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This Week's Citation Classic

Horn H S. Measurement of "overlap" in comparative ecological studies. *Amer. Naturalist* **100**:419-24, 1966. [Department of Zoology, University of Washington, Seattle, WA]

I present and review measures of overlap between samples of items distributed proportionally into various qualitative categories. These measures should prove useful to ecologists doing comparative studies of diet, habitat preference, seasonal patterns of abundance, faunal lists, or similar data. [The *SCI*® indicates that this paper has been cited over 125 times since 1966.]

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"In 1963 I was a graduate student in ecology at the University of Washington. Many of my fellows and mentors were studying the competitive relations among similar species, and they were in need of a simple measurement to condense dietary data for two animals into a single number expressing their similarity. I invented such a measure and modified another due to Morisita,[1] and my measures were used by local ecologists, especially Alan Kohn, Bob Paine, Gordon Orians, Eric Pianka, and Chris Smith, all of whom urged me to publish. The editor of the *American Naturalist* sent my paper for review to the late Robert MacArthur. Robert questioned the proliferation of measures of overlap, citing his own similar measures[2] and those of Dick Levins,[3] which were then respectively in press and in manuscript. I withdrew my paper, and wrote to Robert, explaining the few rhetorical advantages that my measures had over his, and agreeing that my paper was superfluous. Robert wrote back asking me to include the substance of my letter in the paper and to publish it. I did. This correspondence started my most treasured friendship.

"At the time of my publication many ecologists were studying competing species and they needed the kind of measures that I had reviewed. This is the main reason for the numerous citations. In retrospect, the measures have formal similarities to statistical criteria[4] and to coefficients in simplified dynamic equations for populations of competing species.[5,6] These similarities are happy accidents; I didn't realize them at the time. They have unfortunately resulted in an overly enthusiastic interpretation of dietary overlap as a direct effector of the dynamic interactions between populations. It just isn't so, but that's another story.

"The measures that I reviewed and developed are now obsolete; simpler and subtler ones are available. These have yet to be reviewed definitively, but the papers by Peter Petraitis,[4] Bob May,[5] and Tom Schoener,[6] plus their bibliographies, are very helpful. Bob's paper even corrects a certain inelegance in mine, which it gracefully blames on someone else; in fact it doesn't even cite my paper. Someday I shall ask the author, who works across the hall from me, why.

"Why does my obsolete paper continue to be cited? I can only conclude that many of my colleagues are intrinsically conservative, or maybe that their acquaintance with the literature of the past decade is as scandalous as mine."

1. **Morisita M.** Measuring of interspecific association and similarity between communities. *Mem. Fac. Sci. Kyushu Univ. Ser. E (Biol.)* **3**:65-80, 1959.
2. **MacArthur R H.** Patterns of species diversity. *Biol. Rev.* **40**:510-33, 1965.
3. **Levins R.** *Evolution in changing environments.* Princeton: Princeton University Press, 1968. 120 p.
4. **Petraitis P S.** Likelihood measures of niche breadth and overlap. *Ecology* **60**:703-10, 1979.
5. **May R M.** Some notes on estimating the competition matrix, α. *Ecology* **56**:737-41, 1975.
6. **Schoener T W.** Some methods for calculating competition coefficients from resource-utilization spectra. *Amer. Naturalist* **108**:332-40, 1974