Values And Science

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10-3-13: for K-INBRE

Origins of Immoral Science

- Moral Schmucks:

Can see the consequences of their actions, but do not regard those consequences as morally relevant; i.e. have the wrong moral theory; i.e. are evil.

Tuskegee Study, 1932-1972: Vonderlehr and Shaw

Origins of Immoral Science

- Moral Schmucks
- Moral Imbeciles

  Refuse to think about moral consequences at all.

Thomas Midgley Jr.

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- Tetraethyl Lead as fuel additive to eliminate engine knock

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- Tetraethyl Lead as fuel additive to eliminate engine knock
- Use of CFC's (Freon) as a refrigerant to replace ammonia

Effects

- Egypt:

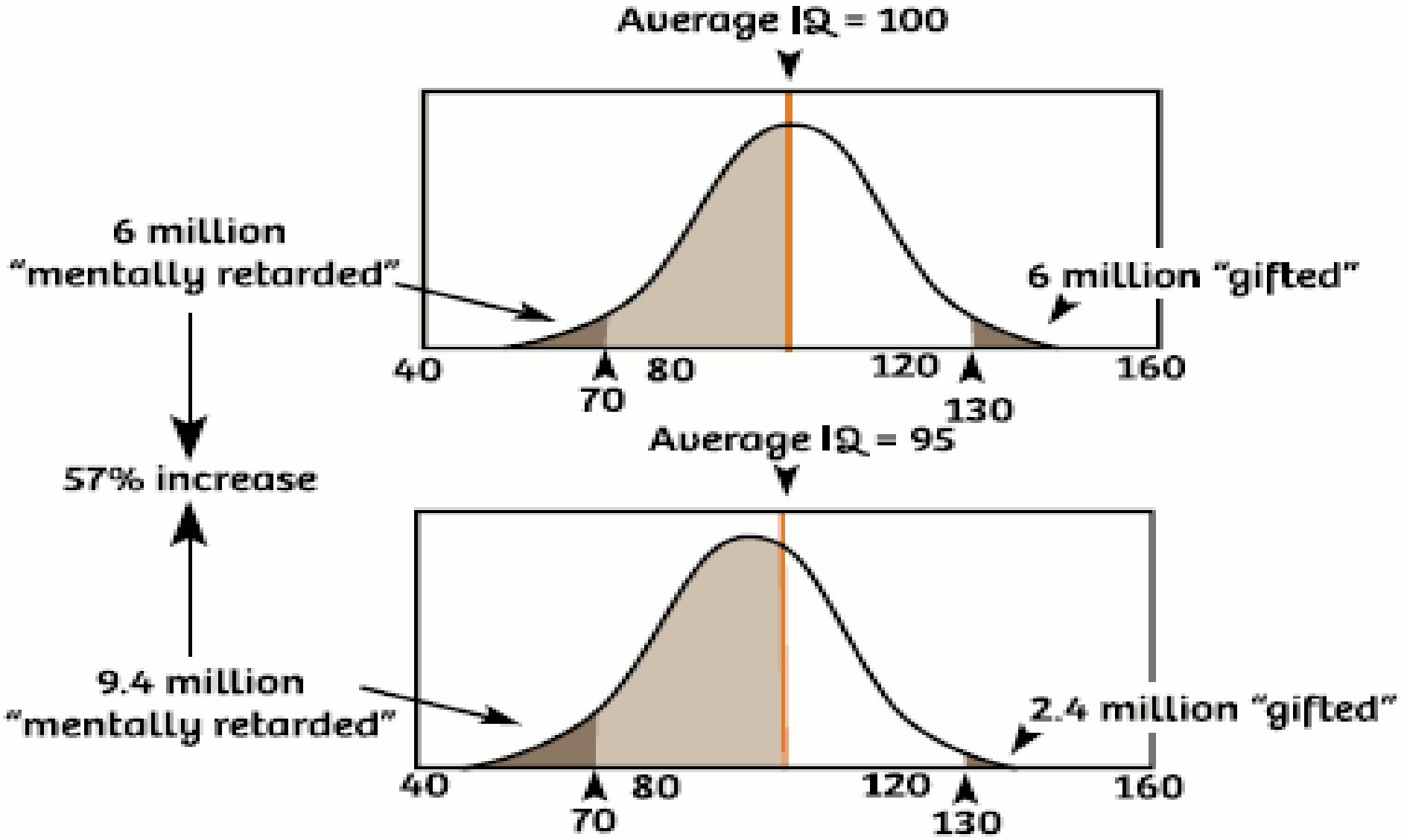
  6,500 to 11,600 heart attacks per year

  800 to 1,400 strokes

  6,300 to 11,100 premature adult deaths, ~820 infant deaths

  average IQ loss ~ 4.25 points

Societal impact of 5-point loss in IQ score



Mt. Sinai Children's Environmental Health

Origins of Immoral Science

- Moral Schmucks
- Moral Imbeciles
- True Believers:

  Want what is good, but are so convinced of their theories they are unwilling to consider evidence that their actions are causing harm.

Cyril Burt

Politically influential in building and maintaining Tripartite System

Crucial role in designing 11plus transfer test

Scientific Claims: IQ is a good measure of intelligence;

IQ is approximately genetically determined

Educational opportunities should be awarded on basis of test scores assessing IQ.

Origins of Immoral Science

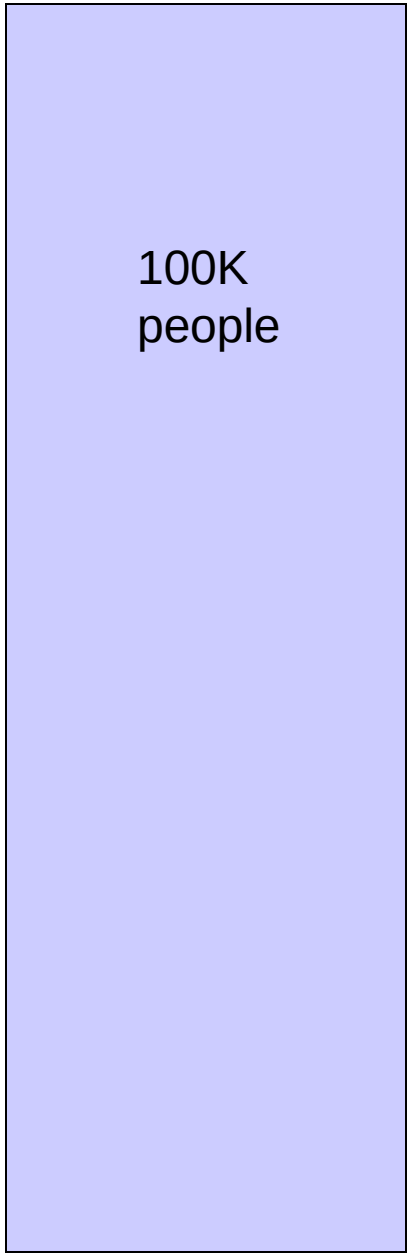
- Moral Schmucks
- Moral Imbeciles
- True Believers
- Change in Inferential Context:

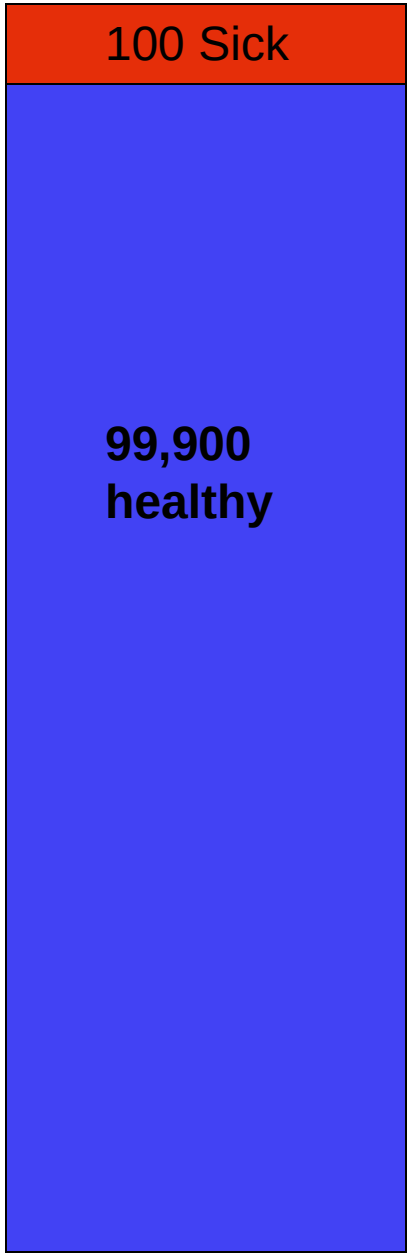
  Can get anyone, if they don’t stop to think.

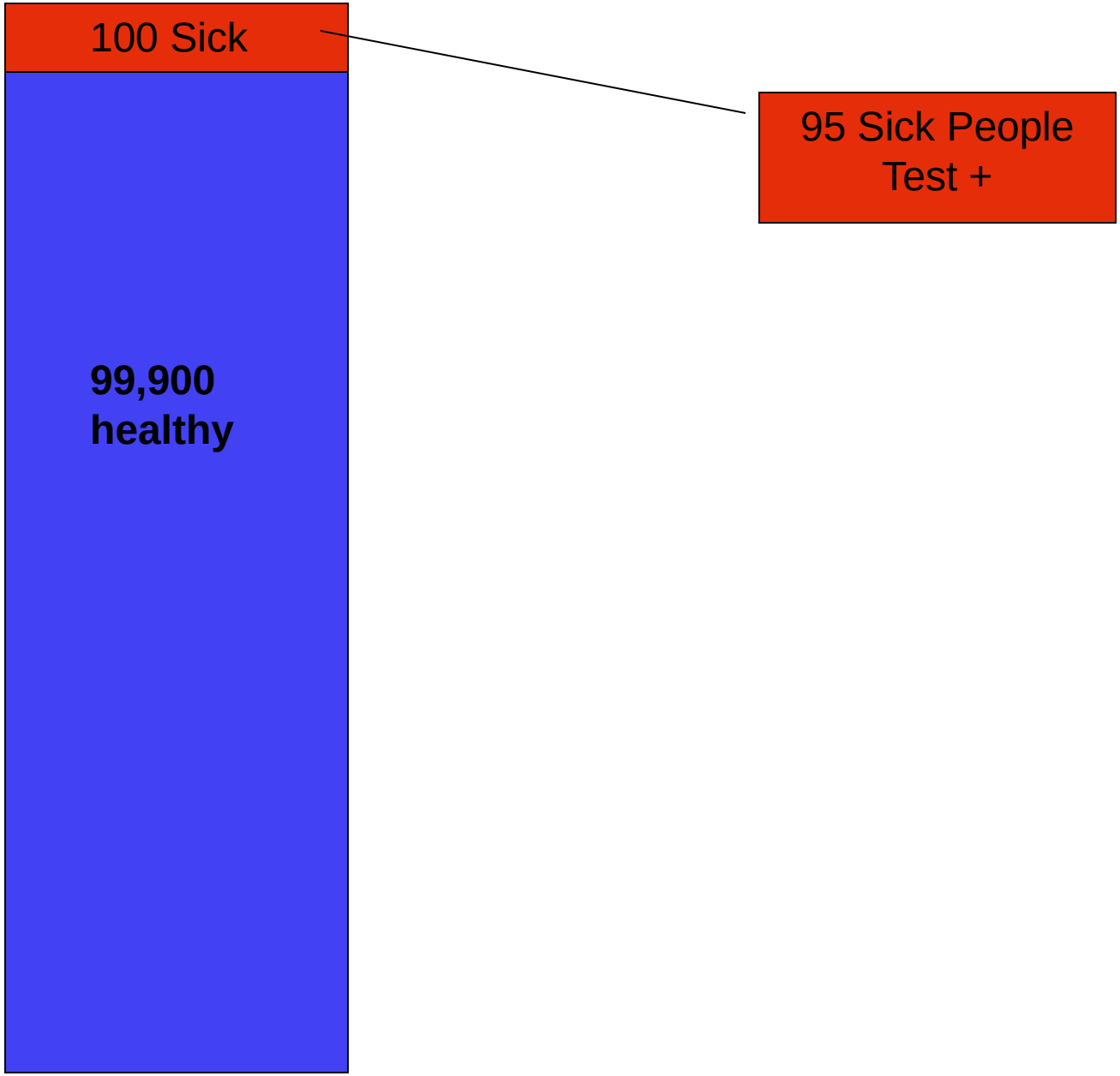
Example

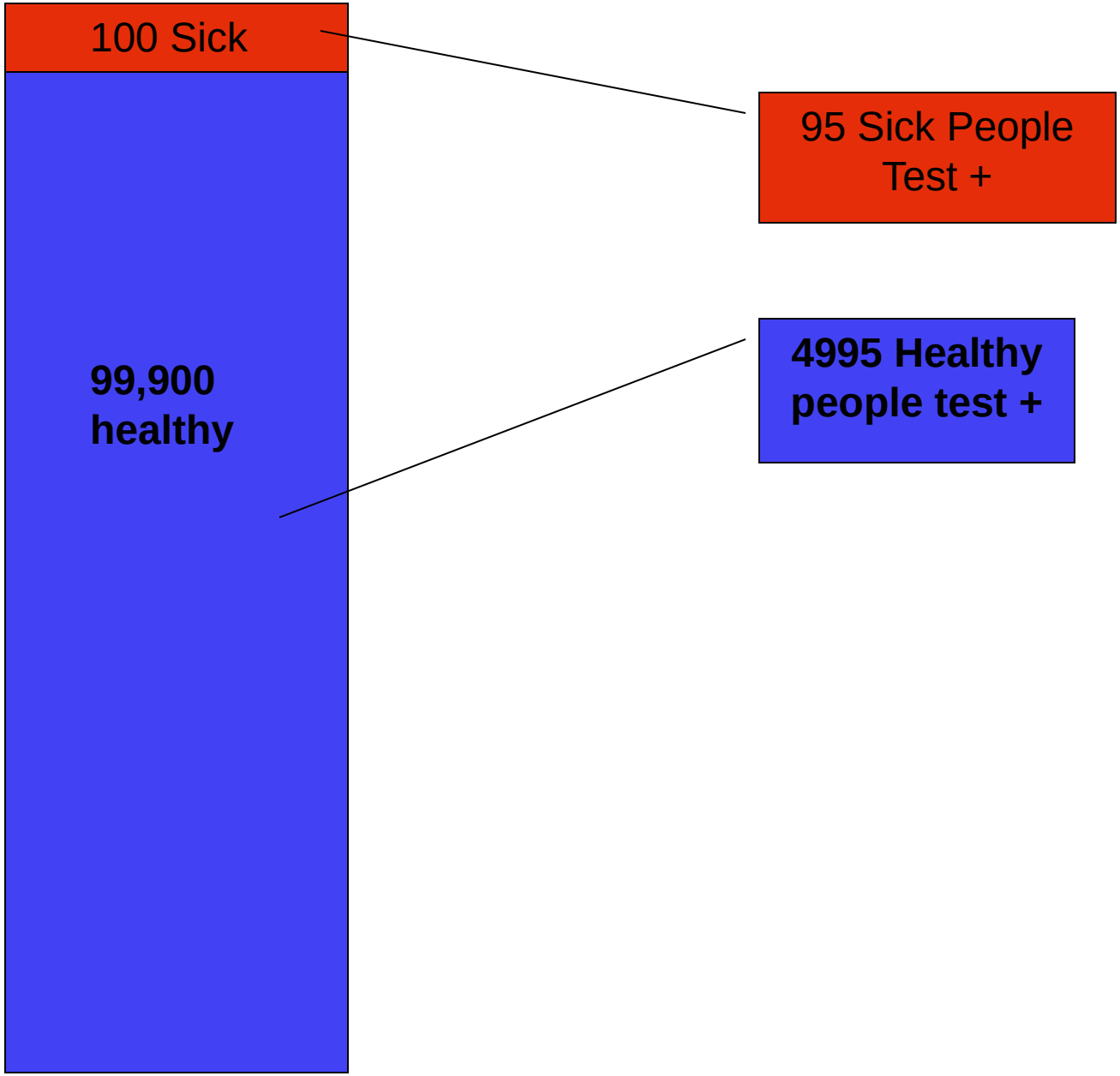
- Design a Medical Test that is 95% reliable– 95% of the time the test result is correct.
- Choice: minimize rates of false positive [Pr(+|~D)] or rates of false negative[Pr(-|D)].

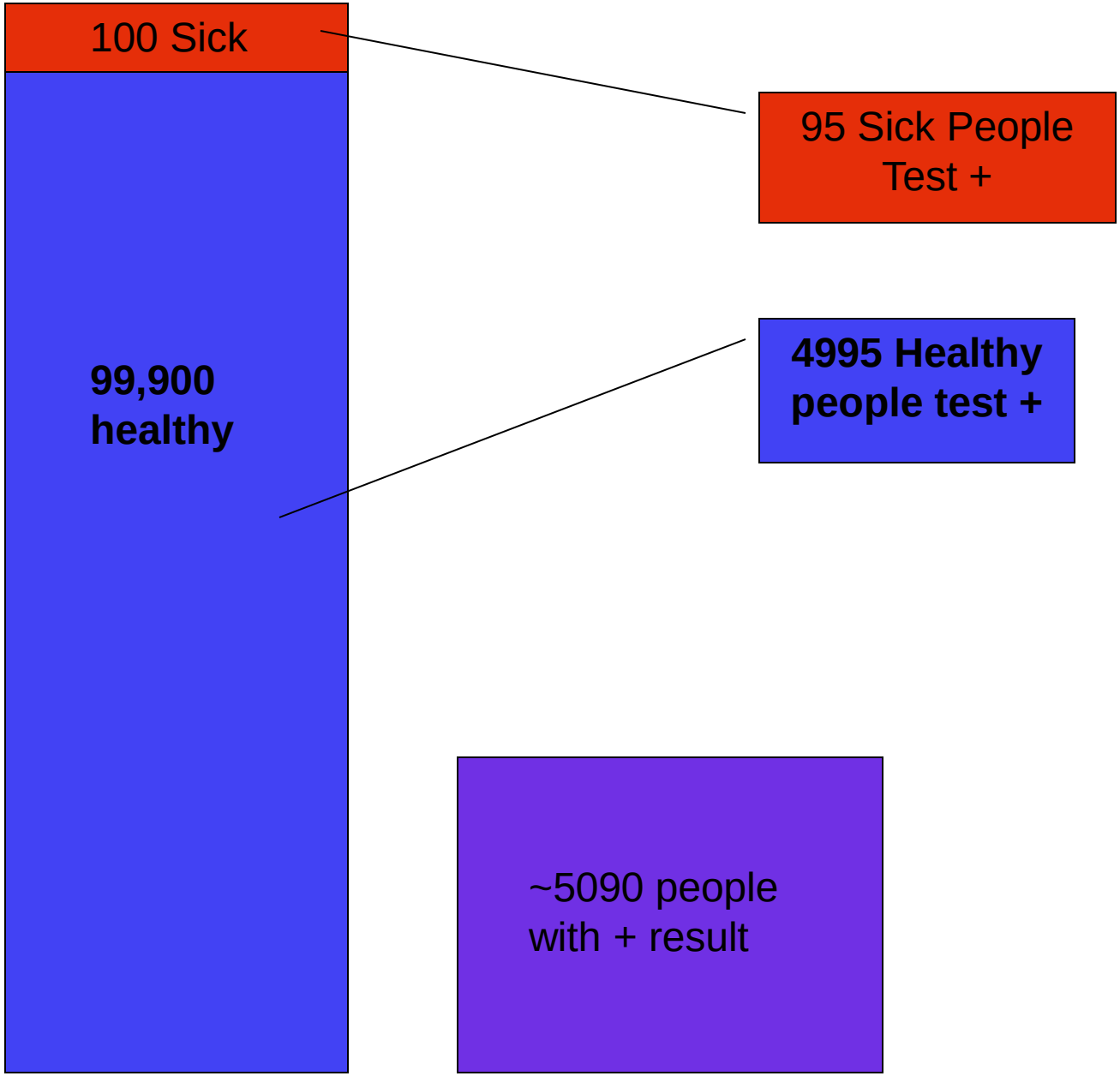
- 1/1000 people have the disease
- Test has equal rates of false positive and false negative, at .05 [so 95% of the time test is correct—either a true positive or a true negative].
- Patient gets a positive result.
- What is the chance that patient has the disease, given the + result?

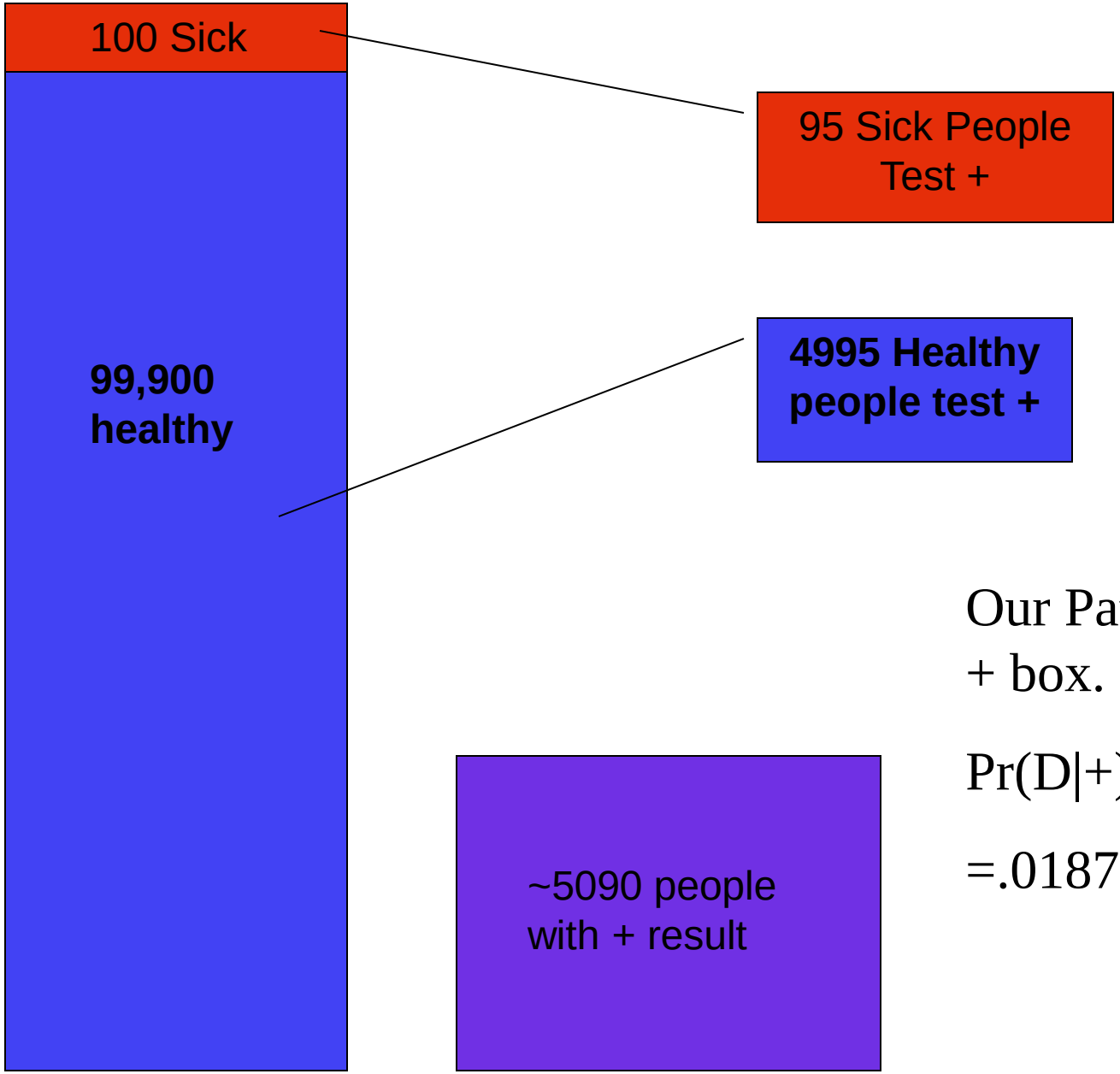

100K
people


100 Sick
99,900
healthy


100 Sick
95 Sick People
Test +
99,900
healthy


100 Sick
99,900
healthy
95 Sick People
Test +
4995 Healthy
people test +


100 Sick
99,900 healthy
95 Sick People Test +
4995 Healthy people test +
~5090 people with + result



Our Patient is in the + box.

Pr(D|+)=95/5090

=.0187, or ~1/50

- Minimize false positives if you wish to ensure that those testing positive really do have the disease.
- Minimize false negatives if you wish to ensure that all those with the disease test positive.
- Can’t do both at once.

Examples:

- Polygraph is tested to ensure low rates of false negatives, for use in e.g. the defense department, but polygraphs are also used in criminal cases, where one wants low rates of false positives.

- Early and regular mammogram screening increases early detection of breast cancer, minimizing false negatives, but this also radically increases rates of false positives, many of which are (unnecessarily) treated with surgery, radiation and/or chemotherapy.

Origins of Immoral Science

- Moral Schmucks
- Moral Imbeciles
- True Believers
- Change in Context
- Hard Moral Problems:

  Can get anyone, if they aren't willing to think *hard*.

Adult Violence and Childhood Exposure

- Exposure to television violence is stably associated with aggressive behaviors in children at short time scales.
- Mean exposure to television violence and rates of aggressive behavior for adults are associated among countries.
- Exposure to televised violence as a child is associated with adult aggression, for individuals, within countries.

Possible Explanations

- Childhood exposure→Adult Aggression
- Personality Trait→Childhood Exposure
  AND

  Personality Trait→Adult Aggression
- Environmental Factor→Childhood Exposure

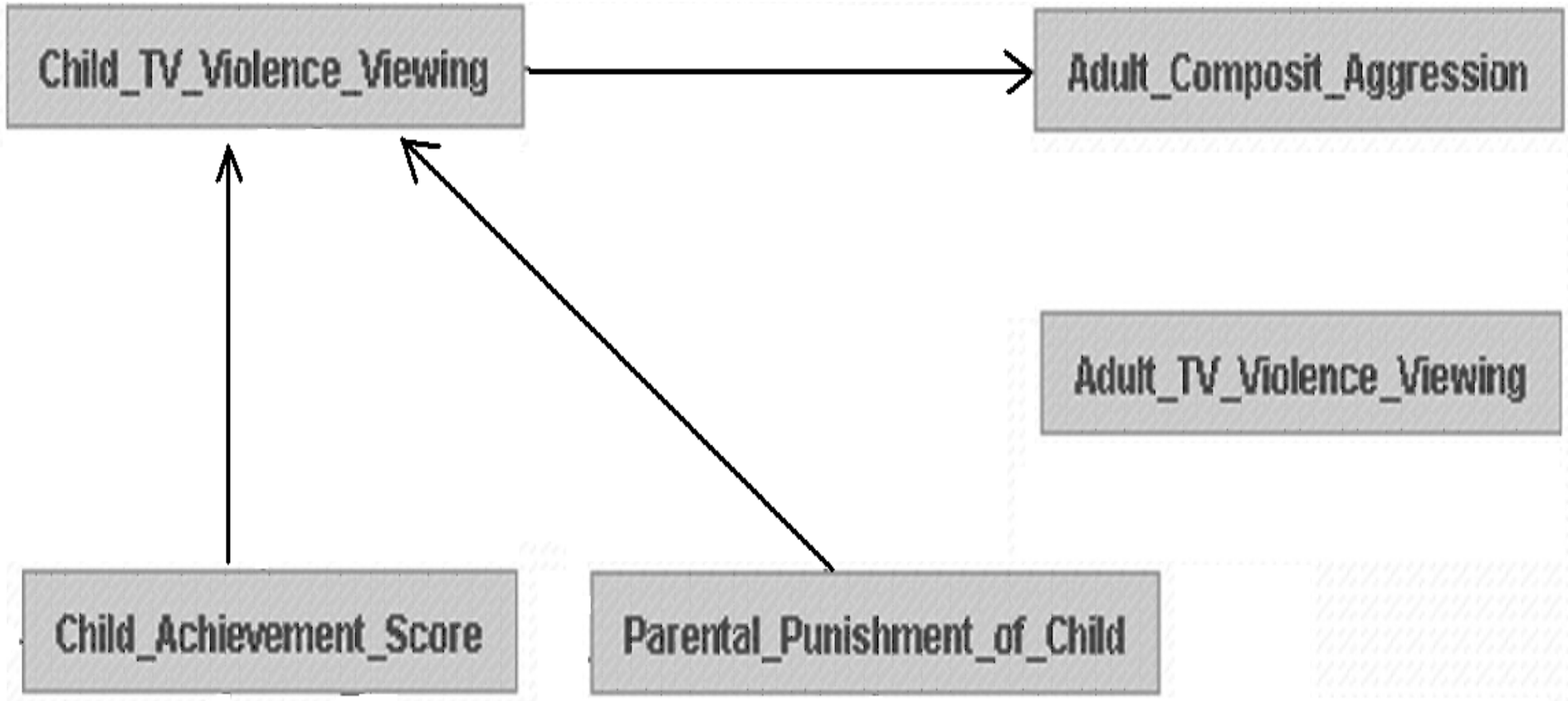
  AND

  Environmental Factor→ Adult Aggression

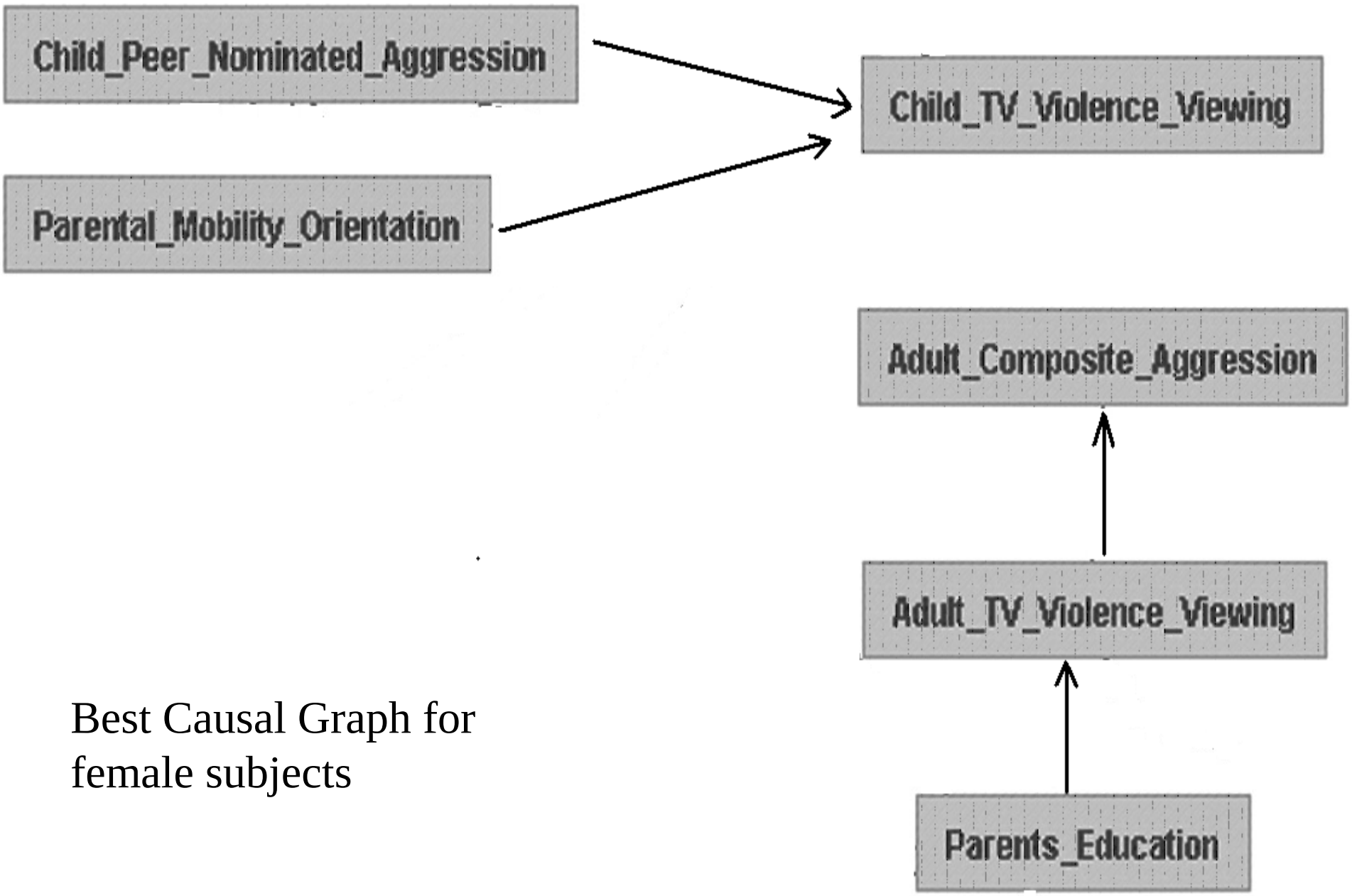
Studies

- Huesman et al. 2003 (Developmental Psychology)
- Johnson et al. 2002 (Science)

Lots of possible common causes measured; association between exposure and adult aggression remains even when these are controlled for.



Best Causal Graph for Male subjects



Best Causal Graph for female subjects

Questions

- What should be said about conclusions in the academic paper?
- What policy recommendations should be made in the academic paper?
  - Censorship (individual or social)
  - Ad campaigns
  - Provision of preferred non-tv activities for children (midnight basketball).

  Problem: note the invitation to discriminatory policy, since the last option only influences males, limited local budgets might be devoted preferentially to male children

Principles to Consider

- Job is to inform so that people can make informed decisions.
- Information not believed is of no use.
- Decisions require facts AND values.
- Unwarranted Optimism—people deny facts when they conflict with desires.
- Scientists are not *experts* with respect to values.
- But scientists ought to take values seriously—both their own and those of others--ask continually and seriously:

How best to Promote Well Being while Respecting Autonomy?

How best to Promote Well Being while Respecting Autonomy?

In my daily life:

- lab/practice/office operations,
- research topic/specialization,
- methods,

In my profession:

- participation in professional societies that determine and enforce rules of professional conduct.

Socially:

- collaboration with industry/government
- advocacy for policy or values

Things you can do now:

1. Take part in ethics discussions at your lab, department, university/hospital; if there is no such discussion forum, organize one on a regular or semi-regular basis.
2. Take ethics courses—not just applied, but theoretical courses too.
3. Take courses/read in related subjects: political philosophy, philosophy of science, game and decision theory, policy oriented political science and economics, policy oriented history and the history of your field.
4. Pay attention to ethics/policy discussions in your field, contribute to them, and encourage others to do the same.
5. Most importantly: be aware, be sensitive and think seriously.