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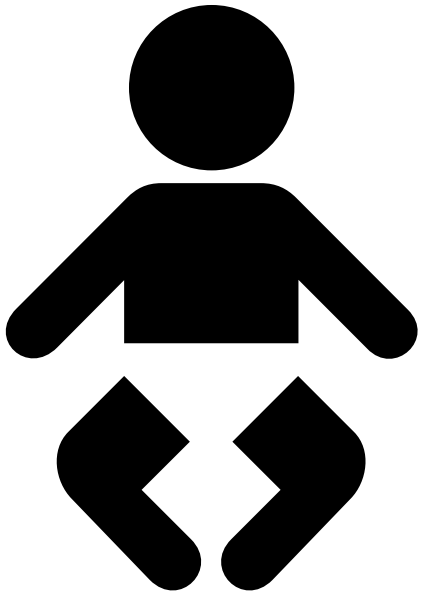
A unified framework of demographic time

Tim Riffe
Jonas Schöley
Francisco Villavicencio

Demographic time



Demographic time measures

A	chronological age
T	thanatological age
L	complete lifespan
C	birth cohort
D	death cohort
P	period

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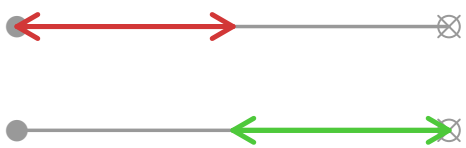

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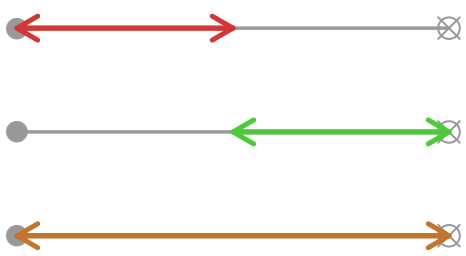

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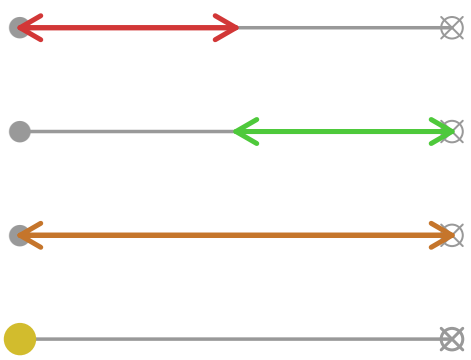

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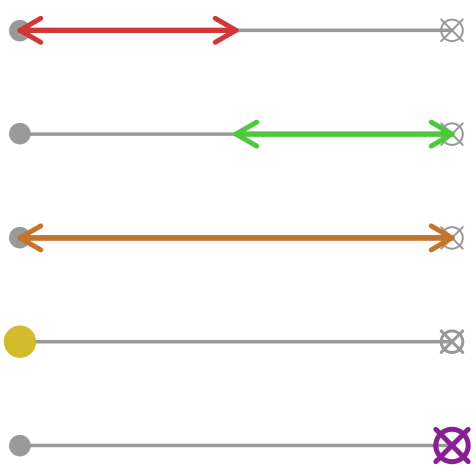

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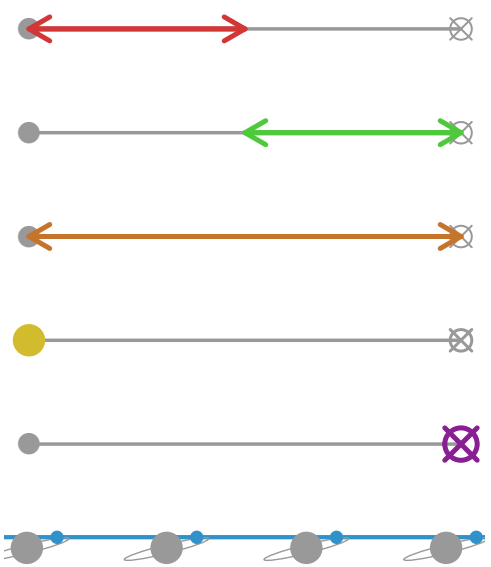

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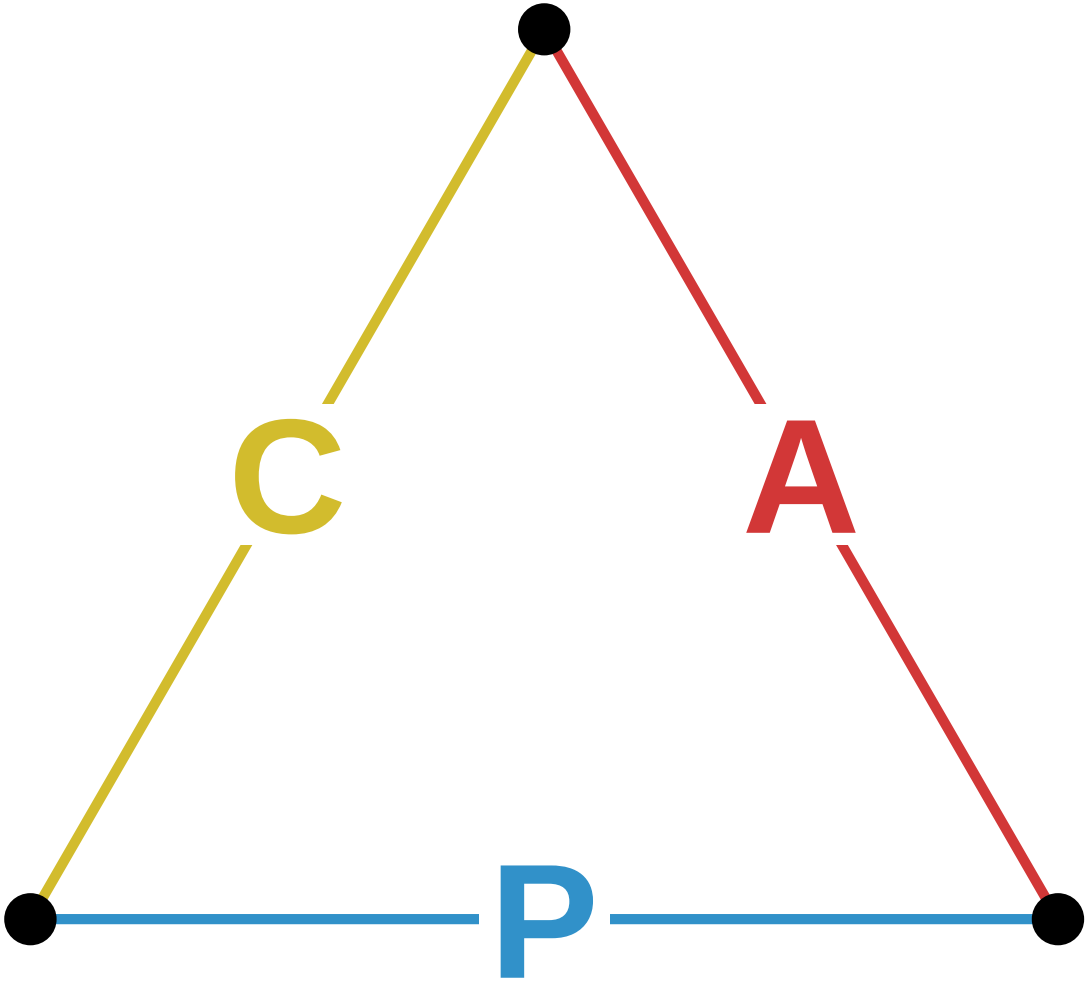
Objective

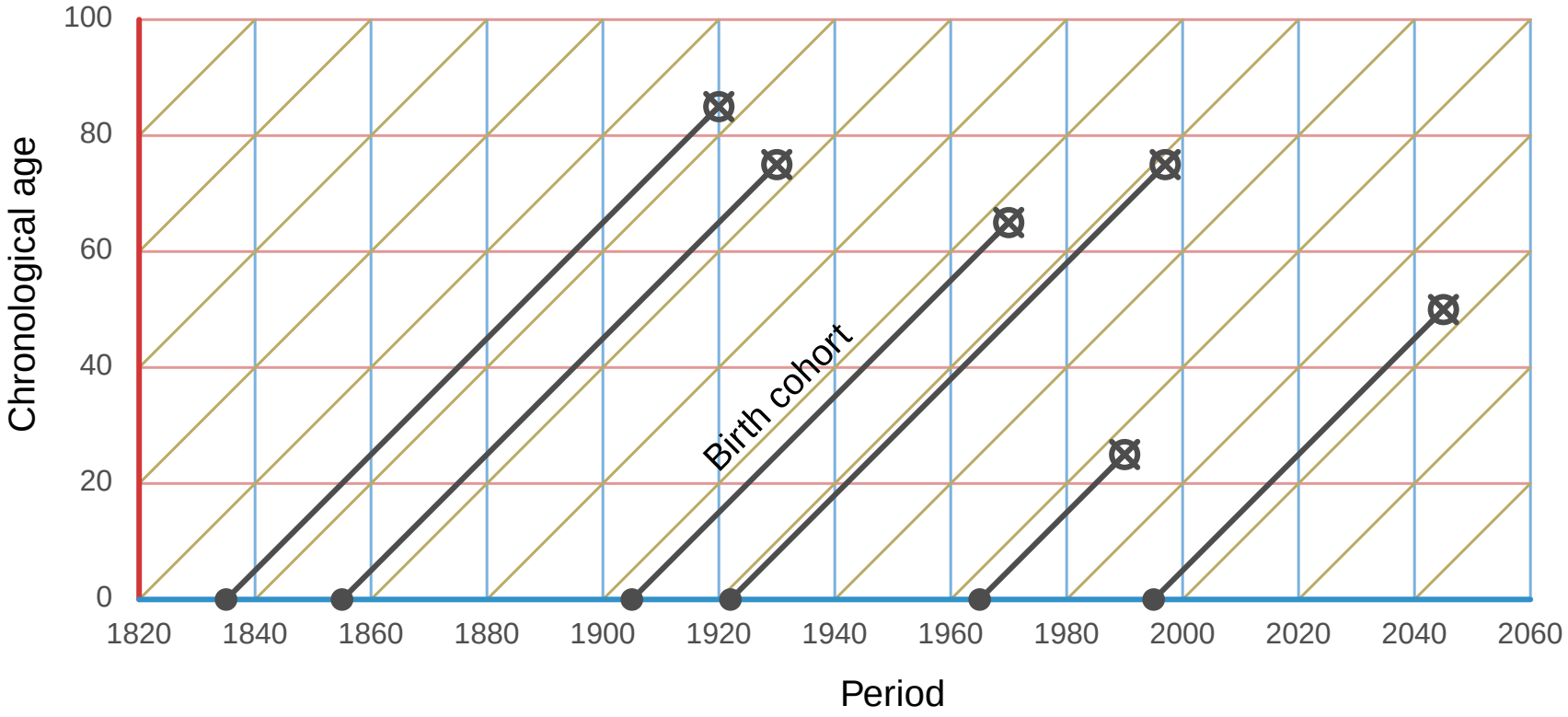
Expand the Lexis diagram to include death-related time measures.

(It turns out Lexis himself did something eerily similar, but not identical. Happy to explain how it works too)

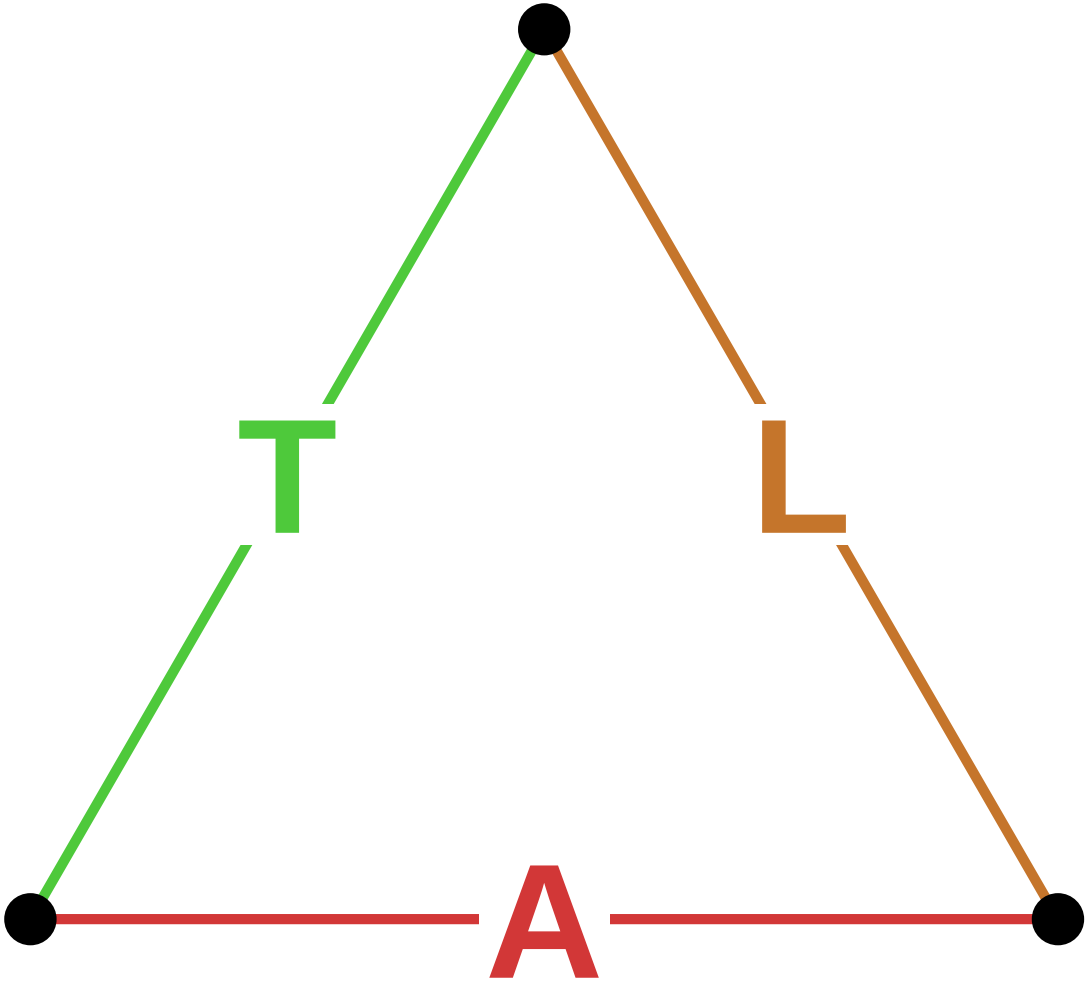
The APC demographic time identity



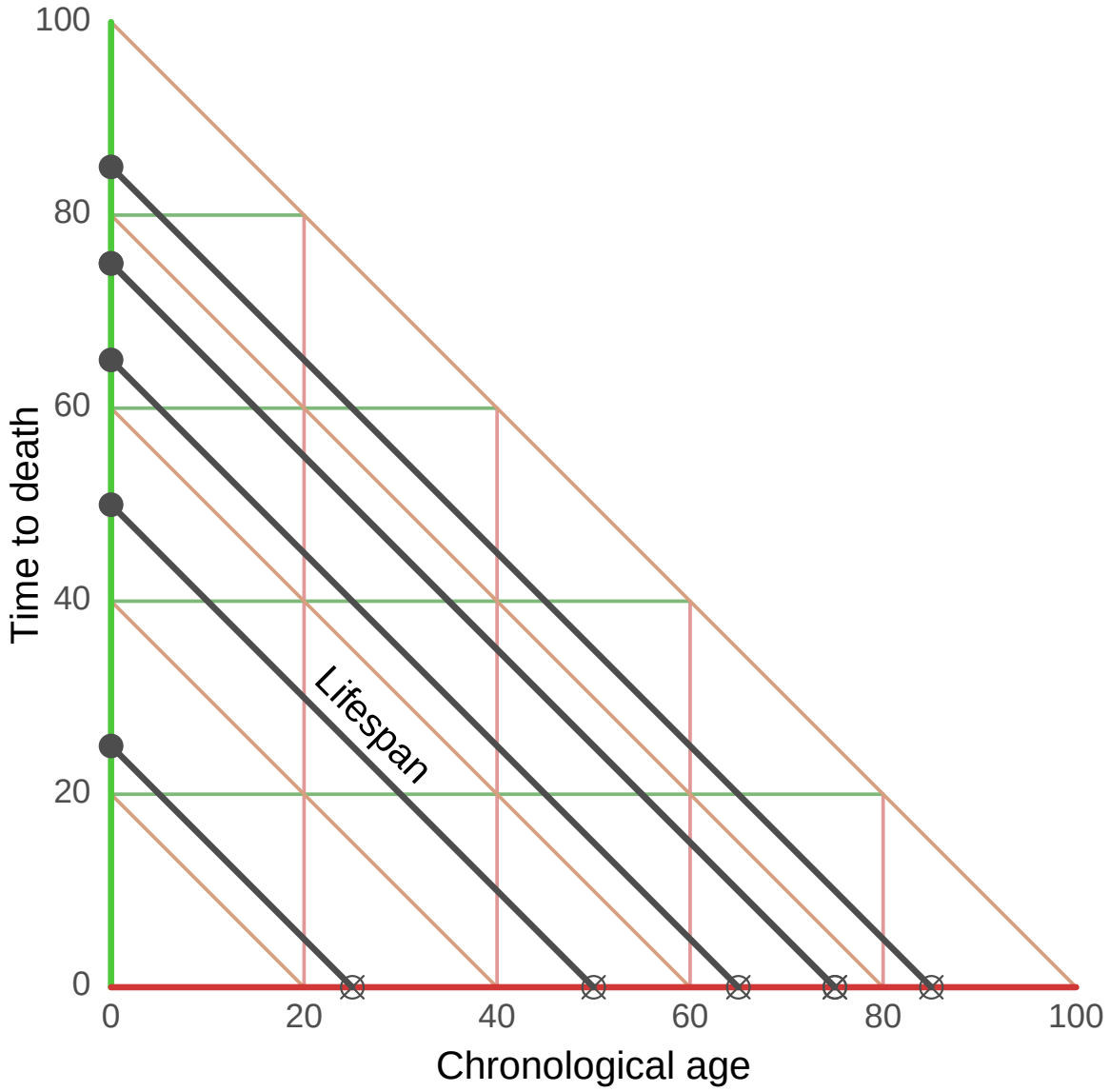
APC diagram (Lexis diagram)



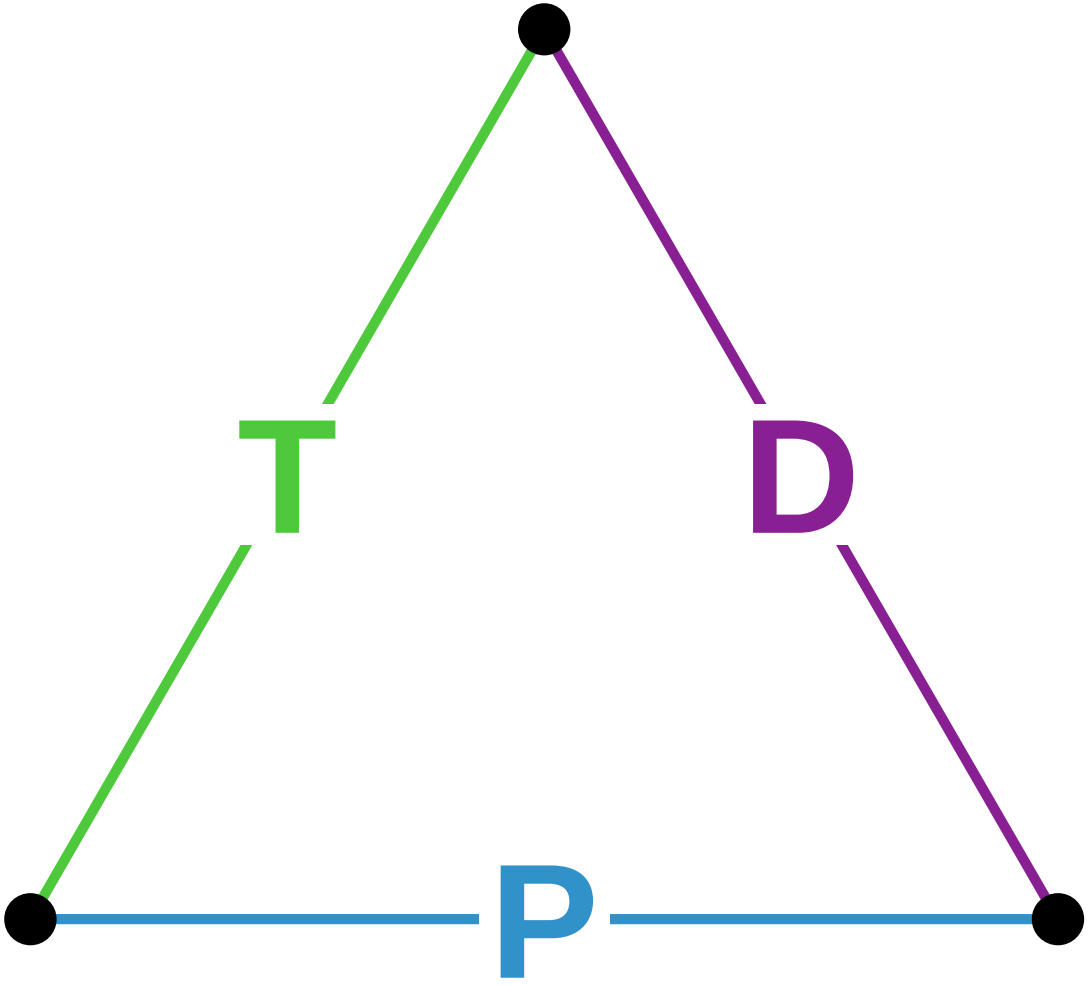
The TAL demographic time identity



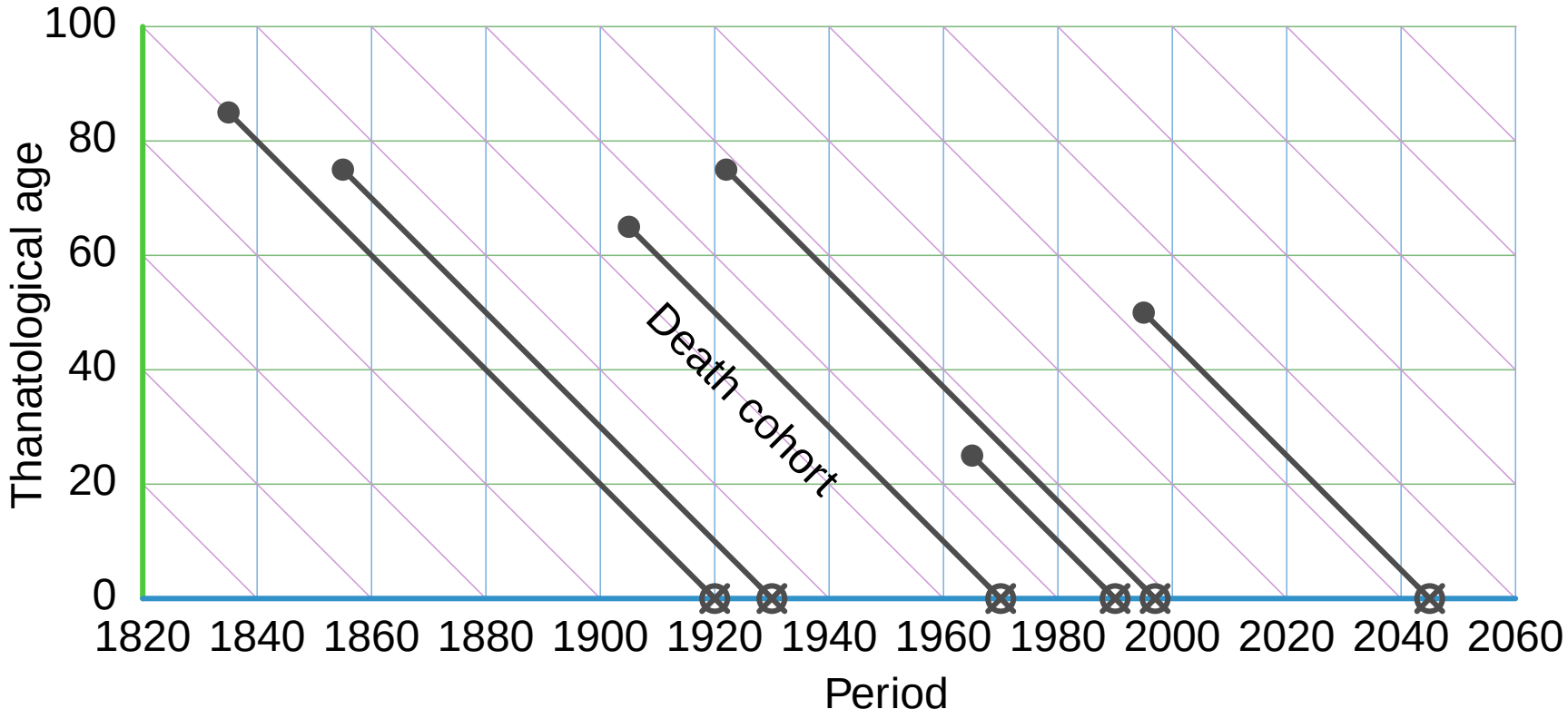
TAL diagram


100
80
60
40
20
0
Time to death
Lifespan
0
20
40
60
80
100
Chronological age

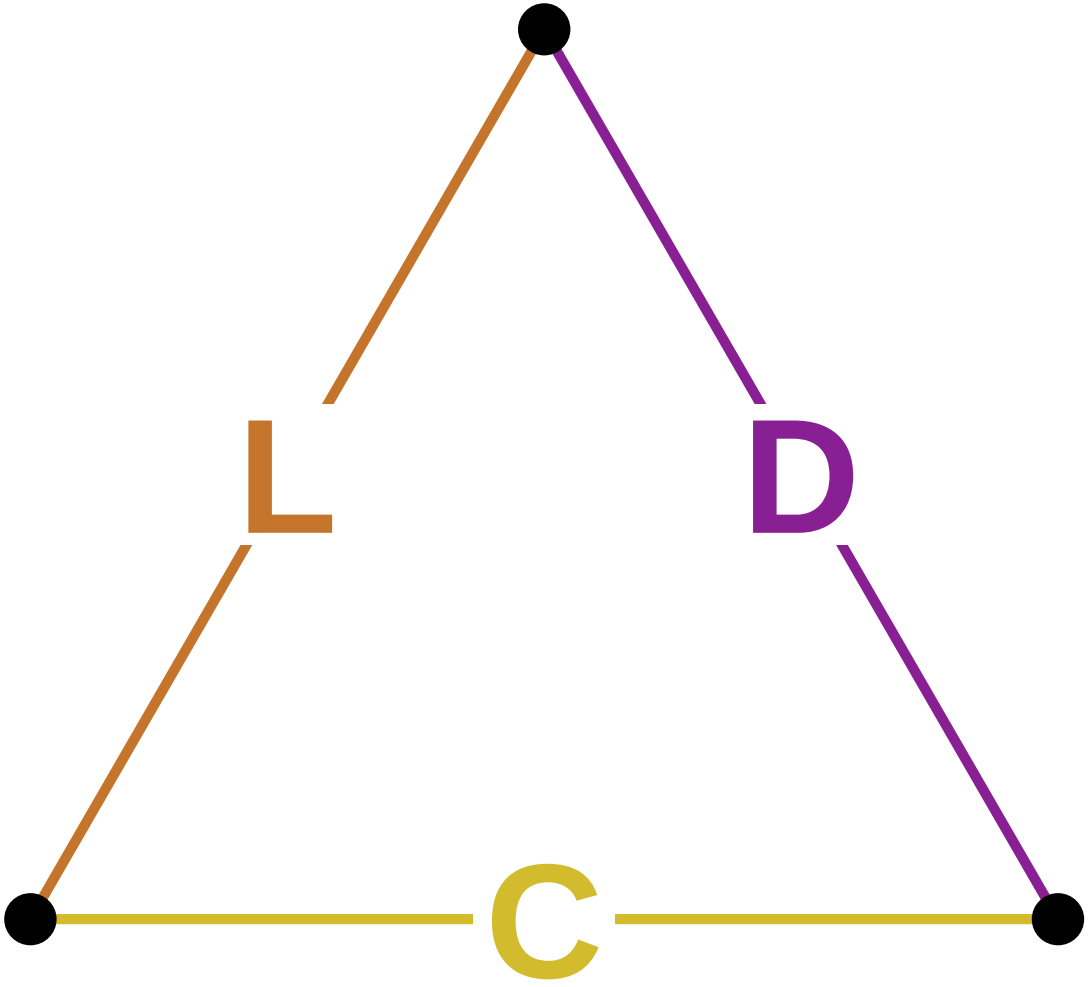
The TPD demographic time identity



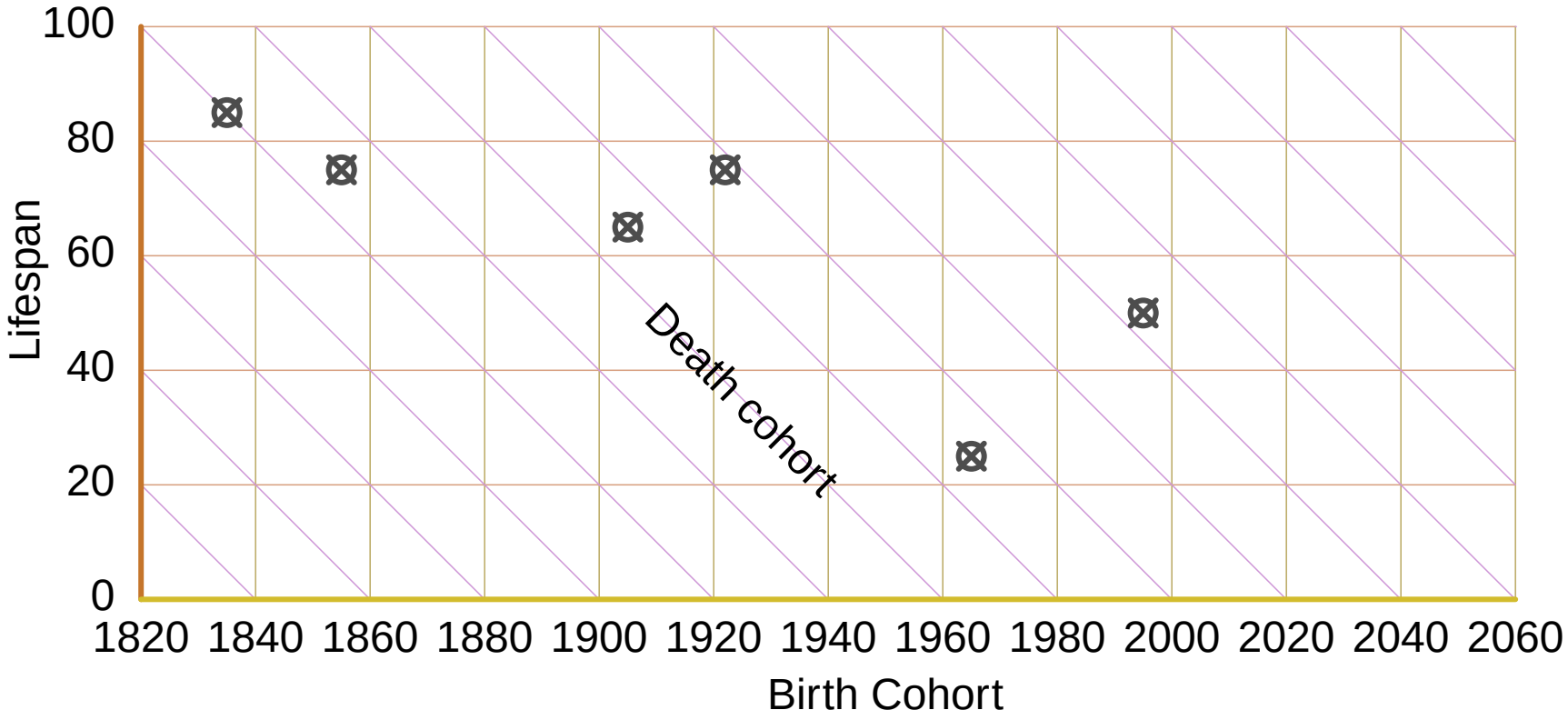
TPD diagram


100
80
60
40
20
0
Thanatological age
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020
2040
2060
Period
Death cohort

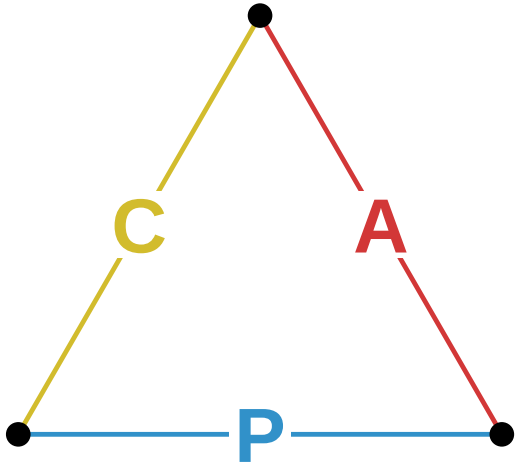
The LCD demographic time identity

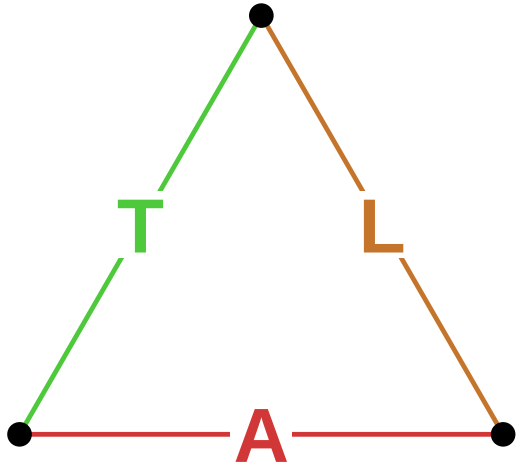


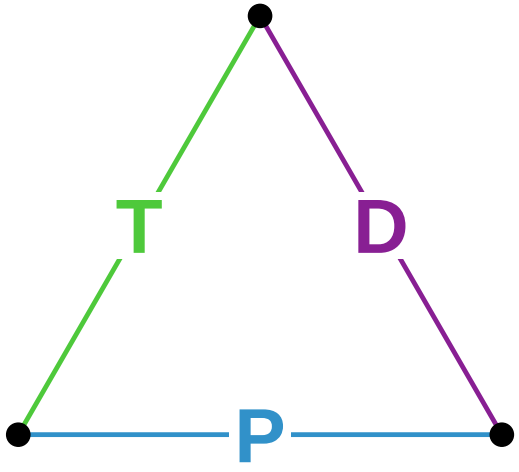
LCD diagram

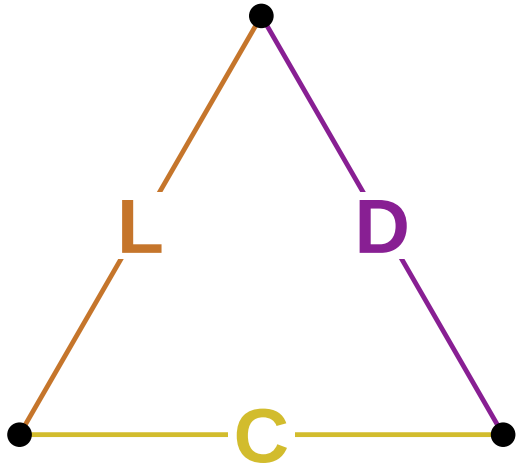

100
80
60
40
20
0
Lifespan
Death cohort
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020
2040
2060
Birth Cohort

Four demographic time identities

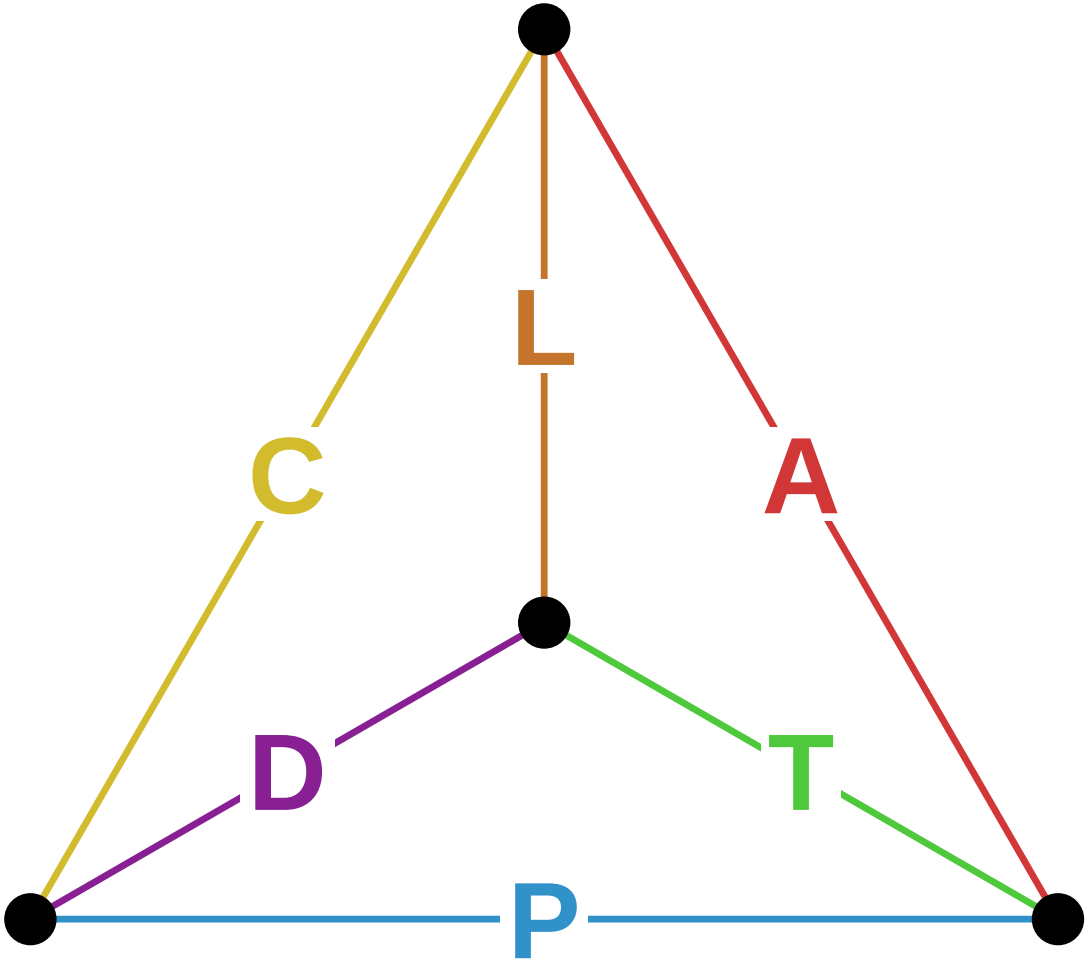




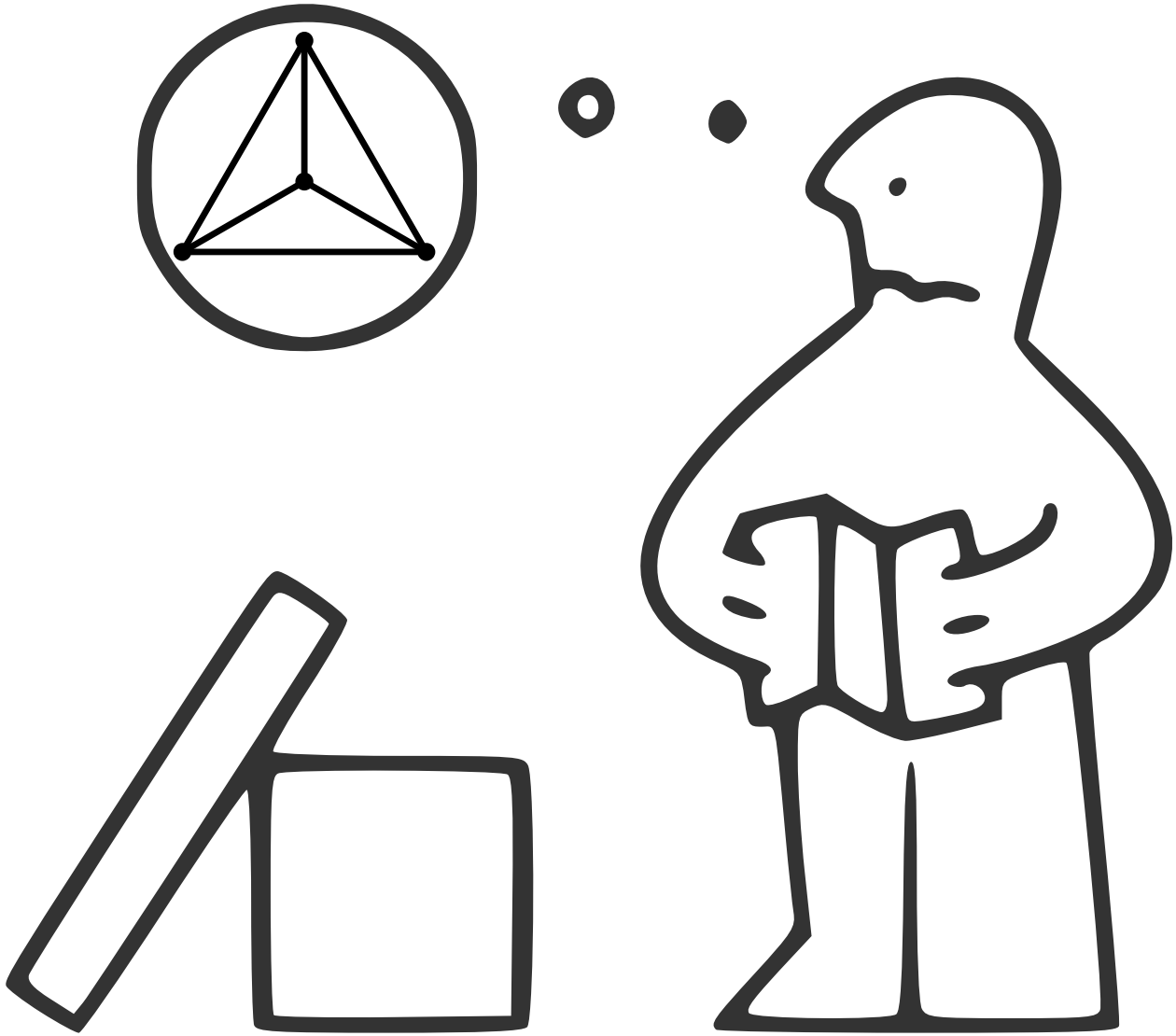




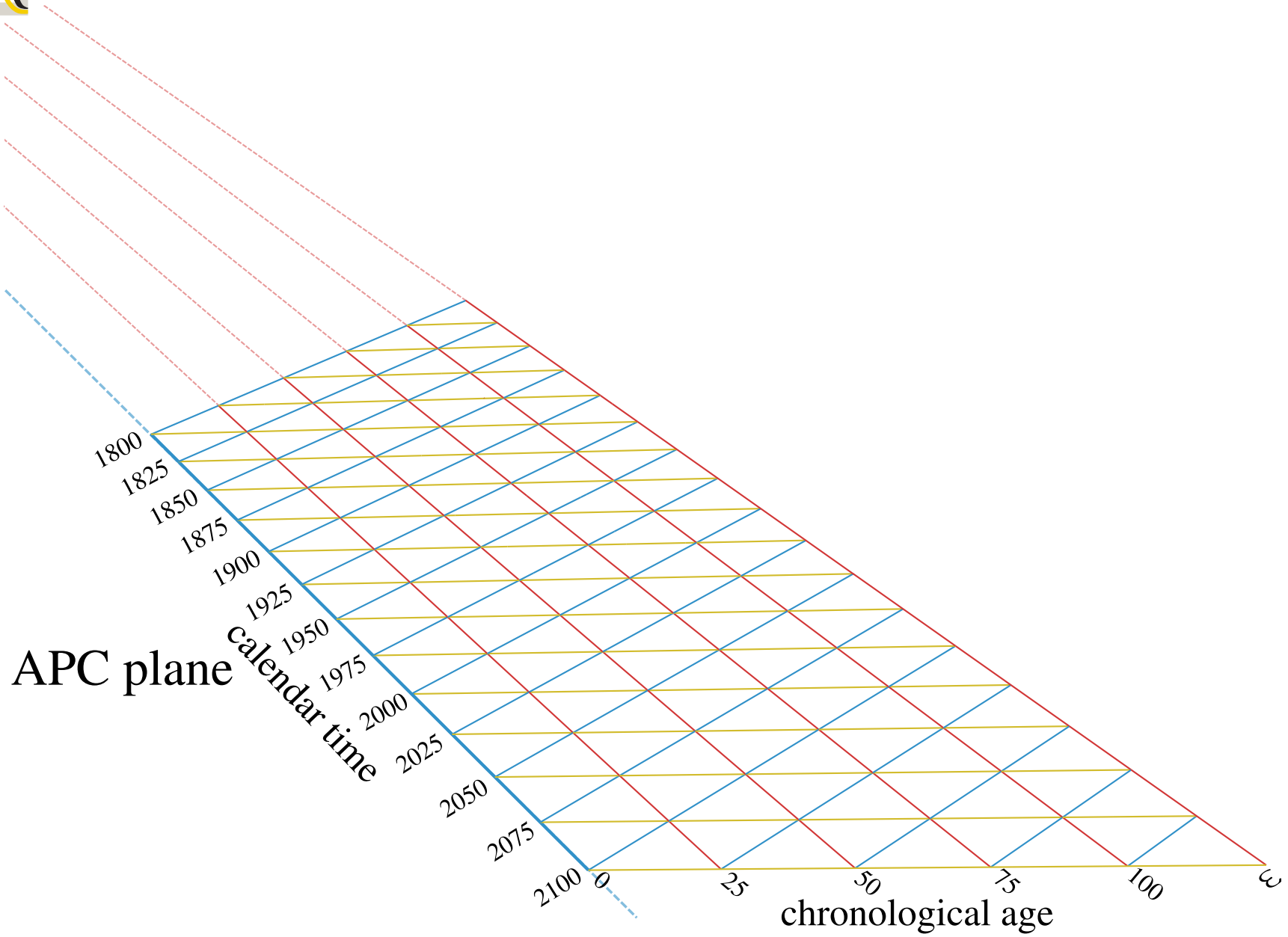
The demographic time identity



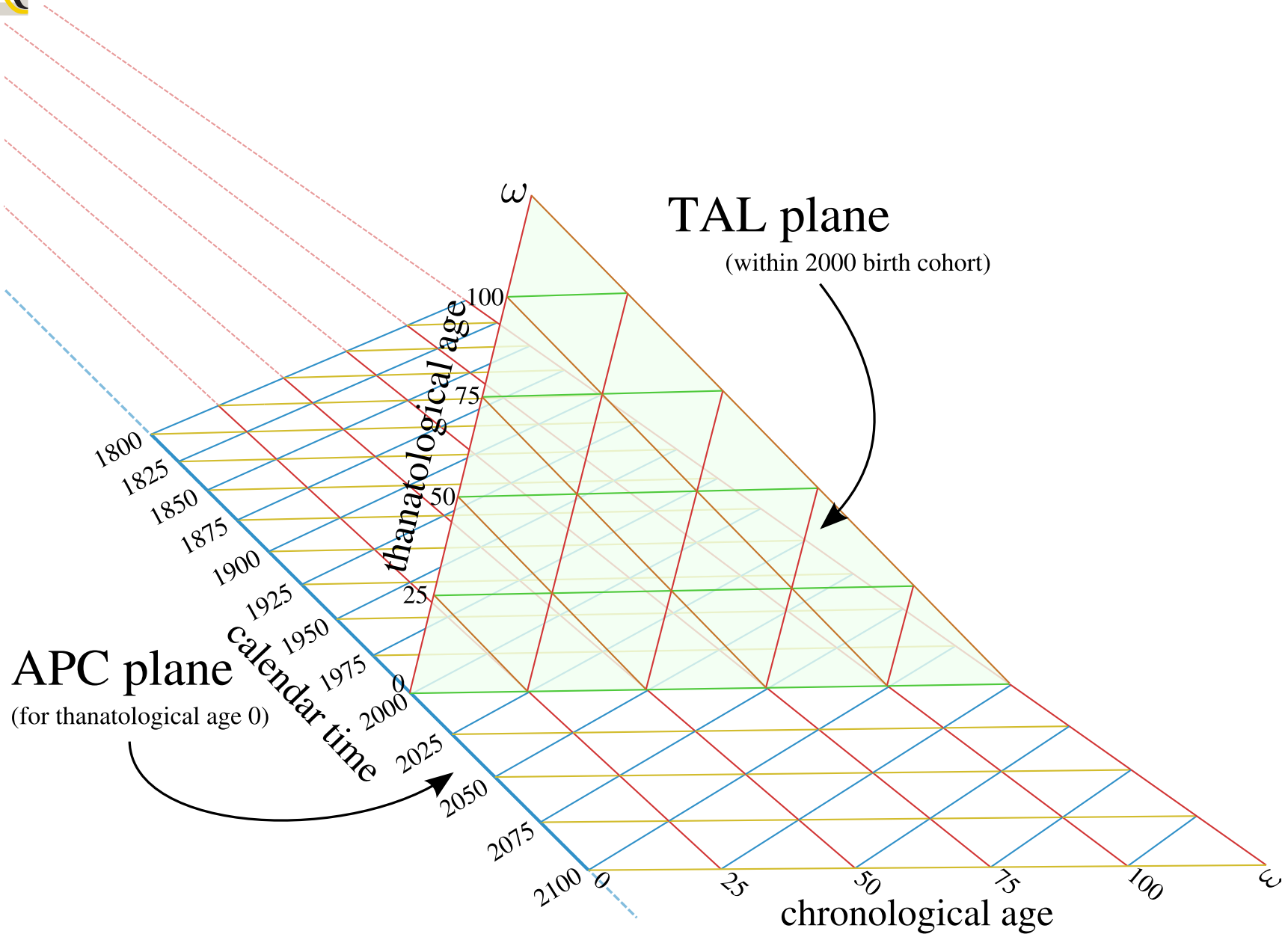
Building a demographic time diagram (1)



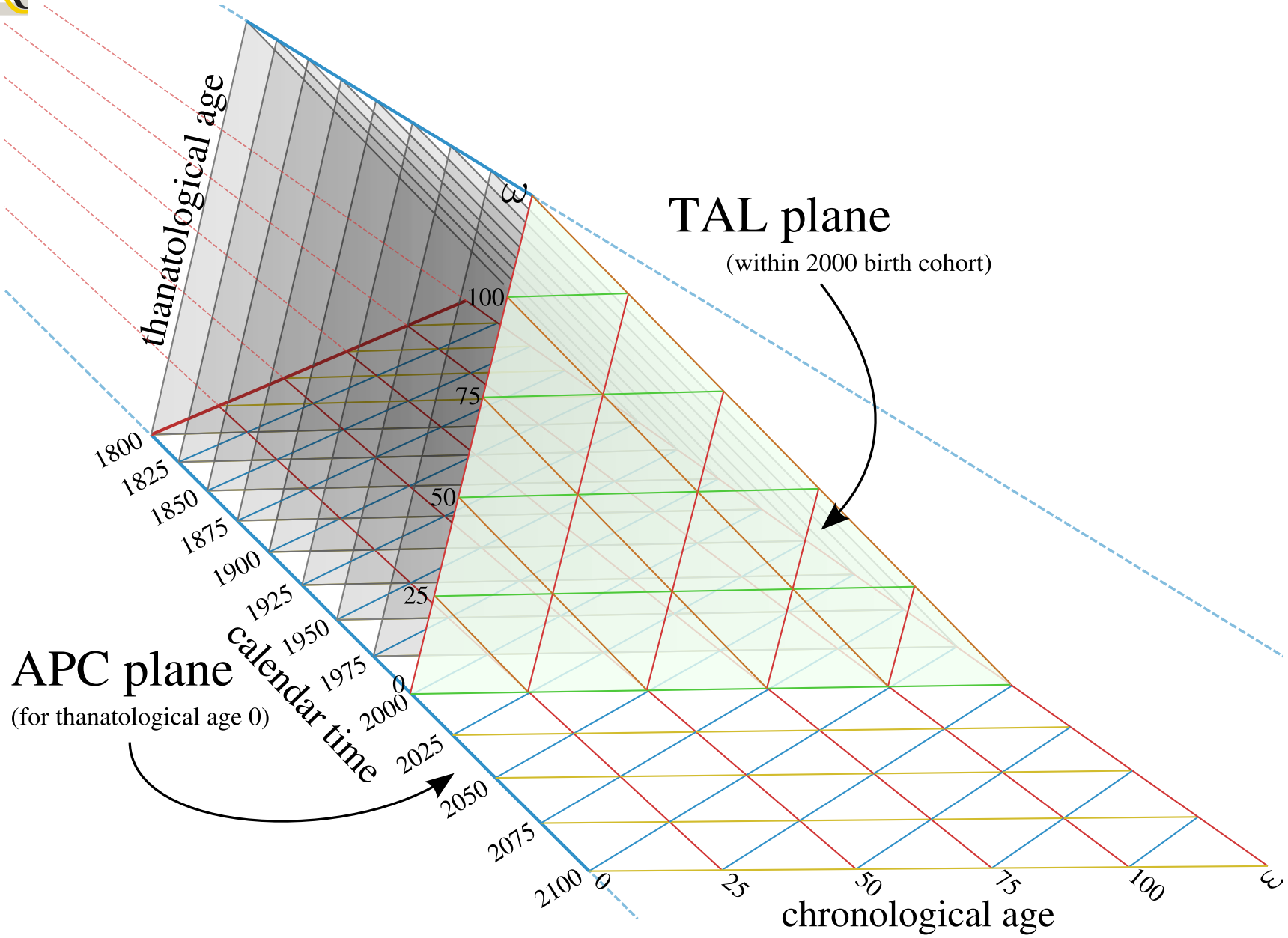
Building a demographic time diagram (2)



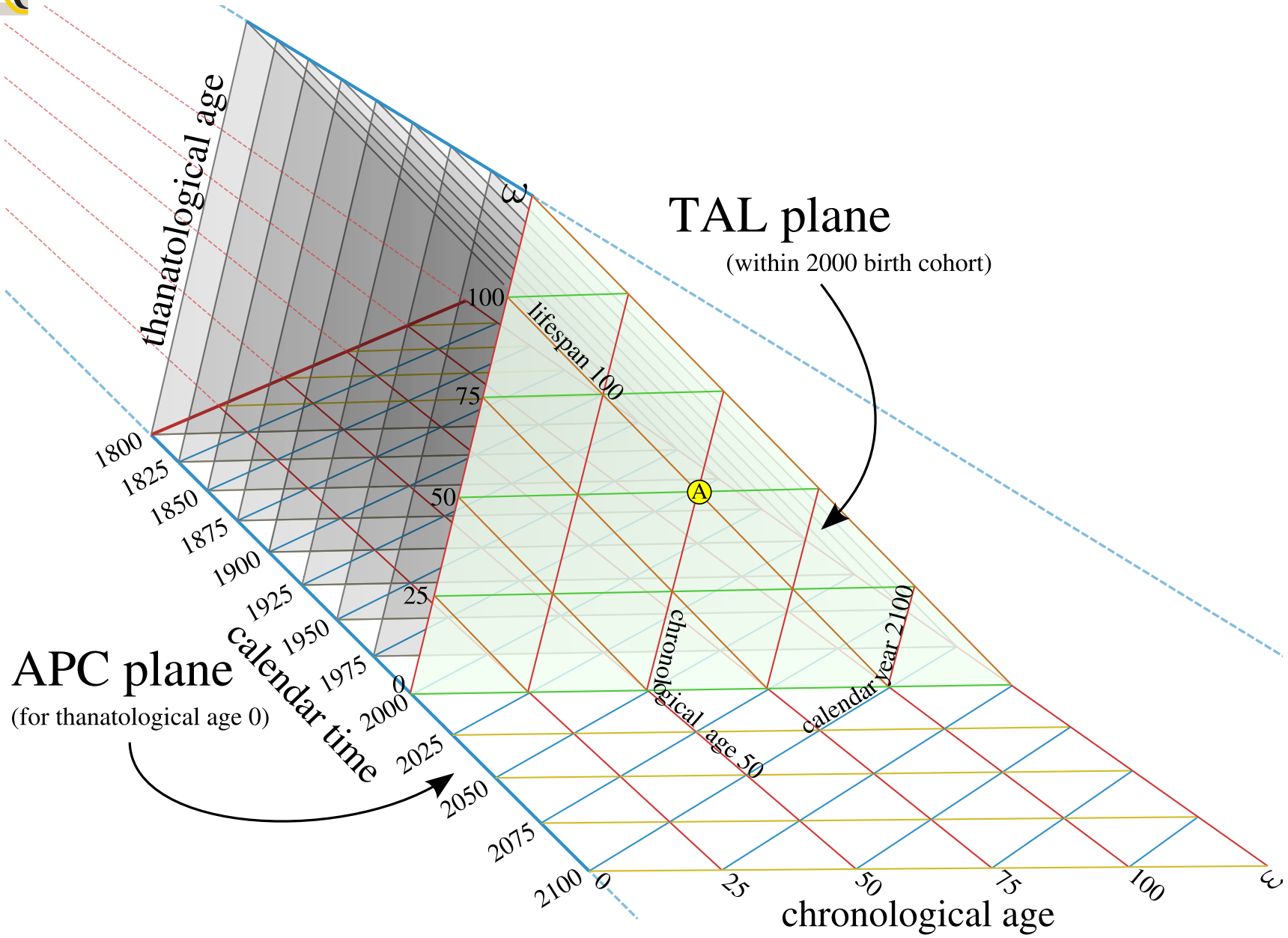
Building a demographic time diagram (3)



Building a demographic time diagram (4)

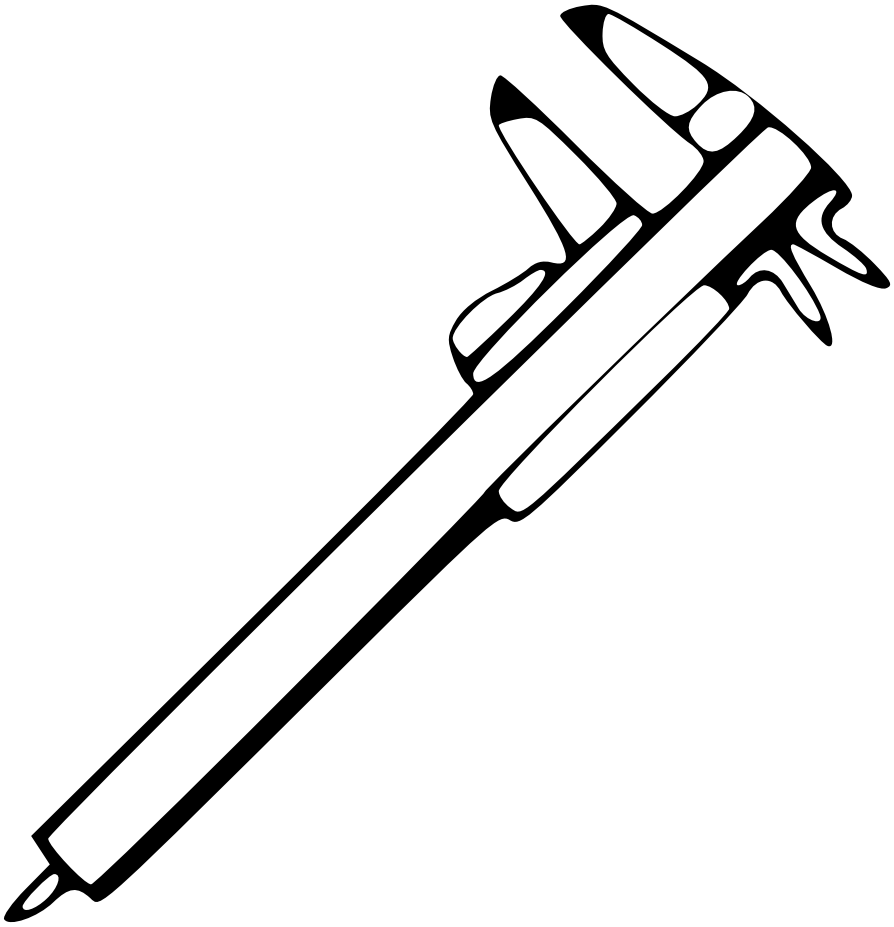


Building a demographic time diagram (5)



So why more planes? (1)

So why more planes? (2)



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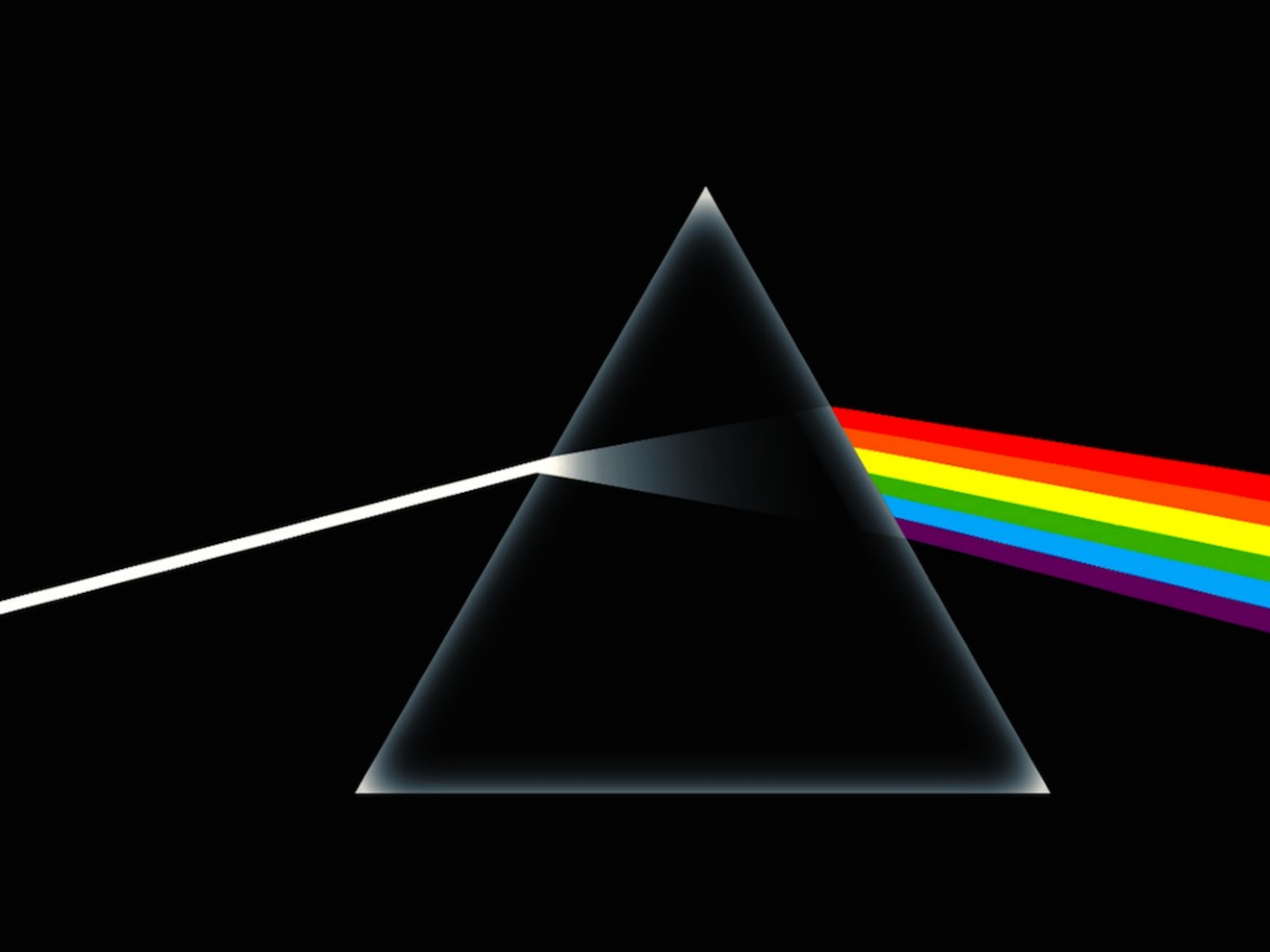
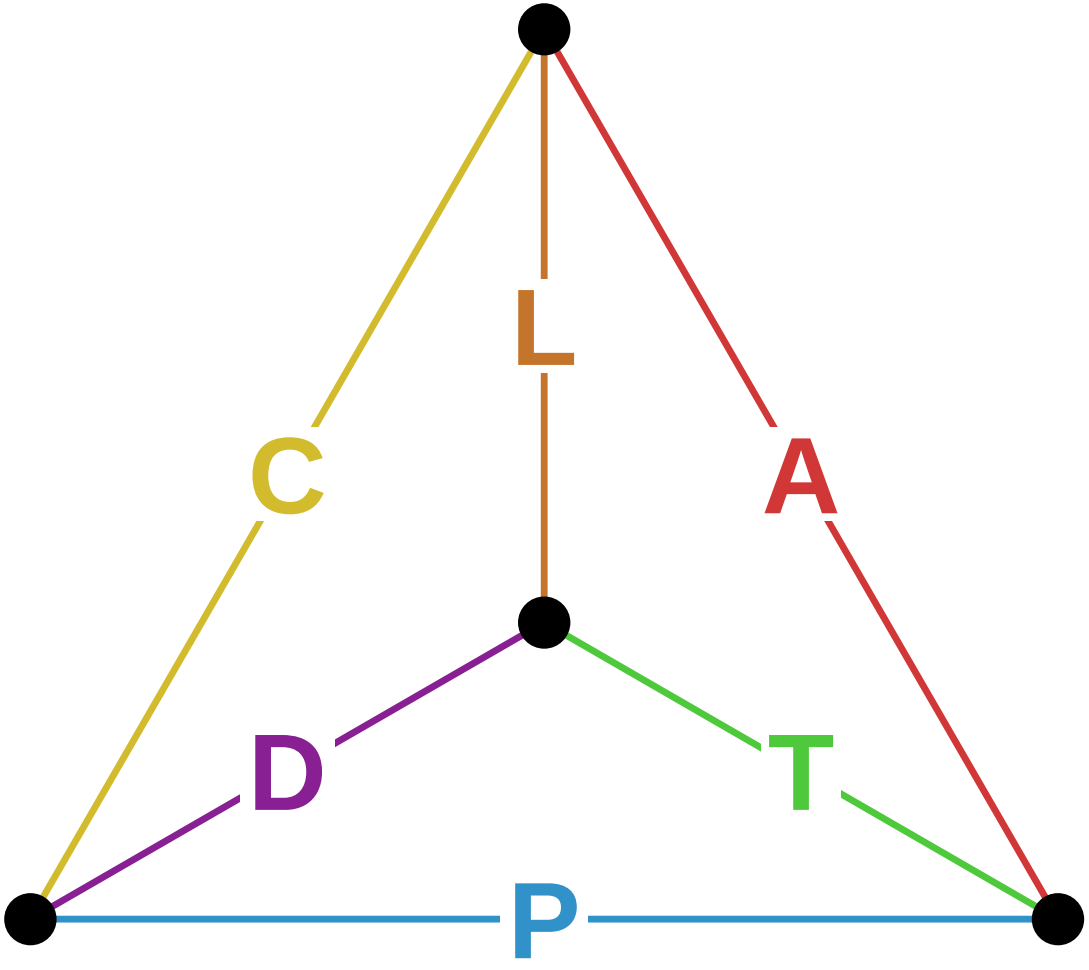


Thanks!



An example inquiry

- compare end-of-life trajectories for several birth cohorts (1905 - 1925)
- HRS (Rand), waves 1-11 (years 1992-2012)
- use TAL plane to uncover patterns that APC hides
- this example: prevalence of poor self-reported health

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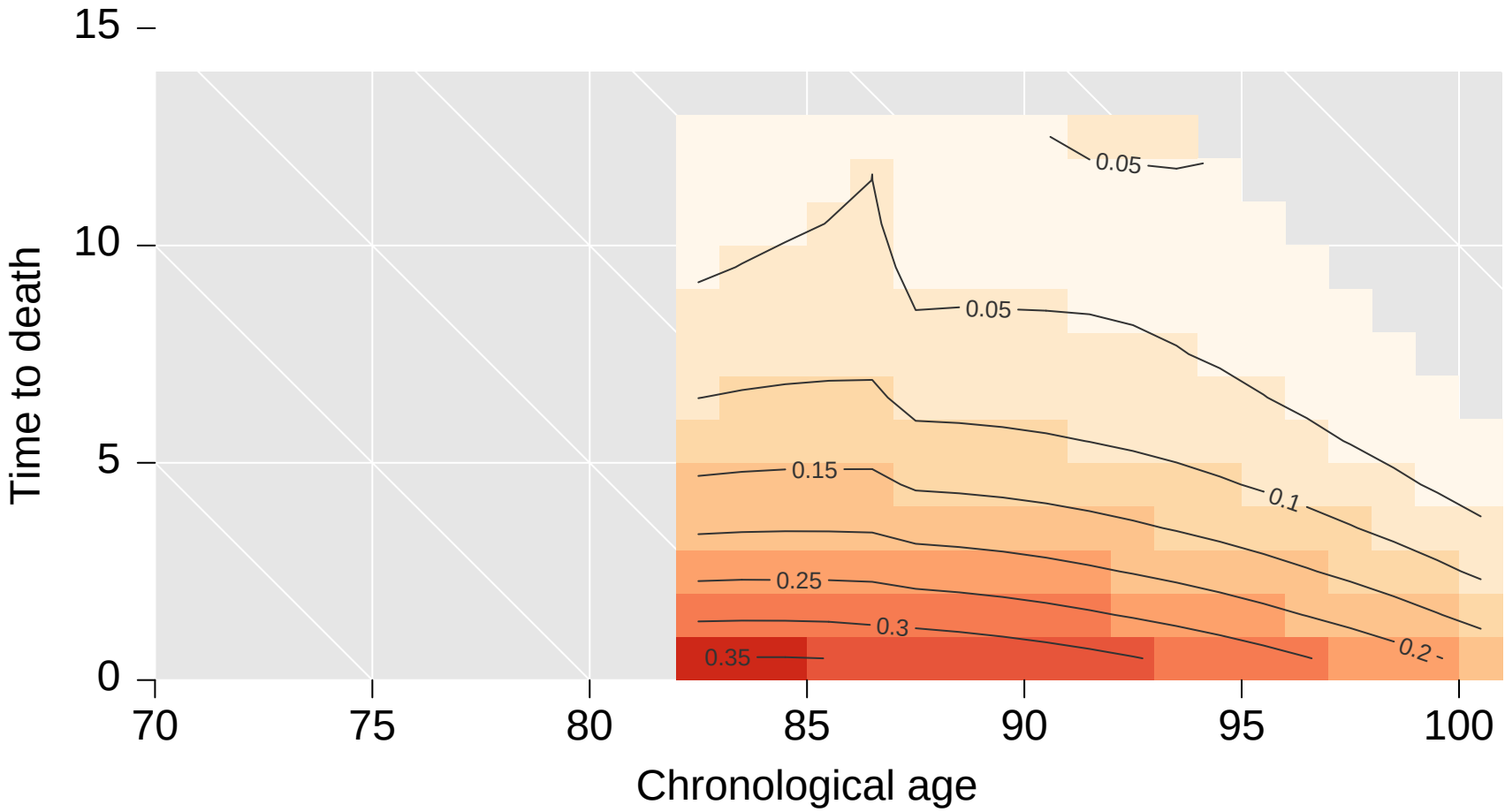
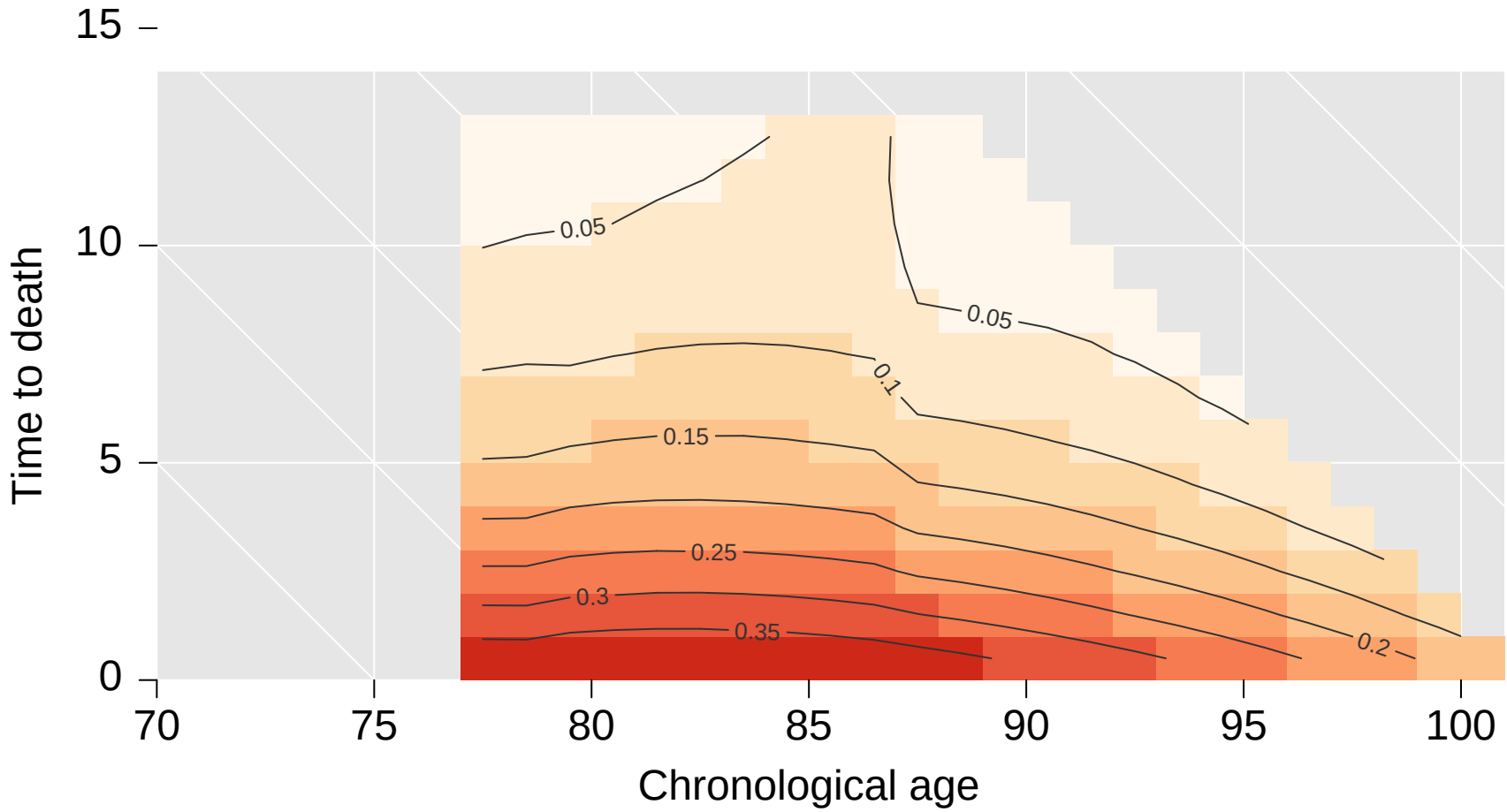
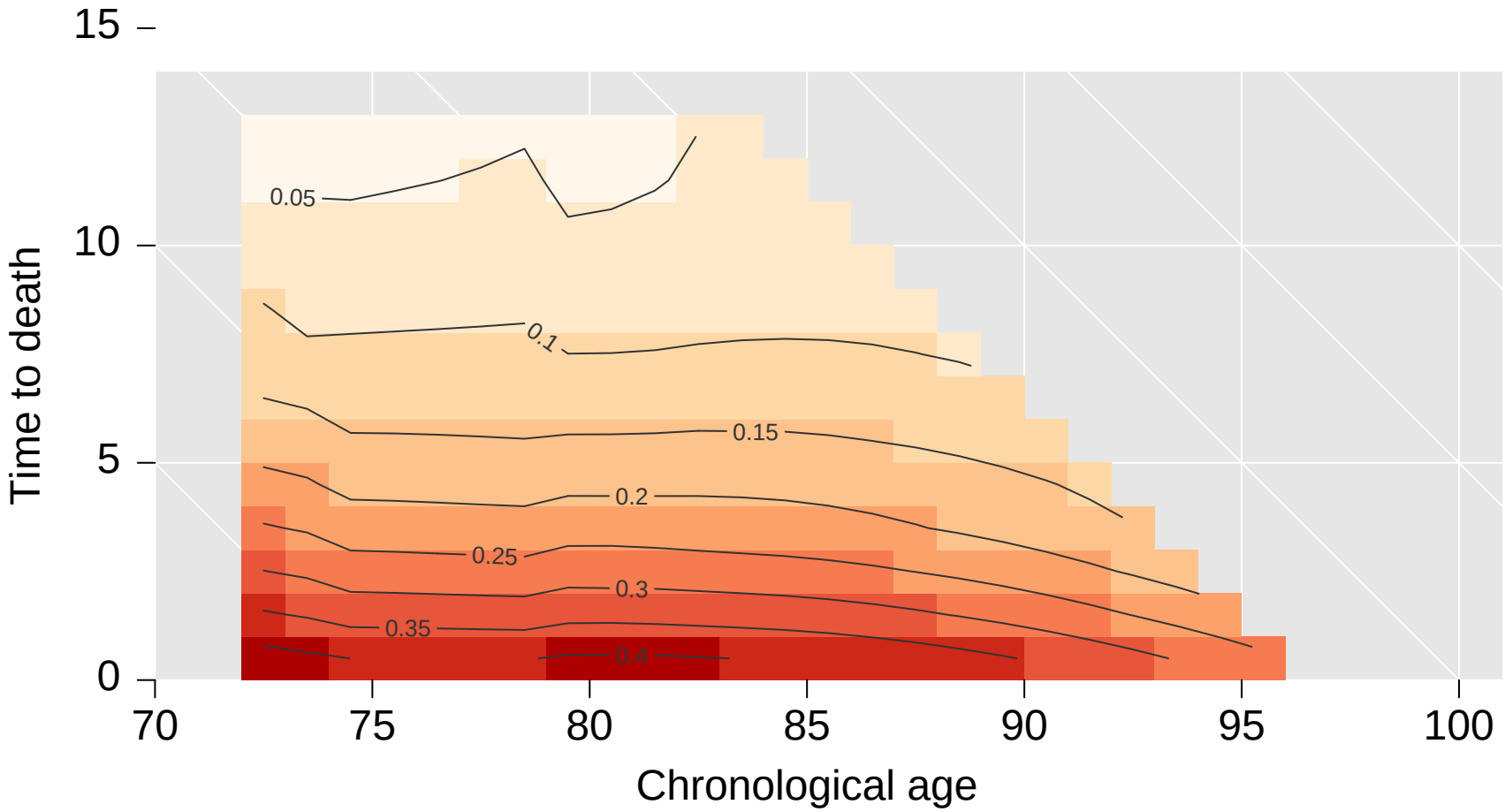
1905 cohort


15
10
5
0
Time to death
70
75
80
85
90
95
100
Chronological age
0.05
0.05
0.15
0.1
0.25
0.3
0.2
0.35

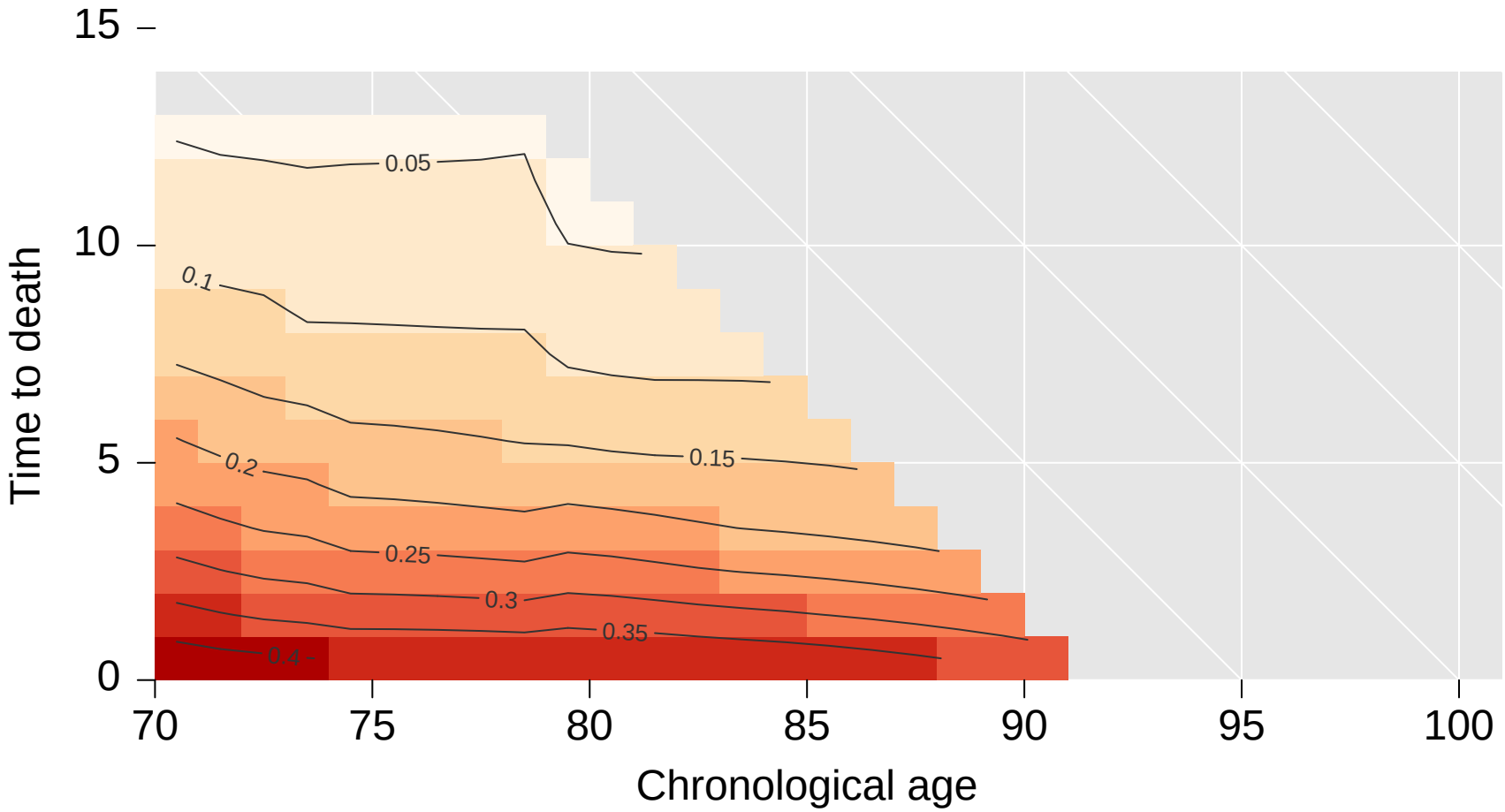
1910 cohort, looking pretty similar



1915 cohort, looking pretty similar



1920 cohort, looking pretty similar



1925 cohort, looking pretty similar