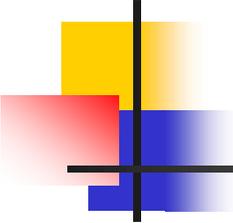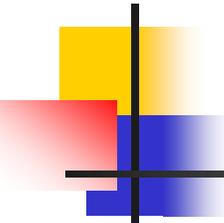# How to find the unexpected

Gunnar Bjune

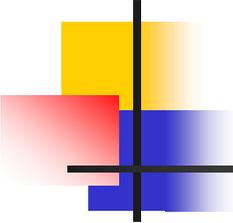2019

# Some principles

- "The expected" (old dogma?) needs checking and rechecking

- "The unexpected" (random phenomena?) could be true! But will need more efforts to be accepted

- "The unexpected" will not be detected unless you look for it!!!!! – But how????
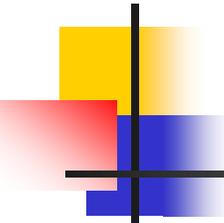
# "Mantra"

- If I find the expected – repeate and confirm/refute (the p-value is still only probability!)
- If I find the unexpected – believe it! (but do not turn "spiritual")

- But if I find the unexpected, I will have to convince *the conservative ones*

# Quantitative tricks

- When you digitalize your data, think of NOTHING but <span style="color:red">quality of the transfer</span>
- Do correlation plots and identify <span style="color:red">"out-layers"</span>
- Do (all) possible <span style="color:red">cross tabulations</span> and contemplate all unexpected significant associations
- Look at all risk-/protective <span style="color:red">factors independently</span>, some might have shifted side!
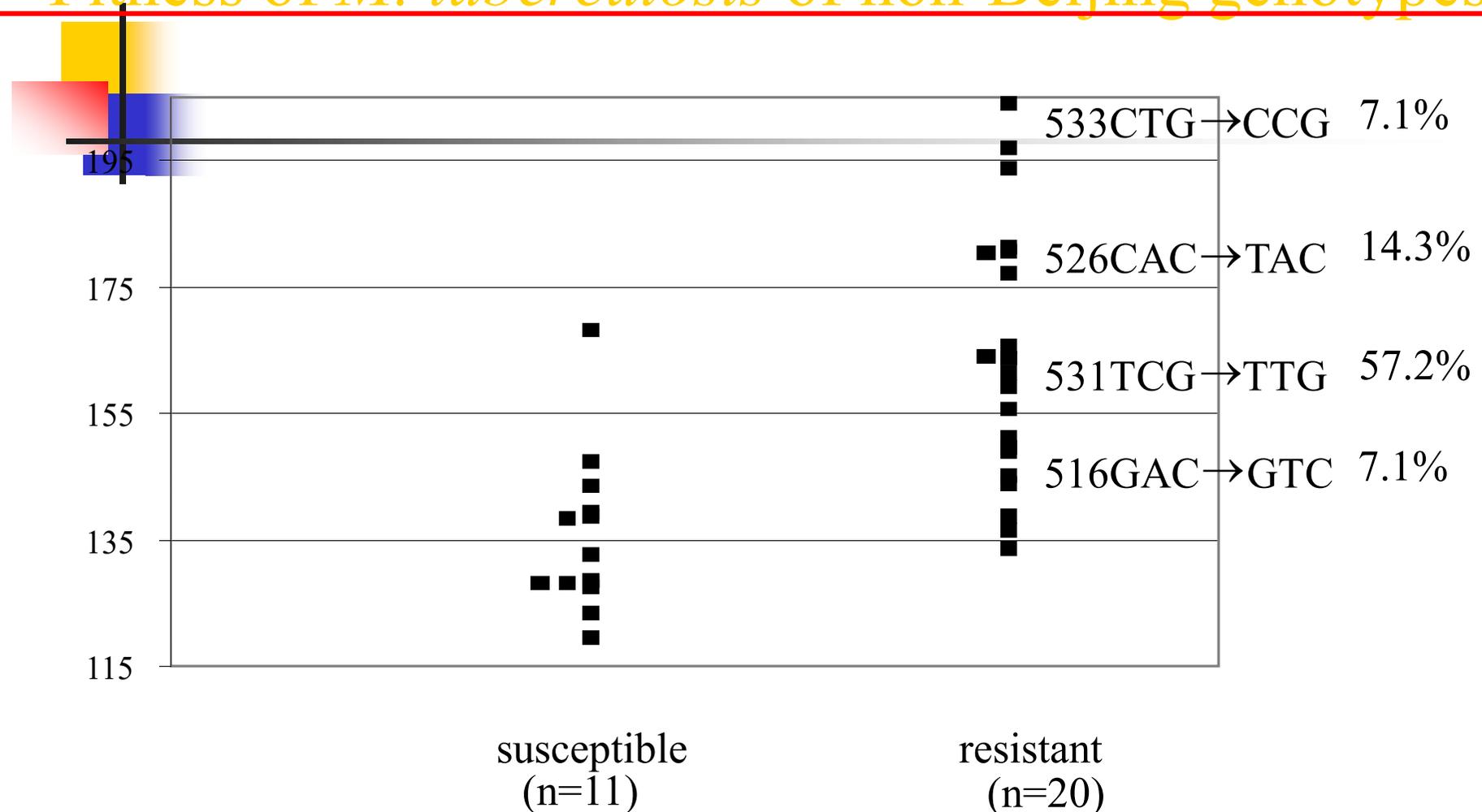- Don't forget the <span style="color:red">null-hypothesis!</span>

# Risk factors <-> protective factors

- Over-weight – risk for Type 2 DM (all)
- Over-weight – protective ------ (some)

"Over-weight is a risk factor where it is stigmatizing and a protective factor where it gives status" Akhtar Hussain
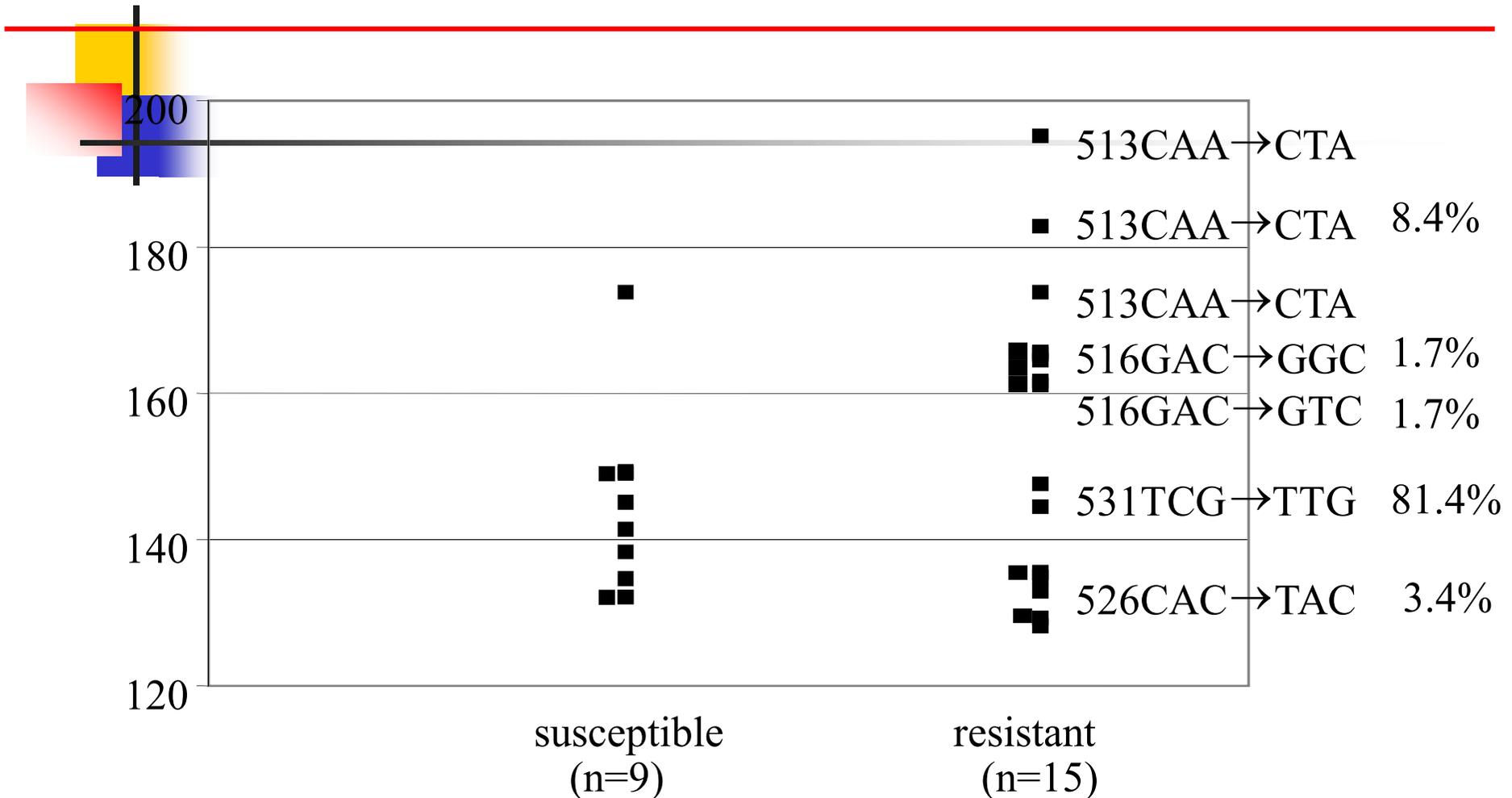
"Positive deviants method" – "success factors"

# Fitness of *M. tuberculosis* of non-Beijing genotypes



533CTG→CCG 7.1%

526CAC→TAC 14.3%

531TCG→TTG 57.2%

516GAC→GTC 7.1%

susceptible
(n=11)

resistant
(n=20)

The mean time necessary to reach 200 units of growth:
susceptible 136.1 hours  (95%CI 126.9-145.3)
resistant 162.6 hours (95%CI 152.9-172.2)  *P* = 0.001

Olga Toungoussova

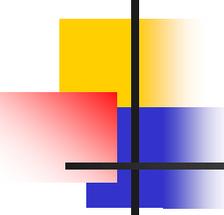# Fitness of *M. tuberculosis* of the W-Beijing family



The mean time necessary to reach 200 units of growth:
susceptible 143.9 hours  (95%CI 133.9-153.9)
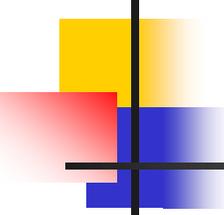resistant 154.8 hours (95%CI 143.4-166.3)  $P = 0.17$

Olga Toungoussova
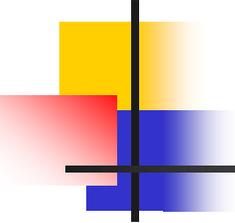
# "Lunatic cross tabulations"

- Vaccine coverage / gender (n.s.)
- Incomplete vaccination / gender (f>m)
- No vaccination / gender (m>f)

- The "answer" was in 1-2 in-dept interviews and confirmed in FGDs
  - Jagrati Jani's Mphil thesis from Mozambique

# Qualitative tricks

- Follow the method!
- Close your eyes and try to revitalize the events
- Write down your "prejudices" and challenge them one by one during the analysis
- Be willing to change your whole theory
- When you have "used" the data – look again at what you have NOT used!

# "The key"

- Let some fellow student(s) see your data and discuss what they might mean (translations, role of your person etc.)


- (If you have time) do a literature review with the same key words as before and identify/read what has been published since you wrote your protocol

The Tree of Wisdom