

# Calculating the Dissimilarity Index

The dissimilarity index measures the extent to which two groups are unevenly distributed across neighborhoods in a city. The dissimilarity index has a clean and intuitive interpretation : the percent of one of the two groups that would have to move neighborhoods in order to make the distribution of the two groups even across the entire city. One nice feature of the dissimilarity index is that it is indifferent to the relative size of the groups in the city. Thus, the dissimilarity indices of two cities with very different racial distributions (e.g. Portland and Detroit) can be directly compared.

Typically, researchers treat the census tract, which is one of the smallest spatial boundaries used by the Census bureau in its reported data aggregation, as a “neighborhood.” If we have  $n$  census tracts in a given metropolitan area, the dissimilarity index  $D$  is given by:

$$D = 100 * (1/2) * \sum_{i=1}^n |(a_i/A) - (b_i/B)|$$

Where  $a_i$  is the number of group  $a$  members that live in census tract  $i$  and  $A$  is the total number of group  $a$  members in the city, and  $b_i$  and  $B$  are identical numbers for group  $b$ . The value  $a_i/A$  is the proportion of group  $a$  out of the entire city that lives in census tract  $i$  and  $b_i/B$  is the proportion of group  $b$  out of the entire city that lives in census tract  $i$ . If both groups are evenly distributed over the city, the difference in these numbers should be zero for every census tract.

Here are the following logical steps that need to be performed to calculate the dissimilarity index:

1. Calculate the total number of  $A$  and  $B$  members in the city.
2. Divide the number of each group in a given neighborhood ( $a_i$  and  $b_i$ ) by the total. This basically gives you the distribution of each group across neighborhoods.
3. Subtract one of the distributions from (2) from the other and take the absolute value.
4. Sum up the values from (3) and multiply by 50.