

# CITATION MEASURES OF THE INFLUENCE OF ROBERT K. MERTON \*

Part 1.  
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## INTRODUCTION

I am deeply honored to contribute to a volume celebrating Robert K. Merton, whose enormous achievements in sociology, the sociology of science, and related areas are so highly and widely esteemed. My personal friendship with Bob Merton extends back about 15 years. On numerous occasions I've acknowledged his moral, intellectual, and personal support in developing the *Science Citation Index*<sup>®</sup> (*SCI*<sup>®</sup>), and especially, the *Social Sciences Citation Index*<sup>®</sup> (*SSCI*<sup>®</sup>), and the *Arts & Humanities Citation Index*<sup>®</sup> (*A&HCI*<sup>®</sup>). He serves on the editorial advisory boards of all three of these services. Recently, in one of my essays in *Current Contents*<sup>®</sup> (*CC*<sup>®</sup>), I had occasion to reflect upon his rather special place in science.

I have always had the kind of reaction to much of Merton's writing that I associate with a great novelist, not a great scientist. So much of what he says is so beautifully obvious—so transparently true—that one can't imagine why no one else has bothered to point it out. He is a special kind of scientist: forever reminding us of the forest, while describing it tree by tree.<sup>1</sup>

Over the years, it has been my intuitive feeling that Robert Merton's influence extends well beyond the traditional boundaries of sociology. Further, it has also been my belief that the strength of his influence is derived primarily from his theoretical contributions.

For the purpose of this paper I have decided to test these two subjective notions by conducting a citation analysis of Merton's work. The specific objectives of the study are (1) to define how far beyond the bounds of sociology Merton's influence extends and (2) to determine the extent to which this influence derives from his conceptual, or theoretical, work.

## MERTON'S INFLUENCE BEYOND SOCIOLOGY

The data for the study were compiled from the *Science Citation Index* and *Social Sciences Citation Index* for the period 1970–1977. The time period chosen was not entirely arbitrary. At the time we began the study, *SSCI* data was available only for this period. If I began the study a few months later, I could have included data from 1966 because we have now processed social science material that far back. In any case, we limited our use of *SCI* data, which does go back to 1961, so we would have a common time frame for both data bases.

The *SCI* and *SSCI* were searched to compile a bibliography of all papers published in the natural (*SCI*) and social (*SSCI*) sciences that cited work on which Merton was identified as first author. (A first-author search was considered adequate because Merton is the first or sole author on almost all of his publications. Self citations were excluded from the analysis.) From the bibliography, we compiled the number of citing articles from each subject field or discipline. Thus, the data compiled reflects not the number of individual citations to Merton, but the number of articles citing Merton by authors other than himself. Fields were defined by the subject-classification assigned to journals in *SCP*<sup>2</sup> or *SSCI*.<sup>3</sup> For this study the "discipline" of the citing article was considered the same as that for the journal in which it was published.

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TABLE I  
SUMMARY OF DISTRIBUTION OF ARTICLES CITING MERTON FROM 1970-1977

Science Area of Citing Journals	Number of Articles Citing Merton	Percent of Total
Natural Sciences	203	8
Sociology	925	36
Social Sciences (Excluding Sociology)	1413	56
Total	2541	100.0

TABLE I summarizes the basic findings of the survey of articles citing Merton in the years 1970-1977. The total number of 2541 citing articles, in itself, is an indication of Merton's impact. Their distribution over the three general categories of the natural sciences, sociology, and the social sciences excluding sociology is equally revealing. The two categories outside of sociology, the natural sciences and the social sciences other than sociology, account for 1616 citing articles—64% of the total.

The figures in the table acquire even stronger significance when compared with the average annual citation frequencies of other authors cited in the natural and social sciences. In the natural sciences, the average annual figure over the eight years studied was 7.05;<sup>4</sup> in the social sciences, it was 3.48.<sup>5</sup> If one simply multiplied these figures by 8 to cover the number of years studied, you would obtain a summed average of 56.4 in the natural sciences and 27.84 in the social sciences. These figures imply, of course, that the average author is cited every year, which certainly is not the case. In that sense, they are a very conservative benchmark for measuring Merton's relative impact.

Nevertheless, even when the 925 citations from sociology are excluded, the remaining 1413 social science citations (TABLE I) are over 50 times greater than average and over 80 times greater if sociology is included. And even in the natural sciences, the 203 citations of his work is almost four times the average of 56.4 for a natural scientist.

#### ANALYSIS BY SOCIAL SCIENCE DISCIPLINE

TABLE 2 shows in more detail the pattern of Merton's influence in the social sciences. In that table, the citations he received between 1970-1977 are distributed by the disciplines of the citing journals.

Predictably, the largest category, with 40% of the total, is Sociology, which includes the sub-specialty of demography. (Demography articles account for less than 5% of the category.) The other categories exhibit a relatively even distribution of citations, ranging from a high of 8% for Education and Political Science to a low of 1% for Theology.

The Miscellaneous Journals category (7%) is a catchall for journals covering fields too small to be included as separate entries. This category includes communications, social research, linguistics, urban studies, ethnic studies, and industrial relations. The broad diversity of this category is a further indication of the wide range of Merton's impact.

Next in importance are three categories, which each account for a 5% share of the citations: Business and Economics, History and History of Science, and Psychology. The Business and Economics category comprises business administration, economics, and economic history journals. Merton is cited here primarily for his work on bureaucracy and personality structure, along with his work on technological emergence as it relates to the industrial revolution.

Merton's Ph.D. dissertation on "Science, Technology, and Society in 17th Century England" is especially interesting. It has been a strongly influential work in the study of the history of science. Of course, Merton's prolific work in the sociology of science has also had impact on historians of science.

Merton's impact on psychology derives largely from his interest in the effects of certain social structures (e.g., bureaucracies) on individual psychosocial tendencies.

Next in rank, the Interdisciplinary Social Science journals (4%) consist of those publications not readily classifiable as belonging to a single traditional social science discipline. Included are *Policy Science*, *Development and Change*, *Journal of Development Studies*, and *General Systems*. This group of citations attests further to the multidisciplinary impact of Merton's work.

The showing of the remaining categories, each of which accounts for less than 5% of the citations in the social sciences, is more a reflection of small numbers than of little impact. Certain fields like anthropology produce less literature than sociology or psychology. In relation to the size of the anthropology literature, 3% is not inconsequential. In fact, the 78 articles from anthropology suggest that Merton's work on functional analysis has had considerable impact.

In other cases, such as social psychology, the small numbers are due to the classification system we adopted. The citing articles were categorized by the specialty of the publishing journal. There are relatively few journals dedicated to social psychology. Much of the literature of this field is published in sociology and psychology journals.

In the cases of philosophy, the philosophy of science, and theology, the small numbers can be attributed to the ambiguous position of these disciplines within the social sciences. Philosophy, in all its variations, has come to be more of a discipline of the humanities than of the social sciences. The coverage of *SSCI* reflects this perspective; its coverage of 48 philosophy journals amounts to only 65% of the coverage provided by the *Arts & Humanities Citation Index (A&HCI)*.<sup>6</sup> The case is even more clear-cut in theology, where the *SSCI* covers 8 journals compared to the 57

TABLE 2  
DISTRIBUTION, BY DISCIPLINE, OF SOCIAL SCIENCE ARTICLES CITING  
MERTON FROM 1970-1977

Discipline of Citing Journals	Number of Articles Citing Merton	Percent of Total
Anthropology	78	3
Business and Economics	127	5
Education	177	8
History and History of Science	124	5
Interdisciplinary Social Science Journals	100	4
Law	55	2
Philosophy and Philosophy of Science	45	2
Political Science	190	8
Psychology	127	5
Sociology and Demography	925	40
Social Issues	69	3
Social Psychology	44	2
Social Work	65	3
Theology	26	1
Miscellaneous Journals	167	7
Multidisciplinary Journals	19	1
Total	2338	99

covered by *A&HCI*. (*A&HCI* was not used in the study because it only covered two years at the time.)

Some of the statistics in these categories, however, are surprising even within the framework of the small numbers involved. Considering that Merton's work on deviant behavior, particularly his contribution to anomie theory, is widely taught and used in social work, one would have expected the literature of that field to cite him more heavily. The fact that it doesn't might reflect another of his concepts: obliteration by incorporation into the common knowledge.<sup>7</sup>

Conversely, the number of citing articles from law seems extraordinarily high for a sociologist, as does the number from theology. Since it is primarily his early work that is relevant to these fields, these findings suggest not only deep impact but also unusual longevity.

The multidisciplinary-journal category consists of only those few journals that cover all the sciences, social and natural alike, such as *Science* and *Nature*. Since they are not primarily social science journals, we included only those citing articles that were clearly on social science subjects. Articles from multidisciplinary journals categorized as natural science are covered in the next section.

#### ANALYSIS BY NATURAL SCIENCES DISCIPLINE

Turning now to the findings in the natural sciences, we see from TABLE 3 that Merton's impact certainly ranges well beyond the social sciences. (It should be noted that the term, natural sciences, is being used to denote all disciplines beyond the social sciences.)

As TABLE 3 shows, the largest number of articles citing Merton occurs in the field of medicine. Many of these articles concern his work in *The Student-Physician*<sup>8</sup> and, to a somewhat lesser extent, his *Social Theory and Social Structure*.<sup>9</sup> In general, the medical-journal articles citing Merton discuss aspects of social medicine or the education of doctors and other medical personnel.

Psychiatry, with 30% of the citations, ranks as the second largest category. Psychiatry, of course, has a strong social science orientation. But since it is also a medical specialty we treated it as part of the natural sciences. In contrast to the medical category, *Social Theory and Social Structure* is cited much more frequently by psychiatrists than *Student-Physician*.

Information science (19%) is the third largest category. Merton's relevant contribution to this field comes from his examination of the growth and structure of science, and from his work in information exchange among scientists.

The relatively small number of citing articles in the physical and biological sciences is, of course, quite understandable, since these areas are the most remote from

TABLE 3  
DISTRIBUTION, BY DISCIPLINE, OF NATURAL SCIENCE ARTICLES CITING  
MERTON FROM 1970-1977

Discipline of Citing Journals	Number of Articles Citing Merton	Percent of Total
Biology and Biochemistry	10	5
Information Science	38	19
Medicine	75	37
Multidisciplinary Journals	6	3
Physical Science	12	6
Psychiatry	62	30
Total	203	100

Merton's own field. Some of the articles in biology and the physical sciences concern the design of courses in their respective fields for use in liberal arts curricula. Other articles discuss historical analyses of major cognitive events, theories, and methodologies within the fields of the authors. Merton is cited principally for his work on the social context of such developments.

As noted previously, Merton's citation record is almost 400% greater than that of the average cited author in the natural sciences. This prompted me to extend the analysis back to 1961 to see whether the pattern holds. TABLE 4 presents the results of that more extensive analysis. Adding nine years to the study almost doubled the number of articles citing his work. But the distribution of citing articles over the natural science disciplines remains essentially the same. The largest difference in citation levels is a 6% increase in the information science category for the most recent years. This reflects the increasing contact between information scientists and people working in the sociology of science.

TABLE 4  
DISTRIBUTION, BY DISCIPLINE, OF NATURAL SCIENCE ARTICLES CITING  
MERTON FROM 1961-1977

Discipline of Citing Journals	Number of Articles Citing Merton	Percent of Total
Biology and Biochemistry	15	4
Information Science	49	13
Medicine	147	40
Multidisciplinary Journals	10	3
Physical Science	21	6
Psychiatry	123	34
Total	365	100

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