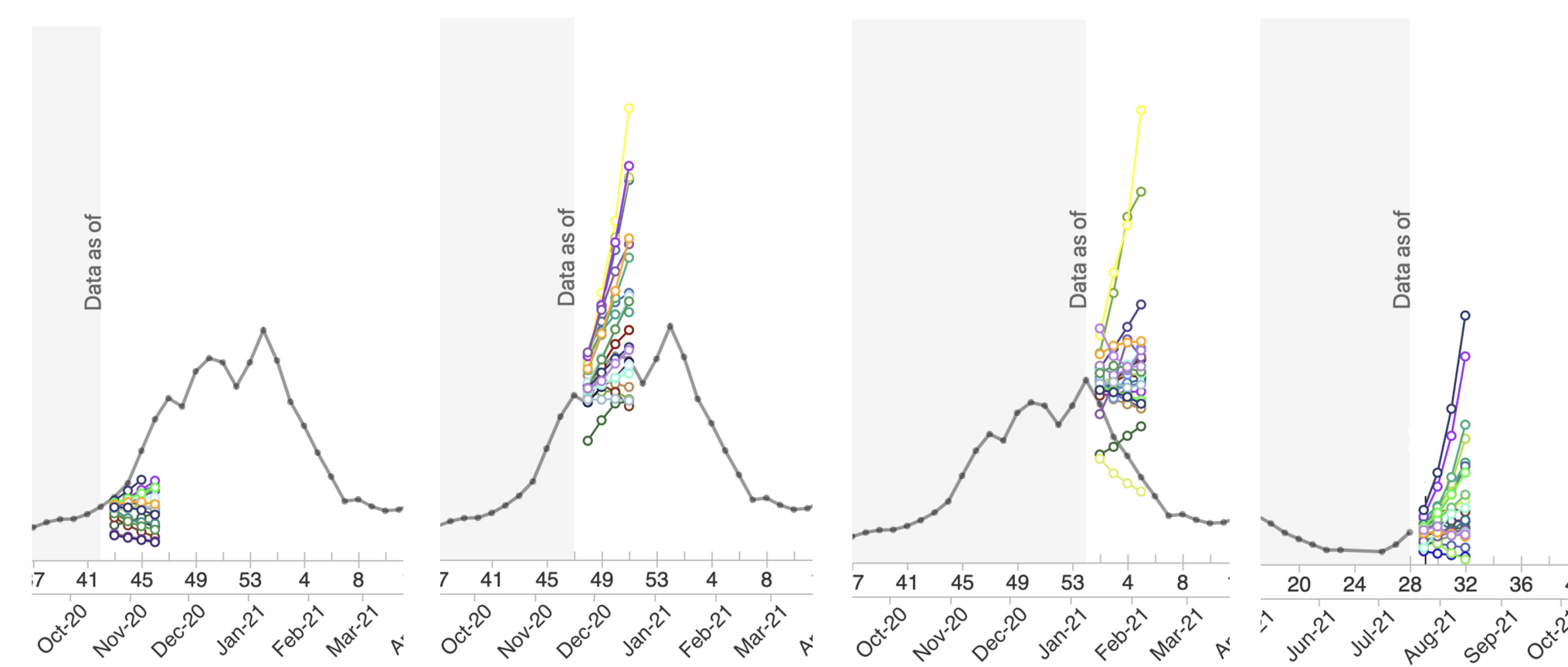


“This Candle Has No Smell”: Detecting the Effect of COVID Anosmia on Amazon Reviews Using Bayesian Vector Autoregression

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1. Motivation



Official CDC prediction models at select dates.

- Predicting Covid is necessary and hard
- Symptoms, opinions and behaviors on social media may precede and predict Covid cases
- But early symptoms are mild and common (cough, sore throat, fever)
- The most distinctive early symptom, *anosmia*, or loss of smell, is rarely discussed – except...

2. Yankee Scented Candle Amazon Reviews

★☆☆☆☆ You can't even smell it!
Reviewed in the United States on December 5, 2021
Verified Purchase

If this is a Yankee candle, then they messed up! There is NO scent! I gave it to my roommate, and they lit it, but you can't even smell it! Don't buy, unless you just like the look of a lit candle! I want my money back!

★☆☆☆☆ No smell!!!!
Reviewed in the United States on December 6, 2021
Verified Purchase

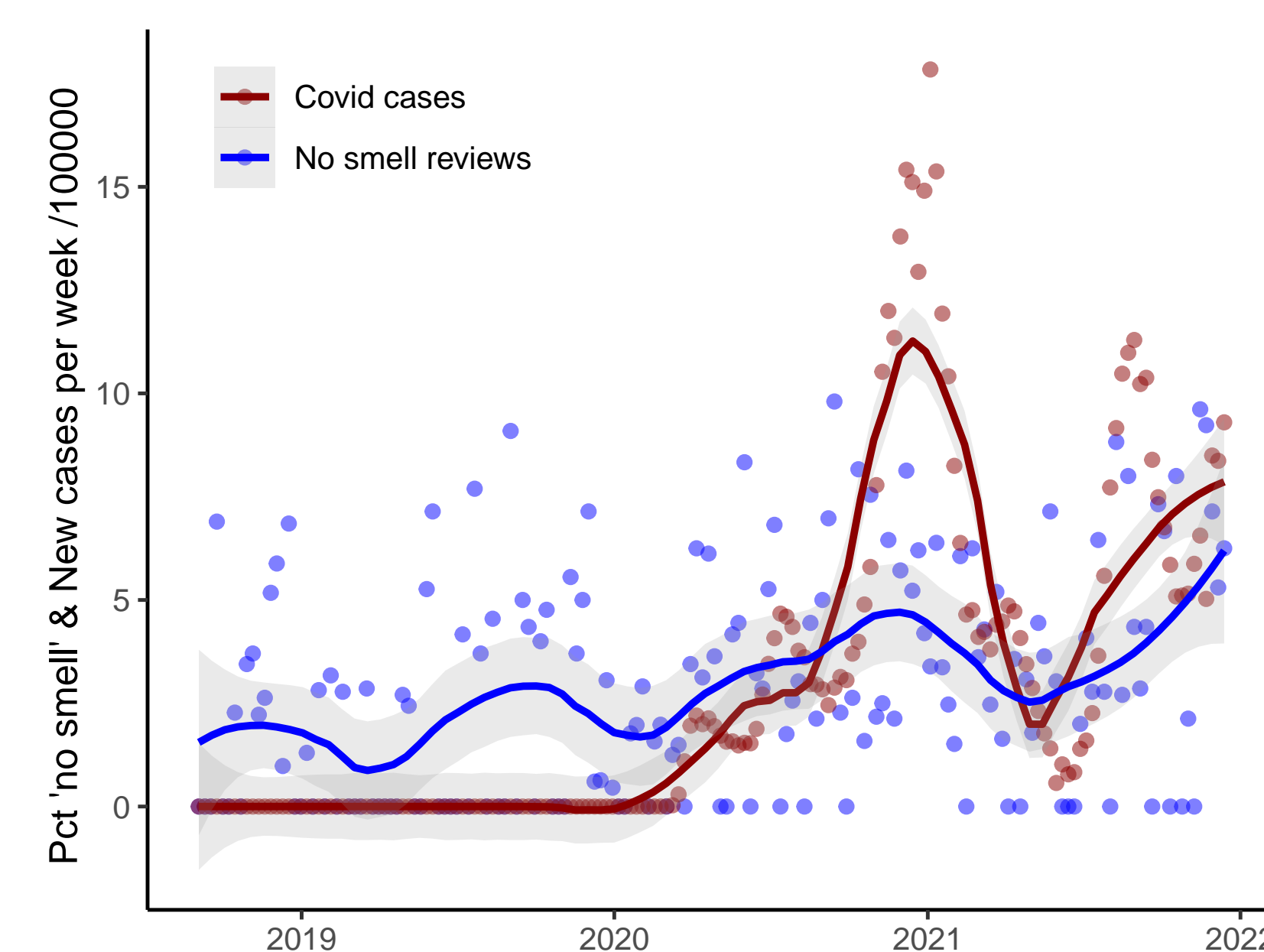
This has no smell at all!! I was shocked because I am an scentes candle junkie and I prefer yankee candles over bath and body but this one is the only one i ever had that hasnt have any smell at all!

★☆☆☆☆ Can not smell it at all@
Reviewed in the United States on December 13, 2021
Size: Large Jar | Style: Fresh Cut Roses | Pattern Name: Candle | Verified Purchase

Waste of money, in my opinion. Can not smell the candle at all. Very disappointed.

A series of viral tweets in 2020 and 2021 raised the possibility that these complaints were due not to product defects, but to anosmia caused by Covid.

3. Cases vs Reviews



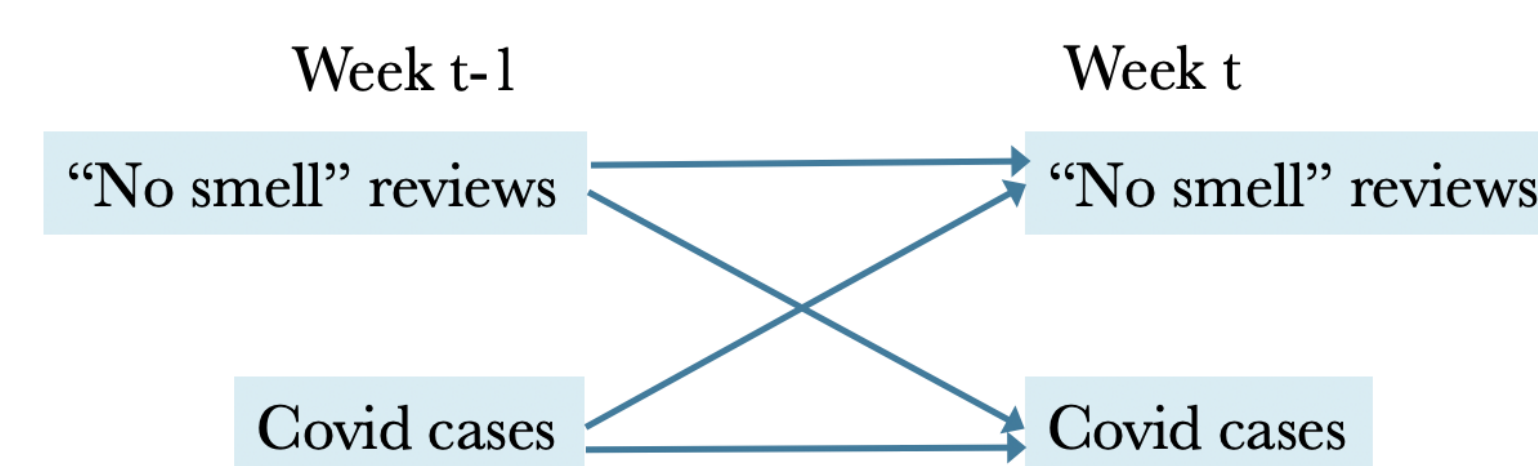
4. Data

- 9837 reviews from the four best-selling *Yankee Candle* brand scented candles on Amazon
- From 9/1/2018 - 12/20/2021
- The percentage of reviews that mentioned “no smell” or “no scent” per week + CDC weekly Covid case rates

5. Bayesian Model

Both reviews and cases are semi-periodic, so is either predictive of the other?

→ Bayesian vector autoregression



$$cov_t \sim N(\mu_1, \sigma_1^2) \quad (1)$$

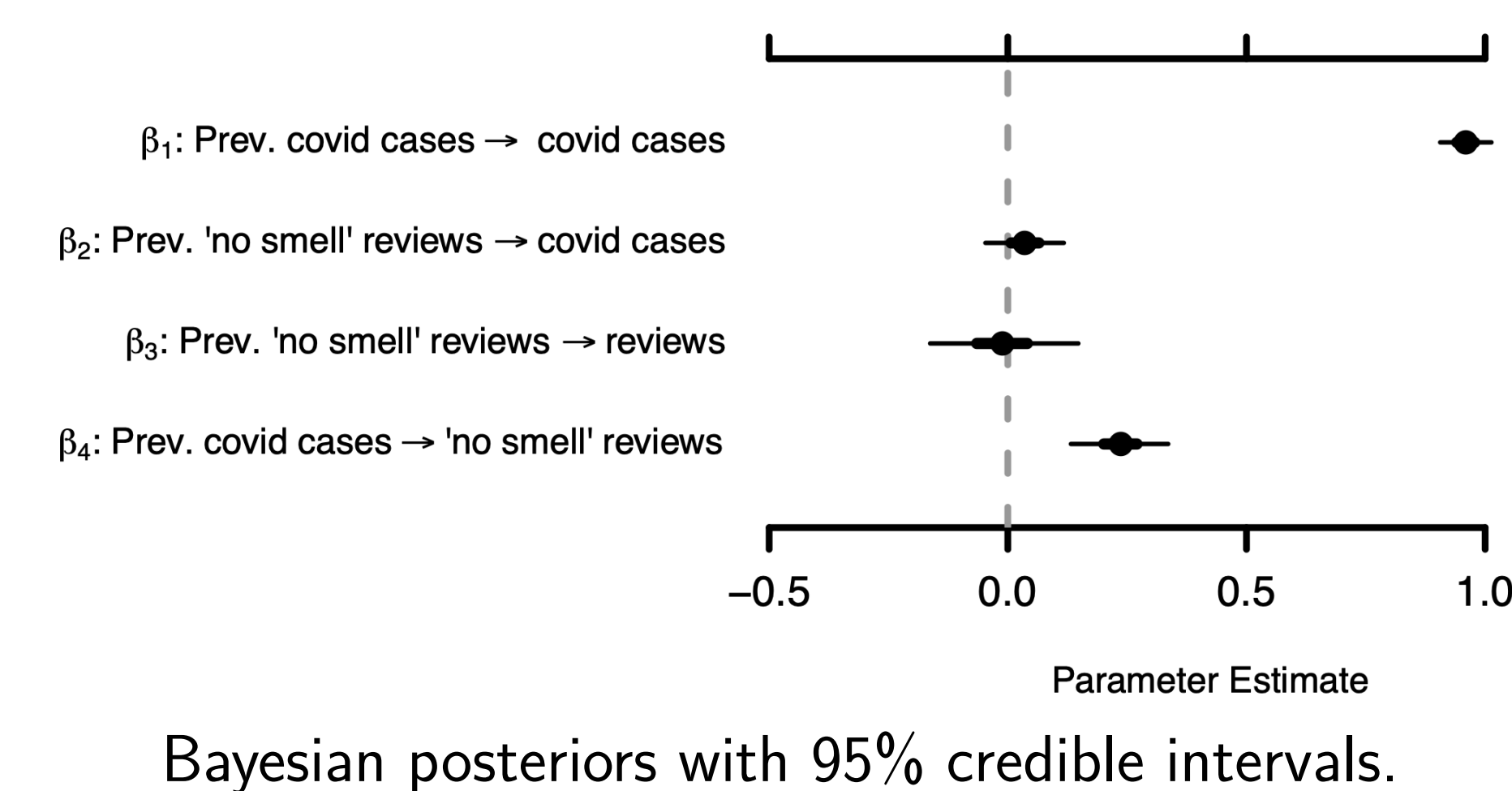
$$\mu_1 = \beta_0 + \beta_1 cov_{t-1} + \beta_2 rev_{t-1}$$

$$rev_t \sim N(\mu_2, \sigma_2^2) \quad (2)$$

$$\mu_2 = \beta_{m(t)} + \beta_3 rev_{t-1} + \beta_4 cov_{t-1}$$

- cov_t = cases at week t ; rev_t = “no smell” reviews;
- $\beta_{m(t)}$ = monthly fixed effects
- Model fit using MCMC in R with strong priors that $\beta_0, \beta_1, \beta_2, \beta_4 = 0$ before the pandemic

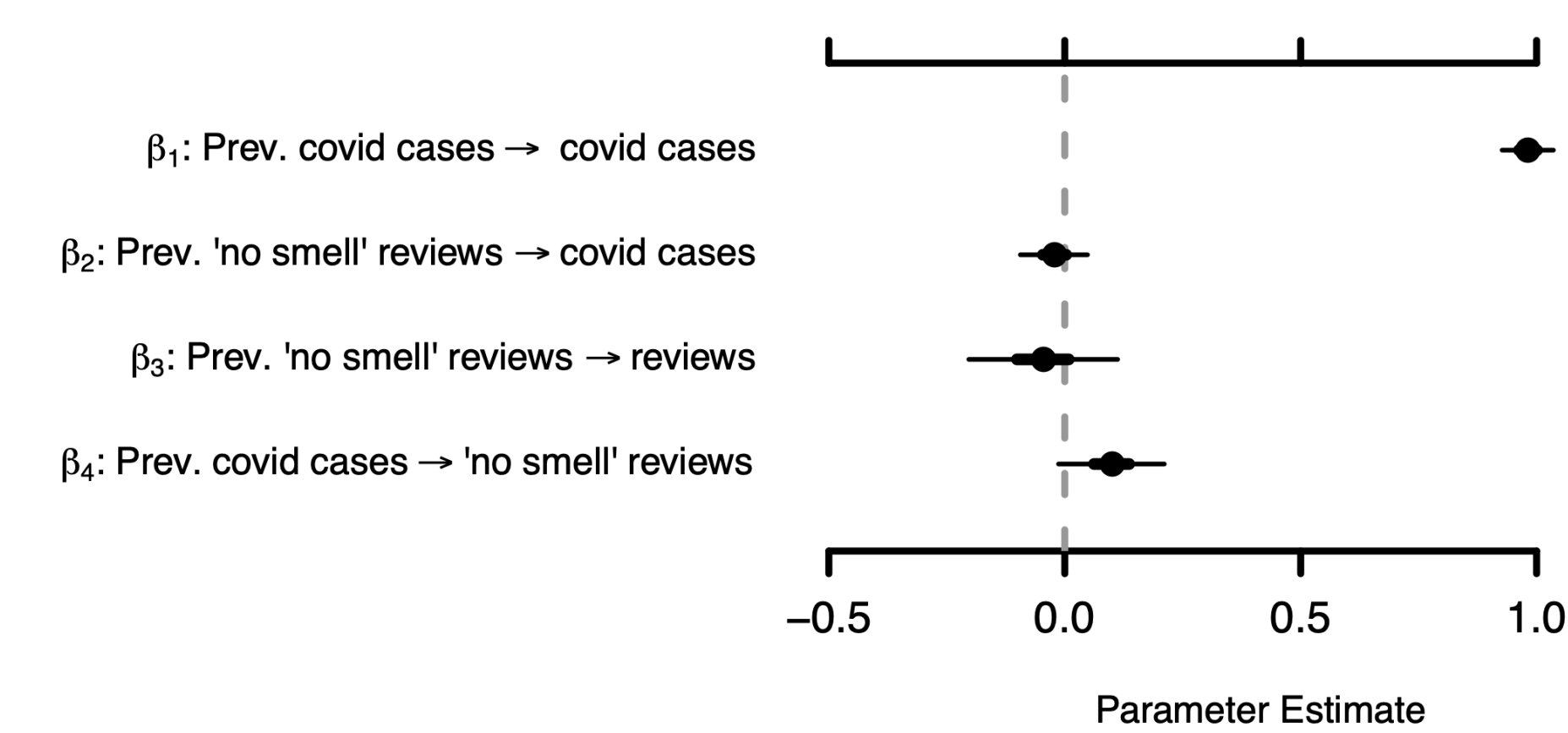
6. Main Results



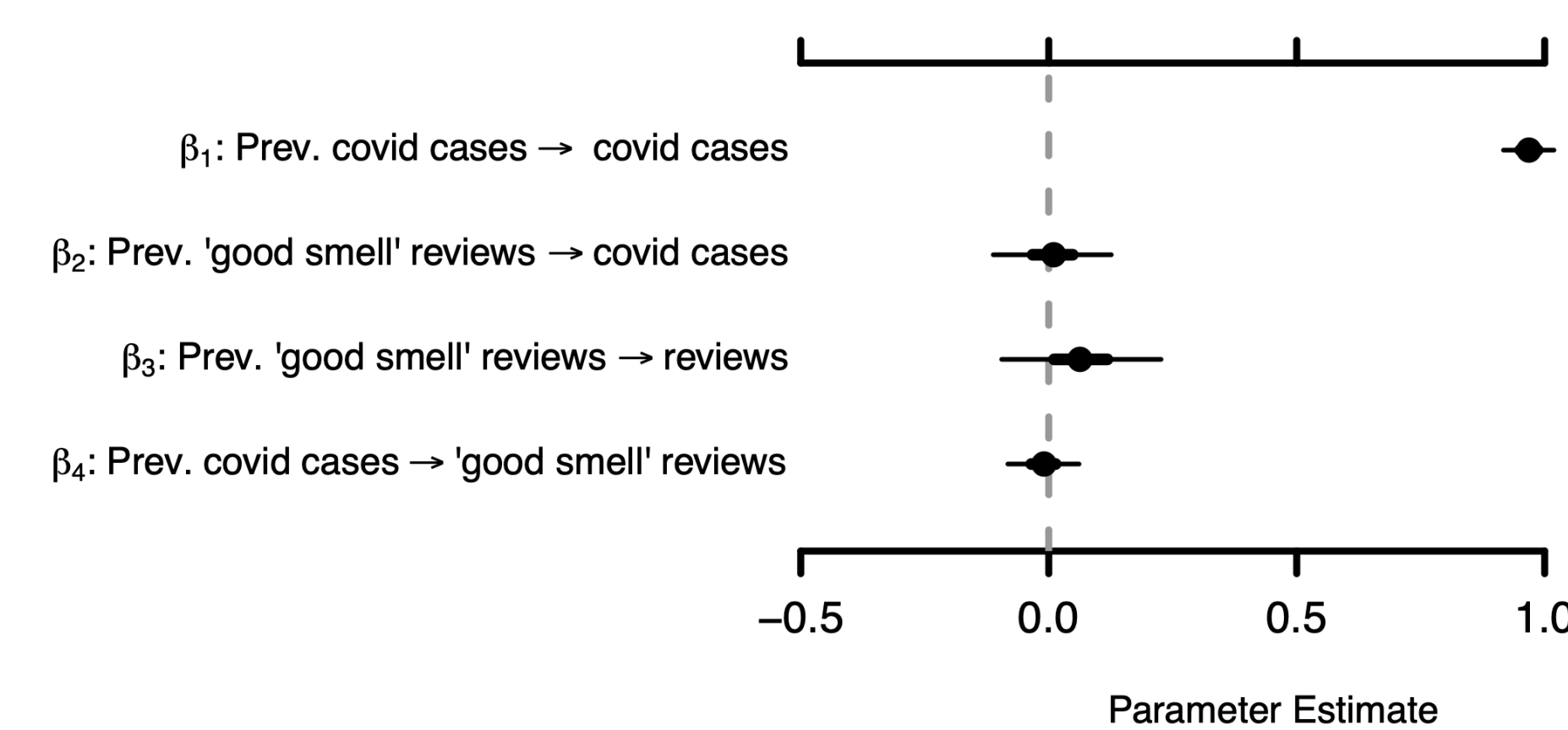
- Covid cases predict reviews ($\beta_4 > 0$)
- But reviews don't predict covid cases ($\beta_2 = 0$).

7. Robustness Checks

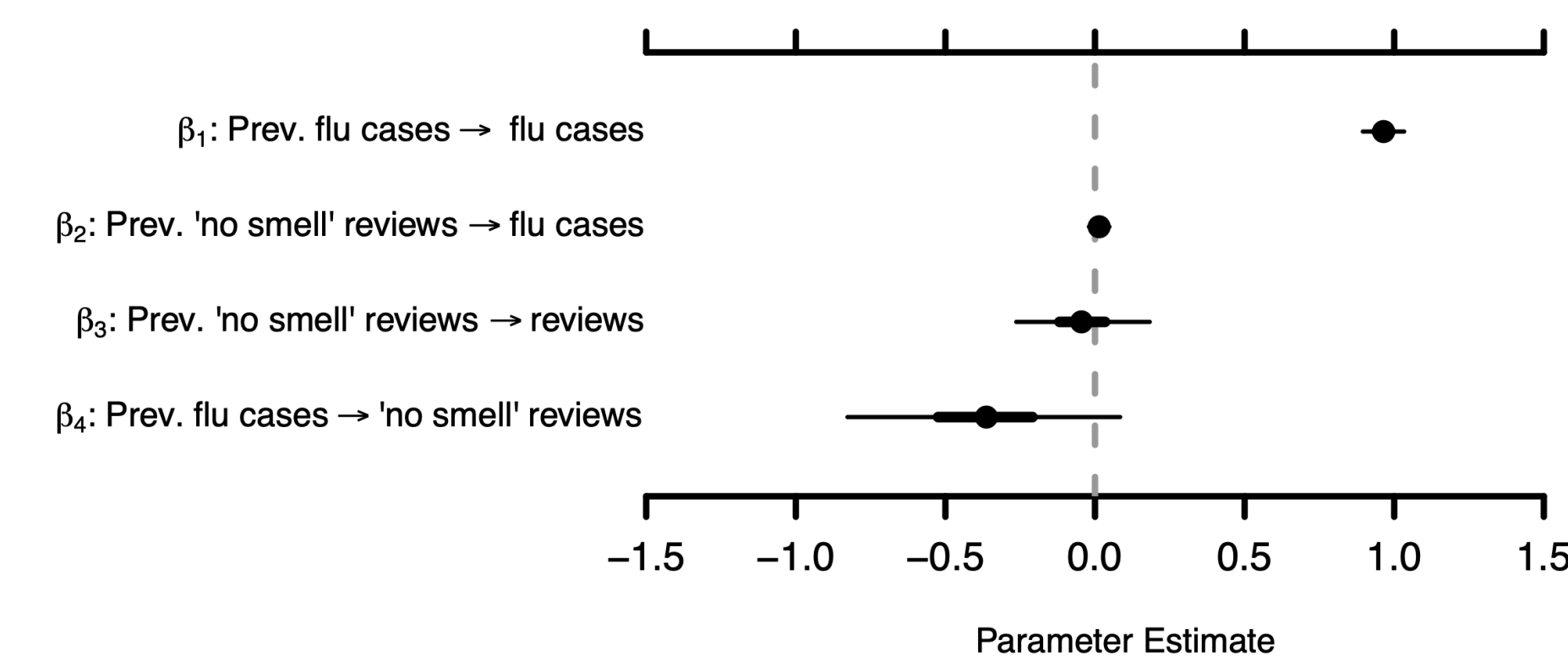
1. Does it hold for perfume complaints? Yes.



2. Does it hold for “good smell” reviews? No.



3. Does it hold for the flu? No.



8. Conclusions

- “No smell” reviews do appear to be partly due to unwitting anosmia caused by Covid
- Alas, reviews do not predict rising Covid cases
- Future improvements include
 - Food/taste reviews for ageusia
 - Other review sites like Yelp
 - Review NLP, sentiment, ratings, etc.

Main take-away:

Cryptic, unwitting or unconscious social media signals, unbiased by expectations, may be valuable predictors of illness, opinions, or behaviors

9. Epilogue

Alas, this is a fragile signal. Since the 2021 viral event the signal has become contaminated.

★☆☆☆☆ Absolutely NO SCENT...And We've NOT HAD COVID
Reviewed in the United States on December 26, 2021
Verified Purchase

What has happened to “Yankee Candle” company? Got the large Balsam and Fir for Christmastime. Nobody could even smell it burning. The press is now saying that the bad reviews for Yankee Candles could be due to loss of smell from Covid. Definitely not the reason for us, thankfully.

★☆☆☆☆ No scent & NOT due to Covid!
Reviewed in the United States on December 28, 2021
Size: Large Jar | Style: Lilac Blossoms | Pattern Name: Candle

Will never buy Yankee Candles again because they have no scent. This has been the issue for years & is NOT due to Covid's smell issue. It's ridiculous for them to say that's the reason for so many bad reviews!!!

★☆☆☆☆ UNSCENTED OMNICRON CANDLE
Reviewed in the United States on December 28, 2021
Verified Purchase

I wasn't going to write a review of this candle until I read an article about the reason that “WE” couldn't smell our new candles. Apparently, COVID is the reason. We can't smell it because we have lost our sense of smell. That's right “All of us who write these reviews”. FYI, I have never had COVID! How can you explain that I can smell the litter box but not the candle? These candles are just a big paperweight and a waste of money! Don't buy Yankee anymore folks, the product is not up to par anymore.

References and Paper



<http://nickbeauchamp.com/work/beauchamp-candles-ICWSM.pdf>