Explanation for Note in Illogical Premises Sub-Page

(Jan. 9, 2012)

Note i to the Illogical Premises sub-page of the Scanlan's Rule page states:

> The main focus of this item is relative differences. But, as discussed, among other places, in Divining Difference, Race and Mortality, and Can We Actually Measure Health Disparities? (and as developed in the Subgroup Effects sub-page and its references including the JSM 2009 Presentation), a corollary to the pattern whereby the rarer an outcome, the greater tends to be the relative difference in experiencing it and the smaller tends to be the relative difference in avoiding it, is a pattern whereby the rarer an outcome the greater will be the proportion a group comprises of both the population experiencing the outcome and the population avoiding the outcome. As noted, this item principally addresses issues apart from these patterns. But I note that, in a manner similar to that done in the text above with regard to proportionate rates of change, one could illustrate that when the prevalence of an outcome changes it is not possible for a group that comprises a disproportionate portion of the population experiencing the outcome to continue to comprise the same proportion of that population that it previously did and the same proportion of the population failing to experience the outcome that it previously did. For example, when poverty declines, female-headed families cannot continue to comprise the same proportion they previously did of the poor and the same proportion they previously did of the non-poor.

Since that point may be difficult to understand, I explain it more fully below:

Suppose that a disadvantaged group (DG) comprises 20% (2000) of the overall population of 10,000 persons. But DG comprises 40% (800) of the 2000 persons (20% of the population) who are poor and 15% (1200) of the 8000 persons who are not poor. If proportion of population that was poor declined to 10%, and DG continued to comprise 40% of the poor (400 of 1000), then it would no longer comprise 15% of the non-poor. Rather, it would increase its share of the non-poor to 17.8% (1600 of 9000). On the other hand, if DG continued to comprise 15% of the non-poor (1350 of 9000), it would increase its share of the poor to 65% (650 of 1000). Since there is no more reason to expect a group to continue to comprise the same proportion of the population experiencing an outcome after the change in the prevalence of the outcome that it did before the change than there is to expect it to comprise the same proportion of the population failing to experience the outcome that it did before the change in the outcome, it is illogical to expect it to comprise the same proportion of either the population now experiencing the outcome or now failing to experience the outcome that it did before change.

In fact, of course, as illustrated in readily available income data, when poverty declines, the group most susceptible to poverty typically will comprise both a larger proportion of the poor and a larger proportion of the non-poor than it previously did (consistent with the tendency for the group with the higher base rate to experience a smaller proportionate change in an outcome and a larger proportionate change in the opposite outcome than the other group). When poverty increases, however, the disadvantaged group will tend to comprise both a smaller proportion of the poor than it previously and a smaller proportion of the non-poor than it previously did.

These patterns are reflected in Table 1 of the Can We Actually Measure Health Disparities (Chance 2006), which is reproduced below with the key columns highlighted.

**Table 1
Relationship of Black and White Rates
of Falling Below and Above Various Percentages
of The Poverty Line with Black Representation of
Those Above and Below plus
Absolute Differences and Odds Ratios**

Perc of Pov Line	Perc Black Below	Perc White Below	Ratio B/W Below	Perc Black Above	Perc White Above	Ratio B/W Above	Black Rep Among Below	Black Rep Among Above	Absolute Difference	Odds Ratio
600	91.9	79.5	1.16	8.1	20.5	0.40	15.3	5.8	12.4	2.91
500	86.9	71.6	1.21	13.2	28.4	0.46	15.9	6.7	15.3	2.62
400	78.6	60.5	1.30	21.4	39.5	0.54	16.8	7.8	18.1	2.39
300	66.1	45.7	1.44	33.9	54.3	0.63	18.4	8.9	20.3	2.31
250	58.0	37.3	1.56	42.0	62.7	0.67	19.5	9.5	20.7	2.32
200	48.7	28.5	1.71	51.3	71.5	0.72	21.1	10.1	20.2	2.38
175	43.6	23.9	1.83	56.4	76.1	0.74	22.2	10.4	19.7	2.46
150	37.3	19.1	1.95	62.7	80.9	0.78	23.3	10.8	18.2	2.52
125	31.0	14.9	2.08	69.0	85.1	0.81	24.5	11.2	16.1	2.56
100	24.7	10.8	2.28	75.3	89.2	0.84	26.2	11.6	13.9	2.70
75	17.84	7.2	2.49	82.2	92.8	0.88	28.0	12.1	10.7	2.82
50	11.7	4.4	2.69	88.3	95.6	0.92	29.6	12.6	7.4	2.92