APPENDIX 3: ENTROPY ANALYSIS

The Challenging Racism Project have used an entropy analytical procedure to group regions that share a specific mix of attitudes (including the intensity and foci of antipathy), racist experiences, cross-cultural contacts, cultural diversity and socio-demographics. We conducted experiments with various multivariate statistical analyses that allow the generation of regional typologies. These experiments were exposed to peer review, with publications regarding NSW and Queensland, and with government agencies (VicHealth and SAHRC) (Forrest & Dunn, 2006; 2007; 2010).

Visualising entropy: understanding how it works

Undertaking entropy analysis requires somewhat complex statistical / mathematical calculations. To assist in our understandings of how entropy works for this project, it is best to visualise it in terms of the construction of bar charts, rather than try to explain complex equations. Vertical bar graphs are constructed for each geographic location within a given state (e.g. LGAs within SA or NSW), with a column in the bar graph for each variable under consideration. Each of these bar graphs is then placed on top of each other. Those that show the greatest similarities are grouped together and when the differences begin to become too great, the next grouping is created.

So, for South Australia, we have approximately 34 variables that we are working with to create various 'groups', which will each be targeted with specific anti-racism strategies. These 34 variables are a combination of census variables, attitudinal variables and experience variables. For each of the specified localities within South Australia (LGAs), a bar chart is created with each column in the bar chart representative of each of the 34 variables, based on percentages of total population (e.g. income variable: percentage of population of given LGA that is in the bottom income category and so forth for each variable). The bar charts for each of the geographic locations (LGAs) are superimposed over one another. Once that occurs it is easy to have a sense of those locations that display similar results. The locations that have the most similarity are grouped together. For example, we may start with those locations the exhibit high levels of homogeneity in the data and group those into 'group 1'. When differences in the data become too great, then the next group is generated, group 2, and so forth. So we may end up with five LGAs from South Australia in group 1, and these five LGAs within group 1 is then targeted with a specific set of anti-racism strategies.

One of the significant differences between entropy and principal component analysis (PCA) is that the entropy index generates a greater number of groups as it takes into account both homogeneity and heterogeneity in the data sets.

Technical introduction to entropy clustering

The major attribute of the entropy procedure, apart from the fact that it is not constrained by issues of normal distribution, lies in its ability to group observation areas (LGAs in this study) with broadly similar profiles based on attitudes and socio-demographic data. Unlike many other grouping procedures, the amount of within-group variance for (1 … n) groups for each new iteration (each

increase in the number of groupings to be created) is minimised by retesting all possible groupings anew (see Forrest and Johnston, 1981; Forrest and Dunn, 2006; 2007; 2010). The number of groups selected is then determined subjectively when a decreasing amount of variation is accounted for by further increasing the number of groups is discerned.

The 29 variables used in Challenging Racism Project entropy analysis

Twenty-nine variables are used to create the 'groups'. This tends to produce no more than about 12 groups of regions across an area like the state of NSW.

Attitudes
1. Anti-cultural diversity
2. Insecurity with cultural difference
3. Pro-assimilation
4. Denial of racism
5. Denial of Anglo-privilege
6. Belief in the need for racial separatism
7. Belief in the existence of racial hierarchy
8. Self-diagnosed prejudice
9. Identify out-groups
10. Anti-Asian sentiment
11. Anti-Indigenous sentiment
12. Anti-Muslim sentiment
13. Anti-Jewish sentiment
14. Anti-African sentiment

Experiences of Racism
15. In the workplace
16. In education
17. In seeking accommodation (rental properties)
18. In dealings with police
19. In shops/restaurants
20. At sporting events
21. Disrespect
22. Insults (racist talk)
23. Cross-cultural contact in the workplace
24. Cross-cultural contact in social life

Demographics (ABS Census Data)
25. Battlers (bottom third of income groupings)
26. Tertiary Education
27. Overseas Born
28. Language other than English (LOTE)
29. ATSI

Most appropriate suggested reading

Forrest, J. and Johnston, R.J., 1981. 'On the characterization of urban sub-areas according to age structure', *Urban Geography*, 2, 31-40.