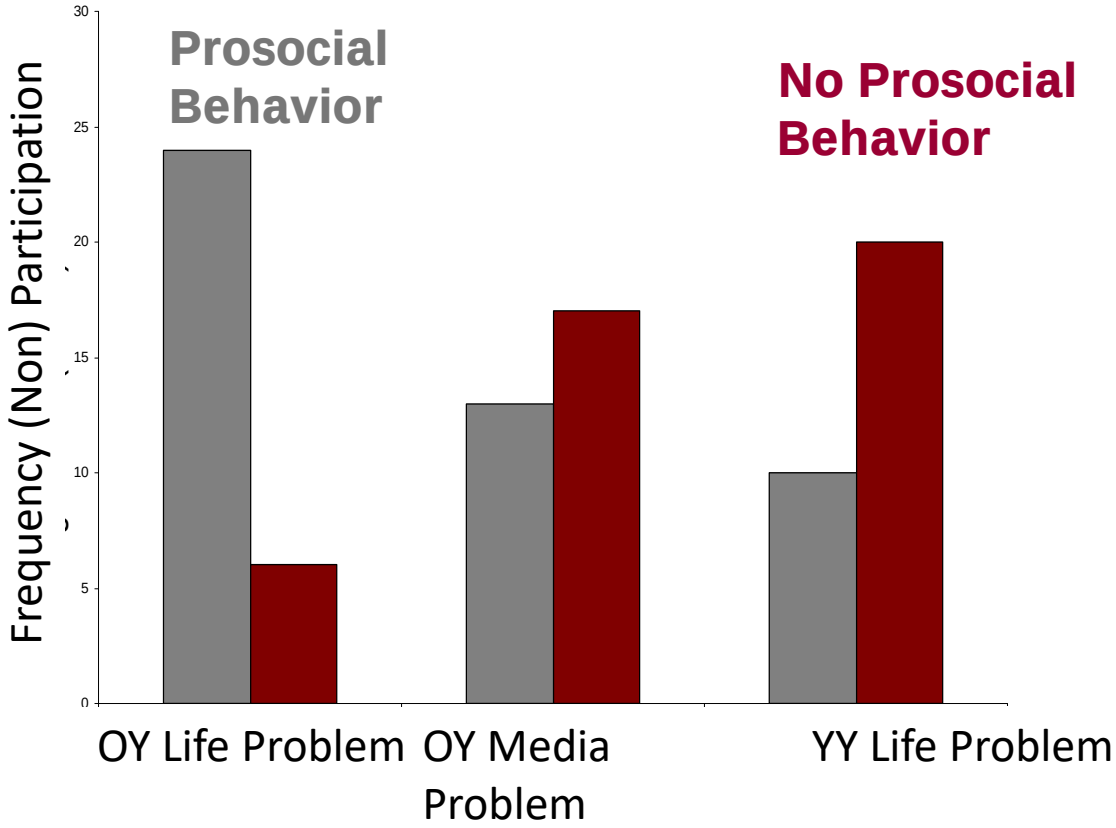
Older Adults Show BETTER Cognitive Performance After Generative Exchange

OY Life Problem
OY Media Problem
OO Life Problem

Kessler & Staudinger, 2007

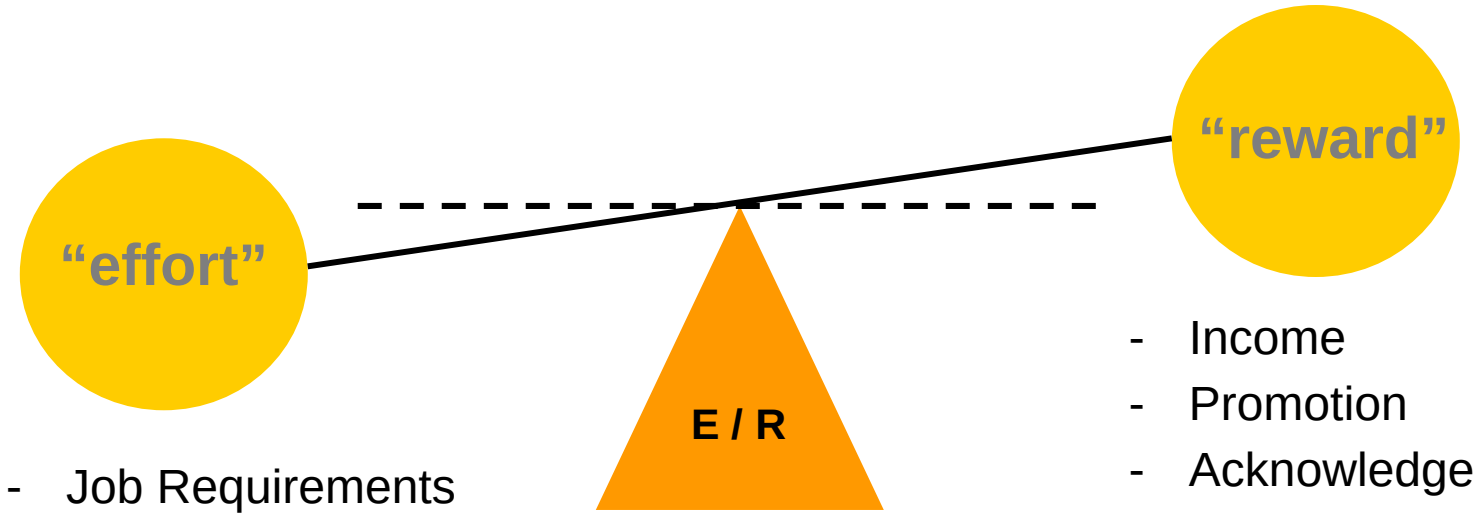
Both Age Groups Profit

Adolescents Behave More Prosocially After Interaction with Older Adults Involving Generativity



Kessler & Staudinger, 2007

Imbalance Between Effort and Reward > Stress



- Job Requirements
- Time Pressure
- Overtime

- Income
- Promotion
- Acknowledgement
- Job Security

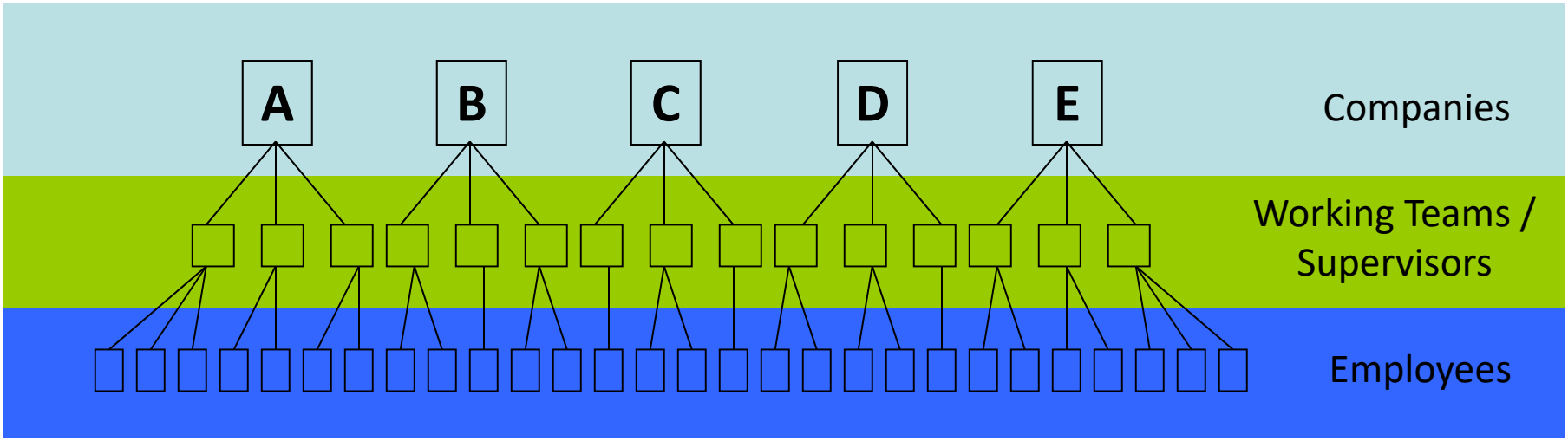
Siegrist, 1996

Effort-Reward Imbalance Associated with Dysfunction

	Burnout	Job Satis-faction	Physical Health	Sick Leave
Effort-Reward Imbalance	↑	↓↓	↓↓	↑↑

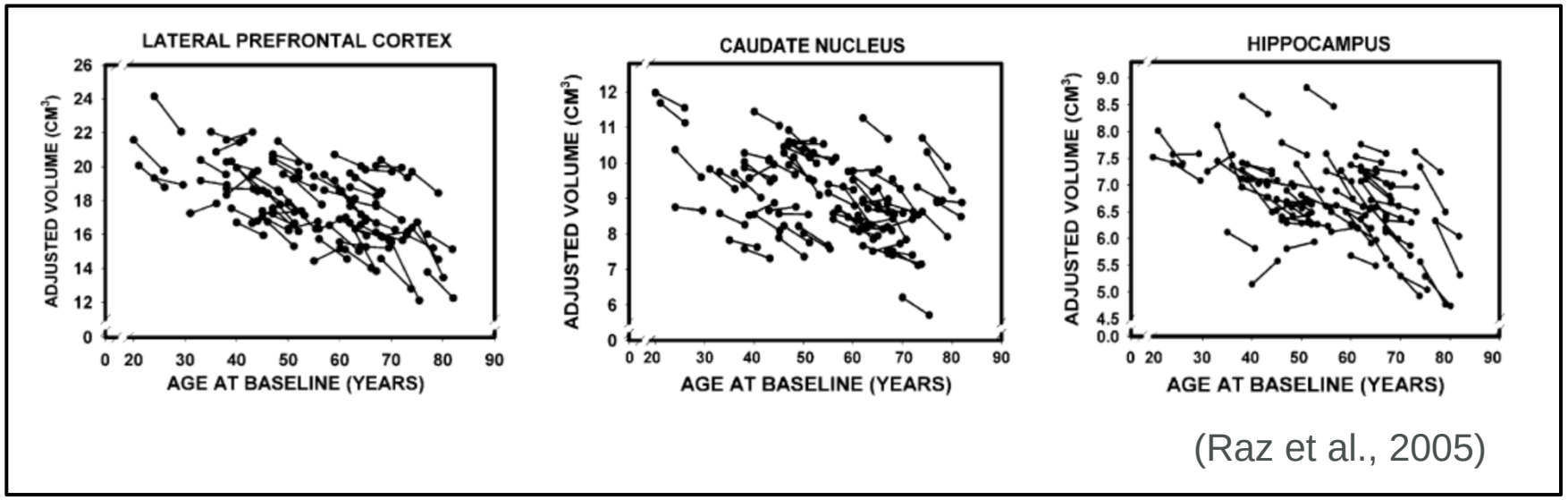
Feuerhahn, Kudielka, Staudinger et al. 2011

What is needed?
Representative Company Sample:
Basic Design + Longitudinal



Staudinger et al., 2011

Brain Aging
Gray Matter Volume Declines

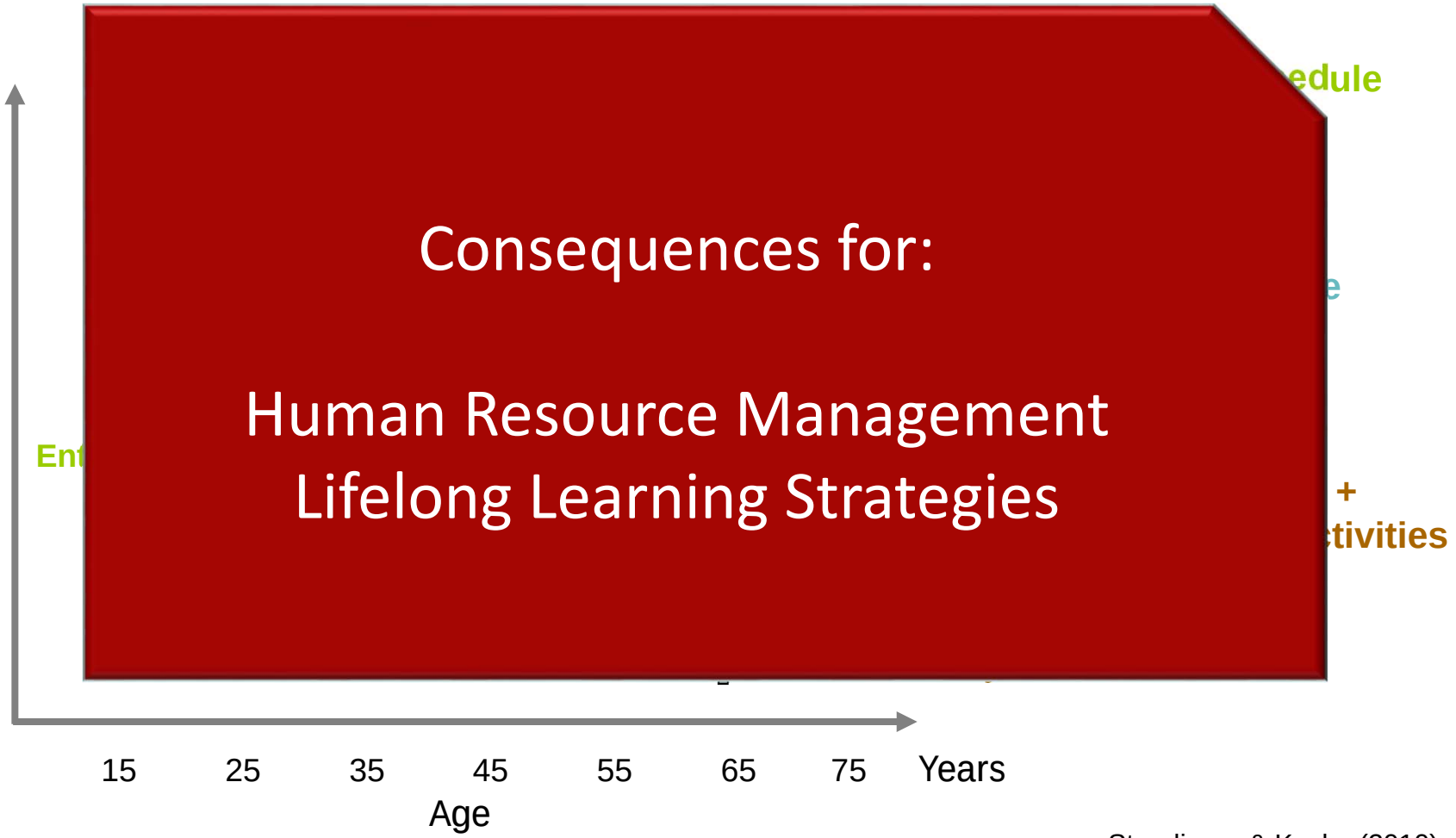


(Raz et al., 2005)

- Approx. **14%** gray matter volume loss across the entire lifespan (Greenwood, 2007)
- Greatest shrinkage in **caudate, hippocampus** and **prefrontal areas** (Park & Reuter-Lorenz, 2009)

Cognitive Training through Varied Activity Biographies

"Use it or Lose it" ⇒ **"Challenge it or Lose it"**



Consequences for:

Human Resource Management
Lifelong Learning Strategies

Staudinger & Kocka (2010).
More Years, More Life