Tracking the Spread of Climate Change Skepticism on X with Simulations and Deep Learning

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INTRODUCTION

Despite escalating climate impacts, skepticism persists and spreads rapidly through social media [1, 2], which amplifies misinformation and weakens the urgency for action [3, 4, 5]. Understanding the mechanisms behind this spread is critical for effective climate communication.

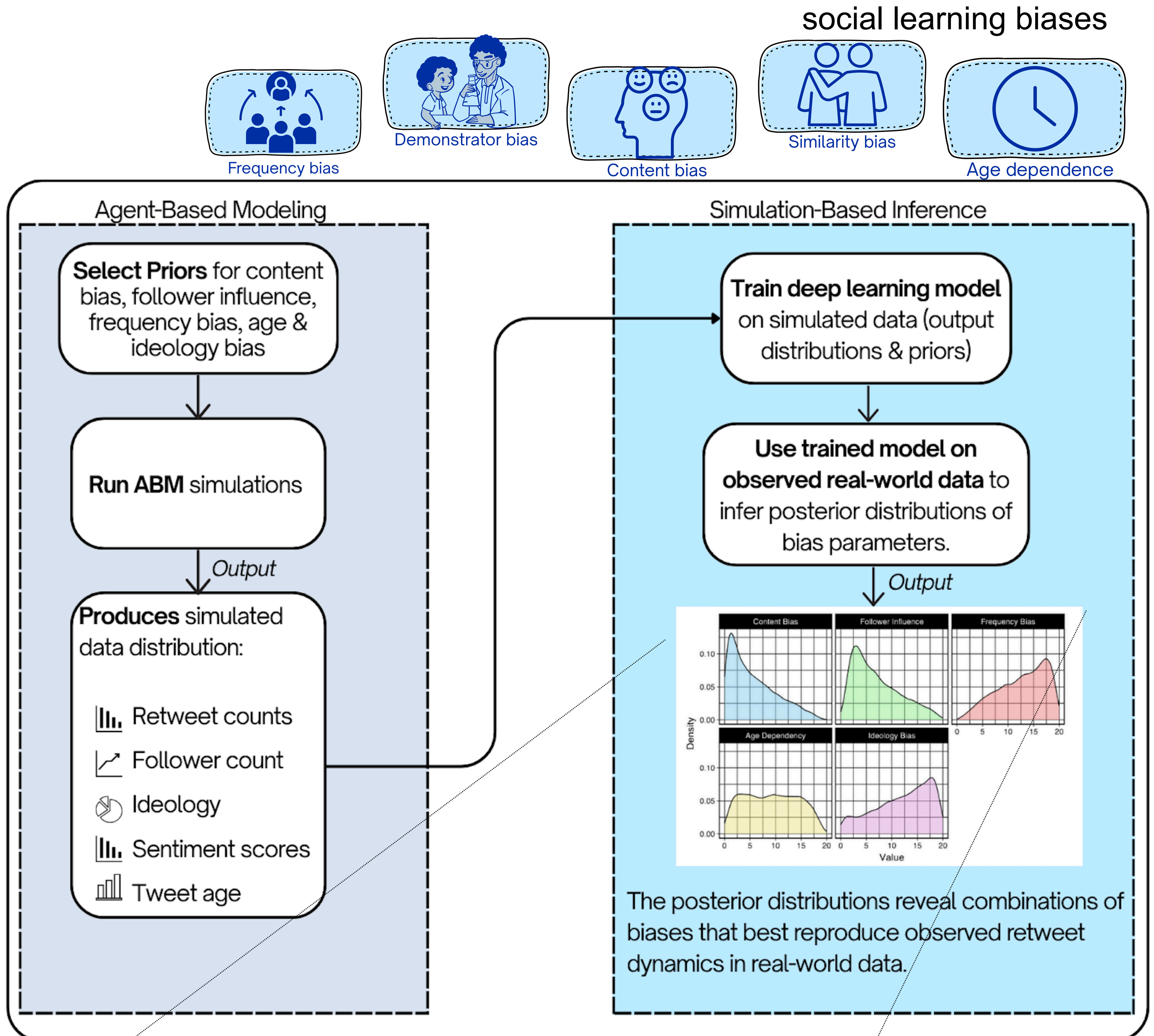
Research Question: Which social learning biases best explain how climate beliefs spread on X?

OBJECTIVE

We propose an **agent-based modeling & simulation-based inference** framework to reveal which **social learning biases** shape climate change conversations on X, offering insights to improve online climate dialogue.

METHODOLOGY

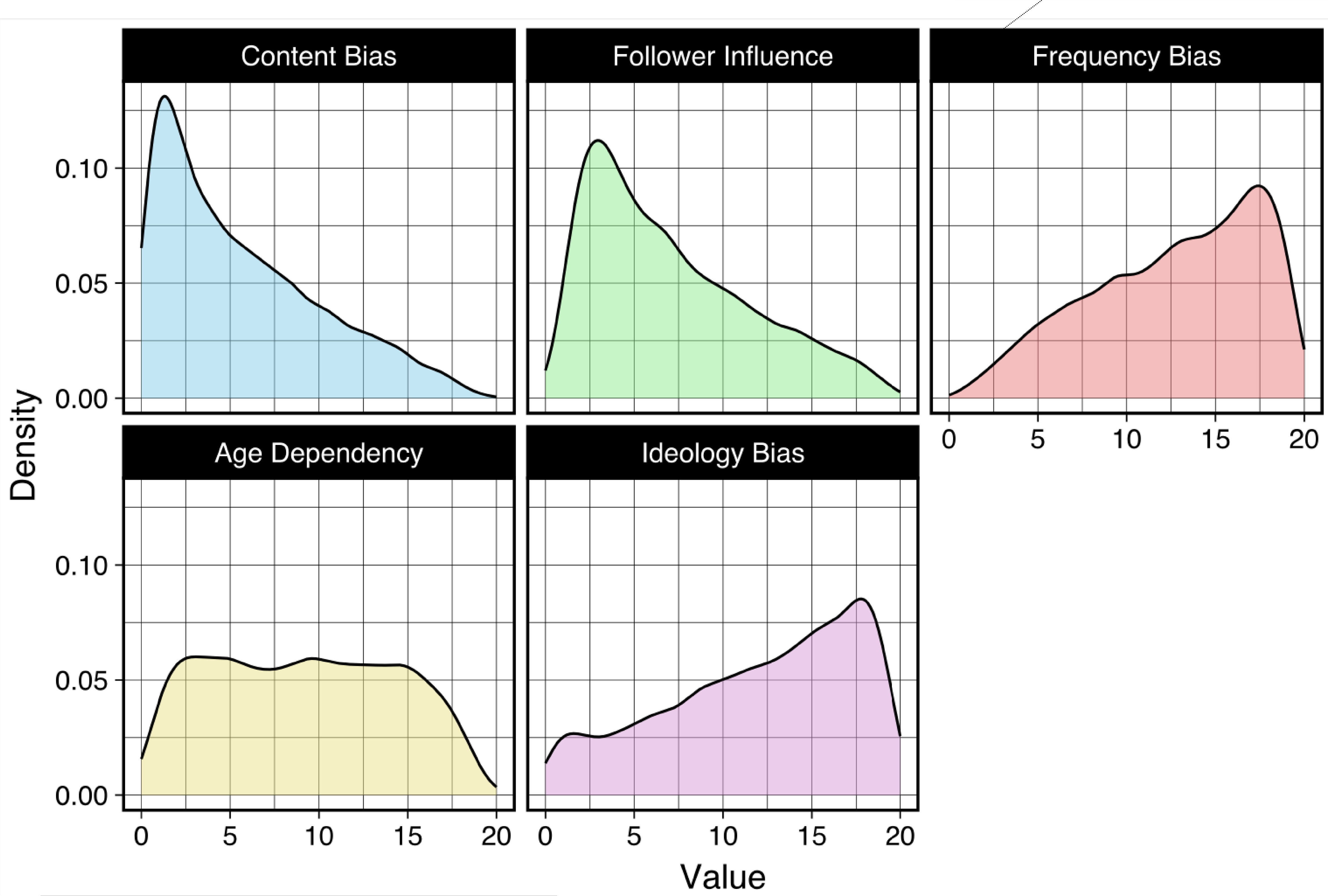
social learning biases



PRELIMINARY FINDINGS

Frequency & Ideology effects > **Content & Follower influence**

Preliminary GLMM analysis revealed that retweeting is ~40% higher within ideological groups, which aligns with the result above.



FUTURE WORK

Use (**Generalized Linear Mixed Models**) GLMMs to test whether retweeting behavior differs across ideological communities in the data.

IMPACTS

The insights from our work will help: (1) identify biases (e.g., if users have a bias towards negative tweets, moderators might design controls to limit the spread of negative or misleading content).
(2) Guide policy makers and climate communicators on message framing.

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[5] Matthew J. Hornsey et al. Climate skepticism decreases when the planet gets hotter and conservative support wanes. Global Environmental Change, 74:102492,129 2022.130