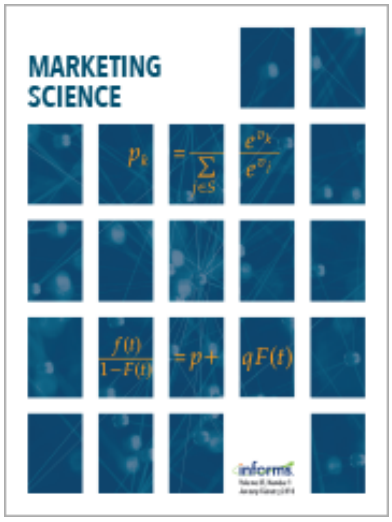

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Commentary

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COMMENTARY

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"A Probabilistic Model for the Multidimensional Scaling of Proximity and Preference Data" by MacKay and Zinnes is indeed an interesting and provocative article for practitioners. Interesting, for positioning is more than ever a must in markets where high technology and high advertising budgets are no longer the privilege of a few and where the proliferation of products and brands has brought forth a generation of more knowledgeable, but less involved, consumers. It is clear that any attempt to improve on such a popular family of techniques as MDS by relaxing one of its simplifying assumptions is bound to stir interest. But the article is also provocative for it takes a cool marketing practitioner to live with the simplifying assumptions imposed on the choice process for the sake of mathematical tractability. Rather than enumerating other areas where probabilistic MDS can be profitably put to work (they are essentially the same as those of deterministic MDS) I should like first to comment in a somewhat naive way on the MacKay and Zinnes article, and then briefly reflect on whether MDS unfolding models, be they deterministic or probabilistic, really offer a good angle at structuring and segmenting a market.

MacKay and Zinnes rightly remind us that deterministic MDS models suffer from two severe limitations: (1) the inability to account for variation in the judgment process and (2) the inability to test hypotheses. The first limitation tells us that recovered distances are not what we think they are. If the simulation (Neidell's example) and empirical (residential alternatives) experiments mean anything, we may have spent the last ten years drawing conclusions from erroneous perception and/or preference maps derived from deterministic methods. Indeed, the KYST and PROSCAL configurations exhibited in Figures 7 and 8 have so little in common that they cannot possibly command the same action if there were actual brands out in the bush. And yet, I find these examples somewhat short of convincing. In the Neidell case, I cannot help thinking that the odds are biased in favor of the probabilistic model inasmuch as (1) the data are made to conform to the model's assumptions and (2) the number of parameters is increased by a factor of $(1 + r)/r$, where r is the dimensionality of the space. I would urge that future research be conducted to compare probabilistic and deterministic models that exhibit roughly the same number of parameters. I would, for instance, be curious to see how a deterministic model like INDSCAL ($r(1 + n)$ parameters) would fare in such a context. In the empirical example, it is not so much the differential number of parameters that bothers me as the possible misuse of KYST, forced into a conceptual framework more akin to conjoint analysis than multidimensional scaling. The latter, in practice, would be typically called for when both the dimensionality of the space and the nature of the attributes underlying perceptions and preferences are not known a priori. Also, past research suggests that estimating the configuration of stimuli first and then fitting the preferences to the resulting space yields more reliable results than unfolding both subjects and stimuli from preference data only. In other words, it may be the case that KYST did not perform well because it should not have been used in the first place. This should not be construed as a criticism of probabilistic MDS per se but, rather as a criticism of conditions under which KYST and PROSCAL have been compared.

Turning now to the second limitation of deterministic MDS, the ability to test hypotheses afforded by probabilistic models such as PROSCAL is indeed a worthy

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feature. This is achieved by letting the coordinates x_{ik} be distributed $N(\mu_{ik},\sigma_i)$. As the authors suggest, there are two possible interpretations of the variance parameter depending on whether one wishes to analyze individual or group data. For individual data, the variance parameter can be conceptualized as the level of unfamiliarity or uncertainty the subject has concerning the nature of the stimulus. For group data, the variance parameter is typically interpreted as an individual difference parameter. I would suspect that both noise and individual differences are present in proximity or preference group data. Also, the assumption of an isotropic space where no dimension is dominant is a severe one. I do not know of a brand manager who would credibly argue that price, quality or styling carry the same weight in the consumers' mind. As an extension of the proposed model, the distance function might incorporate a weight parameter to reflect the varying importance of each dimension. This appears to be a more fruitful extension than allowing the variance parameter to vary across dimensions, because, being combinations of elementary attributes, these dimensions can be reasonably assumed to have equal variances.

Finally, I should like to mention what I personally consider to be the two most serious limitations of MDS models when applied to preference data. The first one has to do with the fact that it is a compensatory model. What if one is convinced that the choice process is essentially noncompensatory in nature? Could some kind of a noncompensatory process (e.g., critical levels for attributes) be built into MDS models? The second limitation stems from the assumption that subjects (ideal points) and stimuli can be portrayed in the same space. Recent research (see, for example, Chandon and Strazzieri) suggests that stimuli can be perceived as being very similar (close in a perceptual map), yet very different in terms of preference (apart in a preference map). This, of course, is not compatible with the assumption of a joint space.

Notwithstanding these remarks, I regard this work as a useful extension of deterministic MDS models. Any practitioner set on using deterministic MDS techniques to exploit his data cannot sensibly ignore this type of probabilistic extension. This is especially true in longitudinal studies where probabilistic MDS could be used to test for differences in configurations brought about by marketing actions. It needs, however, to come up against real world data to prove that it leads to better decisions.

Reference

Chandon et Strazzieri (1986), "Une Analyse de Structure de Marché sur la Base de la Mesure de l'Ensemble Evoqué," *Recherches et Applications en Marketing*, 18–39.