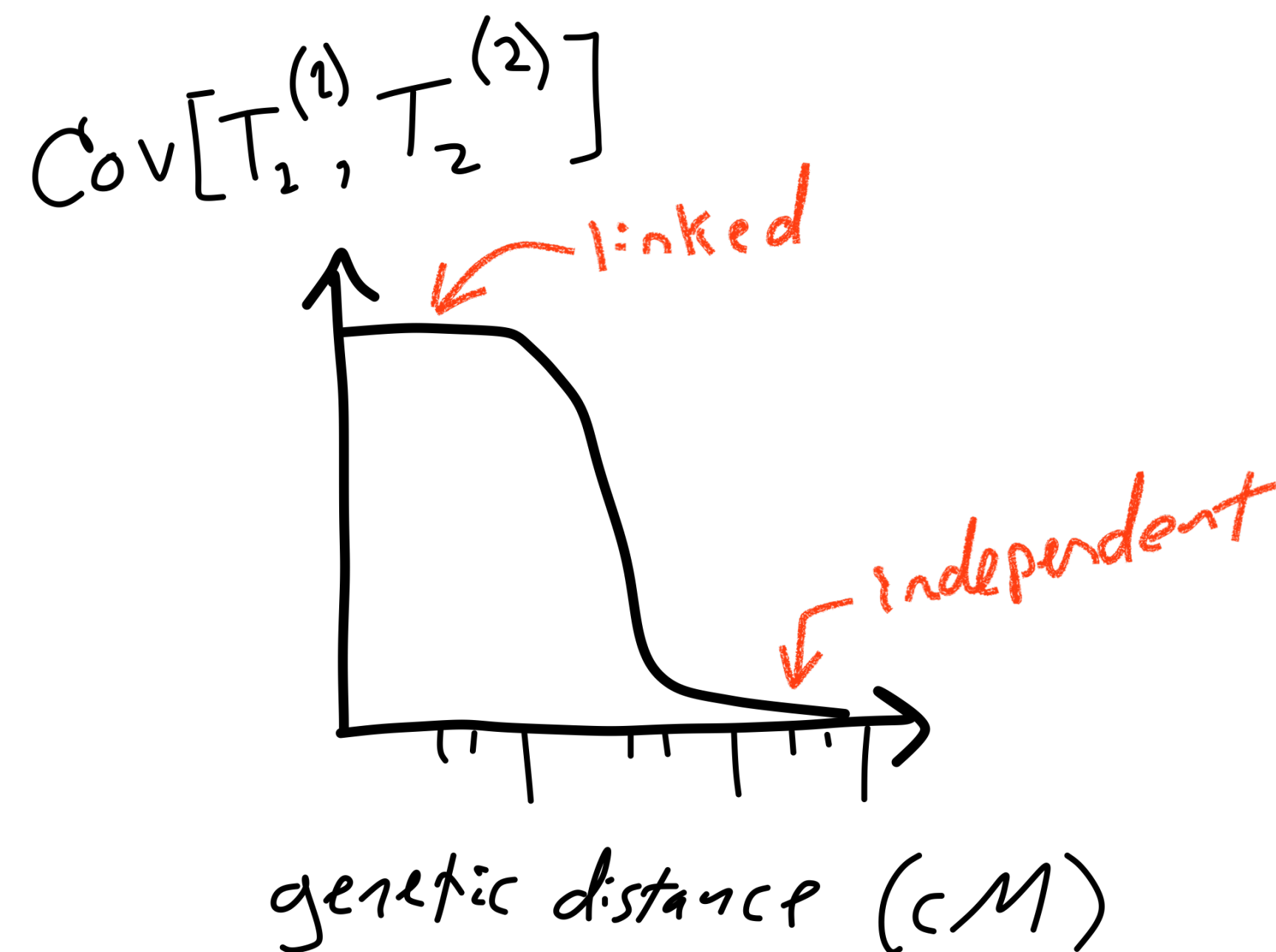
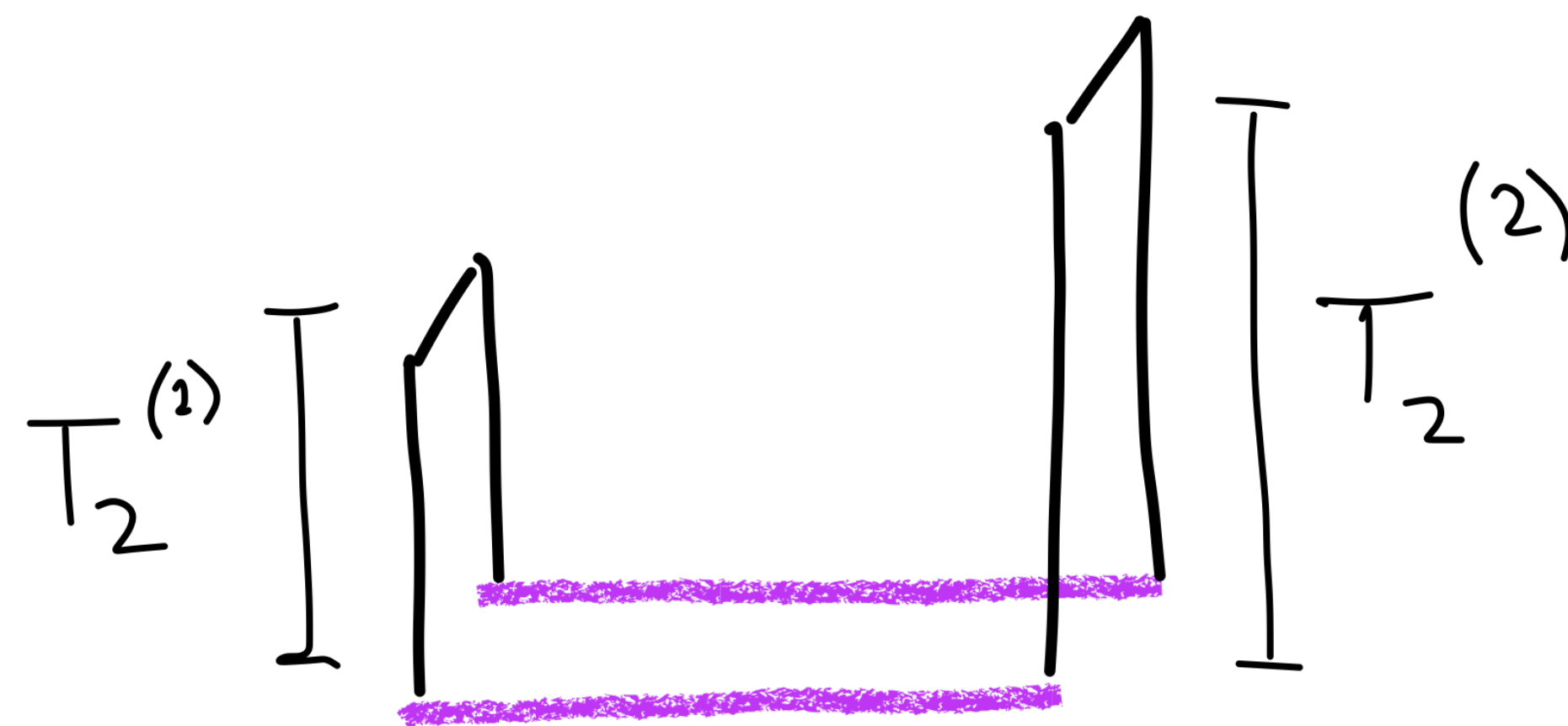


Decay of linkage

Larger genetic distance
 \Rightarrow recombination more likely



Deeper coalescence
 \Rightarrow shorter span

$X/t \sim \exp(4Nr t)$

genetic dist. to recomb.

recombination rate

T_{MRCA}

A diagram showing a single vertical lineage. A horizontal purple line is drawn across the lineage. Above the purple line, a vertical segment is labeled T_{MRCA} . The purple line is highlighted in purple.

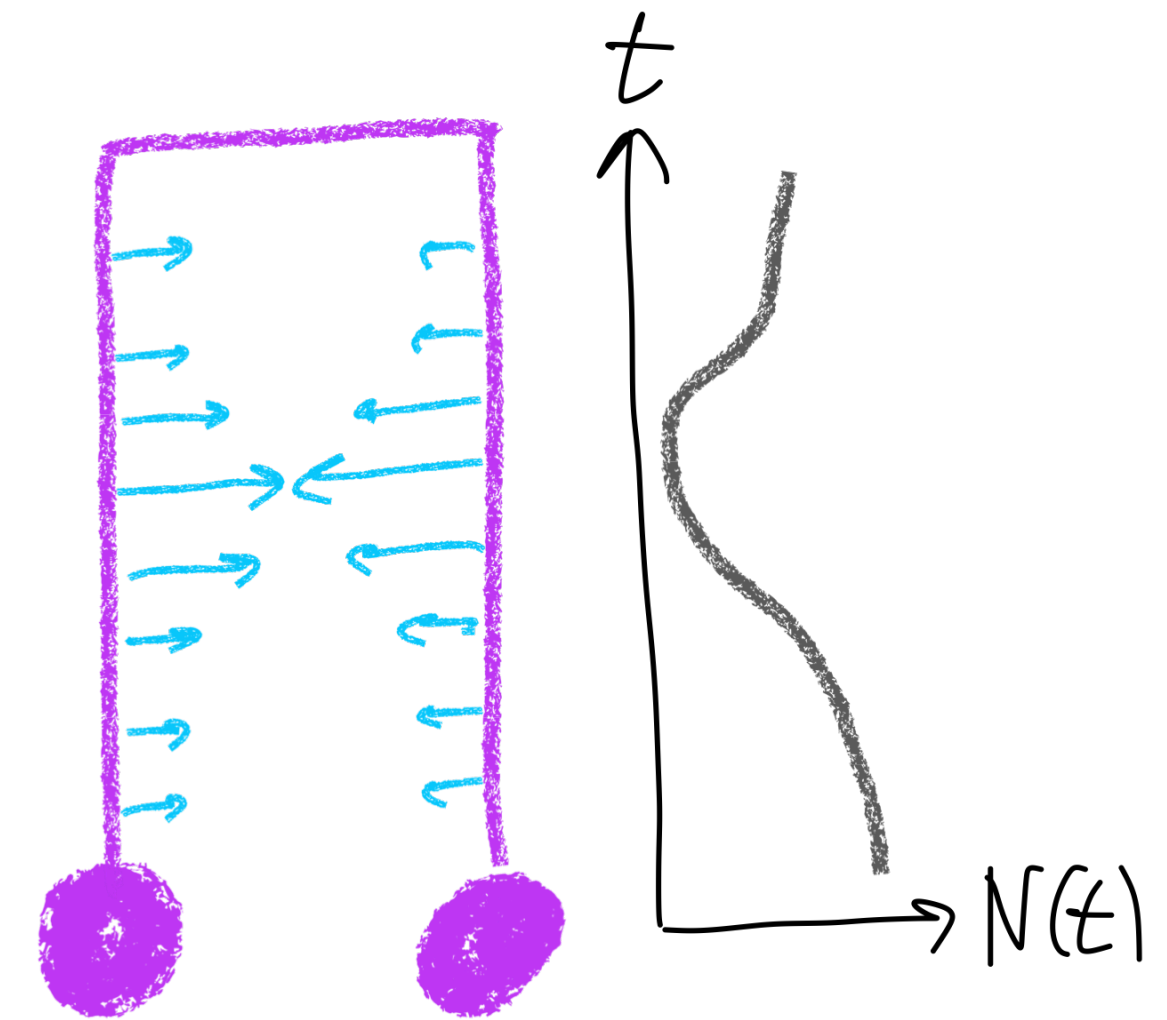
Previously on...

Population size determines coalescence rate

What if population size varies over time? $N(t)$

$N(t)$ distorts time scale
from the standard coalescent

- time compressed when $N(t)$ is small
- time stretched when $N(t)$ is large



The details:

$$P(T_i = t_i) = \frac{\binom{i}{2}}{2N_{t_i}} \prod_{j=2}^{t_i-1} \left(1 - \frac{\binom{i}{2}}{2N_j}\right)$$

$$\xrightarrow{\text{big } N} p(t_i) = \frac{\binom{i}{2}}{2N(t_i)} e^{-\binom{i}{2} \int_0^t \frac{ds}{2N(s)}}$$

inhomogeneous Poisson process