

Armed with novel statistic, researchers push back against partisan bias in redistricting

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Voting districts are redrawn every 10 years — after each U.S. census — to reflect changes in population. The process can be manipulated by "gerrymandering," drawing districts that have irregular shapes to effectively "stack the deck" in favor of one party or another. Today, as mapping capabilities have evolved, political insiders can create districts with unremarkable shapes that still lock in safe seats for one party.

In recent years, voters have attempted to rein in such abuses, with Californians passing two ballot measures, each declaring, "In the current process, politicians are choosing the voters instead of voters having a real choice. This reform will put the voters back in charge."

Still, the cross-cutting interests at play and the complexity of the process can make it difficult to determine whether partisan bias will be better or worse with a given redistricting plan.

Now, researchers at UCLA have developed an innovative one-number summary for evaluating redistricting plans, relying solely on census data and geographical information. The measure makes comparing plans as transparent as assessing the gas mileage of different cars or the energy efficiency of various appliances.

Tom Belin, a professor of biostatistics at the UCLA School of Public Health, led the research effort that gave rise to the idea of a "density-variation/compactness," or DVC, measure, showing that district plans that have less variation in population density and greater average

geometric compactness tend to have less partisan bias.

The research is published in the current issue of the online journal *Statistics, Politics, and Policy* (bit.ly/1AKIHL);

Despite landmark "one-person, one-vote" Supreme Court rulings in the 1960s, which held that districts of unequal size underrepresent some voters' interests and overrepresent others, it is still possible to "pack" voters of the opposition party into a small number of districts while maintaining a partisan advantage in other districts.

The researchers compare current redistricting dynamics to a scenario in which one of the teams vying for the NBA championship would be allowed to dictate that several games in the seven-game series would be played six-on-four rather than five-on-five — as long as the average number of players across games was five to a side.

Not every legislative district will be as competitive as a five-on-five basketball game even with the DVC information, the researchers note, but plans with higher DVC scores tend to contain more districts in which close elections would be expected.

The researchers developed the DVC measure using voter registration data from California, then tested its performance on election data from Texas, where there have been several high-profile redistricting battles over the past decade. As with grade-point averages, a DVC value of 4.0 would be a high score, but the DVC score can also be a negative number if a plan has less balance in population density than there was in the year 2000, which was taken as a baseline year. As it happened, all of the actual redistricting plans since 2000 in California and Texas had negative DVC scores.

The approach could have implications for polarized politics in many

states and in the nation as a whole.

"Would Californians have embraced the redistricting done in 2002 knowing that its DVC score was -2.92, when a DVC score of 3.00 was possible?" Belin asked. "Maybe. But maybe a lot of people would have been embarrassed to think that -2.92 is the best they could do by way of self-governance."

Although it might seem surprising that publishing a one-number summary for each proposed redistricting plan would have much impact, Belin cited a familiar example of how a statistic can have a game-changing effect.

"In the 1980's, the airline reservation systems used by travel agents favored the shortest flights, so airlines gamed the system by publishing schedules with unrealistic arrival times. All it took to bring reality back into the system was to require airlines to publish on-time arrival statistics."

Would publication of DVC scores have a game-changing impact?

Belin thinks so, and when the newly created California Citizens Redistricting Commission held a public-input hearing in Los Angeles in late April, he made the case that constituencies favoring less gridlock in government would easily qualify as "communities of interest."

"For the sake of transparency, it is imperative that this commission report a DVC score for each plan you submit for public consideration," he told the commissioners. "The 2002 redistricting had a negative DVC score — it didn't have to — and it had consequences."

In addition to Belin, members of the research team included Heidi Fischer, a current Ph.D. student in the UCLA Department of

Biostatistics, and Cory Zigler, who received his Ph.D. from the UCLA Department of Biostatistics in 2010 and is now a postdoctoral fellow at Harvard University.

Provided by University of California Los Angeles

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