



(Half-)Sib Pairs for mammals and perhaps beyond



Mark Bravington, CSIRO: June 2021

O&A
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HSPs: *Humungodon scarii*

Adults rarely sampled;

- juves in gillnets

Ageable from vertebrae

No litter-size / body-size link

Gestation < 1yr; mature @ 4
HSPs only

$$N_{t+1} = N_t e^{\lambda t}$$

RoI : λ



Genetics: stuff you *must* know

POPs: found 100% reliably

FSPs: found 100% reliably

HSPs:

- look just like GGP and FTPs
- FTPs rare ..?
- GGP pickable based on birth-gap
- MHSPs can be split from PHSPs -- mtDNA
- HSPs overlap with weaker kin eg HTPs
- can *exclude* the latter by Thresholding...
- ... with False-Neg rate ...
- ... which is *estimable*, provided you found enuf HSPs
- Weaker kin (HTPs etc): can't reliably find
- **Don't** be tempted to use "maybes"

HSPs: *Humungodon scarii*

Acme Archipelago

accurate age data

used “juves” up to age 6

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HSPs: *Humungodon scarii*

Takehomes from Acme Archipelago

1. Very simple!
2. Exclude same-cht based on age
3. Limit comps to avoid GGP risk



HSPs: what's wrong with same-cohort comps?

Equations ...

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Equations ...

- “Lucky litter” effect: *variance* affects mean

$$\mathbb{E} [\text{sib-pairs whose Mum is Mary}]$$

$$\propto \mathbb{E} [R_{\text{Mary},b1} \times R_{\text{Mary},b2} | \text{Mary}]$$

$$= \mathbb{E} [R_{\text{Mary},b1} | \text{Mary}] \times \mathbb{E} [R_{\text{Mary},b2} | \text{Mary}] \text{ iff } b_1 \neq b_2$$

- (Sampling artefact from schooling ?)

HSPs: *Humungodon scarii*

Coast of Confusion

Pyrolytic enfumeration...

... imprecise age

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HSPs: *Humungodon scarii*

Imprecise age on HSPs: **PITA** !

Either: restrict “age” range in HSP
comps to exclude same-cht

or: model extra kintypes:

- “lucky litter” effect
- FSP
- multiple-paternity

And: sum over possible ages a la POPs

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- juves in gillnets
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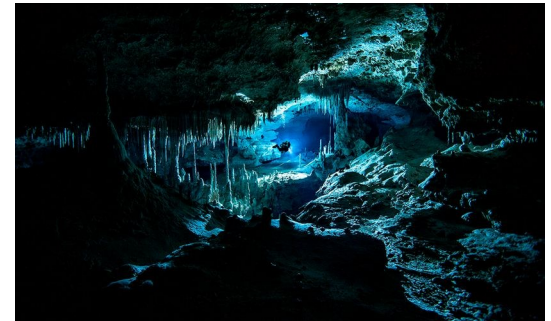
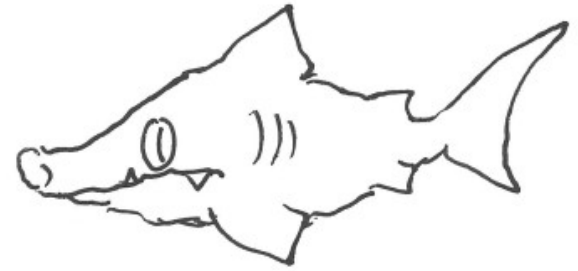
HSPs: Cave shark

Speleosqualus territorissimus

Breeding females: solitary cave-dwellers, litter size ~2

Males small

Caveless females don't breed

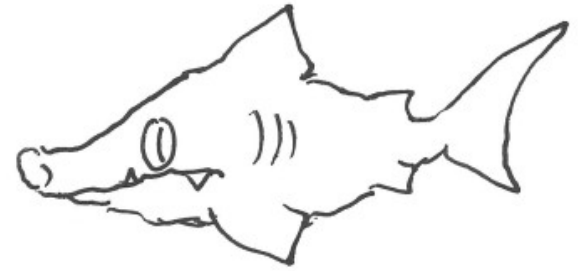


HSPs: Cave shark

Speleosqualus territorissimus

Takehomes from Cave Sharks

1. HSPs can be *delicate*
2. MHSPs => abund of *cave-dwellers*
3. PHSPs: there aren't any !



HSPs:

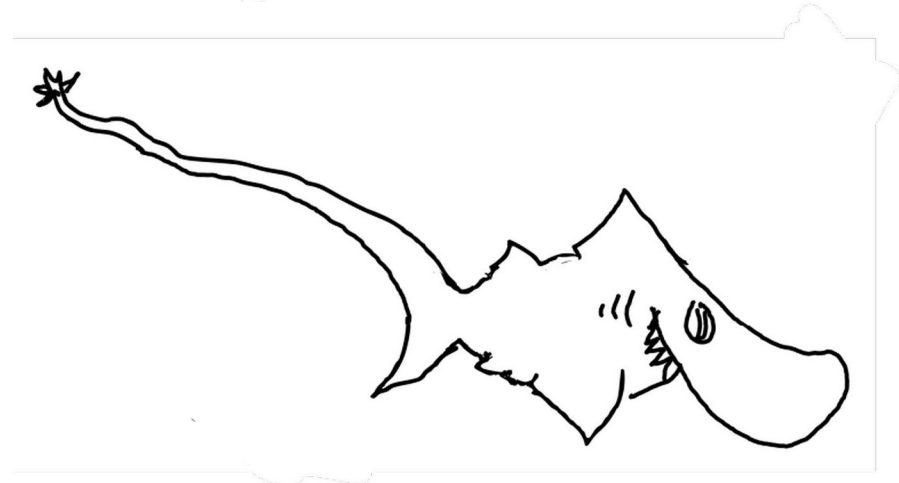
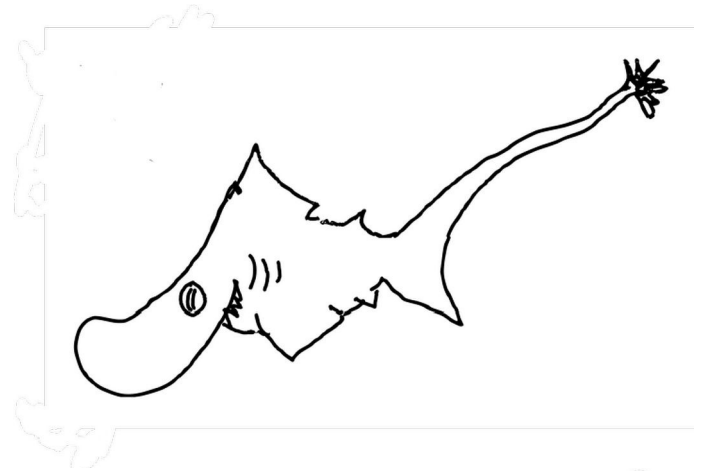
Moominshark

Rhinormus janssonae

Little is known about this enigmatic dweller of the depths...

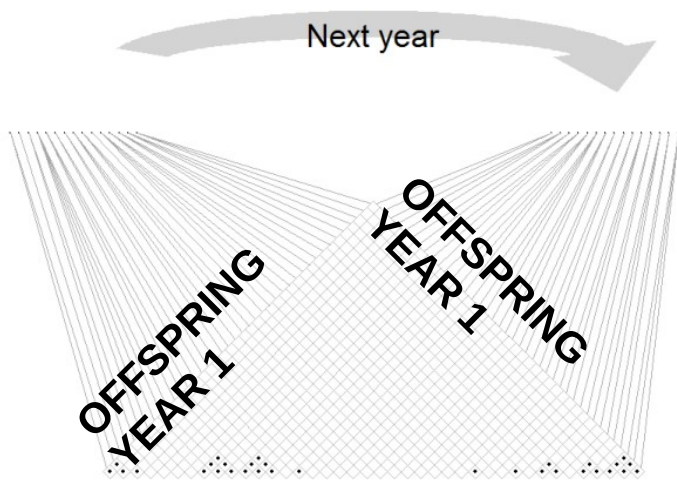
Apparently big litters

Only juves are regularly caught



What do HSPs tell you ?

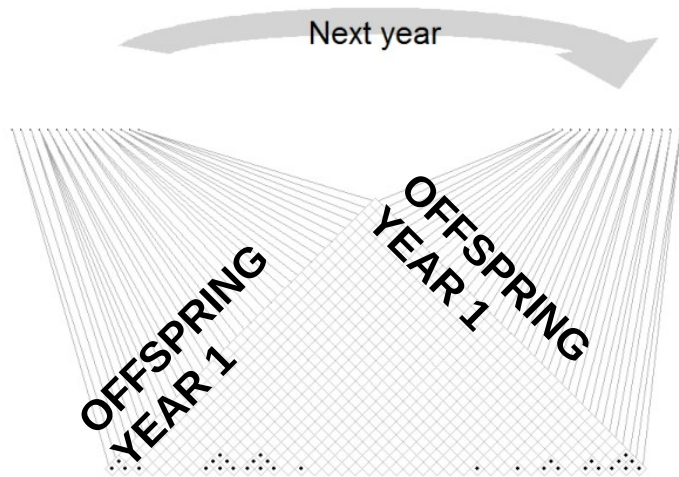
- Time-gaps between birth => adult survival ie Z tho NB growth/fec
- Abundance: not what you think! unless all adults similar, eg “mammals”



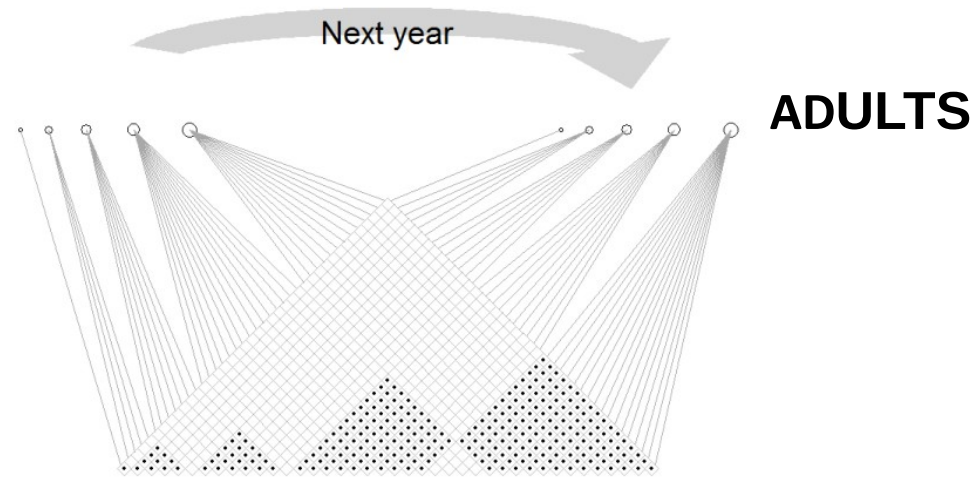
Scenario 1: lots of *young* adults

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Scenario 1: lots of *young* adults

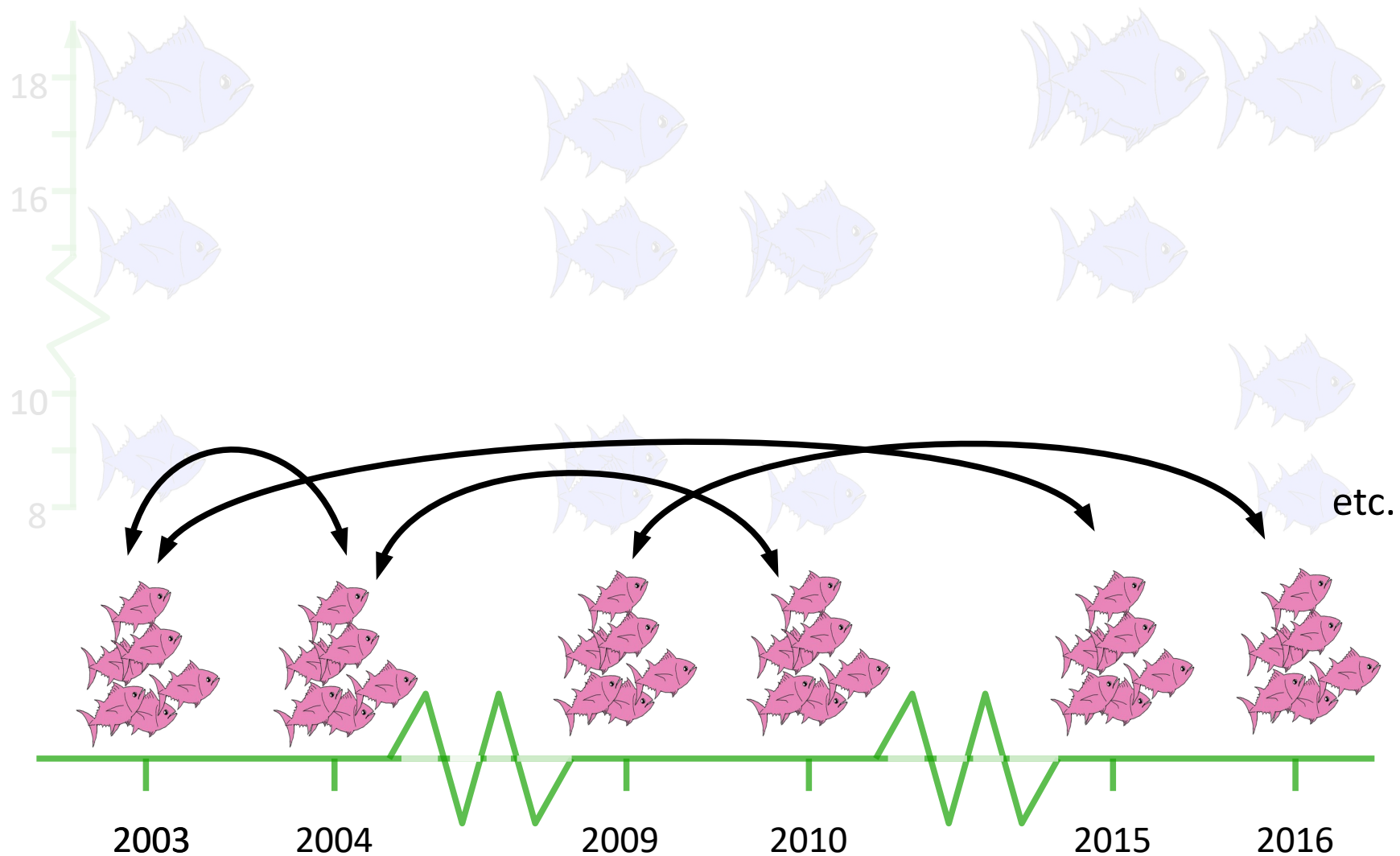


Scenario 2: fewer adults, but older

- Both scenarios have same TRO and same fec-at-age
- but very different numbers of HSPs

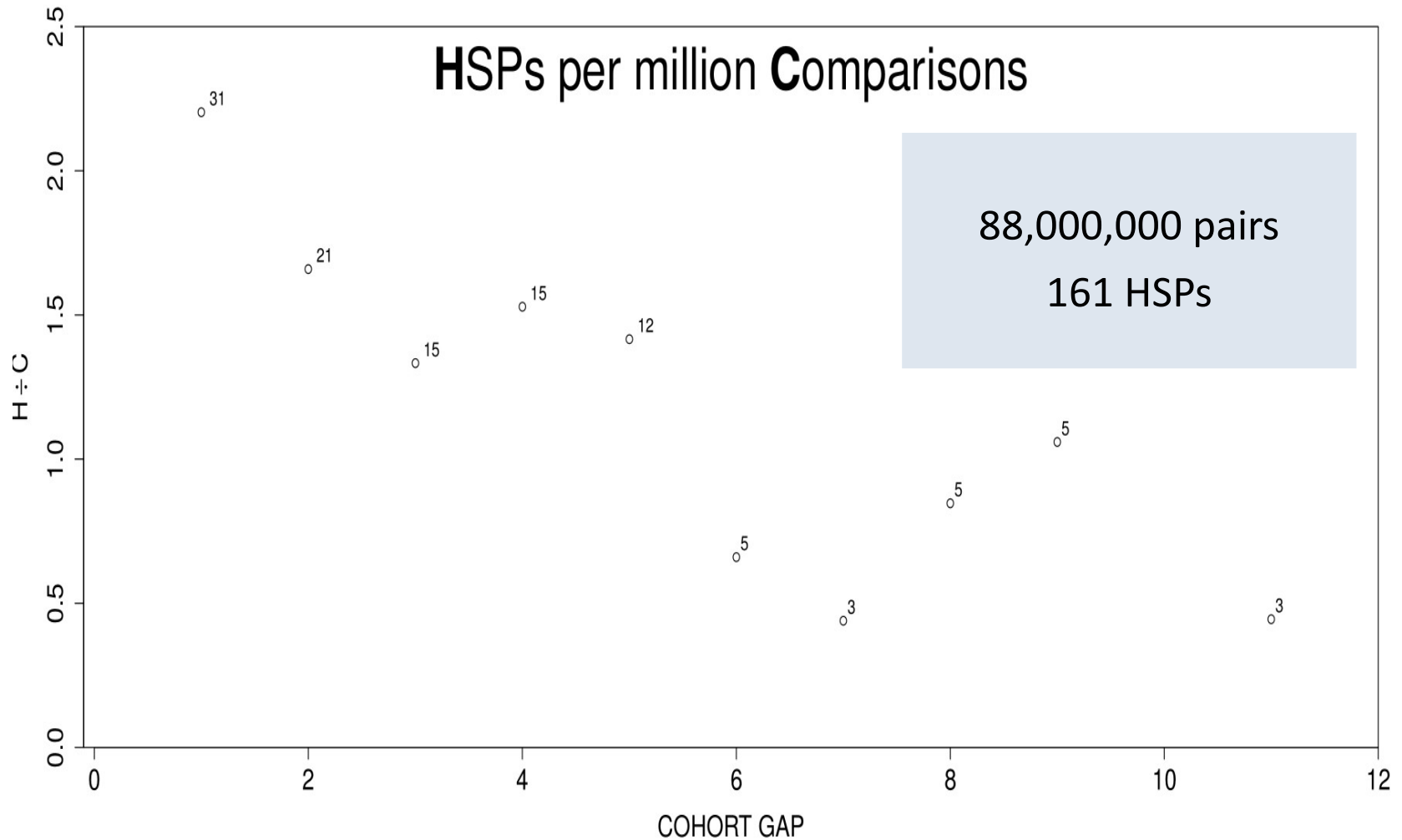


SBT: information from **HSPs**



Don't use HSPs on their own, unless it's a “mammal” ...

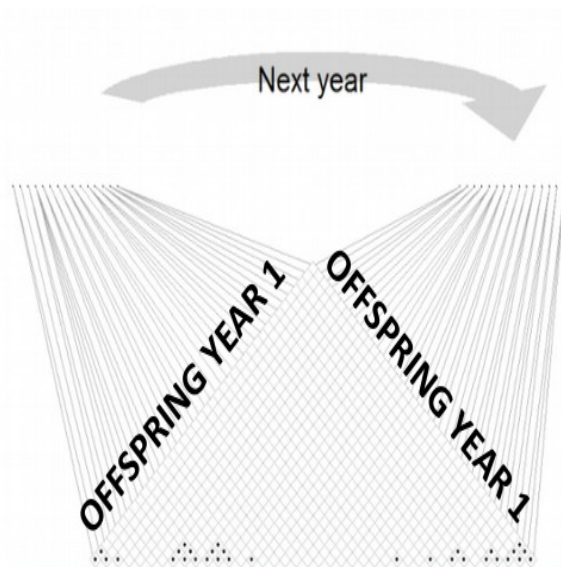
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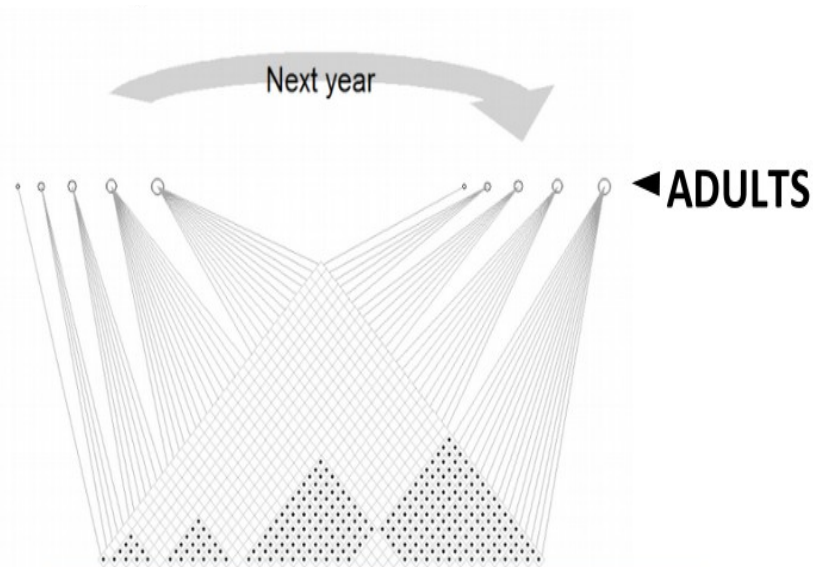
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SBT: information from HSPs

- Time-gaps between birth => adult survival but, watch out for *growth*
- Abundance: no *direct* interpretation
 - **unless** all adults are similar: "mammals"



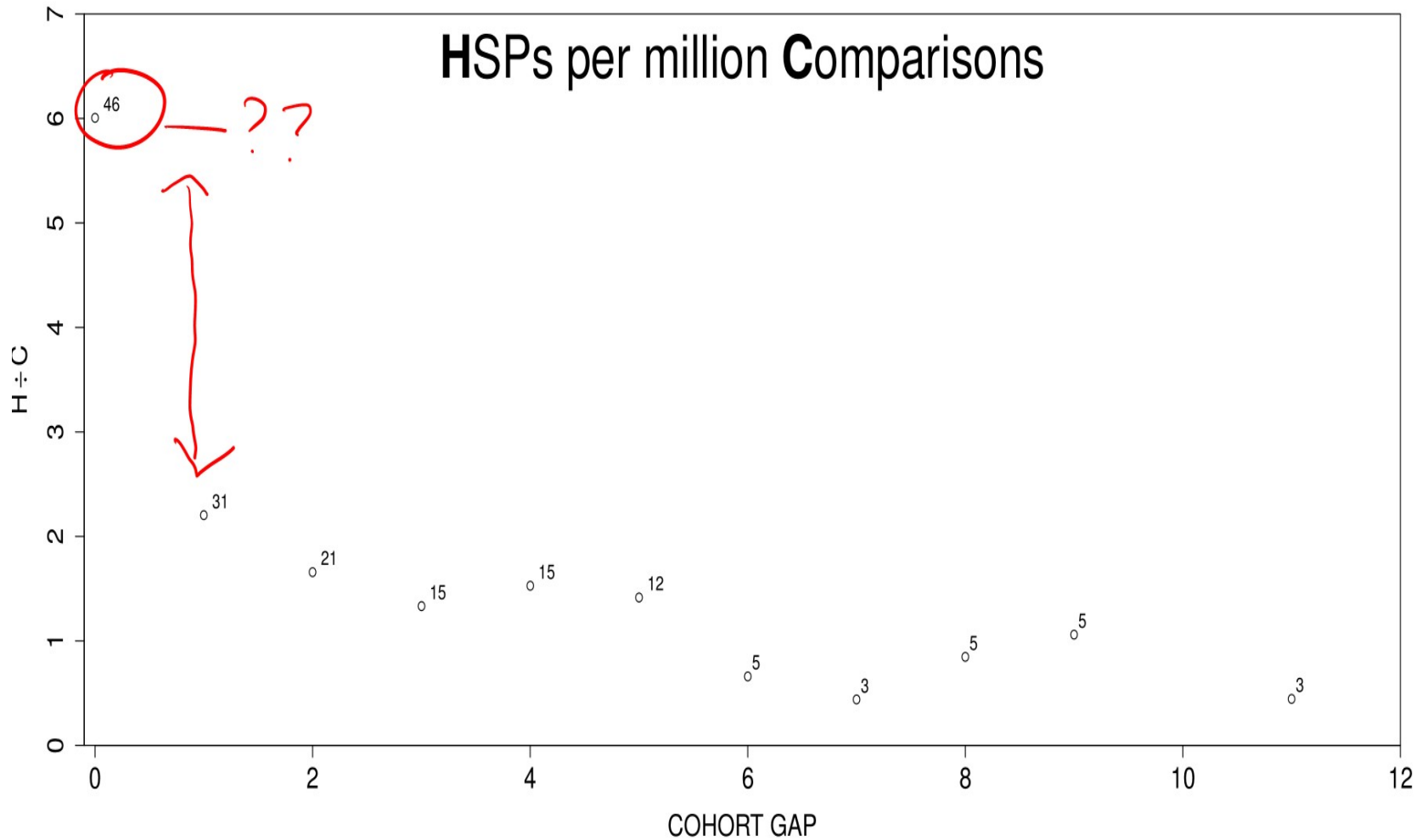
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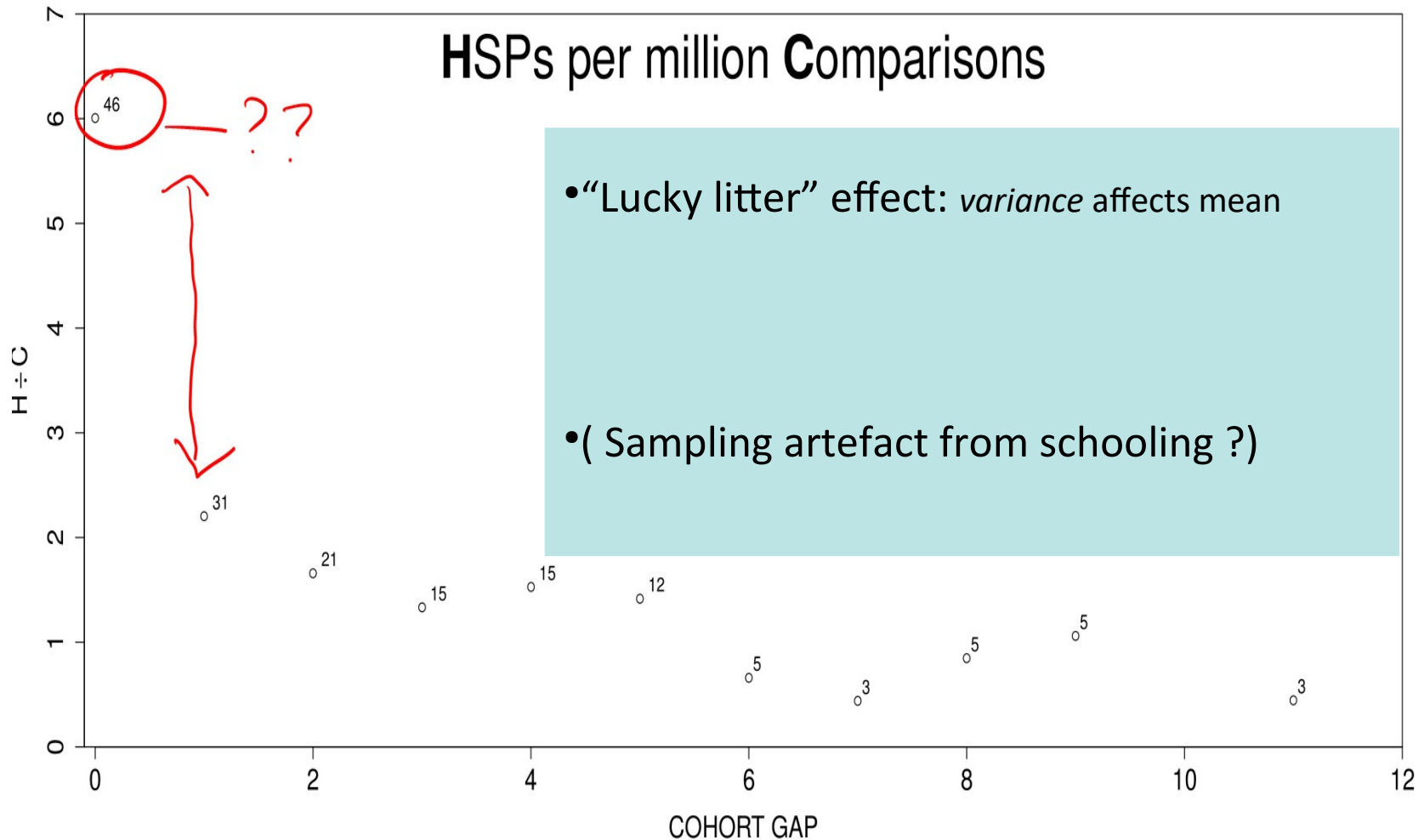
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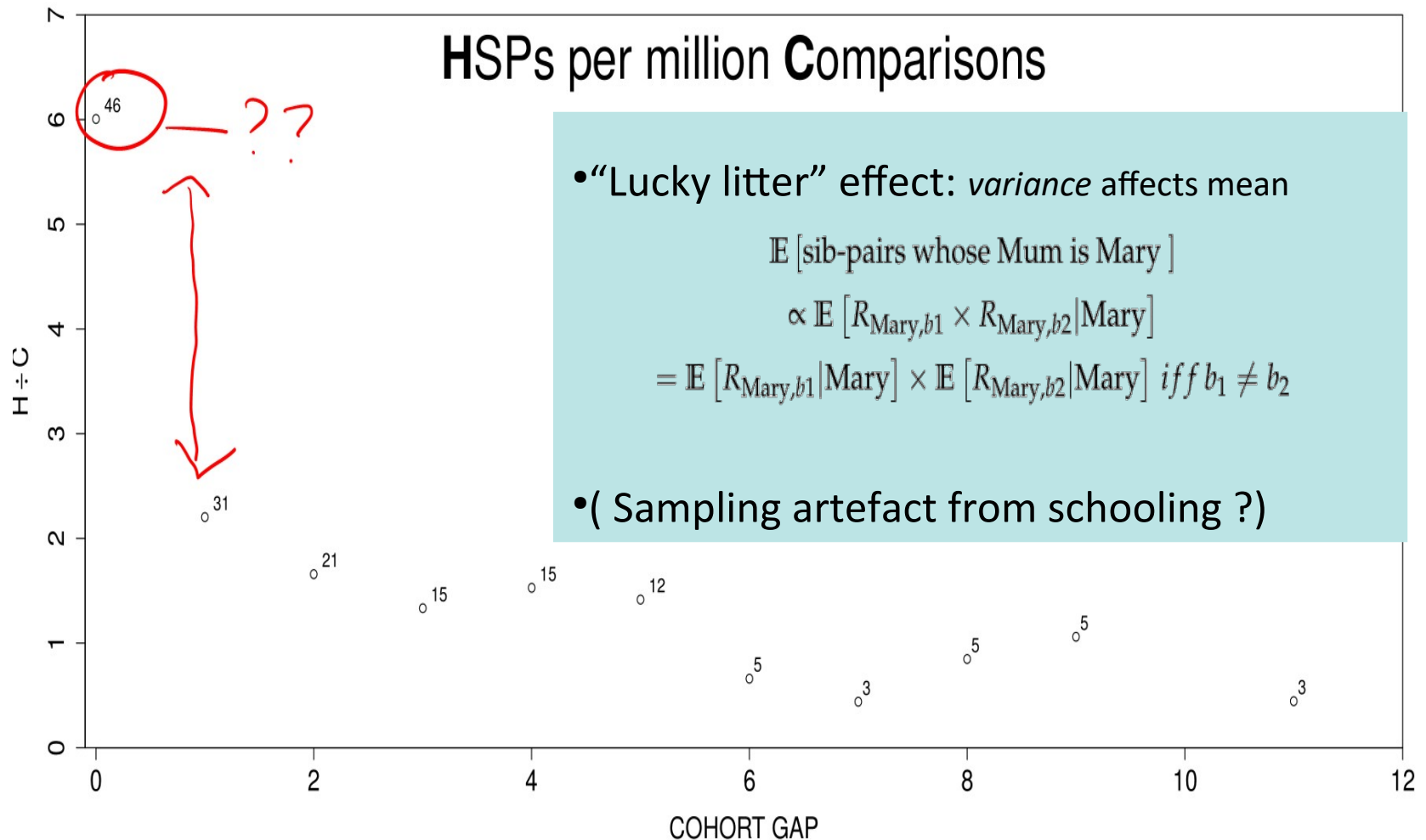


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Never use same-cohort comparisons !

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