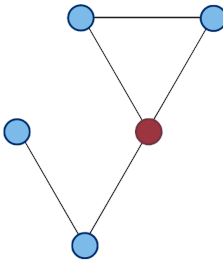


Characterizing the impacts of disease on behavior: policy, perception, & potential for infection



Casey Zipfel*, **Juliana C. Taube***, Shweta Bansal

MIDAS Annual Meeting 2025



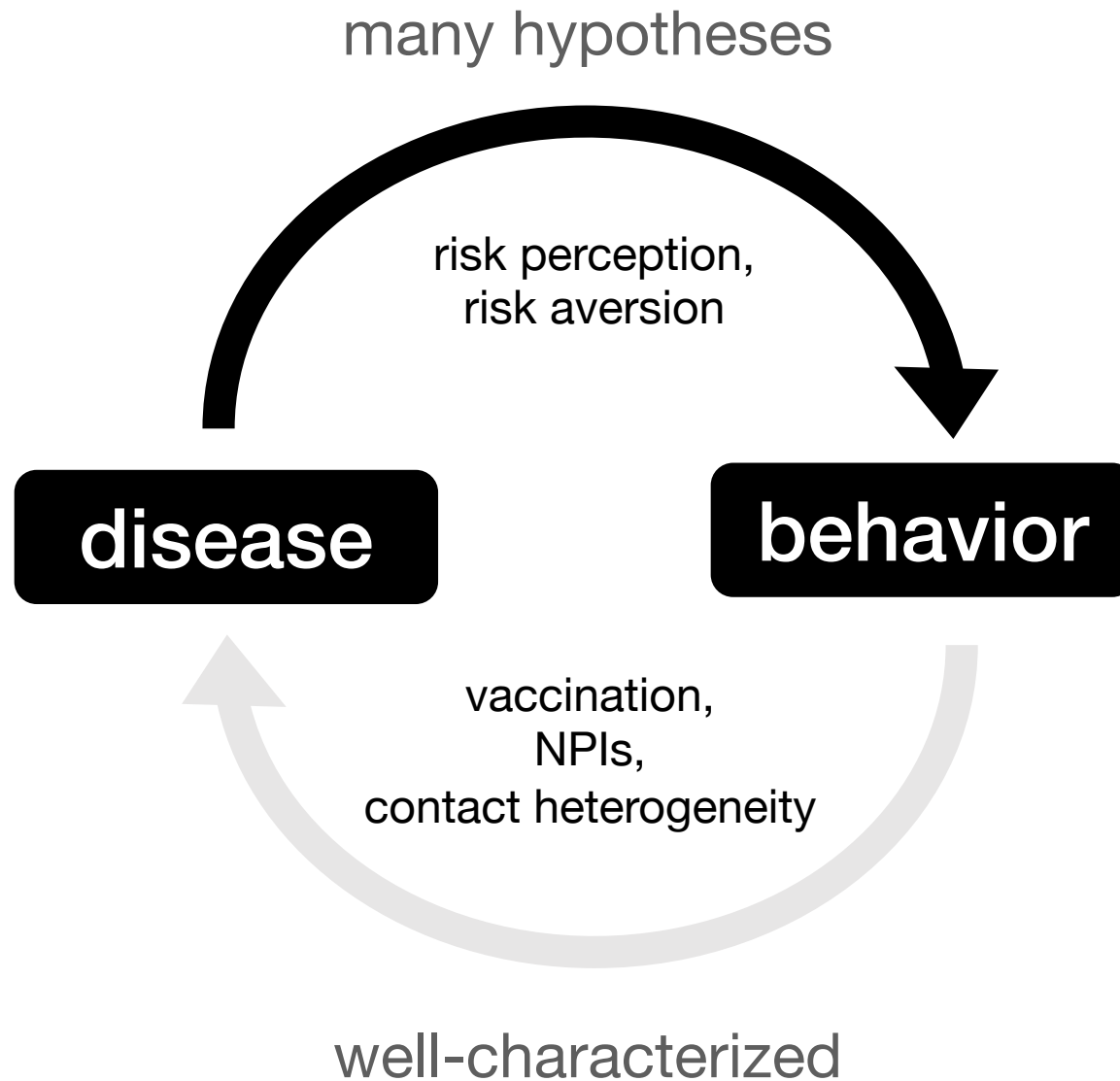
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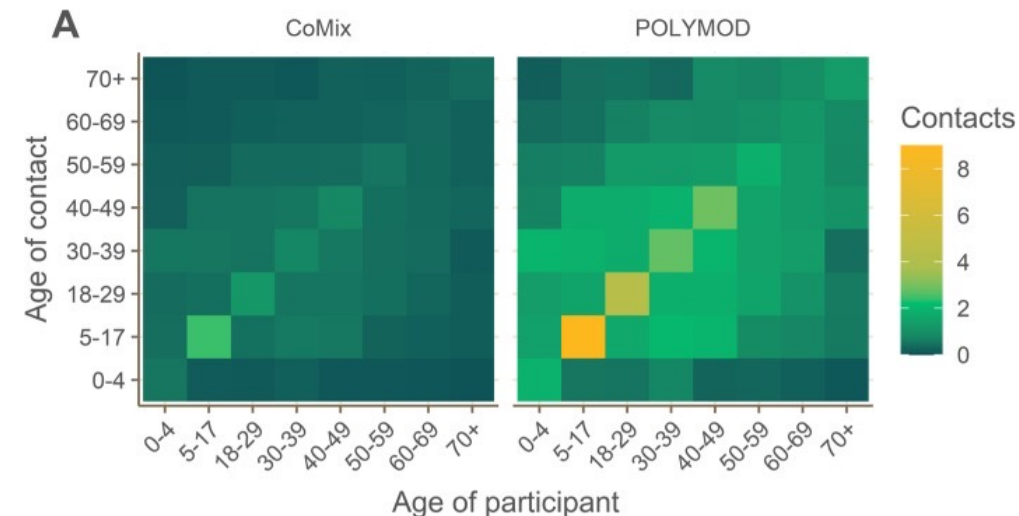
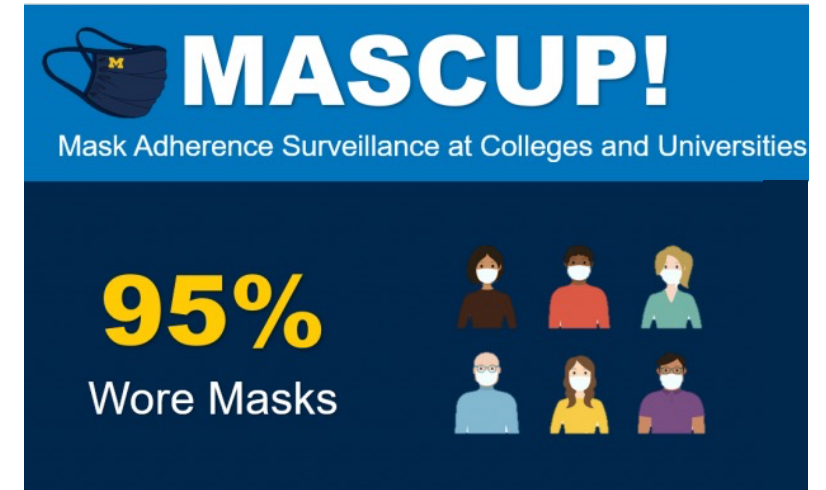
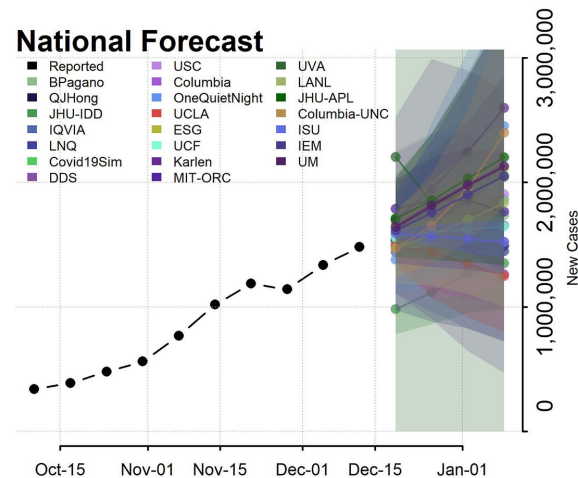
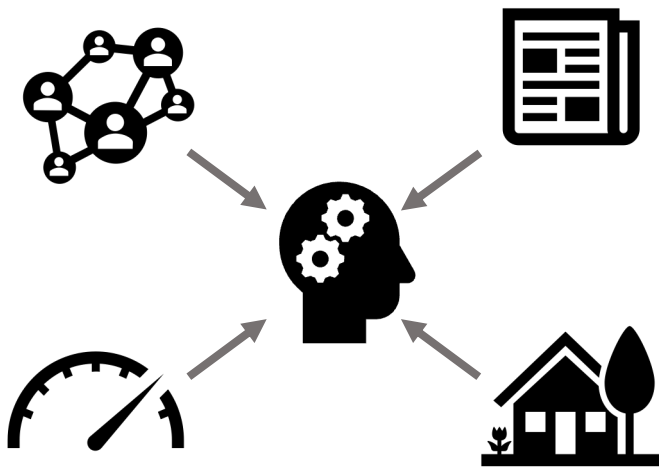


Dr. Casey Zipfel

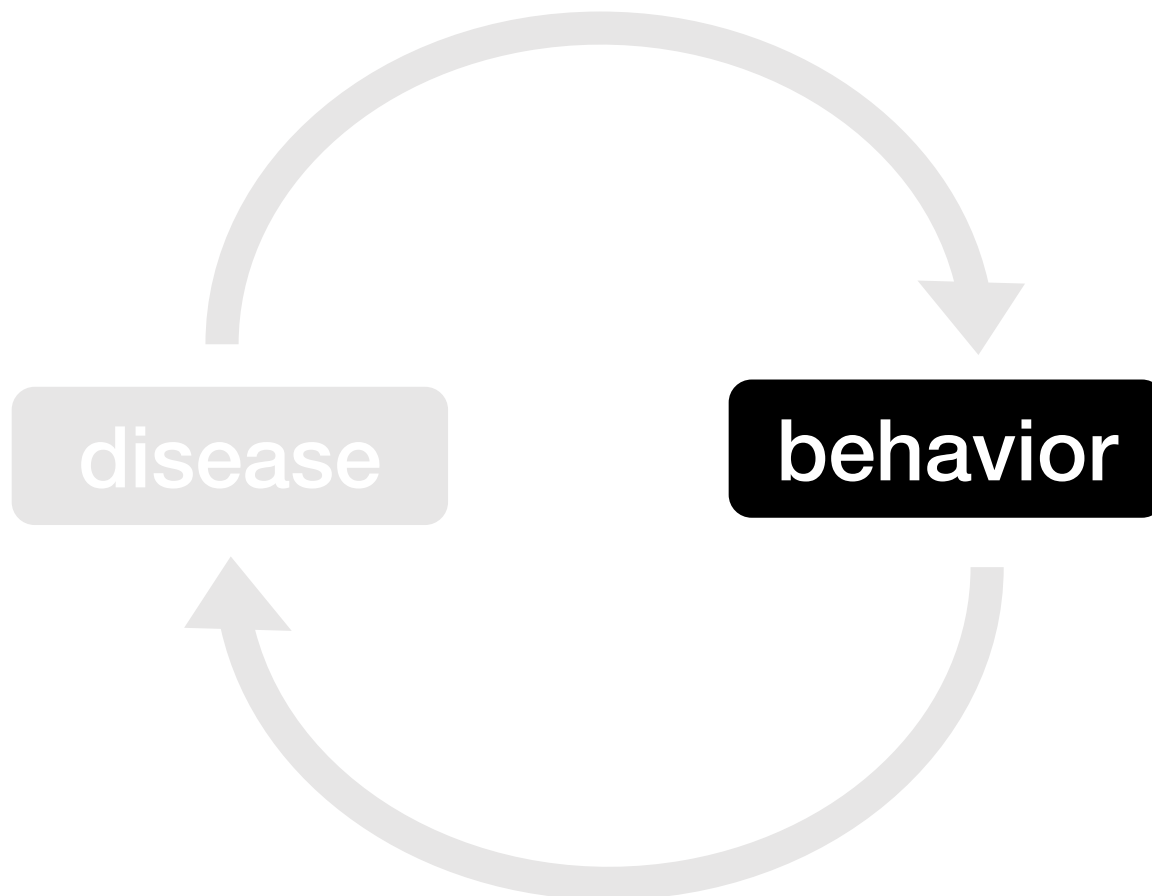


Why care about disease → behavior pathway?

- Inform policy interventions (or not)
- Clarify behavioral data collection needs
- Improve disease forecasts
- Reveal underlying mechanisms (info)



Does behavior vary?



Behavior: non-household contacts



COVID-19 Trends and Impact Survey



10 million valid responses (Jun 2020 – Apr 2021)



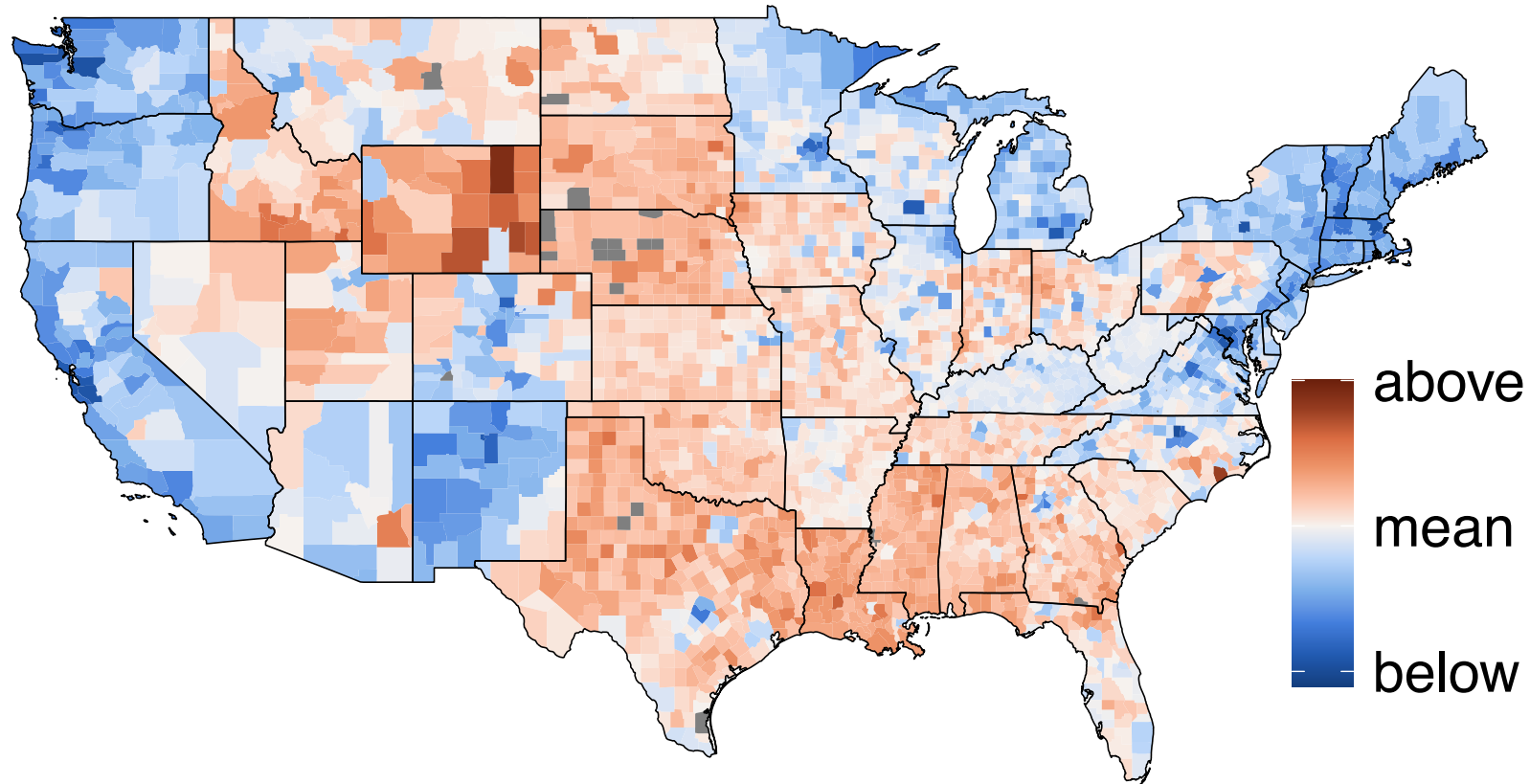
Number of direct non-household contacts in the last 24 hrs



Spatiotemporal GAMs to smooth noisy data; county-week estimates

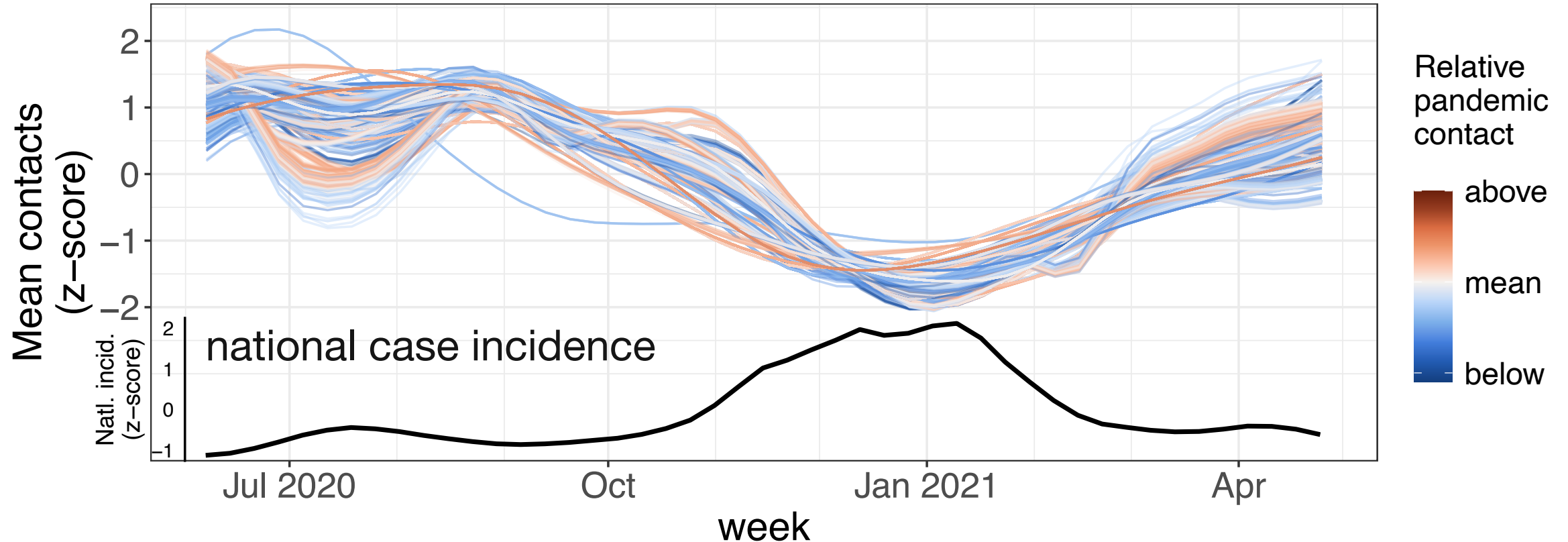
Contact is defined as “a conversation lasting more than 5 minutes with a person who is closer than 6 feet away from you, or physical contact like hand-shaking, hugging, or kissing”

Contact varied spatially during the pandemic



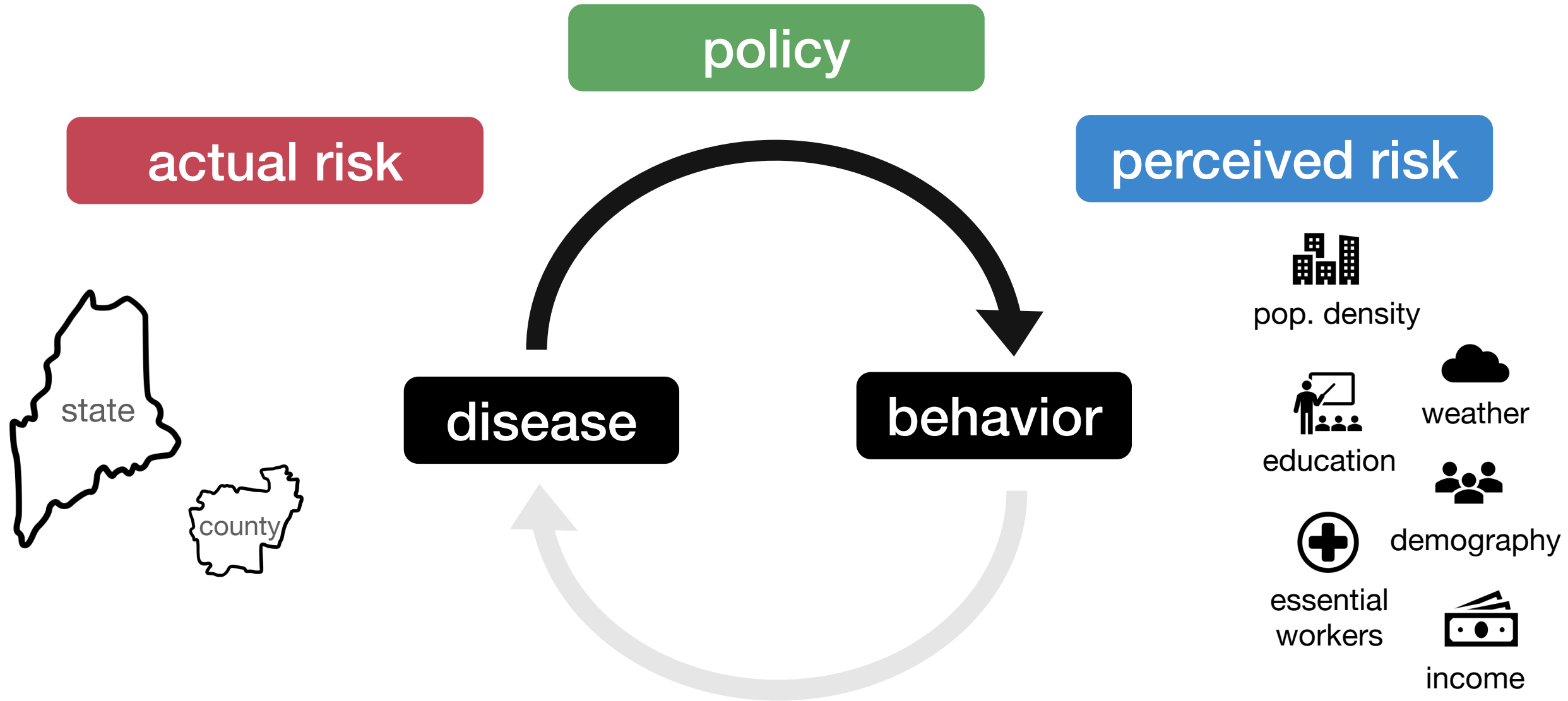
Mean county contact

Contact varied temporally during the pandemic



What's driving these changes in behavior?

What's driving these changes in behavior?



behavior ~ actual risk + perceived risk + policy + control variables

Actual risk: COVID-19



Case incidence



The New York Times



Right-aligned 3-week rolling avg

Coronavirus in the U.S.: Latest Map and Case Count



Perceived risk: worry



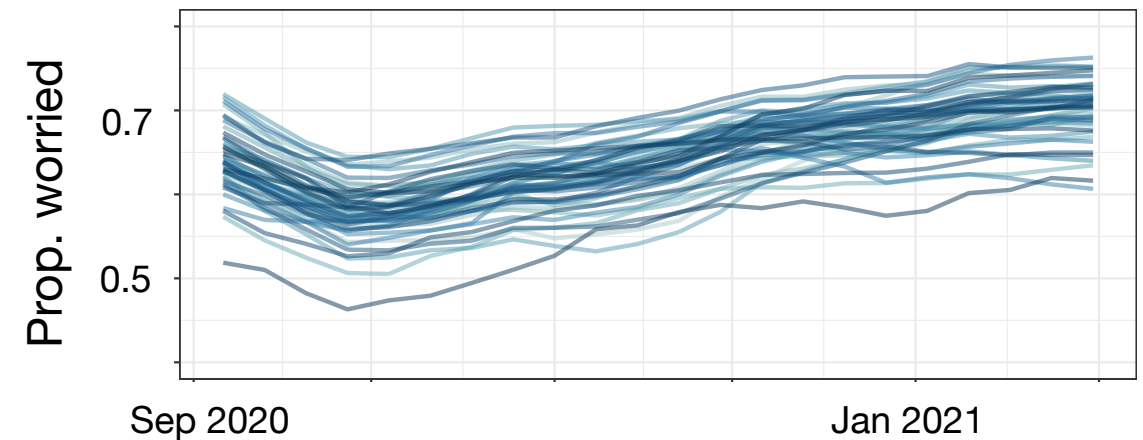
Proportion concerned about family member becoming seriously ill



COVID-19 Trends & Impact Survey



Right-aligned 3-week rolling avg



How worried do you feel that you or someone in your immediate family might become seriously ill from COVID-19? on a scale of 1-4

Policy

COVID-19 State and County Policy Orders, HHS

nonessential



food & drink



entertainment



outdoor recreation



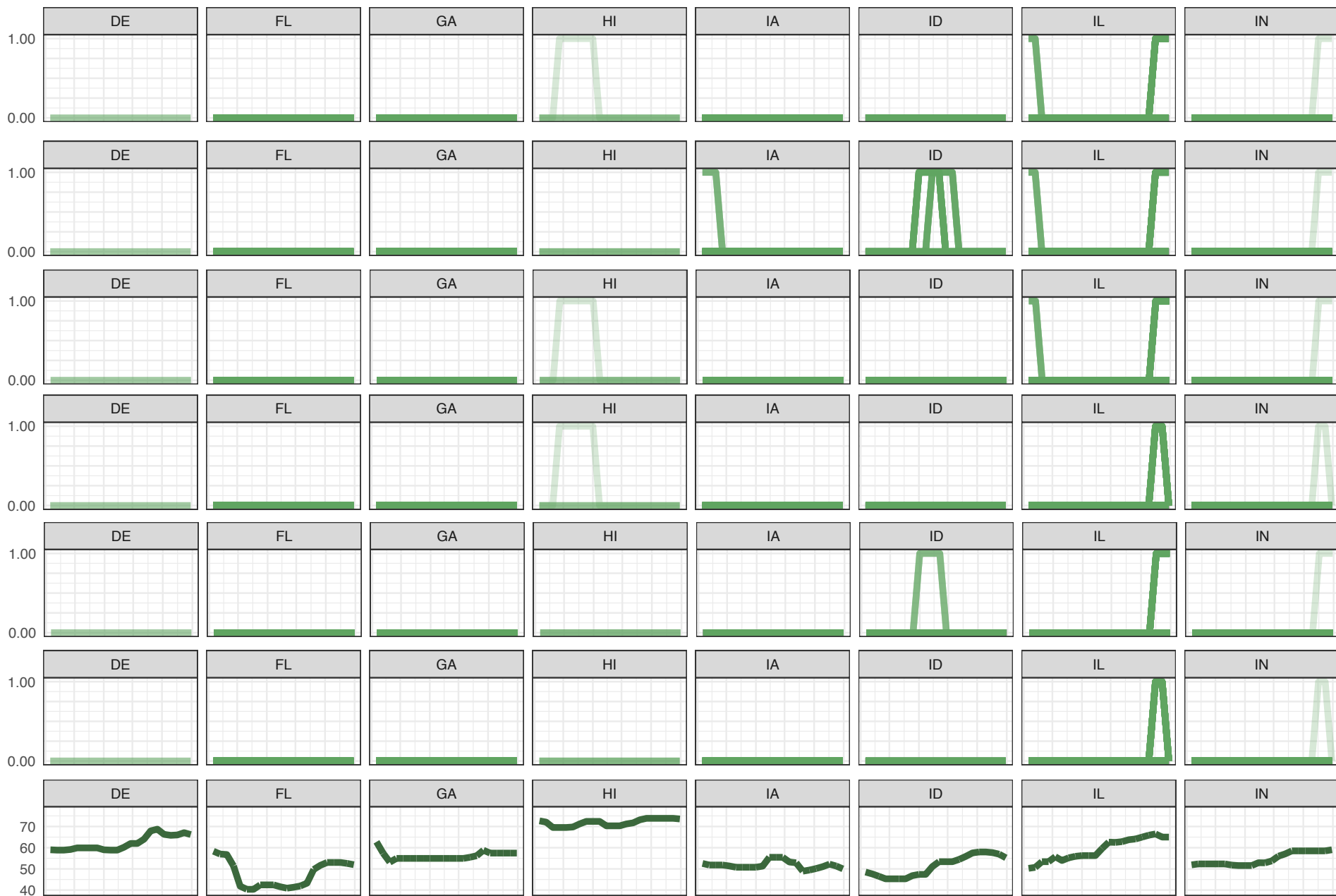
worship



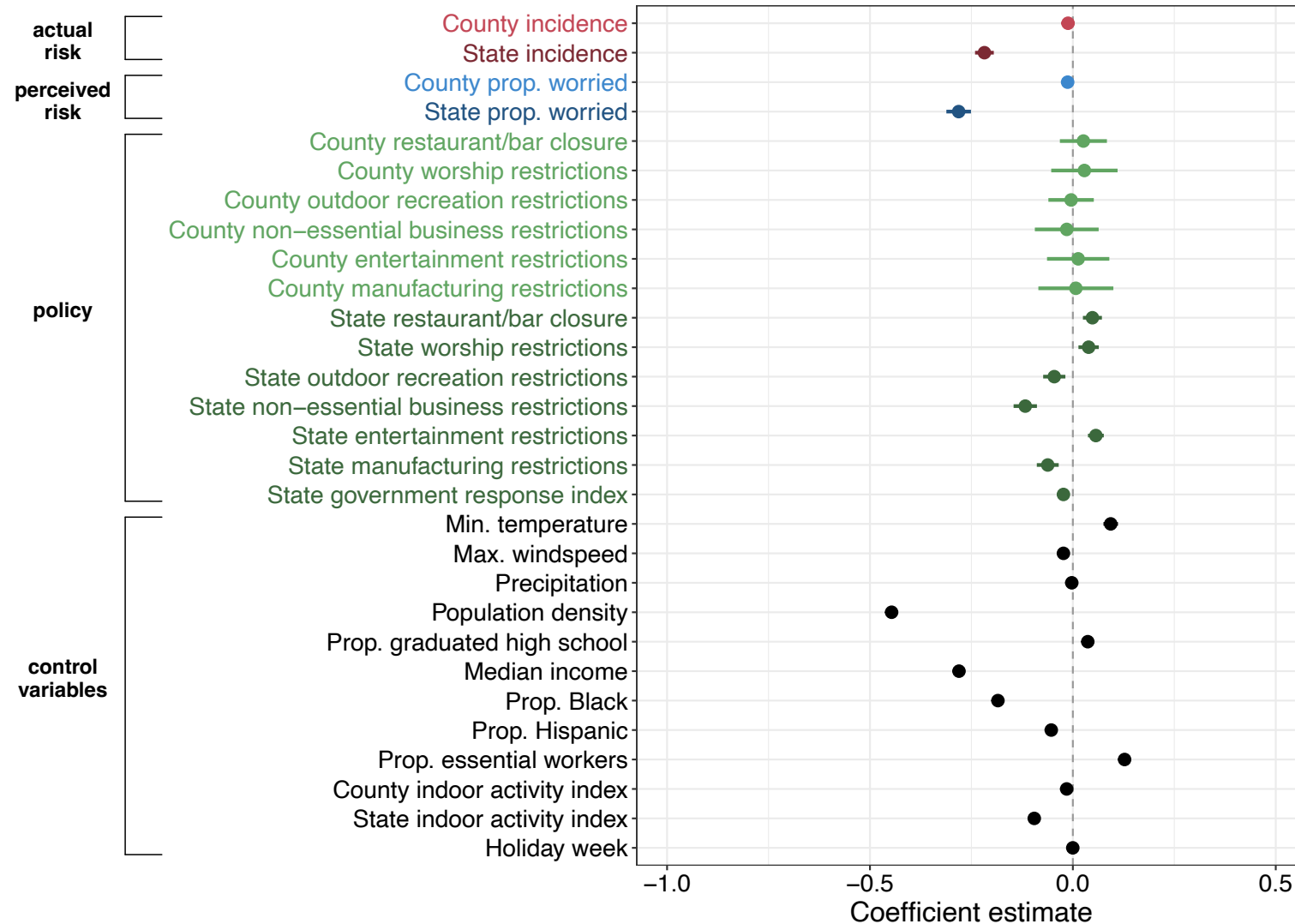
manufacturing



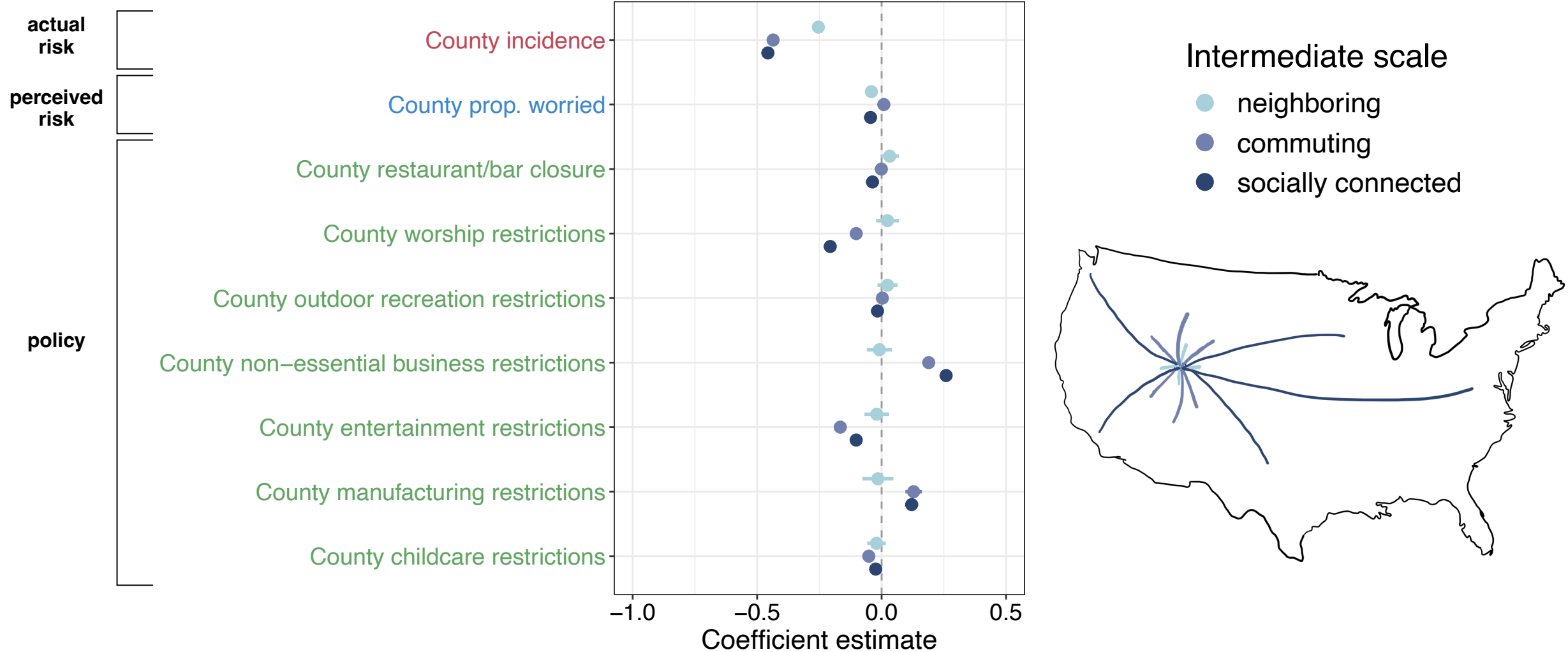
Oxford Stringency Index
(state-level only)



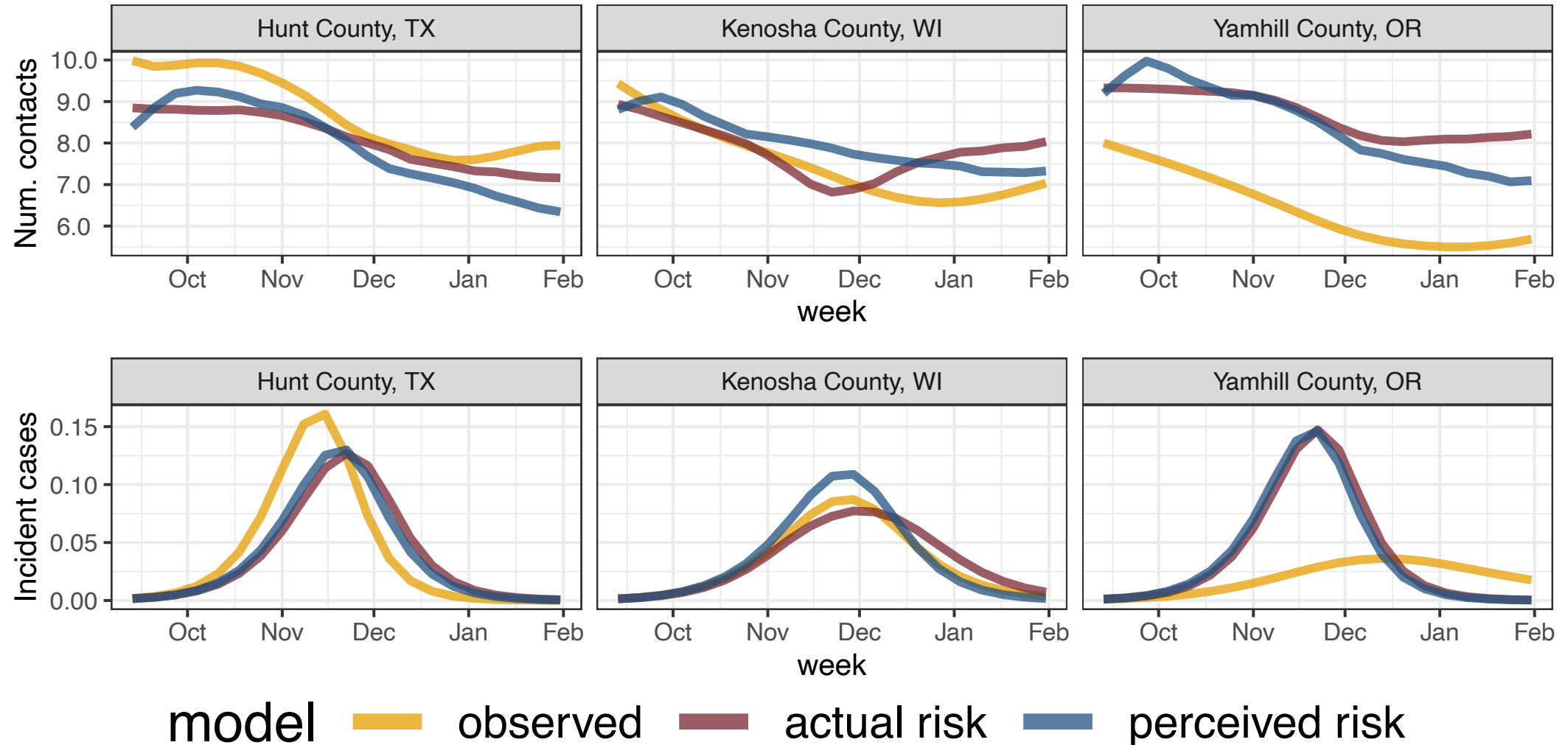
Behavior change is informed by **disease** & **perception**, especially at larger spatial scales



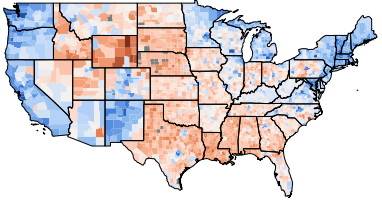
Information networks are spatially diffuse



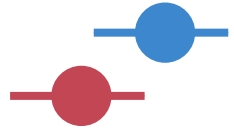
Test coupled disease-behavior model assumptions



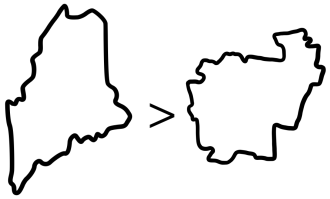
Conclusions



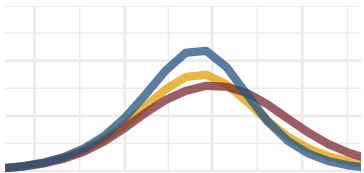
Pandemic contact patterns varied across space & time



Driven by both **actual** & **perceived** risk, more than **policy**



Behavior is influenced by information at **larger** spatial scales



Good news: modeling assumptions are supported by data

