



Article

Aging Redefined: Cognitive and Physical Improvement with Positive Age Beliefs

Becca R. Levy ^{1,2,*} and Martin D. Slade ³

¹ Social and Behavioral Sciences Department, Yale School of Public Health, New Haven, CT 06520, USA

² Psychology Department, Yale University, New Haven, CT 06520, USA

³ Department of Internal Medicine, Yale School of Medicine, New Haven, CT 06520, USA;

martin.slade@yale.edu

* Correspondence: becca.levy@yale.edu

Abstract

Background/Objectives: A widespread assumption exists among scientists, health care providers, and the public that later life is a time of inevitable and universal cognitive and physical decline. This assumption is likely due to considering older persons who improve to be exceptions, and the reliance on aging-health measures that do not allow for improvement. In contrast, we utilized a measure that allowed for an upward trajectory to occur. Our objective was to examine whether a meaningful number of older persons improve with this measure and, if so, to examine whether a promising modifiable culture-

1

On Aging

“First you forget names, then you forget faces. Next you forget to pull up your zipper and finally, you forget to pull it down.”

George Burns

1896 - 1996



2

Aging Redefined: Cognitive and Physical Improvement with Positive Age Beliefs

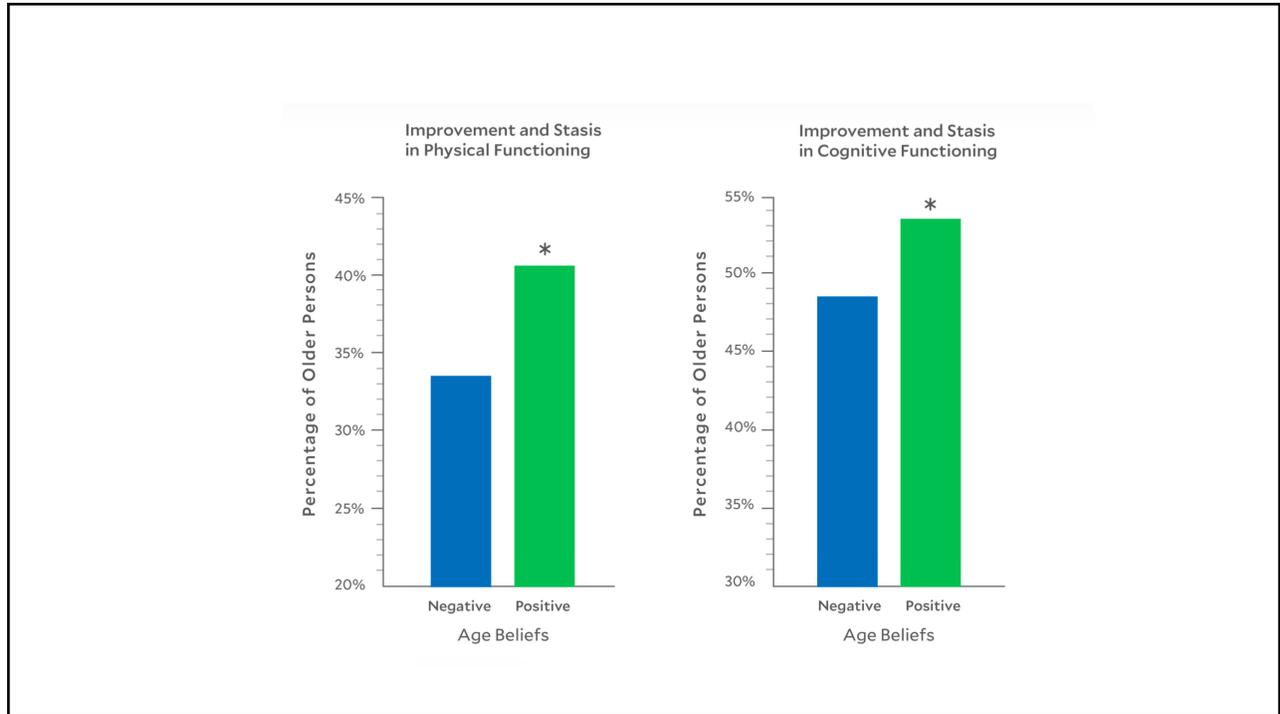
- Participants 65+ years old from the Health and retirement Study (National Institute of Aging)
- 11,314 participants with average age 68 followed for average of 8.5 years
- Attitude Toward Aging subscale of the Philadelphia Geriatric Center Morale Scale (e.g., *The older I get, the more useless I feel and I am as happy now as I was when I was younger*)
- Cognitive improvement was assessed with the 27-point version of TICS, a global measure of cognition that covers a range of cognitive domains, including short-term memory, delayed recall, and mathematical skills, and which has been validated with gold-standard clinical assessments and with other datasets that include similar-aged participants
- Physical improvement was assessed by measuring walking speed, a global measure of physical function, which is often referred to as the “sixth vital sign” because it predicts lower rates of hospitalizations, disability, and mortality among older persons

3

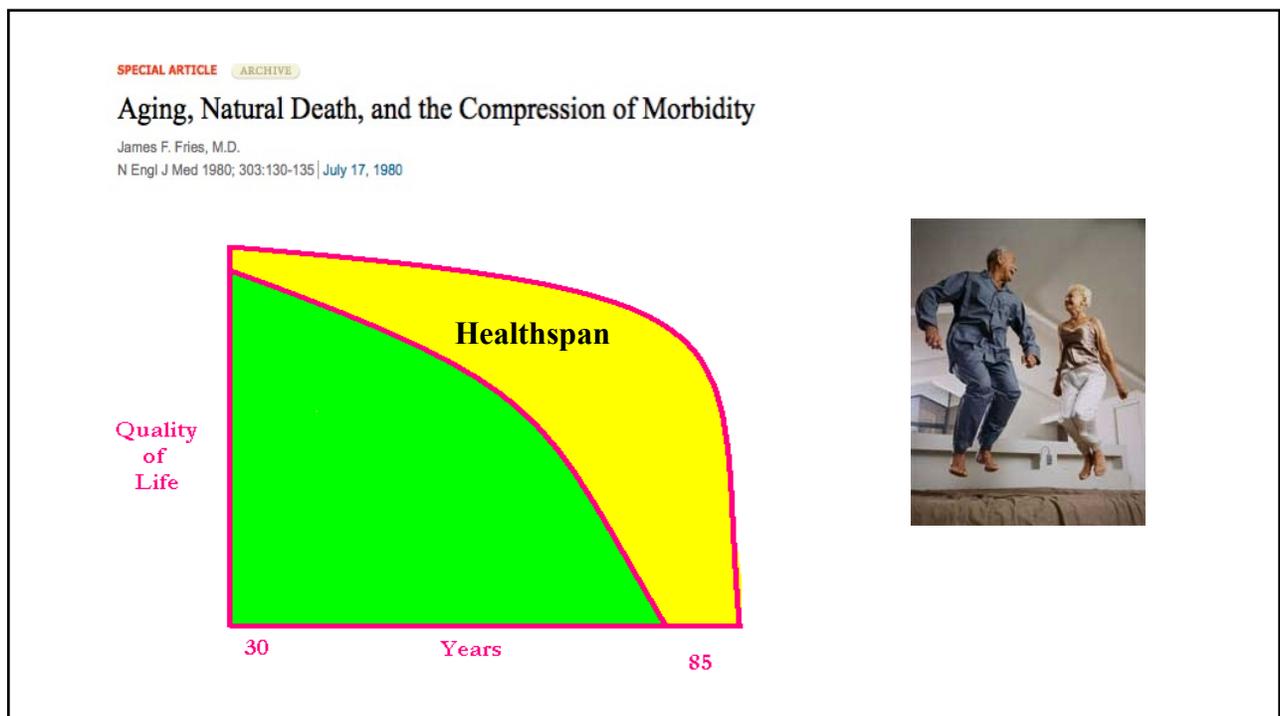
Aging Redefined: Cognitive and Physical Improvement with Positive Age Beliefs

- We discovered that *45.15% of the participants*, who were 65 years and older, showed improvement in cognitive and/or physical function over a period of up to 12 years from baseline. If this finding was extrapolated to the entire US population, it would suggest that more than 26 million older persons are experiencing an improvement in functioning.
- In addition, the current study demonstrated for the first time that participants who had assimilated more-positive age beliefs were more likely to show improvement in both cognitive and physical function.
- This suggests that the improvement, and its prediction by positive age beliefs, is not only due to participants with deficits recovering to a normal level of functioning, but also occurred for those who started at normal levels of functioning. Thus, it seems this improvement pattern is picking up on a cognitive and physical reserve that is available to the general population of older persons.

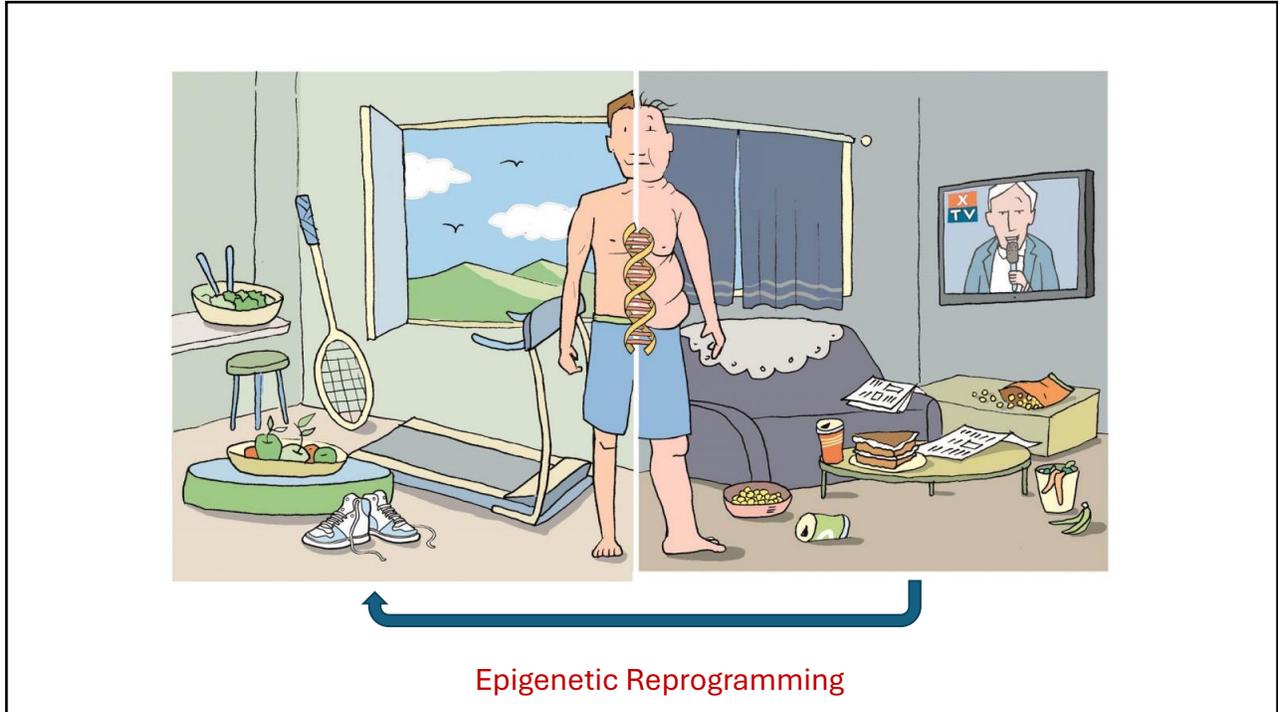
4



5



6



7

nature reviews genetics

Explore content ▾ About the journal ▾ Publish with us ▾ Subscribe

[nature](#) > [nature reviews genetics](#) > [review articles](#) > [article](#)

Review Article | [Published: 11 April 2018](#)

EPIGENETICS

DNA methylation-based biomarkers and the epigenetic clock theory of ageing

[Steve Horvath](#) & [Kenneth Raj](#)

The graph plots "Weighted methylation average" on the y-axis (ranging from -4 to 4) against "Age (years)" on the x-axis (ranging from 0 to 100). A blue curve starts at approximately -3.5 at age 0 and rises to about 3.5 at age 100. A vertical dashed line is drawn at age 60. To the left of this line, the area is shaded green and labeled "Negative epigenetic age acceleration". To the right, it is shaded yellow and labeled "Positive epigenetic age acceleration". An illustration of a man in a wheelchair is placed above the curve at age 60, with a callout box pointing to the curve that says "Average epigenetic age acceleration at chronological age".

8



Motion is the lotion !
Dance to the music you love

9



Thank You

10

Reclaiming and maintaining **our metabolic flexibility** (ie. mitochondrial health)



Circadian rhythm



Sleep



Light exposure



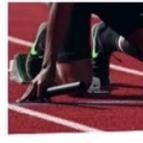
Gut health



Meaningful relationships



Lift weights



Go fast



Go slow



Novel experiences

11

Passion and Longevity

“Everybody needs a passion. That’s what keeps life interesting. If you live without passion, you can go through life without leaving any footprints.”
—From her book, *If You Ask Me (And Of Course You Won’t)*

Betty White
1922-2021



12