ON MEASURING SYSTEMATIC INTEGRATION

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ABSTRACT. A separate index of systematic integration is introduced that seems to solve the problems raised by Mitchell (1978). Taken together with the segration index, this measure of integration permits the systematic examination of social links between two classes of people whether their observed cross-class links are over or underrepresented as compared to a random baseline.

In my earlier paper (Freeman, 1978), I suggested that segregation could be thought of as a restriction on social network ties between members of two distinguishable 'kinds' of people. Thus, segregation was seen as a systematic--as opposed to random--social arrangement that reflected limitations on the access of different classes of people to one another.

Given this view, there are two different situations in which segregation is absent: (1) when cross-class links are random, and people relate to each other as if they were unaware of class membership, and (2) when there are more than the expected number of cross-class links, and people in each class seem to be going out of their way to relate to members of the other class.

This latter situation implies systematic (or perhaps "formula") integration. It arises when people are not segregated, but rather its opposite. And it is this kind of systematic departure from random relations among people that interests Clyde Mitchell (1978) and to which my measure of segregation is insensitive.

Mitchell has proposed a measure, MSI, that is responsive not only to segregation in the sense defined here, but to systematic integration as well. Such a measure is undoubtedly useful; it yields a kind of information that is unobtainable from a strict measure of segregation. The measure proposed by Mitchell, however, has three limitations that have been specified by its author: (1) it does not vary linearly with switching cases from within-class to cross-class linkages, (2) it requires an ad hoc adjustment to make the expected number of cross-class links under the assumption of randomness produce an index value of zero, and (3) it has an unknown distribution.

Here, I would like to propose an alternative solution to the problem raised by Mitchell. Instead of a combined measure of segregation-integration like MSI, I shall propose a separate measure of systematic integration with the same properties of linearity, rational zero point and known distribution as my segregation index, S.

Measuring Integration

Let

m = the number of points in the set under study,

m_g = the number of points in a subset designated according to an external criterion (age, sex, race, etc.)

n = the number of edges linking points in the set under study,

e^* = the number of edges that link points in the designated subset with points not in the subset, and

$E(e^*)$ = the expected number of cross-subset links under an assumption of random generation of edges.

Then, if $E(e^*) \geq e^*$, if there are fewer than the expected number of cross-subset links, Freeman (1978) proposed that segregation be measured by

$$S = \frac{E(e^*)-e^*}{E(e^*)-\text{Min}(e^*)}$$

where

$\text{Min}(e^*)$ = the minimum possible number of cross-subset links, which is uniformly equal to zero.

By the same reasoning, we can define a measure of integration to be used whenever $E(e^*) < e^*$, that is if there are greater than the expected number of cross-subset links. The measure of integration is

$$I = \frac{E(e^*)-e^*}{E(e^*)-\text{Max}(e^*)}$$

where

$\text{Max}(e^*)$ = the maximum possible number of cross-subset links, which is always equal to $(m_g)\ (m-m_g)$.

This integration measure, I, varies between o and 1. A value of 0 indicates a complete lack of systematic integration: the number of cross-subset links is either equal to or less than the number expected

by chance under the random linkage assumption. A value of 1 indicates that all possible cross-subset links are present.

Moreover, like S, I grows linearly as links are switched from within subset pairs to cross-subset pairs. And, again like S, the distribution of I may be determined--using e*--in the manner previously described by Freeman (1978).

Conclusion

It would seem, then, that this measure would solve the problem raised by Mitchell. I has all the properties described by Mitchell, except that it is a separate measure. It is not integrated with a measure of segregation to form a single combined index of segregation-integration. However, given the costs of combining the two measures into one, perhaps it is best to settle for two indexes--one of segregation and one of integration.

References

Freeman, Linton C. 1978. 'Segregation in Social Networks.' Sociological Methods and Research, 6(4):411-429.
Mitchell, J. Clyde. 1978. 'On Freeman's Segregation Index: An alternative.' Connections (this volume).

NETWORK NOTEBOOK ...Continued from page 8.

A Request for Information on Social Support Systems:

Manuel Barrera (Psychology, Arizona State) makes a request for items for a literature review. "Two colleagues and I are in the midst of a review which has the working title "Natural Social Support Systems and Well-Being: A Review of Concepts, Methods, and Research Findings." As suggested by the title, the review has a tripartite purpose:

1. To examine the basic vocabulary associated with the study of natural social support systems (NSSS), to clarify differences in the use of terminology, and to critically discuss concepts that have been proposed;
2. To evaluate the adequacy of research methods that have been used to study NSSS, particularly measures of social support and related network interactions;
3. To summarize and critically discuss the research findings with respect to the role of NSSS in buffering the impact of stressful life events, utilizing non-professional helpers, utilizing professional helpers, and recovering from physical and psychological distress.

The general mission of the paper is to stimulate and to provide direction for future research efforts by investigators who primarily identify themselves as psychologists. Accordingly, concepts and research that is judged to be of particular interest to psychologists will be emphasized. In addition, the review will be limited to natural social support systems and will not include formal self-help groups (such as Alcoholics Anonymous, Recovery, GROW, etc.) or network therapy approaches.

We are still interested in receiving reprints, preprints, convention papers, or unpublished work that appears to fall within the scope of the review. Those that contribute materials may request to receive a copy of the review when it is completed. All forms of social support (which we define as material aid, physical assistance, cognitive guidance, encouragement-reassurance, and social interaction) will be appreciated."

Information on Information:

The Information Systems Division of the International Communication Association publishes a lively Newsletter named Systemsletter. (We have borrowed one of their book summaries for this issue). For membership and subscription information, contact the Editor (and INSNA member) Rolf T. Wigand, Communication Program, 472 Stauffer Building, Arizona State University, Tempe, Arizona 85281, U.S.A.

More Information:

C/O : Journal of Alternative Human Services is another useful source of information on informal non-bureaucratic, non-governmental services. The latest issue - Vol.6, #3 (Autumn, 1978) - has an article by Peter & Trudy Johnson-Lenz (INSNA members) "On Facilitating Networks for Social Change" and has other items on accessing information through networks and systems. For subscription information, contact the Editor at 1172 Morena Blvd., San Diego, California 92110, U.S.A.