# PLSC 508 REPLICATION

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**ABSTRACT**

***K*eywords** First keyword · Second keyword · More

## 1 Introduction

Due to advances in data access, computing power, and statistical techniques, the measurement of latent ideological positions has made significant strides in recent years. This represents a significant and exciting methodological advancement in political science as it enables researchers to control for and explain ideological dimensions in populations where this was previously not possible. A network based approach proposed by Barbera in 2015 is one such technique that has proven robust. In this paper I leverage methodological and computational advances to iterate upon Barberas method and propose future research to further improve ideal point estimates. Specifically, I examine the impact of changing the functional form of Barberas model to a bilinear model.

## 2 Data and Model

Barbera uses a sample of the twitter accounts belonging to political elites and their followers. A follower network is constructed from this sample such that Yij = 1 if twitter user i follows political elite j and Yij=0 otherwise. The decision to follow a particular elite is modeled as a logistic function of both the elite and users political ideology. Additional controls for the popularity of elite j and political interest of user i are also introduced. The decision of a given use to follow a given elite is thus modeled as such:

$$P(y_{ij} = 1|\alpha_j, \beta_i, \gamma, \theta_i, \phi_j) = logit^{-}1(\alpha_j + \beta_i - \gamma||\theta_i - \phi_j||^2) \tag{1}$$

Where $\alpha_j$ is the popularity of a given elite, $\mathcal{B}_i$ is the political interest of a user, $\theta_i$ is the ideal point estimate of a given users, $\phi_j$ is the ideal point estimate of a given elite, and $\gamma$ is a normalizing constant.

For this research, the most significant assumption in this model is the assumption that a user's decision to follow an elite is a function of the squared euclidean distance of the ideological point estimates of user i and elite j: $-\gamma||\theta_i - \phi_j||^2$

I re-examine this model by instead assuming a bilinear relationship between ideological point estimates and a users decision to follow a political elite: $-\gamma(\theta_i \times \phi_j)^2$

The model I test is thus a slight variation on Barbera's:

$$P(y_{ij} = 1|\alpha_j, \beta_i, \gamma, \theta_i, \phi_j) = logit^{-}1(\alpha_j + \beta_i - \gamma(\theta_i \times \phi_j)^2) \tag{2}$$

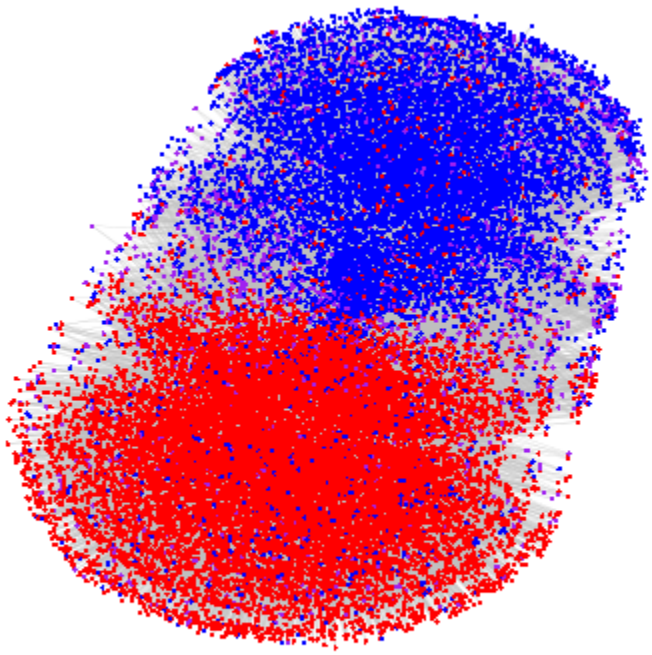
To test this I used Barberas original network data from the United States with the euclidian and bilinear model implementations in Rs latentnet package. The data is a set of political actors with twitter accounts circa 2014 that consists of: (1) political representatives in national-level institutions; (2) political parties with twitter accounts; and (3) political media outlets and journalists. Only twitter users with over five thousand followers were used. This results in a total

of 318 political elites. From these political elites a sample of 301,537 of their combined followers was taken. The sample was created by subsetting the entire population of their combined followers to those who (1) have sent over one hundred tweets; (2) have sent at least one tweet in the past six months; (3) have more than twenty-five followers; (4) are located inside the borders of the United States; (5) follow at least three political twitter accounts.

## 3 Analysis

In this section I replicate Barberra's original study and compare the results of the original model to the bilinear specification.

Follower network:



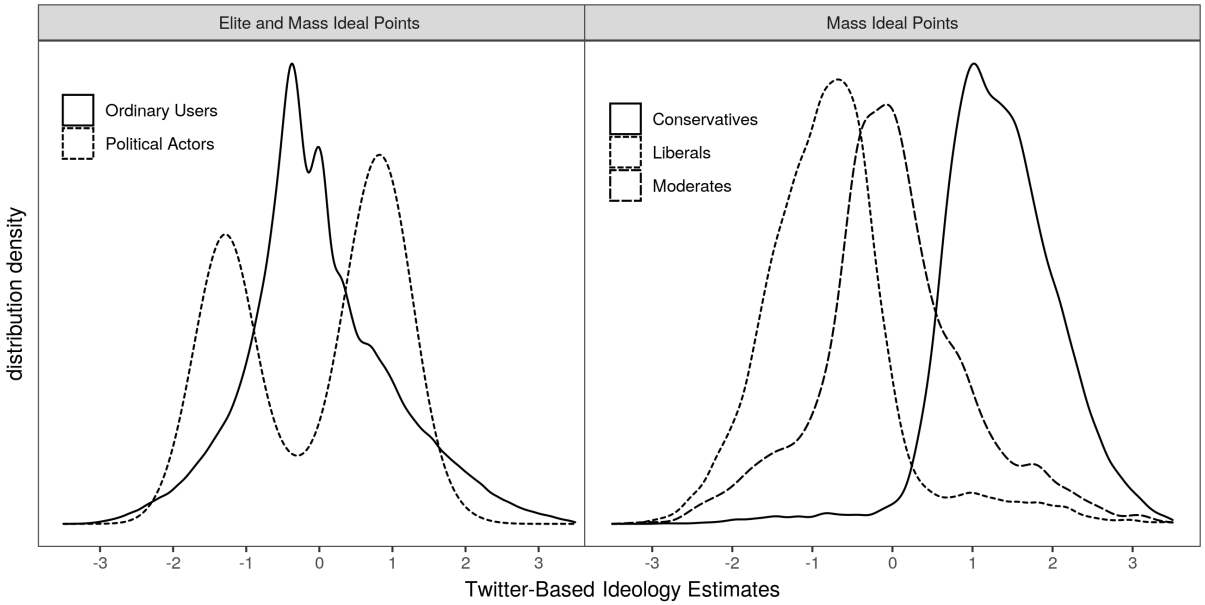
### 3.1 Mass Ideology at the Aggregate Level

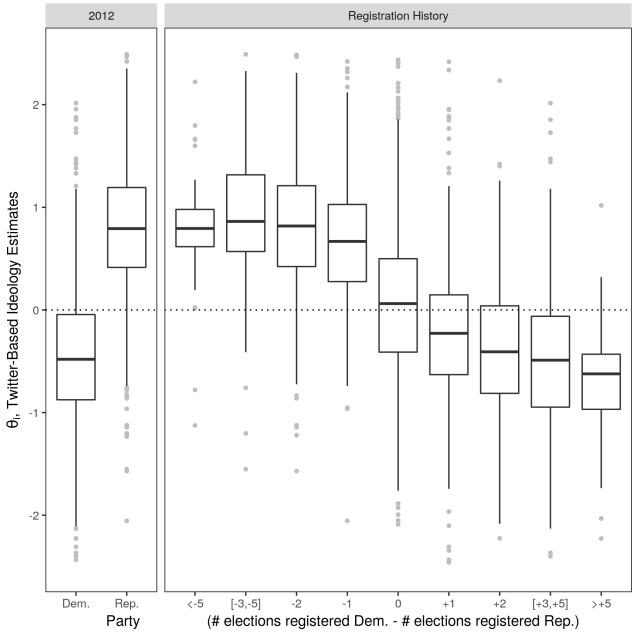
Correlation between state ideal point estimate and proportion of citizens that hold liberal opinions: $\rho = 0.877$

Correlation between state median ideal point estimate and two-party vote for Obama in 2012: $\rho = 0.785$

### 3.2 Mass Ideology at the Individual Level

Correlation between state ideal point estimate and campaign contribution records: $\rho = 0.798$

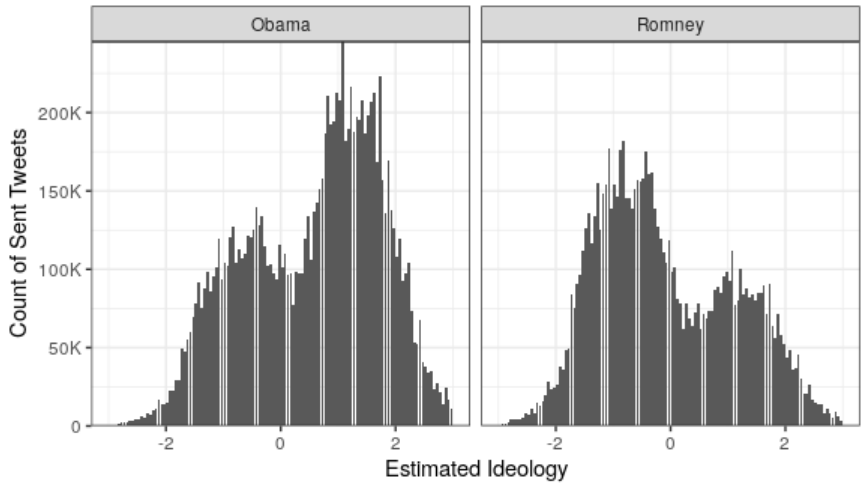


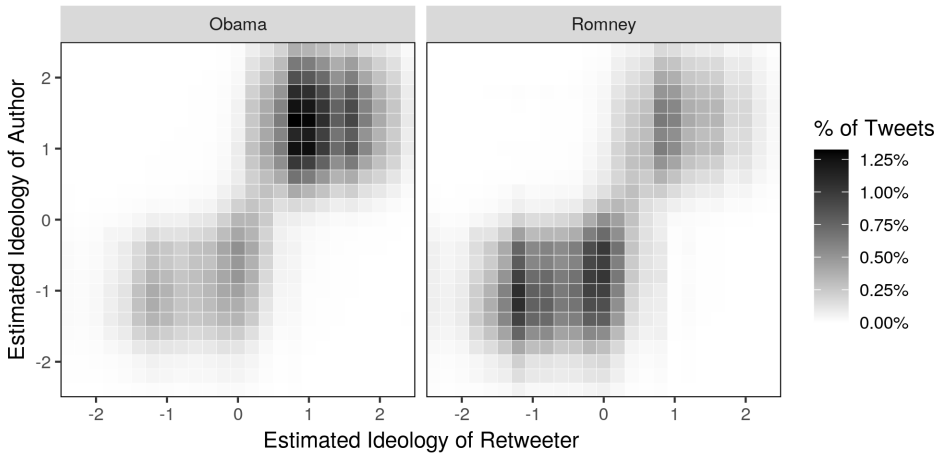




### 3.3 Twitter's Echo Chamber

## References

[1] Pablo Barberra Birds of the same feather tweet together: Bayesian ideal point estimation using Twitter data *Political analysis* no. 1 (2015): 76-91.


Obama
Romney
Count of Sent Tweets
200K
150K
100K
50K
0
-2
0
2
Estimated Ideology


Obama
Romney
Estimated Ideology of Author
2
1
0
-1
-2
Estimated Ideology of Retweeter
% of Tweets
1.25%
1.00%
0.75%
0.50%
0.25%
0.00%