

Towards a General Methodology of Bridging Ideological Spaces

Non-Parametric and Multi-Dimensional Ideal Point Estimations of Voters and Politicians

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Existing “Bridging” Methodologies

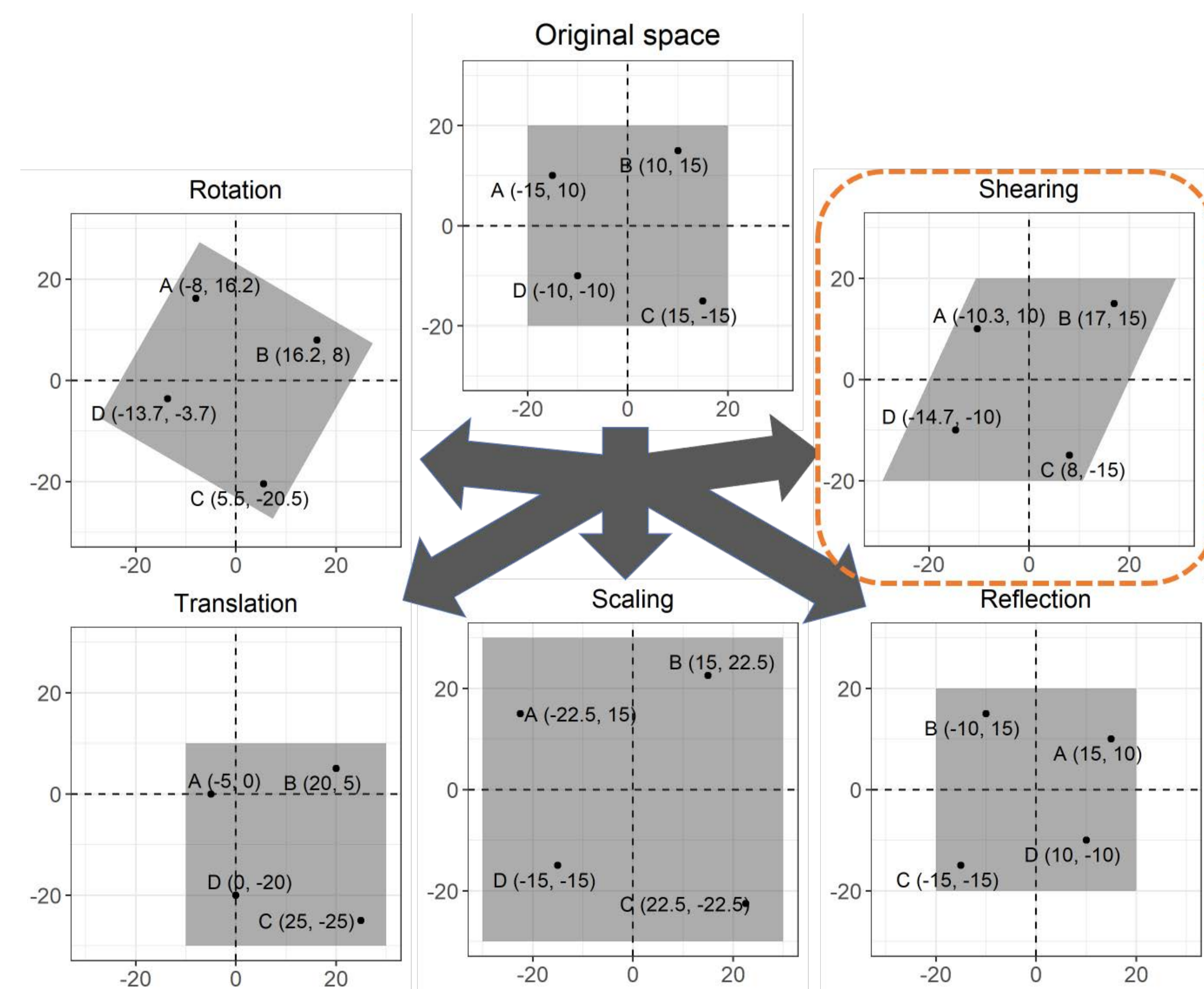
Ideal point estimation is **data-dependent**. We cannot simply compare/merge ideal points estimated on two separate datasets. To remedy this, two broad categories of “bridging” methodologies have been developed:

- **Joint Scaling:** Merge two (or more) datasets and jointly estimate ideal points.
- **Dimensional-Mapping:** Separately estimate ideal points and transform one set of ideal points, mapping them onto the dimensional space of the other.

Problem: Joint scaling is inappropriate if two ideological spaces **have different structures**. Existing dimensional-mapping methods (e.g., parametric model prediction & linear regression) cannot be easily or effectively applied to **non-parametrically estimated and/or multi-dimensional** ideal points.

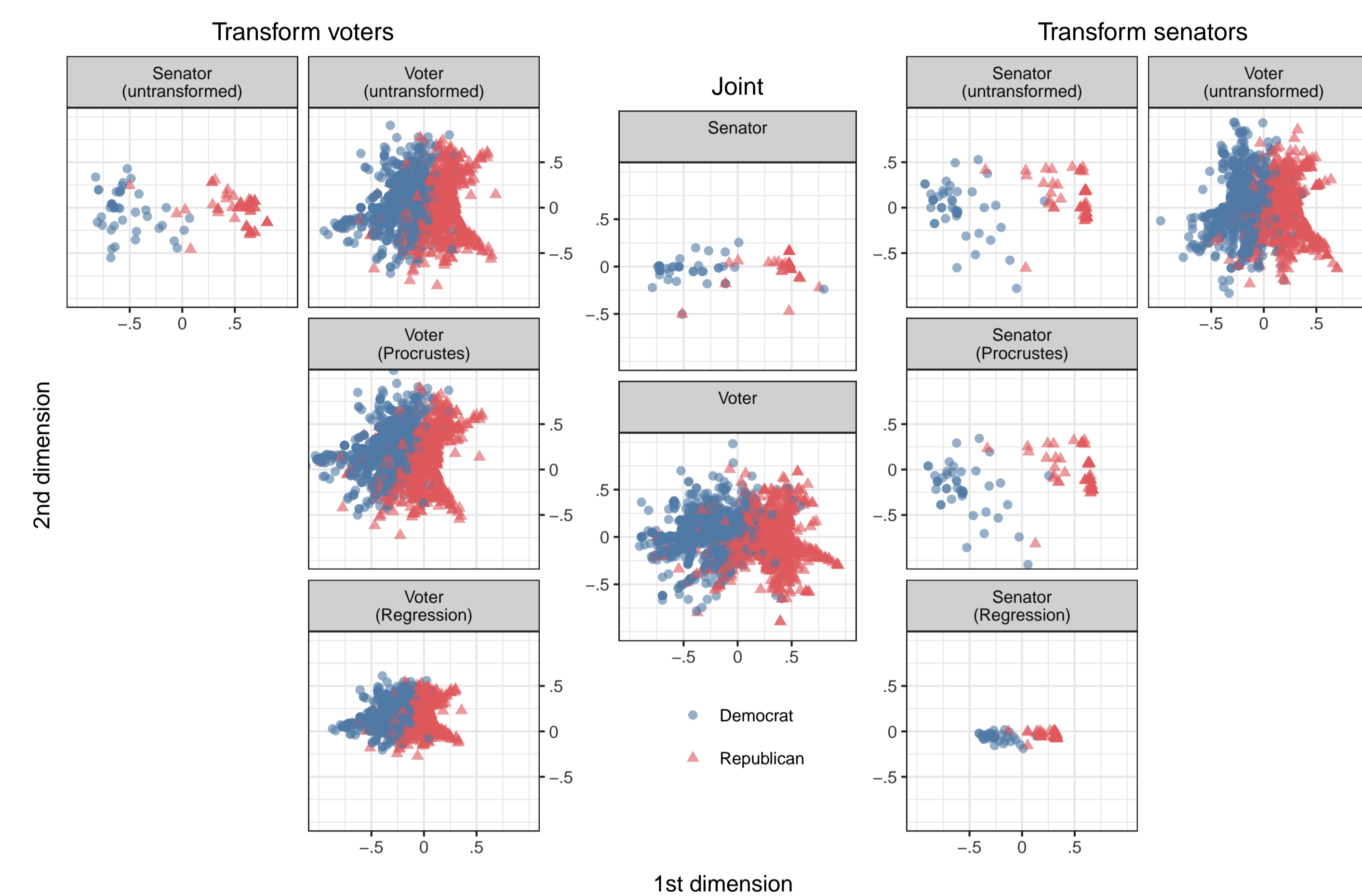
Our Approach

We propose a new dimensional-mapping technique that utilizes the non-parametric **Procrustes transformation**. This enables our method to bridge non-parametrically estimated ideal points spaces. Also, in contrast to existing methods (e.g., linear regression), our method **avoids shearing**, which can lead to over-fitting when bridging multi-dimensional spaces, and can use **synthetic**, rather than actual, anchors to bridge spaces.



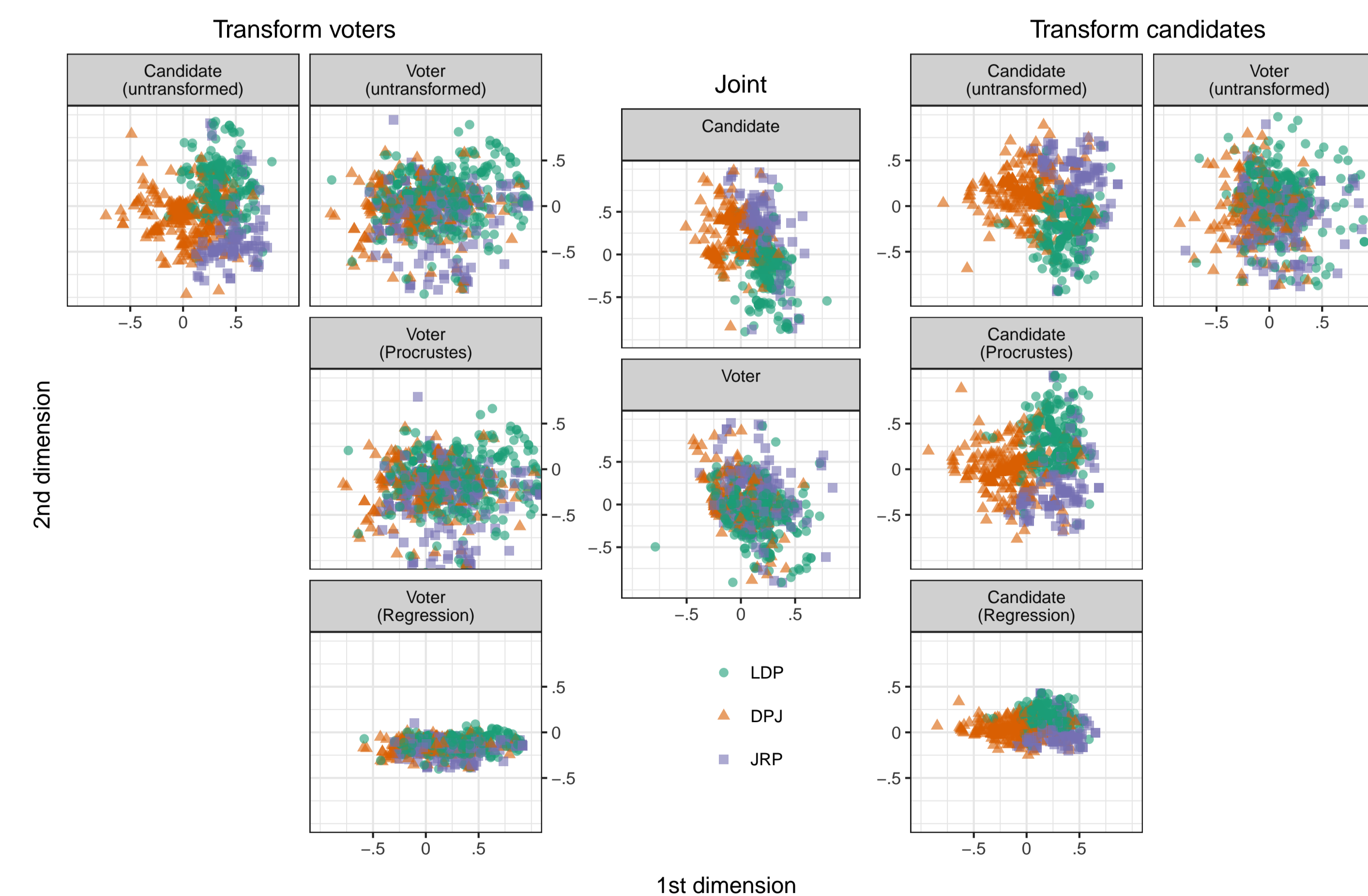
Application 1: Bridging American Voters and Senators (2005–06)

Voters: Senate Representation Survey (Dec. 2005 to Jan. 2006), N=3423; Senators: Roll-call votes in 2004-2005 Congress, N=99.



Application 2: Bridging Japanese Voters and Candidates (2012)

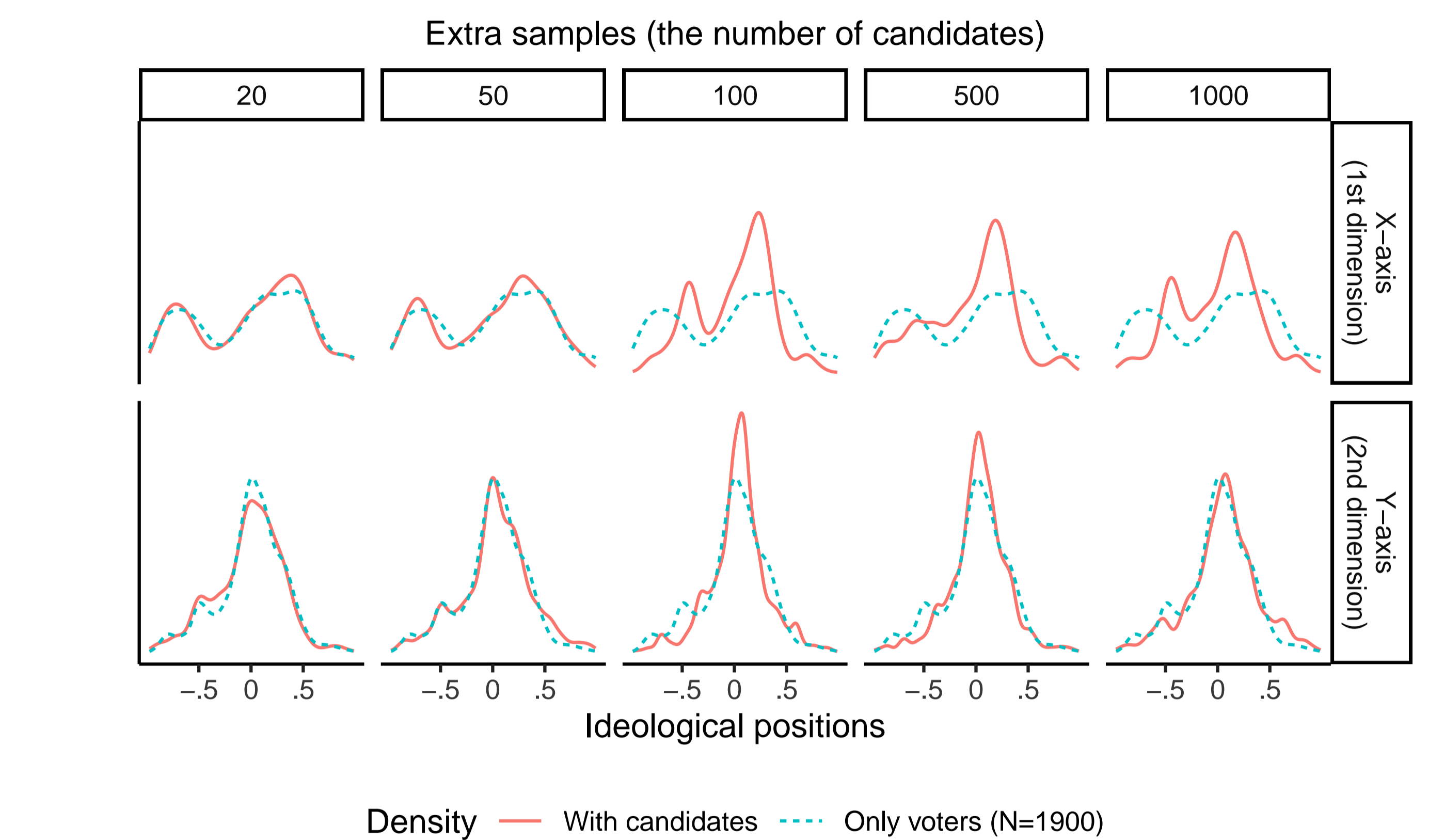
U-Tokyo Asahi Survey (fielded after the 2012 House of Representatives election). Voters N=1900; Candidates N=1404.



Application Takeaways:

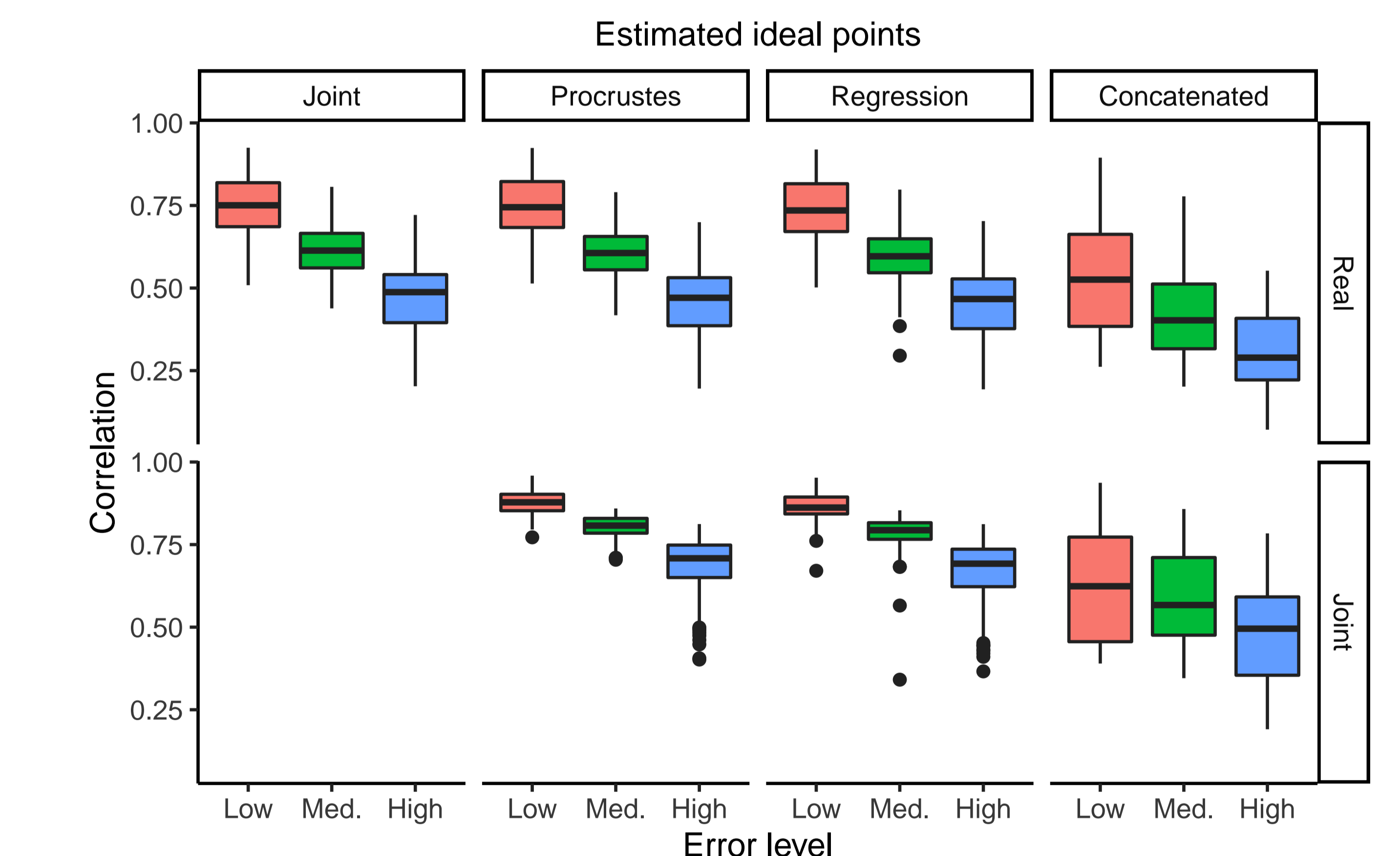
- ⇒ **Voters and elites may not share the same ideological structure.**
- ⇒ **Regression transformation distorts and loses important information when bridging between the two groups.**

Validation through Monte-Carlo Simulation (UTAS 2012)



⇒ **If small enough, the inclusion of extra samples does not seriously distort ideal point estimation.**

Evaluation through Monte-Carlo Simulation (Generated Data)



⇒ **Procrustes transformation performs just as well as (if not better than) other methods, with fewer assumptions.**

Discussion

- We propose a bridging method that is **more general, flexible, and applicable than existing methodologies**.
- Our method makes **fewer assumptions** and **performs no worse** than existing methods (i.e., joint scaling and regression transformation).