Statistics Departments: Time for the Second Divorce?

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"Congratulations" and "condolences," two expressive terms, usually avoid each other. Recently, however, as I was becoming a department chair, they have been visiting me as twin brothers — an intriguing reflection of a few conflicts, perceived or real, existing in academia, especially at research universities. As statistics is undergoing a rapid evolution, or mutation, depending on whether one is thrilled by more cross-fertilization or is concerned with deeper fragmentation, some of these conflicts appear to be increasingly challenging. So I gather that those who sent me their condolences were not entirely being humorous.

The emerging challenges for at least some statistics chairs lie in two intertwined tasks: to establish/maintain an effective environment conducive to first-rate interdisciplinary research, and to maintain/enhance the "statistical core" at the highest intellectual level, in terms of both research and teaching. Cultural and infrastructural differences between statistics and other disciplines (biology, for instance) appear to be primary contributors to the challenges. These differences, when not dealt with effectively, can cause problems and affect morale, especially for younger generations who are still in the process of forming professional identities.

From a chair's point of view, perhaps the most difficult issue to resolve is the difference in spatial resources. As most of us know, in many natural and other sciences departments, spaces are arranged and occupied according to "labs/groups," typically led by individual faculty members with a number of post-docs, students, and other associates and assistants. That is, a typical individual faculty member in those departments has access to and allowance for more space than almost any statistics department can possibly hope to accommodate.

Some may be puzzled by why this is a problem for statistics departments — the difference occurs because different fields have different needs. And that is precisely the problem! With more academic statisticians moving into interdisciplinary areas and playing more vital roles (beyond just being a "statistical consultant"), their needs for space also expand accordingly. Although perhaps it will never be possible, or even appropriate, for a statistics department to provide a "faculty compound" for every faculty member, the usual one-office-one-faculty-member setting becomes rather inadequate for those faculty members who are engaged in large-scale interdisciplinary research that would require a substantial number of students, post-docs, research assistants, programmers, project managers, etc.

One way to "resolve" this problem is to "squeeze and borrow." I certainly have seen student/post-doc office space squeezed to a level that is literally more crowded than the four-bunk-beds undergraduate dorm space I managed to live through more than 20 years ago in Shanghai. Or there are "borrowed" offices that are so far away from the main department that the appearance of their occupants in the department sometimes raises the security color level from yellow to orange for those who are more alert. Although each chair has to do whatever she or he can to meet demands, it is clear that "squeeze and borrow" is neither a long-term nor a healthy solution. So is there a more desirable alternative?

Another problematic difference is in the teaching load. Many departments in natural and other sciences (e.g., medical) typically have substantially more faculty members than statistics departments to share the teaching for both undergraduate and graduate courses. And the research and publication pace in these fields makes it difficult for individual faculty members to stay competitive research-wise and at the same time to teach as much as we do. I am not suggesting that academic statisticians need or want less research time, but the plain fact is that we operate at a slower to much slower pace – just take a look at our publication cycles. Whether one takes an optimistic view that our research findings tend to be time-honored or a cynical view that little we do has any time urgency, the reality is that "mainstream" statisticians are simply not under the same type of time pressure to "produce results" as are many of our colleagues who are directly involved in interdisciplinary research. (My recent involvement in a national mental health survey study reminds me

that the time pressure for "producing results" is just as great in social sciences as in natural sciences.)

But as we all only have 24 hours a day, the greater time demand and pressure for research results means that interdisciplinary statistical researchers tend to have increased needs and incentives to carry a lower regular teaching load than mainstream statisticians. I am sure many of my mainstream colleagues would scream "What are you talking about? I want to, and need to, carry a lower teaching load as well!" Indeed, one often hears gossip such as "Oh, he got a very good deal — he only needs to teach one course per year." I have never heard someone say "Oh, I got a very good deal — I only need to write one paper per year." My point is that no matter how much we emphasize the importance, value, and even the joy of teaching, the current academic culture and reward system in (research) universities is such that course load reduction is generally regarded, and received, as an incentive, regardless of whether there is a real need for doing so.

So here comes another challenge for those chairs who need to fill out the "teaching sheet" and at the same time want to balance sensibly the research needs among faculty members who are engaged in different types of research under different time pressures. How can this be done? A common strategy is to allow "buy-out," which seems to be a perfectly logical solution: if you can bring in more research grants, then you can do less "service" teaching. But this scheme has a number of undesirable consequences. First, and most importantly, since the buy-out money is usually used to hire temporary visitors, the variation of the teaching quality is increased and the coherence of the courses is decreased. Excellent "substitutes" do exist, but temporary members of a department, in general, cannot be expected to contribute as viably as regular members to the long-term health and development of the department.

Second, the buy-out scheme itself helps to reinforce the notion that if one is good at research then one can teach less. Although this is a reality and some degree of this reality will always exist in academia, it is a notion that a chair should try to minimize, not to reinforce, both for the more noble cause of providing the best possible education to students and for the more practical reason

that such a notion would serve as a disincentive for faculty members, as well as students (as teaching assistants), to treat their teaching responsibility as seriously as their research activity. Regardless of a chair's own passion for teaching, a major part of his or her duty is to ensure the overall departmental teaching quality, because poor teaching quality makes it at least more difficult for a chair to ask for more resources. So is there a more desirable way of balancing faculty members' teaching and research needs, without helping to reinforce the perception that somehow teaching is a form of punishment for not doing "fundable" research?

There is yet another difference that requires a chair's attention: the difference in the demand for infrastructural and administrative support. Faculty members who have a large group to "feed" typically need a lot more administrative support for grant proposals, personnel management, computing, etc. Again, there seems to be a perfect solution: if you need more service, pay more. Although such practice does exist, hiring additional departmental staff is typically far more complicated than just having a funding source, especially if the source only pays a portion or is uncertain in its sustainability (typical for outside research funding). In addition, a staff's day-to-day support to different faculty members can rarely be divided as cleanly as the division of his or her funding sources.

And no matter how humble or "egoless" each individual faculty member might be, no one will get a warm and fuzzy feeling if he or she is effectively told to wait in line because a colleague's needs are just more urgent. Putting it differently, a chair cannot and should not rely on faculty members' good will as a solution for balancing the differential demands for staff support. So once again, what can a chair do to provide an equally supportive environment to each faculty member, given very limited staff resources?

Roughly a half century ago, research universities began to recognize the need to "divorce" statistics from mathematics — the two statistics departments with which I have been associated were established during that period (Chicago in 1949 and Harvard in 1957). However, the basic settings and infrastructures of the statistics departments have been closely modeled after a typical mathematics department, albeit often smaller in size. With the ongoing substantial

increases in involvement of statistical faculty and researchers in large-scale scientific studies, one wonders if the challenges and difficulties listed above are indicative of a "second divorce" in progress. That is, perhaps the real solution to these problems requires a fundamental structural change, to move a bit away from the traditional mathematics department format and a bit closer to the structure of most natural science departments, and thereby "naturally" be in a position to request more space, faculty, and staff resources from deans and university central administrations.

Of course, it is perhaps never possible, nor desirable, to have every statistics department structured as a natural science department. But it seems worth considering, by our profession as a whole, whether it would be desirable to have at least some statistics departments adopt a hybrid format, that is, a "mixture" of the traditional mathematics/statistics setting and that of a natural science department. And if so, how can we ensure that the two settings are harmonious? And how can we make collective efforts to convince university administrators to shift their mindset from the "math" module to the "mixture" module when considering the resource needs for a statistics department?

This will not be an easy task — even the first "divorce" was not 100% successful, and from time to time we still hear threats of being forced to "remarry" (but thanks to our collective efforts such threats usually only remain as "parental" wishful thinking). Nor is it clear that this would be an effective move for the future of statistics as a major independent scientific discipline. (Indeed, there are many existing vehicles for interdisciplinary research, such as joint appointments, committees and centers, biostatistics departments, etc., though none of them directly addresses the aforementioned intertwined tasks for statistics departments.) My purpose here perhaps can best be described by a Chinese proverb, "cast a brick to attract jade," which roughly means to offer a few preliminary thoughts and remarks in hoping to "attract" more refined and profound thoughts, strategies, and even solutions. So if you have any "jade" to offer, regardless of its color or purity, I'd greatly appreciate if you could share it with me (*chair@ stat.harvard.edu*), or better, with the readers of *Amstat News*. ∎