Feighner et al., Invisible Colleges, and the Matthew Effect

by Roger K. Blashfield

At Issue

In the article that begins below, Roger K. Blashfield traces the impact of a landmark article in American psychiatry—the publication by Feighner et al. in 1972 of a set of diagnostic criteria for use in psychiatric research. The author's focus is not on the scientific merits of the diagnostic criteria proposed by Feighner et al., but rather on the process by which these criteria came into widespread use in the psychiatric research community. Accompanying Dr. Blashfield's essay are commentaries by Samuel B. Guze, one of the originators of the Feighner criteria; Martin M. Katz and John S. Strauss, two scientists who have themselves made important contributions to the development of research diagnostic criteria; and R.E. Kendell, who offers—in addition to diagnostic expertise—an international perspective on this interesting phenomenon.

Comments from Schizophrenia Bulletin *readers are welcomed, and should be sent to At Issue, Center for Studies of Schizophrenia, Rm. 10-95, 5600 Fishers Lane, Rockville, MD 20857.*—The Editors.

Abstract

A citation analysis of an article published by Feighner et al. in 1972 has shown that it had a major impact on the literature about psychopathology. In fact, the Feighner article had over 70 times more citations than an average article published in the same journal. The Feighner article attracted attention partly because it had been created and promoted by the prolific St. Louis/Iowa group. The researchers associated with this group have advocated a neo-Kraepelinian approach to classification, and have had a powerful effect on classifications within American psychiatry during the 1970s. The influence of the neo-Kraepelinians provides an example of a process suggested by Deutsch (1966) concerning how changes in classificatory systems occur.

A journal article published by Feighner, Robins, Guze, Woodruff, Winokur, and Munoz (1972) in the *Archives of General Psychiatry* entitled "Diagnostic Criteria for Use in Psychiatric Research" is the focus of this article. It will emphasize the sociological aspects associated with the popularity of the Feighner et al. article, which proposed explicit diagnostic criteria to define 16 conventional classification categories. The 16 categories defined by Feighner et al. represented disorders such as schizophrenia, mania, depression, and anorexia nervosa, which these authors believed had been shown to be valid. The reason for using explicit criteria was to increase the reliability of the categories. In addition to the above, the Feighner article also mentioned five types of data which are necessary when validating categories in the classification of mental disorders.

As measured by citation frequency, the Feighner article has had a marked impact on the literature about psychopathology. From 1972 through 1980, there had been 1,157 citations to this article in the *Science Citation Index*. This was an average of 144.6 citations per year. In contrast, the average article published in the *Archives of General*

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Psychiatry received only 2.1 citations per year. In other words, the Feighner et al. article had over 70 times the number of citations during an 8-year period as had an average article published in the *Archives of General Psychiatry*.

Why has this article attracted so many citations? Three possible answers are: First, the Feighner article was published in a prestigious journal. According to the Journal Ranking Package of the *Science Citations Index*, the *Archives of General Psychiatry* has the highest impact factor of all journals concerned with psychopathology (see table 1). Thus, the fact that the Feighner article was published in the *Archives* probably contributed to its impact. This factor alone, however, is insufficient to account for its popularity, as shown by the average number of citations per year to the Feighner article (about 145) compared to the average number expected for a typical article published in the *Archives* (about two).

A second possible factor is the reputation of the authors. All of the authors (Feighner, Guze, Munoz, Robins, Winokur, and Woodruff) were at Washington University in St. Louis at the time the article was written. One of the six, Winokur, became the chairperson at the University of Iowa in 1971, just before the article was published. The "St. Louis group," of which these authors were members, is a well-known collection of psychiatric researchers who have published a great deal on the topics of genetics, biochemistry, and classification of mental disorders. But since the Feighner article is the most frequently cited publication by members of the "St. Louis group," the prominence of the authors is again insufficient by itself to account completely for its popularity.

Table 1. Relative frequency of citations (i.e., impact factor) for journals concerned with psychopathology

Journals	Impact factor
Archives of General Psychiatry	2.104
Biological Psychiatry	1.626
American Journal of Psychiatry	1.482
British Journal of Psychiatry	1.172
Journal of Abnormal Psychology	1.124
Journal of Nervous and Mental Disease	.921
Journal of Psychiatric Research	.857
Diseases of the Nervous System	.752
Acta Psychiatrica Scandinavica	.639
Comprehensive Psychiatry	.430
Journal of Clinical Psychology	.367

Note: These data are from the "Journal Ranking Package" of *Science Citations Index* (1976, Volume 9). Impact factor is defined as the total number of 1974 citations to articles published in the target journals during 1972–73 divided by the total number of source articles per target journal in 1972–73.

A third possible reason for the large number of citations is that it is a methodological article. Journal articles or books proposing a new methodology can attract a large number of citations. For instance, a book by Draper and Smith (1966) about linear regression has collected 2,760 citations in 15 years (about 184 citations per year). However, methodological articles and books concerning psychiatric classification generally have not had the impact which the Feighner article has demonstrated. For instance, Lorr (1966) edited a book in which cluster analysis methods were used to form new classifications of psychotic patients; Overall and Williams (1961) discussed different statistical models which could be used to help improve the diagnostic process; and Nathan (1967) published a book which contained a decision tree model to assign psychiatric diagnoses. Like the Feighner article, the intent of all three was to propose methodological alternatives to traditional clinical diagnosis that would improve the reliability of the diagnostic process. In total, the three works by Lorr, Nathan, and Overall and Williams have gathered only 102 citations—an average of 2.2 citations per year. Thus, the fact that the Feighner article suggested a new methodology concerning psychiatric classification does not sufficiently account for its high rate of citations.

In order to arrive at a better understanding of the impact of the Feighner article, an analysis was conducted on a randomly selected set of 50 journal articles that cited Feighner et al. The most striking feature about the 50 was that many were written by researchers at two different settings: Washington University in St. Louis, and the University of Iowa. In other words, 24 of the 50 articles were written by persons at the two universities that were the academic

homes of the authors of the Feighner article. Of the remaining 26 articles, nine articles had authors who had been psychiatric residents at Washington University. Thus 60 percent of the 50 randomly chosen articles citing Feighner et al. were written by authors who at some time had been at St. Louis or Iowa.

This clustering of authors can also be documented through an analysis of citation frequency by author. From 1972 to 1974, 18 authors cited Feighner et al. more than once. Of these 18 persons, only two (Robert Spitzer and J.J. Schildkraut) had not been directly associated with either Washington University or the University of Iowa. Of the 58 authors who cited the Feighner article more than once from 1975 to 1977, 21 had been at Washington University or Iowa. This suggests that most of the early citations to the Feighner article were by members of the St. Louis/Iowa group while, more recently, the article has attracted attention among other groups of researchers.

Invisible Colleges and the Matthew Effect

The analysis of citations to the 1972 journal article by Feighner et al. demonstrates two major concepts which have been discussed within the literature on the sociology of science: (1) invisible colleges and (2) the Matthew effect. The concept of *invisible college* was first used in the 17th century to refer to the collection of scientists who eventually formed the Royal Society of London (Cole and Zuckerman 1975). The noun "college" was used to describe such a group of scientists because, like the faculty of a college, the group represented a collection of intellectuals who had a sense of allegiance to each other and who frequently interacted both professionally and socially. The adjective "invisible" was used because the membership of the group was not confined to a particular academic setting, and was not obvious to persons who had little knowledge about 17th century science. In 1963, Price reintroduced the term "invisible college" to describe the existence of such groups in modern sciences. These groups are collections of scientists who live in disparate geographical locations, but who often attend the same conferences, who publish in the same journals, who invite each other to give presentations at their home institutions, and who share preprints of their research endeavors. It is through the political power of such "colleges" that many of the changes in a science are made.

An important point to note about the concept of invisible colleges is that it is not intended to connote a conspiratorial or subversive process in which power groups engage in Machiavellian struggles for control of a science. As the concept has come to be used by sociologists, the existence of invisible colleges occurs in every science and virtually every researcher/scientist can be identified as belonging to some particular invisible college (Crane 1972). In fact, when Price (1963) first introduced the term, he was using it to describe how scientists must form into reasonably small, homogeneous groups in order to protect themselves from the pressures of "Big Science," the "publish or perish" ethic, and the tremendous explosion of scientific literature. All of these forces are sufficiently powerful to overwhelm virtually any scientist who attempts to remain isolated and yet make significant advances in his or her field. It is through the formation of small, informal collegial groups that individual scientists can gain sufficient support and power to become effective.

The citation analysis of Feighner et al. demonstrates the existence of an invisible college within modern psychiatric classification. A large percentage of citations to the Feighner article have been made by researchers who are or had been at the University of Iowa or Washington University, suggesting that there exists an invisible college associated with the St. Louis/Iowa group approach to descriptive psychiatry. Gradually this "college" has expanded to include psychiatrists at New York State Psychiatric Institute, UCLA, UCSD, Southern Illinois University, and the University of Kentucky.

The presence of this invisible college has also been discussed in an article by Klerman (1978). He associated this college with the biological psychiatry movement, which was formed during the 1960s and became a powerful force in American psychiatry during the 1970s. Klerman had given the members of this "college" the name "the neo-Kraepelinians." According to him, the most prominent members of the neo-Kraepelinian movement were Robins, Guze, Winokur, Klein, and Spitzer. The first three individuals are all co-authors of the Feighner article while the last two are currently at the New York State Psychiatric Institute, which is described above as an associated setting for this invisible college.

Klerman used the name "neo-Kraepelinian" to describe this invisible college because the principles of classification assumed by these researchers were similar to the principles inherent in Kraepelin's approach to classification (Kahn 1959). That is, these psychiatrists all strongly advocated a scientific approach to classification, supported the medical model, engaged in biological research, and eschewed the psychoanalytic perspective which had dominated psychiatric thinking in the United States. Table 2 lists nine propositions which collectively form the basic beliefs of the neo-Kraepelinian invisible college.

Neo-Kraepelinians had a major impact on psychiatric thinking about classification during the 1960s. First, it was the members of this college who wrote and promoted the Feighner article. In the mid-1970s Spitzer, Endicott, and Robins (1975) created the *Research Diagnostic Criteria* (RDC). The RDC proposed explicit diagnostic criteria for the schizophrenic and affective disorders and were incorporated in much of the research on these disorders being sponsored by NIMH during the late 1970s. In addition, the RDC was a precursor to the new *Diagnostic and Statistical Manual of Mental Disorders*, i.e., the *DSM-III* (American Psychiatric Association 1980). Ten of the 19 members of the psychiatric task force which created the *DSM–III* were members of the neo-Kraepelinian college. After a number of revisions, critical comments by researchers, and a set of field trials, the *DSM–III* became the official classification of American psychiatry in 1980.

The second important concept from the sociology of science which can be used to understand the dramatic number of citations to the Feighner article is the *Matthew effect*. The effect was first described by Merton (1968). This effect is named for a verse in the Gospel according to Matthew which says "For unto every one that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath" (Matthew 25:29). The Matthew effect refers to the fact that most persons who publish journal articles receive very few citations to their articles (they hath not). On the other hand, there are a smaller number of persons who also publish articles in scientific journals, and their articles frequently attract a large number of citations (they hath abundance). The latter researchers have established reputations, are likely to serve on editorial boards in their areas, are more likely to receive research grants, etc.

After its initial promotion by members of the neo-Kraepelinian movement, the number of citations to the Feighner article showed a rapid growth. A likely contributing reason for this rapid growth of citations is the Matthew effect. The Feighner article had four prolific co-authors (Guze, Robins, Winokur, and Woodruff) whose publications had already been demonstrated to "hath abundance." In addition, the relatively large number of early citations to this article (i.e., almost 100 citations before 1975) increased the probability that the article would

Table 2. Neo-Kraepelinian credo

1. Psychiatry is a branch of medicine.
2. Psychiatry should utilize modern scientific methodologies and base its practice on scientific knowledge.
3. Psychiatry treats people who are sick and who require treatment for mental illness.
4. There is a boundary between the normal and the sick.
5. There are discrete mental illnesses. Mental illnesses are not myths. There is not one but many mental illnesses. It is the task of scientific psychiatry, as of other medical specialties, to investigate the causes, diagnosis, and treatment of these mental illnesses.
6. The focus of psychiatric physicians should be particularly on the biological aspects of mental illness.
7. There should be an explicit and intentional concern with diagnosis and classification.
8. Diagnostic criteria should be codified, and a legitimate and valued area of research should be to validate such criteria by various techniques. Further, departments of psychiatry in medical schools should teach these criteria and not depreciate them, as has been the case for many years.
9. In research efforts directed at improving the reliability and validity of diagnosis and classification, statistical techniques should be utilized.

attract the attention of other researchers. In short, the initial promotion of the Feighner article by the St. Louis/Iowa invisible college was compounded by the Matthew effect into generating an enormous number of citations.

Discussion

Historians and sociologists who have studied the process of science have suggested that two types of forces can be used to account for changes within any science. The first force is the *cognitive* (internal, scientific) force which concerns the quality and amount of evidence supporting any innovation in a science before it is adopted. It is the cognitive aspect which researchers are trained to emphasize. Theories, hypotheses, methodologies, statistics—these are the cognitive aspects of science which supposedly determine if a piece of research is to be accepted. The second force involved in scientific change is the *noncognitive* (external, extrascientific) which pertains to religious beliefs, metaphysical conceptions, socioeconomic issues, and internal politics.

The entire focus here has been on the "noncognitive" aspects of the Feighner et al. article. No discussion has been directed at the scientific merit of the diagnostic criteria proposed by the St. Louis group. Journal articles by Helzer et al. (1977); Brockington, Kendell, and Leff (1978); Overall and Hollister (1979); and Fenton, Mosher, and Matthews (1981) address the issue of scientific merit of the Feighner criteria, especially when these criteria are used to define schizophrenia.

Although this article has focused on noncognitive forces, it was not meant to imply that scientific merit was unrelated to the wide impact of the Feighner et al. article. Historians of science generally agree that the alterations in a science rarely result from either cognitive or noncognitive factors alone (MacLeod 1977). The reason for examining noncognitive factors here is the fact that these factors, as they influence the classification of mental disorders, have been largely ignored.

Concerning the noncognitive aspects of change within a classification, the Feighner et al. article provides a dramatic example of an argument proposed by Deutsch (1966). He suggested that most changes in the language system of a science will be effected by a small group of scientists of related interest forming a collective body. As the group solidifies its ideas, it will create its own jargon of new classificatory concepts or new definitions of old concepts. It follows that as the power and prestige of this group increases within its scientific domain, its jargon will gain acceptance.

The process of change described by Deutsch appears to describe the growth of influence by the neo-Kraepelinians. The psychiatrists who favored the biological approach to psychiatry and who believed in the medical model formed an "invisible college." Many of these psychiatrists were at or had been associated with Washington University in St. Louis or the University of Iowa (or, later, with the New York State Psychiatric Institute). Because of their emphasis on science and research, this group became concerned with classification and proposed a set of diagnostic criteria which could be used in research. As the influence of the neo-Kraepelinians spread, their diagnostic criteria gathered a great deal of attention, were frequently cited, and finally became the basis for diagnostic definitions used in the new psychiatric classification, the *DSM-III*.

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Comments on Blashfield's Article

Since Roger Blashfield was candid enough to reveal that he had unsuccessfully submitted this manuscript to five other journals before it was accepted by *Schizophrenia Bulletin*, I want to note, at the beginning, that I had been asked to review the manuscript three times, including the last time by *Schizophrenia Bulletin*, and that I had recommended acceptance each time. I think I did so for several reasons. He had made an interesting observation (there are never too many of these); it was flattering and reassuring to see documented our own impression about the impact of our article and our work; and it might reinforce such impact by making it explicit and objective.

At the same time, I had a vague sense of uneasiness: Would Blashfield's article lead to some backlash from the field? Would it stimulate an organized effort against the importance of diagnosis in psychiatry on the part of many who have never accepted the premises underlying the medical model for psychiatric disorders? Would this backlash focus on the sociological aspects of the phenomenon (what Blashfield refers