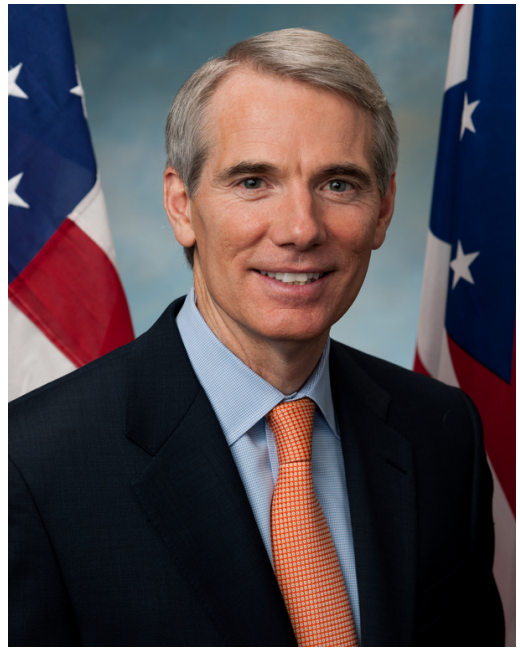
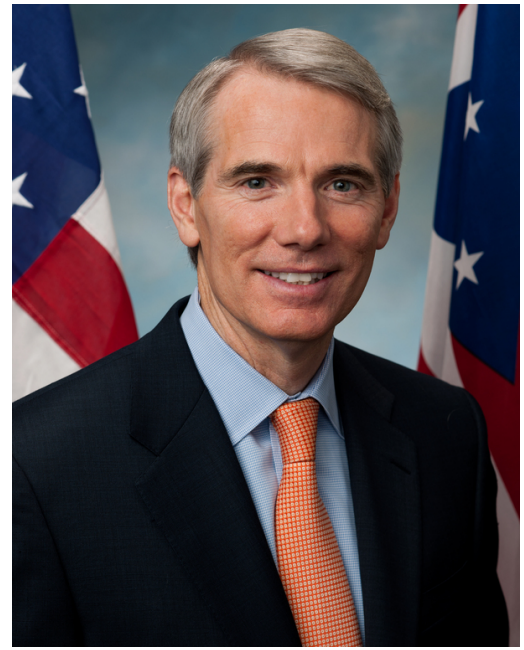
Learning about networks using sampling

Andrew Gelman

Department of Statistics and Department of Political Science
Columbia University, New York

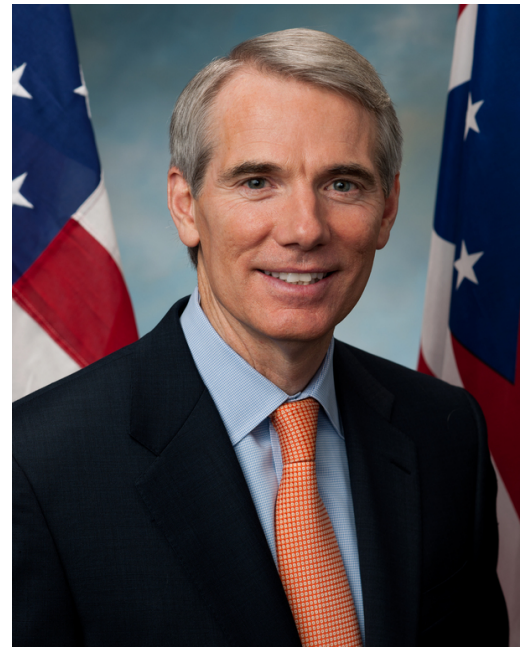
Discussion of Steve Thompson's Morris Hansen lecture
Washington, D.C., 17 Nov 2015





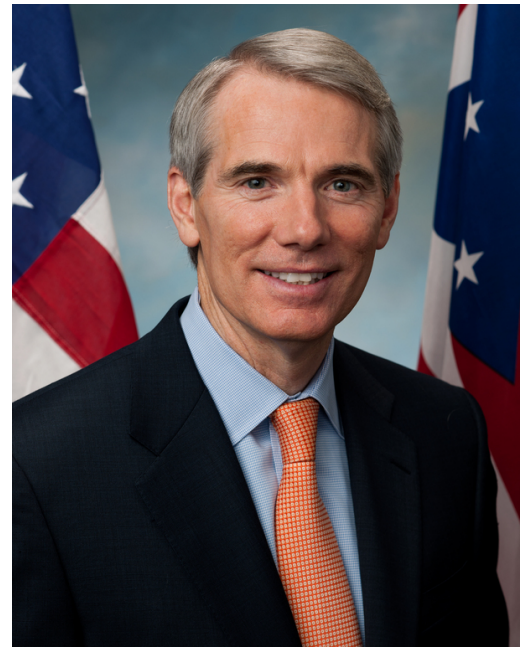
- Sen. Rob Portman (R-Ohio)

- 1996: co-sponsored the Defense of Marriage Act, defining marriage as one man and one woman



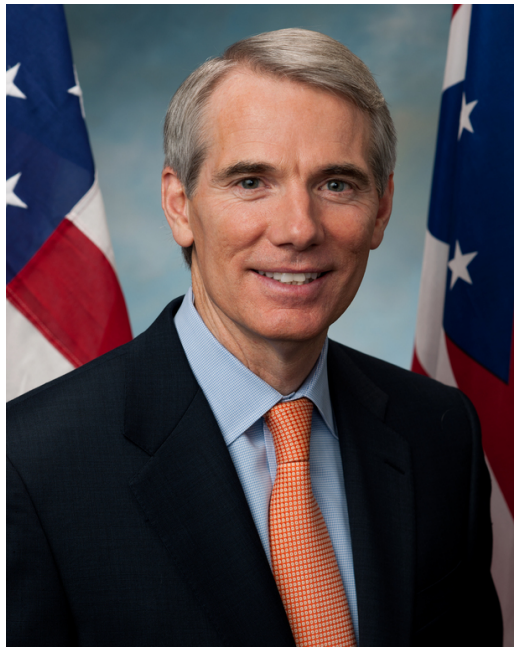
- Sen. Rob Portman (R-Ohio)

- 1996: co-sponsored the Defense of Marriage Act, defining marriage as one man and one woman
- 1999: voted for a measure prohibiting same-sex couples from adopting children.



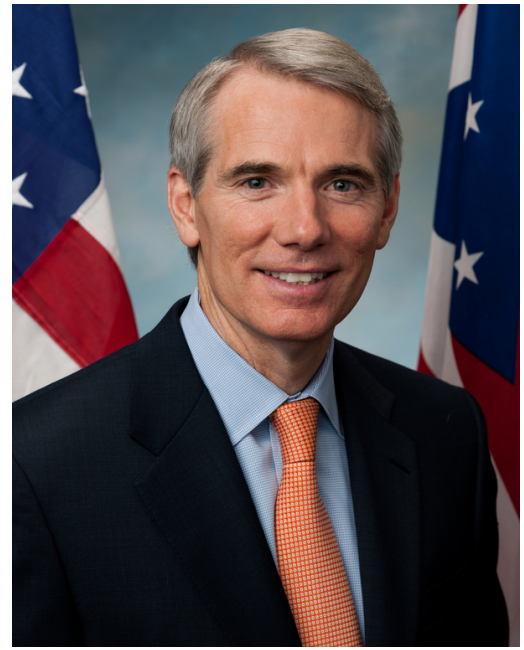
- Sen. Rob Portman (R-Ohio)

- 1996: co-sponsored the Defense of Marriage Act, defining marriage as one man and one woman
- 1999: voted for a measure prohibiting same-sex couples from adopting children.
- 2011: "openly hostile" record on gay rights led to a mass protest of students at the University of Michigan against Portman speaking at the graduation ceremony

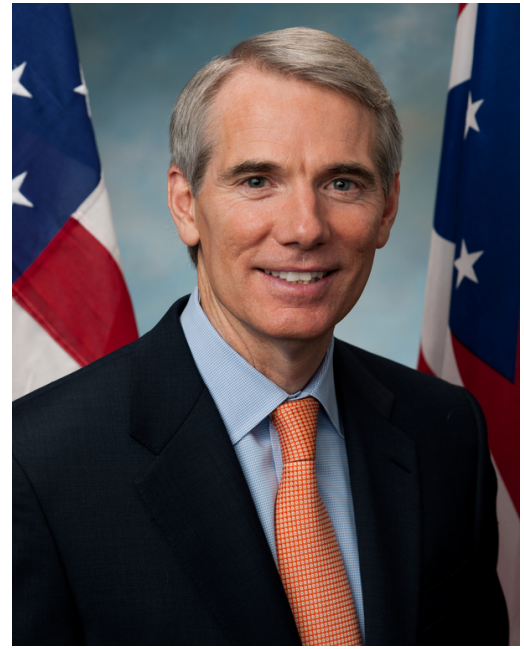


- Sen. Rob Portman (R-Ohio)

- 1996: co-sponsored the Defense of Marriage Act, defining marriage as one man and one woman
- 1999: voted for a measure prohibiting same-sex couples from adopting children.
- 2011: "openly hostile" record on gay rights led to a mass protest of students at the University of Michigan against Portman speaking at the graduation ceremony
- "Rob believes marriage is a sacred bond between one man and one woman"—Portman spokesman to Cleveland *Plain Dealer* at the time of the protest

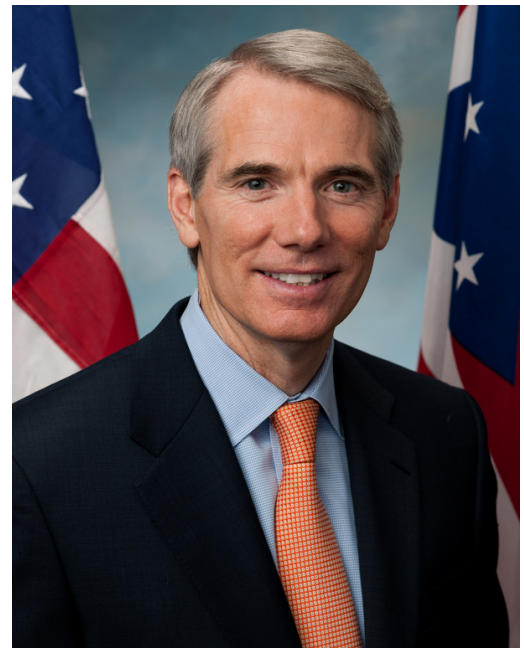


- Sen. Rob Portman (R-Ohio)



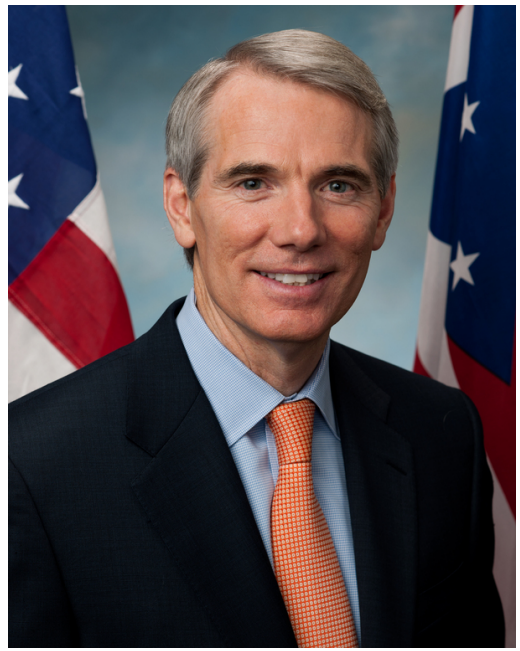
- Sen. Rob Portman (R-Ohio)

- 2013: “I’m announcing today a change of heart [for] gay marriage. . . My son came to Jane, my wife, and I, told us that he was gay, and that it was not a choice, and that it’s just part of who he is, and that’s who he’d been that way for as long as he could remember.”



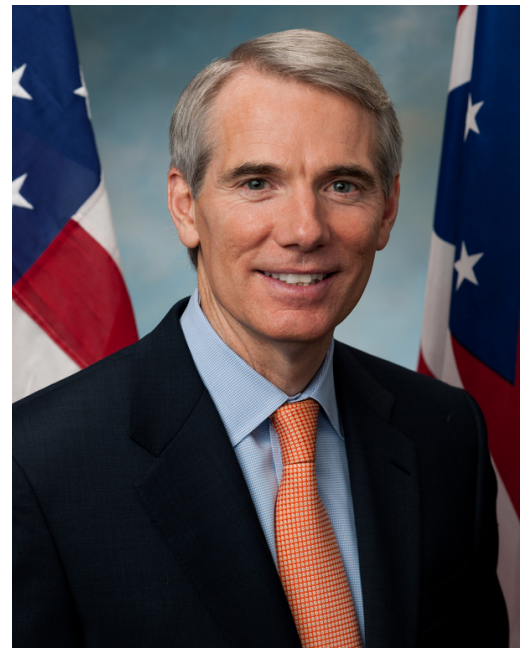
- Sen. Rob Portman (R-Ohio)

- 2013: "I'm announcing today a change of heart [for] gay marriage. . . My son came to Jane, my wife, and I, told us that he was gay, and that it was not a choice, and that it's just part of who he is, and that's who he'd been that way for as long as he could remember."
- "I've come to the conclusion that . . . [marriage] is something that we should allow people to do . . . and to have the joy and stability of marriage that I've had for over 26 years."



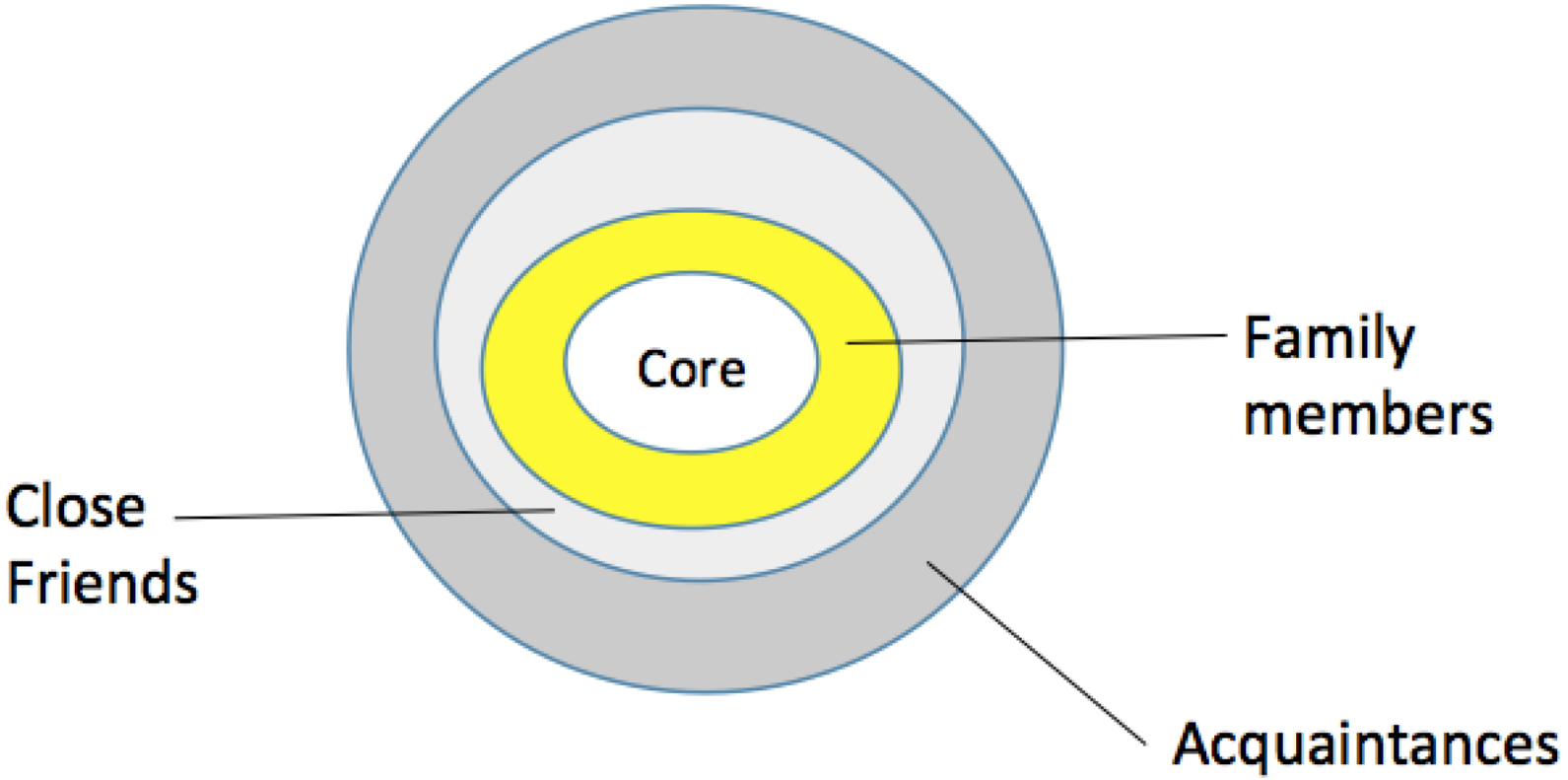
- Sen. Rob Portman (R-Ohio)

- 2013: "I'm announcing today a change of heart [for] gay marriage. . . My son came to Jane, my wife, and I, told us that he was gay, and that it was not a choice, and that it's just part of who he is, and that's who he'd been that way for as long as he could remember."
- "I've come to the conclusion that . . . [marriage] is something that we should allow people to do . . . and to have the joy and stability of marriage that I've had for over 26 years."
- Portman also mentioned his consultation with former Vice President Dick Cheney, whose own daughter's coming out: "forced him to re-think the issue too, and over time, he changed his view on it"



- Sen. Rob Portman (R-Ohio)

Social penumbra



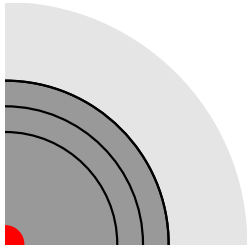
- Size and the shape of the penumbra can relate to the political salience and influence of a social group

Survey data

- Panel design
- Two surveys administered by YouGov 12 months apart
- 3,000 respondents in wave 1; 2,106 re-interviewed in wave 2
- Penumbra membership in 14 social groups and 8 names
- Attitude questions on 12 related policies
- Also GSS in 2006 and 2014

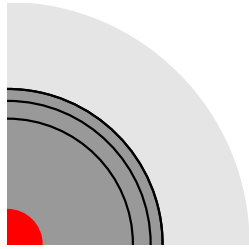
Group size (area of red circle) and penumbras (areas of black circles indicate close family, close family + close friends, and close family + close friends + others known) compared to the population of American adults (light gray circle)

Active Military

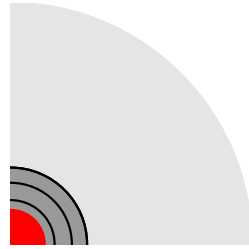


Immigrant in Past 5 Yrs

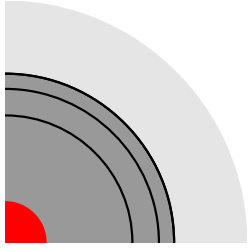
NRA Member



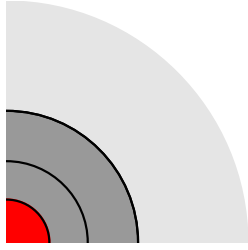
Abortion in Past 5 Yrs



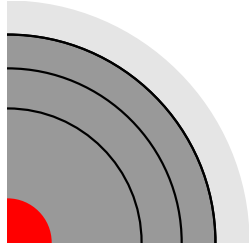
Lost Job Last Year



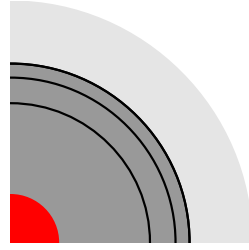
Muslim



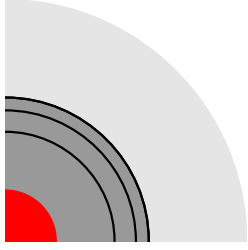
Gay/Lesbian



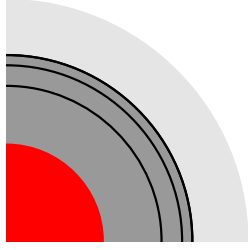
Currently Unemployed



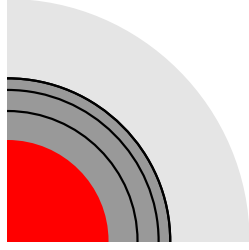
Mortgage Underwater



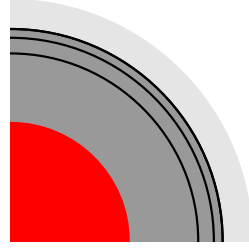
No Health Insurance



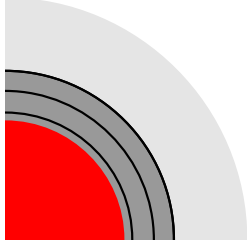
Care for Elder



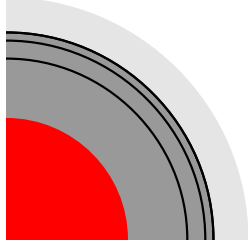
Gun Owner



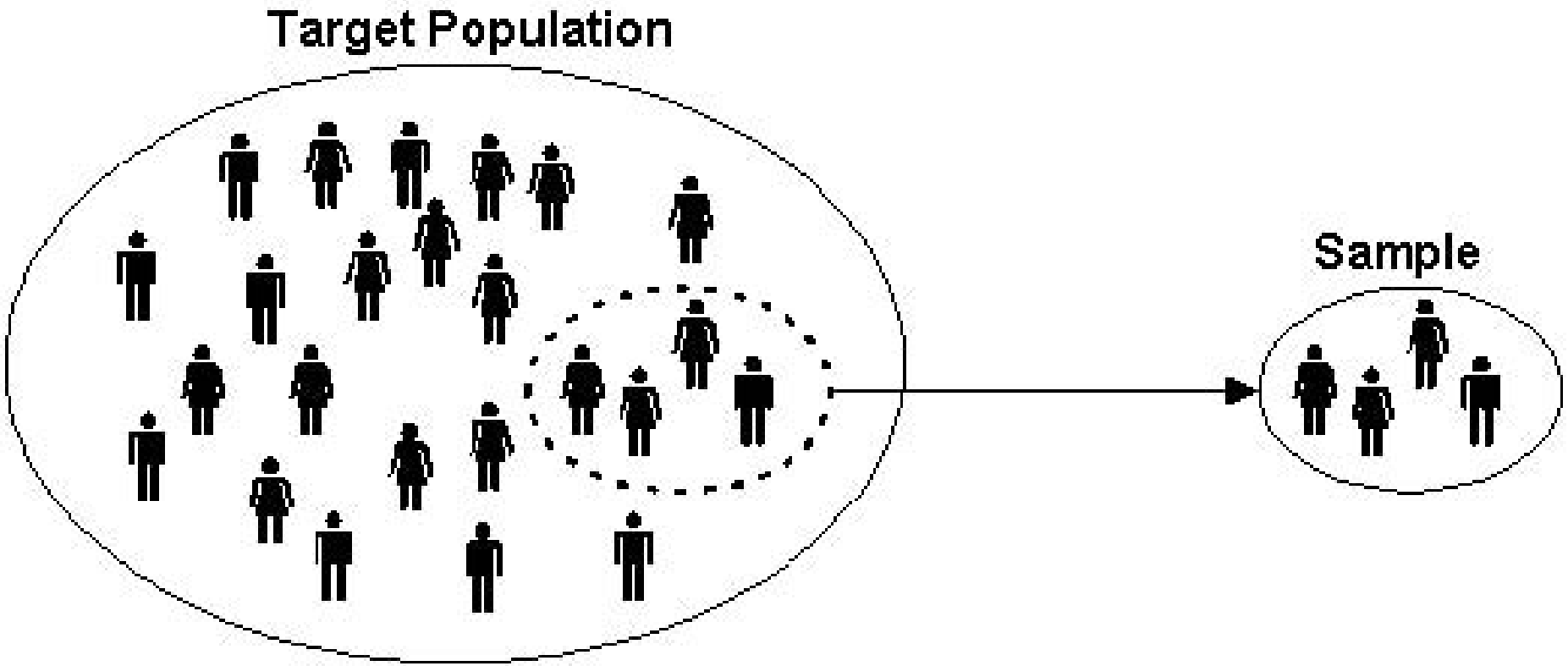
Receive Govt Welfare



Serious Health Problem



Sample as microcosm of the general population



The poststratification identity

$$\theta = \frac{\sum_{j=1}^{J} N_j \theta_j}{\sum_{j=1}^{J} N_j}$$

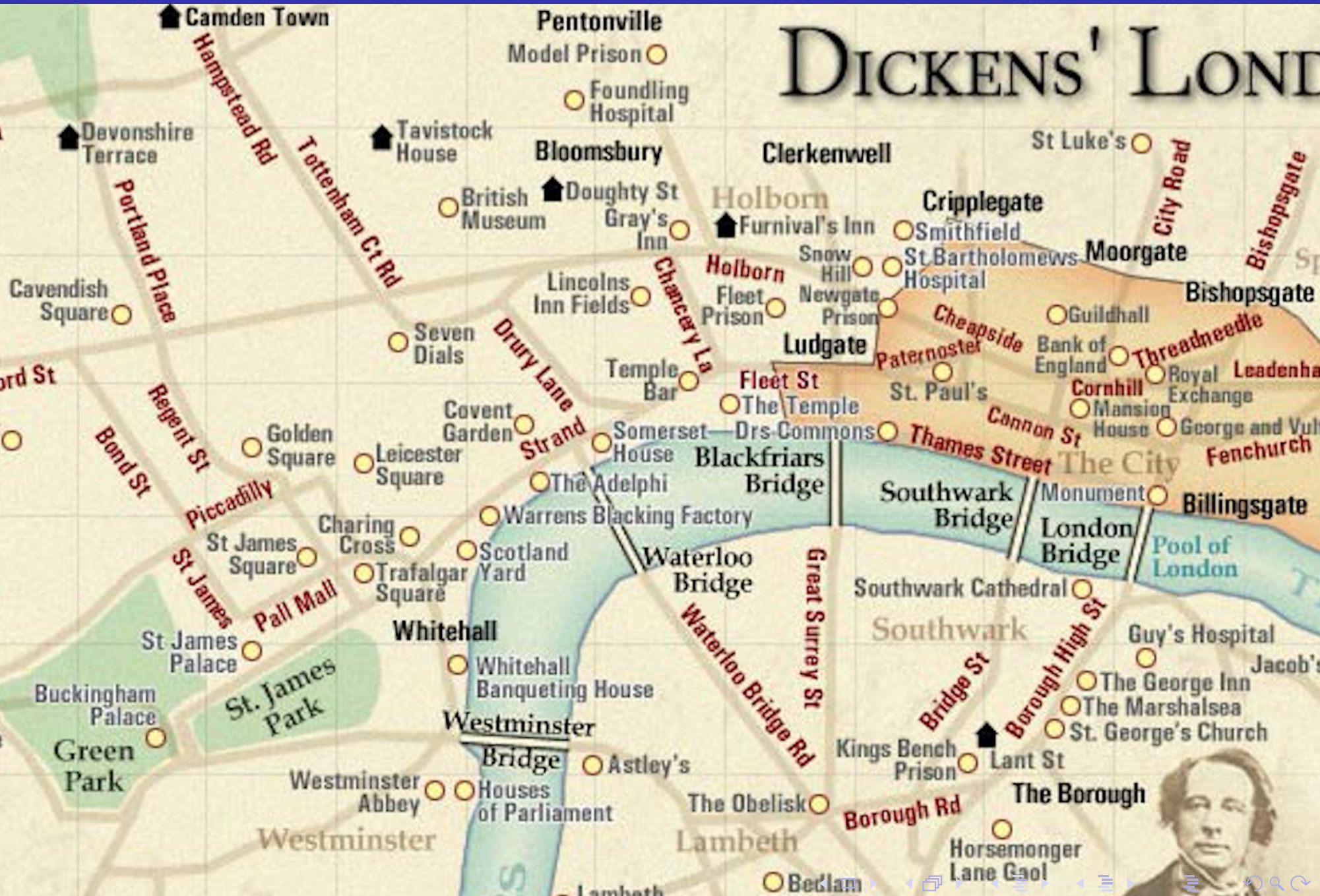
The poststratified estimate

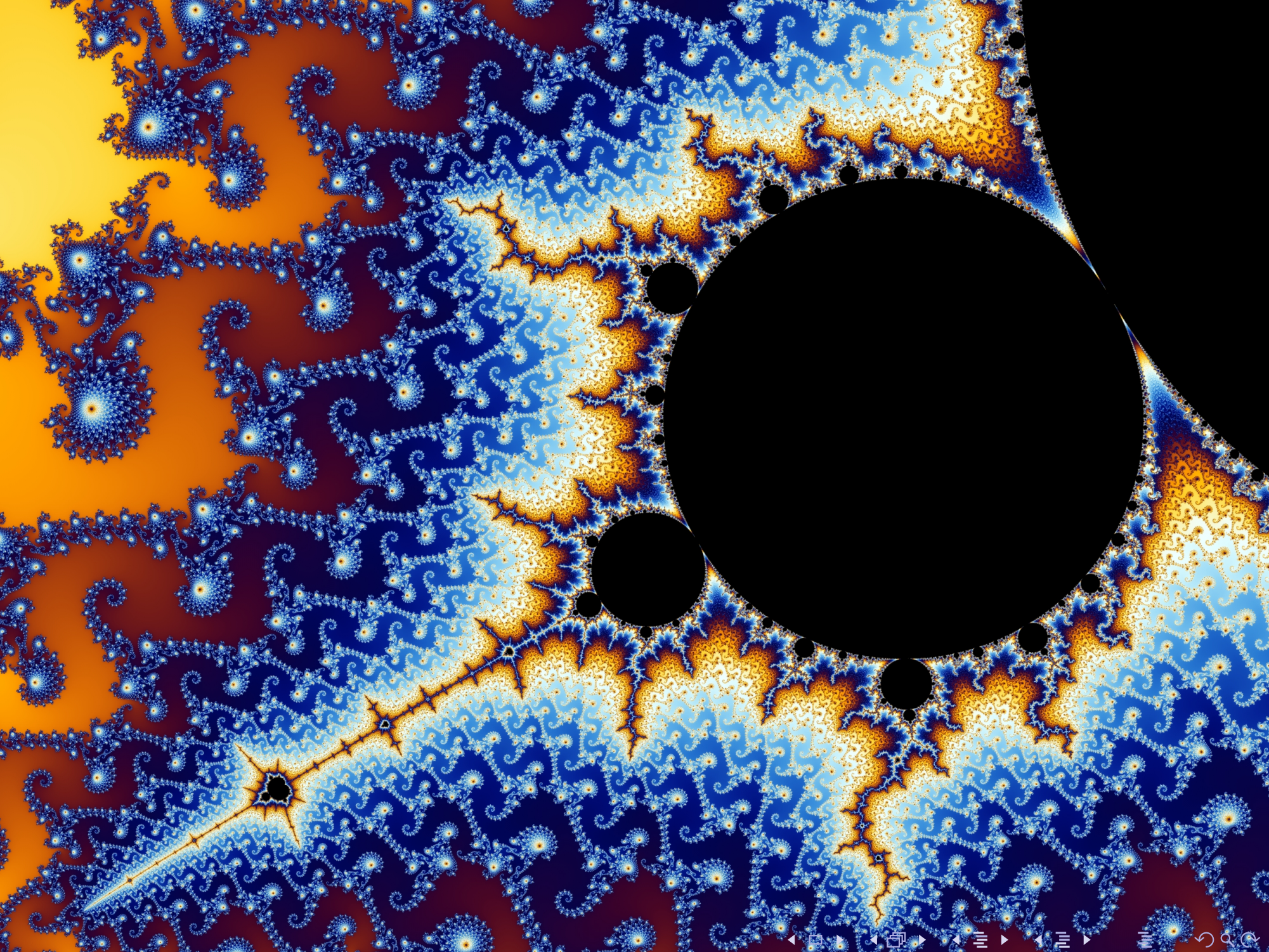
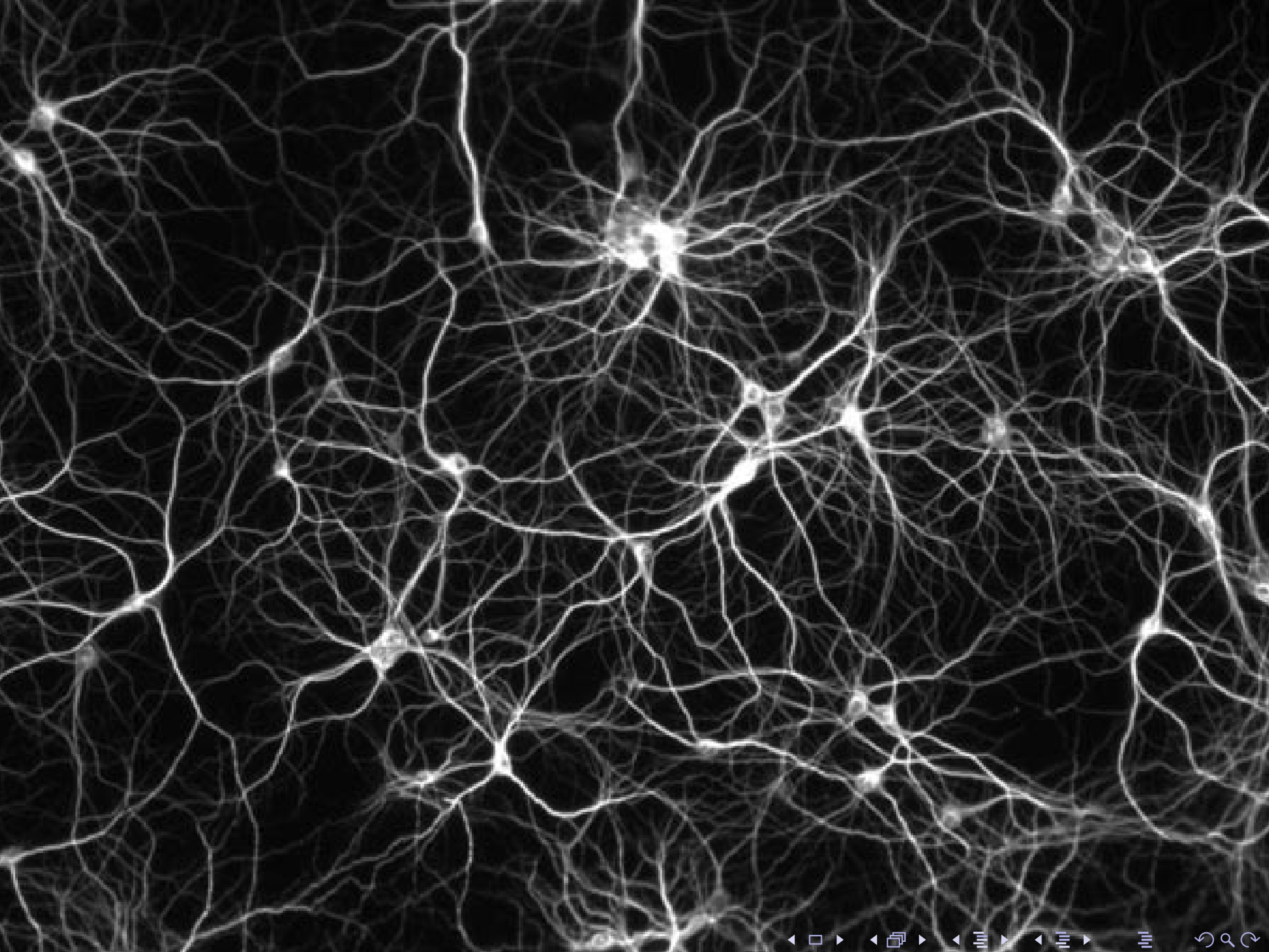
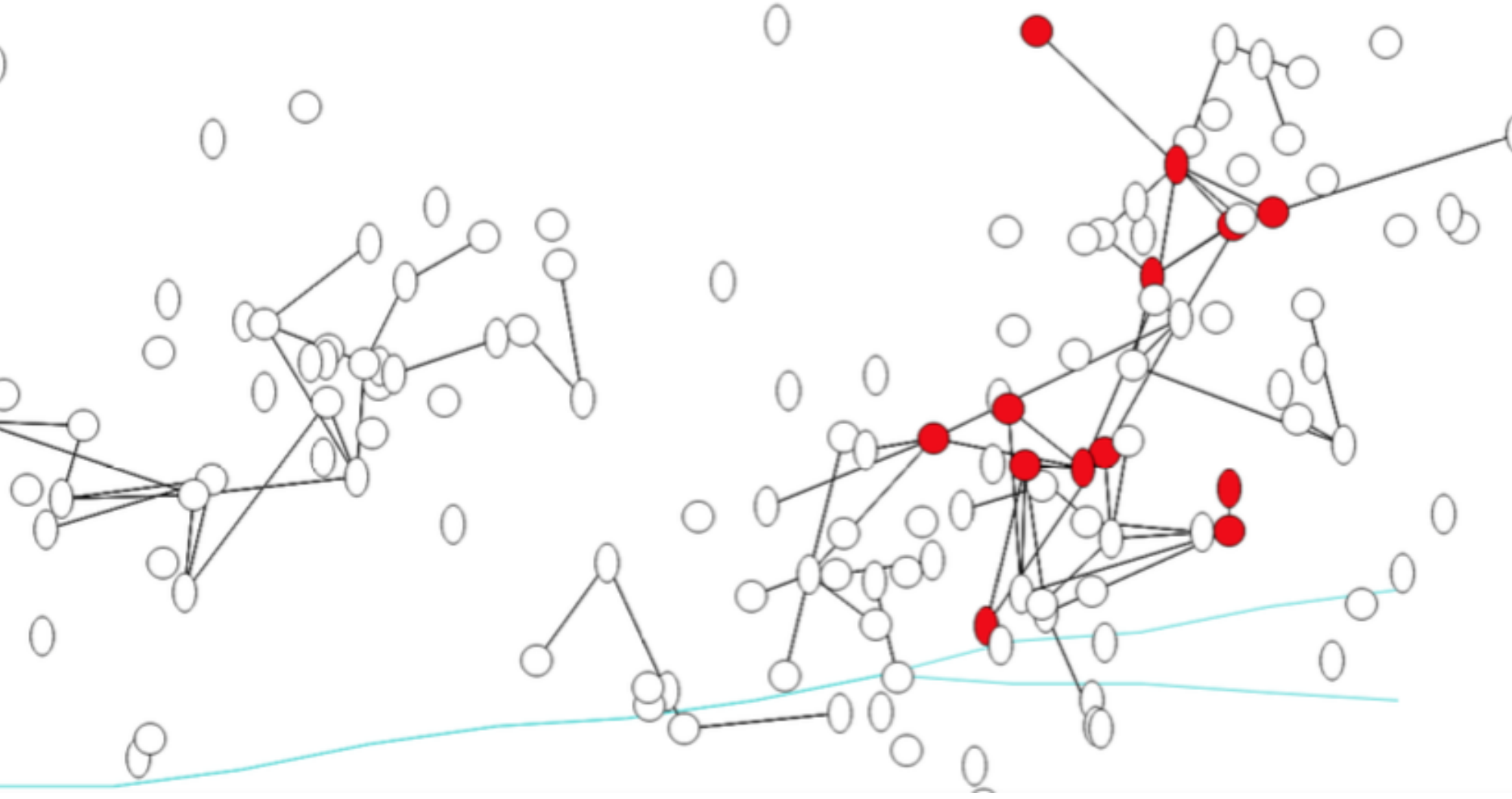
$$\hat{\theta} = \frac{\sum_{j=1}^{J} N_j \hat{\theta}_j}{\sum_{j=1}^{J} N_j}$$

Why multilevel regression?

Fundamental problem of network sampling

Challenges of replicating a network in miniature



Learning about hard-to-reach populations

Good Readers VISUALIZE
Good Readers MAKE CONNECTIONS
Good Readers ASK QUESTIONS
Happy Birthday!