PHPE 308M/PHIL 209F
Fairness

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Kfir Eliaz and Ariel Rubinstein (2014). *On the fairness of random procedures*. Economics Letters, 123, pp. 168 - 170.

After a decision problem and two procedures (Procedure A and Procedure B) are described. The following is asked to an individual:

In your opinion, from the point of view of (an entity indicated in bold letters):

1. Procedure A is fairer than B (denoted by A)
2. Procedure B is fairer than A (denoted by B) or
3. Both procedures are equally fair (denoted by $A \sim B$).

P1: randomly pivotal

Consider a committee of 15 members that needs to decide by majority vote whether or not to fire some employee. Simultaneously, each committee member puts his name and his vote in a sealed envelope. The committee chair collects the envelopes and meets in private with the employee. Compare the fairness (from the point of view of the committee members) of the following two procedures for communicating the decision to the employee.

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(A) The committee chair opens the envelopes in private and counts the votes. He announces the outcome of the vote to the candidate and shows him the content of each envelope in some random order.

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(A) The committee chair opens the envelopes in private and counts the votes. He announces the outcome of the vote to the candidate and shows him the content of each envelope in some random order.

(B) The committee chair opens the envelopes in some random order in front of the candidate. For each opened envelope he announces the name of the committee member and his vote. When at some point, a majority of votes is reached the chair announces the outcome and continues to open the remaining envelopes.

P1: randomly pivotal

Procedure A is intuitively fairer than B since in B one of the committee members appears to be responsible for the firing decision, in violation of:

(C1) It is fair to treat all individuals equally ex-ante.

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Results:

A	B	$A \sim B$
56%	18%	26%

P2: random dictatorship

You are a student in a class that needs to select one of two exam dates. Compare the fairness (from the point of view of the students) of the following procedures for making the decision.

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(A) One of the students is selected at random and is asked to make the choice. His identity will be announced and his decision will determine the outcome.

(B) Each student has to submit a note bearing his name and his choice. One of the notes will be randomly picked; the identity of the student will be announced and his choice will determine the outcome.

P2: random dictatorship

The two procedures are versions of the "random dictator" voting method. Both treat all individuals equally ex-ante (it satisfies (C1)), but only Procedure B is more likely to be viewed as fairer since it is the only one satisfying:

(C2) It is fair to allow all individuals to actively participate in the procedure whatever the realization of the random elements.

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Results:

A	B	$A \sim B$
5%	52%	43%

P3: implicit or explicit randomization

Consider an employer who needs to fire at most one worker who failed some qualification exam. All workers have taken the exam, some passed some failed. Compare the fairness (from the point of view of the workers) of the following procedures for selecting the worker to be fired.

P3: implicit or explicit randomization

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(A) The employer reviews the list of exam results at a random order. The first worker to fail the exam is fired.

(B) The employer selects a worker at random from among all the workers who failed the exam.

This problem is related to experiment 9 in Keren and Teigen (2010). They asked subjects to rank four types of random procedures for deciding which patient will receive treatment. Their findings indicate a tendency to view a coin toss as fairer than procedures such as drawing a piece of paper out of a hat or randomly choosing one of the rooms in which each patient is waiting.

Gideon Keren and Karl H. Teigen (2010). *Decisions by coin toss: Inappropriate but fair*. Judgment and Decision Making, 5(2), pp. 83 - 101.

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Both procedures satisfy (C1) and (C2): Ex ante, each worker who failed the exam has the same chance of being fired. In addition, all workers actively participate in the procedure by taking the exam.

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Both procedures have two stages: In A, the random element is activated first and then the exams are marked; In B, all exams are marked and then the random element is realized. But only B satisfies the following:

(C3) It is fair to delay any asymmetry in the treatment of participants to as late a stage as possible in the procedure.

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Results:

A	B	$A \sim B$
6%	40%	54%

P4: the doctor or the mother

Suppose two twins need to receive a kidney transplant from their mother. The mother can donate only one kidney. Compare the fairness (from the point of view of the mother) of the following two procedures for determining who will receive the kidney.

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(A) The doctor will toss a coin.

(B) The mother will toss the coin.

P4: the doctor or the mother

If the mother tosses the coin, she will bear a higher psychological burden than the doctor as a result of denying a kidney to one of her children. Only A satisfies the following:

(C4) It is fair to reduce the psychological burden associated with the perception that the individual who executes a random device bears some responsibility for its outcome.

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Results:

A	B	$A \sim B$
31%	10%	58%

P5: the ‘drawn’ or the ‘not drawn’

Imagine there are two equally qualified candidates for a position, both of whom reached the final stage of the recruiting process. The name of each candidate is put in a sealed envelope. One of the envelopes will be randomly drawn. Compare the fairness (from the point of view of the candidates) of the following two procedures for selecting the candidate to be hired.

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(A) The candidate whose name is drawn is hired.

(B) The candidate whose name is not drawn is hired.

P5: the ‘drawn’ or the ‘not drawn’

A appears to be fairer according to two fairness criteria.

(C5) It is fair to use “conventional” or “familiar” means of randomization.

(C6) It is fair to respect “divine providence” as manifested in the realization of the random device.

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Results:

A	B	$A \sim B$
14%	2%	84%

P6: drawn twice

One prize is to be awarded to one person from among 20 candidates. Compare the fairness (from the point of view of the candidates) of the following procedures for selecting who will get the prize.

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One prize is to be awarded to one person from among 20 candidates. Compare the fairness (from the point of view of the candidates) of the following procedures for selecting who will get the prize.

(A) A computer program repeatedly draws a name at random, and the prize is awarded to the first person whose name is drawn twice.

(B) A computer program draws one of the names at random and that person is awarded the prize.

P6: drawn twice

There are two conflicting criteria in this case.

On the one hand, the fact that the same name appears twice is an indication that it is "God's will" and thus according to (C6) procedure A is fairer.

On the other hand, Procedure A allows for candidates to be drawn once but not to be selected in the end, which may be viewed as going against "God's will" and thus, according to (C6) Procedure B is fairer.

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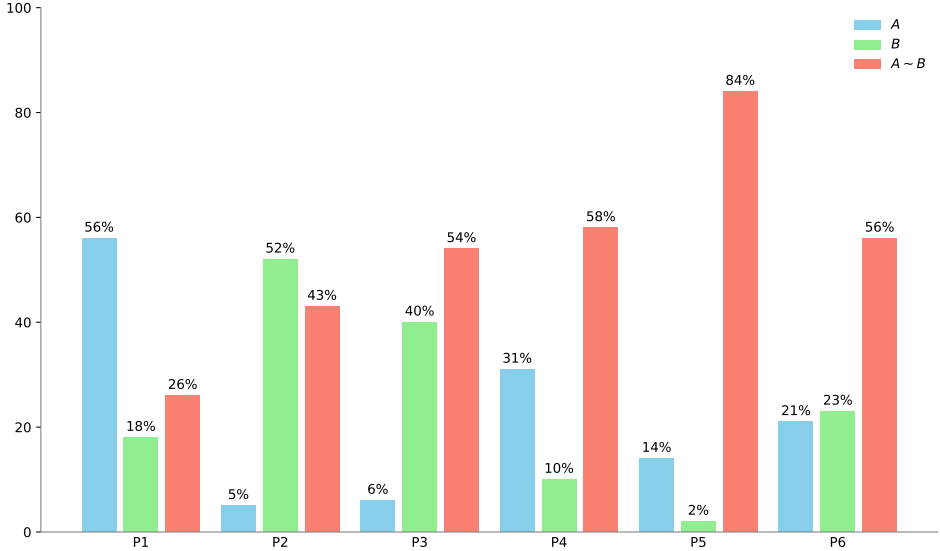
Results:

A	B	$A \sim B$
21%	23%	56%

Results


100
80
60
40
20
0
A
B
A ~ B
56%
18%
26%
5%
52%
43%
6%
40%
54%
31%
10%
58%
14%
2%
84%
21%
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56%
P1
P2
P3
P4
P5
P6

(C1) It is fair to treat all individuals equally ex-ante.

(C2) It is fair to allow all individuals to actively participate in the. procedure whatever the realization of the random elements.

(C3) It is fair to delay any asymmetry in the treatment of participants to as late a stage as possible in the procedure.

(C4) It is fair to reduce the psychological burden associated with the perception that the individual who executes a random device bears some responsibility for its outcome.

(C5) It is fair to use "conventional" or "familiar" means of randomization.

(C6) It is fair to respect "divine providence" as manifested in the realization of the random device.

A natural question is whether the data points to the existence of "types", i.e., systematic patterns in responses that characterize significant proportions of the participants.

The proposed typology is based on only the first four questions. This is because 84% of the subjects in P5 considered both procedures to be equally fair and no unique procedure was perceived as being fairer than the other in P6.

Types of Responses

Emotional			
P1	**P2**	**P3**	**P4**
A	B	B	A
A	B	B	B
A	B	B	$A \sim B$
A	B	A	A
A	B	$A \sim B$	A
B	B	B	A
$A \sim B$	B	B	A

Consequentialist			
P1	**P2**	**P3**	**P4**
$A \sim B$	$A \sim B$	$A \sim B$	$A \sim B$
$A \sim B$	$A \sim B$	$A \sim B$	A
$A \sim B$	$A \sim B$	$A \sim B$	B
$A \sim B$	$A \sim B$	A	$A \sim B$
$A \sim B$	$A \sim B$	B	$A \sim B$
$A \sim B$	A	$A \sim B$	$A \sim B$
$A \sim B$	B	$A \sim B$	$A \sim B$
A	$A \sim B$	$A \sim B$	$A \sim B$
B	$A \sim B$	$A \sim B$	$A \sim B$

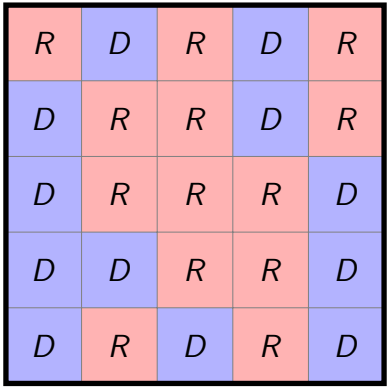
- Consequentialist: About 31% of the subjects fall into this category. Of those 209 subjects, 40% displayed four indifferences and 60% displayed three.
- Emotional: About 30% of all participants were classified as emotional and 25% of them chose exactly (A, B, B, A).
- Other: Chosen by only 39% of the subjects. Each of these profiles was exhibited by at most 6% of all subjects.

Fair Representation

Gerrymandering

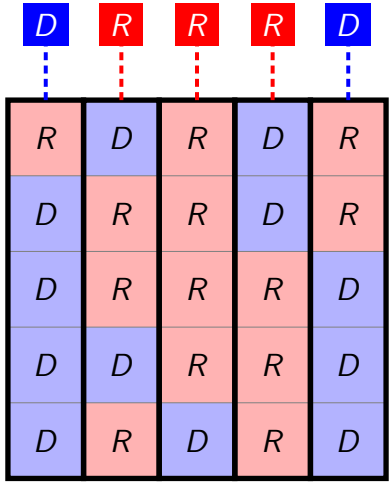
The term ‘gerrymander’ (gerry-mander) dates back to early 19th century Massachusetts. The governor at the time, Elbridge Gerry, along with the State Senate, passed redistricting plans that heavily favored the Democratic-Republicans (opposing the Federalist Party) in elections, and featured particularly strange district shapes.

The Problem



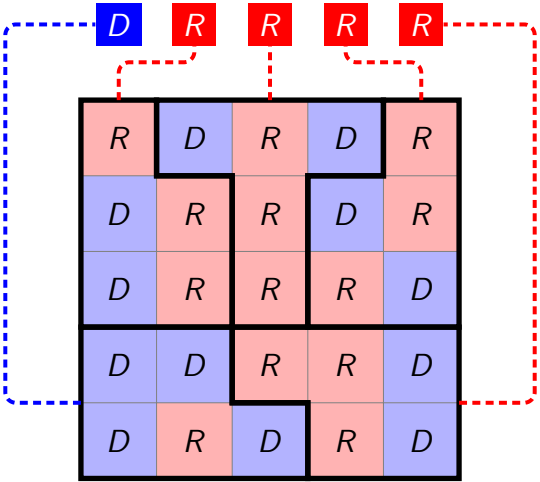
13/25 of the population will vote for R and 12/25 of the voters will vote for D.

The Problem



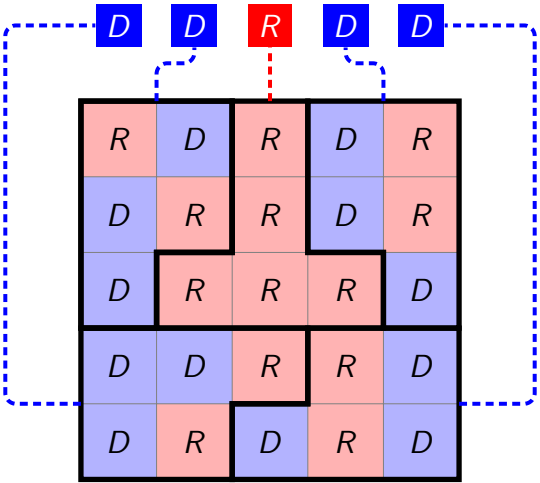
R wins 3 out of the 5 districts.

The Problem



R wins 4 out of the 5 districts.

The Problem



D wins 4 out of the 5 districts.

Tactics of gerrymandering

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- **Cracking:** taking a group/community, and splitting them across multiple districts. This prevents the group from having a significant influence on any given electoral race

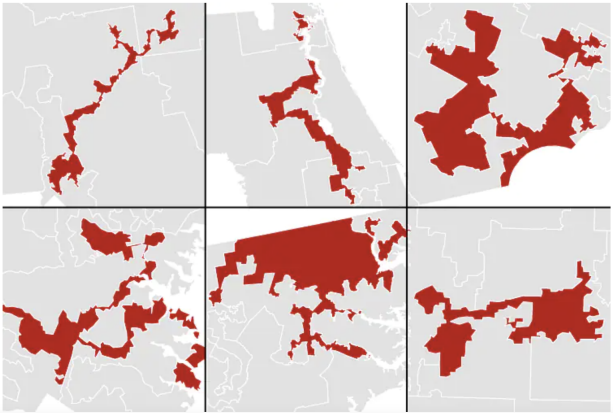
- **Packing:** taking a group/community that is spread over a wider area and concentrating them into one (or a few) districts. This minimizing how many electoral races the group can influence.

The Washington Post
Democracy Dies in Darkness

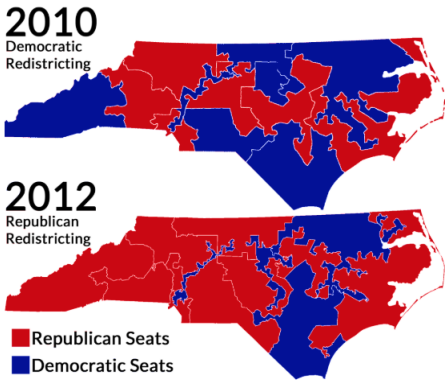
America's most gerrymandered congressional districts

By Christopher Ingraham

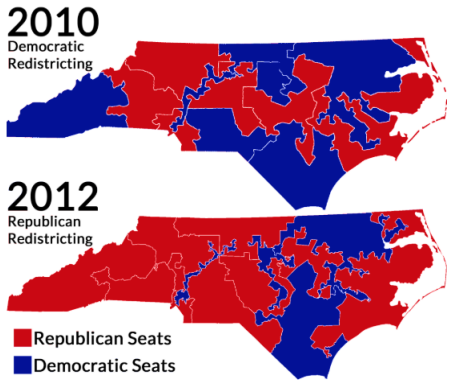
May 15, 2014 at 10:22 a.m. EDT



North Carolina

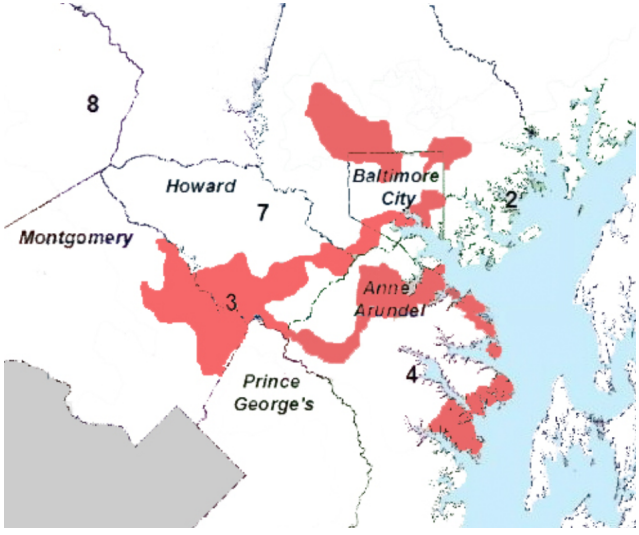


North Carolina



"[I] proposed that [the Commitee] draw the maps to give a partisan advantage to 10 Republicans and 3 Democrats because [I] did not believe it [would be] possible to draw a map with 11 Republicans and 2 Democrats" -David Lewis, co-chair of the NCGA's Joint Select Committee on Congressional Redistricting

Maryland 3rd



THE EVOLUTION OF MARYLAND'S THIRD DISTRICT