Using overseas surveys to produce reliable models of sexual minorities

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Difficulties in minority research

- We need to research at risk populations but they are often small
- Capturing representative populations in small countries is hard
- Overseas data is often quite different

Can a Bayesian approach address these difficulties ?

Bayes theorem

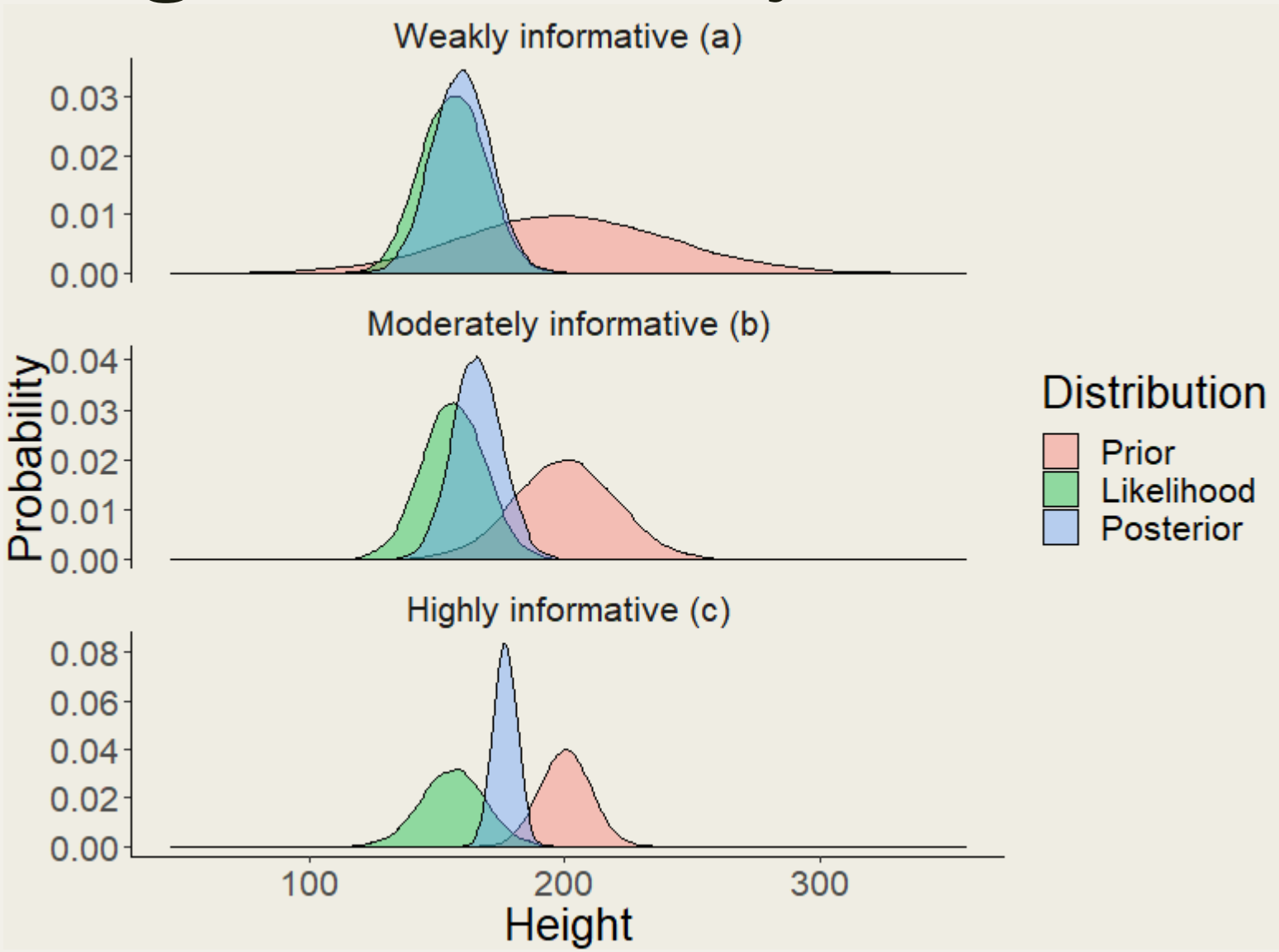
- Combine *prior* knowledge with observed *likelihood* of an event to get a *posterior* representation of a parameter
- That is…

$$Posterior = Likelihood \times Prior / Normalising\ constant$$

- Or if you prefer single letters…

$$P(H|D) = P(D|H) \times P(H) / P(D)$$

Accounting for uncertainty



An applied example

We sought to investigate if sexual minorities (SMs) are at higher risk of hazardous drinking

- A small sample exists in the NZ Health Survey… with a lot of error
- A large sample exists in the US Drug Use Survey… but the variables are different

Can we use the US data to study our NZ population ?

Results from US data

	Estimate	Error	Probability
Intercept	0.19	1.06	100.00%
Sex	1.34	1.03	100.00%
Homosexual	**2.80**	**1.10**	**100.00%**
Bisexual	**3.27**	**1.10**	**100.00%**
Sex * Homosexual	0.94	1.14	69.15%
Sex * Bisexual	0.99	1.11	53.03%
Age	0.14	1.10	100.00%
Income	0.40	1.04	100.00%

Okay now what ?

Hazardous drinking ~ Sex + Age + Deprivation + SM status + SM status * Sex

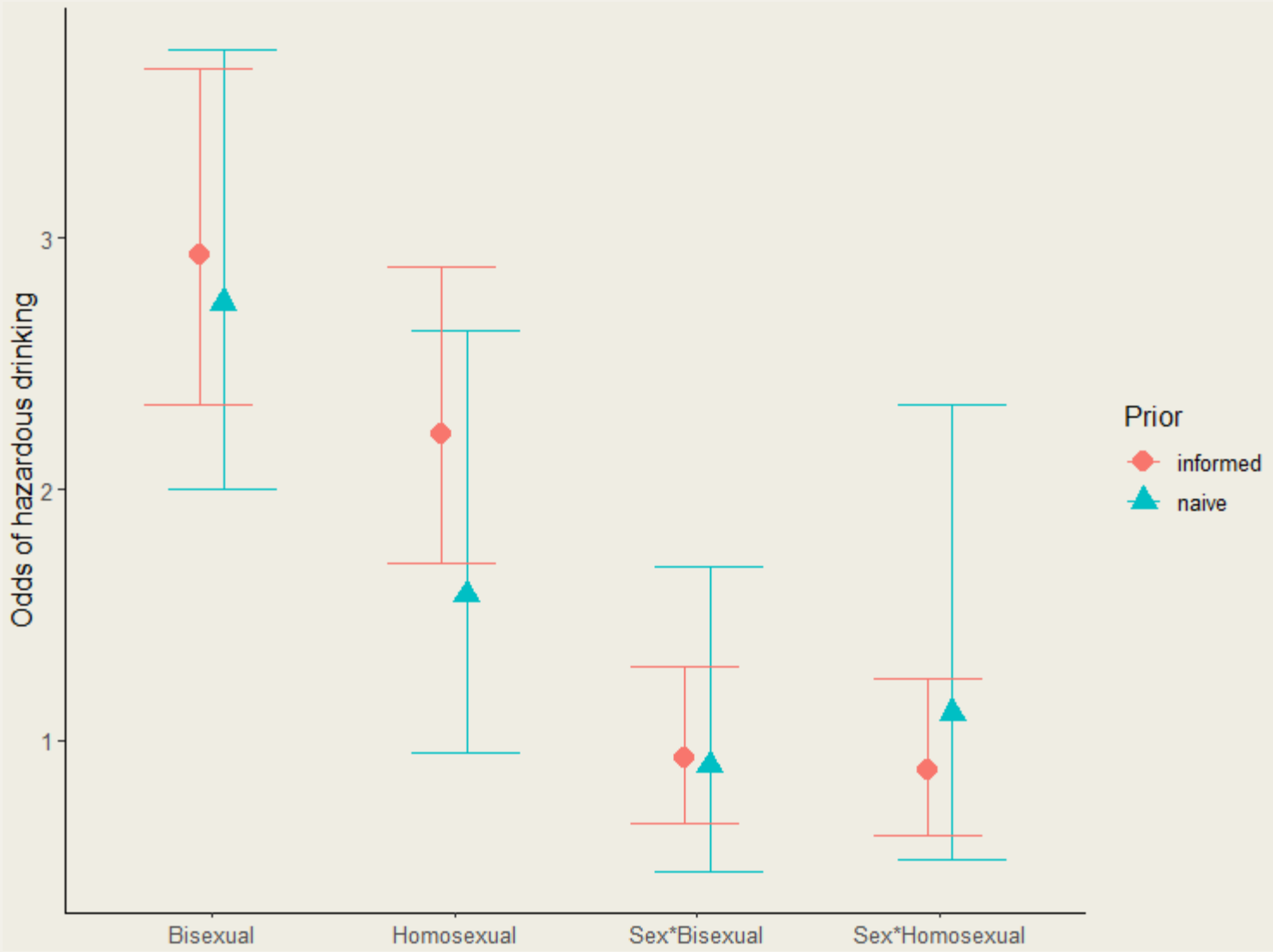
So… as an example, we as an example:

Sex ~ normal(2.80, 1.10)

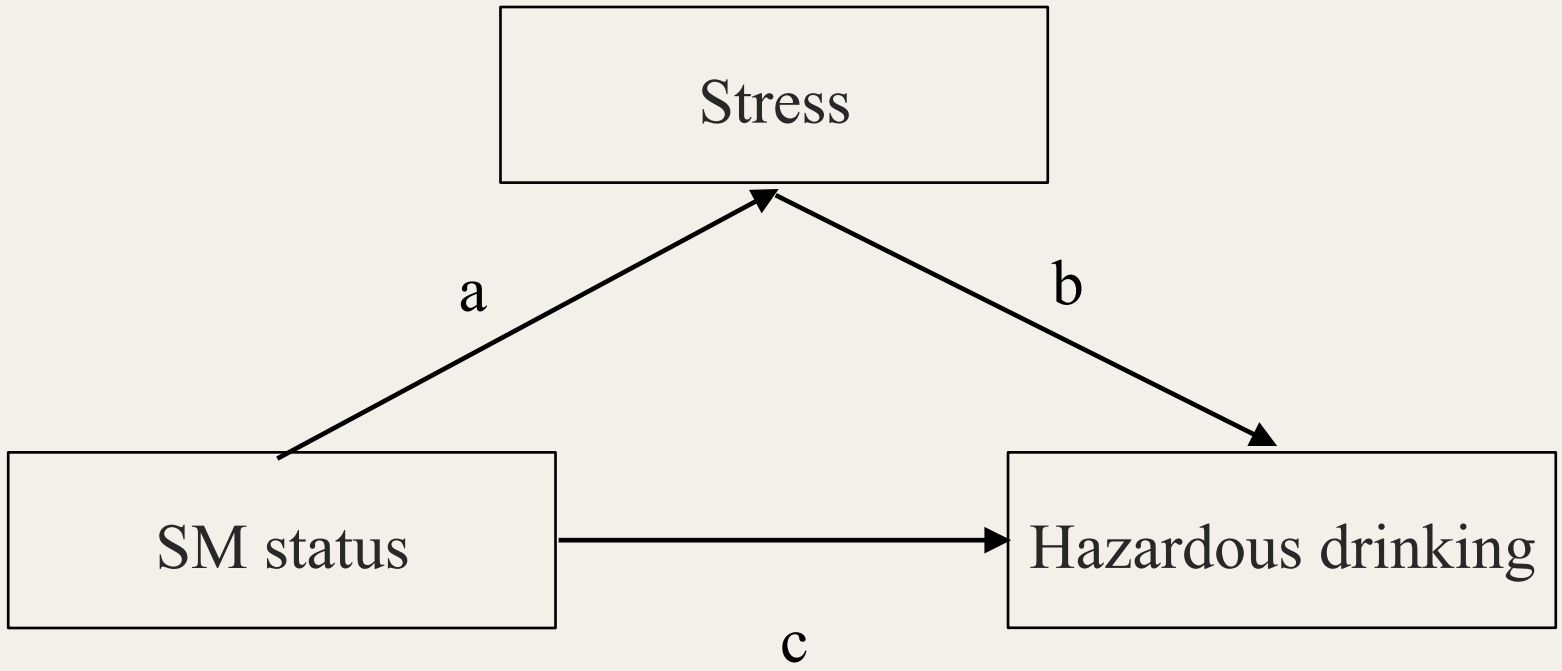
Or… if we are uncertain about the US data:

Sex ~ normal(2.80, 1.40)

Results from NZ data



Building complexity



Mediation analyses