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Demographic time, metabolism, and structure

Comments on Portugal and the EU

**V congresso Português de demografia
6-7 October, 2016**

Tim Riffe



Expert opinions (anonymous)

- What is the average length of life in the EU now (period)?
- What will the average length of life be in 2100 in the EU (period)?
- What will the average length of life be for babies born in the EU in 2020 (cohort)?



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Growth

- Migration aside, is the EU population growing, shrinking, or stationary, according to period mortality and fertility rates right now?
- What about if we include migration?



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Alternative perspectives on growth

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REPORT

Is low fertility really a problem? Population aging, dependency, and consumption

Ronald Lee^{1,*}, Andrew Mason^{2,3,*}, members of the NTA Network[†]

+ Author Affiliations

↩^{*} Corresponding author. E-mail: rlee@demog.berkeley.edu (R.L.); amason@hawaii.edu (A.M.)

Science 10 Oct 2014:
Vol. 346, Issue 6206, pp. 229-234
DOI: 10.1126/science.1250542

Lee, Mason, & NTA team (2014)



Alternative perspectives on growth

Turnover and Dependency are Minimized when Population Growth is Negative

Joshua R. Goldstein
UC, Berkeley

April 17, 2015

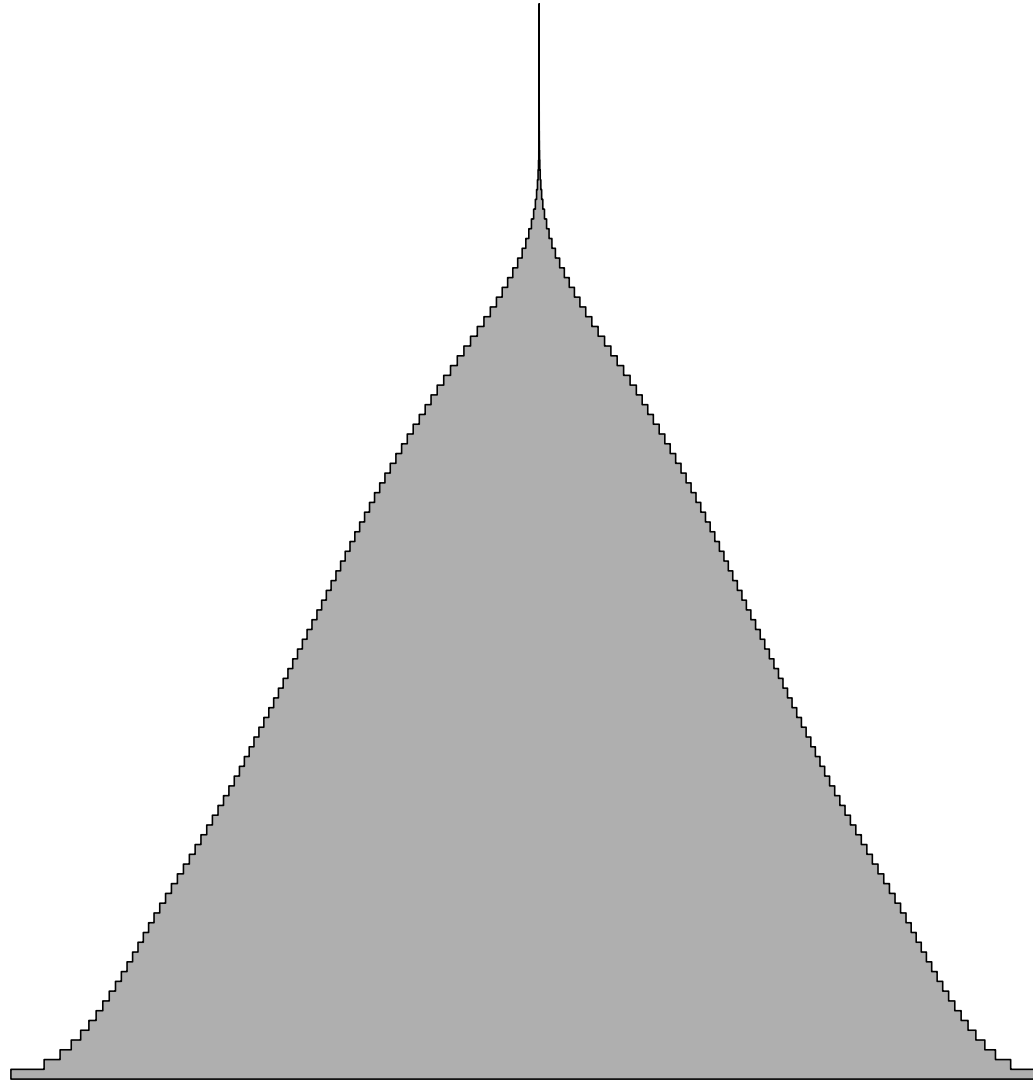
Abstract

The sum of the birth rate and death rates is a measure of population turnover. It is also a measure of the care-giving needs – an alternative to the dependency ratio – since it tells the fraction of the population that is close to birth or close to death.

Here I show that the minimum turnover for stable populations is



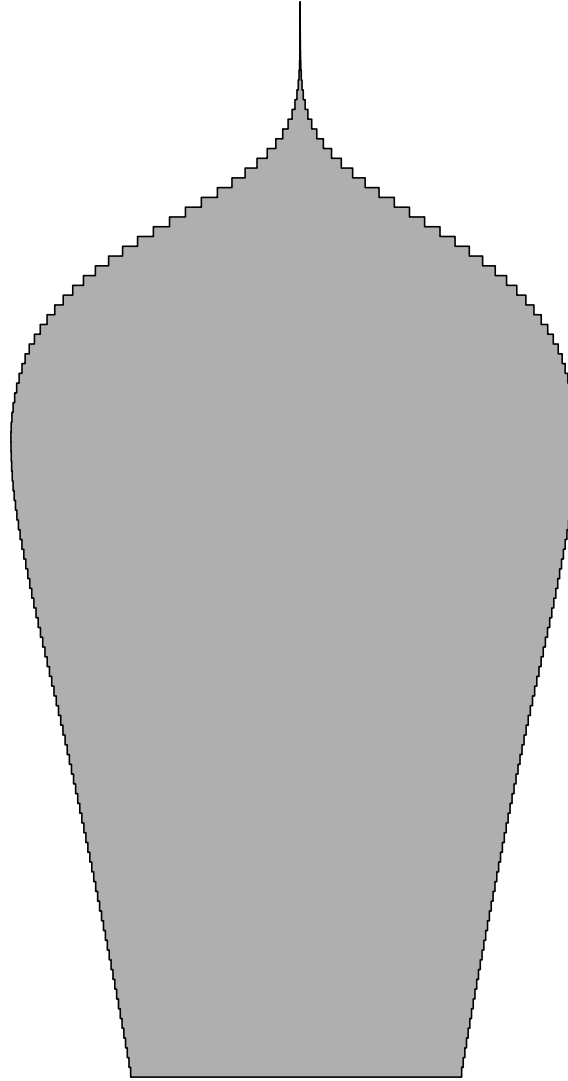
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1900 Sweden lifetable pop growing at 1% per annum



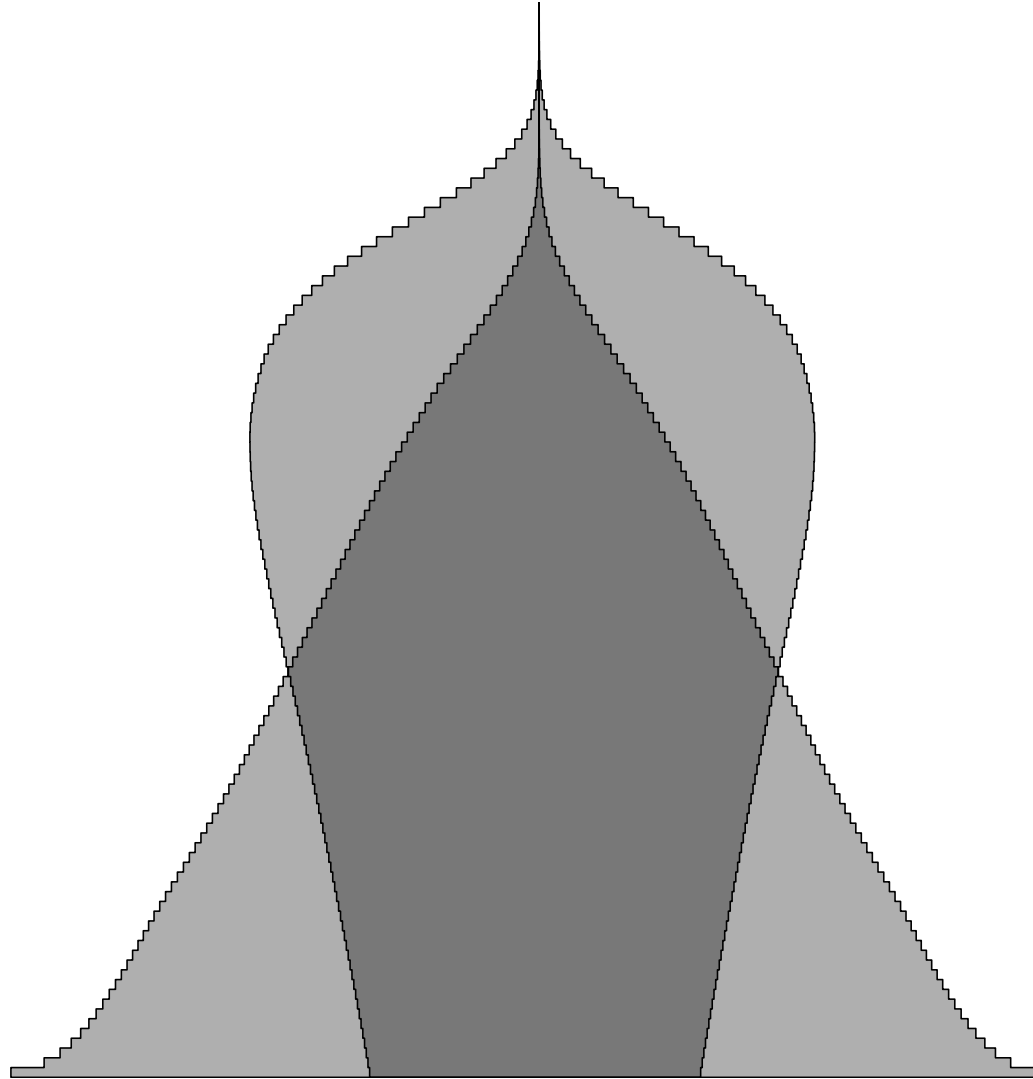
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2014 Sweden lifetable pop shrinking at 1% per annum



Alternative perspectives on growth



both stable populations



Alternative perspectives on growth

RÉFLEXIONS SUR LES TAUX DE REPRODUCTION

Le concept de reproduction n'a de signification claire que lorsque toutes les générations ont la même histoire. Dans ce cas, en effet, il y a un rapport constant entre deux caractéristiques numériques quelconques d'une génération, par exemple, son effectif initial et son effectif à 50 ans; le rapport entre un effectif d'une génération mère et l'effectif homologue moyen des générations filles est indépendant de l'effectif particulier considéré, les naissances ou les survivantes à 50 ans; lorsque ce rapport est 1, il y a exactement reproduction indéfinie de la population en nombre et en structure, lorsque le rapport dépasse 1 les générations mères sont remplacées par des générations filles

Henry (1965) Population. Vol. 20, No. 1



Units



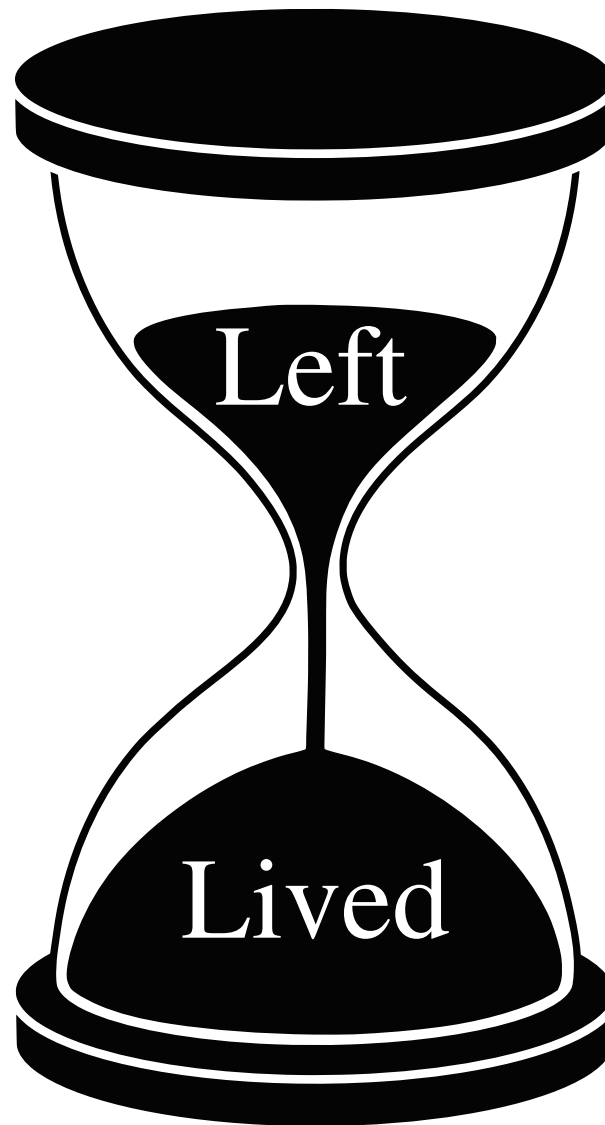


Counting years of life





Counting years of life





Alternative perspectives on aging

nature

International weekly journal of science

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Letter

Nature **435**, 811–813 (9 June 2005) | doi:10.1038/nature03593; Received 13 January 2005; Accepted 24 March 2005

Average remaining lifetimes can increase as human populations age

Warren C. Sanderson^{1,2} & Sergei Scherbov^{2,3}

1. Departments of Economics and History, State University of New York at Stony Brook, Stony Brook, New York 11794-4384, USA
2. World Population Project, International Institute for Applied Systems Analysis (IIASA), Laxenburg A-2361, Austria
3. Vienna Institute of Demography, Prinz Eugen Strasse 8, Vienna A-1040, Austria

Correspondence to: Warren C. Sanderson^{1,2} Correspondence and requests for materials should be addressed to W.C.S. (Email: wsanderson@notes.cc.sunysb.edu).

Increases in median ages, the most commonly used measure of population ageing^{1,2}, are rapid in today's wealthier countries^{2,3}, and population ageing is widely considered



Alternative perspectives on aging

L'ESPACE POPULATIONS SOCIÉTÉS 1986-II pp. 157-168

Nicolas BROUARD

INED, Paris
27, rue du Commandeur,
75675 Paris Cedex 14

Structure et dynamique des populations La pyramide des années à vivre, aspects nationaux et exemples régionaux



Alternative perspectives on aging

re Brouard: homeostasis in the remaining-years pyramid is possible for extended periods. Animate, if there's time.



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Remeasuring Aging

Warren C. Sanderson^{1,3,*} and **Sergei Scherbov^{2,3}**

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Science 10 Sep 2010:
Vol. 329, Issue 5997, pp. 1287-1288
DOI: [10.1126/science.1193647](https://doi.org/10.1126/science.1193647)



Alternative perspectives on aging

Time-to-death patterns in markers of age and dependency

Tim Riffe*¹, Pil H. Chung², Jeroen Spijker³, and John MacInnes⁴

¹Max Planck Institute for Demographic Research

²Department of Demography, University of California, Berkeley

³Centre d'Estudis Demogràfics

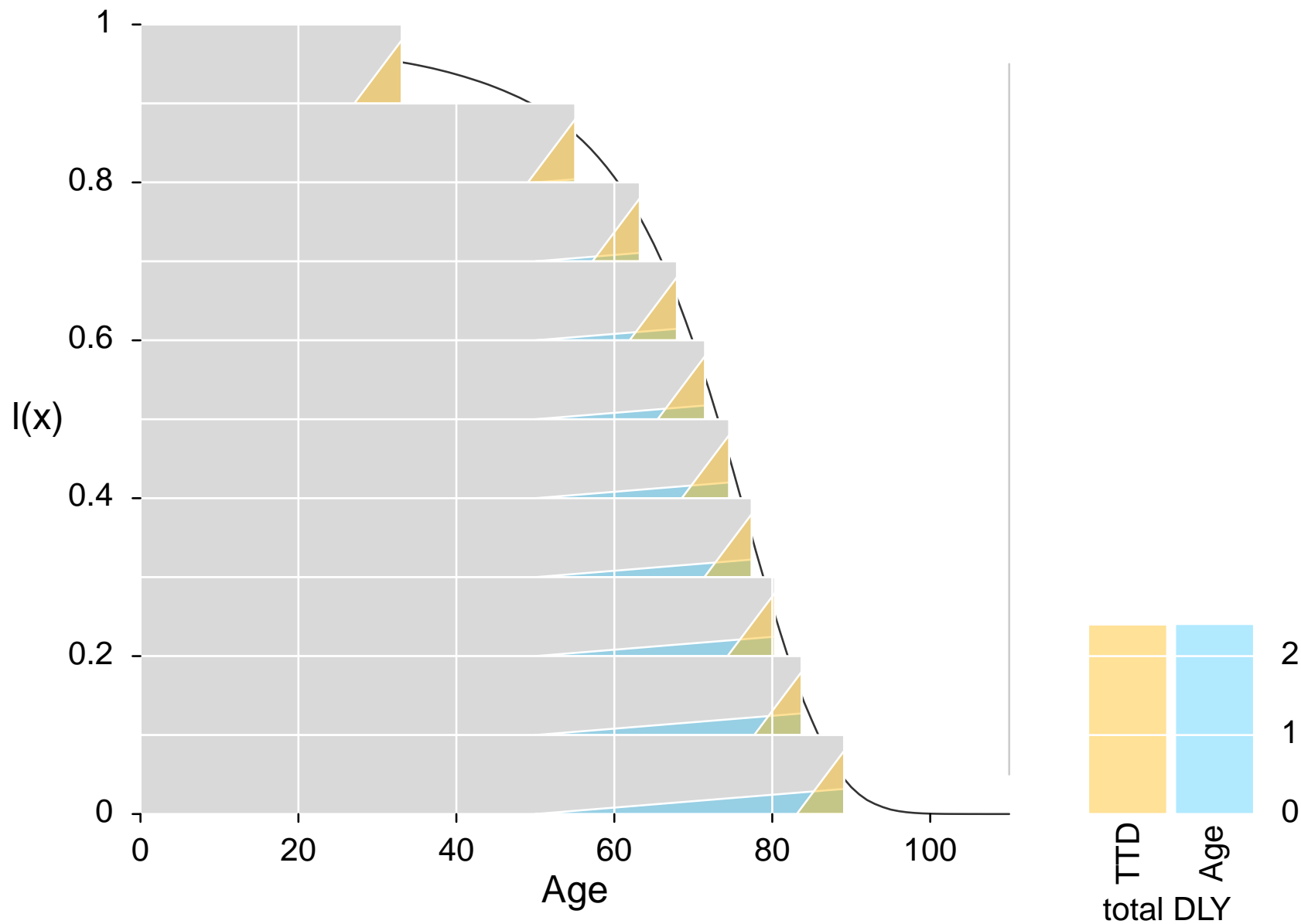
⁴School of Social and Political Science, University of Edinburgh

October 4, 2016

Riffe et. al. VYPR v15 (in press)

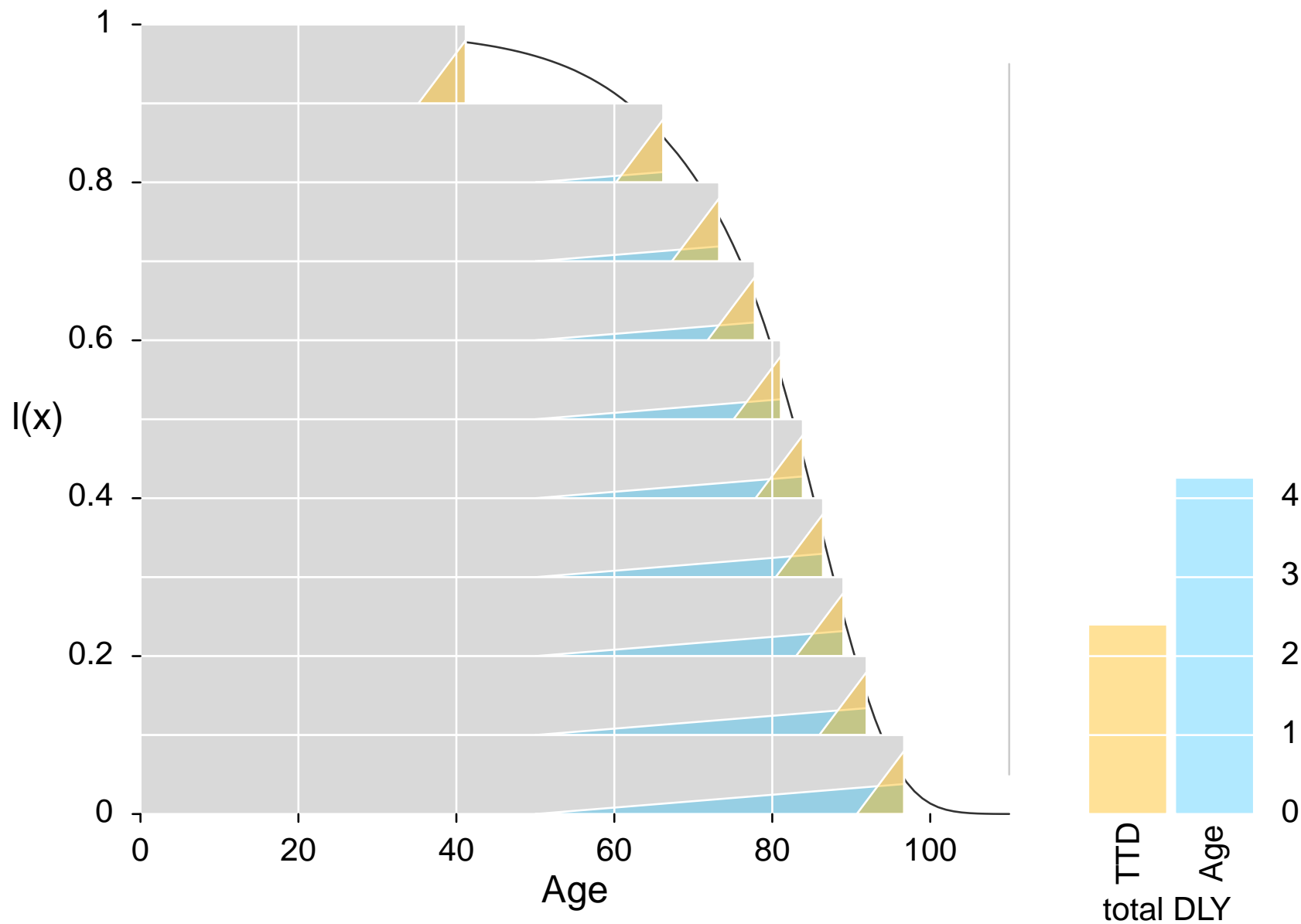


A simple illustration





A simple illustration





Hands-on in \mathbb{R} and maybe spreadsheets

1. Sanderson & Scherbov adjusted old-age indicator
2. Brouard remaining-years pyramid, animated
3. Goldstein turnover (Lotka's r , etc.)
4. Henry, either historical or with assumptions
5. Riffe, morbidity assumptions.



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